



US Army Corps
of Engineers
Savannah District

Georgia

**Solicitation Number
W912HN-09-R-0018
MATOC for Design/Build and/or Construction
Volume 2 of 3 - Albritton Junior High School Addition
Fort Bragg, North Carolina
FY-10, LI AM822505
Technical Provisions - Division 01 – 12
January 2010**

THIS SOLCITATION IS BEING OFFERED AS A SMALL BUSINESS SET ASIDE.

**U.S. ARMY ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640**

PROJECT TABLE OF CONTENTS**DIVISION 01 - GENERAL REQUIREMENTS**

01 11 00	SUMMARY OF WORK
01 22 00.00 10	*2 MEASUREMENT AND PAYMENT
01 32 01.00 10	PROJECT SCHEDULE
01 33 00	SUBMITTAL PROCEDURES
01 33 29	LEED(TM) DOCUMENTATION
01 35 26	GOVERNMENTAL SAFETY REQUIREMENTS
01 42 00	SOURCES FOR REFERENCE PUBLICATIONS
01 45 01.10	USACE QUALITY CONTROL SYSTEM (QCS)
01 45 01	USACE QUALITY CONTROL
01 45 35	SPECIAL INSPECTION FOR SEISMIC-RESISTING SYSTEMS
01 50 00	TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
01 50 61	DUST CONTROL
01 57 19.11	INDOOR AIR QUALITY (IAQ) MANAGEMENT
01 57 20.00 10	ENVIRONMENTAL PROTECTION
01 57 23	TEMPORARY STORM WATER POLLUTION CONTROL
01 62 35	RECYCLED / RECOVERED MATERIALS
01 73 29	CUTTING AND PATCHING
01 74 19	CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
01 78 00	CLOSEOUT SUBMITTALS
01 78 23	OPERATION AND MAINTENANCE DATA

DIVISION 02 - EXISTING CONDITIONS

02 41 00	DEMOLITION AND DECONSTRUCTION
02 82 14.00 10	*2 DELETED
02 82 16.00 20	*2 ENGINEERING CONTROL OF ASBESTOS CONTAINING MATERIALS

DIVISION 03 - CONCRETE

03 30 53	MISCELLANEOUS CAST-IN-PLACE CONCRETE
----------	--------------------------------------

DIVISION 04 - MASONRY

04 20 00	MASONRY
04 72 00	ARCHITECTURAL CAST STONE

DIVISION 05 - METALS

05 30 00	STEEL DECKS
05 40 00	COLD-FORMED METAL FRAMING
05 50 13	MISCELLANEOUS METAL FABRICATIONS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 10 00	ROUGH CARPENTRY
06 16 13	INSULATING SHEATHING

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 11 13	BITUMINOUS DAMPPROOFING
07 21 16	MINERAL FIBER BLANKET INSULATION
07 31 13	ASPHALT SHINGLES
07 60 00	FLASHING AND SHEET METAL
07 84 00	FIRESTOPPING
07 92 00	JOINT SEALANTS

DIVISION 08 - OPENINGS

08 11 13	STEEL DOORS AND FRAMES
08 14 00	WOOD DOORS
08 51 14.00 10	ALUMINUM WINDOWS
08 71 00	BUILDERS' HARDWARE (FORT BRAGG PROJECTS)
08 81 00	GLAZING
08 91 00	METAL WALL LOUVERS

DIVISION 09 - FINISHES

09 22 00	SUPPORTS FOR GYPSUM BOARD
09 24 23	STUCCO
09 29 00	GYPSUM BOARD
09 30 00	CERAMIC TILE
09 51 00	ACOUSTICAL CEILINGS
09 65 00	RESILIENT FLOORING
09 66 23	RESINOUS TERRAZZO FLOORING
09 90 00	PAINTS AND COATINGS

DIVISION 10 - SPECIALTIES

10 10 00	VISUAL COMMUNICATIONS SPECIALTIES
10 14 02	INTERIOR SIGNAGE
10 21 13	TOILET COMPARTMENTS
10 28 13	TOILET ACCESSORIES
10 44 16	PORTABLE FIRE EXTINGUISHERS
10 51 13	METAL LOCKERS
10 56 13	STEEL SHELVING

DIVISION 12 - FURNISHINGS

12 21 00	WINDOW BLINDS
12 35 53	CLASSROOM AND LABORATORY CASEWORK
12 48 16	ENTRANCE FLOOR GRILLES
12 93 00	SITE FURNISHINGS

DIVISION 13 - SPECIAL CONSTRUCTION

13 48 00.00 10	SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT
13 48 00	SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT

DIVISION 22 - PLUMBING

22 00 00	PLUMBING, GENERAL PURPOSE
----------	---------------------------

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING

23 00 00	AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEMS
23 03 00.00 20	BASIC MECHANICAL MATERIALS AND METHODS
23 05 93	TESTING, ADJUSTING, AND BALANCING FOR HVAC
23 07 00	THERMAL INSULATION FOR MECHANICAL SYSTEMS
23 08 00.00 10	COMMISSIONING OF HVAC SYSTEMS
23 09 23.13 20	BACnet DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC
23 52 00	HEATING BOILERS
23 64 10	WATER CHILLERS, VAPOR COMPRESSION TYPE
23 64 26	CHILLED, CHILLED-HOT, AND CONDENSER WATER PIPING SYSTEMS

DIVISION 26 - ELECTRICAL

26	00	00.00	20	BASIC ELECTRICAL MATERIALS AND METHODS
26	05	48.00	10	SEISMIC PROTECTION FOR ELECTRICAL EQUIPMENT
26	20	00		INTERIOR DISTRIBUTION SYSTEM
26	51	00.00	40	INTERIOR LIGHTING
26	52	00.00	40	EMERGENCY LIGHTING
26	53	00.00	40	EXIT SIGNS

DIVISION 27 - COMMUNICATIONS

27	05	14.00	10	CABLE TELEVISION PREMISES DISTRIBUTION SYSTEM
27	10	00		BUILDING TELECOMMUNICATIONS CABLING SYSTEM

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

28	31	64.00	10	FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE
----	----	-------	----	--

DIVISION 31 - EARTHWORK

31	00	00		EARTHWORK
31	11	00		CLEARING AND GRUBBING
31	31	16		SOIL TREATMENT FOR SUBTERRANEAN TERMITE CONTROL
31	32	11		SOIL SURFACE EROSION CONTROL

DIVISION 32 - EXTERIOR IMPROVEMENTS

32	05	33		LANDSCAPE ESTABLISHMENT
32	16	13		CONCRETE SIDEWALKS AND CURBS AND GUTTERS
32	92	19		SEEDING
32	92	23		SODDING
32	93	00		EXTERIOR PLANTS

DIVISION 33 - UTILITIES

33	11	23		NATURAL GAS AND LIQUID PETROLEUM PIPING
33	40	00		STORM DRAINAGE UTILITIES
33	61	00		PREFABRICATED UNDERGROUND HEATING/COOLING DISTRIBUTION SYSTEM

-- End of Project Table of Contents --

SECTION 01 11 00

SUMMARY OF WORK

01/08

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1.1.1 Project Description

The work includes approximately an addition to an existing junior high school including classrooms, science labs, antiterrorism measures, related sitework, and other work as indicated.

1.1.2 Location

The location of the work is at Fort Bragg, NC, as indicated on the drawings.

1.1.3 Sequencing of Construction - OMITTED

1.2 OCCUPANCY OF PREMISES

Building(s) will be occupied during performance of work under this Contract. Occupancy notifications will be posted in a prominent location in the work area.

Before work is started, the Contractor shall arrange with the Contracting Officer a sequence of procedure, means of access, space for storage of materials and equipment, and use of approaches, corridors, and stairways.

1.3 EXISTING WORK

In addition to "FAR 52.236-9, Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements":

- a. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.
- b. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Contracting Officer. At the completion of operations, existing work shall be in a condition equal to or better than that which existed before new work started.

1.3 LOCATION OF UNDERGROUND FACILITIES

Obtain digging permits prior to start of excavation. Verify elevations before installing new work, using nearest benchmarks at which an established grade can be determined.

1.4 GOVERNMENT-FURNISHED MATERIAL AND EQUIPMENT - NONE

1.5 GOVERNMENT-INSTALLED WORK - NONE

1.6 SALVAGE MATERIAL AND EQUIPMENT - NONE

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 22 00.00 10

*2 MEASUREMENT AND PAYMENT

04/06

PART 1 GENERAL

1.1 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.2 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

1.2.1 Undercut Excavation and Backfill of Highly Plastic "CH" Soils

1.2.1.1 Payment

Payment for the undercut excavation and backfilling required beneath pavement areas will be made under Item 0005 of the Schedule. The unit price bid in the schedule shall include the costs of all labor, equipment, and materials required to perform the work as specified in these specifications and on the drawings.

1.2.1.2 Measurement

The unit of measurement will be computed by the average end-area method from cross sections taken before and after the excavation. All surveying operations shall be coordinated with the Contracting Officer and performed under the inspection of a representative of the Contracting Officer. Measurement shall not include volume of any ramps excavated for ingress and egress, or any volume excavated without authorization. Survey cross sections shall be taken as deemed necessary to accurately measure the excavation.

1.2.1.3 Unit of Measure

Unit of measure: cubic yard.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 01 32 01.00 10

PROJECT SCHEDULE
08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

ECB 2005-10 (2005) Scheduling Requirements for Testing
of Mechanical Systems in Construction

ER 1-1-11 (1995) Progress, Schedules, and Network
Analysis Systems

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Schedule; G, RO

1.3 QUALITY ASSURANCE

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating (activity status) and preparation of reports. The authorized representative shall have previously developed, created, and maintained at least 2 electronic schedules for projects similar in nature to this project and shall be experienced in the use of the scheduling software that meets the requirements of this specification.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS. Show in the schedule the sequence in which the Contractor proposes to perform the work and dates on which the Contractor contemplates starting and completing all schedule activities. The scheduling of the entire project, including the design and construction sequences, is required. The scheduling of construction is the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall also contribute

in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool.

3.1.1 Approved Project Schedule

Use the approved Project Schedule to measure the progress of the work and to aid in evaluating time extensions. Make the schedule cost loaded and activity coded. The schedule will provide the basis for all progress payments. If the Contractor fails to submit any schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

3.1.2 Schedule Status Reports

Provide a Schedule Status Report on at least a monthly basis. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

3.1.3 Default Terms

Failure of the Contractor to comply with the requirements of the Contracting Officer shall be grounds for a determination, by the Contracting Officer, that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of the contract.

3.2 BASIS FOR PAYMENT AND COST LOADING

Use the schedule as the basis for determining contract earnings during each update period and therefore the amount of each progress payment. Lack of an approved schedule update, or qualified scheduling personnel, will result in the inability of the Contracting Officer to evaluate contract earned value for the purposes of payment. Failure of the Contractor to provide all required information will result in the disapproval of the preliminary, initial and subsequent schedule updates. In the event schedule revisions are directed by the Contracting Officer and those revisions have not been included in subsequent revisions or updates, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until such revisions to the Project Schedule have been made. Activity cost loading shall be reasonable, as determined by the Contracting Officer. The aggregate value of all activities coded to a contract CLIN shall equal the value of the CLIN on the Schedule.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

The computer software system utilized to produce and update the Project Schedule shall be capable of meeting all requirements of this specification. Failure of the Contractor to meet the requirements of this specification will result in the disapproval of the schedule.

3.3.1 Critical Path Method

Use the Critical Path Method (CPM) of network calculation to generate the Project Schedule. Prepare the Project Schedule using the Precedence Diagram Method (PDM).

3.3.2 Level of Detail Required

Develop the Project Schedule to an appropriate level of detail. Failure to develop the Project Schedule to an appropriate level of detail, as determined by the Contracting Officer, will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2.1 Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities shall have Original Durations (OD) greater than 20 work days or 30 calendar days. Procurement activities are defined herein.

3.3.2.2 Procurement Activities

The schedule must include activities associated with the submittal, approval, procurement, fabrication and delivery of long lead materials, equipment, fabricated assemblies and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days. A typical procurement sequence includes the string of activities: submit, approve, procure, fabricate, and deliver.

3.3.2.3 Mandatory Tasks

The following tasks must be included and properly scheduled:

- a. Submission, review and acceptance of design packages.
- b. Submission of mechanical/electrical/information systems layout drawings.
- c. Submission and approval of O & M manuals.
- d. Submission and approval of as-built drawings.
- e. Submission and approval of 1354 data and installed equipment lists.
- f. Submission and approval of testing and air balance (TAB).
- g. Submission of TAB specialist design review report.
- h. Submission and approval of fire protection specialist.
- i. Submission and approval of testing and balancing of HVAC plus commissioning plans and data. Develop the schedule logic associated with testing and commissioning of mechanical systems to a level of detail consistent with [ECB 2005-10](#).
- j. Air and water balancing.

- h. Controls testing plan submission.
- i. Controls testing.
- j. Performance Verification testing.
- k. Other systems testing, if required.
- l. Contractor's pre-final inspection.
- m. Correction of punchlist from Contractor's pre-final inspection.
- n. Government's pre-final inspection.
- o. Correction of punch list from Government's pre-final inspection.
- p. Final inspection.

3.3.2.4 Government Activities

Show Government and other agency activities that could impact progress. These activities include, but are not limited to: [approvals](#), inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.2.5 Activity Responsibility Coding (RESP)

Assign responsibility Code for all activities to the Prime Contractor, Subcontractor or Government agency responsible for performing the activity. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements. Code all activities not coded with a Government Responsibility Code to the Prime Contractor or Subcontractor responsible to perform the work. Activities shall not have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE). Unacceptable code values are abbreviations of the names of subcontractors.

3.3.2.6 Activity Work Area Coding

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew, from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities shall not have more than one Work Area Code. Not all activities are required to be Work Area coded. A lack of Work Area coding will indicate the activity is not resource or space constrained.

3.3.2.7 Contract Changes/Requests for Equitable Adjustment (REA) Coding (MODF)

Assign Activity code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by the

Contracting Officer, with a Contract Changes/REA Code. Key all Code values to the Government's modification numbering system. Any activity or sequence of activities added to the schedule as a result of alleged constructive changes made by the Government may be added to a copy of the current schedule, subject to the approval of the Contracting Officer. Assign Activity codes for these activities with a Contract Changes/REA Code. Key the code values to the Contractor's numbering system. Approval to add these activities does not necessarily mean the Government accepts responsibility and, therefore, liability for such activities and any associated impacts to the schedule, but rather the Government recognizes such activities are appropriately added to the schedule for the purposes of maintaining a realistic and meaningful schedule. Such activities shall not be Responsibility Coded to the Government unless approved. An activity shall not have more than one Contract Changes/REA Code.

3.3.2.8 Contract Line Item (CLIN) Coding (BIDI)

Code all activities to the CLIN on the Contract Line Item Schedule to which the activity belongs. An activity shall not contain more than one CLIN Item Code. CLIN Item code all activities, even when an activity is not cost loaded.

3.3.2.9 Phase of Work Coding (PHAS) - OMITTED

3.3.2.10 Category of Work Coding (CATW)

Assign Category of Work Code to all Activities based upon the category of work to which the activity belongs. Category of Work Code must include, but is not limited to: construction submittal approvals, Acceptance, Procurement, Fabrication, Delivery, Weather Sensitive Installation, Non-Weather Sensitive Installation, Start-Up, Test and Turnover. Assign a Category of Work Code to each activity. Each activity shall have only one Category of Work Code.

3.3.2.11 Definable Features of Work Coding (FOW1, FOW2, FOW3)

Assign a Definable Feature of Work Code to appropriate activities based on the definable feature of work to which the activity belongs. Definable Feature of Work is defined in Specification Section 01 45 01 USACE QUALITY CONTROL. An activity shall not have more than one Definable Feature of Work Code. Not all activities are required to be Definable Feature of Work Coded.

3.3.3 Scheduled Project Completion and Activity Calendars

The schedule interval shall extend from NTP date to the required contract completion date. The contract completion activity (End Project) shall finish based on the required contract duration in the accepted contract proposal, as adjusted for any approved contract time extensions. The first scheduled work period shall be the day after NTP is received by the Contractor. Schedule activities on a calendar to which the activity logically belongs. Activities may be assigned to a 7 day calendar when the contract assigns calendar day durations for the activity such as a Government Acceptance activity. If the Contractor intends to perform physical work less than seven days per week, schedule the associated activities on a calendar with non-work periods identified including weekends and holidays. Assign the Category of Work Code - Weather Sensitive Installation to those activities that are weather sensitive. Original durations must account for anticipated normal adverse weather.

The Government will interpret all work periods not identified as non-work periods on each calendar as meaning the Contractor intends to perform work during those periods.

3.3.3.1 Project Start Date

The schedule shall start no earlier than the date on which the NTP was acknowledged. Include as the first activity in the project schedule an activity called "Start Project" (or NTP). The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

3.3.3.2 Schedule Constraints and Open Ended Logic

Constrain completion of the last activity in the schedule by the contract completion date. Schedule calculations shall result in a negative float when the calculated early finish date of the last activity is later than the contract completion date. Include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the contract completion date for the project, and with a zero day duration or by using the "project must finish by" date in the scheduling software. The schedule shall have no constrained dates other than those specified in the contract. The use of artificial float constraints such as "zero free float" or "zero total float" are typically prohibited. There shall only be 2 open ended activities: Start Project (or NTP) with no predecessor logic and End Project with no successor logic.

3.3.3.3 Early Project Completion

In the event the Preliminary or Initial project schedule calculates an early completion date of the last activity prior to the contract completion date, the Contractor shall identify those activities that it intends to accelerate and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. The last activity shall have a late finish constraint equal to the contract completion date and the schedule will calculate positive float. The Government will not approve an early completion schedule with zero float on the longest path. The Government is under no obligation to accelerate activities for which it is responsible to support a proposed early contract completion.

3.3.4 Interim Completion Dates

Constrain contractually specified interim completion dates to show negative float when the calculated early finish date of the last activity in that phase is later than the specified interim completion date.

3.3.4.1 Start Phase - OMITTED

3.3.4.2 End Phase - OMITTED

3.3.4.3 Phase "X" Hammock - OMITTED

3.3.5 Default Progress Data Disallowed

Do not automatically update Actual Start and Finish dates with default mechanisms that may be included in the scheduling software. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process shall match those dates provided from Contractor Quality Control

Reports. Failure of the Contractor to document the AS and AF dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's updated schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Disable program features which calculate one of these parameters from the other.

3.3.6 Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Correct out of sequence progress that continues for more than two update cycles by logic revision, as approved by the Contracting Officer.

3.3.7 Negative Lags and Start to Finish Relationships

Lag durations contained in the project schedule shall not have a negative value. Do not use Start to Finish (SF) relationships.

3.3.8 Calculation Mode

Schedule calculations shall retain the logic between predecessors and successors even when the successor activity starts and the predecessor activity has not finished. Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") will not be allowed.

3.3.9 Milestones

The schedule must include milestone activities for each significant project event including but not limited to: milestone activities for each fast track design package released for construction; design complete; foundation/substructure construction complete; superstructure construction complete; building dry-in or enclosure complete to allow the initiation of finish activities; permanent power complete; and building systems commissioning complete.

3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1 Preliminary Project Schedule Submission

Submit the Preliminary Project Schedule, defining the Contractor's planned operations for the first 90 calendar days for approval within 15 calendar days after the NTP is acknowledged. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. Detail it for the first 90 calendar days. It may be summary in nature for the

remaining performance period. It must be early start and late finish constrained and logically tied as previously specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required Plan and Program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, the planned submissions of all early design packages, permitting activities, design review conference activities and other non-construction activities intended to occur within the first 90 calendar days. Schedule any construction activities planned for the first 90 calendar days after NTP. Constrain planned construction activities by Government acceptance of the associated design package(s) and all other specified Program and Plan approvals. Activity code any activities that are summary in nature after the first 90 calendar days with Responsibility Code (RESP) and Feature of Work code (FOW1, FOW2, FOW3).

3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after NTP. The schedule shall demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. The Initial Schedule shall be at a reasonable level of detail as determined by the Contracting Officer.

3.4.3 Design Package Schedule Submission

With each design package submitted to the Government, submit a frag-net schedule extracted from the then current Preliminary, Initial or Updated schedule which covers the activities associated with that Design Package including construction, procurement and permitting activities.

3.4.4 Periodic Schedule Updates

Based on the result of the meeting, specified in PERIODIC SCHEDULE UPDATE MEETINGS, submit periodic schedule updates. These submissions will enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgement of the Contracting Officer or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

3.4.5 Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in [ER 1-1-11](#), Appendix A. This exact structure is mandatory, even if some fields are not used. A template SDEF compatible schedule backup file (sdef.prx) is available on the QCS website: www.rmssupport.com. The SDEF format is as follows:

Field	Activity Code	Length	Description
1	WRKP	3	Workers per Day
2	RESP	4	Responsible Party (e.g. GC, subcontractor, USACE)
3	AREA	4	Area of Work
4	MODF	6	Modification or REA number
5	BIDI	6	Bid Item (CLIN)
6	PHAS	2	Phase of Work

Field	Activity		
	Code	Length	Description
7	CATW	1	Category of Work
8	FOW1	10	Feature of Work (used up to 10 characters in length)
9	FOW2	10	Feature of Work (used up to 20 characters in length)
10	FOW3	10	Feature of Work (used up to 30 characters in length)

3.5 SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

3.5.1 Data CD's

Provide two sets of data CD's containing the project schedule in the backup format. Each CD shall also contain all previous update backup files. File medium shall be CD. Label each CD indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file name. Each schedule shall have a unique file name as determined by the Contractor.

3.5.2 Narrative Report

Provide a Narrative Report with the Preliminary, Initial, and each Periodic Update of the project schedule, as the basis of the progress payment request. The Narrative Report shall include: a description of activities along the 2 most critical paths where the total float is less than or equal to 20 work days, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to communicate to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis. Identify and explain why any activities that, based their calculated late dates, should have either started or finished during the update period but did not.

3.5.3 Approved Changes Verification

Include only those project schedule changes in the schedule submission that have been previously approved by the Contracting Officer. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

3.5.4 Schedule Reports

The format, filtering, organizing and sorting for each schedule report shall be as directed by the Contracting Officer. Typically reports shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. The following lists typical reports that will be requested. One or all of these reports may be requested for each schedule submission.

3.5.4.1 Activity Report

A list of all activities sorted according to activity number.

3.5.4.2 Logic Report

A list of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.5.4.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.4.4 Earnings Report by CLIN

A compilation of the Contractor's Total Earnings on the project from the NTP to the data date. This report shall reflect the earnings of specific activities based on the agreements made in the schedule update meeting defined herein. Provided that the Contractor has furnished a complete schedule update, this report shall serve as the basis of determining progress payments. Group activities by CLIN item number and sort by activity number. This report shall: sum all activities coded to a particular CLIN and provide a CLIN item percent earned value; and complete and sum CLIN items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

3.5.5 Network Diagram

The network diagram is required for the Preliminary, Initial and Periodic Updates. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.5.2 Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3 Critical Path

Clearly show the critical path.

3.5.5.4 Banding

Organize activities as directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

3.6 PERIODIC SCHEDULE UPDATE MEETINGS

Conduct periodic schedule update meetings for the purposes of reviewing the Contractor's proposed out of sequence corrections, determining causes for delay, correcting logic, maintaining schedule accuracy and determining earned value. Meetings shall occur at least monthly within five days of the proposed schedule data date and after the Contractor has updated the schedule with Government concurrence respecting actual start dates, actual finish dates, remaining durations and percent complete for each activity it intend to status. Provide a computer with the scheduling software loaded and a projector during the meeting which allows all meeting participants to view the proposed schedule update during the meeting. The meeting and resultant approvable schedule update shall be a condition precedent to a formal submission of the update as described in SUBMISSION REQUIREMENTS and to the submission of an invoice for payment. The meeting will be a working interactive exchange which will allow the Government and the Contractor the opportunity to review the updated schedule on a real time and interactive basis. The Contractor's authorized scheduling representative will organize, sort, filter and schedule the update as requested by the Government. The meeting will last no longer than 8 hours. A rough draft of the proposed activity logic corrections and narrative report shall be provided to the Government 48 hours in advance of the meeting. The Contractor's Project Manager and Authorized Scheduler shall attend the meeting with the Authorized Representative of the Contracting Officer.

3.6.1 Update Submission Following Progress Meeting

Submit a complete update of the project schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 working days after the periodic schedule update meeting, reflecting only those changes made during the previous update meeting.

3.6.2 Status of Activities

Update information, including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete shall be subject to the approval of the Government prior to the meeting. As a minimum, address the following items on an activity by activity basis during each progress meeting.

3.6.2.1 Start and Finish Dates

Accurately show the status of the AS and/or AF dates for each activity currently in-progress or completed since the last update. The Government may allow an AF date to be assigned with the percent complete less than 100% to account for the value of work remaining but not restraining successor activities. Only assign AS dates when actual progress occurs on an activity.

3.6.2.2 Remaining Duration

Update the estimated RD for all incomplete activities independent of Percent Complete. Remaining Durations may exceed the activity OD or may

exceed the activity's prior update RD if the Government considers the current OD or RD to be understated based on current progress, insufficient work crews actually manning the job, unrealistic OD or deficiencies that must be corrected that restrain successor activities.

3.6.2.3 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete. To allow for proper schedule management, cost load the correction of punch list from Government pre-final inspection activity(ies) not less than 1 percent of the total contract value, which activity(ies) may be declared 100 percent complete upon completion and correction of all punch list work identified during Government pre-final inspection(s).

3.6.2.4 Logic Changes

Specifically identify and discuss all logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, Contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, and other changes that have been made pursuant to contract provisions. The Government will only approve logic revisions for the purpose of keeping the schedule valid in terms of its usefulness in calculating a realistic completion date, correcting erroneous logic ties, and accurately sequencing the work.

3.6.2.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary. 3) Changes required to correct a schedule that does not represent the actual or planned prosecution and progress of the work.

3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor believes it is entitled to an extension of the contract performance period, completion date, or any interim milestone date, furnish the following for a determination by the Contracting Officer: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of excusable delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is a condition precedent to any approvals by the Government. In response to each Request For Proposal issued by the Government, the Contractor shall submit a schedule impact analysis demonstrating whether or not the change contemplated by the Government impacts the critical path.

3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the

Contractor's own actions, which result in a calculated schedule delay, will not be a cause for an extension to the performance period, completion date, or any interim milestone date.

3.7.2 Submission Requirements

Submit a justification for each request for a change in the contract completion date of less than 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

- a. A list of affected activities, with their associated project schedule activity number.
- b. A brief explanation of the causes of the change.
- c. An analysis of the overall impact of the changes proposed.
- d. A sub-network of the affected area.

Identify activities impacted in each justification for change by a unique activity code contained in the required data file.

3.7.3 Additional Submission Requirements

The Contracting Officer may request an interim update with revised activities for any requested time extension of over 2 weeks. Provide this disk within 4 days of the Contracting Officer's request.

3.8 DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The Contracting Officer will approve proposed revisions to the schedule prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.9 WEEKLY PROGRESS MEETINGS

- a. The Government and the Contractor shall meet weekly (or as otherwise mutually agreed to) between the meetings described in paragraph PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. The then current and approved schedule update shall be used for

the purposes of this meeting and for the production and review of reports. The Contractor's Project Manager and the Authorized Representative of the Contracting Officer shall attend. The weekly progress meeting will address the status of RFI's, RFP's and Submittals.

b. Provide a bar chart produced by the scheduling software, organized by Total Float and Sorted by Early Start Date, and a two week "look-ahead" schedule by filtering all schedule activities to show only current ongoing activities and activities schedule to start during the upcoming two weeks, organized by Work Area Code (AREA) and sorted by Early Start Date.

c. The Government and the Contractor shall jointly review the reports. If it appears that activities on the longest path(s) which are currently driving the calculated completion date (driving activities), are not progressing satisfactorily and therefore could jeopardize timely project completion, corrective action must be taken immediately. Corrective action includes but is not limited to: increasing the number of work crews; increasing the number of work shifts; increasing the number of hours worked per shift; and determining if Government responsibility coded activities require Government corrective action.

3.10 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

3.11 TRANSFER OF SCHEDULE DATA INTO RMS/QCS

The Contractor shall download and upload the schedule data into the Resident Management System (RMS) prior to RMS databases being transferred to the Government and is considered to be additional supporting data in a form and detail required by the Contracting Officer pursuant to FAR 52.232-5 - Payments under Fixed-Price Construction Contracts. The receipt of a proper payment request pursuant to FAR 52.232-27 - Prompt Payment for Construction Contracts is contingent upon the Government receiving both acceptable and approvable hard copies and electronic export from QCS of the application for progress payment.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

02/09

PART 1 GENERAL

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Contractor's Quality Control (CQC) System Manager to check and approve all items prior to submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

Submittals requiring Government approval are to be scheduled and made prior to the acquisition of the material or equipment covered thereby. Picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations samples remaining upon completion of the work.

1.1 DEFINITIONS

1.1.1 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required prior to a notice to proceed. Submittals required prior to the start of the next major phase of the construction on a multi-phase contract. Schedules or tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work, submitted prior to contract notice to proceed or next major phase of construction.

Certificates of insurance
Surety bonds
List of proposed subcontractors
List of proposed products
Construction Progress Schedule
Network Analysis Schedule (NAS)
Submittal register

Schedule of prices
Health and safety plan
Work plan
Quality control (QC) plan
Environmental protection plan

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared

for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and must state the test results; and indicate whether the material, product, or system has passed or failed the test.

Factory test reports.

SD-10 Operation and Maintenance Data

Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel, including manufacturer's help and product line documentation necessary to maintain and install equipment. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

This data is intended to be incorporated in an operations and

maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.1.2 Approving Authority

Office or designated person authorized to approve submittal.

1.1.3 Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with this section.

SD-01 Preconstruction Submittals

Submittal register; G, D

1.3 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.3.1 Designer of Record Approved (D)

Designer of Record (DOR) approval is required for critical materials, any deviations from the solicitation, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings." Contractor to provide the Government with the number of copies designated hereinafter of all DOR approved submittals. The Government may review any or all Designer of Record approved submittals for conformance to the Solicitation, Accepted Proposal and the completed design. The Government will review all submittals designated as deviating from the Solicitation or Accepted Proposal, as described below.

1.3.2 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and

Drawings for Construction," they are considered to be "shop drawings."

1.3.3 Information Only

Submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.4 PREPARATION

1.4.1 Transmittal Form

Use the attached sample transmittal form (ENG Form 4025) for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

1.5 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.6 VARIATIONS / SUBSTITUTION REQUESTS

Variations from contract requirements require Government approval pursuant to contract Clause FAR 52.236-21 and will be considered where advantageous to Government.

1.6.1 Considering Variations

Discussion with Contracting Officer prior to submission, will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

1.6.2 Proposing Variations

When proposing variation, deliver written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government. If lower cost

is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Check the column "variation" of ENG Form 4025 for submittals which include proposed deviations requested by the Contractor. Set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.6.3 Warranting That Variations Are Compatible

When delivering a variation for approval, Contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.6.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

1.7 SUBMITTAL REGISTER

At the end of this section is one set of ENG Form 4288 Submittal Register listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive, and additional submittals may be required. In the event of a discrepancy between the submittal register and the Specifications, the Specifications shall govern. The submittal register files, containing the pdf of ENG Form 4288, and an importable source file in text format, are available electronically upon request.

Prepare and maintain submittal register, as the work progresses. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by Government; retain data which is output in columns (a), (g), (h), and (i) as approved. A submittal register showing items of equipment and materials for which submittals are required by the specifications is provided as an attachment. This list may not be all inclusive and additional submittals may be required. Maintain a submittal register for the project in accordance with Section 01 45 01.10 USACE QUALITY CONTROL SYSTEM (QCS).

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD No. and type, e.g. SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting project requirements.

1.7.1 Use of Submittal Register

Submit submittal register with QC plan and project schedule. Verify that all submittals required for project are listed and add missing submittals. Coordinate and complete the following fields on the register submitted with

the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.

Column (h) Contractor Approval Date: Date Contractor needs approval of submittal.

Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

1.7.2 Contractor Use of Submittal Register

Update the following fields in the Government-furnished submittal register program or equivalent fields in program utilized by Contractor with each submittal throughout contract.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.7.3 Approving Authority Use of Submittal Register

Update the following fields in the Government-furnished submittal register program or equivalent fields in program utilized by Contractor.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (l) List date of submittal receipt.

Column (m) through (p) List Date related to review actions.

Column (q) List date returned to Contractor.

1.7.4 Contractor Action Code and Action Code

Entries for columns (j) and (o), are to be used are as follows (others may be prescribed by Transmittal Form):

NR - Not Received

AN - Approved as noted

A - Approved

RR - Disapproved, Revise, and Resubmit

1.7.5 Copies Delivered to the Government

Deliver one copy of submittal register updated by Contractor to Government with each invoice request.

1.8 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. Adequate time (a minimum of thirty (30) calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals. An additional ten (10) calendar days will be allowed and shown on the register for review and approval of submittals for HVAC control systems.

- a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements.
- b. Submittals called for by the contract documents will be listed on the register. If a submittal is called for but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but which have been omitted from the register or marked "N/A".
- c. Re-submit register and annotate monthly by the Contractor with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.
- d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

1.9 GOVERNMENT APPROVING AUTHORITY

When approving authority is Contracting Officer, the Government will:

- a. Note date on which submittal was received.
- b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.
- c. Identify returned submittals with one of the actions defined in paragraph entitled "Review Notations" and with markings appropriate for action indicated.

The Contractor will submit to the Contracting Officer for approval a minimum of five (5) copies of all "G D" or "G RO" level submittals. Three (3) copies of all "information only" level submittals will be provided. The number of copies of submittals specified in this portion of the contract shall be complied with in lieu of four (4) copies as specified by

FAR 52.236-21.

Upon completion of review of submittals requiring Government approval, stamp and date approved submittals.

1.10 DISAPPROVED OR REJECTED SUBMITTALS

Contractor shall make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications; notice as required under the clause entitled, "Changes" is to be given to the Contracting Officer. Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, the Contractor shall make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.11 APPROVED/ACCEPTED SUBMITTALS

The Contracting Officer's approval or acceptance of submittals is not be construed as a complete check, and indicates only that **the general method of construction, materials, detailing and other information are satisfactory**. Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.12 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, the Contractor to assure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for Materials and equipment incorporated in the work. If requested, approved samples, including those which may be damaged in testing, will be returned to the Contractor, at his expense, upon completion of the contract. Samples not approved will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. Government reserves the right to disapproved any material or equipment which previously has proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals.

Contractor to replace such materials or equipment to meet contract requirements.

Approval of the Contractor's samples by the Contracting Officer does not relieve the Contractor of his responsibilities under the contract.

1.13 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

1.14 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements is to be similar to the following:

CONTRACTOR	
(Firm Name)	
_____	Approved
_____	Approved with corrections as noted on submittal data and/or attached sheets(s)
SIGNATURE: _____	
TITLE: _____	
DATE: _____	

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 32 01.00 10	SD-01 Preconstruction Submittals														
			Project Schedule	3.4	G RO												
		01 33 00	SD-01 Preconstruction Submittals														
			Submittal register	1.9	G D												
		01 33 29	SD-11 Closeout Submittals														
			LEED Documentation Notebook	1.5	G L												
		01 35 26	SD-01 Preconstruction Submittals														
			Accident Prevention Plan (APP)	1.7	G A												
			Activity Hazard Analysis (AHA)	1.8	G A												
			Crane Critical Lift Plan	1.7.1	G A												
			Crane Operators	1.6.1.6	G A												
			SD-06 Test Reports														
			Reports	1.12													
			Accident Reports	1.12.1													
			Monthly Exposure Reports	1.12.3													
			Crane Reports	1.12.4													
			SD-07 Certificates														
			Confined Space Entry Permit	1.9													
			Hot work permit	1.9													
		01 45 01	SD-01 Preconstruction Submittals														
			Contractor Quality Control (CQC)	3.2													
			Plan														
		01 45 35	SD-07 Certificates														
			Special Inspector	1.5	G D												
			Quality Assurance Plan	1.4	G												
		01 50 00	SD-01 Preconstruction Submittals														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 50 00	Construction site plan	1.4	G												
			Traffic control plan	3.3.1	G												
		01 50 61	SD-01 Preconstruction Submittals														
			Dust Control	3.1	G												
			Products and Procedures	2.1	G												
			SD-02 Shop Drawings														
			Recordkeeping	1.7													
		01 57 19.11	SD-01 Preconstruction Submittals														
			Indoor Air Quality (IAQ)	1.3	G												
			Management Plan														
			SD-06 Test Reports														
			Air contamination testing	1.19.2													
			SD-11 Closeout Submittals														
			LEED														
		01 57 20.00 10	SD-01 Preconstruction Submittals														
			Environmental Protection Plan	1.7	G												
		01 57 23	SD-06 Test Reports														
			Storm Water Inspection Reports	1.3.2													
			for General Permit														
			Erosion and Sediment Controls	1.3													
			SD-07 Certificates														
			Mill Certificate or Affidavit	2.1.3													
		01 74 19	SD-01 Preconstruction Submittals														
			Waste Management Plan	1.6	G												
			SD-11 Closeout Submittals														
			Records	1.7													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 78 00	SD-03 Product Data														
			As-Built Record of Equipment and Materials	1.3.2													
			Warranty Management Plan	1.7.1													
			Warranty Tags	1.7.5													
			Final Cleaning	1.10													
			Spare Parts Data	1.4													
			SD-08 Manufacturer's Instructions														
			Preventative Maintenance	1.5													
			Condition Monitoring (Predictive Testing)	1.5													
			Inspection	1.5													
			Instructions	1.7.1													
			SD-10 Operation and Maintenance Data														
			Operation and Maintenance Manuals	1.9													
			SD-11 Closeout Submittals														
			Record Drawings	1.3.1													
			Certification of EPA Designated Items	1.6	G												
			Form DD1354	1.11	G												
			Checklist for Form DD1354	1.11	G												
		02 41 00	SD-07 Certificates														
			Demolition Plan	1.10	G D												
			Deconstruction Plan	1.10	G D												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 41 00	Notifications	1.4.1	G D												
			SD-11 Closeout Submittals														
			Receipts	1.4.2													
		02 82 16.00 20	SD-03 Product Data														
			Local exhaust equipment	3.1.4	G												
			Vacuums	3.1.5	G												
			Respirators	3.1.1.1	G												
			Pressure differential automatic recording instrument	3.1.4	G												
			Amended water	1.2.2	G												
			Glovebags	3.1.7	G												
			Material Safety Data Sheets (MSDS) for all materials	1.3.8	G												
			Encapsulants	2.1	G												
			SD-06 Test Reports														
			Air sampling results	1.5.5	G												
			Pressure differential recordings for local exhaust system	1.5.6	G												
			Asbestos disposal quantity report	3.3.3.2	G												
			Encapsulation test patches	3.2.6.2	G												
			Clearance sampling	3.2.7.3	G												
			SD-07 Certificates														
			Asbestos hazard abatement plan	1.3.9	G												
			Testing laboratory	1.3.10	G												
			Private qualified person documentation	1.5.1	G												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 82 16.00 20	Contractor's license	1.5.4	G												
			Competent person	1.5.2	G												
			Worker's license	1.5.3	G												
			Landfill approval	1.3.11	G												
			Employee training	1.3.3	G												
			Medical certification	1.3.12	G												
			Waste shipment records	1.3.11	G												
			Respiratory Protection Program	1.3.6	G												
			Delivery tickets	1.3.11	G												
			Vacuums	3.1.5	G												
			Water filtration equipment	3.1.2.3	G												
			Ventilation systems	3.1.5	G												
			equipment used to contain airborne asbestos fibers	3.1	G												
			encapsulants	2.1	G												
			Notifications	1.3.4													
			Notifications	1.3.4													
			SD-11 Closeout Submittals														
			Notifications	1.3.4	G												
			Notifications	1.3.4	G												
			Rental equipment	1.6.1	G												
			Respirator program records	1.3.6.1	G												
			Permits and licenses	1.3.4	G												
			Protective clothing	1.5.7	G												
			decontamination quality control records														

SUBMITTAL REGISTER											CONTRACT NO.						
TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 82 16.00 20	Protective clothing decontamination facility notification	1.5.8	G												
		03 30 53	SD-03 Product Data														
			Air-Entraining Admixture	2.1.3.1													
			Accelerating Admixture														
			Water-Reducing or Retarding Admixture	2.1.3.3													
			Curing Materials	2.1.12													
			Reinforcing Steel	2.1.5													
			Expansion Joint Filler Strips, Premolded	2.1.6													
			Joint Sealants - Field Molded Sealants	2.1.7													
			Batching and Mixing Equipment														
			Conveying and Placing Concrete	3.2													
			Ready-Mix Concrete	2.2													
			Mix Design Data	2.2													
			Air-Entraining Admixtures	2.2													
			Fly Ash	2.2													
			Steel Reinforcement	2.3													
			Curing Compound	2.5.3													
			Measurement of Floor Tolerances	3.4.3.4													
			Concrete	3.12													
			SD-06 Test Reports														
			Aggregates	2.1.2													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		03 30 53	Concrete Mixture Proportions	1.4.3													
			Compressive Strength Testing	3.12													
			Slump	3.12													
			SD-07 Certificates														
			Cementitious Materials	2.1.1													
			CPG for recycled materials or appropriate Waiver Form														
			Aggregates	2.1.2													
		04 20 00	SD-02 Shop Drawings														
			Structural Masonry	1.5	G D												
			SD-03 Product Data														
			Anchors, Ties and Bar Positioners	2.11													
			Joint Reinforcement	2.12													
			Insulation	2.15													
			Flashing	2.17													
			Water-Repellant Admixture	2.9													
			Cold Weather Installation	3.1.2													
			Local/Regional Materials	1.7.1													
			Recycled Content	1.7.2													
			SD-04 Samples														
			Concrete Masonry Units (CMU)	2.4													
			Anchors, Ties, and Bar Positioners	2.11													
			Expansion-Joint Materials	2.16													
			Joint Reinforcement	2.12													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		04 20 00	Insulation	2.15													
			Weep Hole Ventilators	2.18	D												
			SD-05 Design Data														
			Pre-mixed Mortar	2.8.5	G RO												
			Unit Strength Method	1.5.2	G RO												
			SD-06 Test Reports														
			Efflorescence Test	3.23.3													
			Field Testing of Mortar	3.23.1													
			Field Testing of Grout	3.23.2													
			Prism tests	3.23.4													
			Fire-rated CMU	2.4.3													
			Special Inspection	1.5.1	G D												
			SD-07 Certificates														
			Concrete Masonry Units (CMU)	2.4													
			Control Joint Keys	2.14													
			Anchors, Ties, and Bar	2.11													
			Positioners														
			Expansion-Joint Materials	2.16													
			Joint Reinforcement	2.12													
			Reinforcing Steel Bars and Rods	2.13													
			Mortar Coloring	2.8.2													
			Insulation	2.15													
			Insulation	2.15													
			Admixtures for Masonry Mortar	2.8.1													
			Admixtures for Grout	2.10.1													
		04 72 00	SD-02 Shop Drawings														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		04 72 00	Cast stone unit	1.6.1													
			SD-03 Product Data														
			ARCHITECTURAL CAST	2.1													
			STONE														
			Local/Regional Materials	1.7.1													
			SD-04 Samples														
			ARCHITECTURAL CAST	2.1													
			STONE														
			SD-06 Test Reports														
			Test Results	1.6.4													
			SD-07 Certificates														
			Cast Stone Unit	1.6.1													
			SD-08 Manufacturer's Instructions														
			Installation of cast stone units	3.1													
			CLEANING	3.2													
		05 30 00	SD-02 Shop Drawings														
			Fabrication Drawings	1.3.5													
			Cant Strips	2.3.4.1													
			Ridge and Valley Plates	2.3.4.2													
			Metal Closure Strips	2.3.4.3													
			SD-03 Product Data														
			Accessories	2.2													
			Deck Units	2.3.1													
			Galvanizing Repair Paint	2.1.3.1													
			Galvanizing Repair Paint	2.1.6													
			Joint Sealant Material	2.1.5													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		05 30 00	Mechanical Fasteners	2.2.12													
			Repair Paint														
			Welder Qualifications	1.3.3													
			Welding Equipment	1.3.3													
			Welding Rods and Accessories	1.3.3													
			SD-05 Design Data														
			Deck Units	2.3.1													
			SD-07 Certificates														
			Welding Procedures														
			Fire Safety	1.3.4.1													
			Wind Storm Resistance	1.3.4.2													
		05 40 00	SD-02 Shop Drawings														
			Framing Components and Trusses		G												
			SD-03 Product Data														
			studs,joists														
			SD-05 Design Data														
			Metal framing calculations	1.6.2	G												
			SD-07 Certificates														
			Load-bearing cold-formed metal framing	1.4													
			Welds	3.1.1													
		05 50 13	SD-02 Shop Drawings														
			Expansion joint covers	2.7													
			TEMPORARY RAMP AND HANDRAILS	2.4													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		05 50 13	angles and plates	2.12													
			SD-03 Product Data														
			TEMPORARY RAMP AND HANDRAILS	2.4													
			Expansion joint covers	2.7													
			Preformed Foam Joint Systems	2.8.1													
			Television Mount	2.13													
			PROJECTOR MOUNTS	2.29													
			Fence and Gate	2.3													
			Local/Regional Materials	1.7.1													
			Recycled Content	1.7.2													
			SD-04 Samples														
			Expansion joint covers	2.7													
			Fence and Gate	2.3													
		06 10 00	SD-02 Shop Drawings														
			Nailing Strips	2.5.10.1													
			Blocking	2.5.10.4													
			SD-03 Product Data														
			Moisture Barrier	2.8.1													
			manufacturer's written instructions	3.7.1													
			Gypsum Wall Sheathing	2.5.3													
			Local/Regional Materials	1.11.1	L												
			Recycled Content	1.10.2	L												
			Fire-retardant treatment	1.8													
			Structural-use and OSB panels	1.4.4													

SUBMITTAL REGISTER												CONTRACT NO.					
TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		06 10 00	Oriented Strand Board	2.3													
			Composite Wood Material	1.4.2	L												
			Adhesives	2.5.11	L												
			SD-06 Test Reports														
			Preservative-treated	1.4.5													
			SD-07 Certificates														
			Certificates of grade	1.9.3													
			Preservative treatment	1.7													
			SD-11 Closeout Submittals														
			Local/Regional Materials	1.11.1	L												
			Adhesives	2.5.11	L												
			Structural-use and OSB Panels	1.4.4													
		06 16 13	SD-03 Product Data														
			Fasteners	2.6													
			VENTED, NAILABLE DECK SYSTEM	2.1													
			SD-06 Test Reports														
			Flame spread and smoke developed ratings	1.4.1													
			SD-07 Certificates														
			qualifications	1.3													
			SD-08 Manufacturer's Instructions														
			fasteners	2.6													
		07 11 13	SD-07 Certificates														
			Materials	1.3													
		07 21 16	SD-03 Product Data														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		07 21 16	Blanket insulation	2.1													
			Accessories	2.6													
			SD-08 Manufacturer's Instructions														
			Insulation	3.3.1													
		07 31 13	SD-03 Product Data														
			Shingles	2.1.1													
			SD-04 Samples														
			Shingles	2.1.1													
			SD-08 Manufacturer's Instructions														
			Application	3.3													
		07 60 00	SD-02 Shop Drawings														
			Gutters	3.1.17													
			Downspouts	3.1.18													
			Fascias	3.1.15													
			Base flashing	3.1.11													
			Expansion joints	3.1.26													
			Counterflashing	3.1.12													
			Flashing at roof penetrations	3.1.27													
			Reglets	3.1.13													
			Copings	3.1.30													
			Drip edge	3.1.16													
			SD-11 Closeout Submittals														
			Quality Control Plan	3.5													
		07 84 00	SD-02 Shop Drawings														
			Firestopping Materials	2.1													
			SD-07 Certificates														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION / REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		07 84 00	Firestopping Materials	2.1													
			Installer Qualifications	1.5													
			Inspection	3.3													
		07 92 00	SD-03 Product Data														
			Sealants	2.1													
			Primers	2.2													
			Bond breakers	2.3													
			Backstops	2.4													
			SD-07 Certificates														
			Sealant	3.3.6													
		08 11 13	SD-02 Shop Drawings														
			Doors	1.5.1													
			Doors	2.1													
			Frames	1.5.1													
			Frames	2.7													
			Accessories	2.5													
			SD-03 Product Data														
			Doors	1.5.1													
			Doors	2.1													
			Frames	1.5.1													
			Frames	2.7													
			Accessories	2.5													
			Local/Regional Materials	1.11.1													
			Recycled Content	1.10.2													
			calculations	1.6.2													
			Design Analysis or Test Reports	1.6.2													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		08 14 00	SD-02 Shop Drawings														
			Doors	2.1													
			SD-03 Product Data														
			Local/Regional Materials	1.11.1	L												
			Recycled Content	1.10.2	L												
			Adhesives, sealants, and primers	1.5.4	L												
			Doors	2.1													
			Fire resistance rating	2.1.7													
			Fire resistance rating	2.1.7													
			Accessories	2.2													
			Water-resistant sealer	2.3.7													
			warranty	1.4													
			SD-04 Samples														
			Doors	2.1													
			Door finish colors	2.3.6.4													
			SD-06 Test Reports														
			Split resistance	2.4													
			Cycle-slam	2.4													
			Hinge loading resistance	2.4													
		08 51 14.00 10	SD-02 Shop Drawings														
			Aluminum Windows	1.3													
			Subsill	2.4													
			Insect Screens	2.3													
			SD-03 Product Data														
			Aluminum Windows	1.3													
			Hardware	2.4.2													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		08 51 14.00 10	Fasteners	2.4.1													
			Insect Screens	2.3													
			Weatherstripping	2.2													
			Accessories	2.4													
			Flexible Flashing	2.9.5													
			Fenestration Ratings	1.6.5													
			SD-04 Samples														
			Aluminum Windows	1.3													
			Subsill	2.4													
			SD-05 Design Data														
			Design Analysis or Test Reports	1.4.3													
			SD-06 Test Reports														
			Aluminum Windows	1.3													
			Condensation Index Rating	1.3.5													
			Resistance to forced entry	2.1.8													
			SD-07 Certificates														
			Aluminum Windows	1.3													
			SD-10 Operation and Maintenance														
			Data														
			Aluminum Windows	1.3													
		08 71 00	SD-02 Shop Drawings														
			Bitting List	1.4													
			SD-03 Product Data														
			Hardware and Accessories														
			Hardware Schedule	1.3													
			Keying Schedule	2.7	G RO												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		08 71 00	SD-07 Certificates														
			Hardware and Accessories														
			SD-11 Closeout Submittals														
			Bitting List	1.4													
		08 81 00	SD-02 Shop Drawings														
			Glass Setting	3.2													
			SD-03 Product Data														
			Insulating Glass	1.6.1													
			Glazing Accessories	1.3													
			SD-04 Samples														
			Insulating Glass	1.6.1													
			Tape	2.4.5													
			Sealant	2.4.3.1													
			SD-08 Manufacturer's Instructions														
			Setting and sealing materials	2.4													
			Glass setting	3.2													
		08 91 00	SD-02 Shop Drawings														
			Wall louvers	1.4													
			Wall louvers	1.5													
			SD-03 Product Data														
			Metal Wall Louvers	2.2													
			Recycled Content	1.10.2													
			SD-04 Samples														
			Wall louvers	1.4													
			Wall louvers	1.5													
		09 22 00	SD-02 Shop Drawings														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		09 22 00	Metal support systems	2.1													
			SD-03 Product Data														
			Local/Regional Materials	1.11.1	L												
			Recycled Content	1.10.2	L												
		09 24 23	SD-02 Shop Drawings														
			Lath	2.1													
			Accessories	2.2													
			SD-03 Product Data														
			Lath	2.1													
			Plaster Materials	2.3													
			Accessories	2.2													
			SD-04 Samples														
			Color selection samples	2.5.6													
			Color verification sample	2.5.6													
		09 29 00	SD-03 Product Data														
			Gypsum Board	2.1.1													
			Accessories	2.1.14													
			Adhesives														
			Joint Treatment Materials	2.1.9													
			Local/Regional Materials	1.11.1													
			Recycled Content	1.10.2													
			SD-07 Certificates														
			Non-contaminated Materials	2.1													
		09 30 00	SD-02 Shop Drawings														
			Detail Drawings	1.4													
			SD-03 Product Data														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		09 30 00	Setting-Bed	2.2	G												
			Mortar, Grout, and Adhesive	2.4													
			Reinforcing Wire Fabric	2.2.6													
			SD-04 Samples														
			Tile	2.1													
			Marble Thresholds	2.5													
			Grout	2.4													
			SD-07 Certificates														
			Tile	2.1													
			Mortar, Grout, and Adhesive	2.4													
		09 51 00	SD-02 Shop Drawings														
			Approved Detail Drawings	1.2													
			SD-03 Product Data														
			Acoustical Units	2.1													
			Exposed Grid System Units														
			ACOUSTICAL SEALANT	2.8													
			Local/Regional Materials	1.11.1	L												
			Recycled Content	1.10.2	L												
			SD-04 Samples														
			Acoustical Units	2.1													
			Exposed Grid System Units														
			SD-06 Test Reports														
			Ceiling Attenuation Class and Test	1.2.2													
			SD-07 Certificates														
			Acoustical Units	2.1													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		09 51 00	Acoustic Ceiling Tiles														
		09 65 00	SD-03 Product Data														
			Resilient Flooring and	2.18													
			Accessories														
			Adhesives	2.14													
			Vinyl Composition Tile	2.1													
			Wall Base	2.9													
			Local/Regional Materials	1.2.1													
			SD-04 Samples														
			Resilient Flooring and	2.18													
			Accessories														
			SD-06 Test Reports														
			Moisture, Alkalinity and Bond	3.3													
			Tests														
			SD-08 Manufacturer's Instructions														
			Surface Preparation	3.2													
			Installation	3.1													
			SD-10 Operation and Maintenance														
			Data														
			Resilient Flooring and	2.18													
			Accessories														
		09 66 23	SD-02 Shop Drawings														
			Approved Detail Drawings	1.2													
			Strips	2.5													
			Control Joint Strips	2.5.2													
			SD-03 Product Data														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		09 66 23	Resin	2.2													
			Mixing, Proportioning, and	3.2													
			Installation														
			Cleaning and Sealing	3.4													
			SD-04 Samples														
			Resinous Terrazzo Flooring	1.2													
		09 90 00	SD-02 Shop Drawings														
			Piping identification	3.12													
			stencil	3.12													
			SD-03 Product Data														
			Materials	2.1													
			Coating	2.1													
			Manufacturer's Technical Data	2.1													
			Sheets														
			SD-04 Samples														
			Color	1.11													
			Test Reports														
			CRI Green Label Requirements														
			for Indoor Air Quality Test Criteria;														
			SD-07 Certificates														
			Applicator's qualifications	1.3													
			Qualification Testing	1.4.1.2													
			SD-08 Manufacturer's Instructions														
			Application instructions	3.4.1													
			Mixing	3.8.2													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		09 90 00	Manufacturer's Material Safety Data Sheets	1.7.2													
			SD-10 Operation and Maintenance Data														
			Coatings:	2.1													
		10 10 00	SD-03 Product Data														
			Visual Display Board	1.2													
			Interactive Whiteboards	2.10	G												
			SD-04 Samples														
			Aluminum	2.1.6													
			Porcelain Enamel	2.1.1													
			SD-07 Certificates														
			Visual Display Board	1.2													
		10 14 02	SD-02 Shop Drawings														
			Detail Drawings	3.1													
			SD-03 Product Data														
			Installation	3.1													
			SD-04 Samples														
			Interior Signage	1.2													
			Approved Manufacturer's Instructions	3.1													
			Protection and Cleaning	3.1.2													
		10 21 13	SD-02 Shop Drawings														
			Installation Drawings	3.3													
			SD-03 Product Data														
			Toilet Partition System	1.2													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION / REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		10 21 13	Toilet Enclosures	2.2.1													
			SD-04 Samples														
			Colors and Finishes	2.8													
			Partition Panels	2.2													
			SD-07 Certificates														
			Certification	1.6													
		10 28 13	SD-03 Product Data														
			Accessory Items	2.2													
			SD-04 Samples														
			Accessory Items	2.2													
			SD-07 Certificates														
			Accessory Items	2.2													
		10 44 16	SD-01 Preconstruction Submittals														
			Manufacturer's Data	2.1													
			SD-02 Shop Drawings														
			Fire Extinguishers	2.1													
			Accessories	2.4													
			Cabinets	2.5													
			Wall Brackets	2.6													
			SD-03 Product Data														
			Fire Extinguishers	2.1													
			Accessories	2.4													
			Cabinets	2.5													
			Wall Brackets	2.6													
			Replacement Parts	3.2.1													
			SD-04 Samples														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		10 44 16	Fire Extinguisher	2.1													
			Cabinet	2.1													
			Wall Brackets	2.6													
			Accessories	2.4													
			SD-07 Certificates														
			Fire Extinguishers	2.1													
			Manufacturer's Warranty with	2.1													
			Inspection Tag														
		10 51 13	SD-02 Shop Drawings														
			Types	2.1													
			Location	1.4													
			Installation	3.1													
			Numbering system	3.2													
			SD-03 Product Data														
			Material	2.2													
			Locking Devices	2.3.1													
			Handles	2.3.4													
			Finish	2.2.3													
			components	2.3													
			Assembly	3.1													
			Local/Regional Materials	1.11.1	L												
			Recycled Content	1.10.2	L												
			SD-04 Samples														
			Color chips	1.5.1													
		10 56 13	SD-03 Product Data														
			Shelving Units	2.1													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		10 56 13	Installation instructions	3.2													
			Local/Regional Materials	1.11.1	L												
			Recycled Content	1.10.2	L												
			SD-04 Samples														
			Finish	2.3													
			SD-06 Test Reports														
			Shelving Units	2.1													
			Finish	2.3													
		12 21 00	SD-02 Shop Drawings														
			Installation	3.3													
			SD-03 Product Data														
			Window Blinds	2.1													
			Installation	3.3													
			SD-04 Samples														
			Window Blinds	2.1													
			SD-06 Test Reports														
			Window Blinds	2.1													
			SD-08 Manufacturer's Instructions														
			Window Blinds	2.1													
			SD-10 Operation and Maintenance														
			Data														
			Window Blinds	2.1													
		12 35 53	SD-02 Shop Drawings														
			Shop Drawings	1.5	D												
			Installation														
			SD-03 Product Data														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		12 35 53	Local/Regional Materials		D L												
			Wood Materials		D												
			Composite Wood Materials		D L												
			Adhesives, Caulks and Sealants		D L												
			Cabinets														
			Corrosion-Resistant Steel														
			Plywood														
			Medium Density Fiberboard (MDF)														
			Hardwood														
			Hardwood Plywood														
			Adhesives														
			Filler Material														
			Particle Board														
			Varnish														
			Fasteners														
			Service Fixtures														
			Accessories and Hardware														
			Plastic Laminate														
			Countertops		G D												
			SD-04 Samples														
			Plastic Laminates		D												
			Accessories and Hardware		D												
			Manufacturer's Standard Color Charts														
			SD-06 Test Reports														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		12 35 53	Casework														
			Countertop														
			SD-07 Certificates														
			Plastic Laminate		D												
			Countertops		D												
		12 48 16	SD-02 Shop Drawings														
			Foot Grilles	2.2	D												
			SD-03 Product Data														
			Foot Grilles	2.2	D												
			Regional Materials	1.5.1	D L												
			Recycled Content	1.5.2	D L												
			Indoor Chemical and Pollutant	1.7.3	D L												
			Source Control														
			SD-04 Samples														
			foot grilles	2.2													
			SD-10 Operation and Maintenance														
			Data														
			foot grilles	2.2													
		12 93 00	SD-02 Shop Drawings														
			Bicycle Racks	2.6	G D												
			Assembly Instruction Drawings	1.3.3													
			SD-03 Product Data														
			Bicycle Racks	2.6													
			SD-04 Samples														
			Finish	2.3.4	G D												
			SD-06 Test Reports														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEW NUMBER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		12 93 00	Testing	3.4													
		13 48 00.00 10	SD-02 Shop Drawings														
			Coupling and Bracing	3.1													
			Flexible Couplings or Joints	3.3													
			Equipment Requirements	1.3													
			Contractor Designed Bracing	1.2.4													
			SD-03 Product Data														
			Coupling and Bracing	3.1													
			Equipment Requirements	1.3													
			Contractor Designed Bracing	1.2.4													
			SD-07 Certificates														
			Flexible Ball Joints	2.2													
		13 48 00	SD-02 Shop Drawings														
			Bracing	3.1													
			Resilient Vibration Isolation Devices	3.4													
			Equipment Requirements	1.3													
			SD-03 Product Data														
			Bracing	3.1													
			Equipment Requirements	1.3													
		22 00 00	SD-02 Shop Drawings														
			Plumbing System	3.9.1	G RO												
			SD-03 Product Data														
			Local/Regional Materials	1.10.1													
			Materials	2.1													
			Fixtures	2.4													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		22 00 00	Flush valve water closets														
			Flush valve urinals														
			Wall hung lavatories														
			Service sinks														
			Drinking-water coolers		G RO												
			Water heaters	2.10	G RO												
			Pumps	2.12	G RO												
			Backflow prevention assemblies	3.9.1.1	G RO												
			Welding														
			Vibration-Absorbing Features	3.4	G RO												
			Plumbing System	3.9.1													
			SD-06 Test Reports														
			Tests, Flushing and Disinfection	3.9													
			Test of Backflow Prevention	3.9.1.1	G RO												
			Assemblies														
			SD-07 Certificates														
			Materials and Equipment	1.3													
			Bolts	2.1.1													
			SD-10 Operation and Maintenance														
			Data														
			Plumbing System	3.9.1	G RO												
		23 00 00	SD-02 Shop Drawings														
			Detail Drawings	1.4.5													
			SD-03 Product Data														
			Metallic Flexible Duct														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 00 00	Insulated Nonmetallic Flexible	2.10.1.2													
			Duct Runouts														
			Duct Connectors	2.10.1.2													
			Duct Access Doors	2.10.2													
			Fire Dampers	2.10.3													
			Manual Balancing Dampers	2.10.4													
			Manual Balancing Dampers	2.10.5													
			Automatic Smoke-Fire Dampers	2.10.7													
			Automatic Smoke Dampers	2.10.8													
			Acoustical Duct Liner														
			Diffusers	2.10.13.1													
			Registers and Grilles														
			Louvers	2.10.14													
			Air Vents														
			Wall Mounted Propeller Fan														
			Exhaust Fans														
			Air Handling Units	2.12													
			Fan-Coil Units	2.13.1													
			Test Procedures	2.13.1													
			Operation and Maintenance	3.15													
			Training														
			SD-06 Test Reports														
			Performance Tests	3.13													
			Performance Tests	3.15													
			Damper Acceptance Test	3.11													
			SD-08 Manufacturer's Instructions														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 00 00	Manufacturer's Installation	3.2													
			Instructions														
			Operation and Maintenance	3.15													
			Training														
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.15													
			Manuals														
			Fire Dampers	2.10.3													
			Manual Balancing Dampers	2.10.4													
			Manual Balancing Dampers	2.10.5													
			Automatic Smoke-Fire Dampers	2.10.7													
			Automatic Smoke Dampers	2.10.8													
			Exhaust Fans														
			Air Handling Units	2.12													
			Fan-Coil Units	2.13.1													
			Wall Mounted Propeller Fan														
		23 05 93	SD-01 Preconstruction Submittals														
			TAB Firm	1.5.4.1													
			TAB team assistants	1.2													
			TAB team engineer to TAB														
			specialists														
			TAB team field leader	1.2													
			SD-02 Shop Drawings														
			TAB Schematic Drawings and	1.3.3													
			Report Forms														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLAS SIFI CATION REVIEW R	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 05 93	SD-03 Product Data														
			Equipment and Performance Data	1.3													
			TAB Related HVAC Submittals	1.5.4.4													
			TAB Procedures	1.5.2													
			Calibration	1.5.2													
			Systems Readiness Check	1.3.3													
			TAB Execution	1.5.5													
			TAB Verification														
			SD-06 Test Reports														
			TAB Work Execution Schedule	3.7	G RO												
			TAB Procedures Summary	3.7	G RO												
			Design review report	1.3.3	G RO												
			Design review report	1.7.3.1	G RO												
			Design review report	3.7	G RO												
			TAB report	1.5.6.2	G RO												
			SD-07 Certificates														
			Independent TAB agency and personnel qualifications	1.5.1	G RO												
			Independent TAB agency and personnel qualifications	1.5.1	G RO												
			Advance Notice of TAB Field Work	3.7	G RO												
			Completed Pre-TAB Work Checklist	3.7													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 05 93	Completed Pre-TAB Work	3.7													
			Checklist														
			Tab Firm	1.5.4.1													
			TAB Submittal and Work	1.7.1													
			Schedule														
			TAB Submittal and Work	1.7.3													
			Schedule														
			Design review report	1.3.3													
			Design review report	1.7.3.1													
			Design review report	3.7													
			Pre-field TAB engineering report	1.7.3.3													
			Advanced notice for TAB field	1.7.3													
			work														
			Prerequisite HVAC Work Check	1.7.3													
			Out List														
		23 07 00	SD-02 Shop Drawings														
			MICA Plates	3.2.2.4													
			Pipe Insulation Systems	2.3													
			Pipe Insulation Systems	3.2													
			Duct Insulation Systems	3.3													
			Equipment Insulation Systems	3.4													
			SD-03 Product Data														
			Pipe Insulation Systems	2.3													
			Pipe Insulation Systems	3.2													
			Duct Insulation Systems	3.3													
			Equipment Insulation Systems	3.4													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 07 00	SD-04 Samples														
			Thermal Insulation	2.2.1.3													
			SD-08 Manufacturer's Instructions														
			Pipe Insulation Systems	2.3													
			Pipe Insulation Systems	3.2													
			Duct Insulation Systems	3.3													
			Equipment Insulation Systems	3.4													
		23 08 00.00 10	SD-02 Shop Drawings														
			Commissioning Plan	1.5.2.2	G RO												
			SD-03 Product Data														
			Pre-Functional Performance Test	3.2.1	G RO												
			Checklists														
			Functional Performance Tests	3.2.2	G RO												
			SD-06 Test Reports														
			Commissioning Report	3.3	G RO												
			SD-07 Certificates														
			Commissioning Firm	1.5.1	G RO												
			Commissioning Specialist	1.5.2	G RO												
		23 09 23.13 20	SD-02 Shop Drawings														
			Control system drawings title	1.4.1.1													
			sheet														
			List of I/O Points	1.4.1.2													
			Control System Components List	1.4.1.3													
			Control system schematics	1.4.1.4													
			HVAC Equipment Electrical	1.4.1.5													
			Ladder diagrams														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION OR REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 09 23.13 20	Component wiring diagrams	1.4.1.6													
			Terminal strip diagrams	1.4.1.7													
			BACnet communication architecture schematic	1.4.1.8													
			SD-03 Product Data														
			Direct Digital Controllers	2.1.1													
			BACnet Gateways	2.1.1.13													
			BACnet Protocol Analyzer	2.1.5													
			DDC Software	2.1.2													
			BACnet Operator Workstation	2.1.3													
			BACnet Operator Workstation DDC Software														
			Sensors and Input Hardware	2.2													
			Output Hardware	2.3													
			Surge and transient protection	2.4.2													
			Indicators	2.6													
			Duct smoke detectors		G												
			Variable frequency (motor) drives	2.8	G												
			SD-05 Design Data														
			Performance Verification Testing Plan	3.4.2	G												
			Pre-Performance Verification Testing Checklist	3.4.4	G												
			SD-06 Test Reports														
			Performance Verification Testing Report	3.4.11	G												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 09 23.13 20	SD-07 Certificates														
			Contractor's Qualifications	1.6.6	G												
			SD-09 Manufacturer's Field Reports														
			Pre-PVT Checklist	3.4.1	G												
			SD-10 Operation and Maintenance Data														
			BACnet Direct Digital Control Systems	1.4													
			Controls System Operators Manuals	3.3													
			VFD Service Manuals	2.8.2													
			SD-11 Closeout Submittals														
			Training documentation	3.5.1													
		23 52 00	SD-02 Shop Drawings														
			Piping Installation	3.3													
			Installation	3.3.6.4													
			Installation	3.3.12													
			SD-03 Product Data														
			Materials and Equipment	2.1.1													
			Spare Parts	1.5													
			Water Treatment System	2.17													
			Boiler Water Treatment	2.17													
			Heating System Tests	3.10													
			Unit Heaters	2.9													
			Welding	1.3													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 52 00	Qualifications	3.10													
			Field Instructions	3.12													
			Tests	3.4													
			SD-06 Test Reports														
			Heating System Tests	3.10													
			Fuel System Tests	3.13													
			Water Treatment Testing	3.10.1													
			SD-07 Certificates														
			Continuous Emissions Monitoring														
			Energy Star	2.1.3													
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.12													
			Instructions														
			Water Treatment System	2.17													
		23 64 10	SD-03 Product Data														
			Water Chiller	2.5													
			Water Chiller	2.5													
			Water Chiller	3.1													
			Water Chiller	3.1													
			Posted Instructions	3.6													
			Verification of Dimensions	1.5.1													
			Manufacturer's Multi-Year	1.7													
			Compressor Warranty														
			System Performance Tests	3.5													
			Demonstrations	3.6													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 64 10	SD-06 Test Reports														
			Field Acceptance Testing	3.4													
			Water Chiller	2.5													
			Water Chiller	3.1													
			System Performance Tests	3.5													
			SD-07 Certificates														
			Refrigeration System	3.1.2													
			SD-08 Manufacturer's Instructions														
			Water Chiller	2.5													
			Water Chiller	3.1													
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.6													
			Manuals														
		23 64 26	SD-03 Product Data														
			Grooved Mechanical	2.2.2.4													
			Connections For Steel														
			Grooved Mechanical	2.5.3													
			Connections For Copper														
			Calibrated Balancing Valves	2.6.8													
			Automatic Flow Control Valves	2.6.9													
			Pump Discharge Valve	2.6.10													
			Water Pressure Reducing Valve	2.6.13													
			Pressure Relief Valve	2.6.14													
			Combination Pressure and	2.6.15													
			Temperature Relief Valves														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 64 26	Pumps	2.8													
			Combination Strainer and Pump Suction Diffuser	2.7.3													
			Expansion Tanks	2.9													
			Air Separator Tanks	2.10													
			Water Treatment Systems	2.11													
			SD-06 Test Reports														
			Piping welds NDE report	3.1.1.3													
			Pressure tests reports	3.4.2													
			SD-07 Certificates														
			Employer's Record Documents (For Welding)	3.1.1.1													
			Welding Procedures and Qualifications	3.1.1.2													
			Piping for Steam and Condensate	2.3													
			Piping for High-Pressure Compressed-Air Systems	2.4													
			Fittings														
			Unions														
			Flanges														
			Gaskets														
			Bolting														
			SD-08 Manufacturer's Instructions														
			Lesson plan for the Instruction Course	3.5													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 64 26	SD-10 Operation and Maintenance Data														
			Calibrated Balancing Valves	2.6.8													
			Automatic Flow Control Valves	2.6.9													
			Pump Discharge Valve	2.6.10													
			Water Pressure Reducing Valve	2.6.13													
			Pressure Relief Valve	2.6.14													
			Combination Pressure and Temperature Relief Valves	2.6.15													
			Pumps	2.8													
			Combination Strainer and Pump Suction Diffuser	2.7.3													
			Expansion Tanks	2.9													
			Air Separator Tanks	2.10													
		26 05 48.00 10	SD-02 Shop Drawings														
			Lighting Fixtures in Buildings	3.2													
			Equipment Requirements	1.3													
			SD-03 Product Data														
			Lighting Fixtures in Buildings	3.2	G RO												
			Equipment Requirements	1.3													
			; G RO														
		26 20 00	SD-02 Shop Drawings														
			Panelboards	2.15	G RO												
			Cable trays	2.5	G RO												
			SD-03 Product Data														
			Receptacles	2.14	G RO												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		26 20 00	Circuit breakers	2.15.3	G RP												
			Switches	2.12	G RO												
			Motor controllers	2.22	G RO												
			Combination motor controllers		G RO												
			Manual motor starters	2.23	G RO												
			Grounding Busbar	2.28.3	G RO												
			Surge protective devices	2.37	G RO												
			SD-06 Test Reports														
			600-volt wiring test	3.5.2	G RO												
			Grounding system test	3.5.5	G RO												
			Ground-fault receptacle test	3.5.4	G RO												
			SD-10 Operation and Maintenance														
			Data														
			Electrical Systems	1.5.1	G RO												
			Metering	2.35	G RO												
		26 51 00.00 40	SD-03 Product Data														
			Fluorescent lighting fixtures	2.2	G RO												
			Fluorescent electronic ballasts	1.5.1	G RO												
			Fluorescent lamps	2.2.6	G RO												
			Electronic dimming ballast	2.2.2	G RO												
			Dimming ballast controls	2.2.3	G RO												
			Local/Regional Materials	1.8.1													
			SD-06 Test Reports														
			Operating test	3.3													
			Operational Tests	3.4													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		26 51 00.00 40	SD-10 Operation and Maintenance														
			Data														
			Operational Service	1.7													
		26 52 00.00 40	SD-01 Preconstruction Submittals														
			Material, Equipment, and Fixture	1.2													
			Lists														
			SD-02 Shop Drawings														
			Central Emergency Lighting	2.4													
			Systems														
			SD-03 Product Data														
			Emergency Fluorescent Lighting	2.3													
			Accessories														
			SD-06 Test Reports														
			System Operational Tests	3.2													
			SD-07 Certificates														
			Emergency Fluorescent Lighting	2.3													
			Accessories														
		26 53 00.00 40	SD-01 Preconstruction Submittals														
			Material, Equipment, and Fixture	1.2													
			Lists														
			Exit Lighting Units	2.3													
			Accessories														
			SD-02 Shop Drawings														
			Exit Lighting Units	2.3													
			Exit Lighting Units	2.3													
			SD-03 Product Data														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		26 53 00.00 40	Exit Lighting Units	2.3													
			Accessories														
			SD-06 Test Reports														
			Operational Tests	3.2													
			SD-07 Certificates														
			Efficiencies	2.1.1													
		27 05 14.00 10	SD-02 Shop Drawings														
			Cable Television Premises	1.2	G RE												
			Distribution System														
			Installation	3.1	G RE												
			SD-03 Product Data														
			Spare Parts	1.7													
			Test Plan	3.4	G RE												
			Qualifications	1.4	G RE												
			SD-06 Test Reports														
			Testing	3.4													
			SD-07 Certificates														
			Materials and Equipment	2.1													
			SD-08 Manufacturer's Instructions														
			Manufacturer's	3.1.2	G RE												
			Recommendations														
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.5													
			Manuals														
		27 10 00	SD-02 Shop Drawings														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		27 10 00	Telecommunications drawings	1.6.1.1	G RE												
			Telecommunications Space	1.6.1.2	G RE												
			Drawings														
			SD-03 Product Data														
			Telecommunications cabling	2.3	G RE												
			Patch panels	2.4.5	G RE												
			Telecommunications	2.5	G RE												
			outlet/connector assemblies														
			Equipment support frame	2.4.2	G RE												
			Connector blocks	2.4.3	G RE												
			Spare Parts	1.10.3	G RE												
			SD-06 Test Reports														
			Telecommunications cabling	3.5.1	G RE												
			testing														
			SD-07 Certificates														
			Telecommunications Contractor	1.6.2.1	G RE												
			Key Personnel	1.6.2.2	G RE												
			Manufacturer Qualifications	1.6.2.3	G RE												
			Test plan	1.6.3	G RE												
			SD-09 Manufacturer's Field														
			Reports														
			Factory reel tests	2.12.1	G RE												
			SD-10 Operation and Maintenance														
			Data														
			Telecommunications cabling and	1.10.1	G RE												
			pathway system														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		27 10 00	SD-11 Closeout Submittals														
			Record Documentation	1.10.2	G RE												
		28 31 64.00 10	SD-02 Shop Drawings														
			Detail Drawings	1.4.2													
			SD-03 Product Data														
			Special Tools and Spare Parts	1.7													
			Testing	3.7													
			SD-06 Test Reports														
			Testing	3.7													
			SD-07 Certificates														
			Equipment	1.2.6													
			Qualifications	1.4.1													
			SD-10 Operation and Maintenance														
			Data														
			Operating and Maintenance		G RO												
			Instructions														
		31 00 00	SD-01 Preconstruction Submittals														
			Shoring	3.5													
			Dewatering Work Plan	1.6.3													
			SD-03 Product Data														
			Utilization of Excavated Materials	3.9													
			Rock Excavation	1.6.1.2													
			Opening of any Excavation or	3.4													
			Borrow Pit														
			Shoulder Construction	3.15													
			SD-06 Test Reports														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		31 00 00	Soil Tests Required on Material Prior to Placement														
			Borrow Site Testing	2.1													
			SD-07 Certificates														
			Testing	3.18													
		31 11 00	SD-04 Samples														
			Tree wound paint	2.1													
			Herbicide	2.2													
		31 31 16	SD-03 Product Data														
			Termiticide Application Plan	3.3.6													
			Termiticides	2.1													
			Foundation Exterior	3.3.3													
			Verification of Measurement	3.1													
			Application Equipment	3.4.1													
			Warranty	1.6													
			SD-04 Samples														
			Termiticides	2.1													
			SD-06 Test Reports														
			Equipment Calibration and Tank Measurement	3.4.1													
			Soil Moisture	3.4.1													
			Quality Assurance	1.3													
			SD-07 Certificates														
			Qualifications	1.3.1													
		31 32 11	SD-01 Preconstruction Submittals														
			Work sequence schedule	1.7	G D												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		31 32 11	SD-02 Shop Drawings														
			Erosion Control	3.2.2													
			Seed Establishment Period	2.5.13.1													
			Maintenance Record	3.6													
			SD-03 Product Data														
			Erosion Control Blankets	2.5													
			SD-04 Samples														
			Materials	1.6													
			SD-06 Test Reports														
			Hydraulic Mulch	2.3.10													
			Geotextile Fabrics	2.4													
			Erosion Control Blankets	2.5													
			SD-07 Certificates														
			Mulch	2.3													
			Hydraulic Mulch	2.3.10													
			Seed	2.5.13													
			Asphalt Adhesive	2.3.8													
			Tackifier	2.3.11													
			Wood By-Products	2.3.6													
			Wood Cellulose Fiber	2.3.3													
		32 05 33	SD-01 Preconstruction Submittals														
			Integrated Pest Management	2.4	G												
			Plan														
			SD-03 Product Data														
			Fertilizer	2.1	G												
			Hose	2.2.1													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION OR REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		32 05 33	Mulches Topdressing	2.3													
			Organic Mulch Materials	2.3.2													
			SD-07 Certificates														
			Maintenance inspection report	3.5.1													
			Plant quantities	3.5.2	G D												
			SD-11 Closeout Submittals														
			Tree staking removal	3.5.3	G D												
		32 16 13	SD-03 Product Data														
			Concrete	2.1													
			SD-06 Test Reports														
			Field Quality Control	3.8													
		32 92 19	SD-03 Product Data														
			Wood cellulose fiber mulch	2.5.3													
			Fertilizer	2.4													
			SD-06 Test Reports														
			Topsoil composition tests	2.2.3	G D												
			SD-07 Certificates														
			seed	2.1													
			SD-08 Manufacturer's Instructions														
			Erosion Control Materials	2.7													
		32 92 23	SD-03 Product Data														
			Fertilizer	2.5													
			SD-06 Test Reports														
			Topsoil composition tests	2.3.3													
			SD-07 Certificates														
			sods	2.1													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		32 93 00	SD-01 Preconstruction Submittals														
			State Landscape Contractor's License	1.4.3													
			Time Restrictions and Planting Conditions	1.6													
			SD-03 Product Data														
			Peat	2.3.5													
			Composted Derivatives	2.3.8													
			Organic Mulch Materials	2.8.2													
			Gypsum	2.3.9													
			Mulch	2.8													
			Hose	2.14.1													
			Fertilizer	2.5													
			Staking Material	2.9.1	G D												
			Antidesiccants	2.11													
			Erosion control materials	2.12													
			Photographs	1.4.4	G D												
			SD-04 Samples														
			Mulch	2.8	G D												
			SD-06 Test Reports														
			Topsoil composition tests	1.4.1	G D												
			Topsoil composition tests	2.2.4	G D												
			Percolation Test	1.4.5	G D												
			SD-07 Certificates														
			Nursery certifications	1.4.2													
			Nursery certifications	2.1.1													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Albritton Junior High School Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		33 11 23	SD-03 Product Data														
			Valve box	2.8													
			Pressure regulator	2.5.3													
			Gas equipment connectors	2.7													
			Valves	2.5													
			Warning and identification tape	2.10													
			Risers	2.3.3													
			Transition fittings	2.3.4													
			Gas meter	2.6													
			SD-07 Certificates														
			Welder's qualifications	1.5.1													
			PE welder's qualifications	1.5.2													
			Welder's identification symbols	1.5.1													
			Year 2000 (Y2K) Compliance	1.7.1													
			Warranty														
			SD-08 Manufacturer's Instructions														
			PE pipe and fittings	2.3.2													
		33 40 00	SD-03 Product Data														
			Placing Pipe	3.3													
			SD-07 Certificates														
			Resin Certification	2.1.10													
			Resin Certification	2.1.11													
			Pipeline Testing	3.8													
			Hydrostatic Test on Watertight	2.7													
			Joints														
			Determination of Density	3.7.5													

[illegible]

SECTION 01 33 29

LEED (TM) DOCUMENTATION
07/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED (2009) LEED 2009 for Schools New
Construction and Major Renovations
(LEED-Schools)

LEED Reference Guide (2005) LEED-NC Reference Guide for New
Construction

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

LEED Documentation Notebook; G, L

1.3 DESCRIPTION

This project has been designed for, and shall be developed for a sustainable rating of certified in accordance with LEED 2009 for Schools: New Construction and Major Renovation. Table 1 (see paragraph Table) identifies the LEED credit items that are designed into or otherwise required for this project. No variations or substitutions to the LEED credits identified for this contract shall be allowed without written consent from the Contracting Officer. Should there be a case where there is any problem meeting the full requirements of a LEED credit identified for this project in Table 1, the Contractor must bring this to the attention of the Contracting Officer immediately.

1.3.1 Credit Validation

This project will not be registered with USGBC for validation of credits earned. Validation of credits earned will be accomplished by the Government.

1.3.2 Contractor Responsibilities

Some LEED credits are inherent in the design provided and require no

further submittal or documentation. For these credits, the Contractor shall notify the Contracting Officer in advance of selection of any specified material or use of any permissible construction methods that may result in a deviation from the LEED designer intent. Some LEED credits involve material selection and are generally identified within the technical sections with the notation "LEED," though not specifically identified in all occurrences. Some LEED credits are dependent on construction practices.

All LEED credits identified in Table 1 not inherent in the design provided shall be documented by the Contractor. Table 1 provides a general summary of applicable credits. Detailed submittal requirements are contained in the LEED Reference Guide and in the technical sections.

In all cases where a material, product, or execution requirement is identified by "LEED" in the contract documents, additional data or certificates shall be submitted with the individual component or process validating the material or component to the respective LEED credit item. These additional data or certificates shall be separable from the other submitted data and a copy shall be included in the LEED Documentation Notebook in addition to the distribution indicated in the submittal register.

1.4 LEED DOCUMENTATION NOTEBOOK

The Contractor shall prepare a comprehensive notebook documenting compliance for each LEED credit identified in Table 1. LEED Documentation Notebook shall be formatted to match LEED numbering system and tabbed for each credit and prerequisite. LEED documentation in notebook shall contain up to date information through the previous month's work, and at least one set shall be available on the jobsite at all times. The Notebook may be maintained and available for reference electronically if preferred format is agreed upon in advance with the Contracting Officer. Completed pages shall be prevented from being altered. If the Contractor fails to maintain the LEED Documentation Notebook as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the Notebook. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of the Notebook. The original, one copy, and an electronic version on CD of the notebook shall be submitted at project closeout.

1.4.1 Content

Notebook shall include Table 1, applicable product data for material selection, final calculations, certifications for construction practices, procurement data, cumulative calculations and other items as identified required in the specifications. Notebook must contain all required data to support full compliance with the indicated LEED credit. LEED credits that are inherent to the design will be documented by the designer of record.

1.4.2 LEED Calculations

Calculations showing compliance with a required LEED credit identified in Table 1. Calculations shall be current and available for monthly review. Final calculations shall be included in the LEED Documentation Notebook under the appropriate tab.

1.4.3 Submittals

All "G" designated submittals required for inclusion in the LEED Documentation Notebook shall be separable from other submitted data and shall be included in the LEED Documentation Notebook in addition to the distribution indicated on the submittal register.

1.5 REQUIREMENTS

LEED credits as identified in Table 1 shall be incorporated and documented as required by the Contract documents and in full compliance with the LEED Reference Guide. LEED credits not identified elsewhere in the Contract documents and those requiring further instruction are specified below. Refer to the LEED Reference Guide for further definitions and requirements.

1.5.1 OMITTED - Materials and Resources Credit 3, Materials Reuse

1.5.2 Materials and Resources Credit 4, Recycled Content

Notwithstanding the requirements of Section 01 62 35 RECYCLED/RECOVERED MATERIALS, Contractor shall select materials so that the sum of post-consumer recycled content value plus one-half of post-industrial recycled content value constitutes at least 10 percent of the total materials cost for the project. EPA Comprehensive Procurement Guidelines has a [supplier database](#). California Integrated Waste Management Board (CIWMB) Recycled Content Directory also contains product and supplier data at www.ciwmb.ca.gov/rcp.

1.5.2.1 Substitutions

In the case of conflict between this requirement and individual technical section requirements, Contractor may submit for Government approval proposed alternative products or systems that provide equivalent performance and appearance and have greater contribution to project recycled content requirements. All such proposed substitutions shall be submitted accompanied by product data that demonstrates equivalence.

1.5.3 Materials and Resources Credit 5, Regional Materials

Contractor shall select materials so that a minimum of 10 percent (by dollar value) of materials and products for the project are extracted, harvested, or recovered, as well as manufactured, regionally within a 500 mile radius of the project site.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 COORDINATION MEETINGS

There will be three onsite coordination meetings. The first will be a preconstruction meeting. The requirements for this meeting may be fulfilled during the coordination and mutual understanding meeting outlined in Section 01 45 01 USACE QUALITY CONTROL. The second will be a pre-closeout meeting to review LEED Documentation Notebook for completeness and identify any outstanding issues relating to final score and

documentation requirements. The third is a closeout meeting to review the final LEED Documentation Notebook. All meetings shall be attended by Contractor's designated individual responsible for LEED documentation, Government representative and Installation representative. At closeout meeting a final score for the project will be determined based on review of project performance and documentation. Contractor shall make a set of contract drawings and specifications available for review at each meeting as well as an updated LEED Documentation Notebook.

3.2 TABLE

LEED credits as identified in Table 1 below are contract requirements and shall be incorporated in full compliance with the LEED Reference Guide.

-- End of Section --

LEED 2009 for Schools Project Checklist

Albritton Jr. High School Addition
Ft. Bragg, NC

Date

12.14.09

Corrected Final Design Checklist

Yes ? No

11	13	Sustainable Sites	24 Points	Notes
Y		Prereq 1 Construction Activity Pollution Prevention	Required	
Y		Prereq 2 Environmental Site Assessment	Required	
1		Credit 1 Site Selection	1	
	4	Credit 2 Development Density & Community Connectivity	4	
	1	Credit 3 Brownfield Redevelopment	1	
4		Credit 4.1 Alternative Transportation, Public Transportation Access	4	
1		Credit 4.2 Alternative Transportation, Bicycle Storage & Changing Rooms	1	
	2	Credit 4.3 Alternative Transportation, Low-Emitting and Fuel-Efficient Vehicles	2	
2		Credit 4.4 Alternative Transportation, Parking Capacity	2	
	1	Credit 5.1 Site Development, Protect or Restore Habitat	1	
1		Credit 5.2 Site Development, Maximize Open Space	1	
	1	Credit 6.1 Stormwater Design, Quantity Control	1	
	1	Credit 6.2 Stormwater Design, Quality Control	1	
1		Credit 7.1 Heat Island Effect, Non-Roof	1	
	1	Credit 7.2 Heat Island Effect, Roof	1	
1		Credit 8 Light Pollution Reduction	1	
	1	Credit 9 Site Master Plan	1	
	1	Credit 10 Joint Use of Facilities	1	

8	3	Water Efficiency	11 Points	Notes
Y		Prereq 1 Water Use Reduction, 20% Reduction	Required	
4		Credit 1 Water Efficient Landscaping	2 to 4	
	2	Credit 2 Innovative Wastewater Technologies	2	
4		Credit 3 Water Use Reduction	2 to 4	
	1	Credit 4 Process Water Use Reduction	1	

2	31	Energy & Atmosphere	33 Points	Notes
Y		Prereq 1 Fundamental Commissioning of the Building Energy Systems	Required	
Y		Prereq 2 Minimum Energy Performance	Required	
Y		Prereq 3 Fundamental Refrigerant Management	Required	
1	18	Credit 1 Optimize Energy Performance	1 to 19	
	7	Credit 2 On-Site Renewable Energy	1 to 7	
	2	Credit 3 Enhanced Commissioning	2	
1		Credit 4 Enhanced Refrigerant Management	1	
	2	Credit 5 Measurement & Verification	2	Potentially attainable should Owner desire Silver rating - See narrative
	2	Credit 6 Green Power	2	

3	3	7	Materials & Resources	13 Points	Notes
Y			Prereq 1 Storage & Collection of Recyclables	Required	
		2	Credit 1.1 Building Reuse, Maintain Existing Walls, Floors & Roof	1 to 2	
		1	Credit 1.2 Building Reuse, Maintain 50% of Interior Non-Structural Elements	1	
1	1		Credit 2 Construction Waste Management	1 to 2	"Maybe" point is potentially attainable should Owner desire Silver rating - See narrative
		2	Credit 3 Materials Reuse	1 to 2	
1	1		Credit 4 Recycled Content	1 to 2	"Maybe" point is potentially attainable should Owner desire Silver rating - See narrative
1	1		Credit 5 Regional Materials	1 to 2	"Maybe" point is potentially attainable should Owner desire Silver rating - See narrative
		1	Credit 6 Rapidly Renewable Materials	1	
		1	Credit 7 Certified Wood	1	

15	4	Indoor Environmental Quality	19 Points	Notes
Y		Prereq 1 Minimum IAQ Performance	Required	
Y		Prereq 2 Environmental Tobacco Smoke (ETS) Control	Required	
Y		Prereq 3 Minimum Acoustical Performance	Required	
1		Credit 1 Outdoor Air Delivery Monitoring	1	
	1	Credit 2 Increased Ventilation	1	
1		Credit 3.1 Construction IAQ Management Plan, During Construction	1	
1		Credit 3.2 Construction IAQ Management Plan, Before Occupancy	1	
4		Credit 4 Low-Emitting Materials	1 to 4	
1		Credit 5 Indoor Chemical & Pollutant Source Control	1	
1		Credit 6.1 Controllability of Systems, Lighting	1	
1		Credit 6.2 Controllability of Systems, Thermal Comfort	1	
1		Credit 7.1 Thermal Comfort, Design	1	
1		Credit 7.2 Thermal Comfort, Verification	1	
	3	Credit 8.1 Daylight & Views, Daylight	1 to 3	
1		Credit 8.2 Daylight & Views, Views for 90% of Spaces	1	
1		Credit 9 Enhanced Acoustical Performance	1	
1		Credit 10 Mold Prevention	1	

1	5	Innovation & Design Process	6 Points	Notes
	1	Credit 1.1 Innovation in Design: Provide Specific Title	1	Potentially attainable should Owner desire Silver rating - See narrative
	1	Credit 1.2 Innovation in Design: Provide Specific Title	1	Potentially attainable should Owner desire Silver rating - See narrative
	1	Credit 1.3 Innovation in Design: Provide Specific Title	1	
	1	Credit 1.4 Innovation in Design: Provide Specific Title	1	
1		Credit 2 LEED® Accredited Professional	1	
	1	Credit 3 The School as a Teaching Tool	1	Potentially attainable should Owner desire Silver rating - See narrative

3	1	Regional Priority	4 Points	Notes
1		Credit 1.1 Regional Priority: SS04.1	1	
1		Credit 1.2 Regional Priority: WEC3 (40%)	1	
1		Credit 1.3 Regional Priority: EQ07.1	1	
	1	Credit 1.4 Regional Priority:	1	

43	3	64	Project Totals (pre-certification estimates)	110 Points
----	---	----	--	------------

Yes ? No

Certified 40-49 points Silver 50-59 points Gold 60-79 points Platinum 80-110 points

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS

02/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

- ASSE/SAFE A10.32 (2004) Fall Protection
- ASSE/SAFE A10.34 (2001; R 2005) Protection of the Public on or Adjacent to Construction Sites
- ASSE/SAFE Z359.1 (2007) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components

ASME INTERNATIONAL (ASME)

- ASME B30.22 (2005) Articulating Boom Cranes
- ASME B30.5 (2007) Mobile and Locomotive Cranes

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 10 (2007; Errata 2007; AMD 1 2007) Standard for Portable Fire Extinguishers
- NFPA 51B (2008) Fire Prevention During Welding, Cutting, and Other Hot Work
- NFPA 70 (2007; AMD 1 2008) National Electrical Code - 2008 Edition
- NFPA 70E (2008) Electrical Safety in the Workplace

U.S. ARMY CORPS OF ENGINEERS (USACE)

- EM 385-1-1 (2008) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

- 29 CFR 1910 Occupational Safety and Health Standards
- 29 CFR 1910.146 Permit-required Confined Spaces
- 29 CFR 1926 Safety and Health Regulations for Construction
- 29 CFR 1926.500 Fall Protection

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Government acceptance is required for submittals with a "G, A" designation.

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G, A

Activity Hazard Analysis (AHA); G, A

Crane Critical Lift Plan; G, A

Proof of qualification for Crane Operators; G, A

SD-06 Test Reports

Reports

Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."

Accident Reports

Monthly Exposure Reports

Crane Reports

SD-07 Certificates

Confined Space Entry Permit

Hot work permit

Submit one copy of each permit/certificate attached to each Daily Quality Control Report.

1.3 DEFINITIONS

a. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.

b. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

c. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:

(1) Death, regardless of the time between the injury and death, or the length of the illness;

- (2) Days away from work (any time lost after day of injury/illness onset);
- (3) Restricted work;
- (4) Transfer to another job;
- (5) Medical treatment beyond first aid;
- (6) Loss of consciousness; or
- (7) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

d. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

e. Weight Handling Equipment (WHE) Accident. A WHE accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; and/or collision, including unplanned contact between the load, crane, and/or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.).

1.4 OMITTED - CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with USACE EM 385-1-1, and the following federal, state, and local, laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.6 SITE QUALIFICATIONS, DUTIES AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 Site Safety and Health Officer (SSHO)

Provide a site Safety and Health Officer (SSHO) at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The Contractor Quality Control (QC) person can be the SSHO on this project. Meet the following requirements within the SSHO:

Level 3:

- A minimum of 5 years safety work on similar projects.
- 30-hour OSHA construction safety class or equivalent within the

last 5 years.

An average of at least 24 hours of formal safety training each year for the past 5 years.

Competent person training as needed.

1.6.1.2 Other Safety Personnel

Duties of other safety personnel shall be as specified in other sections of the specifications.

1.6.1.3 Crane Operators

If cranes to be used, meet the crane operators requirements in USACE EM 385-1-1, Section 16 and Appendix G. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, designate crane operators as qualified by a source that qualifies crane operators (i.e., union, a government agency, or an organization that tests and qualifies crane operators). Provide proof of current qualification.

1.6.2 Personnel Duties

1.6.2.1 Site Safety and Health Officer (SSHO)

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily quality control report.
- b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.
- c. Maintain applicable safety reference material on the job site.
- d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
- e. Implement and enforce accepted APPS and AHAs.
- f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. Post a list of unresolved safety and health deficiencies on the safety bulletin board.
- g. Ensure sub-contractor compliance with safety and health requirements.

Failure to perform the above duties will result in dismissal of the superintendent and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

1.6.2.2 Certified Safety Professional (CSP), Certified Industrial Hygienist (CIH), Associate Safety Professional (ASP), Certified Safety Trained Supervisor (STS), and/or Certified Construction Health & Safety Technician (CHST)

1.6.3 Meetings

1.6.3.1 Pre-Work Safety Meeting (Safety Preconstruction Conference)

The safety meeting will be held prior to construction.

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.

c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

d. The functions of a Preconstruction conference may take place at the Post-Award Kickoff meeting for Design Build Contracts.

1.7 ACCIDENT PREVENTION PLAN (APP)

Use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated CSP and/or CIH.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and quality control manager. Should any hazard become evident, stop work in the area, secure the area, and develop a plan to remove the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34,) and the environment.

Copies of the accepted plan will be maintained at the Contracting Officer's office and at the job site.

Continuously reviewed and amended the APP, as necessary, throughout the life of the contract. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered.

1.7.1 EM 385-1-1 Contents

In addition to the requirements outlines in Appendix A of USACE EM 385-1-1, the following is required:

a. If crane is to be used, Crane Critical Lift Plan. Prepare and sign weight handling critical lift plans for lifts over 75 percent of the capacity of the crane or hoist (or lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane or hoist; lifts of personnel; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. Submit 15 calendar days prior to on-site work and include the requirements of USACE EM 385-1-1, paragraph 16.C.18. and the following:

(1) For lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.550(g).

(2) For barge mounted mobile cranes, barge stability calculations identifying barge list and trim based on anticipated loading; and load charts based on calculated list and trim. The amount of list and trim shall be within the crane manufacturer's requirements.

h. Asbestos Hazard Abatement Plan. The safety and health aspects of asbestos work, prepared in accordance with Section 02 82 14.00 10 ASBESTOS ABATEMENT.

b. Site Demolition Plan. The safety and health aspects prepared in accordance with Section 02 41 00 DEMOLITION and referenced sources.

c. Excavation Plan. The safety and health aspects prepared in accordance with Section 31 00 00 EARTHWORK.

1.8 ACTIVITY HAZARD ANALYSIS (AHA)

The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1. Submit the AHA for review at least 15 calendar days prior to the start of each phase. Format subsequent AHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

Develop the activity hazard analyses using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer.

1.9 DISPLAY OF SAFETY INFORMATION

Within 7 calendar day after commencement of work, erect a safety bulletin board at the job site. Include and maintain information on safety bulletin board as required by EM 385-1-1, section 01.A.06. Additional items required to be posted include:

- a. Confined space entry permit.
- b. Hot work permit.

1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

1.11 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.12 REPORTS

1.12.1 Accident Reports

- a. Conduct an accident investigation for recordable injuries and illnesses, and property damage accidents resulting in at least \$2,000 in damages, to establish the root cause(s) of the accident, complete the USACE Accident Report Form 3394 and provide the report to the Contracting Officer within 5 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

1.12.2 Accident Notification

Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal

to or greater than \$2,000, or any weight handling equipment accident. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.

1.12.3 Monthly Exposure Reports

Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor.

1.12.4 Crane Reports

Submit crane inspection reports required in accordance with USACE EM 385-1-1, Appendix H and as specified herein with Daily Reports of Inspections.

1.12.5 OMITTED - Certificate of Crane Compliance

1.13 HOT WORK

Submit and obtain a written permit prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, from the Fire Marshall. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. The Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit.

1.14 OMITTED - RADIATION SAFETY REQUIREMENTS

1.15 FACILITY OCCUPANCY CLOSURE

Streets, walks, and other facilities occupied and used by the Government shall not be closed or obstructed without written permission from the Contracting Officer.

1.16 OMITTED - GAS PROTECTION

1.17 OMITTED - HIGH NOISE LEVEL PROTECTION

1.18 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

- a. Secure outside equipment and materials and place materials that could be damaged in protected areas.
- b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or

against existing facilities.

- c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS

Not used.

2.1 OMITTED - CONFINED SPACE SIGNAGE

2.2 OMITTED - FALL PROTECTION ANCHORAGE

PART 3 EXECUTION

3.1 CONSTRUCTION AND/OR OTHER WORK

3.1.1 OMITTED - Hazardous Material Use

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

3.1.3 Unforeseen Hazardous Material

The design should have identified materials such as asbestos, such as at steam piping. If other material, is encountered during construction operations, that may be hazardous to human health upon disturbance stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

3.2 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least 15 days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, attend a pre-outage coordination meeting with the Contracting Officer and the Public Utilities representative to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

3.3 SAFETY LOCKOUT/TAGOUT PROCEDURES

Contractor shall ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

Contracting Officer will, at the Contractor's request, apply lockout/tagout tags and take other actions that, because of experience and knowledge, are known to be necessary to make the particular equipment safe to work on.

No person, regardless of position or authority, shall operate any switch, valve, or equipment that has an official lockout/tagout tag attached to it, nor shall such tag be removed except as provided in this section.

No person shall work on any equipment that requires a lockout/tagout tag unless he, his immediate supervisor, project leader, or a subordinate has in his possession the stubs of the required lockout/tagout tags.

When work is to be performed on electrical circuits, only qualified personnel shall perform work on electrical circuits.

A supervisor who is required to enter an area protected by a lockout/tagout tag will be considered a member of the protected group provided he notifies the holder of the tag stub each time he enters and departs from the protected area.

Identification markings on building light and power distribution circuits shall not be relied on for established safe work conditions.

Before clearance will be given on any equipment other than electrical (generally referred to as mechanical apparatus), the apparatus, valves, or systems shall be secured in a passive condition with the appropriate vents, pins, and locks.

Pressurized or vacuum systems shall be vented to relieve differential pressure completely.

Vent valves shall be tagged open during the course of the work.

Where dangerous gas or fluid systems are involved, or in areas where the environment may be oxygen deficient, system or areas shall be purged, ventilated, or otherwise made safe prior to entry.

3.3.1 Tag Placement

Lockout/tagout tags shall be completed in accordance with the regulations printed on the back thereof and attached to any device which, if operated, could cause an unsafe condition to exist.

If more than one group is to work on any circuit or equipment, the employee in charge of each group shall have a separate set of lockout/tagout tags completed and properly attached.

When it is required that certain equipment be tagged, the Government will review the characteristics of the various systems involved that affect the safety of the operations and the work to be done; take the necessary actions, including voltage and pressure checks, grounding, and venting, to make the system and equipment safe to work on; and apply such lockout/tagout tags to those switches, valves, vents, or other mechanical

devices needed to preserve the safety provided. This operation is referred to as "Providing Safety Clearance."

3.3.2 Tag Removal

When any individual or group has completed its part of the work and is clear of the circuits or equipment, the supervisor, project leader, or individual for whom the equipment was tagged shall turn in his signed lockout/tagout tag stub to the Contracting Officer. That group's or individual's lockout/tagout tags on equipment may then be removed on authorization by the Contracting Officer.

3.4 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

Establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures.

3.4.1 Training

Institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with USACE EM 385-1-1, section 21.A.16.

3.4.2 Fall Protection Equipment and Systems

Enforce use of the fall protection equipment and systems designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, section 21. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, paragraphs 05.H. and 05.I. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M, USACE EM 385-1-1 and ASSE/SAFE A10.32.

3.4.2.1 Personal Fall Arrest Equipment

Personal fall arrest equipment, systems, subsystems, and components shall meet ASSE/SAFE Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 6 feet. The total fall distance and any

swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

3.4.3 Fall Protection for Roofing Work

Implement fall protection controls based on the type of roof being constructed and work being performed. Evaluate the roof area to be accessed for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 1.8 m (6 feet) of an edge, on low-slope roofs, Protect personnel from falling by use of personal fall arrest systems, guardrails, or safety nets.

(2) For work greater than 1.8 m (6 feet) from an edge, erect and install warning lines in accordance with 29 CFR 1926.500 and USACE EM 385-1-1.

b. Steep-Sloped Roofs: Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.

3.4.4 Existing Anchorage

Certified (or re-certified) by a qualified person for fall protection eexisting anchorages, to be used for attachment of personal fall arrest equipmentin accordance with ASSE/SAFE Z359.1. Exiting horizontal lifeline anchorages must be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.

3.4.5 Horizontal Lifelines

Design, install, certify and use under the supervision of a qualified person horizontal lifelines for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500).

3.4.6 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1 and 29 CFR 1926 Subpart M.

3.4.7 Rescue and Evacuation Procedures

When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

3.5 OMITTED - SHIPYARD REQUIREMENTS

3.6 OMITTED - SCAFFOLDING

3.6.1 Stilts

The use of stilts for gaining additional height in construction, renovation, repair or maintenance work is prohibited.

3.7 EQUIPMENT

3.7.1 Material Handling Equipment

a. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.

c. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

3.7.2 Weight Handling Equipment

a. Equip cranes and derricks as specified in EM 385-1-1, section 16.

b. Comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.

c. Comply with ASME B30.5 for mobile cranes, and ASME B30.22 for articulating boom cranes.

d. Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.

e. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and follow the requirements of USACE EM 385-1-1 section 11 and ASME B30.5 or ASME B30.22 as applicable.

f. Do not crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane.

g. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.

h. All employees must keep clear of loads about to be lifted and of suspended loads.

j. Use cribbing when performing lifts on outriggers.

k. The crane hook/block must be positioned directly over the load.

Side loading of the crane is prohibited.

l. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.

m. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.

n. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.

o. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

3.8 EXCAVATIONS

Perform soil classification by a competent person in accordance with 29 CFR 1926. The standards for excavation and trenching are outlined in 29 CFR 1926, Subpart P. These standards shall be followed in addition to those outlined in USACE EM 385-1-1. The competent person for excavations performed as a result of contract work shall be on-site when excavation work is being performed, and shall inspect, and document the excavations daily prior to entry by workers. The competent person must evaluate all hazards, including atmospheric, that may be associated with the work, and shall have the resources necessary to correct hazards promptly.

3.8.1 Utility Locations

Prior to digging, the appropriate digging permit must be obtained. All underground utilities in the work area must be positively identified by a private utility locating service in addition to any station locating service and coordinated with the station utility department. Any markings made during the utility investigation must be maintained throughout the contract.

3.8.2 Utility Location Verification

The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within 2 feet of a known utility must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility expose the utility by hand digging every 30.5 m (100 feet) if parallel within 1.5 m (5 feet) of the excavation.

3.8.3 Shoring Systems

Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review. Job-made shoring or shielding must have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.

3.8.4 Trenching Machinery

Operate trenching machines with digging chain drives only when the spotters/laborers are in plain view of the operator. Provide operator and spotters/laborers training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Keep documentation of the training on file at the project site.

3.9 UTILITIES WITHIN CONCRETE SLABS

Utilities located within concrete slabs or pier structures, bridges, and the like, are extremely difficult to identify due to the reinforcing steel used in the construction of these structures. Whenever contract work involves concrete chipping, saw cutting, or core drilling, the existing utility location must be coordinated with station utility departments in addition to a private locating service. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

3.10 ELECTRICAL

3.10.1 Conduct of Electrical Work

Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Station Utilities for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers will be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. In addition, provide electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA.

3.10.2 Portable Extension Cords

Size portable extension cords in accordance with manufacturer ratings for the tool to be powered and protected from damage. Immediately removed from service all damaged extension cords. Portable extension cords shall meet the requirements of NFPA 70.

3.11 WORK IN CONFINED SPACES

Comply with the requirements in Section 06.I of USACE EM 385-1-1, OSHA 29 CFR 1910.146 and OSHA 29 CFR 1926.21(b)(6). Any potential for a hazard in the confined space requires a permit system to be used.

-- End of Section --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

05/09

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization, (e.g. ASTM B 564 Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the standards producing organization should be ordered from the source by title rather than by number.

ACOUSTICAL SOCIETY OF AMERICA (ASA)
2 Huntington Quadrangle, Suite 1N01
Melville, NY 11747-4502
Ph: 516-576-2360
Fax: 516-576-2377
E-mail: asa@aip.org
Internet: <http://asa.aip.org>

ACI INTERNATIONAL (ACI)
38800 Country Club Drive
Farmington Hills, MI 48331
Ph: 248-848-3700
Fax: 248-848-3701
E-mail: bkstore@concrete.org
Internet: <http://www.concrete.org>

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)
2111 Wilson blvd, Suite 500
Arlington, VA 22201
Ph: 703-524-8800
Fax: 703-528-3816
E-mail: ahri@ahrinet.org
Internet: <http://www.ahrinet.org>

AIR CONDITIONING CONTRACTORS OF AMERICA (ACCA)
2800 Shirlington Road, Suite 300
Arlington, VA 22206
Ph: 703-575-4477
Fax: 703-575-4449
E-mail: info@acca.org

Internet: <http://www.acca.org>

AIR DIFFUSION COUNCIL (ADC)
104 So. Michigan Ave., No. 1500
Chicago, IL 60603
Ph: 312-201-0101
Fax: 312-201-0214

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL (AMCA)
30 West University Drive
Arlington Heights, IL 60004-1893
Ph: 847-394-0150
Fax: 847-253-0088
E-mail: amca@amca.org
Internet: <http://www.amca.org>

ALLIANCE FOR TELECOMMUNICATIONS INDUSTRY SOLUTIONS (ATIS)
1200 G Street, NW, Suite 500
Washington, D.C. 20005
Ph: 202-628-6380
Fax: 202-393-5453
Internet: <http://www.atis.org>

ALUMINUM ASSOCIATION (AA)
National Headquarters
1525 Wilson Boulevard, Suite 600
Arlington, VA 22209
Ph: 703-358-2960
Fax: 703-358-2961
Internet: <http://www.aluminum.org>

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)
1827 Walden Office Square
Suite 550
Schaumburg, IL 60173-4268
Ph: 847-303-5664
Fax: 847-303-5774
E-mail: webmaster@aamanet.org
Internet: <http://www.aamanet.org>

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)
444 North Capital Street, NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@ashto.org
Internet: <http://www.aashto.org>

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)
1 Davis Drive
P.O. Box 12215
Research Triangle Park, NC 27709-2215
Ph: 919-549-8141
Fax: 919-549-8933
E-mail: quantem@aatcc.org
Technical Questions: hammona@aatc.org
Internet: <http://www.aatcc.org>

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)
2025 M Street, NW, Suite 800
Washington, DC 20036
Ph: 202-367-1155
Fax: 202-367-2155
E-mail: info.abma@smithbucklin.com
Internet: <http://www.abma-dc.org>

AMERICAN BOILER MANUFACTURERS ASSOCIATION (ABMA)
8221 Old Courthouse Road Suite 207
Vienna, VA 22182
Ph: 703-356-7172
Fax: 703-356-4543
Internet: <http://www.abma.com>

AMERICAN BUREAU OF SHIPPING (ABS)
Internet: <http://www.eagle.org>

AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)
222 West Las Colinas Boulevard, Suite 641
Irving, TX 75039-5423
Ph: 972-506-7216
Fax: 972-506-7682
E-mail: info@concrete-pipe.org
Internet: <http://www.concrete-pipe.org>

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)
1330 Kemper Meadow Drive
Cincinnati, OH 45240
Ph: 513-742-2020
Fax: 513-742-3355
E-mail: mail@acgih.org
Internet: <http://www.acgih.org>

AMERICAN FOREST & PAPER ASSOCIATION (AF&PA)
American Wood Council
ATTN: Publications Department
1111 Nineteenth Street NW, Suite 800
Washington, DC 20036
Ph: 800-890-7732 or 202-463-2766
Fax: 202-463-2791
Internet: <http://www.awc.org/>

AMERICAN GAS ASSOCIATION (AGA)
400 North Capitol Street N.W.
Suite 450
Washington, D.C. 20001
Ph: 202-824-7000
Fax: 202-824-7115
E-mail: webmaster@aga.org
Internet: <http://www.aga.org>

AMERICAN GEAR MANUFACTURERS ASSOCIATION (AGMA)
500 Montgomery Street, Suite 350
Alexandria, VA 22314-1560
Ph: 703-684-0211
Fax: 703-684-0242
E-mail: webmaster@agma.org
Internet: <http://www.agma.org>

AMERICAN HARDBOARD ASSOCIATION (AHA)
c/o Composite Panel Association
18922 Premiere Court
Gaithersburg, MD 20879-1574
Ph: 301-670-0604
Fax: 301-840-1252
Internet: <http://www.pbmdf.org>

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA)
2700 Prosperity Ave., Shite 250
Fairfax, VA 22031
Tel: 703-849-8888
Fax: 703-207-3561
E-mail: infonet@aiha.org
Internet <http://www.aiha.org>

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
One East Wacker Drive
Chicago, IL 60601-1802
Ph: 312-670-2400
Fax: 312-670-5403
Publications: 800-644-2400
E-mail: pubs@aisc.org
Internet: <http://www.aisc.org>

AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC)
7012 South Revere Parkway, Suite 140
Englewood, CO 80112
Ph: 303-792-9559
Fax: 303-792-0669
E-mail: info@aitc-glulam.org
Internet: <http://www.aitc-glulam.org>

AMERICAN IRON AND STEEL INSTITUTE (AISI)
1140 Connecticut Avenue, NW, Suite 705
Washington, DC 20036
Ph: 202-452-7100
Fax: 202-463-6573
Internet: <http://www.steel.org>

AMERICAN LADDER INSTITUTE (ALI/LADDER)
410 North Michigan Avenue
Chicago, IL 60611
Tel: 312-644-6610
Fax: 312-527-6705
E-mail: rpietrzak@smithbucklin.com
Internet: <http://www.americanladderinstitute.org>

AMERICAN LUMBER STANDARDS COMMITTEE (ALSC)
P.O. Box 210
Germantown, MD 20875-0210
Ph: 301-972-1700
Fax: 301-540-8004
E-mail: alsc@alsc.org
Internet: <http://www.alsc.org>

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1819 L Street, NW, 6th Floor

Washington, DC 20036
Ph: 202-293-8020
Fax: 202-293-9287
E-mail: info@ansi.org
Internet: <http://www.ansi.org/>

AMERICAN NURSERY AND LANDSCAPE ASSOCIATION (ANLA)
1000 Vermont Avenue, NW, Suite 300
Washington, DC 20005-4914
Ph: 202-789-2900
Fax: 202-789-1893
Internet: <http://www.anla.org>

AMERICAN PETROLEUM INSTITUTE (API)
1220 L Street, NW
Washington, DC 20005-4070
Ph: 202-682-8000
Fax: 202-682-8223
Internet: <http://www.api.org>

AMERICAN PUBLIC HEALTH ASSOCIATION (APHA)
800 I Street, NW
Washington, DC 20001
Ph: 202-777-2742
Fax: 202-777-2534
E-mail: comments@apha.org
Internet: <http://www.apha.org>

AMERICAN RAILWAY ENGINEERING AND MAINTENANCE-OF-WAY ASSOCIATION
(AREMA)
10003 Derekwood Lane, Suite 210
Lanham, MD 20706
Ph: 301-459-3200
Fax: 301-459-8077
Internet: <http://www.arema.org>

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)
1711 Arlingate Lane
P.O. Box 28518
Columbus, OH 43228-0518
Ph: 800-222-2768; 614-274-6003
Fax: 614-274-6899
E-mail: webmaster@asnt.org
Internet: <http://www.asnt.org>

AMERICAN SOCIETY FOR QUALITY (ASQ)
600 North Plankinton Avenue
Milwaukee, WI 53203
-or-
P.O. Box 3005
Milwaukee, WI 53201-3005
Ph: 800-248-1946; 414-272-8575
Fax: 414-272-1734
E-mail: cs@asq.org or help@asq.org
Internet: <http://www.asq.org>

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
1801 Alexander Bell Drive
Reston, VA 20191-4400

Ph: 703-295-6300 - 800-548-2723
Fax: 703-295-6222
E-mail: marketing@asce.org
Internet: <http://www.asce.org>

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING
ENGINEERS (ASHRAE)
1791 Tullie Circle, NE
Atlanta, GA 30329
Ph: 800-527-4723 or 404-636-8400
Fax: 404-321-5478
E-mail: ashrae@ashrae.org
Internet: <http://www.ashrae.org>

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)
1800 East Oakton Street
Des Plaines, IL 60018-2187
Ph: 847-699-2929
Fax: 847-768-3434
E-mail: customerservice@asse.org
Internet: <http://www.asse.org>

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)
901 Canterbury, Suite A
Westlake, OH 44145
Ph: 440-835-3040
Fax: 440-835-3488
E-mail: info@asse-plumbing.org
Internet: <http://www.asse-plumbing.org>

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 West Quincy Avenue
Denver, CO 80235
Ph: 800-926-7337
Fax: 303-347-0804
Internet: <http://www.awwa.org>

AMERICAN WELDING SOCIETY (AWS)
550 N.W. LeJeune Road
Miami, FL 33126
Ph: 800-443-9353 - 305-443-9353
Fax: 305-443-7559
E-mail: info@aws.org
Internet: <http://www.aws.org>

AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)
P.O. Box 361784
Birmingham, AL 35236-1784
Ph: 205-733-4077
Fax: 205-733-4075
E-mail: email@awpa.com
Internet: <http://www.awpa.com>

APA - THE ENGINEERED WOOD ASSOCIATION (APA)
7011 South 19th
Tacoma, WA 98466
Ph: 253-565-6600
Fax: 253-565-7265
E-mail: help@apawood.org

Internet: <http://www.apawood.org>

ARCHITECTURAL WOODWORK INSTITUTE (AWI)
146179 Westlake Drive, Suite 120
Potomac Falls, VA 20165
Ph: 571-323-3636
Fax: 571-323-3630
Internet: <http://www.awinet.org>

ASM INTERNATIONAL (ASM)
9639 Kinsman Road
Materials Park, OH 44073-0002
Ph: 440-338-5151
Fax: 440-338-4634
E-mail: cust-srv@asminternational.org
Internet: <http://www.asm-international.org>

ASME INTERNATIONAL (ASME)
Three Park Avenue, M/S 10E
New York, NY 10016
Ph: 212-591-7722 or 800-843-2763
Fax: 212-591-7674
E-mail: infocentral@asme.org
Internet: <http://www.asme.org>

ASPHALT INSTITUTE (AI)
Research Park Drive
P.O. Box 14052
Lexington, KY 40512-4052
Ph: 859-288-4960
Fax: 859-288-4999
E-mail: info@asphaltinstitute.org
Internet: <http://www.asphaltinstitute.org>

ASPHALT ROOFING MANUFACTURER'S ASSOCIATION (ARMA)
1156-15TH Street, NW, Suite 900
Washington D.C. 20005
Ph: 202-207-0917
Fax: 202-223-9741
Internet: <http://www.asphaltroofing.org>

ASSOCIATED AIR BALANCE COUNCIL (AABC)
1518 K Street, NW
Washington, DC 20005
Ph: 202-737-0202
Fax: 202-638-4833
E-mail: info@aabc.com
Internet: <http://www.aabchg.com>

ASSOCIATION FOR THE ADVANCEMENT OF MEDICAL INSTRUMENTATION (AAMI)
1110 North Glebe Road, Suite 220
Arlington, VA 22201-4795
Ph: 800-332-2264 or 703-525-4890
E-mail: customerservice@aami.org
Internet: <http://www.aami.org>

ASSOCIATION FOR IRON AND STEEL TECHNOLOGY (AIST)
186 Thorn Hill Road

Warrendale, PA 15086-7528
Ph: 724-776-6040
Fax: 724-776-1880
E-Mail: info@aistech.org
Internet: <http://www.aistech.org>

ASSOCIATION FOR IRON AND STEEL TECHNOLOGY (AIST) (FORMERLY: IRON & STEEL SOCIETY (ISS))
186 Thorn Hill Road
Warrendale, PA 15086-7528
Ph: 724-776-6040
Fax: 724-776-1880
E-Mail: info@aistech.org
Internet: <http://www.aistech.org>

ASSOCIATION OF EDISON ILLUMINATING COMPANIES (AEIC)
600 North 18th Street
P.O. Box 2641
Birmingham, AL 35291
Ph: 205-257-2530
Fax: 205-257-2540
Internet: <http://www.aeic.org>

ASSOCIATION OF HOME APPLIANCE MANUFACTURERS (AHAM)
1111 19th Street NW, Suite 402
Washington, DC 20036
Ph: 202-872-5955
Fax: 202-872-9354
E-mail: info@aham.org
Internet: <http://www.aham.org>

ASSOCIATION OF THE WALL AND CEILING INDUSTRIES - INTERNATIONAL (AWCI)
513 West Broad Street, Suite 210
Falls Church, VA 22046
Ph: 703-534-8300
Fax: 703-534-8307
E-mail: info@awci.org
Internet: <http://www.awci.org>

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
E-mail: service@astm.org
Internet: <http://www.astm.org>

BAY AREA AIR QUALITY MANAGEMENT DISTRICT (Bay Area AQMD)
939 Ellis Street
San Francisco, CA 94109
Ph: 415-771-6000
Fax: 415-928-8560
Internet: <http://www.baaqmd.gov/>

BAY AREA AIR RESOURCES BOARD (BAARB)
Address and contact information unavailable.

BIFMA INTERNATIONAL (BIFMA)
2680 Horizon Drive SE, Suite A-1
Grand Rapids, MI 49546-7500
Ph: 616-285-3963
Fax: 616-285-3765
E-mail: email@bifma.org
Internet: <http://www.bifma.org>

BIOCYCLE, JOURNAL OF COMPOSTING AND RECYCLING (BIOCYCLE)
The JG Press Inc.
419 State Avenue
Emmaus, PA 18049
Ph: 610-967-4135, Ext. 22
E-mail: biocycle@jgpress.com
Internet: <http://www.biocycle.net>

BRICK INDUSTRY ASSOCIATION (BIA)
11490 Commerce Park Drive
Reston, VA 22091-1525
Ph: 703-620-0010
Fax: 703-620-3928
E-mail: brickinfo@bia.org
Internet: <http://www.bia.org>

BRITISH STANDARDS INSTITUTE (BSI)
389 Chiswick High Road
London W4 4AL
United Kingdom
Ph: +44 (0)20 8996 9000
Fax: +44 (0)20 8996 7001
E-mail: cservices@bsi-global.com
Internet: <http://www.bsi-global.com>

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)
355 Lexington Avenue
17th Floor
New York, NY 10017
Ph: 212-297-2122
Fax: 212-370-9047
E-mail: assocmgmt@aol.com
Internet: <http://www.buildershardware.com>

CANADIAN STANDARDS ASSOCIATION (CSA)
178 Rexdale Blvd.
Etobicoke, ON M9W 1R3
CANADA
Ph: 416-747-4104
Fax: 416-747-2475
internet: <http://www.csa.ca/Default.asp?language=english>

CSA AMERICA INC (CSA/AM)
8501 East Pleasant Valley Road
Cleveland, OH 44131-5575
Ph: 216-524-4990
Fax: 216-520-8979
E-mail: cathy.rake@csa-america.org
Internet: <http://www.csa-america.org>

CSA INTERNATIONAL (CSA)
8501 East Pleasant Valley Road
Cleveland, OH 44131-5575
Ph: 216-524-4990
Fax: 216-642-3463
E-mail: certinfo@csa-international.org
Internet: <http://www.csa-international.org>

CALIFORNIA ENERGY COMMISSION (CEC)
Media and Public Communications Office
1516 Ninth Street, MS-29
Sacramento, CA 95814-5512
Ph: 916-654-4287
Internet: <http://www.energy.ca.gov/>

CARPET AND RUG INSTITUTE (CRI)
P.O. Box 2048
Dalton, GA 30722-2048
Ph: 800-882-8846 or 706-278-3176
Fax: 706-278-8835
Internet: <http://www.carpet-rug.com>

CAST IRON SOIL PIPE INSTITUTE (CISPI)
5959 Shallowford Road, Suite 419
Chattanooga, TN 37421
Ph: 423-892-0137
Fax: 423-892-0817
Internet: <http://www.cispi.org>

CAST STONE INSTITUTE (CSI)
813 Chestnut Street
P.O. Box 68
Lebanon, PA 17042
Ph: (717) 272-3744
Fax: (717) 272-5147
E-mail: staff@caststone.org
Internet: www.caststone.org

CEILINGS & INTERIOR SYSTEMS CONSTRUCTION ASSOCIATION (CISCA)
1500 Lincoln Highway, Suite 202
St. Charles, IL 60174
Ph: 630-584-1919
Fax: 630-584-2003
E-mail: info@cisca.org
Internet: <http://www.cisca.org>

CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)
1600 Clifton Road
Atlanta, GA 30333
Ph: 404-639-3311
Internet: <http://www.cdc.gov>

CHEMICAL FABRICS & FILM ASSOCIATION (CFFA)
1300 Sumner Avenue
Cleveland OH 44115-2851
Ph: 216-241-7333
Fax: 216-241-0105
E-mail: cffa@chemicalfabricsandfilm.com
Internet: <http://www.chemicalfabricsandfilm.com/>

CHLORINE INSTITUTE (CI)
1300 Wilson Boulevard
Arlington, VA 22209
Ph: 703-741-5760
Fax: 703-741-6068
E-mail: aonna@CL2.com
Internet: <http://www.CL2.com>

COMPOSITE PANEL ASSOCIATION (CPA)
18922 Premeire Court
Gaithersburg, MD 20879-1574
Ph: 301-670-0604
Fax: 301-840-1252
Internet: <http://www.pbmdf.com>

COMPRESSED AIR AND GAS INSTITUTE (CAGI)
1300 Sumner Avenue
Cleveland OH 44115-2851
Ph: 216-241-7333
Fax: 216-241-0105
E-mail: cagi@cagi.org
Internet: <http://www.cagi.org/>

COMPRESSED GAS ASSOCIATION (CGA)
4221 Walney Road, 5th Floor
Chantilly, VA 20151-2923
Ph: 703-788-2700
Fax: 703-961-1831
E-mail: cga@cganet.com
Internet: <http://www.cganet.com>

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
933 North Plum Grove Road
Schaumburg, IL 60173-4758
Ph: 847-517-1200
Fax: 847-517-1206
Internet: <http://www.crsi.org/>

CONCRETE SAWING AND DRILLING ASSOCIATION (CSDA)
11001 Danka Way North, Suite 1
St Petersburg, FL 33716
PH: 727-577-5004
Fax: 727-577-5012
E-mail: info@csda.org
Internet: <http://www.csda.org>

CONSUMER ELECTRONICS ASSOCIATION (CEA)
2500 Wilson Blvd.
Arlington, VA 22201-3834
Ph: 866-858-1555 or 703-907-7600
Fax: 703-907-7675
E-mail: cea@CE.org
Internet: <http://www.CE.org>

CONSUMER PRODUCT SAFETY COMMISSION (CPSC)
4330 East-West Highway
Bethesda, MD 20814-4408

Ph: 301-504-7923
Fax: 301-504-0124 or 301-504-0025
E-mail: info@cpsc.gov
Internet: <http://www.cpsc.gov>

CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION (CEMA)
6724 Lone Oak Boulevard
Naples, FL 34109
Ph: 239-514-3441
Fax: 239-514-3470
E-mail: cema@cemanet.org
Internet: <http://www.cemanet.org>

COOLING TECHNOLOGY INSTITUTE (CTI)
2611 FM 1960 West
Suite A-101
Houston, TX 77068-3730
Ph: 281-583-4087
Fax: 281-537-1721
Internet: <http://www.cti.org>

COPPER DEVELOPMENT ASSOCIATION (CDA)
260 Madison Avenue
New York, NY 10016
Ph: 212-251-7200
Fax: 212-251-7234
E-mail: questions@cda.copper.org
Internet: <http://www.copper.org>

CRANE MANUFACTURERS ASSOCIATION OF AMERICA (CMAA)
8720 Red Oak Boulevard, Suite 201
Charlotte, NC 28217-3992
Ph: 704-676-1190
Fax: 704-676-1199
Internet: www.mhia.org/psc/PSC_Products_Cranes.cfm

CSA AMERICA, INC. (CSA/AM)
8501 East Pleasant Valley Road
Cleveland, OH 44131-5575
Ph: 216-524-4990
Fax: 216-520-8979
E-mail: cathy.rake@csa-america.org
Internet: <http://www.csa-america.org>

DOOR AND HARDWARE INSTITUTE (DHI)
14150 Newbrook Dr.
Chantilly, VA 20151-2232
Ph: 703-222-2010
Fax: 703-222-2410
E-mail: infor@dhi.org
Internet: <http://www.dhi.org>

DISTRICT OF COLUMBIA MUNICIPAL REGULATIONS (DCMR)
441 4th Street NW, Suite 520S
Washington DC 20001
PH: 202-727-6306
Fax: 202-727-3582
Internet: <http://os.dc.gov/info/odai/odai.shtm>

DOOR AND ACCESS SYSTEM MANUFACTURERS ASSOCIATION (DASMA)
1300 Sumner Avenue
Cleveland, OH 44115-2851
Ph: 216-241-7333
Fax: 216-241-0105
E-mail: dasma@dasma.com
Internet: <http://www.dasma.com>

DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA)
245 Riverchase Parkway East, Suite O
Birmingham, AL 35244
Ph: 205-402-8700
Fax: 205-402-8730
E-mail: info@dipra.org
Internet: <http://www.dipra.org>

EIFS INDUSTRY MEMBERS ASSOCIATION (EIMA)
3000 Corporate Center Drive, Suite 270
Morrow, GA 30260
Ph: 800-294-3462
Fax: 770-968-5818
E-mail: lwidzowski@eima.com
Internet: <http://www.eima.com>

ELECTRICAL GENERATING SYSTEMS ASSOCIATION (EGSA)
1650 South Dixie Highway, Suite 500
Boca Raton, FL 33432-7462
Ph: 561-750-5575
Fax: 561-395-8557
E-mail: e-mail@egsa.org
Internet: <http://www.egsa.org>

ELECTRONIC INDUSTRIES ALLIANCE (EIA)
2500 Wilson Boulevard
Arlington, VA 22201-3834
Ph: 703-907-7500
Fax: 703-907-7501
Internet: <http://www.eia.org>

U.S. DEPARTMENT OF ENERGY (DOE)
1000 Independence Ave. SW
Washington, DC 20585
Ph: 800-342-5363
Fax: 202-586-4403
E-mail: dmteam@hq.doe.gov
Internet: <http://www.eh.doe.gov/>

ETL TESTING LABORATORIES (ETL)
Intertek Testing Services, ETL SEMKO
70 Codman Hill Road
Buxborough, MA 01719
Ph: 978-263-2662
Fax: 978-263-7086
E-mail: info@etlsemko.com
Internet: <http://www.etlsemko.com>

EUROPEAN COMMITTEE FOR STANDARDIZATION (CEN/CENELEC)
CEN Management Centre
36, rue de Stassart
B-1050 Brussels
Ph: 32-2-550-08-11
Fax: 32-2-550-08-19
E-mail: infodesk@cenorm.be
Internet: <http://www.cenorm.be>

EXPANSION JOINT MANUFACTURERS ASSOCIATION (EJMA)
25 North Broadway
Tarrytown, NY 10591
Ph: 914-332-0040
Fax: 914-332-1541
E-mail: inquiries@ejma.org
Internet: <http://www.ejma.org>

FEDERAL ENERGY REGULATORY COMMISSION (FERC)
888 First Street, NE
Washington, DC 20426
Ph: 202-502-6088
E-mail: customer@ferc.gov
Internet: <http://www.ferc.gov/default.asp>

FLAT GLASS MARKETING ASSOCIATION (FGMA)
White Lakes Professional Bldg.
3310 Harrison St.
Topeka, KS 66611-2279
Ph: 913-266-7013
Fax: 913-266-0272

FLUID CONTROLS INSTITUTE (FCI)
1300 Sumner Avenue
Cleveland, OH 44115
Ph: 216-241-7333
Fax: 216-241-0105
E-mail: fcifluidcontrolsinstitute.org
Internet: www.fluidcontrolsinstitute.org

FLUID SEALING ASSOCIATION (FSA)
994 Old Eagle School Rd. #1019
Wayne, PA 19087
Ph: 610-971-4850
E-mail: info@fluidsealing.com
Internet: www.fluidsealing.com

FM GLOBAL (FM)
1301 Atwood Avenue
P.O. Box 7500
Johnston, RI 02919
Ph: 401-275-3000
Fax: 401-275-3029
E-mail: information@fmglobal.com
Internet: <http://www.fmglobal.com>

FOREST STEWARDSHIP COUNCIL (FSC)
1155 30th Street NW
Suite 300
Washington, DC 20007

Ph: 202.342.0413
Fax: 202.342.6589
E-mail: info@fscus.org
Internet: <http://www.fscus.org>

FORESTRY SUPPLIERS INC. (FSUP)
205 West Rankin Street
P.O. Box 8397
Jackson, MS 39284-8397
Ph: 601-354-3565
Fax: 601-292-0165
E-mail: cs@forestry-suppliers.com
Internet: <http://www.forestry-suppliers.com>

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH
(FCCCHR)
University of South California
Kaprielian Hall 200
Los Angeles, CA 90089-2531
Ph: 213-740-2032 or 800-545-6340
Fax: 213-740-8399
E-mail: fccchr@usc.edu
Internet: <http://www.usc.edu/dept/fccchr>

GEOLOGICAL SOCIETY OF AMERICA (GSA)
P.O. Box 9140
Boulder, CO 80301-9140
Ph: 303-357-1000
Fax: 303-357-1070
E-mail: gsaservice@geosociety.org
Internet: <http://www.geosociety.org>

GEOSYNTHETIC INSTITUTE (GSI)
475 Kedron Avenue
Folsom, PA 19033
Ph: 610-522-8440
Fax: 610-522-8441
Internet: <http://www.geosynthetic-institute.org>

GLASS ASSOCIATION OF NORTH AMERICA (GANA)
2945 SW Wanamaker Drive, Suite A
Topeka, KS 66614
Ph: 785-271-0208
Fax: 785-271-0166
E-mail: gana@glasswebsite.com
Internet: <http://www.glasswebsite.com>

GREEN BUILDING INITIATIVE (GBI)
222 SW Columbia St.
Suite 1800
Portland, Oregon 97201
Ph: 877-424-4241
Fax: 503.961.8991
Email: info@thegbi.org
Internet: <http://www.thegbi.org/gbi/>

GREEN SEAL (GS)
1001 Connecticut Avenue, NW

Suite 827
Washington, DC 20036-5525
Ph: 202-872-6400
Fax: 202-872-4324
E-mail: greenseal@greenseal.org
Internet: <http://www.greenseal.org>

GREENGUARD ENVIRONMENTAL INSTITUTE (GEI)

2211 Newmarket Parkway, Suite 110
Marietta, GA 30067
E-mail: info@greenguard.org
Internet: <http://www.greenguard.org/>

GYPSUM ASSOCIATION (GA)
810 First Street, NE, Suite 510
Washington, DC 20002
Ph: 202-289-5440
Fax: 202-289-3707
E-mail: info@gypsum.org
Internet: <http://www.gypsum.org>

HARDWOOD PLYWOOD AND VENEER ASSOCIATION (HPVA)
P.O. Box 2789
Reston, VA 20195-0789
Ph: 703-435-2900
Fax: 703-435-2537
E-mail: hpva@hpva.org
Internet: <http://www.hpva.org>

HEAT EXCHANGE INSTITUTE (HEI)
1300 Sumner Avenue
Cleveland, OH 44115-2851
Ph: 216-241-7333
Fax: 216-241-0105
E-mail: hei@heatexchange.org
Internet: <http://www.heatexchange.org>

HOIST MANUFACTURERS INSTITUTE (HMI)
8720 Red Oak Boulevard, Suite 201
Charlotte, NC 28217
Ph: 704-676-1190
Fax: 704-676-1199
E-mail: hmi@mhia.org
Internet: http://www.mhia.org/psc/PSC_Products_Hoists.cfm

H.P. WHITE LABORATORY (HPW)
3114 Scarboro Road
Street, MD 21154
Ph: 410-838-6550
Fax: 410-838-2802
E-mail: info@hpwhite.com
Internet: <http://www.hpwhite.com>

HYDRAULIC INSTITUTE (HI)
9 Sylvan Way
Parsippany, NJ 07054-3802
Ph: 973-267-9700
Fax: 973-267-9055

E-mail: webmaster@pumps.org
Internet: <http://www.pumps.org>

HYDRONICS INSTITUTE DIVISION OF GAMA (HYI)
35 Russo Place
P.O. Box 218
Berkeley Heights, NJ 07922-0218
Ph: 908-464-8200
Fax: 908-464-7818
E-mail: information@gamanet.org
Internet: <http://www.gamanet.org/publist/hydroordr.htm>

ICC EVALUATION SERVICE, INC. (ICC-ES)
5360 Workman Mill Road
Whitier, CA 90601
Ph: 562-699-0543
Fax: 562-695-4694
E-mail: es@icc-es.org
Internet: <http://www.icc-es.org>

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)
120 Wall Street, 17th Floor
New York, NY 10005
Ph: 212-248-5000
Fax: 212-248-5018
E-mail: iesna@iesna.org
Internet: <http://www.iesna.org>

INDUSTRIAL FASTENERS INSTITUTE (IFI)
6363 Oak Tree Boulevard
Independance, OH 44131
Ph: 216-241-1482
Fax: 216-241-5901
E-mail: IFI-orders@indfast.org
Internet: <http://www.industrial-fasteners.org>

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)
1901 North Moore Street
Arlington, VA 22209-1762
Ph: 703-525-1695
Fax: 703-528-2148
E-mail: isea@safetyequipment.org
Internet: <http://www.safetyequipment.org/>

INNOVATIVE PAVEMENT RESEARCH FOUNDATION (IPRF)
5420 Old Orchard Rd, Suite A-100
Skokie, IL 60077-1059
Internet: www.iprf.org

INSECT SCREEN WEAVERS ASSOCIATION (ISWA)
2000 Maple Hill Street
P.O. Box 309
Yorktown Heights, NY 10598

INSTITUTE OF TRANSPORTATION ENGINEERS (ITE)
1099 14th Street, Suite 300 West
Washington, DC 20005-3438
Ph: 202-289-0222
Fax: 202-289-7722

E-mail: ite_staff@ite.org
Internet: <http://www.ite.org>

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)
703 Waterford Way (NW 62nd Avenue), Suite 600
Miami, FL 33126
Ph: 305-264-7772
Fax: 305-264-8088
Internet: <http://www.iata.org>

INSTITUTE OF CLEAN AIR COMPANIES (ICAC)
1730 M Street NW, Suite 206
Washington, DC 20036-4535
Ph: 202-457-0911
Fax: 202-331-1388
E-mail: icacinfo@icac.com
Internet: <http://icac.com>

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 Hoes Lane
Piscataway, NJ 08855-1331
Ph: 732-981-0060
Fax: 732-981-1712
E-mail: customer-services@ieee.org
Internet: <http://www.ieee.org>

INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY (IEST)
5005 Newport Drive, Suite 506
Rolling Meadows, IL 60008-3841
Ph: 847-255-1561
Fax: 847-255-1699
E-mail: iest@iest.org
Internet: <http://www.iest.org>

INSTRUCTIONS AND STANDARDS FOR NAVBASE GUANTANAMO BAY CUBA
(COMNAVBASEGTMOINST)
Address Not Available

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)
P.O. Box 1568
Carrollton, GA 30112
Ph: 770-830-0369
Fax: 770-830-8501
Internet: <http://www.icea.net>

INSULATING GLASS MANUFACTURERS ALLIANCE (IGMA)
1500 Bank Street, Suite 300
Ottawa, Ontario CANADA K1H 1B8
Ph: 613-233-1510
Fax: 613-482-9436
E-mail: info@igmaonline.org
Internet: <http://www.igmaonline.org>

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS
(IAPMO)
5001 E. Philadelphia St.
Ontario, CA 91761
Ph: 909-472-4100
Fax: 909-472-4150

E-mail: iampo@iampo.org
Internet: www.iampo.org

INTERNATIONAL CODE COUNCIL (ICC)
5360 Workman Mill Road
Whittier, CA 90601
Ph: 562-699-0541
Fax: 562-699-9721
E-mail: webmaster@iccsafe.org
Internet: www.iccsafe.org

INTERNATIONAL CONCRETE REPAIR INSTITUTE (ICRI)
3166 South River Road, Suite 132
Des Plaines, IL 60018
Ph: 847-827-0830
Fax: 847-827-0832
Internet: <http://www.icri.org>

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO)
5360 Workman Mill Road
Whittier, CA 90601-2298
Ph: 800-284-4406 and 562-699-0541
Fax: 562-692-3853
Internet: <http://www.icbo.org>

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)
P.O. Box 687
106 Stone Street
Morrison, CO 80465
Ph: 303-697-8441
Fax: 303-697-8431
E-mail: neta@netaworld.org
Internet: <http://www.netaworld.org>

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)
3, rue de Varembe, P.O. Box 131
CH-1211 Geneva 20, Switzerland
Ph: 41-22-919-0211
Fax: 41-22-919-0300
E-mail: custserv@iec.ch
Internet: <http://www.iec.ch>

INTERNATIONAL GROUND SOURCE HEAT PUMP ASSOCIATION (IGSHPA)
Oklahoma State University
374 Cordell South
Stillwater OK 74078-8018
Ph: 405-744-5175
Fax: 405-744-5283
Internet: <http://www.igshpa.okstate.edu/>

INTERNATIONAL INSTITUTE OF AMMONIA REFRIGERATION (IIAR)
1110 North Glebe Road, Suite 250
Arlington, VA 22201
Ph: 703-312-4200
Fax: 703-312-0065
E-mail: info@iiar.org
Internet: <http://www.iiar.org>

INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION (IMSA)
P.O. Box 539
165 East Union Street
Newark, NY 14513-0539
Ph: 315-331-2182 and 800-723-4672
Fax: 315-331-8205
E-mail: info@imsasafety.org
Internet: <http://www.imsasafety.org/>

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
1, rue de Varembe'
Case Postale 56
CH-1211 Geneve 20 Switzerland
Ph: 41-22-749-0111
Fax: 41-22-733-3430
E-mail: central@iso.ch
Internet: <http://www.iso.ch>

INTERNATIONAL TELECOMMUNICATION UNION (ITU)
For documents not available from Dept of Commerce:
Sales Service
International Telecommunication Union
Place des Nations
CH-1211 Geneve 20 Switzerland
Ph: 41-22-730-5111
Fax: 41-22-733-7256
E-mail: itumail@itu.int
Internet: <http://www.itu.org>

For documents available from Dept of Commerce:
U.S. Dept of Commerce
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Ph: 703-605-6585
FAX: 703-605-6887
E-mail: info@ntis.gov
Internet: <http://www.ntis.gov>

IPC - ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES (IPC)
3000 Lakeside Drive, 309S
Bannockburn, IL 60015
Ph: 847-615-7100
Fax: 847-615-7105
Internet: <http://www.ipc.org>
e-mail: orderipc@ipc.org

ISA - INTERNATIONAL SOCIETY OF AUTOMATION (ISA)
67 Alexander Drive
Research Triangle Park, NC 27709
Ph: 919-549-8411
Fax: 919-549-8288
E-mail: info@isa.org
Internet: <http://www.isa.org>

INTERNATIONAL WINDOW CLEANING ASSOCIATION (IWCA)
6277 Franconia Rd.
Alexandria, VA 22310
Ph: 800-875-4922 or 703-971-7771

FAX: 703-971-7772
E-mail: IWCA@aol.com
Internet: <http://www.iwca.org>

THE INTERNET ENGINEERING TASK FORCE (IETF)
IETF, Internet Society
1775 Wiehle Ave, Suite 102
Reston, VA 20190-5108
Ph: 703-326-9880
Fax: 703-326-9881
E-mail: ietf-info@ietf.org
Internet: <http://www.ietf.org/>

ITALIAN LAWS AND DECREES (D.M.)
Unable to locate organization or documents.

KITCHEN CABINET MANUFACTURERS ASSOCIATION (KCMA)
1899 Preston White Drive
Reston, VA 20191-5435
Ph: 703-264-1690
Fax: 703-620-6530
E-mail: info@kcma.org
Internet: <http://www.kcma.org>

L.H. BAILEY HORTORIUM (LHBH)
Dept of Plant Biology
c/o Cornell University
228 Plant Science Building
Ithaca, NY 14853
Ph: 607-255-4477
Internet: <http://www.plantbio.cornell.edu/Hort.php>

LONMARK INTERNATIONAL (LonMark)
550 Meridan Ave.
San Jose, CA 95126
Ph: 408-938-5266
Fax: 408-790-3838
E-mail: info@lonmark.org
Internet: <http://www.lonmark.org>

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS
INDUSTRY (MSS)
127 Park Street, NE
Vienna, VA 22180-4602
Ph: 703-281-6613
Fax: 703-281-6671
E-mail: info@mss-hq.com
Internet: <http://www.mss-hq.com>

MAPLE FLOORING MANUFACTURERS ASSOCIATION (MFMA)
60 Revere Drive, Suite 500
Northbrook, IL 60062
Ph: 847-480-9138
Fax: 847-480-9282
E-mail: mfma@maplefloor.org
Internet: <http://www.maplefloor.org>

MARBLE INSTITUTE OF AMERICA (MIA)
28901 Clemens Road, Suite 100

Westlake, OH 44145
Ph: 440-250-9222
Fax: 440-250-9223
E-mail: info@marble-institute.com
Internet: <http://www.marble-institute.com>

MASTER PAINTERS INSTITUTE (MPI)
4090 Graveley Street
Burnaby, BC CANADA V5C 3T6
Ph: 888-674-8937
Fax: 888-211-8708
E-mail: info@paintinfo.com
Internet: <http://www.paintinfo.com/mpi>

MATERIAL HANDLING INDUSTRY OF AMERICA INC (MHIA)
8720 Red Oak Blvd., Suite 201
Charlotte, NC 28717-3992
Ph: 704-676-1190
Fax: 704-676-1199
Internet: <http://www.mhia.org>

METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA)
1300 Sumner Avenue
Cleveland, OH 44115-2851
Ph: 216-241-7333
Fax: 216-241-0105
E-mail: mbma@mbma.com
Internet: <http://www.mbma.com>

MIDWEST INSULATION CONTRACTORS ASSOCIATION (MICA)
16712 elm Circle
Omaha, NE 68130
Ph: 800-747-6422
Fax: 402-330-9702
E-mail: info@micainsulation.org
Internet: <http://www.micainsulation.org>

MIDWEST ROOFING CONTRACTORS ASSOCIATION (MRCA)
4840 Bob Billings Parkway, Suite 1000
Lawrence, Kansas 66094-3862
Ph: 785-843-4888 or 800-497-6722
Fax: 785-843-7555
E-mail: mrca@mrca.org
Internet: General Information: <http://www.mrca.org>

MONORAIL MANUFACTURERS ASSOCIATION (MMA)
8720 Red Oak Boulevard, Suite 201
Charlotte, NC 28217
Ph: 704-676-1190
Fax: 704-676-1199
E-mail: mma@mhia.org
Internet: <http://www.mhia.org/mma>

NACE INTERNATIONAL (NACE)
1440 South Creek Drive
Houston, TX 77084-4906
Ph: 281-228-6200
Fax: 281-228-6300
E-mail: firstservice@nace.org

Internet: <http://www.nace.org>

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
Publication(s) Available From
Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402
Ph: 202-783-3238

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)
800 Roosevelt Road, Bldg C, Suite 312
Glen Ellyn, IL 60137
Ph: 630-942-6591
Fax: 630-790-3095
E-mail: naamm@gss.net
Internet: <http://www.naamm.org>

NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS (NBBPVI)
1055 Crupper Avenue
Columbus, OH 43229-1183
Ph: 614-888-8320
Fax: 614-847-1147
E-mail: getinfo@nationalboard.org
Internet: <http://www.nationalboard.org>

NATIONAL CABLE AND TELECOMMUNICATIONS ASSOCIATION (NCTA)
1724 Massachusetts Avenue, NW
Washington, DC 20036
Ph: 202-775-3550
Fax: 202-775-1055
E-mail: webmaster@ncta.com
Internet: <http://www.ncta.com>

NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
13750 Sunrise Valley Drive
Herndon, VA 20171-4662
Ph: 703-713-1900
Fax: 703-713-1910
E-mail: ncma@ncma.org
Internet: <http://www.ncma.org>

NATIONAL COUNCIL ON RADIATION PROTECTION AND MEASUREMENTS (NCRP)
7910 Woodmont Avenue, Suite 400
Bethesda, MD 20814-3095
Ph: 301-657-2652
Fax: 301-907-8768
E-mail: ncrp@ncrp.com
Internet: <http://www.ncrp.com>

NATIONAL DRILLING ASSOCIATION (NDA)
11001 Danka Way North, Suite 1
St. Petersburg, FL 33716
Ph: 727-577-5006
Fax: 727-577-5012
E-mail: info@nda4u.com
Internet: <http://www.nda4u.com/>

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)
3 Bethesda Metro Center, Suite 1100

Bethesda, MD 20814
Ph: 301-657-3110
Fax: 301-215-45002
Internet: <http://www.necanet.org/>

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
1300 North 17th Street, Suite 1752
Rosslyn, VA 22209
Ph: 703-841-3200
Fax: 703-841-5900
E-mail: webmaster@nema.org
Internet: <http://www.nema.org/>

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)
8575 Grovemont Circle
Gaithersburg, MD 20877
Ph: 301-977-3698
Fax: 301-977-9589
Internet: <http://www.nebb.org>

NATIONAL FENESTRATION RATING COUNCIL (NFRC)
8484 Georgia Avenue, Suite 320
Silver Spring, MD 20910
Ph: 301-589-1776
Fax: 301-589-3884
E-Mail: info@nfrc.org
Internet: <http://www.nfrc.org>

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 617-770-3000
Fax: 617-770-0700
E-mail: webmaster@nfpa.org
Internet: <http://www.nfpa.org>

NATIONAL FLUID POWER ASSOCIATION (NFLPA)
3333 North Mayfair Road, Suite 211
Milwaukee, WI 53222-3219
Ph: 414-778-3344
Fax: 414-778-3361
E-mail: nfpa@nfpa.com
Internet: <http://www.nfpa.com>

NATIONAL HARDWOOD LUMBER ASSOCIATION (NHLA)
6830 Raleigh LaGrange Road
Memphis, TN 38184-0518
Ph: 901-377-1818
Fax: 901-382-6419
E-mail: info@nhla.com
Internet: <http://www.natlhardwood.org>

NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES
(NICET)
1420 King Street
Alexandria, VA 22314-2794
Ph: 888-476-4238
E-mail: tech@nicet.org
Internet: <http://www.nicet.org>

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
Mail Stop C-13
4676 Columbia Parkway
Cincinnati, OH 45226-1998
Ph: 800-356-4674
Fax: 513-533-8573
E-mail: pubstaff@cdc.gov
Internet: <http://www.cdc.gov/niosh/homepage.html>

NATIONAL INSTITUTE OF JUSTICE (NIJ)
National Law Enforcement and Corrections Technology Center
2277 Research Boulevard - Mailstop 8J
Rockville, MD 20850
Ph: 800-248-2742 or 301-519-5060
Fax: 301-519-5149
E-mail: asknlectc@nlectc.org
Internet: <http://www.nlectc.org>

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
100 Bureau Drive
Stop 2100
Gaithersburg, MD 20899-2100
Ph: 301-975-NIST
Internet: <http://www.nist.gov>
Order Publications From:
Superintendent of Documents
U.S. Government Printing Office (GPO)
732 North Capitol Street, NW
Washington, DC 20401
Ph: 888-293-6498 or 202-512-1530
Fax: 202-512-1262
E-mail: gpoaccess@gpo.gov
Internet: <http://www.gpoaccess.gov>
or
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Ph: 703-605-6585
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: <http://www.ntis.gov>

NATIONAL LIME ASSOCIATION (NLA)
200 North Glebe Road, Suite 800
Arlington, VA 22203
Ph: 703-243-5463
Fax: 703-243-5489
E-mail: natlime@lime.org
Internet: <http://www.lime.org>

NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA)
10333 N. Meridian Street, Suite 272
Indianapolis, Indiana 46290
Ph: 317-571-9500 or 800 366 7731
Fax: 317-571-0041
E-mail: npca@precast.org
Internet: www.precast.org

NOFMA: THE WOOD FLOORING MANUFACTURERS ASSOCIATION (NOFMA)
22 N. Front Street, Suite 660
Memphis, TN 38103
Ph: 901-526-5016
Fax: 901-526-7022
E-mail: info@nofma.org
Internet: <http://www.nofma.org>

NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)
900 Spring Street
Silver Spring, MD 20910
Ph: 301-587-1400
Fax: 301-585-4219
Internet: <http://www.nrmca.org>

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
10255 West Higgins Road, Suite 600
Rosemont, IL 60018
Ph: 847-299-9070
Fax: 847-299-1183
Internet: <http://www.nrca.net>

NATIONAL TERRAZZO & MOSAIC ASSOCIATION (NTMA)
201 North Maple Avenue, Suite 208
Purcellville, VA 20132
Ph: 540-751-0930 or 800-323-9736
Fax: 540-751-0935
E-mail: info@ntma.com
Internet: <http://www.ntma.com>

NATIONAL WOOD WINDOW AND DOOR ASSOCIATION (NWWDA)
1400 East Touhy Avenue, Suite 470
Des Plaines, IL 60018
Ph: 847-299-5200
Fax: 847-299-1286
E-mail: admin@wdma.com
Internet: <http://www.wdma.com>

NATURAL RESOURCE, AGRICULTURAL AND ENGINEERING SERVICE (NRAES)
Cooperative Extension
P.O. Box 4557
Ithaca, NY 14852-4557
Ph: 607-255-7654
Fax: 607-254-8770
E-mail: nraes@cornell.edu
Internet: <http://www.nraes.org>

U.S. NAVAL SEA SYSTEMS COMMAND (NAVSEA)
Commander Naval Sea Systems Command
1333 Isaac Hull Ave., SE
Washington Navy Yard, DC 20376-1080
Ph: 202-781-0000

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION (NAIMA)
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
Ph: 703-684-0084
Fax: 703-684-0427
E-mail: insulation@naima.org

Internet: <http://www.naima.org>

NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION (NELMA)
272 Tuttle Road
Cumberland, ME 04021
Ph: 207-829-6901
Fax: 207-829-4293
E-mail: info@nelma.org
Internet: <http://www.nelma.org>

NORTHWEST AIR POLLUTION AUTHORITY (NWAPA)
1600 2nd Street
Mt. Vernon, WA 98273
Ph: 360-428-4627
E-mail: info@nwair.org

NSF INTERNATIONAL (NSF)
789 North Dixboro Road
P.O. Box 130140
Ann Arbor, MI 48113-0140
Ph: 734-769-8010 or 800-NSF-MARK
Fax: 734-769-0109
E-mail: info@nsf.org
Internet: <http://www.nsf.org>

OLYMPIC AIR POLLUTION CONTROL AUTHORITY (OAPCA)
2940-B Limited Lane NW
Olympia, WA 98502
Ph: 360-586-1044
Fax: 360-491-6308
E-mail: jkelly@oapca.org
Internet: www.oapca.org

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)
2, rue Andre Pascal
F-75775 Paris Cedex 16
France
Ph: + 33 1 45 24 82 00
Fax: 33 1 45 24 85 00
E-mail: bookshop@oecd.org
Internet: <http://www.oecd.org>

U.S. Contact Center
OECD Washington Center
2001 L Street, NW, Suite 650
Washington, DC 20036-4922
Ph: 202-785-6323
Fax: 202-785-0350
E-mail: washington.contact@oecd.org

PIPE FABRICATION INSTITUTE (PFI)
666 5th Avenue, #325
New York, NY 10103
Ph: 514-634-3434
Fax: 514-634-9736
E-mail: pfi@pfi-institute.org
Internet: <http://www.pfi-institute.org>

Canada Office

655-32nd Ave., Suite 201
Lachine, QC H8T 3G6

PLASTIC PIPE AND FITTINGS ASSOCIATION (PPFA)
800 Roosevelt Road, Building C, Suite 20
Glen Ellyn, IL 60137
Ph: 630-858-6540
Fax: 630-790-3095
Internet: <http://www.ppfahome.org>

PLASTICS PIPE INSTITUTE (PPI)
1825 Connecticut Avenue, NW, Suite 680
Washington, D.C. 20009
Ph: 202-462-9607
Fax: 202-462-9779
Internet: <http://www.plasticpipe.org>

PLUMBING AND DRAINAGE INSTITUTE (PDI)
800 Turnpike Street, Suite 300
North Andover, MA 01845
Ph: 978-557-0720 or 800-589-8956
Fax: 978-557-0721
E-Mail: info@pdionline.org
Internet: <http://www.pdionline.org>

PLUMBING AND MECHANICAL CONTRACTORS ASSOCIATION (PMCA)
8600 SW Saint Helens Drive, Suite 200
Wilsonville, OR 97070
Ph: 503-682-7919
Fax: 503-682-6241
Internet: <http://www.pmcaoregon.com/>

PLUMBING-HEATING-COOLING CONTRACTORS NATIONAL ASSOCIATION (PHCC)
180 South Washington Street
P.O. Box 6808
Falls Church, VA 22046
Ph: 800-533-7694 or 703-237-8100
Fax: 703-237-7442
E-mail: naphcc@naphcc.org
Internet: <http://www.phccweb.org>

PORCELAIN ENAMEL INSTITUTE (PEI)
PO Box 920220
3700 Mansell Rd., Suite 220
Alpharetta, GA 30022
Ph: 770-281-8980
Fax: 770-281-8981
E-mail: penamel@aol.com
Internet: <http://www.porcelainenamel.com>

POST-TENSIONING INSTITUTE (PTI)
8601 North Black Canyon Highway, Suite 103
Phoenix, AZ 85021
Ph: 602-870-7540
Fax: 602-870-7541
E-mail: info@post-tensioning.org
Internet: <http://www.post-tensioning.org/>

PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI)
209 West Jackson Boulevard
Chicago, IL 60606-6938
Ph: 312-786-0300
Fax: 312-786-0353
E-mail: info@pci.org
Internet: <http://www.pci.org>

PUGET SOUND CLEAN AIR AGENCY (PSCAA)
1904 Third Street
Suite 103
Seattle, WA 9810
Ph: 206-343-8800
Fax: 206-343-7522
E-Mail: communications@psccleanair.org
Internet:

REDWOOD INSPECTION SERVICE (RIS) OF THE CALIFORNIA REDWOOD
ASSOCIATION (CRA)
405 Enfrente Drive, Suite 200
Novato, CA 94949
Ph: 415-382-0662 or 888-225-7339
Fax: 415-382-8531
E-Mail: info@calredwood.org
Internet: <http://www.calredwood.org>

RUBBER MANUFACTURERS ASSOCIATION (RMA)
1400 K Street, NW, Suite 900
Washington, DC 20005
Ph: 202-682-4800
Fax: 202-682-4854
E-mail: info@rma.org
Internet: <http://www.rma.org>

SCIENTIFIC EQUIPMENT AND FURNITURE ASSOCIATION (SEFA)
1205 Franklin Avenue, Suite 320
Garden City, N.Y. 11530
Ph: 516-294-5424
Fax: 516-294-27582

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)
2200 Powell Street, Suite 725
Emeryville, CA 94608
Ph: 510-452-8000
Fax: 510-452-8001
E-mail: webmaster@scscertified.com
Internet: <http://www.scs1.com>

SCREEN MANUFACTURERS ASSOCIATION (SMA)
2850 South Ocean Boulevard, Suite 114
Palm Beach, FL 33480-6205
Ph: 561-533-0991
Fax: 561-533-7466
E-mail: fitzgeraldscott@bellsouth.net
Internet: <http://www.smacentral.org>

SEMICONDUCTOR EQUIPMENT AND MATERIALS INTERNATIONAL (SEMI)
3081 Zanker Road

San Jose, CA 95134
Ph: 408-943-6900
Fax: 408-428-9600
E-mail: semihq@semi.org
Internet: <http://www.semi.org>

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION
(SMACNA)
4201 Lafayette Center Drive
Chantilly, VA 20151-1209
Ph: 703-803-2980
Fax: 703-803-3732
E-mail: info@smacna.org
Internet: <http://www.smacna.org>

SINGLE PLY ROOFING INDUSTRY (SPRI)
77 Rumford Avenue, Suite 3B
Waltham, MA 02453
Ph: 781-647-7026
Fax: 781-647-7222
E-mail: info@spri.org
Internet: <http://www.spri.org>

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)
400 Commonwealth Drive
Warrendale, PA 15096-0001
Ph: 724-776-4841
Fax: 724-776-0790
E-mail: customerservice@sae.org
Internet: <http://www.sae.org>

SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS (SMPTE)
3 Baker Avenue
White Plains, New York 10601
Ph: 914-761-1100
Fax: 914-761-3115
E-mail: smppte@smppte.org
Internet: <http://www.smppte.org>

SPRAY POLYURETHANE FOAM ALLIANCE (SPFA)
4400 Fair Lakes Court, Suite 105
Fairfax, VA 22033
Ph: 800-523-6154
Fax: 703-222-5816
Internet: <http://www.sprayfoam.org>

SOLAR RATING AND CERTIFICATION CORPORATION (SRCC)
c/o FSEC, 1679 Clearlake Road
Cocoa, FL 32922-5703
Ph: 321-638-1537
Fax: 321-638-1010
E-mail: srcc@fsec.ucf.edu
Internet: <http://www.solar-rating.org>

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)
21865 Copley Drive
Diamond Bar, CA 91765-4182
Ph: 909-396-2000
E-mail: webinquiry@aqmd.gov

Internet: <http://www.agmd.gov>

SOUTHERN CYPRESS MANUFACTURERS ASSOCIATION (SCMA)
400 Penn Center Boulevard, Suite 530
Pittsburgh, PA 15235
Ph: 412-829-0770 or 877-607-SCMA
Fax: 412-829-0844
Internet: <http://www.cypressinfo.org>

SOUTHERN PINE INSPECTION BUREAU (SPIB)
4709 Scenic Highway
Pensacola, FL 32504-9094
Ph: 850-434-2611
Fax: 850-433-5594
E-mail: spib@spib.org
Internet: <http://www.spib.org>

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION (CDT)
Publication Distribution Unit
1900 Royal Oaks Dr.
Sacramento, CA 95815-3800
Ph: 916-445-3520
Fax: 916-324-8997
E-mail: publications@dot.ca.gov
Internet: www.dot.ca.gov/hq/esc/ctms

STATE OF MARYLAND CODE OF MARYLAND REGULATIONS (COMAR)
Division of State Documents
16 Francis Street, Jeffrey Building
Annapolis, MD 21401
Ph: 410-974-2486x3872
Fax: 410-974-2546
E-mail: support@sos.state.md.us
Internet: www.dsd.state.md.us/comar/

STATE OF VIRGINIA ADMINISTRATIVE CODE (VAC)
Virginia Code Commission
General Assembly Building, 2nd Floor
910 Capitol Street
Richmond, Virginia 23219
Ph: 804-786-3591
Fax: 804-692-0625
Internet: <http://leg1.state.va.us/000/srr.htm>

STEEL DECK INSTITUTE (SDI)
P.O. Box 25
Fox River Grove, IL 60021
Ph: 847-458-4647
Fax: 847-458-4648
E-mail: Steve@sdi.org
Internet: <http://www.sdi.org>

STEEL DOOR INSTITUTE (SDI/DOOR)
c/o Wherry Associates
30200 Detroit Road
Cleveland, OH 44145-1967
Ph: 440-899-0010
Fax: 440-892-1404
E-mail: leh@wherryassoc.com

Internet: <http://www.steeldoor.org>

STEEL JOIST INSTITUTE (SJI)
3127 Mr. Joe White Avenue
Myrtle Beach, SC 29577-6760
Ph: 843-626-1995
Fax: 843-626-5565
E-mail: sji@steeljoist.org
Internet: <http://www.steeljoist.org>

STEEL TANK INSTITUTE (STI)
570 Oakwood Road
Lake Zurich, IL 60047
Ph: 847-438-8265
Fax: 847-438-8766
Internet: <http://www.steeltank.com>

STEEL WINDOW INSTITUTE (SWI)
1300 Sumner Avenue
Cleveland, OH 44115-2851
Ph: 216-241-7333
Fax: 216-241-0105
E-mail: swi@steelwindows.com
Internet: <http://www.steelwindows.com>

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY (TAPPI)
15 Technology Parkway South
Norcross, GA 30092
Ph: 800-322-8686 or 770-446-1400
Fax: 770-446-6947
E-mail: memberconnection@tappi.org
Internet: <http://www.tappi.org>

TECHNICAL MANUAL (TM)
Commander
USACE Publication Depot
ATTN: CEHEC-IM-PD
2803 52nd Ave.
Hyattsville, MD 20781-1102
Ph: 301-394-0081
Fax: 301-394-0084
E-mail: karl.abt@hq02.usace.army.mil
Internet: www.usace.army.mil/usace-docs/armytm/

TELECOMMUNICATIONS INDUSTRIES ASSOCIATION (TIA)
2500 Wilson Blvd., Suite 300
Arlington, VA 22201 USA
ph: (703) 907-7700
fax: (703) 907-7727
tty: (703) 907-7776

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)
40 24th Street, 6th Floor
Pittsburgh, PA 15222-4656
Ph: 412-281-2331
Fax: 412-281-9992
E-mail: info@sspc.org
Internet: <http://www.sspc.org>

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)
2500 Wilson Blvd,. Suite 300
Arlington, VA 22201
Ph: 703-907-7700
Fax: 703-907-7727
Internet: <http://www.tiaonline.org>

TESTING, ADJUSTING AND BALANCING BUREAU (TABB)
601 North Fairfax Street
Suite 250
Alexandria, Va 22314
Ph: 703-299-6546
Fax: 703-683-7615
E-mail: infor@tabbcertified.org
Internet: <http://www.tabbcertified.org>

TILE COUNCIL OF AMERICA (TCA)
100 Clemson Research Boulevard
Anderson, SC 29625
Ph: 864-646-8453
Fax: 864-646-2821
E-mail: literature@tileusa.com
Internet: <http://www.tileusa.com>

TRUSS PLATE INSTITUTE (TPI)
218 N. Lee Street, Suite 312
Alexandria, VA 22314
Ph: 703-683-1010
Internet: <http://www.tpinst.org>

TUBULAR EXCHANGER MANUFACTURERS ASSOCIATION (TEMA)
25 North Broadway
Tarrytown, NY 10591
Ph: 914-332-0040
Fax: 914-332-1541
E-mail: info@tema.org
Internet: <http://www.tema.org>

TURFGRASS PRODUCERS INTERNATIONAL (TPI)
2 East Main Street
East Dundee, IL 60118
Ph: 847-649-5555 or 800-405-8873
Fax: 847-649-5678
E-mail: info@turfgrasssod.org
Internet: <http://www.turfgrasssod.org>

UNDERWRITERS LABORATORIES (UL)
333 Pfingsten Road
Northbrook, IL 60062-2096
Ph: 847-272-8800
Fax: 847-272-8129
E-mail: customerexperiencecenter@us.ul.com
Internet: <http://www.ul.com/>

UNI-BELL PVC PIPE ASSOCIATION (UBPPA)
2655 Villa Creek Drive, Suite 155
Dallas, TX 75234
Ph: 972-243-3902
Fax: 972-243-3907

E-mail: info@uni-bell.org
Internet: <http://www.uni-bell.org>

U.S. AIR FORCE (USAF)
Air Force Publishing Distribution Center
Ph: 410-687-3330
Fax: 410-436-4629
E-mail: afpdc-service@pentagon.af.mil
Internet: <http://www.e-publishing.af.mil/>

U.S. AIR FORCE TECHNICAL ORDERS (TO)
Air Force Logistics Command, ATTN: D.A.D.
Wright-Patterson Air Force Base, OH 45433

U.S. ARMY (DA)
U.S. Army Publishing Directorate
Internet: <http://www.apd.army.mil>

U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
(USACHPPM)
5158 Blackhawk Road
Aberdeen Proving Ground, MD 21010-5403
Ph: 800-222-9698
Internet: <http://chppm-www.apgea.army.mil>

U.S. ARMY CORPS OF ENGINEERS (USACE)
Order CRD-C DOCUMENTS from:
U.S. Army Engineer Waterways Experiment Station
ATTN: Technical Report Distribution Section, Services
Branch, TIC
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
Ph: 601-634-2664
Fax: 601-634-2388
E-mail: mtc-info@erdc.usace.army.mil
Internet: <http://www.wes.army.mil/SL/MTC/handbook.htm>

Order Other Documents from:
USACE Publications Depot
Attn: CEHEC-IM-PD
2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081
Fax: 301-394-0084
E-mail: pubs-army@usace.army.mil
Internet: <http://www.usace.army.mil/publications>
or <http://www.hnd.usace.army.mil/techinfo/engpubs.htm>

U.S. ARMY RESEARCH, DEVELOPMENT, AND ENGINEERING COMMAND (EA)
Attn: Public Affairs/G-5; Bldg. E5101/223
Aberdeen Proving Ground, MD 21010-5423
Ph: 410-671-5770
Internet: <http://www.rdecom.army.mil>

U.S. ARMY ENVIRONMENTAL CENTER (USAEC)
5179 Hoadley Road
Aberdeen Proving Ground, MD 21010-5401
Internet: <http://aec.army.mil/usaec>
Order from:

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Ph: 703-605-6585
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: <http://www.ntis.gov>

U.S. BUREAU OF RECLAMATION (BOR)
Denver Federal Center
P.O. Box 25007
Denver, CO 80225
Ph: 303-445-2072
Fax: 303-445-6303
Internet: <http://www.usbr.gov>
Order from:
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Ph: 703-605-6585
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: <http://www.ntis.gov>

U.S. DEFENSE INFORMATION SYSTEMS AGENCY (DISA)
Washington, DC 20305-2000
Internet: <http://www.disa.mil>

U.S. DEFENSE INTELLIGENCE AGENCY (DIA)
Defense Intelligence Analysis Center (DIAC)
MacDill Boulevard and Luke Avenue
Bolling AFB, MD
Internet: <http://www.dia.mil>

U.S. DEFENSE LOGISTICS AGENCY (DLA)
Andrew T. McNamara Building
8725 John J. Kingman Road
Fort Belvoir, VA 22060
Ph: 1-877-352-2255
Internet: <http://www.dla.mil>

U.S. DEPARTMENT OF AGRICULTURE (USDA)
Order AMS Publications from:
AGRICULTURAL MARKETING SERVICE (AMS)
Seed Regulatory and Testing Branch
801 Summit Crossing Place, Suite C
Gastonia, NC 28054-2193
Ph: 704-810-8870
Fax: 704-852-4189
Internet: <http://www.ams.usda.gov/lsg/seed.htm>
E-mail: seed.ams@usda.gov

Order Other Publications from:
U.S. Department of Agriculture, Rural Utilities Service
14th and Independence Avenue, SW, Room 4028-S
Washington, DC 20250
Ph: 202-720-2791
Fax: 202-720-2166

Internet: <http://www.usda.gov/rus>

U.S. DEPARTMENT OF COMMERCE (DOC)
1401 Constitution Avenue, NW
Washington, DC 20230
Ph: 202-482-2000
Internet: <http://www.commerce.gov/>

Order Publications From:
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Ph: 703-605-6585
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: <http://www.ntis.gov>

U.S. DEPARTMENT OF DEFENSE (DOD)
Directorate for Public Inquiry and Analysis
Office of the Secretary of Defense (Public Affairs)
Room 3A750 -- The Pentagon
1400 Defense Pentagon
Washington, DC 20301-1400
Ph: 703-428-0711
E-mail: pia@hq.afis.asd.mil
Internet: <http://www.dod.gov>

Order DOD Documents from:
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Ph: 703-605-6585
FAX: 703-605-6900
E-mail: info@ntis.gov
Internet: <http://www.ntis.gov>

Order Military Specifications, Standards and Related Publications
from:
Department of Defense Single Stock Point for (DODSSP)
Defense Automation and Production Service (DAPS)
Building 4D
700 Robbins Avenue
Philadelphia, PA 19111-5098
Ph: 215-697-2179
Fax: 215-697-1462
Internet: <http://www.dodssp.daps.mil>
www.daps.dla.mil

- - - - - Detail Series Documents - - - - -

U.S. DEPARTMENT OF ENERGY (DOE)
Order from:
1000 Independence Avenue Southwest
Washington, D.C. 20585
Ph: 800-363-3732
Internet: www.eere.energy.gov

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)
Order from:

HUD User
P.O. Box 23268
Washington, DC 20026-3268
Ph: 800-245-2691 or 202-708-9981
Fax: 202-708-9981
E-mail: Huduser@aspensys.com
Internet: <http://www.huduser.org>

U.S. DEPARTMENT OF STATE (SD)
2201 C Street, NW
Washington, DC 20520
Ph: 202-647-4000
Internet: <http://www.state.gov>

U.S. DEPARTMENT OF TRANSPORTATION (DOT)
400 7th Street, SW
Washington, DC 20590
Ph: 202-366-4000
Internet: <http://www.dot.gov>

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
Ph: 202-272-0167
Internet: <http://www.epa.gov>

--- Some EPA documents are available only from:
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Ph: 703-605-6585
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: <http://www.ntis.gov>

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)
Order for sale documents from:
Superintendent of Documents
U.S. Government Printing Office (GPO)
732 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: <http://www.gpoaccess.gov>

Order free documents from:
Federal Aviation Administration
Department of Transportation
800 Independence Avenue, SW
Washington, DC 20591
Ph: 1-866-835-5322
Internet: <http://www.faa.gov>

U.S. FEDERAL COMMUNICATIONS COMMISSION (FCC)
445 12th Street SW
Washington, DC 20554
Phone: 888-CALL-FCC

Fax: 866-418-0232
Internet: <http://www.fcc.gov>
E-mail: fccinfo@fcc.gov
Order Publications From:
Superintendent of Documents
U.S. Government Printing Office (GPO)
732 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: <http://www.gpoaccess.gov>

U.S. FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)
500 C Street, SW
Washington, D.C. 20472
Ph: 1-800-621-FEMA
Internet: <http://www.fema.gov>

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)
Office of Highway Safety (HHS-31)
400 Seventh Street, SW
Washington, DC 20590-0001
Ph: 202-366-0411
Fax: 202-366-2249
Internet: <http://www.fhwa.dot.gov>
Order from:

Superintendent of Documents
U. S. Government Printing Office (GPO)
732 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: <http://www.gpoaccess.gov>

U. S. GREEN BUILDING COUNCIL (USGBC)
1015 18th Street, NW, Suite 508
Washington, D.C. 20036
Ph: 202-828-7422
Fax: 202-828-5110
E-mail: info@usbc.org
Internet: <http://www.usgbc.org>
AOK: 2/04
LOK: 2/04

U.S. GENERAL SERVICES ADMINISTRATION (GSA)
General Services Administration
1800 F Street, NW
Washington, DC 20405
Ph: 202-501-1021
Internet: www.GSA.gov

Order from:
General Services Administration
Federal Supply Service Bureau
1941 Jefferson Davis Highway
Arlington, VA 22202

Ph: 703-605-5400

Internet: <http://apps.fss.gsa.gov/pub/fedspecs/index.cfm>

- - - - - Commercial Item Description Documents - - - - -

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

8601 Adelphi Road

College Park, MD 20740-6001

Ph: 866-272-6272

Fax: 301-837-0483

Internet: <http://www.archives.gov>

Order documents from:

Superintendent of Documents

U.S. Government Printing Office (GPO)

732 North Capitol Street, NW

Washington, DC 20401

Ph: 202-512-1800

Fax: 202-512-2104

E-mail: contactcenter@gpo.gov

Internet: <http://www.gpoaccess.gov>

U.S. NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

1322 Patterson Ave. SE, Suite 1000

Washington Navy Yard, DC 20374

Ph: 757-322-4200

Fax: 757-322-4416

Internet: <http://www.navfac.navy.mil>

U.S. NAVAL FACILITIES ENGINEERING SERVICE CENTER (NFESC)

1100 23rd Avenue

Port Hueneme, CA 93043-4370

Ph: 805-982-4980

Internet: <http://www.nfesc.navy.mil>

WASHINGTON STATE ADMINISTRATIVE CODE (WAC)

Code Reviser

P.O. Box 4055

Olympia, WA 98504-0551

Ph: 360-782-6777

Fax: 360-786-1529

E-mail: Via internet address and prompt at "Title 1: Code Reviser"

Internet: <http://apps.leg.wa.gov/wac/>

WATER ENVIRONMENT FEDERATION (WEF)

601 Wythe Street

Alexandria, VA 22314-1994

Ph: 703-684-2452 or 1-800-666-0206

Fax: 703-684-2492

E-mail: pubs@wef.org

Internet: <http://www.wef.org>

WATER QUALITY ASSOCIATION (WQA)

4151 Naperville Road

Lisle, IL 60532

Ph: 630-505-0160

Fax: 630-505-9637

E-mail: info@mail.wqa.org

Internet: <http://www.wqa.org>

WEST COAST LUMBER INSPECTION BUREAU (WCLIB)
P.O. Box 23145
Tigard, OR 97281
Ph: 503-639-0651
Fax: 503-684-8928
E-mail: info@wclib.org
Internet: <http://www.wclib.org>

WESTERN WOOD PRESERVERS INSTITUTE (WWPI)
7017 N.E. Highway 99 Suite 108
Vancouver, WA 98665
Ph: 360-693-9958
Fax: 360-693-9967
E-mail: info@wwpinstitute.org
Internet: <http://www.wwpinstitute.org>

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)
Yeon Building
522 SW 5th Avenue
Suite 500
Portland, OR 97204-2122
Ph: 503-224-3930
Fax: 503-224-3934
E-mail: info@wwpa.org
Internet: <http://www.wwpa.org>

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)
1400 East Touhy Avenue, Suite 470
Des Plaines, IL 60018
Ph: 847-299-5200 or 800-223-2301
Fax: 847-299-1286
E-mail: admin@wdma.com
Internet: <http://www.wdma.com>

WIRE ROPE TECHNICAL BOARD (WRTB)
801 North Fairfax Street, Suite 211
Alexandria, VA 22314
Ph: 703-299-8550
Fax: 703-299-9253
E-mail: wrtb@usa.net
Internet: www.domesticwirerope.org/wrtb

WOOD MOULDING AND MILLWORK PRODUCERS ASSOCIATION (WMMPA)
507 First Street
Woodland, CA 95695
Ph: 530-661-9591
Fax: 530-661-9586
E-mail: info@wmmmpa.com
Internet: <http://www.wmmmpa.com>

WOOLMARK BUSINESS INTELIGENCE (WBI)
The Woolmark Company
1230 Avenue of the Americas, 7th Fl.
New York, NY 10020
Ph: 646-756-2535
Fax: 646 756 2538
Internet: www.woolmark.org

-- End of Section --

SECTION 01 45 01

USACE QUALITY CONTROL
01/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 3740 (2008) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (2008) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan

1.3 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all associated costs will be included in the applicable Bid Schedule unit or lump-sum prices.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system in compliance with the Contract Clause titled "Inspection of Construction." QC consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. Cover all construction operations, both onsite and offsite, and be keyed to the proposed construction sequence. The project superintendent must maintain a physical presence at the site at all times and is responsible for all

construction and related activities at the site, except as otherwise acceptable to the Contracting Officer.

3.2 QUALITY CONTROL PLAN

Submit on or before pre-construction meeting, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The Government will consider an interim plan for the first sixty (60) days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work.

3.2.1 Content of the CQC Plan

Include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three phase control system for all aspects of the work specified. Include a CQC System Manager who reports to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. Letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities will be issued by the CQC System Manager. Copies of these letters must be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures must be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities approved by the Contracting Officer must be used.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been

corrected.

- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of [construction](#). Acceptance is conditional and will be predicated on satisfactory performance during the [construction](#). The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the [Preconstruction Conference, before start of construction](#), and prior to acceptance by the Government of the CQC Plan, meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. Submit the CQC Plan a minimum of seven (7) calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CQC [operations](#), control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared by the Government, signed by both the Contractor and the Contracting Officer and will become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a [CQC System Manager](#) and sufficient number of additional qualified personnel to ensure safety and contract compliance. The Safety and Health Manager must receive direction and authority from the CQC System Manager and serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff must maintain a presence at the site at all times during progress

of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff will be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly complete and furnish all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who is responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager must be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of eight (8) years construction experience on construction similar to this contract. This CQC System Manager must be on the site at all times during construction and be employed by the prime Contractor. The CQC System Manager must be assigned no other duties. Identify in the plan an alternate to serve in the event of the CQC System Manager's absence. The requirements for the alternate are the same as the CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: electrical, and mechanical, . These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. A single person may cover more than one area provided that they are qualified to perform QC activities in each designated and that workload allows.

Experience Matrix

Area	Qualifications
a. Mechanical	Graduate Mechanical Engineer or Construction Manager with 2 yrs experience or person with 5 yrs related experience
b. Electrical	Graduate Electrical Engineer or Construction Manager with 2 yrs related experience or person with 5 yrs related experience
c. Submittals	Submittal Clerk with 1 yr experience

Experience Matrix

Area	Qualifications
<hr/>	
3.4.4 Additional Requirement	
<p>In addition to the above experience and/or education requirements the CQC System Manager must have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered at locations within the Savannah District.</p>	
3.4.5 Organizational Changes	
<p>Maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.</p>	
3.5 SUBMITTALS AND DELIVERABLES	
<p>Submittals, if needed, must comply with the requirements in Section 01 33 00 SUBMITTAL PROCEDURES. The CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the contract requirements. When Section 23 08 00.00 10 COMMISSIONING OF HVAC SYSTEMS is included in the contract, the submittals required by those sections must be coordinated with Section 01 33 00 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.</p>	
3.6 CONTROL	
<p>Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control must be conducted by the CQC System Manager for each definable feature of the construction work as follows:</p>	
3.6.1 Preparatory Phase	
<p>This phase is performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase includes:</p>	
<ol style="list-style-type: none">a. A review of each paragraph of applicable specifications, reference codes, and standards. Make available during the preparatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Government personnel until final acceptance of the work.b. Review of the contract drawings.c. Check to assure that all materials and/or equipment have been tested, submitted, and approved.d. Review of provisions that have been made to provide required	

control inspection and testing.

- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. Examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. Review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government must be notified at least forty-eight (48) hours in advance of beginning the preparatory control phase. Include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attach to the daily CQC report. Instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase is accomplished at the beginning of a definable feature of work. Accomplish the following:

- a. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government must be notified at least twenty-four (24) hours in advance of beginning the initial phase. Prepare separate minutes of this phase by the CQC System Manager and attach to the daily CQC report. Indicate the exact location of initial phase for future reference and comparison with follow-up phases.

- g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. Record the checks in the CQC documentation. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. Procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. Perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel must meet criteria detailed in [ASTM D 3740](#) and [ASTM E 329](#).

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government must be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

For delivery by mail: P.O. Box 51, Marietta, GA 30061

For other deliveries: 611 South Cobb Drive, Marietta, GA 30061-3112

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Conduct an inspection of the work by the CQC Manager near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications. Prepare and include in the CQC documentation a punch list of items which do not conform to the approved drawings and specifications, as required by paragraph DOCUMENTATION. Include within the list of deficiencies the estimated date by which the deficiencies will be corrected. Make a second inspection the CQC System Manager or staff to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the

facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. Ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. These inspections and any deficiency corrections required by this paragraph must be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative must be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notify the Contracting Officer at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- g. Offsite surveillance activities, including actions taken.

- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Furnish the original and one copy of these records in report form to the Government daily within twenty-four (24) hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days must be accounted for throughout the life of the contract. The first report following a day of no work will be for that day only. Reports must be signed and dated by the CQC System Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the CQC System Manager Report.

3.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, will be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

SECTION 01 45 01.10

USACE QUALITY CONTROL SYSTEM (QCS)
01/08

PART 1 GENERAL

1.1 Contract Administration

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor must use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. The Contractor module, user manuals, updates, and training information can be downloaded from the [RMS](#) web site. This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

- Administration
- Finances
- Quality Control
- Submittal Monitoring
- Scheduling
- Import/Export of Data

1.1.1 Correspondence and Electronic Communications

For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record will also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.1.2 Other Factors

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", Section 01 32 01.00 10 PROJECT SCHEDULE, Section 01 33 00 SUBMITTAL PROCEDURES, and Section 01 45 01 USACE QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through QCS. Also, there is no separate payment for establishing and maintaining the QCS database; all costs associated therewith will be included in the contract pricing for the work.

1.2 QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the QCS software to the Contractor after award of the construction contract. Prior to the Pre-Construction Conference, the Contractor will be responsible to download, install and use the latest version of the QCS software from the Government's RMS Internet Website. Upon specific justification and request by the Contractor, the Government can provide QCS on CD-ROM. Any program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

1.3 SYSTEM REQUIREMENTS

The following is the minimum system configuration that the Contractor must have to run QCS:

QCS and QAS System

Hardware

IBM-compatible PC with 1000 MHz Pentium or higher processor
256+ MB RAM for workstation / 512+ MB RAM for server
1 GB hard drive disk space for sole use by the QCS system
3-1/2 inch high-density floppy drive
Compact Disk (CD) Reader 8x speed or higher
SVGA or higher resolution monitor (1024x768, 256 colors)
Mouse or other pointing device
Windows compatible printer. (Laser printer must have 4 MB+ of RAM)
Connection to the Internet, minimum 56k BPS

Software

MS Windows 2000 or higher
QAS-Word Processing software: MS Word 2000 or newer
Latest version of: Netscape Navigator, Microsoft Internet Explorer, or other browser that supports HTML 4.0 or higher
Electronic mail (E-mail) MAPI compatible
Virus protection software that is regularly upgraded with all issued manufacturer's updates

1.4 RELATED INFORMATION

1.4.1 QCS User Guide

After contract award, download instructions for the installation and use of QCS from the Government RMS Internet Website. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.4.2 Contractor Quality Control (CQC) Training

The use of QCS will be discussed with the Contractor's QC System Manager during the mandatory CQC Training class.

1.5 CONTRACT DATABASE

Prior to the pre-construction conference, the Government will provide the

Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed, generally by using the Government's SFTP repository built into QCS import/export function. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.6 DATABASE MAINTENANCE

Establish, maintain, and update data in the QCS database throughout the duration of the contract at the Contractor's site office. Submit data updates to the Government (e.g., daily reports, submittals, RFI's, schedule updates, payment requests, etc.) using the Government's SFTP repository built into QCS export function. If permitted by the Contracting Officer, e-mail or CD-ROM may be used instead of E-mail (see Paragraph DATA SUBMISSION VIA CD-ROM). The QCS database typically includes current data on the following items:

1.6.1 Administration

1.6.1.1 Contractor Information

Contain within the database the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of QCS software from the Government, deliver Contractor administrative data in electronic format.

1.6.1.2 Subcontractor Information

Contain within the database the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Assign each subcontractor/trade a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, deliver subcontractor administrative data in electronic format.

1.6.1.3 Correspondence

Identify all Contractor correspondence to the Government with a serial number. Prefix correspondence initiated by the Contractor's site office with "S". Prefix letters initiated by the Contractor's home (main) office with "H". Letters must be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

1.6.1.4 Equipment

Contain within the Contractor's QCS database a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.6.1.5 Management Reporting

QCS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.6.1.6 Request For Information (RFI)

Exchange all Requests For Information (RFI) using the Built-in RFI generator and tracker in QCS.

1.6.2 Finances

1.6.2.1 Pay Activity Data

Include within the QCS database a list of pay activities that the Contractor must develop in conjunction with the construction schedule. The sum of all pay activities must be equal to the total contract amount, including modifications. Group pay activities Contract Line Item Number (CLIN); the sum of the activities must equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.6.2.2 Payment Requests

Prepare all progress payment requests using QCS. Complete the payment request worksheet, prompt payment certification, and payment invoice in QCS. Update the work completed under the contract, measured as percent or as specific quantities, at least monthly. After the update, generate a payment request report using QCS. Submit the payment request, prompt payment certification, and payment invoice with supporting data using the Government's SFTP repository built into QCS export function. If permitted by the Contracting Officer, e-mail or a CD-ROM may be used. A signed paper copy of the approved payment request is also required, which will govern in the event of discrepancy with the electronic version.

1.6.3 Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other Contractor QC requirements. Maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. Provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01 45 01 USACE QUALITY CONTROL. Within seven calendar days of Government acceptance, submit a QCS update reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.6.3.1 Daily Contractor Quality Control (CQC) Reports.

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS must be the Contractor's official report. Summarize data from any supplemental reports by the Contractor and consolidate onto the QCS-generated Daily CQC Report. Submit daily CQC Reports as required by Section 01 45 01 USACE QUALITY CONTROL. Electronically submit reports to the Government within 24 hours after the date covered by the report. Also provide the Government a signed, printed copy of the daily CQC report.

1.6.3.2 Deficiency Tracking.

Use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. Maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The

Government's QA punch list items will be included in its export file to the Contractor. Regularly update the correction status of both QC and QA punch list items.

1.6.3.3 QC Requirements

Develop and maintain a complete list of QC testing and required structural and life safety special inspections required by the International Code Council (ICC), transferred and installed property, and user training requirements in QCS. Update all data on these QC requirements as work progresses, and promptly provide this information to the Government via QCS.

1.6.3.4 Three-Phase Control Meetings

Maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.6.3.5 Labor and Equipment Hours

Log labor and equipment exposure hours on a daily basis. This data will be rolled up into a monthly exposure report.

1.6.3.6 Accident/Safety Reporting

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. Regularly update the correction status of the safety comments. In addition, utilize QCS to advise the Government of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 300.

1.6.3.7 Features of Work

Include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.6.3.8 Hazard Analysis

Use QCS to develop a hazard analysis for each feature of work included in the CQC Plan. Address any hazards, or potential hazards, that may be associated with the work.

1.6.4 Submittal Management

The Government will provide the initial submittal register in electronic format. Thereafter, maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. Use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update must be produced using QCS. QCS and RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.6.5 Schedule

Develop a construction schedule consisting of pay activities, in accordance with Section 01 32 01.00 10 PROJECT SCHEDULE. Input and maintain in the QCS database this schedule either manually or by using the Standard Data Exchange Format (SDEF) (see Section 01 32 01.00 10 PROJECT SCHEDULE). Include with each pay request the updated schedule.

1.6.6 Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data from RMS, and schedule data using SDEF.

1.7 IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. Ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

1.8 DATA SUBMISSION VIA CD-ROM

The Government-preferred method for Contractor's submission of QCS data is by using the Government's SFTP repository built into QCS export function. Other data should be submitted using E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of CD-ROM for data transfer. Export data onto CDs using the QCS built-in export function. If used, submit CD-ROMs in accordance with the following:

1.8.1 File Medium

Submit in English required data on CD-ROM conforming to industry standards used in the United States.

1.8.2 CD-ROM Labels

Affix a permanent exterior label to each CD-ROM submitted. Indicate on the label in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.8.3 File Names

The files will be automatically named by the QCS software. The naming convention established by the QCS software must not be altered.

1.9 MONTHLY COORDINATION MEETING

Update the QCS database each workday. At least monthly, generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, meet with the Government representative to review the planned progress payment data submission for errors and omissions.

Make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by

incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, will be deemed sufficient for the purpose of notification.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 45 35

SPECIAL INSPECTION FOR SEISMIC-RESISTING SYSTEMS
08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ACI INTERNATIONAL (ACI)

ACI 318 (2008; Errata 2008) Building Code Requirements for Structural Concrete and Commentary

ACI 530/530.1 (2008; Errata 2008; Errata 2009) Building Code Requirements and Specification for Masonry Structures; Containing Building Code Requirements for Masonry Structures, Specification for Masonry Structures and Companion Commentaries

1.2 SYSTEM DESCRIPTION

Perform the Special Inspection for seismic-resisting system components as specified. Special Inspector personnel shall be in addition to the quality control inspections and inspectors required elsewhere in this section.

1.2.1 Continuous Special Inspection

Continuous special inspection is the full time observation of the work by the Special Inspector present in the work area whenever work is being performed. Perform continuous special inspection where specified for items as shown on the drawings.

1.2.2 Periodic Special Inspection

Periodic special inspection is the intermittent observation of the work by a Special Inspector present in the work area while work is being performed. The intermittent observation periods shall be: at times of significant work; recurrent over the complete work period; and total at least 25 percent of the total work time. Perform periodic special inspection where specified for items as shown on the drawings.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Special Inspector; G, D

Certification attesting that the Special Inspector is qualified by knowledge and experience to perform the specified Special Inspections. Information, which provides evidence of the knowledge and experience necessary to qualify a person as a Special Inspector for the category of work being certified, will accompany the qualification.

Quality Assurance Plan; G

A copy of the Quality Assurance Plan covered by a certificate indicating that the plan meets the content specified in this section.

1.4 QUALITY ASSURANCE PLAN

Develop a quality assurance plan containing the following:

- a. A list of all items that require quality assurance Special Inspection and testing, including the type, frequency, extent, and duration of the special inspection for each item on this list.
- b. A list of all items that require quality assurance testing, including the type and frequency of testing for each item on this list.
- c. The content, distribution, and frequency of special inspection reports.
- d. The content, distribution, and frequency of testing reports.
- e. The procedures, controls, and people used within the Contractor's organization to develop, sign, and distribute Special Inspection and Testing reports along with the position title and pertinent qualifications of all Contractor personnel involved.

1.5 SPECIAL INSPECTOR

Use a Special Inspector to perform Special Inspections required by this section. The Special Inspector is a person employed by the Contractor and approved by the Government as being qualified by knowledge and experience to perform the Special Inspection for the category of work being constructed. Special Inspectors shall perform their duties independent from the construction quality control staff employed by the Contractor. More than one Special Inspector may be required to provide the varied knowledge and experience necessary to adequately inspect all of the categories of work requiring Special Inspection.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PERFORMANCE OF INSPECTIONS

Perform Special Inspections for the following where designated on the drawings:

3.1.1 OMMITTED - Piers Piles Caissons

3.1.2 Reinforcing Steel

- a. Periodic special inspection during and upon completion of the placement of reinforcing steel in shear walls.

3.1.3 Structural Concrete

Periodic special inspection during and on completion of the placement of concrete in shear walls.

3.1.4 OMITTED - Prestressed Concrete

3.1.5 Structural Masonry

- a. Periodic special inspection during the preparation of mortar, the laying of masonry units, and placement of reinforcement and prior to placement of grout.

- b. Periodic special inspection during the grouting, consolidation and reconsolidation and placement of anchors or weld plates.

3.1.6 Structural Steel

- a. Periodic special inspection for all structural welding, except that periodic special inspection is permitted for single-pass or resistance welds provided the qualifications of the welder and the welding electrodes are inspected at the beginning of the work and all welds are inspected for compliance with the approved construction documents at the completion of welding.

3.1.7 OMITTED - Structural Wood

3.1.8 OMITTED - Cold-Formed Steel Framing

3.1.9 Architectural Components

Perform special inspection of the architectural components ensuring that the methods of anchoring and fastening indicated on the drawings are being complied with at the onset of construction of the components, and that the specified or shown number, spacing, and types of fasteners were actually installed. Special inspection for architectural components shall be as follows:

- a. Periodic special inspection during the erection and fastening of exterior cladding and masonry veneer.

- b. Periodic special inspection during the anchorage of suspended ceilings and storage racks 8 feet or greater in height.

3.1.10 Mechanical and Electrical Components

Perform special inspection of the mechanical and electrical components ensuring that the methods of anchoring and fastening indicated on the drawings are being complied with at the onset of construction of the component, and that the specified or shown number, spacing, and types of fasteners were actually installed. Special inspection for mechanical and

electrical components shall be as follows:

- a. Periodic special inspection during the anchorage of electrical equipment for emergency or standby power systems.
- b. Periodic special inspection during the installation of anchorage of all other electrical equipment.
- c. Periodic special inspection during installation for flammable, combustible, or highly toxic piping systems and their associated mechanical units.
- d. Periodic special inspection during the installation of HVAC ductwork that will contain hazardous materials.

3.1.11 OMITTED - Seismic Isolation System

3.1.12 OMITTED - Energy Dissipation System

3.2 TESTING

The special inspector shall be responsible for verifying that the testing requirements are performed by an approved testing agency for compliance with the following, where shown on the drawings:

- a. Reinforcing Steel: Special testing of reinforcing steel shall be as follows:
 - (1) Examine certified mill test reports for each shipment of reinforcing steel used in reinforced masonry shear walls. The special inspector shall determine conformance with the construction documents.
- b. Structural Concrete: Verify that samples of structural concrete obtained at the project site, along with all material components obtained at the batch plant, have been tested in accordance with the requirements of **ACI 318** and comply with all acceptance provisions contained therein.
- c. Structural Masonry: Verify that all quality assurance testing of structural masonry along with all material components is in accordance with the requirements of **ACI 530/530.1** and complies with all acceptance provisions contained therein.

3.3 REPORTING AND COMPLIANCE PROCEDURES

- a. On the first day of each month, furnish to the Government five copies of the combined progress reports of the special inspector's observations listing all special inspections of construction or reviews of testing performed during that month, noting all uncorrected deficiencies, and describing the corrections made both to these deficiencies and to previously reported deficiencies. Each monthly report shall be signed by all special inspectors who performed special inspections of construction or reviewed testing during that month, regardless of whether they reported any deficiencies. Each monthly report shall be signed by the Contractor.
- b. At completion of construction, each special inspector shall prepare and sign a final report attesting that all work they inspected and all

testing and test reports they reviewed were completed in accordance with the approved construction documents and that deficiencies identified were satisfactorily corrected. Submit a combined final report containing the signed final reports of all the special inspectors. Sign the combined final report attesting that all final reports of special inspectors that performed work to comply with these construction documents are contained therein, and that the Contractor has reviewed and approved all of the individual inspector's final reports.

-- End of Section --

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
10/07

PART 1 GENERAL

1.1 SUMMARY

Requirements of this Section apply to, and are a component of, each section of the specifications.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241 (2009) Safeguarding
Construction, Alteration, and Demolition
Operations

NFPA 70 (2007; AMD 1 2008) National Electrical
Code - 2008 Edition

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1 (Rev K) Obstruction Marking and Lighting

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD (2000) Manual of Uniform Traffic Control
Devices

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191 Americans with Disabilities Act (ADA)
Accessibility Guidelines for Buildings and
Facilities

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submitted the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction site plan; G

Traffic control plan; G

SD-06 Test Reports

SD-07 Certificates

1.4 CONSTRUCTION SITE PLAN

Prior to the start of work, submit a site plan showing the locations and dimensions of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Indicate if the use of a supplemental or other staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

1.5 Identification of Employees

The Contractor shall be responsible for furnishing to each employee, and for requiring each employee engaged on the work to display, identification as approved and directed by the Contracting Officer. Prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employee. When required, the Contractor shall obtain and provide fingerprints of persons employed on the project. Contractor and subContractor personnel shall wear identifying markings on hard hats clearly identifying the company for whom the employee works.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Bulletin Board

Immediately upon beginning of work, provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

2.1.2 Project and Safety Signs

The requirements for the signs, their content, and location are as shown on the drawings. Erect signs within 15 days after receipt of the notice to proceed. Correct the data required by the safety sign daily, with light colored metallic or non-metallic numerals. Upon completion of the project, the signs shall be removed from the site.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 Haul Roads

At contractors expense construct access and haul roads necessary for proper prosecution of the work under this contract. Construct with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic are to be avoided. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, must be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads are subject to approval by the Contracting Officer. Lighting must be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations.

2.2.2 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic barricades will be required. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

2.2.2.1 Temporary Exits and Egress Enclosure Tunnels

Provide temporary exits for emergency egresses.

Provide barricades and protective egress enclosure tunnels, at temporary exits and at existing exit doors.

Request inspection of temporary egress facilities by Fire Marshall, and proceed with the Project only upon Fire Marshall's written approval.

2.2.3 Temporary Accessibility Provisions

Provide temporary checkerplate aluminum ramps, railings, landings, and other facilities as required to comply with [36 CFR 1191](#) (ADAAG). Construct with slope not to exceed the ADAAG maximum (1:12), and with ramp widths, landing sizes, railing and guardrail heights, railing radius, railing extensions, picket spacings, and other requirements as stated in the ADAAG.

For information only, refer to AlumiRamp, Inc. as one available manufacturer of engineered systems designed for compliance. (800) 800-3864, 855 East Chicago Road, Quincy, MI 49082, sales@alumiramp.com, www.alumiramp.com.

2.2.4 Fencing

a. Provide fencing along the construction site at all open excavations and tunnels to control access by unauthorized people. Fencing must be installed to be able to restrain a force of at least [250 pounds](#) against it.

2.2.5 Temporary Wiring

Provide temporary wiring in accordance with [NFPA 241](#) and [NFPA 70](#), Article 305-6(b), Assured Equipment Grounding Conductor Program. Include frequent

inspection of all equipment and apparatus.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

Contractor employees will park privately owned vehicles in an area designated by the Contracting Officer. This area will be within reasonable walking distance of the construction site. Contractor employee parking must not interfere with existing and established parking requirements of the government installation.

3.2 AVAILABILITY AND USE OF UTILITY SERVICES

3.2.1 Temporary Utilities

Provide temporary utilities required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

3.2.2 Payment for Utility Services

a. The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed will be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. Carefully conserve any utilities furnished without charge.

3.2.3 Meters and Temporary Connections

At the Contractors expense and in a manner satisfactory to the Contracting Officer, provide and maintain necessary temporary connections, distribution lines, and meter bases (Government will provide meters) required to measure the amount of each utility used for the purpose of determining charges. Notify the Contracting Officer, in writing, 5 working days before final electrical connection is desired so that a utilities contract can be established. The Government will provide a meter and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation. The Contractor will not make the final electrical connection.

3.2.4 Advance Deposit

An advance deposit for utilities consisting of an estimated month's usage or a minimum of \$50.00 will be required. The last monthly bills for the fiscal year will normally be offset by the deposit and adjustments will be billed or returned as appropriate. Services to be rendered for the next fiscal year, beginning 1 October, will require a new deposit. Notification of the due date for this deposit will be mailed to the Contractor prior to the end of the current fiscal year.

3.2.5 Final Meter Reading

Before completion of the work and final acceptance of the work by the Government, notify the Contracting Officer, in writing, 5 working days before termination is desired. The Government will take a final meter

reading, disconnect service, and remove the meters. Then remove all the temporary distribution lines, meter bases, and associated paraphernalia. Pay all outstanding utility bills before final acceptance of the work by the Government.

3.2.6 Sanitation

a. Provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Obtain approval from the system owner prior to discharge into any municipal, district, or commercial sanitary sewer system. Any penalties and / or fines associated with improper discharge will be the responsibility of the Contractor. Coordinate with the Contracting Officer and follow station regulations and procedures when discharging into the station sanitary sewer system. Maintain these conveniences at all times without nuisance. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.

3.2.7 Telephone

Make arrangements and pay all costs for telephone facilities desired.

3.2.8 Obstruction Lighting of Cranes

If cranes are used, provide a minimum of 2 aviation red or high intensity white obstruction lights on temporary structures (including cranes) over 100 feet above ground level. Light construction and installation must comply with FAA AC 70/7460-1. Lights must be operational during periods of reduced visibility, darkness, and as directed by the Contracting Officer.

3.2.9 Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction. Remove debris and flammable materials daily to minimize potential hazards.

3.3 TRAFFIC PROVISIONS

3.3.1 Maintenance of Traffic

a. Conduct operations in a manner that will not close any thoroughfare or interfere in any way with traffic on railways or highways except with written permission of the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI. Contractor may move oversized and slow-moving vehicles to the worksite provided requirements of the highway authority have been met.

b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain approval from the Contracting Officer prior to starting any activity that will obstruct traffic.

c. Provide, erect, and maintain, at contractors expense, lights,

barriers, signals, passageways, detours, and other items, that may be required by the Life Safety Signage, overhead protection authority having jurisdiction.

3.3.2 Protection of Traffic

Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of any damage to roads caused by construction operations.

3.3.3 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Treat dust abatement on access roads with applications of calcium chloride, water sprinklers, or similar methods or treatment.

3.4 CONTRACTOR'S TEMPORARY FACILITIES

3.4.1 Safety

Protect the integrity of any installed safety systems or personnel safety devices. If entrance into systems serving safety devices is required, the Contractor must obtain prior approval from the Contracting Officer. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Contracting Officer.

3.4.2 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

3.4.3 Storage Area

Construct a temporary 6 foot high chain link fence around trailers and materials. Include plastic strip inserts, colored brown, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Do not place or store Trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the installation boundaries. Trailers, equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on any given day. Do not stockpile materials outside the fence in preparation for the next day's work. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment within the fenced area at the end of

each work day.

3.4.4 Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but will be within the installation boundaries. Fencing of materials or equipment will not be required at this site; however, the Contractor is responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

3.4.5 Appearance of Trailers

a. Trailers utilized by the Contractor for administrative or material storage purposes must present a clean and neat exterior appearance and be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on installation property.

b. Paint using suitable paint and maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal.

3.4.6 Maintenance of Storage Area

a. Keep fencing in a state of good repair and proper alignment. Grassed or unpaved areas, which are not established roadways, will be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways, should the Contractor elect to traverse them with construction equipment or other vehicles; gravel gradation will be at the Contractor's discretion. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers will be edged or trimmed neatly.

3.4.7 New Building

In the event a new building is constructed for the temporary project field office, it will be a minimum 12 feet in width, 16 feet in length and have a minimum of 7 feet headroom. Equip the building with approved electrical wiring, at least one double convenience outlet and the required switches and fuses to provide 110-120 volt power. Provide a work table with stool, desk with chair, two additional chairs, and one legal size file cabinet that can be locked. The building must be waterproof, supplied with a heater, have a minimum of two doors, electric lights, a telephone, a battery operated smoke detector alarm, a sufficient number of adjustable windows for adequate light and ventilation, and a supply of approved drinking water. Approved sanitary facilities must be furnished. Screen the windows and doors and provide the doors with dead bolt type locking devices or a padlock and heavy duty hasp bolted to the door. Door hinge pins will be non-removable. Arrange the windows to open and to be securely fastened from the inside. Protect glass panels in windows by bars or heavy mesh screens to prevent easy access. In warm weather, furnish air conditioning capable of maintaining the office at 50 percent relative humidity and a room temperature 20 degrees F below the outside temperature when the outside temperature is 95 degrees F. Any new building erected for a temporary field office must be maintained by the Contractor during the

life of the contract and upon completion and acceptance of the work become the property of the Contractor and removed from the site. All charges for telephone service for the temporary field office will be borne by the Contractor, including long distance charges up to a maximum of \$75.00 per month.

3.4.8 Security Provisions

Provide adequate outside security lighting at the Contractor's temporary facilities. The Contractor will be responsible for the security of its own equipment; in addition, the Contractor will notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

3.4.9 Weather Protection of Temporary Facilities and Stored Materials

Take necessary precautions to ensure that roof openings and other critical openings in the building are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

3.4.9.1 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions must include, but are not limited to, closing openings; removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property.

3.5 PLANT COMMUNICATION

Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory, the Contractor must install a satisfactory means of communication, such as telephone or other suitable devices and made available for use by Government personnel.

3.6 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing at the work site. The safety fencing must be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at the approved location. Maintain the safety fencing during the life of the contract and, upon completion and acceptance of the work, will become the property of the Contractor and be removed from the work site.

3.7 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store within the fenced area described above or at the supplemental storage area any materials resulting

from demolition activities which are salvageable. Neatly stacked stored materials not in trailers, whether new or salvaged.

3.8 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletinboard, signs, barricades, haulroads, and any other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence that will become the property of the Contractor. Restore to the original or better condition, areas used by the Contractor for the storage of equipment or material, or other use. Gravel used to traverse grassed areas must be removed and the area restored to its original condition, including top soil and seeding as necessary.

-- End of Section --

SECTION 01 50 61

DUST CONTROL

11/02

PART 1 GENERAL

1.1 SUMMARY

The work covered by this section consists of furnishing all labor, materials and equipment and performing all work required for the control and prevention of fugitive dust during and as the result of construction operations under this contract except for those measures set forth in other Technical Provisions of these specifications. For the purpose of this specification, fugitive dust entails the generation of solid particles by the forces of wind or machinery acting upon exposed materials. Provisions of this specification shall prevent fugitive dust from adversely affecting human health or welfare; unfavorably altering ecological balances of importance to human life; affecting other species of importance to man; or degrading the utility of the environment for aesthetic and recreational purposes.

1.2 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referenced in the text by basic designation only.

CORPS OF ENGINEERS (COE)

EM 385-1-1

(2008) Safety and Health Requirements
Manual

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Dust Control; G
Products and Procedures; G

Prior to commencement of the work, the Contractor shall submit in writing a proposal to the Contracting Officer for implementing the provisions of this section for fugitive dust control. The Contractor shall address by submittal the plans to prevent and control fugitive dust through specific mitigative and preventative measures, including any products to be used. The effectiveness of the dust control program shall be periodically checked and reviewed. Revisions to the dust control plan shall be submitted to the Contracting Officer as changes are necessary during the duration of this contract.

SD-02 Shop Drawings

Recordkeeping

Maintain and furnish records in accordance with PART 1 paragraph RECORDKEEPING.

1.4 IMPLEMENTATION MEETING

Prior to commencement of the work the Contractor shall meet with representatives of the Contracting Officer to develop mutual understandings relative to compliance with these provisions and administration of the dust control program.

1.5 APPLICABLE REGULATIONS

In order to prevent and to provide control of pollution arising from the construction activities of the Contractor and his subcontractors in the performance of this contract, all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement, and all applicable provisions of the EM 385-1-1 as well as the specific requirements stated in this section and elsewhere in the contract specifications. Compliance with the provisions of this section by subcontractors will be the responsibility of the Contractor.

1.6 NOTIFICATION OF NON-COMPLIANCE

The Contracting Officer will notify the Contractor in writing of any observed non-compliance with the foregoing provisions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it was later determined that the Contractor was in compliance.

1.7 RECORDKEEPING

The Contractor shall, at a minimum, maintain records indicating dust control measures taken. Information provided shall be sufficient to answer any questions regarding control methods utilized, products used, application rates, inspections performed. Additional information to be recorded, but not limited to reporting, includes treated area, operator, date and time of treatment, meteorological conditions and inspection and monitoring reports. Records shall be submitted every 30 days to the Contracting Officer.

PART 2 PRODUCTS

2.1 PRODUCTS AND PROCEDURES

Products and procedures used in controlling particulates and dust shall be in accordance with the Contractor's Environmental Protection Plan and the dust control plan required by this Section. If the Contractor proposes to

use chemical treatments or other manufactured products such as SOIL CEMENT, prior approval by the Post Directorate of Environment is required and shall be obtained by submitting a written request to the Contracting Officer's Representative.

PART 3 EXECUTION

3.1 HVAC SYSTEM ISOLATION

3.1.1 During Construction Project

Remove or isolate HVAC system in area where work is being done to prevent contamination of duct system.

Complete all critical barriers (sheetrock, plywood or plastic) to seal area from non-Work area, or implement control cube method (cart with plastic covering and sealed connection to Work site with HEPA vacuum for vacuuming prior to exit) before construction begins.

Maintain negative air pressure within Work site utilizing HEPA equipped air filtration units.

Contain construction waste before transport in tightly covered containers.

Cover transport receptacles or carts. Tape covering unless solid lid.

3.1.2 Upon Completion of Project

Do not remove barriers from Work area until completed Project is inspected by the Safety Department and Infection Control Department and thoroughly cleaned by Environmental Services Department.

Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.

Vacuum Work area with HEPA filtered vacuums.

Wet mop area with disinfectant.

Remove isolation of HVAC system in area where Work is being performed.

3.2 DUST CONTROL

Control techniques for fugitive dust sources shall involve watering, chemical treatment, light bituminous treatment, reduction of surface wind speed with wind breaks or source enclosures, or similar methods. The methods utilized shall be cost effective and appropriate for the size and scope of the fugitive dust source. Methods and controls shall not have an adverse effects on plant and animal life, or contaminate the treated material.

Methods shall be repeated at such intervals as to keep all parts of the disturbed area treated at all times, and the Contractor shall have sufficient competent equipment on the job to accomplish control techniques. Products shall provide a method to reduce dust-related environmental concerns and aid in complying with applicable regulations. Products shall not in any form produce any adverse environmental effects through their use and shall provide an effective, clean, safe control of

airborne dust and protection against soil erosion.

3.2.1 Preventative Techniques

The reduction of source extent, the incorporation of process modifications, or adjusted work practices, which reduce the amount of dust-generation, are preventative techniques for the control of fugitive dust emissions. These techniques could include, for example, the elimination of mud and dirt carry-out onto paved roads at construction sites.

3.2.2 Mitigative Techniques

Mitigative measures entail the periodic removal of dust-producing material. Examples of mitigative control measures include clean-up of spillage on paved or unpaved travel surfaces and clean-up of material spillage at transfer points.

3.3 MATERIALS HANDLING

The Contractor shall take the following minimum precautions to limit fugitive dust emissions from material handling and transportation to achieve control of dust emissions to the extent practicable:

a. Stockpiles

The Contractor shall apply water or other approved suitable chemicals or materials, or cover material stockpiles and other surfaces which can create airborne dust.

b. Transportation

At a minimum, complete covering of materials hauled from the construction site in open-bed vehicles which can create airborne particulate matter is required. Additional application of water, suitable chemicals, or maintaining a minimum 12 inch free-board space shall be required if additional controls are considered necessary by the Contracting Officer.

c. Off-Site Tracking

Dust control shall be performed as the work proceeds to minimize vehicle off-site tracking of sediment and generation of dust. Every effort shall be made to keep vehicles from tracking soils from the construction site. Dust generation shall be controlled by sprinkling, chemical treatment, light bituminous treatment, or similar approved methods.

3.4 CONSTRUCTION AND DEMOLITION

The Contractor shall control dust resulting from demolition and construction activities. No person may cause, suffer, allow, or permit a structure, road, street, alley, or parking area to be constructed, altered, repaired, or demolished, or land to be cleared without taking minimum precautions to achieve control of dust emissions.

3.4.1 Demolition

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. The use of water, oil or chemical treatment for control of dust in the demolition of

structures, in construction operations, in work performed on a road, parking area, or in the clearing of land is required.

3.4.2 Sandblasting

Adequate methods such as wet-sandblasting and enclosure of work areas to prevent airborne particulate matter during sandblasting of structures or other similar operations shall be utilized.

3.5 ACCESS ROADS AND PARKING LOTS

No person may cause, suffer, allow, or permit any public, industrial, commercial, or private road, street, or alley to be used without taking precautions to achieve control of dust emissions.

In addition to preventative techniques, the removal of soil or other materials shall be periodically performed by mechanical sweepers or their equivalent. The Contractor shall also spot clean dirty roadways and parking lots. These activities shall be performed as deemed necessary. Sand applied for the specific purpose of snow or ice control shall be removed as soon as practicable.

3.5.1 Access Roads

The use of asphalt or uniform gravel cover is an acceptable method of dust control for roads leading to and from the area of construction activity. Water, suitable oil, or approved chemical applications to construction and demolition site access roads may be used if accepted by the Contracting Officer.

3.5.2 Parking Lots

No person may allow any vehicular parking surface having more than five parking spaces to be used unless dust is controlled by the appropriate application of asphalt, water, or suitable oil or chemicals.

Parking surfaces with more than five parking spaces shall be paved or uniformly covered with gravel. This provision shall not apply to temporary parking lots used for less than one month, after which access is prohibited unless a continuance is granted by the Contracting Officer. Such temporary lots shall be required to apply water or suitable oil or chemical. Lots with more than 100 parking spaces shall be paved or covered by an equivalent method approved by the Contracting Officer.

3.6 CONTROL STRUCTURES

Activities performed under this Contract shall conform with the specifications described herein along with other technical specifications, particularly Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION.

If the Contractor proposes to construct temporary structures, he shall submit the proposal for approval at least ten (10) days prior to the scheduled start of such temporary work. Modification of the Contractor's plans shall be made only with the written approval of the Contracting Officer.

3.7 MAINTENANCE

During the life of this contract, the Contractor shall maintain all

facilities constructed for pollution control under this Contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

During the construction period the Contractor shall conduct frequent training courses for his maintenance personnel. The curricula shall include methods of dust control, familiarity with pollution standards, and care of controls and measures to prevent and correct fugitive dust pollution.

The Contractor shall furnish daily services for the temporary control measures at the project site and perform any required maintenance as deemed necessary by and to the satisfaction of the Contracting Officer during the entire life of the Contract. Services shall be performed at such a time and in such a manner to least interfere with the operations.

The Contractor's designated Site Inspector shall inspect all pollution prevention measures at the Contracting Officer's request.

-- End of Section --

SECTION 01 57 19.11

INDOOR AIR QUALITY (IAQ) MANAGEMENT
11/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 52.2 (2007; Addenda B 2008; Errata 2009) Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 008 (2007) IAQ Guidance for Occupied Buildings Under Construction

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED Reference Guide (2005) LEED-NC Reference Guide for New Construction

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Indoor Air Quality (IAQ) Management Plan; G

SD-06 Test Reports

Air contamination testing

SD-11 Closeout Submittals

LEED data for indoor air quality management during construction and before occupancy.

1.3 CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN

Submit an IAQ Management Plan within 30 days after notice to proceed and not less than 10 days before the preconstruction meeting. Revise and resubmit plan as required by the Contracting Officer. Make copies of the final plan available to workers on site. Include provisions in the plan to

meet the requirements specified below and to ensure safe, healthy air for construction workers and building occupants.

1.3.1 Requirements During Construction

Use filters with a Minimum Efficiency Reporting Value (MERV) of 8 in permanently installed air handlers that are used during construction.

1.3.1.1 Control Measures

Meet or exceed the requirements of [SMACNA 008](#), Chapter 3, to help minimize contamination of the building from construction activities. The 5 requirements of this manual which shall be adhered to are described below:

- a. HVAC protection: Isolate return side of HVAC system from surrounding environment to prevent construction dust and debris from entering the duct work and spaces.
- b. Source control: Use low emitting paints and other finishes, sealants, adhesives, and other materials as specified. When available, cleaning products shall have a low VOC content and be non-toxic to minimize building contamination. Utilize cleaning techniques that minimize dust generation. Cycle equipment off when not needed. Prohibit idling motor vehicles where emissions could be drawn into building. Designate receiving/storage areas for incoming material that minimize IAQ impacts.
- c. Pathway interruption: When pollutants are generated use strategies such as 100 percent outside air ventilation or erection of physical barriers between work and non-work areas to prevent contamination.
- d. Housekeeping: Clean frequently to remove construction dust and debris. Promptly clean up spills. Remove accumulated water and keep work areas dry to discourage the growth of mold and bacteria. Take extra measures when hazardous materials are involved.
- e. Scheduling: Control the sequence of construction to minimize the absorption of VOCs by other building materials.

1.3.1.2 Moisture Contamination

- a. Remove accumulated water and keep work dry.
- b. Protect porous materials from exposure to moisture.
- c. Remove and replace items which remain damp for more than a few hours.

1.3.2 Requirements After Construction

After construction ends and prior to occupancy, conduct a building flush-out or test the indoor air contaminant levels. Flush-out shall be with MERV-13 filtration media as determined by [ASHRAE 52.2](#) and in accordance with [LEED Reference Guide](#). [Air contamination testing](#) and follow-up actions shall be in accordance with EPA's current Compendium of Methods for the Determination of Air Pollutants in Indoor Air, and with the [LEED Reference Guide](#). After building flush-out or testing and prior to occupancy, replace filtration media. Filtration media shall have a MERV of

13 as determined by **ASHRAE 52.2**. LEED Reference Guide option for flush-out of occupied building is not permitted.

Submit the results of the air contamination tests to the Contracting Officer's Representative.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PREPARATION

Store and handle materials in a manner to prevent loss from weather and other damage. Keep materials, products, and accessories covered and off the ground and store in a dry, secure area. Prevent contact with material that may cause corrosion, discoloration, or staining. Protect materials and installations from damage by the activities of other trades.

-- End of Section --

SECTION 01 57 20.00 10

ENVIRONMENTAL PROTECTION
04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY (DA)

DA AR 200-5 (1999) Pest Management

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2008) Safety and Health Requirements Manual

WETLAND MANUAL Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328 Definitions of Waters of the United States

40 CFR 150 - 189 Pesticide Programs

40 CFR 260 Hazardous Waste Management System: General

40 CFR 261 Identification and Listing of Hazardous Waste

40 CFR 262 Standards Applicable to Generators of Hazardous Waste

40 CFR 279 Standards for the Management of Used Oil

40 CFR 302 Designation, Reportable Quantities, and Notification

40 CFR 355 Emergency Planning and Notification

40 CFR 68 Chemical Accident Prevention Provisions

49 CFR 171 - 178 Hazardous Materials Regulations

1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life;

affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

1.2.5 Project Pesticide Coordinator

The Project Pesticide Coordinator (PPC) is an individual that resides at a Civil Works Project office and that is responsible for oversight of pesticide application on Project grounds.

1.2.6 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor must discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Land Application must be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.7 Pesticide

Pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.8 Pests

The term "pests" means arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment,

or vegetation; or are otherwise undesirable.

1.2.9 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.10 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.11 Wetlands

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

1.3 GENERAL REQUIREMENTS

Minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work must be protected during the entire duration of this contract. Comply with all applicable environmental Federal, State, and local laws and regulations. Any delays resulting from failure to comply with environmental laws and regulations will be the Contractor's responsibility.

1.4 SUBCONTRACTORS

Ensure compliance with this section by subcontractors.

1.5 PAYMENT

No separate payment will be made for work covered under this section. Payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor, and payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations are the Contractor's responsibility. All costs associated with this section must be included in the contract price.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G

The environmental protection plan.

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern must be defined within the Environmental Protection Plan as outlined in this section. Address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but are considered necessary, must be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan must be current and maintained onsite by the Contractor.

1.7.1 Compliance

No requirement in this Section will relieve the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor will be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.2 Contents

Include in the environmental protection plan, but not limit it to, the following:

- a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.
- b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.
- c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
- d. Description of the Contractor's environmental protection personnel training program.
- e. OMITTED
- f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.
- g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud

transported onto paved public roads by vehicles or runoff.

h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

i. Drawing showing the location of borrow areas.

j. Include in the Spill Control plan the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. Include in this plan, as a minimum:

- 1). The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual will immediately notify the Contracting Officer and Facility Fire Department in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. Include in the plan a list of the required reporting channels and telephone numbers.

- 2). The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

- 3). Training requirements for Contractor's personnel and methods of accomplishing the training.

- 4). A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

- 5). The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

- 6). The methods and procedures to be used for expeditious contaminant cleanup.

k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris and schedules for disposal.

- 1). Identify any subcontractors responsible for the transportation and disposal of solid waste. Submit licenses or permits for solid waste disposal sites that are not a commercial operating facility.

- 2). Evidence of the disposal facility's acceptance of the solid waste must be attached to this plan during the construction. Attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. Submit the report for the previous quarter on the first working day after the first quarter that

non-hazardous solid waste has been disposed and/or diverted (e.g. the first working day of January, April, July, and October).

3). Indicate in the report the total amount of waste generated and total amount of waste diverted in cubic yards or tons along with the percent that was diverted.

4). A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. Detail in the plan the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

n. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be onsite at any given time must be included in the contaminant prevention plan. Update the plan as new hazardous materials are brought onsite or removed from the site.

o. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan must include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan must include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, include a copy of the permit and associated documents as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, the plan must include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

p. OMITTED

q. Include and update a pesticide treatment plan, as information becomes available. Include in the plan: sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (i.e. pounds of active ingredient applied), equipment used for application and calibration of equipment. Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional Installation Project Office specific requirements are the Contractor's responsibility in conformance with DA AR 200-5 Pest Management, Chapter 2, Section III "Pest Management Records and Reports" for data required to be reported to the Installation.

1.7.3 Appendix

Attach to the Environmental Protection Plan, as an appendix, copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents.

1.8 PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, the Contractor and the Contracting Officer will make a joint condition survey. Immediately following the survey, the Contractor will prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report will be signed by both the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor must protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the work under the contract.

1.9 SPECIAL ENVIRONMENTAL REQUIREMENTS

Comply with the special environmental requirements listed on the Drawings.

1.10 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations from the drawings, plans and specifications, requested by the Contractor and which may have an environmental impact, will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. After receipt of such notice, the Contractor will inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or equitable adjustments allowed for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

1.12 OMITTED - HTRW PERIMETER AIR MONITORING

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

Complying with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations is the Contractor's responsibility.

3.2 LAND RESOURCES

Confine all activities to areas defined by the drawings and specifications. Identify any land resources to be preserved within the work area prior to the beginning of any construction. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval, except in areas indicated on the drawings or specified to be cleared. Ropes, cables, or guys will not be fastened to or attached to any trees for anchorage unless specifically authorized. Provide effective protection for land and vegetation resources at all times, as defined in the following subparagraphs. Remove stone, soil, or other materials displaced into uncleared areas.

3.2.1 Work Area Limits

Mark the areas that need not be disturbed under this contract prior to commencing construction activities. Mark or fence isolated areas within the general work area which are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers must be visible in the dark. The Contractor's personnel must be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved must be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. Restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

Providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations is the Contractor's responsibility. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. Construct or install temporary and permanent erosion and sediment control best management practices (BMPs) as indicated on the drawings. BMPs may include, but not be limited to, vegetation cover, slope stabilization, silt fences, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. **The Contractor's best management practices must also be in accordance with the North Carolina National Pollutant Discharge Elimination System (NPDES) Storm Water**

Pollution Prevention Plan (SWPPP). The plan shall be available at the construction site until project completion. Remove any temporary measures after the area has been stabilized.

3.2.4 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities will be made only when approved. Erosion and sediment controls must be provided for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas must be controlled to protect adjacent areas.

3.3 WATER RESOURCES

Monitor all water areas affected by construction activities to prevent pollution of surface and ground waters. Do not apply toxic or hazardous chemicals to soil or vegetation unless otherwise indicated. For construction activities immediately adjacent to impaired surface waters, the Contractor must be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.3.1 Cofferdams, Diversions, and Dewatering Operations

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure will be controlled at all times to maintain compliance with existing State water quality standards and designated uses of the surface water body. **Comply with the State of North Carolina water quality standards.**

3.3.2 OMITTED - Stream Crossings

3.3.3 OMITTED - Wetlands

3.4 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with all Federal and State air emission and performance laws and standards.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; must be controlled at all times, including weekends, holidays and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. Provide sufficient, competent equipment available to

accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with all State and local visibility regulations.

3.4.2 Odors

Odors from construction activities must be controlled at all times. The odors must be in compliance with State regulations and/or local ordinances and may not constitute a health hazard.

3.4.3 Sound Intrusions

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State of North Carolina rules.

3.4.4 Burning

Burning is prohibited on the Government premises.

3.5 OMITTED - HTRW AIR EMISSION CONTROL

3.6 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes will be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.6.1 Solid Wastes

Place solid wastes (excluding clearing debris) in containers which are emptied on a regular schedule. Handling, storage, and disposal must be conducted to prevent contamination. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with solid waste. Waste materials will be hauled to the Government landfill site designated by the Contracting Officer.

3.6.2 Chemicals and Chemical Wastes

Dispense chemicals ensuring no spillage to the ground or water. Perform and document periodic inspections of dispensing areas to identify leakage and initiate corrective action. This documentation will be periodically reviewed by the Government. Collect chemical waste in corrosion resistant, compatible containers. Collection drums must be monitored and removed to a staging or storage area when contents are within 6 inches of the top. Wastes will be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.6.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. At a minimum, manage and store hazardous waste in compliance with 40 CFR 262 in accordance with the Installation hazardous waste management plan. Take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. Segregate hazardous waste from other materials and wastes, protect it from the weather by placing it in a safe covered location, and take precautionary measures such as berming or other appropriate measures against accidental spillage. Storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and

local laws and regulations is the Contractor's responsibility. Transport Contractor generated hazardous waste off Government property within 60 days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. Dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials must be immediately reported to the Contracting Officer. Cleanup and cleanup costs due to spills are the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility. Coordinate the disposition of hazardous waste with the Facility's Hazardous Waste Manager and the Contracting Officer.

3.6.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles must be conducted in a manner that affords the maximum protection against spill and evaporation. Manage and store fuel, lubricants and oil in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded must be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. Storage of fuel on the project site will be in accordance with all Federal, State, and local laws and regulations. Implementation of SPCC requirements where fuel and lubricants are stored/used/managed will prevent/minimize pollution of ground and water sources. As part of construction operations, pollutants include, but not limited to: POL products (fuel, oil, lubricants), solvents, paints, pesticides, herbicides, fertilizers, chemicals, etc. Other pollutants include litter and biological waste. Sources of these pollutants include fuel tanks, drums, cans, heavy equipment, and the materials used for construction.

3.6.5 Waste Water

Disposal of waste water will be as specified below.

- a. Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. will not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. Dispose of the construction related waste water off-Government property in accordance with all Federal, State, Regional and Local laws and regulations.
- b. For discharge of ground water, the Contractor will discharge the water in accordance with all Federal, State, and local laws and regulations in accordance with the requirements of the State STORM WATER DISCHARGES FROM CONSTRUCTION SITES permit. Land application shall be in accordance with all Federal, State, Regional, and/or Local laws and regulations for pumping and land applying ground water.
- c. Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing will be land applied in accordance with all Federal, State, and local laws and regulations for land application .

3.7 RECYCLING AND WASTE MINIMIZATION

Participate in State and local government sponsored recycling programs.

The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project. .

3.8 NON-HAZARDOUS SOLID WASTE DIVERSION REPORT

Maintain an inventory of non-hazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that non-hazardous solid waste has been generated.

3.9 OMITTED - HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES 3.10 BIOLOGICAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The protection of threatened and endangered animal and plant species, including their habitat, is the Contractor's responsibility in accordance with Federal, State, Regional, and local laws and regulations.

3.11 INTEGRATED PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, the Contractor through the Contracting Officer, must coordinate with the Installation Pest Management Coordinator (IPMC) at the earliest possible time prior to pesticide application. Discuss integrated pest management strategies with the IPMC and receive concurrence from the IPMC through the COR prior to the application of any pesticide associated with these specifications. Installation Project Office Pest Management personnel will be given the opportunity to be present at all meetings concerning treatment measures for pest or disease control and during application of the pesticide. For termiticide requirements see Section 31 31 16 SOIL TREATMENT FOR SUBTERRANEAN TERMITE CONTROL. The use and management of pesticides are regulated under 40 CFR 150 - 189.

3.11.1 Pesticide Delivery and Storage

Deliver pesticides to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Store pesticides according to manufacturer's instructions and under lock and key when unattended.

3.11.2 Qualifications

For the application of pesticides, use the services of a subcontractor whose principal business is pest control. The subcontractor must be licensed and certified in the state where the work is to be performed.

3.11.3 Pesticide Handling Requirements

Formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and use the clothing and personal protective equipment specified on the labeling for use during all phases of the application. Furnish Material Safety Data Sheets (MSDS) for all pesticide products.

3.11.4 Application

Apply pesticides using a State Certified Pesticide Applicator in accordance with EPA label restrictions and recommendation. The Certified Applicator

must wear clothing and personal protective equipment as specified on the pesticide label. The Contracting Officer will designate locations for water used in formulating. Do not allow the equipment to overflow. All equipment must be inspected for leaks, clogging, wear, or damage and repaired prior to application of pesticide.

3.12 PREVIOUSLY USED EQUIPMENT

Clean all previously used construction equipment prior to bringing it onto the project site. Ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the USDA jurisdictional office for additional cleaning requirements.

3.13 MAINTENANCE OF POLLUTION FACILITIES

Maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.14 MILITARY MUNITIONS

In the event military munitions, as defined in 40 CFR 260, are discovered or uncovered, the Contractor will immediately stop work in that area and immediately inform the Contracting Officer.

3.15 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel must be trained in all phases of environmental protection and pollution control. Conduct environmental protection/pollution control meetings for all personnel prior to commencing construction activities. Additional meetings must be conducted for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.16 CONTAMINATED MEDIA MANAGEMENT

Manage contaminated environmental media consisting of, but not limited to, ground water, soils, and sediments in accordance with this Section.

3.17 POST CONSTRUCTION CLEANUP

The Contractor will clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area must be graded, filled and the entire area seeded unless otherwise indicated.

-- End of Section --

SECTION 01 57 23

TEMPORARY STORM WATER POLLUTION CONTROL
04/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 4439	(2004) Geosynthetics
ASTM D 4491	(1999a; R 2004e1) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(2004) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(2002) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

1.2 SYSTEM DESCRIPTION

The work consists of implementing the storm water pollution prevention measures to prevent sediment from entering streams or water bodies as specified in this Section in conformance with the requirements of Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit attached to that Section.

1.3 EROSION AND SEDIMENT CONTROLS

The controls and measures required of the Contractor are described below.

1.3.1 Stabilization Practices

The stabilization practices to be implemented include temporary seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, erosion control matts, protection of trees, preservation of mature vegetation, etc. On the daily CQC Report, record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, initiate stabilization practices as soon as practicable, but no more than 14 days, in any portion of the site where construction

activities have temporarily or permanently ceased.

1.3.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases or is precluded by unsuitable conditions caused by the weather, initiate stabilization practices as soon as practicable after conditions become suitable.

1.3.1.2 No Activity for Less Than 21 Days

When the total time period in which construction activity is temporarily ceased on a portion of the site is 21 days minimum, stabilization practices do not have to be initiated on that portion of the site until 14 days have elapsed after construction activity temporarily ceased.

1.3.1.3 Burnoff

Burnoff of the ground cover is not permitted.

1.3.1.4 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified, and protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

1.3.2 Erosion, Sediment and Stormwater Control

a. Submit "Erosion and Sediment Controls" (E&S) (form provided at the pre-construction conference) and [Storm Water Inspection Reports for General Permit](#) to the Contracting Officer once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch or more of rain.

b. Submit "Erosion and Sediment Control Reports" (E&S) (form provided at the pre-construction conference) and "Stormwater Inspections for General Permit NCG010000 - Land Disturbing Activities" (form provided at [http://h2o.enr.state.nc.us/su/PDF Files/SW General Permits/NCG01 Inspect log.pdf](http://h2o.enr.state.nc.us/su/PDF%20Files/SW%20General%20Permits/NCG01%20Inspect%20log.pdf)) to the Contracting Officer once every 7 days and within 24 hours of a storm event that produces 0.5 inch or more of rain.

c. Omitted

1.3.3 Structural Practices

Implement structural practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement structural practices in a timely manner, during the construction process, to minimize erosion and sediment runoff. Include the following devices; Location and details of installation and construction are shown on the drawings.

1.3.3.1 Silt Fences

Provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Properly install silt fences to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Install silt fences in the locations indicated on the drawings. Obtain approval from the Contracting Officer prior to final removal of silt fence barriers.

1.3.3.2 Diversion Dikes

Build diversion dikes with a maximum channel slope of 2 percent and adequately compacted to prevent failure as necessary. The minimum height measured from the top of the dike to the bottom of the channel shall be 18 inches. The minimum base width shall be 6 feet and the minimum top width shall be 2 feet. Ensure that the diversion dikes are not damaged by construction operations or traffic. Locate diversion dikes where shown on the drawings.

1.3.4 Sediment Basins

Trap sediment in temporary sediment basins as necessary. Select a basin size to accommodate the runoff of a local 25-year storm. Pump dry and remove the accumulated sediment, after each storm. Use a paved weir or vertical overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs. Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare BMP Inspection Reports as required by the general permit. If required by the permit, include those inspection reports.

1.3.5 Vegetation and Mulch

a. Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

b. Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish a suitable stand of grass. The seeding operation will be as specified in Section 32 92 19 SEEDING.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

SD-06 Test Reports

Storm Water Inspection Reports for General Permit

Erosion and Sediment Controls

SD-07 Certificates

Mill Certificate or Affidavit

Certificate attesting that the Contractor has met all specified requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

Identify, store and handle filter fabric in accordance with ASTM D 4873.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

Provide geotextile that complies with the requirements of ASTM D 4439, and consists of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and contains stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. Provide synthetic filter fabric that contains ultraviolet ray inhibitors and stabilizers to assure a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile	ASTM D 4632	100 lbs. min.
Elongation (percent)		30 percent max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

2.1.2 Silt Fence Stakes and Posts

Use steel posts for fence construction. . Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 5 feet.

2.1.3 Mill Certificate or Affidavit

Provide a mill certificate or affidavit attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. Specify in the mill certificate or affidavit the actual Minimum Average Roll Values and identify the fabric supplied by roll identification numbers. Submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter

fabric.

2.2 OMITTED - COMPONENTS FOR STRAW BALES

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Extend silt fences 24 inches above the ground surface. Provide filter fabric from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, splice together filter fabric at a support post, with a minimum 6 inch overlap, and securely sealed. Excavate trench approximately 4 inches wide and 8 inches deep on the upslope side of the location of the silt fence. The 8 by 4 inch trench shall be backfilled and the soil compacted over the filter fabric. Remove silt fences upon approval by the Contracting Officer.

3.2 OMITTED - INSTALLATION OF STRAW BALES

3.3 FIELD QUALITY CONTROL

Maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. Use the following procedures to maintain the protective measures.

3.3.1 Silt Fence Maintenance

Inspect the silt fences in accordance with paragraph, titled "Inspections," of this section. Any required repairs shall be made promptly. Pay close attention to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, replace the fabric promptly. Remove sediment deposits when deposits reach one-third of the height of the barrier. Remove a silt fence when it is no longer required. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall receive erosion control.

3.3.2 OMITTED - Straw Bale Maintenance

3.3.3 Diversion Dike Maintenance

Inspect diversion dikes in accordance with paragraph, titled "Inspections," of this section. Pay close attention to the repair of damaged diversion dikes and accomplish necessary repairs promptly. When diversion dikes are no longer required, shape to an acceptable grade. Seed the areas disturbed by this shaping in accordance with Section 32 92 19 SEEDING.

3.4 INSPECTIONS

3.4.1 General

Inspect disturbed areas of the construction site, areas that have not been finally stabilized used for storage of materials exposed to precipitation, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Conduct inspections at least once every month where sites have been finally stabilized.

3.4.2 Inspections Details

Inspect disturbed areas and areas used for material storage that are exposed to precipitation for evidence of, or the potential for, pollutants entering the drainage system. Observe erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan to ensure that they are operating correctly. Inspect discharge locations or points to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Inspect locations where vehicles exit the site for evidence of offsite sediment tracking.

3.4.3 Inspection Reports

For each inspection conducted, prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. Furnish the report to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

3.4.4 Monthly Inspection Report and Certification Form

Complete, sign, and submit the original form, on the first working day of each month, to the State of North Carolina.

Also furnish, on the first working day of each month, one copy of the form as part of the Contractor's daily CQC Report and attach a copy of the completed form to the Plan. Unless otherwise notified, submit the Monthly Inspection Report and Certification Forms for an additional two months after the final completion of all storm water pollution prevention measures required in this contract have been implemented.

-- End of Section --

SECTION 01 62 35

RECYCLED / RECOVERED MATERIALS

07/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247

Comprehensive Procurement Guideline for
Products Containing Recovered Materials

1.2 OBJECTIVES

Government procurement policy is to acquire, in a cost effective manner, items containing the highest percentage of recycled and recovered materials practicable consistent with maintaining a satisfactory level of competition without adversely affecting performance requirements or exposing suppliers' employees to undue hazards from the recovered materials. The Environmental Protection Agency (EPA) has designated certain items which must contain a specified percent range of recovered or recycled materials. EPA designated products specified in this contract comply with the stated policy and with the EPA guidelines. The Contractor shall make all reasonable efforts to use recycled and recovered materials in providing the EPA designated products and in otherwise utilizing recycled and recovered materials in the execution of the work.

1.3 EPA DESIGNATED ITEMS INCORPORATED IN THE WORK

Various sections of the specifications contain requirements for materials that have been designated by EPA as being products which are or can be made with recovered or recycled materials. These items, when incorporated into the work under this contract, shall contain at least the specified percentage of recycled or recovered materials unless adequate justification (non-availability) for non-use is provided. When a designated item is specified as an option to a non-designated item, the designated item requirements apply only if the designated item is used in the work.

1.4 EPA PROPOSED ITEMS INCORPORATED IN THE WORK

Products other than those designated by EPA are still being researched and are being considered for future Comprehensive Procurement Guideline (CPG) designation. It is recommended that these items, when incorporated in the work under this contract, contain the highest practicable percentage of recycled or recovered materials, provided specified requirements are also met.

1.5 EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

There are many products listed in 40 CFR 247 which have been designated or proposed by EPA to include recycled or recovered materials that may be used by the Contractor in performing the work but will not be incorporated into the work. These products include office products, temporary traffic control products, and pallets. It is recommended that these non-construction products, when used in the conduct of the work, contain the highest practicable percentage of recycled or recovered materials and that these products be recycled when no longer needed.

-- End of Section --

SECTION 01 73 29

CUTTING AND PATCHING

05/06

PART 1 GENERAL

1.1 SUMMARY

This Section includes procedural requirements for cutting and patching.

1.2 DEFINITIONS

Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.3 QUALITY ASSURANCE

1.3.1 Structural Elements

Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

1.3.2 Operational Elements

Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or de-creased operational life or safety. Operating elements include the following:

Primary operational systems and equipment.

Air or smoke barriers.

Fire-suppression systems.

Mechanical systems piping and ducts.

Control systems.

Communication systems.

Conveying systems.

Electrical wiring systems.

Operating systems of special construction in Division 13 Sections.

1.3.3 Miscellaneous Elements

Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as in-tended, or that results in increased maintenance or decreased operational life or safety.

Miscellaneous elements include the following:

Water, moisture, or vapor barriers.

Membranes and flashings.

Exterior curtain-wall construction.

Equipment supports.

Piping, ductwork, vessels, and equipment.

Noise- and vibration-control elements and systems.

1.3.4 Visual Requirements

Do not cut and patch construction in a manner that results in visual evidence of cut-ting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.4 WARRANTY

1.4.1 Existing Warranties

Remove, replace, patch, and repair materials and surfaces cut or damaged during cut-ting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

Comply with requirements specified in other Sections.

2.1.2 In-Place Materials

Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 EXAMINATION

Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.

Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

Temporary Support: Provide temporary support of Work to be cut.

Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.3 PERFORMANCE

3.3.1 General

Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

3.3.2 Cutting

Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.

Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

Proceed with patching after construction operations requiring cutting are complete.

3.3.3 Patching

Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

3.3.4 Inspection

Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

3.3.5 Exposed Finishes

Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

Clean piping, conduit, and similar features before applying paint or other finishing materials.

Restore damaged pipe covering to its original condition.

3.3.6 Floors and Walls

Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

3.3.7 Ceilings

Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

3.3.8 Exterior Building Enclosure

Patch components in a manner that restores enclosure to a weathertight condition.

3.3.9 Cleaning

Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

-- End of Section --

SECTION 01 74 19

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
01/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E 1609 (2001) Development and Implementation of a Pollution Prevention Program

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED (2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)

1.2 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy the Contractor shall: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse. A minimum of 50 percent by weight of total project solid waste shall be diverted from the landfill.

1.3 MANAGEMENT

Develop and implement a waste management program in accordance with ASTM E 1609 and as specified. Take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. The Contractor is responsible for implementation of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling accrue to the Contractor. Appropriately permit firms and facilities used for recycling, reuse, and disposal for the intended use to the extent required by federal, state, and local regulations. Also, provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return

methods to be used by all parties at the appropriate stages of the project.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Management Plan; G; (LEED)

SD-11 Closeout Submittals

Records; (LEED)

1.5 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Contracting Officer to discuss the proposed Waste Management Plan and to develop a mutual understanding relative to the details of waste management. The requirements for this meeting may be fulfilled during the coordination and mutual understanding meeting outlined in Section 01 45 01 USACE QUALITY CONTROL. At a minimum, environmental and waste management goals and issues shall be discussed at the following additional meetings:

- a. Pre-bid meeting.
- b. Preconstruction meeting.
- c. Regular QC meetings.
- d. Work safety meetings.

1.6 WASTE MANAGEMENT PLAN

A waste management plan shall be submitted within 15 days after contract award and not less than 10 days before the preconstruction meeting. The plan shall demonstrate how the project waste diversion goal shall be met and shall include the following:

- a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
- b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.
- c. Description of the regular meetings to be held to address waste management.
- d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of wastes.

- e. Characterization, including estimated types and quantities, of the waste to be generated.
- f. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.
- g. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name, location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.
- h. List of specific waste materials that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Recycling facilities that will be used shall be identified by name, location, and phone number, including a copy of the permit or license for each facility.
- i. Identification of materials that cannot be recycled/reused with an explanation or justification, to be approved by the Contracting Officer.
- j. Description of the means by which any waste materials identified in item (h) above will be protected from contamination.
- k. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).
- l. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Distribute copies of the Waste Management Plan to each subcontractor, the Quality Control Manager, and the Contracting Officer.

1.7 RECORDS

Records shall be maintained to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Quantities may be measured by weight or by volume, but must be consistent throughout. List each type of waste separately noting the disposal or diversion date. Identify the landfill, recycling center, waste processor, or other organization used to process or receive the solid waste. Provide explanations for any waste not recycled or reused. With each application for payment, submit updated documentation for solid waste disposal and diversion, and submit manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be delivered to the Contracting Officer upon completion of the construction.

1.8 REPORTS

Provide quarterly reports and a final report to SWARS Coordinator, (contact name and information to be provided by the Contracting Office). Quarterly and final reports shall include project name, information for waste generated this quarter, and cumulative totals for the project. Each report shall include supporting documentation to include manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. Include timber harvest and demolition information, if any.

1.9 COLLECTION

Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in a manner that maximizes recyclability and salvagability of identified materials. Provide the necessary containers, bins and storage areas to facilitate effective waste management and clearly and appropriately identify them. Provide materials for barriers and enclosures around recyclable material storage areas which are nonhazardous and recyclable or reusable. Locate out of the way of construction traffic. Provide adequate space for pick-up and delivery and convenience to subcontractors. Recycling and waste bin areas are to be kept neat and clean, and recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials. Clean contaminated materials prior to placing in collection containers. Use cleaning materials that are nonhazardous and biodegradable. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION. Separate materials by one of the following methods:

1.9.1 Source Separated Method.

Waste products and materials that are recyclable shall be separated from trash and sorted as described below into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the following category types as appropriate to the project waste and to the available recycling and reuse programs in the project area:

- a. Land clearing debris.
- b. Asphalt.
- c. Concrete and masonry.
- d. Metal (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).
 - (1) Ferrous.
 - (2) Non-ferrous.
- e. Wood (nails and staples allowed).
- f. Debris.

- g. Glass (colored glass allowed).
- h. Paper.
 - (1) Bond.
 - (2) Newsprint.
 - (3) Cardboard and paper packaging materials.
- i. Plastic.
 - (1) Type 1: Polyethylene Terephthalate (PET, PETE).
 - (2) Type 2: High Density Polyethylene (HDPE).
 - (3) Type 3: Vinyl (Polyvinyl Chloride or PVC).
 - (4) Type 4: Low Density Polyethylene (LDPE).
 - (5) Type 5: Polypropylene (PP).
 - (6) Type 6: Polystyrene (PS).
 - (7) Type 7: Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.
- j. Gypsum.
- k. Non-hazardous paint and paint cans.
- l. Carpet.
- m. Ceiling tiles.
- n. Insulation.
- o. Beverage containers.

1.9.2 Co-Mingled Method.

Waste products and recyclable materials shall be placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed.

1.9.3 Other Methods.

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

1.10 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures. Except as otherwise specified in other sections of the specifications, disposal shall

be in accordance with the following:

1.10.1 Reuse.

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Coordinate reuse with the Contracting Officer. Sale or donation of waste suitable for reuse shall be considered.

1.10.2 Recycle.

Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling. All fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site shall be recycled. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

1.10.3 Waste.

Materials with no practical use or economic benefit shall be disposed at a landfill or incinerator.

1.10.4 Return

Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS

05/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E 1971

(2005) Stewardship for the Cleaning of
Commercial and Institutional Buildings

GREEN SEAL (GS)

GS-37

(2000; R 2005) Industrial and
Institutional Cleaners

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

As-Built Record of Equipment and Materials

Two copies of the record listing the as-built materials and equipment incorporated into the construction of the project.

Warranty Management Plan

One set of the warranty management plan containing information relevant to the warranty of materials and equipment incorporated into the construction project, including the starting date of warranty of construction. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

Warranty Tags

Two record copies of the warranty tags showing the layout and design.

Final Cleaning

Two copies of the listing of completed final clean-up items.

Spare Parts Data

Two copies of list that indicates manufacturer's name, part number, nomenclature, and stock level recommended for maintenance and repair. List those items that may be standard to the normal maintenance of the system.

SD-08 Manufacturer's Instructions

Preventative Maintenance and Condition Monitoring (Predictive Testing) and Inspection schedules with instructions that state when systems should be retested.

Define within the schedule the anticipated length of each test, test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements. On each test feature; e.g., gpm, rpm, psi, provide a signoff blank for the Contractor and Contracting Officer. Within a remarks column of the testing validation procedure include references to operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventative maintenance, condition monitoring (predictive testing) and inspection, adjustment, lubrication and cleaning necessary to prevent failure.

Posted Instructions

SD-10 Operation and Maintenance Data

Submit Operation and Maintenance Manuals in accordance with paragraph entitled, "Operation and Maintenance," of this section.

SD-11 Closeout Submittals

Record Drawings

Drawings showing final as-built conditions of the project. The final CADD record drawings must consist of one set of electronic CADD drawing files in the specified format, one set of mylar drawings, 2 sets of blue-line prints of the mylars, and one set of the approved working Record drawings.

Certification of EPA Designated Items; G

Form DD1354; G

Checklist for Form DD1354; G

1.3 PROJECT RECORD DOCUMENTS

1.3.1 Record Drawings

This paragraph covers record drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working record drawings" and "final record drawings" refer to contract drawings which are revised to be used for final record drawings showing as-built conditions.

1.3.1.1 Government Furnished Materials

One set of electronic CADD files in the specified software and format revised to reflect all bid amendments will be provided by the Government at the preconstruction conference for projects requiring CADD file record drawings.

1.3.1.2 Working Record and Final Record Drawings

Revise 2 sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. Kept these working as-built marked drawings current on a weekly basis and at least one set available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction must be accurately and neatly recorded as they occur by means of details and notes. Prepare final record (as-built) drawings after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked prints and final record (as-built) drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final record drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the record drawings. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. Show on the working and final record drawings, but not limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the record drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

b. The location and dimensions of any changes within the building structure.

c. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

d. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

e. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

f. Changes or modifications which result from the final inspection.

g. Where contract drawings or specifications present options, show

only the option selected for construction on the final as-built prints.

h. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.

i. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

j. Modifications (include within change order price the cost to change working and final record drawings to reflect modifications) and compliance with the following procedures.

(1) Follow directions in the modification for posting descriptive changes.

(2) Place a Modification Delta at the location of each deletion.

(3) For new details or sections which are added to a drawing, place a Modification Delta by the detail or section title.

(4) For minor changes, place a Modification Delta by the area changed on the drawing (each location).

(5) For major changes to a drawing, place a Modification Delta by the title of the affected plan, section, or detail at each location.

(6) For changes to schedules or drawings, place a Modification Delta either by the schedule heading or by the change in the schedule.

(7) The Modification Delta size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

1.3.1.3 Drawing Preparation

Modify the record drawings as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, and adding such additional drawings as may be necessary. These working as-built marked prints must be neat, legible and accurate. These drawings are part of the permanent records of this project and must be returned to the Contracting Officer after approval by the Government. Any drawings damaged or lost by the Contractor must be satisfactorily replaced by the Contractor at no expense to the Government.

1.3.1.4 Computer Aided Design and Drafting (CADD) Drawings

Only employ personnel proficient in the preparation of CADD drawings to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings must be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols must be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, prepare them using the specified electronic file format applying the same graphic standards specified for original drawings. The title block and drawing border to be used for any

new final record drawings must be identical to that used on the contract drawings. Accomplish additions and corrections to the contract drawings using CADD files. The Contractor will be furnished "as-designed" drawings in Microstation V8 format compatible with a Windows XP operating system. The electronic files will be supplied on compact disc, read-only memory (CD-ROM). Provide all program files and hardware necessary to prepare final record drawings. The Contracting Officer will review final record drawings for accuracy and return them to the Contractor for required corrections, changes, additions, and deletions.

a. Provide CADD "base" colors of red, green, and blue. Color code for changes as follows:

- (1) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.
- (2) Additions (Green) - Added items, lettering in notes and leaders.
- (3) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

b. Rename the Contract Drawing files in a manner related to the contract number (i.e., 98-C-10.DGN) as instructed in the Pre-Construction conference. Use only those renamed files for the Marked-up changes. All changes shall be made on the layer/level as the original item.

c. When final revisions have been completed, show the wording "RECORD DRAWINGS / AS-BUILT CONDITIONS" followed by the name of the Contractor in letters at least 3/16 inch high on the cover sheet drawing. Mark all other contract drawings either "Record" drawing denoting no revisions on the sheet or "Revised Record" denoting one or more revisions. Date original contract drawings in the revision block.

d. Within 20 days for contracts \$5 million and above after Government approval of all of the working record drawings for a phase of work, prepare the final CADD record drawings for that phase of work and submit two sets of blue-lined prints of these drawings for Government review and approval. The Government will promptly return one set of prints annotated with any necessary corrections. Within 10 days for contracts \$5 million and above revise the CADD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government. Within 20 days for contracts \$5 million and above of substantial completion of all phases of work, submit the final record drawing package for the entire project. Submit one set of electronic files on compact disc, read-only memory (CD-ROM), one set of mylars, two sets of blue-line prints and one set of the approved working record drawings. They must be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the Contractor. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CADD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final record drawing files and marked prints as specified will be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final record drawings must be accomplished before final payment is made to the Contractor.

1.3.1.5 Payment

No separate payment will be made for record drawings required under this contract, and all costs accrued in connection with such drawings are considered a subsidiary obligation of the Contractor.

1.3.2 As-Built Record of Equipment and Materials

Furnish one copy of preliminary record of equipment and materials used on the project 15 days prior to final inspection. This preliminary submittal will be reviewed and returned 2 days after final inspection with Government comments. Submit Two sets of final record of equipment and materials 10 days after final inspection. Key the designations to the related area depicted on the contract drawings. List the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA

Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used
-------------	--------------------------	---	-------------------------	---------------

1.3.3 Final Approved Shop Drawings

Furnish final approved project shop drawings 30 days after transfer of the completed facility.

1.3.4 Construction Contract Specifications

Furnish final record (as-built) construction contract specifications, including modifications thereto, 30 days after transfer of the completed facility.

1.3.5 Real Property Equipment

Furnish a list of installed equipment furnished under this contract. Include all information usually listed on manufacturer's name plate. In the "EQUIPMENT-IN-PLACE LIST" include, as applicable, the following for each piece of equipment installed: description of item, location (by room number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. Furnish a draft list at time of transfer. Furnish the final list 30 days after transfer of the completed facility.

1.4 SPARE PARTS DATA

Indicate manufacturer's name, part number, nomenclature, and stock level required for maintenance and repair. List those items that may be standard to the normal maintenance of the system.

Supply two items of each part for spare parts inventory. Provision of spare parts does not relieve the Contractor of responsibilities listed under the contract guarantee provisions.

1.5 PREVENTATIVE MAINTENANCE

Submit Preventative Maintenance and Condition Monitoring (Predictive Testing) and Inspection schedules with instructions that state when systems

should be retested.

Define the anticipated length of each test, test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements within the schedule. Provide a signoff blank for the Contractor and Contracting Officer for each test feature; e.g., [gpm](#), [rpm](#), [psi](#). Include a remarks column for the testing validation procedure referencing operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventative maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize corrective maintenance and repair.

Repair requirements must inform operators how to check out, troubleshoot, repair, and replace components of the system. Include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting of the system after acceptance.

1.6 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the [Certification of EPA Designated Items](#) as required by FAR 52.223-9, "Certification and Estimate of Percentage of Recovered Material Content for EPA Designated Items". Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials: 1) The product does not meet appropriate performance standards; 2) The product is not available within a reasonable time frame; 3) The product is not available competitively (from two or more sources); 4) The product is only available at an unreasonable price (compared with a comparable non-recycled content product)." Record each product used in the project that has a requirement or option of containing recycled content in accordance with Section [01 62 35](#) RECYCLED/RECOVERED MATERIALS, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, exemptions (1, 2, 3, or 4, as indicated), and comments. Recycled content values may be determined by weight or volume percent, but must be consistent throughout.

1.7 WARRANTY MANAGEMENT

1.7.1 [Warranty Management Plan](#)

Develop a warranty management plan which contains information relevant to the clause Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit the warranty management plan for Government approval. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan must be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase must be submitted to the Contracting Officer for approval prior to

each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period will begin on the date of project acceptance and continue for the full product warranty period. A joint 4 month and 9 month warranty inspection will be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Include within the warranty management plan , but not limited to, the following:

a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subContractors, manufacturers or suppliers involved.

b. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.

c. A list for each warranted equipment, item, feature of construction or system indicating:

1. Name of item.
2. Model and serial numbers.
3. Location where installed.
4. Name and phone numbers of manufacturers or suppliers.
5. Names, addresses and telephone numbers of sources of spare parts.
6. Warranties and terms of warranty. Include one-year overall warranty of construction. Items which have extended warranties must be indicated with separate warranty expiration dates.
7. Cross-reference to warranty certificates as applicable.
8. Starting point and duration of warranty period.
9. Summary of maintenance procedures required to continue the warranty in force.
10. Cross-reference to specific pertinent Operation and Maintenance manuals.
11. Organization, names and phone numbers of persons to call for warranty service.
12. Typical response time and repair time expected for various warranted equipment.

d. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

e. Procedure and status of tagging of all equipment covered by extended warranties.

f. Copies of [instructions](#) to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.7.2 Performance Bond

The Contractor's Performance Bond must remain effective throughout the construction period .

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred

by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.7.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty will be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, be continuously available, and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.7.4 Contractor's Response to Construction Warranty Service Requirements

Following oral or written notification by the Contracting Officer, respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. Submit a report on any warranty item that has been repaired during the warranty period. Include within the report the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframes specified, the Government will perform the work and backcharge the construction warranty payment item established.

a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.

b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.

c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.

d. The "Construction Warranty Service Priority List" is as follows:

Code 1-Air Conditioning Systems

(1) Recreational support.

- (2) Air conditioning leak in part of building, if causing damage.
- (3) Air conditioning system not cooling properly.

Code 1-Doors

- (1) Overhead doors not operational, causing a security, fire, or safety problem.
- (2) Interior, exterior personnel doors or hardware, not functioning properly, causing a security, fire, or safety problem.

Code 3-Doors

- (1) Overhead doors not operational.
- (2) Interior/exterior personnel doors or hardware not functioning properly.

Code 1-Electrical

- (1) Power failure (entire area or any building operational after 1600 hours).
- (2) Security lights
- (3) Smoke detectors

Code 2-Electrical

- (1) Power failure (no power to a room or part of building).
- (2) Receptacle and lights (in a room or part of building).

Code 3-Electrical

Street lights.

Code 1-Gas

- (1) Leaks and breaks.
- (2) No gas to family housing unit or cantonment area.

Code 1-Heat

- (1). Area power failure affecting heat.
- (2). Heater in unit not working.

Code 2-Kitchen Equipment

- (1) Dishwasher not operating properly.
- (2) All other equipment hampering preparation of a meal.

Code 1-Plumbing

- (1) Hot water heater failure.
- (2) Leaking water supply pipes.

Code 2-Plumbing

- (1) Flush valves not operating properly.
- (2) Fixture drain, supply line to commode, or any water pipe leaking.
- (3) Commode leaking at base.

Code 3 -Plumbing

Leaky faucets.

Code 3-Interior

- (1) Floors damaged.
- (2) Paint chipping or peeling.
- (3) Casework.

Code 1-Roof Leaks

Temporary repairs will be made where major damage to property is

occurring.

Code 2-Roof Leaks

Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.

Code 2-Water (Exterior)

No water to facility.

Code 2-Water (Hot)

No hot water in portion of building listed.

Code 3-All other work not listed above.

1.7.5 Warranty Tags

At the time of installation, tag each warranted item with a durable, oil and water resistant tag approved by the Contracting Officer. Attached each tag with a copper wire and spray with a silicone waterproof coating. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

- a. Type of product/material_____.
- b. Model number_____.
- c. Serial number_____.
- d. Contract number_____.
- e. Warranty period_____from_____to_____.
- f. Inspector's signature_____.
- g. Construction Contractor_____.
- Address_____.
- Telephone number_____.
- h. Warranty contact_____.
- Address_____.
- Telephone number_____.
- i. Warranty response time priority code_____.

j. WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.

1.8 MECHANICAL TESTING AND BALANCING

Prior to final inspection and transfer of the completed facility; all reports, statements, certificates, and completed checklists for testing, adjusting, balancing, and commissioning of mechanical systems shall be submitted to and approved by the Contracting Officer as specified in applicable technical specification sections.

1.9 OPERATION AND MAINTENANCE MANUALS

Operation and Maintenance Manuals must be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions. Bind information in manual format and grouped by technical sections. Test data must be legible and of good quality. Light-sensitive reproduction techniques are acceptable provided finished pages are clear, legible, and not subject to fading. Pages for vendor data and manuals must have 0.3937-inch holes and be bound in 3-ring, loose-leaf binders. Organize data by separate index and tabbed sheets, in a loose-leaf binder. Binder must lie flat with printed sheets that are easy to read. Caution and warning indications must be clearly labeled.

Submit classroom and field instructions in the operation and maintenance of systems equipment where required by the technical provisions. These services must be directed by the Contractor, using the manufacturer's factory-trained personnel or qualified representatives. Contracting Officer will be given 7 calendar days written notice of scheduled instructional services. Instructional materials belonging to the manufacturer or vendor, such as lists, static exhibits, and visual aids, must be made available to the Contracting Officer.

Submit 6 copies of the project operation and maintenance manuals 30 calendar days prior to testing the system involved. Update and resubmit data for final approval no later than 30 calendar days prior to contract completion.

1.10 CLEANUP

Provide final cleaning in accordance with ASTM E 1971. Leave premises "broom clean." Comply with GS-37 for general purpose cleaning and bathroom cleaning. Use only nonhazardous cleaning materials, including natural cleaning materials, in the final cleanup. Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Replace filters of operating equipment and comply with the Indoor Air Quality (IAQ) Management Plan. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site. Recycle, salvage, and return construction and demolition waste from project in accordance with the Waste Management Plan. Promptly and legally transport and dispose of any trash. Do not burn, bury, or otherwise dispose of trash on the project site.

1.11 REAL PROPERTY RECORD

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete, update draft attached to this section, and submit an accounting of all installed property on Form DD1354 "Transfer and Acceptance of Military Real Property." Contact the Contracting Officer for any project specific information necessary to complete the DD Form 1354. For information purposes, a blank DD Form 1354 (fill-able) in ADOBE (PDF) may be obtained at the following web site:

<http://www.dtic.mil/whs/directives/infomgt/forms/eforms/dd1354.pdf>

Submit the completed Checklist for Form DD1354 of Government-Furnished and

Contractor-Furnished/Contractor Installed items. Attach this list to the updated DD Form 1354. Instructions for completing the form and a blank checklist (fill-able) in ADOBE (PDF) may be obtained at the following web site:

[http://www.wbdg.org/ccb/DOD/UFC/ufc 1 300 08.pdf](http://www.wbdg.org/ccb/DOD/UFC/ufc_1_300_08.pdf) See Appendix D of this pdf for the checklist.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

07/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E 1971

(2005) Stewardship for the Cleaning of
Commercial and Institutional Buildings

1.2 SUBMISSION OF OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data specifically applicable to this contract and a complete and concise depiction of the provided equipment, product, or system, stressing and enhancing the importance of system interactions, troubleshooting, and long-term preventative maintenance and operation. The subcontractors shall compile and prepare data and deliver to the Contractor prior to the training of Government personnel. The Contractor shall compile and prepare aggregate O&M data including clarifying and updating the original sequences of operation to as-built conditions. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01 33 00 SUBMITTAL PROCEDURES.

1.2.1 Package Quality

Documents must be fully legible. Poor quality copies and material with hole punches obliterating the text or drawings will not be accepted.

1.2.2 Package Content

Data package content shall be as shown in the paragraph titled "Schedule of Operation and Maintenance Data Packages." Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission.

1.2.3 Changes to Submittals

Manufacturer-originated changes or revisions to submitted data shall be furnished by the Contractor if a component of an item is so affected subsequent to acceptance of the O&M Data. Changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data, shall be submitted by the Contractor within 30 calendar days of the notification of this change requirement.

1.2.4 O&M Database

Develop a database from the O&M manuals that contains the information

required to start a preventative maintenance program.

1.3 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

1.3.1 Operating Instructions

Include specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.3.1.1 Safety Precautions

List personnel hazards and equipment or product safety precautions for all operating conditions.

1.3.1.2 Operator Prestart

Include procedures required to install, set up, and prepare each system for use.

1.3.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.3.1.4 Normal Operations

Provide narrative description of Normal Operating Procedures. Include Control Diagrams with data to explain operation and control of systems and specific equipment.

1.3.1.5 Emergency Operations

Include Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of all utility systems including required valve positions, valve locations and zones or portions of systems controlled.

1.3.1.6 Operator Service Requirements

Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gage readings.

1.3.1.7 Environmental Conditions

Include a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

1.3.2 Preventive Maintenance

Include the following information for preventive and scheduled maintenance to minimize corrective maintenance and repair for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.3.2.1 Lubrication Data

Include preventative maintenance lubrication data, in addition to instructions for lubrication provided under paragraph titled "Operator Service Requirements":

- a. A table showing recommended lubricants for specific temperature ranges and applications.
- b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.
- c. A Lubrication Schedule showing service interval frequency.

1.3.2.2 Preventive Maintenance Plan and Schedule

Include manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation and to minimize corrective maintenance. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

1.3.2.3 Cleaning Recommendations

Provide environmentally preferable cleaning recommendations in accordance with ASTM E 1971.

1.3.3 Corrective Maintenance (Repair)

Include manufacturer's recommended procedures and instructions for correcting problems and making repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.3.3.1 Troubleshooting Guides and Diagnostic Techniques

Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.3.3.2 Wiring Diagrams and Control Diagrams

Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

1.3.3.3 Maintenance and Repair Procedures

Include instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

1.3.3.4 Removal and Replacement Instructions

Include step-by-step procedures and a list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

1.3.3.5 Spare Parts and Supply Lists

Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

1.3.4 Corrective Maintenance Work-Hours

Include manufacturer's projection of corrective maintenance work-hours including requirements by type of craft. Corrective maintenance that requires completion or participation of the equipment manufacturer shall be identified and tabulated separately.

1.3.5 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1.3.5.1 Product Submittal Data

Provide a copy of all SD-03 Product Data submittals required in the applicable technical sections.

1.3.5.2 Manufacturer's Instructions

Provide a copy of all SD-08 Manufacturer's Instructions submittals required in the applicable technical sections.

1.3.5.3 O&M Submittal Data

Provide a copy of all SD-10 Operation and Maintenance Data submittals required in the applicable technical sections.

1.3.5.4 Parts Identification

Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice.

Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog

1.3.5.5 Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components such as the compressor of air conditioning system.

1.3.5.6 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

1.3.5.7 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

1.3.5.8 Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms.

1.3.5.9 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization that can provide replacements most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

1.4 TYPES OF INFORMATION REQUIRED IN CONTROLS O&M DATA PACKAGES

Include Data Package 5 and the following for control systems:

- a. Narrative description on how to perform and apply all functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.
- b. Full as-built sequence of operations.
- c. Copies of all checkout tests and calibrations performed by the Contractor (not Cx tests).
- d. Full points list. A listing of rooms shall be provided with the following information for each room:

- (1) Floor

- (2) Room number
 - (3) Room name
 - (4) Air handler unit ID
 - (5) Reference drawing number
 - (6) Air terminal unit tag ID
 - (7) Heating and/or cooling valve tag ID
 - (8) Minimum cfm
 - (9) Maximum cfm
- e. Full print out of all schedules and set points after testing and acceptance of the system.
 - f. Full as-built print out of software program.
 - g. Electronic copy on disk or CD of the entire program for this facility.
 - h. Marking of all system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

1.5 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Furnish the O&M data packages specified in individual technical sections. The required information for each O&M data package is as follows:

1.5.1 Data Package 1

- a. Safety precautions
- b. Cleaning recommendations
- c. Maintenance and repair procedures
- d. Warranty information
- e. Contractor information
- f. Spare parts and supply list

1.5.2 Data Package 2

- a. Safety precautions
- b. Normal operations
- c. Environmental conditions
- d. Lubrication data
- e. Preventive maintenance plan and schedule

- f. Cleaning recommendations
- g. Maintenance and repair procedures
- h. Removal and replacement instructions
- i. Spare parts and supply list
- j. Parts identification
- k. Warranty information
- l. Contractor information

1.5.3 Data Package 3

- a. Safety precautions
- b. Operator prestart
- c. Startup, shutdown, and post-shutdown procedures
- d. Normal operations
- e. Emergency operations
- f. Environmental conditions
- g. Lubrication data
- h. Preventive maintenance plan and schedule
- i. Cleaning recommendations
- j. Troubleshooting guides and diagnostic techniques
- k. Wiring diagrams and control diagrams
- l. Maintenance and repair procedures
- m. Removal and replacement instructions
- n. Spare parts and supply list
- o. Product submittal data
- p. O&M submittal data
- q. Parts identification
- r. Warranty information
- s. Testing equipment and special tool information
- t. Testing and performance data
- u. Contractor information

1.5.4 Data Package 4

- a. Safety precautions
- b. Operator prestart
- c. Startup, shutdown, and post-shutdown procedures
- d. Normal operations
- e. Emergency operations
- f. Operator service requirements
- g. Environmental conditions
- h. Lubrication data
- i. Preventive maintenance plan and schedule
- j. Cleaning recommendations
- k. Troubleshooting guides and diagnostic techniques
- l. Wiring diagrams and control diagrams
- m. Maintenance and repair procedures
- n. Removal and replacement instructions
- o. Spare parts and supply list
- p. Corrective maintenance man-hours
- q. Product submittal data
- r. O&M submittal data
- s. Parts identification
- t. Warranty information
- u. Personnel training requirements
- v. Testing equipment and special tool information
- w. Testing and performance data
- x. Contractor information

1.5.5 Data Package 5

- a. Safety precautions
- b. Operator prestart
- c. Start-up, shutdown, and post-shutdown procedures
- d. Normal operations

- e. Environmental conditions
- f. Preventive maintenance plan and schedule
- g. Troubleshooting guides and diagnostic techniques
- h. Wiring and control diagrams
- i. Maintenance and repair procedures
- j. Removal and replacement instructions
- k. Spare parts and supply list
- l. Product submittal data
- m. Manufacturer's instructions
- n. O&M submittal data
- o. Parts identification
- p. Testing equipment and special tool information
- q. Warranty information
- r. Testing and performance data
- s. Contractor information

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 02 41 00

DEMOLITION AND DECONSTRUCTION
10/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)

AHRI Guideline K (2005) Guideline for Containers for Recovered Non-Flammable Fluorocarbon Refrigerants

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6 (2006) Safety Requirements for Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2008) Safety and Health Requirements Manual

U.S. DEFENSE LOGISTICS AGENCY (DLA)

DLA 4145.25 (June 2000) Storage and Handling of Liquefied and Gaseous Compressed Gases and Their Full and Empty Cylinders

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD 4000.25-1-M (2006; Notice 1) Requisitioning and Issue Procedures

MIL-STD-129 (Rev P; Notice 3; Change 4) Military Marking for Shipment and Storage

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61 National Emission Standards for Hazardous Air Pollutants

40 CFR 82 Protection of Stratospheric Ozone

49 CFR 173.301 Shipment of Compressed Gases in Cylinders and Spherical Pressure Vessels

1.2 GENERAL REQUIREMENTS

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work of this section is to be performed

in a manner that maximizes salvage and recycling of materials. The work includes demolition, , salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer. In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Demolition Plan; G, D
Deconstruction Plan; G, D
Notifications; G, D

SD-11 Closeout Submittals

Receipts

Receipts or bills of lading, as specified.

1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSE/SAFE A10.6.

1.4.1 Notifications

1.4.1.1 General Requirements

Furnish timely notification of demolition and deconstruction projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the State's environmental protection agency and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M.

1.4.1.2 Omitted - Hawaii Requirements

1.4.2 Receipts

Submit a shipping receipt or bill of lading for all containers of ozone depleting substance (ODS) shipped to the Defense Depot, Richmond, Virginia.

1.5 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

1.6 PROTECTION

1.6.1 Traffic Control Signs

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

1.6.2 Existing Conditions Documentation

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inch will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to before starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document.

1.6.3 Items to Remain in Place

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload structural elements or pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.6.4 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove snow, dust, dirt, and debris from work areas daily.

1.6.5 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.6.6 Trees

Protect trees within the project site which might be damaged during

demolition or deconstruction. Replace any tree designated to remain that is damaged during the work under this contract with like-kind or as approved by the Contracting Officer.

1.6.7 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government and disconnected and sealed by the Contractor.

1.6.8 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.

1.6.9 Protection of Personnel

Before, during and after the demolition and deconstruction work the Contractor shall continuously evaluate the condition of the structure being demolished and deconstructed and take immediate action to protect all personnel working in and around the project site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.7 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.8 OMITTED - FOREIGN OBJECT DAMAGE (FOD)

1.9 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Items to be relocated which are damaged by the Contractor shall be repaired or replaced with new undamaged items as approved by the Contracting Officer.

1.10 REQUIRED DATA

Prepare a [Demolition Plan](#)[Deconstruction Plan](#). Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress and a disconnection schedule of utility services, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations. [Identify components and materials to be salvaged for reuse or recycling with reference to paragraph Existing Facilities to be Removed.](#) [Append tracking forms for all removed materials indicating type, quantities, condition, destination, and end use.](#) Coordinate with Waste Management Plan.

1.11 ENVIRONMENTAL PROTECTION

Comply with the Environmental Protection Agency requirements specified.

1.12 USE OF EXPLOSIVES

Use of explosives will be permitted.

1.13 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available in accordance with the following schedule:

Area	Date
_____	_____
All	N.T.P.

PART 2 PRODUCTS

2.1 FILL MATERIAL

Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition or deconstruction of structures.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures on site for reuse. Existing construction scheduled to be removed for reuse shall be disassembled. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Materials shall be designated for reuse on site whenever possible.

3.1.1 Structures

- a. Remove existing structures indicated to be removed in their entirety.. Remove sidewalks, curbs, gutters and street light bases as indicated.
- b. Demolish structures in a systematic manner from the top of the structure to the ground. Demolish concrete and masonry walls in small sections. Remove structural framing members and lower to ground by means of derricks, platforms hoists, or other suitable methods as approved by the Contracting Officer.
- c. Locate demolition and deconstruction equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition

or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities , as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered that are not indicated on the drawings, the Contracting Officer shall be notified prior to further work in that area. Remove meters and related equipment and deliver to a location in accordance with instructions of the Contracting Officer.

3.1.3 Omitted - Chain Link Fencing

3.1.4 Paving and Slabs

Provide neat sawcuts at limits of pavement removal as indicated.

3.1.5 Omitted - Roofing

3.1.6 Masonry

Sawcut and remove masonry so as to prevent damage to surfaces to remain and to facilitate the installation of new work. Where new masonry adjoins existing, the new work shall abut or tie into the existing construction as specified for the new work. Provide square, straight edges and corners where existing masonry adjoins new work and other locations..

3.1.7 Concrete

Saw entirely through concrete along straight lines.

- 3.1.8 Omitted - Structural Steel
 - 3.1.9 Omitted - Miscellaneous Metal
 - 3.1.10 Omitted - Carpentry
 - 3.1.11 Omitted - Carpet
 - 3.1.12 Omitted - Acoustic Ceiling Tile
 - 3.1.13 Omitted - Airfield Lighting
 - 3.1.14 Omitted - Patching
 - 3.1.15 Omitted - Air Conditioning Equipment
 - 3.1.16 Omitted - Cylinders and Canisters
 - 3.1.17 Omitted - Locksets on Swinging Doors
 - 3.1.18 Omitted - Mechanical Equipment and Fixtures
 - 3.1.18.1 Omitted - Preparation for Storage
 - 3.1.19 Omitted - Electrical Equipment and Fixtures
 - 3.1.20 Omitted - Elevators and Hoists
 - 3.1.21 Omitted - Items With Unique/Regulated Disposal Requirements
- 3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3.2 Reuse of Materials and Equipment

Remove and store materials and equipment indicated to be reused or relocated to prevent damage, and reinstall as the work progresses.

3.3.3 Omitted - Salvaged Materials and Equipment

3.3.4 Omitted - Debris Disposal in the San Diego Area

3.3.5 Disposal of Ozone Depleting Substance (ODS)

Class I and Class II ODS are defined in Section, 602(a) and (b), of The Clean Air Act. Prevent discharge of Class I and Class II ODS to the atmosphere. Place recovered ODS in cylinders meeting AHRI Guideline K suitable for the type ODS (filled to no more than 80 percent capacity) and provide appropriate labeling. Recovered ODS shall be removed from Government property and disposed of in accordance with 40 CFR 82. Products, equipment and appliances containing ODS in a sealed, self-contained system (e.g. residential refrigerators and window air conditioners) shall be disposed of in accordance with 40 CFR 82.

3.3.5.1 Special Instructions

No more than one type of ODS is permitted in each container. A warning/hazardous label shall be applied to the containers in accordance with Department of Transportation regulations. All cylinders including but not limited to fire extinguishers, spheres, or canisters containing an ODS shall have a tag with the following information:

- a. Activity name and unit identification code
- b. Activity point of contact and phone number
- c. Type of ODS and pounds of ODS contained
- d. Date of shipment
- e. Naval stock number (for information, call (804) 279-4525).

3.3.5.2 Omitted - Fire Suppression Containers

3.3.6 Transportation Guidance

Ship all ODS containers in accordance with MIL-STD-129, DLA 4145.25 (also referenced one of the following: Army Regulation 700-68, Naval Supply Instruction 4440.128C, Marine Corps Order 10330.2C, and Air Force Regulation 67-12), 49 CFR 173.301, and DOD 4000.25-1-M.

3.3.7 Omitted - Unsalvageable and Non-Recyclable Material

3.4 CLEANUP

Remove debris and rubbish from basement and similar excavations. Remove and transport the in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified.

3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property.

3.5.3 Removal to Spoil Areas on Government Property

Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas on Government property.

3.5.4 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as directed.

3.6 OMITTED - REUSE OF SALVAGED ITEMS

-- End of Section --

SECTION 02 82 16.00 20

*2 ENGINEERING CONTROL OF ASBESTOS CONTAINING MATERIALS

04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- ANSI Z88.2 (1992) Respiratory Protection
- ANSI Z9.2 (2001) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

- ASTM C 732 (2006) Aging Effects of Artificial Weathering on Latex Sealants
- ASTM D 1331 (1989; R 2001) Surface and Interfacial Tension of Solutions of Surface-Active Agents
- ASTM D 2794 (1993; R 2004) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
- ASTM D 522 (1993a; R 2008) Mandrel Bend Test of Attached Organic Coatings
- ASTM E 119 (2008a) Standard Test Methods for Fire Tests of Building Construction and Materials
- ASTM E 1368 (2005e1) Visual Inspection of Asbestos Abatement Projects
- ASTM E 1494 (1992; R 2002) Encapsulants for Spray- or Trowel-Applied Friable Asbestos-Containing Building Materials
- ASTM E 736 (2000; R 2006) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
- ASTM E 84 (2009a) Standard Test Method for Surface Burning Characteristics of Building Materials
- ASTM E 96/E 96M (2005) Standard Test Methods for Water Vapor Transmission of Materials

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 560/5-85-024 (1985) Guidance for Controlling
Asbestos-Containing Materials in Buildings
(Purple Book)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.103 Respiratory Protection
29 CFR 1926.1101 Asbestos
29 CFR 1926.200 Accident Prevention Signs and Tags
29 CFR 1926.51 Sanitation
29 CFR 1926.59 Hazard Communication
40 CFR 61-SUBPART A General Provisions
40 CFR 61-SUBPART M National Emission Standard for Asbestos
40 CFR 763 Asbestos

U.S. NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

ND OPNAVINST 5100.23 (Rev G) Navy Occupational Safety and
Health (NAVOSH) Program Manual

UNDERWRITERS LABORATORIES (UL)

UL 586 (1996; Rev thru Aug 2008) Standard for
High-Efficiency Particulate, Air Filter
Units

1.2 DEFINITIONS

1.2.1 ACM

Asbestos Containing Materials.

1.2.2 Amended Water

Water containing a wetting agent or surfactant with a maximum surface
tension of 29 dynes per centimeter when tested in accordance with
ASTM D 1331.

1.2.3 Area Sampling

Sampling of asbestos fiber concentrations which approximates the
concentrations of asbestos in the theoretical breathing zone but is not
actually collected in the breathing zone of an employee.

1.2.4 Asbestos

The term asbestos includes chrysotile, amosite, crocidolite, tremolite
asbestos, anthophyllite asbestos, and actinolite asbestos and any of these
minerals that has been chemically treated or altered. Materials are

considered to contain asbestos if the asbestos content of the material is determined to be at least one percent.

1.2.5 Asbestos Control Area

That area where asbestos removal operations are performed which is isolated by physical boundaries which assist in the prevention of the uncontrolled release of asbestos dust, fibers, or debris.

1.2.6 Asbestos Fibers

Those fibers having an aspect ratio of at least 3:1 and longer than 5 micrometers as determined by National Institute for Occupational Safety and Health (NIOSH) Method 7400.

1.2.7 Asbestos Permissible Exposure Limit

0.1 fibers per cubic centimeter of air as an 8-hour time weighted average measured in the breathing zone as defined by 29 CFR 1926.1101 or other Federal legislation having legal jurisdiction for the protection of workers health.

1.2.8 Background

The ambient airborne asbestos concentration in an uncontaminated area as measured prior to any asbestos hazard abatement efforts. Background concentrations for other (contaminated) areas are measured in similar but asbestos free locations.

1.2.9 Contractor

The Contractor is that individual, or entity under contract to the Navy to perform the herein listed work.

1.2.10 Competent Person

A person meeting the requirements for competent person as specified in 29 CFR 1926.1101 including a person capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, and is specifically trained in a training course which meet the criteria of EPA's Model Accreditation Plan (40 CFR 763) for project designer or supervisor, or its equivalent. The competent person shall have a current State of North Carolina asbestos contractors or supervisors license.

1.2.11 Encapsulation

The abatement of an asbestos hazard through the appropriate use of chemical encapsulants.

1.2.12 Encapsulants

Specific materials in various forms used to chemically or physically entrap asbestos fibers in various configurations to prevent these fibers from becoming airborne. There are four types of encapsulants as follows which must comply with performance requirements as specified herein.

- a. Removal Encapsulant (can be used as a wetting agent)

- b. Bridging Encapsulant (used to provide a tough, durable surface coating to asbestos containing material)
- c. Penetrating Encapsulant (used to penetrate the asbestos containing material encapsulating all asbestos fibers and preventing fiber release due to routine mechanical damage)
- d. Lock-Down Encapsulant (used to seal off or "lock-down" minute asbestos fibers left on surfaces from which asbestos containing material has been removed).

1.2.13 Friable Asbestos Material

One percent asbestos containing material that can be crumbled, pulverized, or reduced to powder by hand pressure when dry.

1.2.14 Glovebag Technique

Those asbestos removal and control techniques put forth in [29 CFR 1926.1101](#) Appendix G.

1.2.15 HEPA Filter Equipment

High efficiency particulate air (HEPA) filtered vacuum and/or exhaust ventilation equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall retain 99.97 percent of particles 0.3 microns or larger as indicated in [UL 586](#).

1.2.16 Negative Pressure Enclosure (NPE)

That engineering control technique described as a negative pressure enclosure in [29 CFR 1926.1101](#).

1.2.17 Nonfriable Asbestos Material

Material that contains asbestos in which the fibers have been immobilized by a bonding agent, coating, binder, or other material so that the asbestos is well bound and will not normally release asbestos fibers during any appropriate use, handling, storage or transportation. It is understood that asbestos fibers may be released under other conditions such as demolition, removal, or mishap.

1.2.18 Personal Sampling

Air sampling which is performed to determine asbestos fiber concentrations within the breathing zone of a specific employee, as performed in accordance with [29 CFR 1926.1101](#).

1.2.19 Private Qualified Person (PQP)

That qualified person hired by the Contractor to perform the herein listed tasks.

1.2.20 Qualified Person (QP)

A Registered Architect, Professional Engineer, Certified Industrial Hygienist, consultant or other qualified person who has successfully completed training and is therefore accredited under a legitimate State

Model Accreditation Plan as described in 40 CFR 763 as a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer; and has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent. The QP must be qualified to perform visual inspections as indicated in ASTM E 1368. The QP shall be appropriately licensed in the State of North Carolina.

1.2.21 TEM

Refers to Transmission Electron Microscopy.

1.2.22 Time Weighted Average (TWA)

The TWA is an 8-hour time weighted average airborne concentration of asbestos fibers.

1.2.23 Wetting Agent

A chemical added to water to reduce the water's surface tension thereby increasing the water's ability to soak into the material to which it is applied. An equivalent wetting agent must have a surface tension of at most 29 dynes per centimeter when tested in accordance with ASTM D 1331.

1.3 REQUIREMENTS

1.3.1 Description of Work

The work covered by this section includes the handling and control of asbestos containing materials and describes some of the resultant procedures and equipment required to protect workers, the environment and occupants of the building or area, or both, from contact with airborne asbestos fibers. The work also includes the disposal of any asbestos containing materials generated by the work. More specific operational procedures shall be outlined in the Asbestos Hazard Abatement Plan called for elsewhere in this specification. The asbestos work includes the demolition of underground piping covered in asbestos containing insulation and the removal of floor tile associated mastic. The latter is considered a non-friable asbestos containing material, and under normal conditions non-friable or chemically bound materials containing asbestos would not be considered hazardous; however, all asbestos containing materials associated with this project are to be considered friable. Therefore, these materials may release airborne asbestos fibers during demolition and removal and therefore must be handled in accordance with the removal and disposal procedures as specified herein. Provide negative pressure enclosure techniques as outlined in this specification. The Army will evacuate the work area during the asbestos abatement work. All asbestos removal work shall be supervised by a competent person as specified herein.

1.3.1.1 Mastic

Based on an Army Corps of Engineers asbestos survey of the structure, discrete samples of the mastic located in the target classroom have been tested and a copy of the survey report along with the results have been attached.

Discrete samples of the mastic associated with the 12" x 12" tan floor tile located in the target classroom were tested and found to contain greater than one percent asbestos.

1.3.1.2 Pipe Insulation

Sampling has not been conducted on this material; however, based on knowledge of the structure, insulation covering underground piping located exterior to the structure is considered to be asbestos containing.

1.3.2 Medical Requirements

Provide medical requirements including but not limited to medical surveillance and medical record keeping as listed in 29 CFR 1926.1101.

1.3.2.1 Medical Examinations

Before exposure to airborne asbestos fibers, provide workers with a comprehensive medical examination as required by 29 CFR 1926.1101 or other pertinent State or local directives. This requirement must have been satisfied within the 12 months prior to the start of work on this contract. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after the termination of employment in such occupation. Specifically identify x-ray films of asbestos workers to the consulting radiologist and mark medical record jackets with the word "ASBESTOS."

1.3.2.2 Medical Records

Maintain complete and accurate records of employees' medical examinations, medical records, and exposure data for a period of indefinite time after termination of employment and make records of the required medical examinations and exposure data available for inspection and copying to: The Assistant Secretary of Labor for Occupational Safety and Health (OSHA), or authorized representatives of them, and an employee's physician upon the request of the employee or former employee.

1.3.3 Employee Training

Submit certificates, prior to the start of work but after the main abatement submittal, signed by each employee indicating that the employee has received training in the proper handling of materials and wastes that contain asbestos in accordance with 40 CFR 763; understands the health implications and risks involved, including the illnesses possible from exposure to airborne asbestos fibers; understands the use and limits of the respiratory equipment to be used; and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment as indicated in 29 CFR 1926.1101 on an initial and annual basis. Certificates shall be organized by individual worker, not grouped by type of certification. Post appropriate evidence of compliance with the training requirements of 40 CFR 763. Train all personnel involved in the asbestos control work in accordance with United States Environmental Protection Agency (USEPA) Asbestos Hazard Emergency Response Act (AHERA) training criteria or State training criteria whichever is more stringent. The Contractor shall document the training by providing: dates of training, training entity, course outline, names of instructors, and qualifications of instructors upon request by the Contracting Officer. Furnish each employee with respirator training and fit testing administered by the PQP as required by 29 CFR 1926.1101. Fully cover engineering and other hazard control techniques and procedures. All asbestos workers shall

have a current State of North Carolina asbestos worker's license.

1.3.4 Permits , Licenses, and Notifications

Obtain necessary permits and licenses in conjunction with asbestos removal, encapsulation, hauling, and disposition, and furnish notification of such actions required by Federal, State, regional, and local authorities prior to the start of work. Notify the State's environmental protection agency and the Contracting Officer in writing 20 working days prior to commencement of work in accordance with 40 CFR 61-SUBPART M and applicable State of North Carolina regulations. Notify the Contracting Officer and other appropriate Government agencies in writing 20 working days prior to the start of asbestos work as indicated in applicable laws, ordinances, criteria, rules, and regulations. Submit copies of all Notifications to the Contracting Officer.

1.3.5 Environment, Safety and Health Compliance

In addition to detailed requirements of this specification, comply with those applicable laws, ordinances, criteria, rules, and regulations of Federal, State, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.1101, 40 CFR 61-SUBPART A, 40 CFR 61-SUBPART M, and ND OPNAVINST 5100.23. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting the work. Where the requirements of this specification, applicable laws, rules, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirement as defined by the Government shall apply.

1.3.6 Respiratory Protection Program

Establish and implement a respirator program as required by ANSI Z88.2, 29 CFR 1926.1101, and 29 CFR 1926.103. Submit a written description of the program to the Contracting Officer. Submit a written program manual or operating procedure including methods of compliance with regulatory statutes.

1.3.6.1 Respirator Program Records

Submit records of the respirator program as required by ANSI Z88.2, 29 CFR 1926.103, and 29 CFR 1926.1101.

1.3.7 Asbestos Hazard Control Supervisor

The Contractor shall be represented on site by a supervisor, trained using the model Contractor accreditation plan as indicated in the Federal statutes for all portions of the herein listed work.

1.3.8 Hazard Communication

Adhere to all parts of 29 CFR 1926.59 and provide the Contracting Officer with a copy of the Material Safety Data Sheets (MSDS) for all materials brought to the site.

1.3.9 Asbestos Hazard Abatement Plan

Submit a detailed plan of the safety precautions such as lockout, tagout,

tryout, fall protection, and confined space entry procedures and equipment and work procedures to be used in the removal of materials containing asbestos. The plan, not to be combined with other hazard abatement plans, shall be prepared, signed, and sealed by the PQP. Provide a Table of Contents for each abatement submittal, which shall follow the sequence of requirements in the contract. Such plan shall include but not be limited to the precise personal protective equipment to be used including, but not limited to, respiratory protection, type of whole-body protection [and if reusable coveralls are to be employed decontamination methods (operations and quality control plan)], the location of asbestos control areas including clean and dirty areas, buffer zones, showers, storage areas, change rooms, removal method, interface of trades involved in the construction, sequencing of asbestos related work, disposal plan, type of wetting agent and asbestos sealer to be used, locations of local exhaust equipment, planned air monitoring strategies, and a detailed description of the method to be employed in order to control environmental pollution. The plan shall also include both fire and medical emergency response plans. The Asbestos Hazard Abatement Plan must be approved in writing prior to starting any asbestos work. The Contractor, Asbestos Hazard Control Supervisor, and PQP shall meet with the Contracting Officer prior to beginning work, to discuss in detail the Asbestos Hazard Abatement Plan, including work procedures and safety precautions. Once approved by the Contracting Officer, the plan will be enforced as if an addition to the specification. Any changes required in the specification as a result of the plan shall be identified specifically in the plan to allow for free discussion and approval by the Contracting Officer prior to starting work.

1.3.10 Testing Laboratory

Submit the name, address, and telephone number of each testing laboratory selected for the sampling, analysis, and reporting of airborne concentrations of asbestos fibers along with evidence that each laboratory selected holds the appropriate State license and/or permits and certification that each laboratory is American Industrial Hygiene Association (AIHA) accredited and that persons counting the samples have been judged proficient by current inclusion on the AIHA Asbestos Analysis Registry (AAR) and successful participation of the laboratory in the Proficiency Analytical Testing (PAT) Program. Where analysis to determine asbestos content in bulk materials or transmission electron microscopy is required, submit evidence that the laboratory is accredited by the National Institute of Science and Technology (NIST) under National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis. The testing laboratory firm shall be independent of the asbestos contractor and shall have no employee or employer relationship which could constitute a conflict of interest.

1.3.11 Landfill Approval

Submit written evidence that the landfill is for asbestos disposal by the U.S. Environmental Protection Agency, Region 3, Air Enforcement Section (38W12), and local regulatory agencies. Within 3 working days after delivery, submit detailed [delivery tickets](#), prepared, signed, and dated by an agent of the landfill, certifying the amount of asbestos materials delivered to the landfill. Submit a copy of the [waste shipment records](#) within 1 day of the shipment leaving the project site.

1.3.12 Medical Certification

Provide a written certification for each worker and supervisor, signed by a

licensed physician indicating that the worker and supervisor has met or exceeded all of the medical prerequisites listed herein and in 29 CFR 1926.1101 and 29 CFR 1926.103 as prescribed by law. Submit certificates prior to the start of work but after the main abatement submittal.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Local exhaust equipment; G

Vacuums; G

Respirators; G

Pressure differential automatic recording instrument; G

Amended water; G

Glovebags; G

Material Safety Data Sheets (MSDS) for all materials proposed for transport to the project site; G

Encapsulants; G

SD-06 Test Reports

Air sampling results; G

Pressure differential recordings for local exhaust system; G

Asbestos disposal quantity report; G

Encapsulation test patches; G

Clearance sampling; G

SD-07 Certificates

Asbestos hazard abatement plan; G

Testing laboratory; G

Private qualified person documentation; G

Contractor's license; G

Competent person documentation; G

Worker's license; G

Landfill approval; G

Employee training; G

Medical certification requirements; G

Waste shipment records and if applicable exemption report; G

Respiratory Protection Program; G

Delivery tickets; G

Vacuums; G

Water filtration equipment; G

Ventilation systems; G

Other equipment used to contain airborne asbestos fibers; G

Chemical encapsulants sealers; G

Notifications

Show compliance with ANSI Z9.2 by providing manufacturers' certifications.

SD-11 Closeout Submittals

Notifications; G

Rental equipment; G

Respirator program records; G

Permits and licenses; G

Protective clothing decontamination quality control records; G

Protective clothing decontamination facility notification; G

1.5 QUALITY ASSURANCE

1.5.1 Private Qualified Person Documentation

Submit the name, address, and telephone number of the Private Qualified Person (PQP) selected to prepare the Asbestos Hazard Abatement Plan, direct monitoring and training, and documented evidence that the PQP has successfully completed training in and is accredited and where required is certified as, a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer as described by 40 CFR 763 and has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent. The PQP shall be appropriately licensed in the State of North Carolina as a Project Monitor. The PQP and the asbestos contractor shall not have an employee/employer relationship or financial relationship which could constitute a conflict of interest. The PQP shall be a first tier subcontractor.

1.5.2 Competent Person Documentation

Submit training certification and a current State of North Carolina Asbestos Contractor's and Supervisor's License.

1.5.3 Worker's License

Submit documentation that requires all workers have a current State of North Carolina Asbestos Workers License.

1.5.4 Contractor's License

Contractor shall have current North Carolina asbestos contractor's license. Submit a copy of the asbestos contractor's license issued by the State of North Carolina.

1.5.5 Air Sampling Results

Complete fiber counting and provide results to the PQP for review within 16 hours of the "time off" of the sample pump. Notify the Contracting Officer immediately of any airborne levels of asbestos fibers in excess of the acceptable limits. Submit sampling results to the Contracting Officer and the affected Contractor employees where required by law within 3 working days, signed by the testing laboratory employee performing air sampling, the employee that analyzed the sample, and the PQP. Notify the Contractor and the Contracting Officer immediately of any variance in the pressure differential which could cause adjacent unsealed areas to have asbestos fiber concentrations in excess of 0.01 fibers per cubic centimeter or background whichever is higher. In no circumstance shall levels exceed 0.1 fibers per cubic centimeter.

1.5.6 Pressure Differential Recordings for Local Exhaust System

Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external to the enclosure and operate it continuously, 24 hours a day, until the temporary enclosure of the asbestos control area is removed. Submit pressure differential recordings for each work day to the PQP for review and to the Contracting Officer within 24 hours from the end of each work day.

1.5.7 Protective Clothing Decontamination Quality Control Records

Provide all records that document quality control for the decontamination of reusable outer protective clothing.

1.5.8 Protective Clothing Decontamination Facility Notification

Submit written evidence that persons who decontaminate, store, or transport asbestos contaminated clothing used in the performance of this contract were duly notified in accordance with 29 CFR 1926.1101.

1.6 EQUIPMENT

1.6.1 Rental Equipment

Provide a copy of the written notification to the rental company concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

PART 2 PRODUCTS

2.1 ENCAPSULANTS

Shall conform to current USEPA requirements, shall contain no toxic or hazardous substances as defined in 29 CFR 1926.59, and shall conform to the following performance requirements.

2.1.1 Removal Encapsulants

<u>Requirement</u>	<u>Test Standard</u>
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Life Expectancy - 20 years	ASTM C 732 Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E 96/E 96M

2.1.2 Bridging Encapsulant

<u>Requirement</u>	<u>Test Standard</u>
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Life Expectancy - 20 years	ASTM C 732 Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E 96/E 96M
Fire Resistance - Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance - Minimum 43 in/lb Gardner Impact Test	ASTM D 2794
Flexibility - no rupture or cracking	ASTM D 522 Mandrel Bend Test

2.1.3 Penetrating Encapsulant

<u>Requirement</u>	<u>Test Standard</u>
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Life Expectancy - 20 years	ASTM C 732 Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E 96/E 96M
Cohesion/Adhesion Test - 50 pounds of force/foot	ASTM E 736
Fire Resistance - Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119

<u>Requirement</u>	<u>Test Standard</u>
Impact Resistance - Minimum 43 in/lb Gardner Impact Test	ASTM D 2794
Flexibility - no rupture or cracking	ASTM D 522 Mandrel Bend Test

2.1.4 Lock-down Encapsulant

<u>Requirement</u>	<u>Test Standard</u>
Flame Spread: 25, Smoke Emission - 50	ASTM E 84
Life Expectancy: 20 years	ASTM C 732 Accelerated Aging Test
Permeability: Minimum 0.4 perms	ASTM E 96/E 96M
Fire Resistance: Negligible affect on fire resistance rating over 3 hour test (Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E 119
Bond Strength: 100 pounds of force/foot (Tests compatibility with cementitious and fibrous fireproofing)	ASTM E 736

PART 3 EXECUTION

3.1 EQUIPMENT

At all times, provide the Contracting Officer or the Contracting Officer's Representative, with at least two complete sets of personal protective equipment as required for entry to and inspection of the asbestos control area. Provide equivalent training to the Contracting Officer or a designated representative as provided to Contractor employees in the use of the required personal protective equipment. Provide manufacturer's certificate of compliance for all equipment used to contain airborne asbestos fibers.

3.1.1 Respirators

Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

3.1.1.1 Respirators for Handling Asbestos

Provide personnel engaged in pre-cleaning, cleanup, handling, encapsulation removal and/or demolition of asbestos materials with respiratory protection as indicated in 29 CFR 1926.1101 and 29 CFR 1926.103.

3.1.2 Exterior Whole Body Protection

3.1.2.1 Outer Protective Clothing

Provide personnel exposed to asbestos with disposable "non-breathable," whole body outer protective clothing, head coverings, gloves, and foot

coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber gloves for comfort, but shall not be used alone. Make sleeves secure at the wrists, make foot coverings secure at the ankles, and make clothing secure at the neck by the use of tape. Reusable whole body outer protective clothing shall be either disposed of as asbestos contaminated waste upon exiting from the asbestos regulated work area or be properly decontaminated.

3.1.2.2 Work Clothing

Provide cloth work clothes for wear under the outer protective clothing and foot coverings and either dispose of or properly decontaminate them as recommended by the PQP after each use.

3.1.2.3 Personal Decontamination Unit

Provide a temporary, negative pressure unit with a separate decontamination locker room and clean locker room with a shower that complies with 29 CFR 1926.51(f)(4)(ii) through (V) in between for personnel required to wear whole body protective clothing. Provide two separate lockers for each asbestos worker, one in each locker room. Keep street clothing and street shoes in the clean locker. HEPA vacuum and remove asbestos contaminated disposable protective clothing while still wearing respirators at the boundary of the asbestos work area and seal in impermeable bags or containers for disposal. HEPA vacuum and remove asbestos contaminated reusable protective clothing while still wearing respirators at the boundary of the asbestos work area, seal in two impermeable bags, label outer bag as asbestos contaminated waste, and transport for decontamination. Do not wear work clothing between home and work. Locate showers between the decontamination locker room and the clean locker room and require that all employees shower before changing into street clothes. Collect used shower water and filter with approved water filtration equipment to remove asbestos contamination. Dispose of filters and residue as asbestos waste. Discharge clean water to the sanitary system. Dispose of asbestos contaminated work clothing as asbestos contaminated waste or properly decontaminate as specified in the Contractor's Asbestos Hazard Abatement Plan. Decontamination units shall be physically attached to the asbestos control area. Build both a personnel decontamination unit and an equipment decontamination unit onto and integral with each asbestos control area.

3.1.2.4 Decontamination of Reusable Outer Protective Clothing

When reusable outer protective clothing is used, transport the double bagged clothing to a previously notified commercial/industrial decontamination facility for decontamination. Perform non-destructive testing to determine the effectiveness of asbestos decontamination. If representative sampling is used, ensure the statistical validity of the sampling results. If representative sampling is used, reject any entire batch in which any of the pieces exceed 40 fibers per square millimeter. Inspect reusable protective clothing prior to use to ensure that it will provide adequate protection and is not or is not about to become ripped, torn, deteriorated, or damaged, and that it is not visibly contaminated. Notify, in writing, all personnel involved in the decontamination of reusable outer protective clothing as indicated in 29 CFR 1926.1101.

3.1.2.5 Eye Protection

Provide goggles to personnel engaged in asbestos abatement operations when

the use of a full face respirator is not required.

3.1.3 Warning Signs and Labels

Provide bilingual warning signs printed in English and Spanish at all approaches to asbestos control areas. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos.

3.1.3.1 Warning Sign

Provide vertical format conforming to 29 CFR 1926.200, and 29 CFR 1926.1101 minimum 20 by 14 inches displaying the following legend in the lower panel:

<u>Legend</u>	<u>Notation</u>
Danger	one inch Sans Serif Gothic or Block
Asbestos	one inch Sans Serif Gothic or Block
Cancer and Lung Disease Hazard	1/4 inch Sans Serif Gothic or Block
Authorized Personnel Only	1/4 inch Gothic
Respirators and Protective Clothing are Required in this Area	1/4 inch Gothic

Spacing between lines shall be at least equal to the height of the upper of any two lines.

3.1.3.2 Warning Labels

Provide labels conforming to 29 CFR 1926.1101 of sufficient size to be clearly legible, displaying the following legend:

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD

BREATHING ASBESTOS DUST MAY
CAUSE SERIOUS BODILY HARM

3.1.4 Local Exhaust System

Provide a local exhaust system in the asbestos control area in accordance with ANSI Z9.2 and 29 CFR 1926.1101 that will provide at least four air changes per hour inside of the negative pressure enclosure. Local exhaust equipment shall be operated 24 hours per day, until the asbestos control

area is removed and shall be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. In no case shall the building ventilation system be used as the local exhaust system for the asbestos control area. Filters on exhaust equipment shall conform to ANSI Z9.2 and UL 586. The local exhaust system shall terminate out of doors and remote from any public access or ventilation system intakes.

3.1.5 Tools

Vacuums shall be leak proof to the filter and equipped with HEPA filters. Filters on vacuums shall conform to ANSI Z9.2 and UL 586. Do not use power tools to remove asbestos containing materials unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation systems. Remove all residual asbestos from reusable tools prior to storage or reuse.

3.1.6 Rental Equipment

If rental equipment is to be used, furnish written notification to the rental agency concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

3.1.7 Glovebags

Submit written manufacturers proof that glovebags will not break down under expected temperatures and conditions.

3.2 WORK PROCEDURE

Perform asbestos related work in accordance with 29 CFR 1926.1101, 40 CFR 61-SUBPART M, and as specified herein. Use wet or appropriate encapsulation procedures as listed in the asbestos hazard abatement plan and negative pressure enclosure techniques. Personnel shall wear and utilize protective clothing and equipment as specified herein. Eating, smoking, drinking, chewing gum, tobacco, or applying cosmetics shall not be permitted in the asbestos work or control areas. Personnel of other trades not engaged in the encapsulation, removal, and demolition of asbestos containing material shall not be exposed at any time to airborne concentrations of asbestos unless all the personnel protection and training provisions of this specification are complied with by the trade personnel. Shut down the building heating, ventilating, and air conditioning system, cap the openings to the system, and provide temporary heating, and ventilation, and air conditioning where needed prior to the commencement of asbestos work. Disconnect electrical service when encapsulation and/or wet removal is performed and provide temporary electrical service with verifiable ground fault circuit interrupter (GFCI) protection prior to the use of any water and/or encapsulant. If an asbestos fiber release or spill occurs outside of the asbestos control area, stop work immediately, correct the condition to the satisfaction of the Contracting Officer including clearance sampling, prior to resumption of work.

3.2.1 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent work. Where such work is damaged or contaminated as verified by the Contracting Officer using visual inspection or sample analysis, it shall be restored to its original condition or decontaminated by the Contractor at no expense to the

Government as deemed appropriate by the Contracting Officer. This includes inadvertent spill of dirt, dust, or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, stop work immediately. Then clean up the spill. When satisfactory visual inspection and air sampling results are obtained from the PQP work may proceed at the discretion of the Contracting Officer.

3.2.2 Precleaning

Wet wipe and HEPA vacuum all surfaces potentially contaminated with asbestos prior to establishment of an enclosure.

3.2.3 Asbestos Control Area Requirements

3.2.3.1 Negative Pressure Enclosure

Block and seal openings in areas where the release of airborne asbestos fibers can be expected. Establish an asbestos negative pressure enclosure with the use of curtains, portable partitions, or other enclosures in order to prevent the escape of asbestos fibers from the contaminated asbestos work area. Negative pressure enclosure development shall include protective covering of uncontaminated walls, and ceilings with a continuous membrane of two layers of minimum 6-mil plastic sheet sealed with tape to prevent water or other damage. Provide two layers of 6-mil plastic sheet over floors and extend a minimum of 12 inches up walls. Seal all joints with tape. Provide local exhaust system in the asbestos control area. Openings will be allowed in enclosures of asbestos control areas for personnel and equipment entry and exit, the supply and exhaust of air for the local exhaust system and the removal of properly containerized asbestos containing materials. Replace local exhaust system filters as required to maintain the efficiency of the system.

3.2.3.2 Glovebag

The construction of a negative pressure enclosure is infeasible for the removal of underground pipe insulation located exterior to the target classroom.. Use alternate techniques as indicated in 29 CFR 1926.1101. Establish designated limits for the asbestos regulated area with the use of rope or other continuous barriers, and maintain all other requirements for asbestos control areas. The PQP shall conduct personal samples of each worker engaged in asbestos handling (removal, disposal, transport and other associated work) throughout the duration of the project. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers at any time exceeds background or 0.01 fibers per cubic centimeter whichever is greater, stop work, evacuate personnel in adjacent areas or provide personnel with approved protective equipment at the discretion of the Contracting Officer. This sampling may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those obtained by the Contractor, the Government will determine which results predominate. If adjacent areas are contaminated as determined by the Contracting Officer, clean the contaminated areas, monitor, and visually inspect the area as specified herein.

3.2.4 Removal Procedures

Wet asbestos material with a fine spray of approved surfactant during removal, cutting, or other handling so as to reduce the emission of airborne fibers. Remove material and immediately place in 6 mil plastic

disposal bags. Remove asbestos containing material in a gradual manner, with continuous application of the amended water or wetting agent in such a manner that no asbestos material is disturbed prior to being adequately wetted. Where unusual circumstances prohibit the use of 6 mil plastic bags, submit an alternate proposal for containment of asbestos fibers to the Contracting Officer for approval. For example, in the case where both piping and insulation are to be removed, the Contractor may elect to wet the insulation, wrap the pipes and insulation in plastic and remove the pipe by sections. Asbestos containing material shall be containerized while wet. At no time shall asbestos material be allowed to accumulate or become dry. Lower and otherwise handle asbestos containing material as indicated in 40 CFR 61-SUBPART M.

3.2.4.1 Sealing Contaminated Items Designated for Disposal

Remove contaminated architectural, mechanical, and electrical appurtenances such as venetian blinds, full-height partitions, carpeting, duct work, pipes and fittings, radiators, light fixtures, conduit, panels, and other contaminated items designated for removal by completely coating the items with an asbestos lock-down encapsulant at the demolition site before removing the items from the asbestos control area. These items need not be vacuumed. The asbestos lock-down encapsulant shall be tinted a contrasting color. It shall be spray-applied by airless method. Thoroughness of sealing operation shall be visually gauged by the extent of colored coating on exposed surfaces. Lock-down encapsulants shall comply with the performance requirements specified herein.

3.2.4.2 Exposed Pipe Insulation Edges

Contain edges of asbestos insulation to remain that are exposed by a removal operation. Wet and cut the rough ends true and square with sharp tools and then encapsulate the edges with a 1/4 inch thick layer of non-asbestos containing insulating cement troweled to a smooth hard finish. When cement is dry, lag the end with a layer of non-asbestos lagging cloth, overlapping the existing ends by at least 4 inches. When insulating cement and cloth is an impractical method of sealing a raw edge of asbestos, take appropriate steps to seal the raw edges as approved by the Contracting Officer.

3.2.5 Encapsulation Procedures

3.2.5.1 Preparation of Test Patches

Install three test patches of encapsulant as indicated. Use airless spray at the lowest pressure and as recommended by the encapsulant manufacturer. Follow exactly the manufacturer's instructions for thinning recommendations, application procedures and rates. Curing time shall be not less than five days or that recommended by the manufacturer, whichever is more. A test patch shall be 9 square feet in size.

3.2.5.2 Field Testing

Field test the encapsulation test patches in accordance with ASTM E 1494, paragraph "Required Field Test," in the presence of the Contracting Officer.

Keep a written record of the testing procedures and test results. Upon successful testing of the encapsulant, submit a signed statement to the Contracting Officer certifying that the encapsulant is suitable for installation on the particular asbestos containing material.

3.2.5.3 Large-Scale Application

Apply encapsulant using the same equipment and procedures as employed for the test patches. Keep the encapsulant material stirred to prevent settling. Keep a clean work area. Change pre-filters in the ventilation equipment as soon as they appear clogged by encapsulant aerosol or pressure differential drops below 0.02 Hg.

3.2.6 Air Sampling

Sampling of airborne concentrations of asbestos fibers shall be performed in accordance with 29 CFR 1926.1101 and as specified herein. Sampling performed in accordance with 29 CFR 1926.1101 shall be performed by the PQP. Sampling performed for environmental and quality control reasons shall be performed by the PQP. Unless otherwise specified, use NIOSH Method 7400 for sampling and analysis. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those results obtained by the Contractor, the Government will determine which results predominate.

3.2.6.1 Sampling Prior to Asbestos Work

Provide area air sampling and establish the baseline one day prior to the masking and sealing operations for each demolition, removal, or encapsulation site. Establish the background by performing area sampling in similar but uncontaminated sites in the building.

3.2.6.2 Sampling During Asbestos Work

The PQP shall provide personal and area sampling as indicated in 29 CFR 1926.1101 and governing environmental regulations. In addition, provided the same type of work is being performed, provide area sampling at least once every work shift close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. If sampling outside the enclosure shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contracting Officer immediately. Where alternate methods are used, perform personal and area air sampling at locations and frequencies that will accurately characterize the evolving airborne asbestos levels.

3.2.6.3 Sampling After Final Clean-Up (Clearance Sampling)

Provide area sampling of asbestos fibers using aggressive air sampling techniques as defined in the EPA 560/5-85-024 and establish an airborne asbestos concentration of less than 0.01 fibers per cubic centimeter after final clean-up but before removal of the enclosure or the asbestos work control area. After final cleanup and the asbestos control area is dry but prior to clearance sampling, the PQP shall perform a visual inspection in accordance with ASTM E 1368 to ensure that the asbestos control and work area is free of any accumulations of dirt, dust, or debris. Prepare a written report signed and dated by the PQP documenting that the asbestos control area is free of dust, dirt, and debris and all waste has been removed. Use transmission electron microscopy (TEM) to analyze clearance samples and report the results in accordance with current NIOSH criteria. The asbestos fiber counts from these samples shall be less than 0.01 fibers per cubic centimeter or be not greater than the background, whichever is

greater. Should any of the final samples indicate a higher value, the Contractor shall take appropriate actions to re-clean the area and shall repeat the sampling and TEM analysis at the Contractor's expense.

3.2.7 Lock-Down

Prior to removal of plastic barriers and after pre-clearance clean up of gross contamination, the PQP shall conduct a visual inspection of all areas affected by the removal and/or encapsulation in accordance with [ASTM E 1368](#). Inspect for any visible fibers, and to ensure that encapsulants were applied evenly and appropriately. A post removal (lock-down) encapsulant shall then be spray applied to ceiling, walls, floors and other areas exposed in the removal area. The exposed area shall include but not be limited to plastic barriers, furnishings and articles to be discarded as well as dirty change room, air locks for bag removal and decontamination chambers.

3.2.8 Site Inspection

While performing asbestos engineering control work, the Contractor shall be subject to on-site inspection by the Contracting Officer who may be assisted by or represented by safety or industrial hygiene personnel. If the work is found to be in violation of this specification, the Contracting Officer or his representative will issue a stop work order to be in effect immediately and until the violation is resolved. All related costs including standby time required to resolve the violation shall be at the Contractor's expense.

3.3 CLEAN-UP AND DISPOSAL

3.3.1 Housekeeping

Essential parts of asbestos dust control are housekeeping and clean-up procedures. Maintain surfaces of the asbestos control area free of accumulations of asbestos fibers. Give meticulous attention to restricting the spread of dust and debris; keep waste from being distributed over the general area. Use HEPA filtered vacuum cleaners. DO NOT BLOW DOWN THE SPACE WITH COMPRESSED AIR. When asbestos removal is complete, all asbestos waste is removed from the work-site, and final clean-up is completed, the Contracting Officer will attest that the area is safe before the signs can be removed. After final clean-up and acceptable airborne concentrations are attained but before the HEPA unit is turned off and the enclosure removed, remove all pre-filters on the building HVAC system and provide new pre-filters. Dispose of filters as asbestos contaminated materials. Reestablish HVAC mechanical, and electrical systems in proper working order. The Contracting Officer will visually inspect all surfaces within the enclosure for residual material or accumulated dust or debris. The Contractor shall re-clean all areas showing dust or residual materials. If re-cleaning is required, air sample and establish an acceptable asbestos airborne concentration after re-cleaning. The Contracting Officer must agree that the area is safe in writing before unrestricted entry will be permitted. The Government shall have the option to perform monitoring to determine if the areas are safe before entry is permitted.

3.3.2 Title to Materials

All waste materials, except as specified otherwise, shall become the property of the Contractor and shall be disposed of as specified in applicable local, State, and Federal regulations and herein.

3.3.3 Disposal of Asbestos

3.3.3.1 Procedure for Disposal

Collect asbestos waste, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing which may produce airborne concentrations of asbestos fibers and place in sealed fiber-proof, waterproof, non-returnable containers (e.g. double plastic bags 6 mils thick, cartons, drums or cans). Wastes within the containers must be adequately wet in accordance with 40 CFR 61-SUBPART M. Affix a warning and Department of Transportation (DOT) label to each container including the bags or use at least 6 mils thick bags with the approved warnings and DOT labeling preprinted on the bag. The name of the waste generator and the location at which the waste was generated shall be clearly indicated on the outside of each container. Prevent contamination of the transport vehicle (especially if the transport vehicle is a rented truck likely to be used in the future for non-asbestos purposes). These precautions include lining the vehicle cargo area with plastic sheeting (similar to work area enclosure) and thorough cleaning of the cargo area after transport and unloading of asbestos debris is complete. Dispose of waste asbestos material at an Environmental Protection Agency (EPA) or State-approved asbestos landfill off Government property. For temporary storage, store sealed impermeable bags in asbestos waste drums or skids. An area for interim storage of asbestos waste-containing drums or skids will be assigned by the Contracting Officer or his authorized representative. Procedure for hauling and disposal shall comply with 40 CFR 61-SUBPART M, State, regional, and local standards. Sealed plastic bags may be dumped from drums into the burial site unless the bags have been broken or damaged. Damaged bags shall remain in the drum and the entire contaminated drum shall be buried. Uncontaminated drums may be recycled. Workers unloading the sealed drums shall wear appropriate respirators and personal protective equipment when handling asbestos materials at the disposal site.

3.3.3.2 Asbestos Disposal Quantity Report

Direct the PQP to record and report, to the Contracting Officer, the amount of asbestos containing material removed and released for disposal. Deliver the report for the previous day at the beginning of each day shift with amounts of material removed during the previous day reported in linear feet or square feet as described initially in this specification and in cubic feet for the amount of asbestos containing material released for disposal.

-- End of Section --



Limited Asbestos Survey

Building 4-3331 Fort Bragg, North Carolina

Prepared by Timothy A. Jones



The contents of this report are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or approval of the use of such commercial products.

The findings of this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

Table of Contents

Asbestos Inspection Report.....	1-3
---------------------------------	-----

List of Tables

Table 1. Suspect ACM Samples	4-5
Table 2. Material Characterization and Assessment	6

List of Figures

Figure 1. Asbestos Sample Locations	7
Figure 2. Asbestos Sample Locations	8

Appendices

Appendix A. Carolina Environmental, Inc, Analytical Report.	9-14
Appendix B. Sample Chain of Custody Forms.....	15-17
Appendix C. Certifications and Accreditations	18-20
Appendix D. AHERA 6 Month Re-Inspection Report	21

Building 4-3331 Fort Bragg, North Carolina

by Timothy A. Jones

Final report

Prepared for: Savannah District Corps of Engineers

Asbestos Inspection Report

Introduction

Scope of the Investigation

This report documents the limited asbestos inspection and survey of Building 4-3331 (Albritton Junior High School) at Ft. Bragg; North Carolina conducted on 9 December 2009 by Savannah District US Army Corps of Engineers employee Tim Jones. The survey was limited to materials expected to be disturbed by demolition activities associated with the construction of an addition to the school expected to begin in year 2010. The survey was conducted in general accordance with the regulatory guidelines in the Asbestos Hazard Emergency Response Act (AHERA) (40 CFR Part 763 Subpart E Sections 763.80-763.88) and “Guidance for Controlling Asbestos-Containing Materials in Buildings” (Purple Book) (EPA publication number 560/5-85-024). Although not required by the AHERA guidelines, roof and other exterior miscellaneous materials were also inspected and sampled.

Background

Building 4-3331 is a single story steel frame building with concrete exterior walls and a mixture of interior wall types. The roof system is of wood decking with asphalt shingle covering. The floor system is concrete slab on grade typically covered with vinyl floor tiles. The original construction date was earl to min 1980’s. Rooms on the building floor plans are arbitrarily numbered for identification in this report only.

Description of study

Investigation

Limited areas of Building No. 4-3331 were visually inspected for suspected asbestos containing materials (ACM) by a North Carolina accredited inspector. A copy of the inspector’s accreditation certificate is included in Appendix C. Bulk samples of all suspect ACM’s within the limited area were collected. This report details ACM as identified at the time of inspection only.

Carolina Environmental, Inc analyzed the bulk samples. The laboratory is accredited by the National Voluntary Laboratory Accredited Program (NVLAP Accreditation sponsored by the National Institute of Standards and Technology (NIST)).

Copies of their accreditation certificates are included in Appendix C. The samples were analyzed by the accepted method of polarized light microscopy (PLM) using EPA's "Method for the Determination of Asbestos in Bulk Building Materials", EPA/600/R-93/116. The laboratories' analytical reports are included in Appendix A.

In compliance with the AHERA regulations, material is considered an Asbestos Containing Material (ACM) when it contains greater than one percent asbestos. Likewise, in this report, any material containing concentrations greater than one percent asbestos will be considered "positive". Occasionally, materials containing less than one percent asbestos, or not sampled, are assumed to be a "positive" asbestos containing material at the discretion of the inspectors. A narrative discussion of the AHERA ACM types (i.e., thermal systems insulation, miscellaneous and surfacing materials) found in Building No. 4-3331 is included in this report where relevant. Bulk sample information appears on Table 1. Estimated quantities of individual asbestos containing materials appear on Table 2. Material characterization of asbestos containing materials appears on Table 3. The approximate location where each bulk sample was obtained is shown on the building floor plans, which appear as Figures. Positive ACM samples are indicated on the floor plan Figures with their numbers enclosed in squares and, where possible, locations of positive ACM are identified. Samples testing negative for asbestos are indicated on the floor plan Figures with their numbers enclosed in circles. It is reasonable to assume that all materials similar to those testing positive also contain positive amounts of asbestos and should be treated as such.

Conclusions

Thermal Systems Insulation (TSI)

TSI is insulation material applied to pipes, fittings, tanks, ducts, or on other interior structural components to prevent heat loss or gain, or water condensation, or for other purposes.

No asbestos containing thermal systems insulation materials were located in the limited inspection areas.

Miscellaneous Materials

Miscellaneous materials include building material on structural components, structural members or fixtures, such as floor and ceiling tiles, and do not include surfacing or TSI. In the past, there were a great number of miscellaneous building materials that had asbestos fibers added to them during the manufacturing process to increase durability and fireproofing qualities. The following suspect miscellaneous materials at Building No. 4-3331 were found to contain or were assumed to contain asbestos:

Flooring Materials: Black mastic associated with the 12" X 12" floor tiles contains asbestos. - (Refer to Tables 1, 2 and 3 for specific information and Figure 1 for sample locations).

Surfacing

Surfacing material is friable material that is sprayed on, troweled on, or otherwise applied to surfaces for decorative or other purposes.

No asbestos containing surfacing material was located in the limited survey areas.

Additional Information

The AHERA 6 month re-inspection report dated February 17, 2009 generated by The EI Group for the Department of Defense Education Activity (DODEA) lists six additional asbestos homogeneous areas identified at the school. They are pink sink coating, black sink coating, pipe flange gaskets, black tabletops and red roof shingles. It is not known by this inspector if these materials were positively identified as asbestos or are presumed asbestos. Of these materials, the red roof shingles were sampled during this inspection and found not to contain positive amounts of asbestos. Other than the red roof shingles, none of these materials are expected to be disturbed by this upcoming construction project. If disturbance of these materials becomes necessary, they should be treated as asbestos materials. The one page copy of the re-inspection report that was available to this inspector is included at the end of this report as Appendix D.

TABLE 1
SUSPECT ACM SAMPLES
Ft. BRAGG, BUILDING 4-3331

FIELD ID	DESCRIPTION	LOCATION	ASBESTOS TYPE & %
3331-1-1	White mastic	On foil backed duct insulation seams above suspended ceiling in classroom	No Asbestos Detected
3331-1-2	Ceiling tile	Classroom, typical tiles	No Asbestos Detected
3331-1-3	Drywall joint compound	On gypsum board wall section in classroom at window	No Asbestos Detected
3331-1-4	Ceiling tile	Classroom, typical tiles	No Asbestos Detected
3331-1-5	Drywall joint compound	On gypsum board wall section in classroom at window	No Asbestos Detected
3331-1-6	Black caulking material	Between metal window frame and wall section inside classroom	No Asbestos Detected
3331-1-7	Black caulking material	Between metal window frame and wall section inside classroom	No Asbestos Detected
3331-1-8	12" X 12" tan floor tile & black mastic	Classroom	Black mastic 5% chrysotile, tiles NAD
3331-1-9	12" X 12" tan floor tile & black mastic	Classroom	No Asbestos Detected
3331-1-10	White mastic	On foil backed duct insulation seams above suspended ceiling in hallway	No Asbestos Detected
3331-1-11	White caulking material	Between metal door frame and wall section inside hallway	No Asbestos Detected
3331-1-12	Drywall joint compound	On gypsum board wall at interior door in hallway	No Asbestos Detected
3331-1-13	Black caulking material	Between metal door frame and wall section inside hallway	No Asbestos Detected
3331-E-14	Black caulking material	Between metal door frame and concrete wall section on exterior of building	No Asbestos Detected
3331-E-15	Grey caulking material	Exterior of building, between sections of precast concrete walls	No Asbestos Detected
3331-E-16	Grey caulking material	Exterior of building, between sections of precast concrete walls	No Asbestos Detected
3331-R-17	Roof shingle	Roof, near exit door	No Asbestos Detected
3331-R-18	Roof shingle	Roof, near exit door	No Asbestos Detected

3331-E-19	Duct seam sealer	Exterior, on seams in 16" exposed ductwork to exhaust fan at side of building	No Asbestos Detected
3331-E-20	Caulking material	Exterior, where exposed exhaust ductwork penetrates building wall	No Asbestos Detected
3331-E-21	Caulking material	Exterior, where exposed exhaust ductwork penetrates building wall	No Asbestos Detected
3331-E-22	Black pipe coating	Exterior, on 4" gas main piping on exit side of gas meter at ground	No Asbestos Detected
3331-E-23	Black pipe coating	Exterior, on gas main piping on inlet side of gas meter at ground	No Asbestos Detected

Samples testing positive for asbestos indicated in **BOLD** type

NAD = No Asbestos Detected

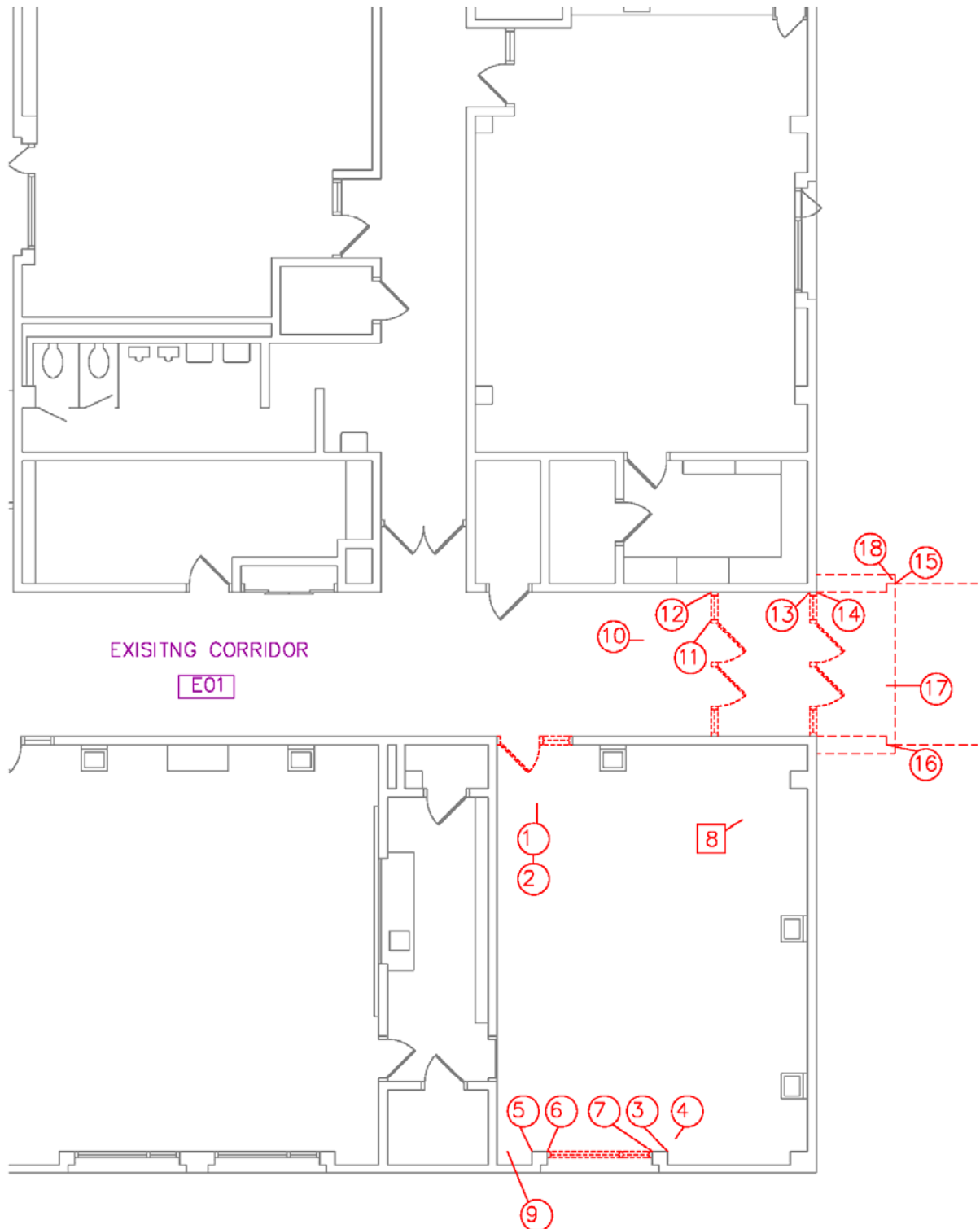
TABLE 2
MATERIAL CHARACTERIZATION AND ASSESSMENT
Ft. BRAGG, BUILDING 4-3331

MATERIAL		CHARACTERISTICS			ASSESSMENT	
Type	Description	Asbestos Yes/No/Assumed	Quantity (If ACM)	Friable / Non- friable	Condition	Disturbance Potential
Miscellaneous	Floor tile mastic	Yes	Not Quantified	Non-friable	Good	Low

S.F. = Square Foot, L.F. = Linear Foot, C.F. = Cubic Foot, Ea. = Each

Disturbance Potential is based on normal building occupancy. Demolition or renovation activities may change assessment.

Figure 1

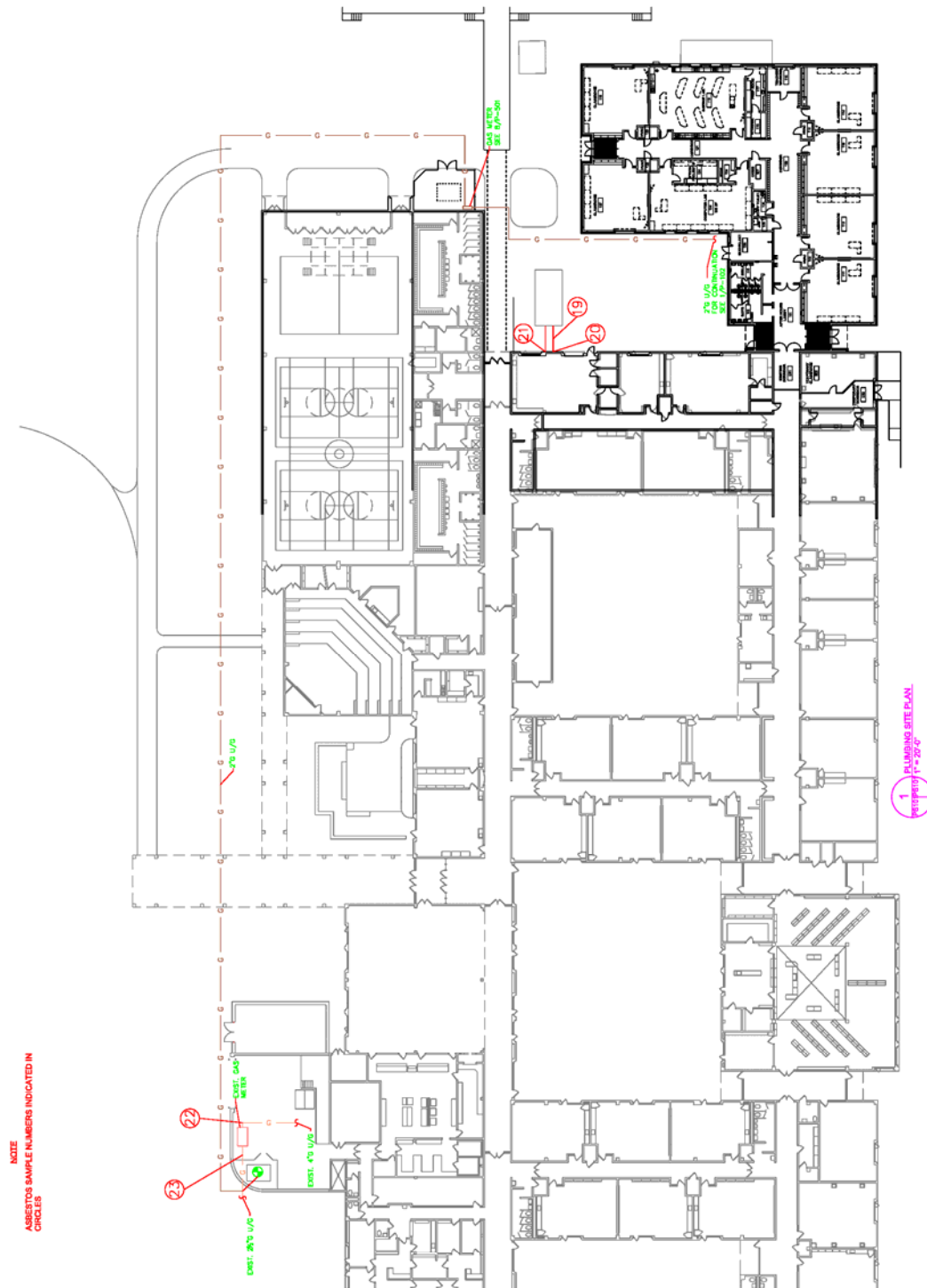


SCALE: 1/8" = 1'-0"

NOTES

1. Negative asbestos sample numbers in circles
2. Positive asbestos sample numbers in squares
3. Sample locations are approximate

Figure 2



Appendix A

Laboratory's Analytical Report

CAROLINA ENVIRONMENTAL, INC.
 107 New Edition Court, Cary, NC 27511
 Phone: (919) 481-1413 Fax: (919) 481-1442

LABORATORY REPORT ASBESTOS BULK ANALYSIS

Client: **US Army Corps of Engineers - Savannah**
District - EMU9
 200 North Cobb Parkway, Bldg. 400 Ste. 404
 Marietta, GA 30062

CEI Lab Code: A09-8707
 Received: 12-15-09
 Analyzed: 12-17-09
 Reported: 12-17-09
 Analyst: Erica Tucker

Project: Ft. Bragg Bldg. 4-3331; 10128

CLIENT ID	CEI LAB ID	HOMOGENEITY DESCRIPTION				% ASBESTOS
3331-1-1	A979622	<u>MASTIC</u>				ND
	Homogeneous,	White, Fibrous, Bound				
		FOIL	<1 %	FBGL	15 %	
		MAST	85 %			
3331-1-2	A979623	<u>CEILING TILE</u>				ND
	Heterogeneous,	White, Grey, Fibrous, Bound				
		PAINT	<1 %	CELL	45 %	
		PERL	20 %	FBGL	35 %	
3331-1-3	A979624	<u>JOINT COMPOUND</u>				ND
	Heterogeneous,	White, Fibrous, Bound				
No drywall present.		PAINT	<1 %	CELL	<1 %	
		MICA	10 %			
		BIND	90 %			
3331-1-4	A979625	<u>CEILING TILE</u>				ND
	Heterogeneous,	White, Grey, Fibrous, Bound				
		PAINT	<1 %	CELL	45 %	
		PERL	20 %	FBGL	35 %	
3331-1-5	A979626	<u>JOINT COMPOUND</u>				ND
	Heterogeneous,	White, Fibrous, Bound				
No drywall present.		PAINT	<1 %	CELL	<1 %	
		MICA	10 %			
		BIND	90 %			

CAROLINA ENVIRONMENTAL, INC.
 107 New Edition Court, Cary, NC 27511
 Phone: 919-481-1413 Fax: 919-481-1442

Project: Ft. Bragg Bldg. 4-3331; 10128

Lab Code: A09-8707

CLIENT ID	CEI LAB ID	HOMOGENEITY DESCRIPTION	% ASBESTOS	
3331-1-6	A979627	<u>CAULKING MATERIAL</u> Heterogeneous, White, Black, Fibrous, Bound	ND	
		PAINT <1 % FBGL <1 % CAULK 100 %		
3331-1-7	A979628	<u>CAULKING MATERIAL</u> Heterogeneous, White, Black, Fibrous, Bound	ND	
		PAINT <1 % FBGL <1 % CAULK 100 %		
3331-1-8	A979629A	<u>FLOOR TILE</u> Homogeneous, White, Grey, Fibrous, Bound	ND	
		CACO 15 % CELL <1 % VINYL 85 %		
	A979629B	<u>MASTIC</u> Homogeneous, Black, Fibrous, Bound	CHRY 5%	
		CHRY 5% MAST 95 % CELL <1 %		
3331-1-9	A979630A	<u>FLOOR TILE</u> Homogeneous, White, Grey, Fibrous, Bound	ND	
		CACO 15 % CELL <1 % VINYL 85 %		
	A979630B	<u>MASTIC</u> Homogeneous, Black, Fibrous, Bound	ND	
		MAST 100 % CELL <1 %		
3331-1-10	A979631	<u>MASTIC</u> Homogeneous, White, Fibrous, Bound	ND	
		FOIL <1 % FBGL 15 % MAST 85 %		

CAROLINA ENVIRONMENTAL, INC.
107 New Edition Court, Cary, NC 27511
Phone: 919-481-1413 Fax: 919-481-1442

Project: Ft. Bragg Bldg. 4-3331; 10128

Lab Code: A09-8707

CLIENT ID	CEI LAB ID	HOMOGENEITY DESCRIPTION	% ASBESTOS			
3331-1-11	A979632	<u>CAULKING MATERIAL</u> Homogeneous, White, Fibrous, Bound	CAULK	100 %	CELL	<1 %
						ND
3331-1-12	A979633	<u>JOINT COMPOUND</u> Heterogeneous, White, Fibrous, Bound	PAINT	<1 %	CELL	<1 %
No drywall present.			MICA	10 %		
			BIND	90 %		
						ND
3331-1-13	A979634	<u>CAULKING MATERIAL</u> Heterogeneous, White, Black, Fibrous, Bound	PAINT	<1 %	FBGL	<1 %
			CAULK	100 %		
						ND
3331-E-14	A979635	<u>CAULKING MATERIAL</u> Homogeneous, Grey, Fibrous, Bound	CAULK	100 %	CELL	<1 %
						ND
3331-E-15	A979636	<u>CAULKING MATERIAL</u> Homogeneous, White, Fibrous, Bound	CAULK	100 %	CELL	<1 %
						ND
3331-E-16	A979637	<u>CAULKING MATERIAL</u> Heterogeneous, White, Fibrous, Bound	CAULK	100 %	CELL	<1 %
			PAINT	<1 %		
						ND
3331-R-17	A979638	<u>ROOF SHINGLE</u> Heterogeneous, Black, Fibrous, Bound	GRAV	15 %	FBGL	25 %
			TAR	60 %		
						ND

CAROLINA ENVIRONMENTAL, INC.
 107 New Edition Court, Cary, NC 27511
 Phone: 919-481-1413 Fax: 919-481-1442

Project: Ft. Bragg Bldg. 4-3331; 10128

Lab Code: A09-8707

CLIENT ID	CEI LAB ID	HOMOGENEITY DESCRIPTION	% ASBESTOS			
3331-R-18	A979639	<u>ROOF SHINGLE</u> Heterogeneous, Black, Fibrous, Bound	GRAV	15 %	FBGL	25 %
			TAR	60 %		
3331-E-19	A979640	<u>DUCT SEAM SEALER</u> Homogeneous, Grey, Blue, Fibrous, Bound	BIND	100 %	CELL	<1 %
3331-E-20	A979641	<u>CAULKING MATERIAL</u> Homogeneous, White, Fibrous, Bound	BIND	100 %	FBGL	<1 %
3331-E-21	A979642	<u>CAULKING MATERIAL</u> Homogeneous, White, Fibrous, Bound	BIND	100 %	FBGL	<1 %
3331-E-22	A979643	<u>PIPE COATING</u> Homogeneous, Black, Fibrous, Bound	PAINT	<1 %	FBGL	<1 %
			TAR	100 %		
3331-E-23	A979644	<u>PIPE COATING</u> Homogeneous, Black, Fibrous, Bound	PAINT	<1 %	FBGL	<1 %
			TAR	100 %		

The following definitions apply to the abbreviations used in the ASBESTOS BULK ANALYSIS REPORT:

CHRY = Chrysotile	CELL = Cellulose	DEBR = Debris
AMOS = Amosite	FBGL = Fibrous Glass	BIND = Binder
CROC = Crocidolite	CACO = Calcium Carbonate	SILI = Silicates
TREM = Tremolite	SYNT = Synthetics	GRAV = Gravel
ANTH = Anthophyllite	WOLL = Wollastonite	MAST = Mastic
ACTN = Actinolite	CERWL = Ceramic Wool	PLAS = Plaster
N D = None Detected	NTREM = Non-Asbestiform Tremolite	PERL = Perlite
NANTH = Non-Asbestiform Anthophyllite	FBGY = Fibrous Gypsum	RUBR = Rubber
		VER = Vermiculite

CLIENT: US Army Corps of Engineers - Savannah District - EMU9

PROJECT: Ft. Bragg Bldg. 4-3331; 10128

CEI LAB CODE: A09-8707

Stereoscopic microscopy and polarized light microscopy coupled with dispersion staining is the analytical technique used for sample identification. The percentage of each component is visually estimated by volume. These results pertain only to the samples analyzed. The samples were analyzed as submitted by the client and may not be representative of the larger material in question. Unless notified in writing to return samples, Carolina Environmental, Inc. will discard all bulk samples after 30 days.

Many vinyl floor tiles have been manufactured using greater than 1% asbestos. Often the asbestos was milled to a fiber size below the detection limit of polarized light microscopy. Therefore, a "None Detected" (ND) reading on vinyl floor tile does not necessarily exclude the presence of asbestos. Transmission electron microscopy provides a more conclusive form of analysis for vinyl floor tiles.

It is certified by the signature below that Carolina Environmental, Inc. is accredited by the National Voluntary Accreditation Program (NVLAP) for the analysis of asbestos in bulk materials. The accredited test method is EPA / 600 / M4-82 / 020 for the analysis of asbestos in building materials. Procedures described in EPA / 600 / R-93 / 116 have been incorporated where applicable. The detection limit for the method is 0.1% (trace amount). Carolina Environmental, Inc.'s NVLAP accreditation number is #101768-0. This report is not to be used to claim product endorsement by NVLAP or any agency of the U. S. Government. This report and its contents are only valid when reproduced in full. Dust and soil analyses for asbestos using PLM are not covered under NVLAP accreditation.

ANALYST



REVIEWED BY



Tianbao Bai, Ph.D.
Laboratory Director

End of Report

Appendix B

Sample Chain of Custody Forms

A09.8707 (23)
A979622. A979644

ASBESTOS CHAIN OF CUSTODY - US ARMY CORPS OF ENGINEERS

Project: Ft. Bragg Bldg 4-3331	Job No.: 10128
Sampler: Tim Jones	Analysis: PLM

DATE	FIELD ID	EMU ID	COMPONENTS/NOTES
12/9/2009	3331-1-1	62077	White mastic
12/9/2009	3331-1-2	62078	Ceiling tile
12/9/2009	3331-1-3	62079	Drywall joint compound
12/9/2009	3331-1-4	62080	Ceiling tile
12/9/2009	3331-1-5	62081	Drywall joint compound
12/9/2009	3331-1-6	62082	Caulking material
12/9/2009	3331-1-7	62083	Caulking material
12/9/2009	3331-1-8	62084	Floor tile & black mastic
12/9/2009	3331-1-9	62085	Floor tile & black mastic
12/9/2009	3331-1-10	62086	White mastic
12/9/2009	3331-1-11	62087	Caulking material
12/9/2009	3331-1-12	62088	Drywall joint compound
12/9/2009	3331-1-13	62089	Caulking material
12/9/2009	3331-E-14	62090	Caulking material
12/9/2009	3331-E-15	62091	Caulking material
12/9/2009	3331-E-16	62092	Caulking material
12/9/2009	3331-R-17	62093	Roof shingle
12/9/2009	3331-R-18	62094	Roof shingle
12/9/2009	3331-E-19	62095	Duct seam sealer
12/9/2009	3331-E-20	62096	Caulking material
12/9/2009	3331-E-21	62097	Caulking material
12/9/2009	3331-E-22	62098	Black pipe coating

Relinquished By	Date	Time	Received By	Date	Time
<i>Tim Jones</i>	12-14-09	1400	<i>Kathy Smith</i>	12-15-09	10:00 AM

--

A09.8707

ASBESTOS CHAIN OF CUSTODY - US ARMY CORPS OF ENGINEERS

Project: Ft. Bragg Bldg 4-3331	Job No.: 10128
Sampler: Tim Jones	Analysis: PLM

[illegible]

Relinquished By	Date	Time	Received By	Date	Time
<i>Travis Goss</i>	12-14-09	1400			

--

Appendix C

Certifications & Accreditations



North Carolina Department of Health and Human Services
Division of Public Health · Epidemiology Section
Occupational and Environmental Epidemiology Branch
1912 Mail Service Center · Raleigh, North Carolina 27699-1912
Tel 919-707-5950 · Fax 919-870-4808

Beverly Eaves Perdue, Governor
Lanier M. Cansler, Secretary

Jeffrey P. Engel, M.D.
State Health Director

October 26, 2009

Timothy A Jones
4411 Smoke Stone Court
Marietta, GA 30062

Dear Mr. Jones:

Based upon the review of your accreditation application, the Health Hazards Control Unit (HHCU) has determined that you have fulfilled the requirements and are eligible for asbestos accreditation as a(n) INSPECTOR. Your assigned North Carolina accreditation number is 12210, which is reflected on your enclosed North Carolina Accreditation card. Please be sure to take this card with you to any asbestos work site where you are employed. The State requires that all persons conducting asbestos abatement or asbestos management activities be accredited and have their identification card on site.

Your North Carolina Inspector accreditation will expire on SEPTEMBER 30, 2010. It is NOT the policy of the HHCU to issue renewal notices. If you wish to continue working as a(n) Inspector after this expiration date, you must successfully complete the required training and submit a completed application to this office prior to September 30, 2010. If you should continue to perform asbestos management activities as a(n) Inspector without a valid North Carolina accreditation, you will be in violation of State regulations and may be cited for noncompliance.

Sincerely,

Marita E Cheek
Accreditation/Certification Secretary
Health Hazards Control Unit

Enclosure

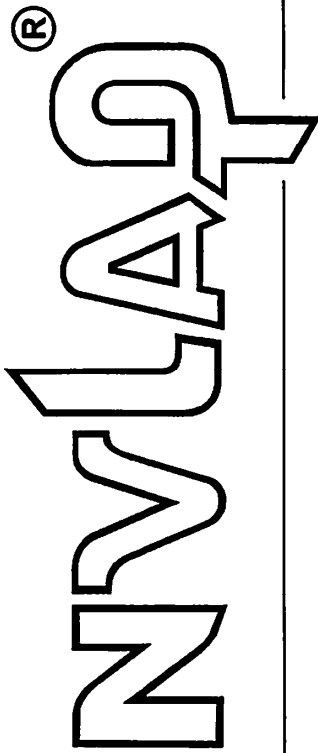


North Carolina Public Health
Working for a healthier and safer North Carolina
Everywhere. Everyday. Everybody.



Location: 5505 Six Forks Road, 2nd Floor, Room D-1 · Raleigh, N.C. 27609

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 101768-0

Carolina Environmental, Inc.
Cary, NC

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

BULK ASBESTOS FIBER ANALYSIS

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2009-04-01 through 2010-03-31

Effective dates



Dolly S. Bruce
For the National Institute of Standards and Technology

Appendix D

AHERA 6 Month Re-Inspection Report

**Six Month AHERA Asbestos Periodic Surveillance Inspection
February 17, 2009**

**Albritton Junior High School
HENC B2**

As part of the Department of Defense Education Activity (DODEA) Asbestos Management Program and in accordance with Asbestos Hazard Emergency Response Act (AHERA) 40 CFR Part 763, Subpart E. EI Group, Inc conducted the 6-month AHERA asbestos periodic surveillance inspection for the Fort Bragg School system. The management of the DODEA Asbestos Management Program is being carried out by the U.S. Army Corps of Engineers Transatlantic Program Center (USACE-TAC).

On February 10, 2009 The EI Group, Inc. Industrial Hygiene Technician Mr. Greg Goss (NC Inspector Accreditation # 12563) conducted a visual inspection and assessment of the identified Asbestos Containing Material (ACM) located within the school. According to the Baker Environmental, Inc. (Baker) three-year re-inspection conducted on March 8, 2007, seven (7) different building materials were found that contain asbestos. The Table below provides the current status of known ACM at this school

ACM Assessment – Bldg #43331

Homogeneous Material Number	Material Type	Previous Condition	Condition Change	Present Condition	Recommendation
006	Sink Coating (Pink)	Undamaged	None	Undamaged	Continue O&M procedure
0018	Floor Adhesive (Black, Under 1x1 Brown Vinyl Floor Tile)	Undamaged	None	Undamaged	Continue O&M procedure
020	Sink Coating (Black)	Undamaged	None	Undamaged	Continue O&M procedure
021	Sheet gasket (3" Diameter, Grey, On Pipe Flange Connections)	Undamaged	None	Undamaged	Continue O&M procedure
025	Floor Adhesive (Black, Under 1x1 Tan Mottled w/Beige Vinyl Floor Tile)	Undamaged	None	Undamaged	Continue O&M procedure
038	Tabletops (Black)	Undamaged	None	Undamaged	Continue O&M procedure
073	Asphalt Roofing (Red Shingles)	Undamaged	None	Undamaged	Continue O&M procedure

Summary

During this periodic surveillance inspection, all of the identified ACM were observed and no changes in their conditions were noted. Table 1 provides a summary of the ACM's, current conditions, their condition change, and operation and maintenance recommendations.

SECTION 03 30 53

MISCELLANEOUS CAST-IN-PLACE CONCRETE

04/08

PART 1 GENERAL

1.1 SUMMARY

Perform all work in accordance with ACI MCP SET Parts 2 and 3.

*2

1.2 ~~UNIT PRICES~~DELETED~~1.2.1 Concrete Payment~~

~~Payment will cover all costs associated with manufacturing, furnishing, delivering, placing, finishing, and curing of concrete for the various items of the schedule, including the cost of all formwork. Payment for concrete, for which payment is made as a lump sum, is to be included in this unit price payment item. Payment for grout, preformed expansion joints, field molded sealants, waterstops, reinforcing steel bars or wire reinforcement is to be included in this unit price payment item.~~

~~1.2.2 Measurement~~

~~Concrete will be measured for payment on the basis of the actual volume of concrete within the pay lines of the structures as indicated. Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structure. No deductions will be made for rounded or beveled edge, for space occupied by meal work, for electrical conduits or timber, or for voids or embedded items that are either less than 5 cubic feet in volume or 1 square foot in cross section.~~

~~1.2.3 Unit of Measure~~

~~Unit of measure: cubic yard.~~

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ACI INTERNATIONAL (ACI)

ACI MCP SET

(2009) Manual of Concrete Practice

ASTM INTERNATIONAL (ASTM)

ASTM A 185/A 185M

(2007) Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

ASTM A 615/A 615M

(2009) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM C 1064/C 1064M	(2008) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C 143/C 143M	(2008) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C 150	(2007) Standard Specification for Portland Cement
ASTM C 171	(2007) Standard Specification for Sheet Materials for Curing Concrete
ASTM C 172	(2008) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C 173/C 173M	(2009) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 231	(2009) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(2006) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C 309	(2007) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 31/C 31M	(2009) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C 33/C 33M	(2008) Standard Specification for Concrete Aggregates
ASTM C 39/C 39M	(2005e1e2) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 494/C 494M	(2008a) Standard Specification for Chemical Admixtures for Concrete
ASTM C 618	(2008a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C 920	(2008) Standard Specification for Elastomeric Joint Sealants
ASTM C 94/C 94M	(2009) Standard Specification for Ready-Mixed Concrete
ASTM D 1752	(2004a; R 2008) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion

ASTM D 75/D 75M	(2009) Standard Practice for Sampling Aggregates
ASTM E 1155	(1996; R 2008) Standard Test Method for Determining Floor Flatness and Floor Levelness Numbers
ASTM E 1155M	(1996; R 2008) Standard Test Method for Determining Floor Flatness and Floor Levelness Numbers (Metric)
ASTM E 96/E 96M	(2005) Standard Test Methods for Water Vapor Transmission of Materials
U.S. ARMY CORPS OF ENGINEERS (USACE)	
COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete
U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)	
40 CFR 247	Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.4 SYSTEM DESCRIPTION

The Government retains the option to sample and test aggregates and concrete to determine compliance with the specifications. Provide facilities and labor as may be necessary to assist the Government in procurement of representative test samples. Obtain samples of aggregates at the point of batching in accordance with ASTM D 75/D 75M. Sample concrete in accordance with ASTM C 172. Determine slump and air content in accordance with ASTM C 143/C 143M and ASTM C 231, respectively, when cylinders are molded. Prepare, cure, and transport compression test specimens in accordance with ASTM C 31/C 31M. Test compression test specimens in accordance with ASTM C 39/C 39M. Take samples for strength tests not less than once each shift in which concrete is produced from each class of concrete required. Provide a minimum of three specimens from each sample; two to be tested at 28 days for acceptance, and one will be tested at 7 days for information.

1.4.1 Strength

Acceptance test results are the average strengths of two specimens tested at 28 days. The strength of the concrete is considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength, f'_c , and no individual acceptance test result falls below f'_c by more than 500 psi.

1.4.2 Construction Tolerances

Apply a Class "C" finish to all surfaces except those specified to receive a Class "D" finish. Apply a Class "D" finish to all post-construction surfaces which will be permanently concealed. Surface requirements for the classes of finish required are as specified in Part 4 of ACI MCP SET.

1.4.3 Concrete Mixture Proportions

Concrete mixture proportions are the responsibility of the Contractor.

Mixture proportions shall include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and quantity of water per cubic yard of concrete. Provide materials included in the mixture proportions of the same type and from the same source as will be used on the project. Specified compressive strength f'c shall be as shown on Drawings. The maximum nominal size coarse aggregate is 3/4 inch, in accordance with ACI MCP SET Part 3. The air content shall be between 4.5 and 7.5 percent with a slump between 2 and 5 inches. The maximum water cement ratio is 0.45.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

- Air-Entraining Admixture
- Accelerating Admixture
- Water-Reducing or Retarding Admixture
- Curing Materials
- Reinforcing Steel
- Expansion Joint Filler Strips, Premolded
- Joint Sealants - Field Molded Sealants

Manufacturer's literature from suppliers which demonstrates compliance with applicable specifications for the above materials.

Batching and Mixing Equipment

Manufacturer's data for batching and mixing equipment which demonstrates compliance with the applicable specifications.

Conveying and Placing Concrete

Methods and equipment for transporting, handling, depositing, and consolidating the concrete prior to the first concrete placement.

- Ready-Mix Concrete
- Mix Design Data
- Air-Entraining Admixtures
- Fly Ash
- Steel Reinforcement
- Curing Compound
- Measurement of Floor Tolerances
- Concrete

SD-06 Test Reports

Aggregates

Test reports for aggregates showing the material(s) meets the quality and grading requirements of the specifications.

Concrete Mixture Proportions

The mixture proportions that will produce concrete of the quality required, ten days prior to placement of concrete. Applicable test reports to verify that the concrete mixture proportions selected will produce concrete of the quality specified.

Compressive Strength Testing Slump

SD-07 Certificates

Cementitious Materials CPG for recycled materials or appropriate Waiver Form

Manufacturer's certificates of compliance, accompanied by mill test reports, attesting that the concrete materials meet the requirements of the specifications in accordance with the Special Clause "CERTIFICATES OF COMPLIANCE". Certificates for all material conforming to EPA's Comprehensive Procurement Guidelines (CPG), in accordance with 40 CFR 247.

Aggregates

Certificates of compliance stating that the material(s) meet the quality and grading requirements of the specifications under which it is furnished.

1.6 QUALITY ASSURANCE

Indicate specific locations of Concrete Placement and Steel Reinforcement on installation drawings and include, but not be limited to, square feet of concrete placements, thicknesses and widths, plan dimensions, and arrangement of cast-in-place concrete section.

1.6.1 Flatness and Levelness of Floor Slabs

Conduct floor flatness and levelness test, (FF and FL respectively), on floor slabs in accordance with the provisions set forth in ASTM E 1155M ASTM E 1155. Also Zi calculation to be used shall be $N \min. = A/10$. Floor tolerance measurements shall be made by the approved laboratory and inspection service within 24 hours after completion of final troweling operation and before forms and shores have been removed. Take measurements with a Dipstick Auto-Read floor profiler instrument. Provide results of floor tolerance tests, including formal notice of acceptance or rejection of the work, to the Contractor within 24 hours after data collection.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Provide cementitious materials that conform to the appropriate specifications listed:

2.1.1.1 Portland Cement

ASTM C 150, Type I or II.

2.1.1.2 Pozzolan

Provide pozzolan that conforms to ASTM C 618, Class C or F, including requirements of Tables 1A and 2A.

2.1.2 Aggregates

Fine and coarse aggregates shall meet the quality and grading requirements of ASTM C 33/C 33M Class Designations 4M or better.

2.1.3 Admixtures

Admixtures to be used, when required or approved, shall comply with the appropriate specification listed. Retest chemical admixtures that have been in storage at the project site, for longer than 6 months or that have been subjected to freezing, at the expense of the Contractor at the request of the Contracting Officer and will be rejected if test results are not satisfactory.

2.1.3.1 Air-Entraining Admixture

Provide air-entraining admixture that meets the requirements of ASTM C 260.

2.1.3.2 Water-Reducing or Retarding Admixture

Provide water-reducing or retarding admixture meeting the requirements of ASTM C 494/C 494M, Type A, B, or D. High-range water reducing admixture Type F may be used only when approved, approval being contingent upon particular placement requirements as described in the Contractor's Quality Control Plan.

2.1.4 Water

Use fresh, clean, potable water for mixing and curing, free from injurious amounts of oil, acid, salt, or alkali, except that unpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.5 Reinforcing Steel

Provide reinforcing bars conforming to the requirements of ASTM A 615/A 615M, Grade 60. Welded steel wire fabric shall conform to the requirements of ASTM A 185/A 185M. Details of reinforcement not shown shall be in accordance with ACI MCP SET Part 3, Chapters 7 and 12.

2.1.6 Expansion Joint Filler Strips, Premolded

Expansion joint filler strips, premolded shall be sponge rubber conforming to ASTM D 1752, Type I.

2.1.7 Joint Sealants - Field Molded Sealants

Joint sealants - field molded sealants shall conform to ASTM C 920, Type M, Grade NS, Class 25, use NT for vertical joints and Type M, Grade P, Class 25, use T for horizontal joints. Provide polyethylene tape, coated paper, metal foil, or similar type bond breaker materials. The backup material

needs to be compressible, nonshrink, nonreactive with the sealant, and a nonabsorptive material such as extruded butyl or polychloroprene foam rubber. Immediately prior to installation of field-molded sealants, clean the joint of all debris and further cleaned using water, chemical solvents, or other means as recommended by the sealant manufacturer or directed.

2.1.1.8 Formwork

The design and engineering of the formwork as well as its construction, will be the responsibility of the Contractor.

2.1.1.9 Form Coatings

Coat forms, for exposed surfaces, with a nonstaining form oil to be applied shortly before concrete is placed.

2.1.1.10 Vapor Barrier

Provide polyethylene vapor barrier sheeting with a minimum thickness of 6 mils or other equivalent material having a vapor permeance rating not exceeding 0.5 perms as determined in accordance with ASTM E 96/E 96M.

2.1.1.11 Curing Materials

Provide curing materials conforming to the following requirements.

2.1.11.1 Impervious Sheet Materials

Impervious sheet materials, ASTM C 171, type optional, except polyethylene film, if used, shall be white opaque.

2.1.11.2 Membrane-Forming Curing Compound

ASTM C 309, Type 1-D or 2, Class A. The curing compound selected shall be compatible with any subsequent finish materials.

2.2 READY-MIX CONCRETE

- a. Concrete shall be ready-mix concrete with mix design data conforming to ACI MCP SET Part 2
- b. Non-exposed concrete elements: 3000 psi minimum compressive strength.
- c. Direct-exposed concrete elements: 3500 psi minimum compressive strength as determined in 28 calendar days.
- d. Slump: 1 to 4 inch according to ASTM C 143/C 143M and ACI MCP SET Part 1.
- e. Portland Cement conforming to ASTM C 150, Type I or II.
- f. Use one brand and type of cement for formed concrete having exposed-to-view finished surfaces.
- g. Air-Entraining Admixtures conforming to ASTM C 260. Exterior concrete exposed to freezing shall be air-entrained 5 to 6 percent by volume. Nonair-entrained interior concrete shall have a total air content of 2 to 4 percent by volume.

h. Water-reducing admixtures, retarding admixtures, accelerating admixtures, water-reducing and accelerating admixtures, and water-reducing and retarding admixtures shall conform to [ASTM C 494/C 494M](#).

i. [Fly Ash](#) used as an admixture shall conform to [ASTM C 618](#), Class F with 4 percent maximum loss on ignition and 35 percent maximum cement replacement by weight. Submit documentation in compliance with [40 CFR 247](#).

2.3 [STEEL REINFORCEMENT](#)

2.3.1 Deformed Steel Bars

Provide steel bars conforming to [ASTM A 615/A 615M](#), Grade 60 ksi.

2.3.2 Welded Wire Fabric

Provide welded wire fabric conforming to [ASTM A 185/A 185M](#).

2.4 [FORMS](#)

Forms shall be of wood, steel, or other approved material and conform to [ACI MCP SET](#), Parts 2 and 3.

Provide form release conforming to [ACI MCP SET](#), Part 4.

2.5 [ACCESSORIES](#)

2.5.1 [Curing Compound](#)

Provide curing compound conforming to [ASTM C 309](#).

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 General

Prepare construction joints to expose coarse aggregate. The surface shall be clean, damp, and free of laitance. Construct ramps and walkways, as necessary, to allow safe and expeditious access for concrete and workmen. Remove snow, ice, standing or flowing water, loose particles, debris, and foreign matter. Earth foundations shall be satisfactorily compacted. Ensure spare vibrators are available. The entire preparation shall be accepted by the Government prior to placing.

3.1.2 Embedded Items

Secure reinforcement in place after joints, anchors, and other embedded items have been positioned. Arrange internal ties so that when the forms are removed the metal part of the tie is not less than [2 inches](#) from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Embedded items shall be free of oil and other foreign matters such as loose coatings or rust, paint, and scale. The embedding of wood in concrete is permitted only when specifically authorized or directed. All equipment needed to place, consolidate, protect, and cure the concrete shall be at the placement site and in good operating condition.

3.1.3 Formwork Installation

Forms shall be properly aligned, adequately supported, and mortar-tight. Provide smooth form surfaces, free from irregularities, dents, sags, or holes when used for permanently exposed faces. Chamfer all exposed joints and edges , unless otherwise indicated.

3.1.4 Vapor Barrier Installation

Apply vapor barriers over gravel fill. Lap edges not less than 6 inches. Seal all joints with pressure-sensitive adhesive not less than 2 inches wide. Protect the vapor barrier at all times to prevent injury or displacement prior to and during concrete placement.

3.1.5 Production of Concrete

3.1.6 Waterstops

Install and splice waterstops as directed by the manufacturer.

3.2 CONVEYING AND PLACING CONCRETE

Perform conveying and placing concrete in conformance with the following requirements.

3.2.1 General

Concrete placement is not permitted when weather conditions prevent proper placement and consolidation without approval. When concrete is mixed and/or transported by a truck mixer, deliver the concrete to the site of the work completing the discharge within 1-1/2 hours or 45 minutes when the placing temperature is 86 degrees F or greater unless a retarding admixture is used. Convey concrete from the mixer to the forms as rapidly as practicable by methods which prevent segregation or loss of ingredients. Concrete shall be in place and consolidated within 15 minutes after discharge from the mixer. Deposit concrete as close as possible to its final position in the forms and regulate it so that it may be effectively consolidated in horizontal layers 18 inches or less in thickness with a minimum of lateral movement. Carry on the placement at such a rate that the formation of cold joints will be prevented.

3.2.2 Consolidation

Consolidate each layer of concrete by internal vibrating equipment. Systematically accomplish internal vibration by inserting the vibrator through the fresh concrete in the layer below at a uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1.5 times the radius of action of the vibrator and overlay the adjacent, just-vibrated area by approximately 4 inches. Ensure that the vibrator penetrates rapidly to the bottom of the layer and at least 6 inches into the layer below, if such a layer exists. Hold vibrator stationary until the concrete is consolidated and then withdraw it slowly at the rate of about 3 inches per second.

3.2.3 Cold-Weather Requirements

No concrete is to be mixed or placed when the ambient temperature is below 36 degrees F or if the ambient temperature is below 41 degrees F and

falling. Provide suitable covering and other means as approved for maintaining the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing and at a temperature above freezing for the remainder of the curing period. Do not mix salt, chemicals, or other foreign materials with the concrete to prevent freezing. Remove and replace concrete damaged by freezing at the expense of the Contractor.

3.2.4 Hot-Weather Requirements

When the rate of evaporation of surface moisture, as determined by use of Figure 1 of ACI MCP SET Part 2, is expected to exceed 0.2 psf per hour, provisions for windbreaks, shading, fog spraying, or covering with a light-colored material shall be made in advance of placement, and such protective measures taken as quickly as finishing operations will allow.

3.2.5 Lifts in Concrete

Deposit concrete in horizontal layers not to exceed 48 inches in thickness. Carry on placement at a rate that prevents the formation of cold joints. Place slabs in one lift.

3.3 FORM REMOVAL

Do not remove forms before 24 hours after concrete placement, except as otherwise specifically authorized. Do not remove supporting forms and shoring until the concrete has cured for at least 5 days. When conditions require longer curing periods, forms shall remain in place.

3.4 FINISHING

3.4.1 General

Do not finish or repair concrete when either the concrete or the ambient temperature is below 50 degrees F.

3.4.2 Finishing Formed Surfaces

Remove all fins and loose materials, and surface defects including filling of tie holes. Repair all honeycomb areas and other defects. Remove all unsound concrete from areas to be repaired. Surface defects greater than 1/2 inch in diameter and holes left by removal of tie rods in all surfaces not to receive additional concrete shall be reamed or chipped and filled with dry-pack mortar. Brush-coat the prepared area with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening and filling with mortar or concrete. The cement used in mortar or concrete for repairs to all surfaces permanently exposed to view shall be a blend of portland cement and white cement so that the final color when cured is the same as adjacent concrete.

3.4.3 Finishing Unformed Surfaces

Float finish all unformed surfaces, that are not to be covered by additional concrete or backfill, to elevations shown, unless otherwise specified. Surfaces to receive additional concrete or backfill shall be brought to the elevations shown and left as a true and regular surface. Slope exterior surfaces for drainage unless otherwise shown. Carefully make joints with a jointing tool. Finish unformed surfaces to a tolerance delineated in Section 3.4.3.3. Do not perform finishing while there is excess moisture or bleeding water on the surface. No water or cement is to

be added to the surface during finishing.

3.4.3.1 Float Finish

Provide float finished surfaces, screeded and darbied or bullfloated to eliminate the ridges and to fill in the voids left by the screed. In addition, the darby or bullfloat shall fill all surface voids and only slightly embed the coarse aggregate below the surface of the fresh concrete. When the water sheen disappears and the concrete supports a person's weight without deep imprint, complete floating. Floating shall embed large aggregates just beneath the surface, remove slight imperfections, humps, and voids to produce a plane surface, compact the concrete, and consolidate mortar at the surface.

3.4.3.2 Trowel Finish

Apply a trowel finish to slabs. Trowelling shall be done immediately following floating to provide a smooth, even, dense finish free from blemishes including trowel marks. Protect finished surfaces from damage during the construction period.

3.4.3.3 Flat Floor Finishes

In accordance with [ACI MCP SET](#) Part 2, construct in accordance with one of the methods recommended in Table 7.15.3, "Typical Composite FF/FL Values for Various Construction Methods." [ACI MCP SET](#) Part 1 for tolerances tested by [ASTM E 1155M](#) or [ASTM E 1155](#). These requirements are based upon the latest FF/FL method. Floor slabs shall conform to the following ACI F-number requirements unless noted otherwise:

a. Slab on Grade:

Specified Overall Values - FF20/FL15
Minimum Local Values - FF15/FL10

3.4.3.4 [Measurement of Floor Tolerances](#)

Test floor slabs within 24 hours of the final troweling. Provide tests to Contracting Officer within 12 hours after collecting data. Floor flatness inspector shall provide a tolerance report which includes:

- a. Name of Project
- b. Name of Contractor
- c. Date of Data Collection
- d. Date of Tolerance Report
- e. A Key Plan Showing Location of Data Collected
- f. Results Required by [ASTM E 1155M](#) [ASTM E 1155](#)

3.4.3.5 Broom Finish

Apply a broom finish to exterior ramps and walkways. Screed and float the concrete to required finish plane with no coarse aggregate visible. After surface moisture disappears, broom or brush the surface with a broom or fiber bristle brush in a direction transverse to that of the main traffic

or as directed.

3.4.3.6 Expansion and Contraction Joints

Make expansion and contraction joints in accordance with the details shown or as otherwise specified. Provide 1/2 inch thick transverse expansion joints where new work abuts an existing concrete. Provide expansion joints at a maximum spacing of 30 feet on center in sidewalks, unless otherwise indicated. Provide contraction joints at a maximum spacing of 6 linear feet in sidewalks, unless otherwise indicated.

3.5 CURING AND PROTECTION

Beginning immediately after placement, and continuing for at least 7 days, cure and protect all concrete from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage, and exposure to rain or flowing water. Provide all materials and equipment needed for adequate curing and protection at the site of the placement prior to the start of concrete placement. Accomplish moisture preservation of moisture for concrete surfaces not in contact with forms by one of the following methods:

- a. Continuous sprinkling or ponding.
- b. Application of absorptive mats or fabrics kept continuously wet.
- c. Application of sand kept continuously wet.
- d. Application of impervious sheet material conforming to ASTM C 171.
- e. Application of membrane-forming curing compound conforming to ASTM C 309, Type 1-D, on surfaces permanently exposed to view. Accomplish Type 2 on other surfaces in accordance with manufacturer's instructions.

Accomplish the preservation of moisture for concrete surfaces placed against wooden forms by keeping the forms continuously wet for 7 days. If forms are removed prior to end of the required curing period, use other curing methods for the balance of the curing period. Do not perform protection removal if the temperature of the air in contact with the concrete may drop more than 60 degrees F within a 24 hour period.

3.6 TESTS AND INSPECTIONS

3.6.1 General

The individuals who sample and test concrete, as required in this specification, must have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.6.2 Inspection Details and Frequency of Testing

3.6.2.1 Preparations for Placing

Inspect foundation or construction joints, forms, and embedded items in sufficient time prior to each concrete placement by the Contractor to certify that it is ready to receive concrete.

3.6.2.2 Air Content

Check air content at least once during each shift that concrete is placed for each class of concrete required. Obtain samples in accordance with [ASTM C 172](#) and tested in accordance with [ASTM C 231](#).

3.6.2.3 Slump

Check slump once during each shift that concrete is produced for each class of concrete required. Obtain samples in accordance with [ASTM C 172](#) and tested in accordance with [ASTM C 143/C 143M](#).

3.6.2.4 Consolidation and Protection

Ensure that the concrete is properly consolidated, finished, protected, and cured.

3.6.3 Action Required

3.6.3.1 Placing

Do not permit placing to begin until the availability of an adequate number of acceptable vibrators, which are in working order and have competent operators, has been verified. Do not continue placing if any pile is inadequately consolidated.

3.6.3.2 Air Content

Whenever an air content test result is outside the specification limits, adjust the dosage of the air-entrainment admixture prior to delivery of concrete to forms.

3.6.3.3 Slump

Whenever a slump test result is outside the specification limits, adjust the batch weights of water and fine aggregate prior to delivery of concrete to the forms. The adjustments are to be made so that the water-cement ratio does not exceed that specified in the submitted concrete mixture proportion.

3.6.4 Reports

Report the results of all tests and inspections conducted at the project site informally at the end of each shift. Submit written reports weekly. Deliver within 3 days after the end of each weekly reporting period. [See Section 01 45 01 USACE QUALITY CONTROL](#).

3.7 FORM WORK

Form work shall conform to [ACI MCP SET](#) Parts 2 through 5.

3.7.1 Preparation of Form Surfaces

Forms shall be true to line and grade, mortar-tight, and sufficiently rigid to prevent objectionable deformation under load. Form surfaces for permanently exposed faces shall be smooth, free from irregularities, dents, sags, or holes. Chamfer exposed joints and exposed edges. Arrange internal ties so that when the forms are removed, the form ties are not less than [2 inches](#) from concrete surfaces permanently exposed to view or

exposed to water on the finished structure.

3.7.2 Form Coating

Coat forms, for exposed surfaces, with a nonstaining form release coating applied shortly before concrete is placed. Forms for unexposed surfaces may be wetted in lieu of coating immediately before the placing of concrete, except that in freezing weather form release coating shall be used.

3.8 STEEL REINFORCING

3.8.1 General

Reinforcement shall be free from loose, flaky rust and scale, and free from oil, grease, or other coating which might destroy or reduce the reinforcement's bond with the concrete.

3.8.2 Fabrication

Shop fabricate steel reinforcement in accordance with **ACI MCP SET** Parts 2 and 3. Shop details and bending shall be in accordance with **ACI MCP SET** Parts 2 and 3.

3.8.3 Splicing

Perform splices in accordance with **ACI MCP SET** Parts 2 and 3.

3.8.4 Supports

Secure reinforcement in place by the use of metal or concrete supports, spacers, or ties.

3.9 EMBEDDED ITEMS

Before placing concrete, take care to determine that all embedded items are firmly and securely fastened in place. Provide embedded items free of oil and other foreign matter, such as loose coatings of rust, paint and scale. Embedding of wood in concrete is permitted only when specifically authorized or directed.

3.10 **BILL OF LADING**

Bill of Lading for each ready-mix concrete delivery shall be in accordance with **ASTM C 94/C 94M**.

3.11 CHEMICAL-HARDENER TREATMENT

Apply Liquid-Chemical Floor Hardener where indicated, after curing and drying concrete surface. Dilute liquid hardener with water and apply in three coats. First coat shall be one-third strength, second coat one-half strength, and third coat two-thirds strength. Apply each coat evenly and allow it to dry 24 hours before applying next coat. Apply proprietary chemical hardeners in accordance with manufacturer's printed directions.

3.12 FIELD TESTING

- a. Provide samples and test concrete for quality control during placement. Sampling of fresh concrete for testing shall be in

accordance with ASTM C 172.

b. Test concrete for compressive strength at 7 and 28 days for each design mix. Concrete test specimens shall conform to ASTM C 31/C 31M. Perform Compressive strength testing conforming to ASTM C 39/C 39M.

c. Test Slump at the site of discharge for each design mix in accordance with ASTM C 143/C 143M.

d. Test air content for air-entrained concrete in accordance with ASTM C 231. Test concrete using lightweight or test extremely porous aggregates in accordance with ASTM C 173/C 173M.

e. Determine temperature of concrete at time of placement in accordance with ASTM C 1064/C 1064M.

-- End of Section --

SECTION 04 20 00

MASONRY
02/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ACI INTERNATIONAL (ACI)

ACI 530/530.1 (2008; Errata 2008; Errata 2009) Building Code Requirements and Specification for Masonry Structures; Containing Building Code Requirements for Masonry Structures, Specification for Masonry Structures and Companion Commentaries

ACI SP-66 (2004) ACI Detailing Manual

ASTM INTERNATIONAL (ASTM)

ASTM A 153/A 153M (2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A 167 (1999; R 2004) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

ASTM A 615/A 615M (2008b) Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM A 641/A 641M (2009a) Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

ASTM A 82 (2002) Steel Wire, Plain, for Concrete Reinforcement

ASTM B 370 (2003) Standard Specification for Copper Sheet and Strip for Building Construction

ASTM C 1019 (2009) Sampling and Testing Grout

ASTM C 1072 (2006) Measurement of Masonry Flexural Bond Strength

ASTM C 1142 (1995; R 2001) Extended Life Mortar for Unit Masonry

ASTM C 1289 (2008) Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

ASTM C 129	(2006) Nonloadbearing Concrete Masonry Units
ASTM C 1329	(2005) Standard Specification for Mortar Cement
ASTM C 136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 140	(2008a) Sampling and Testing Concrete Masonry Units and Related Units
ASTM C 144	(2004) Standard Specification for Aggregate for Masonry Mortar
ASTM C 150	(2007) Standard Specification for Portland Cement
ASTM C 151/C 151M	(2009) Standard Test Method for Autoclave Expansion of Hydraulic Cement
ASTM C 207	(2006) Standard Specification for Hydrated Lime for Masonry Purposes
ASTM C 270	(2008a) Mortar for Unit Masonry
ASTM C 40	(2004) Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
ASTM C 476	(2008) Grout for Masonry
ASTM C 494/C 494M	(2008a) Chemical Admixtures for Concrete
ASTM C 578	(2008b) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM C 641	(2007) Staining Materials in Lightweight Concrete Aggregates
ASTM C 67	(2008) Sampling and Testing Brick and Structural Clay Tile
ASTM C 744	(2008) Prefaced Concrete and Calcium Silicate Masonry Units
ASTM C 780	(2008a) Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
ASTM C 90	(2008) Loadbearing Concrete Masonry Units
ASTM C 94/C 94M	(2009) Ready-Mixed Concrete
ASTM D 2000	(2008) Rubber Products in Automotive Applications
ASTM D 2240	(2005) Rubber Property - Durometer Hardness

ASTM D 2287 (1996; R 2001) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds

ASTM E 119 (2008a) Standard Test Methods for Fire Tests of Building Construction and Materials

ASTM E 514 (2008) Water Penetration and Leakage Through Masonry

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2006; Errata 2006; Errata 2007; Supplement 2007; Errata 2007) International Building Code

1.2 UNDERWRITERS LABORATORIES

The UL Design Numbers which apply to this project are shown on Drawing F-001. All work shall comply with the UL Design Numbers which are indicated on this drawing. Each UL Design indicates the manufacturers/materials which have been tested and approved as components of the UL Design. All manufacturers/materials for use on this project shall have been tested and approved for use as components of the UL Designs. The only acceptable manufacturers/materials are those which have been tested and approved for use as components of the UL Design. Manufacturers/materials which are not listed as components with the UL Designs are not acceptable and will be rejected for use on this project.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Structural Masonry; G, D

Drawings including plans, elevations, and details of wall reinforcement; details of reinforcing bars at corners and wall intersections; offsets; tops, bottoms, and ends of walls; control and expansion joints; lintels; and wall openings. Bar splice locations shall be shown. Bent bars shall be identified on a bending diagram and shall be referenced and located on the drawings. Wall dimensions, bar clearances, and wall openings greater than one masonry unit in area shall be shown. No approval will be given to the shop drawings until the Contractor certifies that all openings, including those for mechanical and electrical service, are shown. If, during construction, additional masonry openings are required, the approved shop drawings shall be resubmitted with the additional openings shown along with the proposed changes. Location of these additional openings shall be clearly highlighted. The minimum scale for wall elevations shall be 1/4 inch per foot. Reinforcement bending details shall conform to the requirements of ACI SP-66.

SD-03 Product Data

Anchors, Ties and Bar Positioners
Joint Reinforcement
Insulation
Flashing
PREFORMED EXPANSION-JOINT MATERIALS
Water-Repellant Admixture

Manufacturer's descriptive data.

Cold Weather Installation

Cold weather construction procedures.

Local/Regional Materials

Documentation indicating distance between manufacturing facility and the project site, and distance of raw material origin from the project site.

Recycled Content

Manufacturer's descriptive data. Documentation indicating percentage of post-industrial and post-consumer recycled content SD-04 Samples of product.

Concrete Masonry Units (CMU)

Color samples of three stretcher units and one unit for each type of special shape. Units shall show the full range of color and texture. Submit sample of colored mortar with applicable masonry unit.

Anchors, Ties, and Bar Positioners

Two of each type used.

Expansion-Joint Materials

One piece of each type used.

Joint Reinforcement

One piece of each type used, including corner and wall intersection pieces, showing at least two cross wires.

Insulation

One piece of board type insulation, not less than 16 by 24 inches in size, containing the label indicating the rated permeance and R-values.

Weep Hole Ventilators; D

Submit color samples for initial selection, having a minimum of 4 color options.

SD-05 Design Data

Pre-mixed Mortar; G, RO
Unit Strength Method; G, RO

Pre-mixed mortar composition. Calculations and certifications of masonry unit and mortar strength.

SD-06 Test Reports

Efflorescence Test
Field Testing of Mortar
Field Testing of Grout
Prism tests
Fire-rated CMU

Test reports from an approved independent laboratory. Test reports on a previously tested material shall be certified as the same as that proposed for use in this project.

Special Inspection; G, D

Copies of masonry inspector reports.

SD-07 Certificates

Concrete Masonry Units (CMU)
Control Joint Keys
Anchors, Ties, and Bar Positioners
Expansion-Joint Materials
Joint Reinforcement
Reinforcing Steel Bars and Rods
Mortar Coloring
Insulation
Admixtures for Masonry Mortar
Admixtures for Grout

Certificates of compliance stating that the materials meet the specified requirements.

Insulation

Certificate attesting that the polyurethane or polyisocyanurate insulation furnished for the project contains recovered material, and showing an estimated percent of such recovered material.

1.4 DELIVERY, HANDLING, AND STORAGE

Materials shall be delivered, handled, stored, and protected to avoid chipping, breakage, and contact with soil or contaminating material.

1.4.1 Masonry Units

Concrete masonry units shall be covered or protected from inclement weather. Store Type II, concrete masonry units at the site for a minimum of 28 days for air cured units, 10 days for atmospheric steam or water cured units, and 3 days for units cured with steam at a pressure of 120 to 150 psi and at a temperature of 350 to 365 degrees F for at least 5 hours. Protect moisture controlled units (Type I) from rain and ground water.

Prefabricated lintels shall be marked on top sides to show either the lintel schedule number or the number and size of top and bottom bars.

1.4.2 Reinforcement, Anchors, and Ties

Steel reinforcing bars, coated anchors, ties, and joint reinforcement shall be stored above the ground. Steel reinforcing bars and uncoated ties shall be free of loose mill scale and rust.

1.4.3 Cementitious Materials, Sand and Aggregates

Cementitious and other packaged materials shall be delivered in unopened containers, plainly marked and labeled with manufacturers' names and brands. Cementitious material shall be stored in dry, weathertight enclosures or be completely covered. Cement shall be handled in a manner that will prevent the inclusion of foreign materials and damage by water or dampness. Sand and aggregates shall be stored in a manner to prevent contamination or segregation.

1.5 STRUCTURAL MASONRY

1.5.1 Special Inspection

A qualified masonry inspector approved by the Contracting Officer shall perform inspection of the masonry work. Minimum qualifications for the masonry inspector shall be 5 years of reinforced masonry inspection experience or acceptance by a State, municipality, or other governmental body having a program of examining and certifying inspectors for reinforced masonry construction. The masonry inspector shall be present during preparation of masonry prisms, sampling and placing of masonry units, placement of reinforcement (including placement of dowels in footings and foundation walls), inspection of grout space, immediately prior to closing of cleanouts, and during grouting operations. The masonry inspector shall assure Contractor compliance with the drawings and specifications. The masonry inspector shall keep a complete record of all inspections and shall submit daily written reports to the Quality Control Supervisory Representative reporting the quality of masonry construction.

1.5.2 Unit Strength Method

Compute compressive strength of masonry system "Unit Strength Method," [ACI 530/530.1](#). Submit calculations and certifications of unit and mortar strength.

1.5.3 Seismic Requirement

In addition to design requirements of [ICC IBC](#), the Contractor shall provide additional seismic reinforcement as detailed on the drawings. The total minimum reinforcing percentage for structural walls shall be 0.20 percent and non-structural walls shall be 0.15 percent. The maximum spacing of reinforcing bars shall be as indicated on the drawings.

<u>Wall Type</u>	<u>Vertical</u>	<u>Horizontal</u>
Structural	24 inches	48 inches
Non-structural	48 inches	80 inches

Bond beams are required as indicated on the drawings.

1.6 QUALITY ASSURANCE

1.6.1 Appearance

Masonry Units shall be manufactured at one time and from the same batch. Blend all units to produce a uniform appearance when installed. An observable "banding" or "layering" of colors or textures caused by improperly mixed brick is unacceptable.

1.6.2 Testing

Masonry strength shall be determined in accordance with **ACI 530/530.1**. Provide Level 2 Quality Assurance. In addition, provide f'm prism test for every of masonry installation. The cost of testing shall be paid by the Contractor.

1.6.3 Spare Vibrator

Maintain at least one spare vibrator on site at all times.

1.6.4 Bracing and Scaffolding

Provide bracing and scaffolding necessary for masonry work. Design bracing to resist wind pressure as required by local code.

1.7 SUSTAINABLE DESIGN REQUIREMENTS

1.7.1 Local/Regional Materials

See Section **01 33 29** LEED(tm) DOCUMENTATION for cumulative total local material requirements. Masonry materials may be locally available.

1.7.2 Recycled Content

See Section **01 33 29** LEED(tm) DOCUMENTATION for cumulative total recycled material requirements. Masonry units and reinforcement made with recycled content may be used to meet cumulative project totals.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

The source of materials which will affect the appearance of the finished work shall not be changed after the work has started except with Contracting Officer's approval.

2.2 CONCRETE MASONRY UNITS (CMU)

Cement shall have a low alkali content and be of one brand. Units shall be of modular dimensions and air, water, or steam cured. Exposed surfaces of units shall be decorative where indicated. Other units shall be smooth and of uniform texture. Exterior concrete masonry units shall have water-repellant admixture added during manufacture. Bottom ash is not permitted for use in concrete masonry units that will have any surface exposed to view, whether coated or uncoated.

- a. Hollow Load-Bearing Units: **ASTM C 90**, Type I or II, made with lightweight aggregate. Provide load-bearing units for exterior

walls, foundation walls, load-bearing walls, and shear walls.

- b. Hollow Non-Load-Bearing Units: [ASTM C 129](#), Type I or II, made with lightweight aggregate. Load-bearing units may be provided in lieu of non-load-bearing units.
- c. Solid Load-Bearing Units: [ASTM C 90](#), Type I or II, lightweight units. Provide solid units as indicated.

2.2.1 Aggregates

Lightweight aggregates and blends of lightweight and heavier aggregates in proportions used in producing the units, shall comply with the following requirements when tested for stain-producing iron compounds in accordance with [ASTM C 641](#): by visual classification method, the iron stain deposited on the filter paper shall not exceed the "light stain" classification.

2.2.1.1 Limitations on Aggregates

For concrete masonry units containing recycled material or post-industrial waste, provide units free of impurities that will cause rusting, staining or popouts and with a record of successful in-service performance in conditions similar to those expected at Project site.

- 1. Ferrous material shall be removed by magnetic separation.
- 2. Aggregates shall contain no combustible materials.
- 3. Aggregates shall be graded and supplied in consist graduations from batch to batch.
- 4. Material shall be tested according to the following:
 - a. [ASTM C 40](#): Organic Impurities in Fine Aggregates for Concrete.
 - b. [ASTM C 136](#): Sieve Analysis of Fine and Coarse Aggregate.
 - c. [ASTM C 641](#): Staining Materials in Lightweight Concrete Aggregates.
 - d. [ASTM C 151/C 151M](#): Autoclave Expansion of Hydraulic Cement (for popouts.)

2.2.2 Kinds and Shapes

Units shall be modular in size and shall include closer, jamb, header, lintel, and bond beam units and special shapes and sizes to complete the work as indicated. In exposed interior masonry surfaces, units having a bullnose shall be used for vertical external corners except at door, window, and louver jambs. Radius of the bullnose shall be [1 inch](#). Units used in exposed masonry surfaces in any one building shall have a uniform fine to medium texture and a uniform color.

2.2.2.1 Architectural Units

Units shall have patterned face shell. Face shell pattern shall be split faced. Units shall be integrally colored during manufacture. Color shall be as indicated in Color Legend on drawings. Patterned face shell shall be properly aligned in the completed wall.

2.2.3 Fire-Rated CMU

Concrete masonry units used in fire-rated construction shown on the drawings shall be of minimum equivalent thickness for the fire rating

indicated and the corresponding type of aggregates indicated in TABLE I. Units containing more than one of the aggregates listed in TABLE I will be rated on the aggregate requiring the greater minimum equivalent thickness to produce the required fire rating. Construction shall conform to [ASTM E 119](#).

TABLE I
FIRE-RATED CONCRETE MASONRY UNITS

See note (a) below

Aggregate Type	Minimum equivalent thickness inches for fire rating of:		
	4 hours	3 hours	2 hours
Pumice	4.7	4.0	3.0
Expanded slag	5.0	4.2	3.3
Expanded clay, shale, or slate	5.7	4.8	3.7
Limestone, scoria, cinders or unexpanded slag	5.9	5.0	4.0
Calcareous gravel	6.2	5.3	4.2
Siliceous gravel	6.7	5.7	4.5

- (a) Minimum equivalent thickness shall equal net volume as determined in conformance with [ASTM C 140](#) divided by the product of the actual length and height of the face shell of the unit in inches. Where walls are to receive plaster or be faced with brick, or otherwise form an assembly; the thickness of plaster or brick or other material in the assembly will be included in determining the equivalent thickness.

2.3 MORTAR FOR STRUCTURAL MASONRY

[ASTM C 270](#), Type M for foundation walls below grade and Type S for exterior walls. Strength (f'm) as indicated. Test in accordance with [ASTM C 780](#). Do not use admixtures containing chlorides. When structural reinforcement is incorporated, maximum air-content shall be 12 percent in cement-lime mortar.

2.4 MASONRY MORTAR

Type M mortar shall conform to [ASTM C 270](#) and shall be used for foundation walls. Mortar Type S shall conform to the proportion specification of [ASTM C 270](#) except Type S cement-lime mortar proportions shall be 1 part cement, 1/2 part lime and 4-1/2 parts aggregate. Type S mortar shall be used for non-load-bearing, non-shear-wall interior masonry work; except where higher compressive strength is indicated on structural drawings. Pointing mortar in showers and kitchens shall contain ammonium stearate, or aluminum tri-stearate, or calcium stearate in an amount equal to 3 percent by weight of cement used. Cement shall have a low alkali content and be of

one brand. Aggregates shall be from one source.

2.4.1 Admixtures for Masonry Mortar

In cold weather, a non-chloride based accelerating admixture may be used subject to approval. Accelerating admixture shall be non-corrosive, shall contain less than 0.2 percent chlorides, and shall conform to [ASTM C 494/C 494M](#), Type C.

2.4.2 Colored Mortar

[Mortar coloring](#) shall be added to the mortar used for exposed masonry surfaces to produce a uniform color matching the color indicated in the Color Legend on the drawings. Quantity of pigment to cementitious content of cement-lime mix shall not exceed 10 percent by weight, carbon black no more than 2 percent by weight. Mortar coloring shall be chemically inert, of finely ground limeproof pigment, and furnished in accurately pre-measured and packaged units that can be added to a measured amount of cement. Compressive strength of colored mortar shall equal to that of Type S mortar..

2.4.3 Hydrated Lime and Alternates

Hydrated lime shall conform to [ASTM C 207](#), Type S. Lime alternates which have a current ICBO, ICBO UBC, Evaluation Report number whose findings state it may be used as an alternate to lime for Type M, and S mortars will be deemed acceptable provided the user follows the manufacturer's proportions and mixing instructions as set forth in ICBO report.

2.4.4 Cement

Portland cement shall conform to [ASTM C 150](#), Type I, II, or III. Containers shall bear complete instructions for proportioning and mixing to obtain the required types of mortar.

Masonry Cement: Not permitted.

Mortar Cement: [ASTM C 1329](#)

2.4.5 Pre-Mixed Mortar

Pre-mixed mortar shall conform to [ASTM C 1142](#), Type RS.

2.4.6 Sand and Water

Sand shall conform to [ASTM C 144](#). Water shall be clean, potable, and free from substances which could adversely affect the mortar.

2.5 WATER-REPELLANT ADMIXTURE

Polymeric type formulated to reduce porosity and water transmission. Construct panels of masonry units conforming to [ASTM C 744](#) and mortar which contain the water-repellant admixture. When tested in accordance with [ASTM C 1072](#), such panels shall have flexural strength not less than that specified or indicated. When tested in accordance with [ASTM E 514](#), panels shall exhibit no water visible on back of test panel and no leaks through the panel after 24 hours, and not more than 25 percent of wall area shall be damp after 72 hours.

2.6 GROUT AND READY-MIXED GROUT

Grout shall conform to [ASTM C 476](#), coarse. Cement used in grout shall have a low alkali content. Grout slump shall be between [8 and 11 inches](#). Minimum grout strength shall be [2000 psi](#) in 28 days, as tested by [ASTM C 1019](#). Grout shall be used subject to the limitations of Table III. Proportions shall not be changed and materials with different physical or chemical characteristics shall not be used in grout for the work unless additional evidence is furnished that the grout meets the specified requirements. Ready-Mixed grout shall conform to [ASTM C 94/C 94M](#).

2.6.1 Admixtures for Grout

In cold weather, a non-chloride based accelerating admixture may be used subject to approval; accelerating admixture shall be non-corrosive, shall contain less than 0.2 percent chlorides, and shall conform to [ASTM C 494/C 494M](#), Type C. In general, air-entrainment, anti-freeze or chloride admixtures shall not be used except as approved by the Contracting Officer.

2.6.2 Grout Barriers

Grout barriers for vertical cores shall consist of fine mesh wire, fiberglass, or expanded metal.

2.7 ANCHORS, TIES, AND BAR POSITIONERS

Anchors and ties shall be fabricated without drips or crimps and shall be zinc-coated in accordance with [ASTM A 153/A 153M](#), Class B-2. Steel wire used for anchors and ties shall be fabricated from steel wire conforming to [ASTM A 82](#). Wire ties or anchors in exterior walls shall conform to [ASTM A 641/A 641M](#). Joint reinforcement in interior walls, and in exterior or interior walls exposed to moist environment shall conform to [ASTM A 641/A 641M](#); coordinate with paragraph JOINT REINFORCEMENT below. Anchors and ties shall be sized to provide a minimum of [5/8 inch](#) mortar cover from either face.

2.7.1 Wire Mesh Ties

Wire mesh for tying [4 inch](#) thick concrete masonry unit partitions to other intersecting masonry partitions shall be [1/2 inch](#) mesh of minimum [16 gauge](#) steel wire. Minimum lengths shall be not less than [12 inches](#).

2.7.2 Wall Ties

Wall ties shall be rectangular-shaped or Z-shaped fabricated of [3/16 inch](#) diameter zinc-coated steel wire. Rectangular wall ties shall be no less than [4 inches](#) wide. Adjustable type wall ties shall consist of two essentially U-shaped elements fabricated of [3/16 inch](#) diameter zinc-coated steel wire. Adjustable ties shall be of the double pintle to eye type and shall allow a maximum of [1/2 inch](#) eccentricity between each element of the tie. Play between pintle and eye opening shall be not more than [1/16 inch](#). The pintle and eye elements shall be formed so that both can be in the same plane.

2.7.3 Adjustable Anchors

Adjustable anchors shall be [3/16 inch](#) diameter steel wire, triangular-shaped. Anchors attached to steel shall be [5/16 inch](#) diameter

steel bars placed to provide 1/16 inch play between flexible anchors and structural steel members. Spacers shall be welded to rods and columns. Equivalent welded-on steel anchor rods or shapes standard with the flexible-anchor manufacturer may be furnished when approved. Welds shall be cleaned and given one coat of zinc-rich touch up paint.

2.7.4 Bar Positioners

Bar positioners, used to prevent displacement of reinforcing bars during the course of construction, shall be factory fabricated from 9 gauge steel wire or equivalent, and coated with a hot-dip galvanized finish. Not more than one wire shall cross the cell.

2.8 JOINT REINFORCEMENT

Joint reinforcement shall be factory fabricated from steel wire conforming to ASTM A 82, welded construction. Tack welding will not be acceptable in reinforcement used for wall ties. Wire shall have zinc coating conforming to ASTM A 153/A 153M, Class B-2. All wires shall be a minimum of 19 mils. Reinforcement shall be ladder type design, having one longitudinal wire in the mortar bed of each face shell for hollow units and one wire for solid units. Joint reinforcement shall be placed a minimum of 5/8 inch cover from either face. The distance between crosswires shall not exceed 16 inches. Joint reinforcement for straight runs shall be furnished in flat sections not less than 10 feet long. Joint reinforcement shall be provided with factory formed corners and intersections. If approved for use, joint reinforcement may be furnished with adjustable wall tie features.

2.9 REINFORCING STEEL BARS AND RODS

Reinforcing steel bars and rods shall conform to ASTM A 615/A 615M, Grade 60.

2.10 CONTROL JOINT KEYS

Control joint keys shall be a factory fabricated solid section of natural or synthetic rubber (or combination thereof) conforming to ASTM D 2000 or polyvinyl chloride conforming to ASTM D 2287. The material shall be resistant to oils and solvents. The control joint key shall be provided with a solid shear section not less than 5/8 inch thick and 3/8 inch thick flanges, with a tolerance of plus or minus 1/16 inch. The control joint key shall fit neatly, but without forcing, in masonry unit jamb sash grooves. The control joint key shall be flexible at a temperature of minus 30 degrees F after five hours exposure, and shall have a durometer hardness of not less than 70 when tested in accordance with ASTM D 2240.

2.11 INSULATION

2.11.1 Rigid Board-Type Insulation

Rigid board-type insulation shall be extruded polystyrene, polyurethane, or polyisocyanurate. Polystyrene shall conform to ASTM C 578. Polyisocyanurate shall conform to ASTM C 1289, Type I, Class 1 or 2, faced with aluminum foil on both sides of the foam. The insulation shall be a standard product and shall be marked with not less than the manufacturer's trademark or name, the specification number, the permeance and R-values.

2.11.1.1 Insulation Thickness and Air Space

The cavity space shall allow for the insulation thickness indicated, and a minimum air space of 1 inch.

2.11.1.2 Aged R-Value

The insulation shall provide a minimum aged R-value indicated on the drawings for the overall thickness. The aged R-value shall be determined at 75 degrees F in accordance with the appropriate referenced specification. The stated R-value of the insulation shall be certified by an independent testing laboratory or certified by an independent Registered Professional Engineer if tests are conducted in the manufacturer's laboratory.

2.11.1.3 Recovered Material

Contractor shall comply with EPA requirements in accordance with Section 01 62 35 RECYCLED / RECOVERD MATERIALS. The polyurethane or polyisocyanurate foam shall have a minimum recovered material content of nine (9) percent by weight of the core material.

2.11.2 Insulation Adhesive

Insulation adhesive shall be specifically prepared to adhere the insulation to the masonry and, where applicable, to the thru-wall flashing. The adhesive shall not deleteriously affect the insulation, and shall have a record of satisfactory and proven performance for the conditions under which to be used.

2.12 EXPANSION-JOINT MATERIALS

Backer rod and sealant shall be adequate to accommodate joint compression equal to 50 percent of the width of the joint. The backer rod shall be compressible rod stock of polyethylene foam, polyurethane foam, butyl rubber foam, or other flexible, nonabsorptive material as recommended by the sealant manufacturer. Sealant shall conform to Section 07 92 00 JOINT SEALANTS.

2.13 PREFORMED EXPANSION-JOINT MATERIALS

Provide EMSEAL ColorSeal preformed expansion joint material in order to accomodate irregularity of joints with watertight seal for full range of movement indicated. Install in accordance with manufacturers written instructions. Include on-site field representation services of manufacturer

2.14 FLASHING

Flashing shall be as specified in Section 07 60 00 FLASHING AND SHEET METAL. Provide one of the following types except that flashing indicated to terminate in reglets shall be metal or coated-metal flashing and except that the material shall be one which is not adversely affected by dampproofing material.

- a. Coated-Copper Flashing: 7 ounce, electrolytic copper sheet, uniformly coated on both sides with acidproof, alkaliproof, elastic bituminous compound. Factory apply coating to a weight of not less than 6 ounces/square foot (approximately 3 ounces/square foot on each side).

- b. Copper or Stainless Steel Flashing: Copper, [ASTM B 370](#), minimum [16 ounce](#) weight; stainless steel, [ASTM A 167](#), Type 301, 302, 304, or 316, [0.015 inch](#) thick, No. 2D finish. Provide with factory-fabricated deformations that mechanically bond flashing against horizontal movement in all directions. Deformations shall consist of dimples, diagonal corrugations, or a combination of dimples and transverse corrugations.
- c. Flexible Flashing, where indicated: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch, that shall be impervious to moisture, flexible, not affected by caustic alkalis, and shall maintain consistency when exposed to the range of temperatures for in-service conditions.

2.15 [WEEP HOLE VENTILATORS](#)

Weephole ventilators shall be prefabricated PVC or nylon blocking sized to the full height of head joints, with color similar to mortar joints. Provide inserts with openings designed to allow the passage of moisture from cavities and to prevent the entrance of insects. Ventilators shall be sized to match modular construction with a standard [3/8 inch](#) mortar joint.

2.16 MORTAR DROPPING COLLECTION MATERIAL

Recycled polyester or high density polyethylene material of a dovetail shape, or other design approved by Architect, to promote air flow, of thickness to match cavity size indicated.

PART 3 EXECUTION

3.1 PREPARATION

Prior to start of work, masonry inspector shall verify the applicable conditions as set forth in [ACI 530/530.1](#), inspection. The Contracting Officer will serve as inspector or will select a masonry inspector.

3.1.1 Hot Weather Installation

The following precautions shall be taken if masonry is erected when the ambient air temperature is more than [99 degrees F](#) in the shade and the relative humidity is less than 50 percent or the ambient air temperature exceeds [90 degrees F](#) and the wind velocity is more than [8 mph](#). All masonry materials shall be shaded from direct sunlight; mortar beds shall be spread no more than [4 feet](#) ahead of masonry; masonry units shall be set within one minute of spreading mortar; and after erection, masonry shall be protected from direct exposure to wind and sun for 48 hours.

3.1.2 Cold Weather Installation

Before erecting masonry when ambient temperature or mean daily air temperature falls below [40 degrees F](#) or temperature of masonry units is below [40 degrees F](#), a written statement of proposed cold weather construction procedures shall be submitted for approval. The following precautions shall be taken during all cold weather erection.

3.1.2.1 Protection

Ice or snow formed on the masonry bed shall be thawed by the application of heat. Heat shall be applied carefully until the top surface of the masonry is dry to the touch. Sections of masonry deemed frozen and damaged shall be removed before continuing construction of those sections.

- a. Air Temperature 40 to 32 Degrees F. Sand or mixing water shall be heated to produce mortar temperatures between 40 and 120 degrees F.
- b. Air Temperature 32 to 25 Degrees F. Sand and mixing water shall be heated to produce mortar temperatures between 40 and 120 degrees F. Temperature of mortar on boards shall be maintained above freezing.
- c. Air Temperature 25 to 20 Degrees F. Sand and mixing water shall be heated to provide mortar temperatures between 40 and 120 degrees F. Temperature of mortar on boards shall be maintained above freezing. Sources of heat shall be used on both sides of walls under construction. Windbreaks shall be employed when wind is in excess of 15 mph.
- d. Air Temperature 20 Degrees F and below. Sand and mixing water shall be heated to provide mortar temperatures between 40 and 120 degrees F. Enclosure and auxiliary heat shall be provided to maintain air temperature above 32 degrees F. Temperature of units when laid shall not be less than 20 degrees F.

3.1.2.2 Completed Masonry and Masonry Not Being Worked On

- a. Mean daily air temperature 40 to 32 degrees F. Masonry shall be protected from rain or snow for 24 hours by covering with weather-resistive membrane.
- b. Mean daily air temperature 32 to 25 degrees F. Masonry shall be completely covered with weather-resistant membrane for 24 hours.
- c. Mean Daily Air Temperature 25 to 20 degrees F. Masonry shall be completely covered with insulating blankets or equally protected for 24 hours.
- d. Mean Daily Temperature 20 degrees F and Below. Masonry temperature shall be maintained above 32 degrees F for 24 hours by enclosure and supplementary heat, by electric heating blankets, infrared heat lamps, or other approved methods.

3.1.3 Stains

Protect exposed surfaces from mortar and other stains. When mortar joints are tooled, remove mortar from exposed surfaces with fiber brushes and wooden paddles. Protect base of walls from splash stains by covering adjacent ground with sand, sawdust, or polyethylene.

3.1.4 Loads

Do not apply uniform loads for at least 12 hours or concentrated loads for at least 72 hours after masonry is constructed. Provide temporary bracing as required.

3.1.5 Surfaces

Surfaces on which masonry is to be placed shall be cleaned of laitance, dust, dirt, oil, organic matter, or other foreign materials and shall be slightly roughened to provide a surface texture with a depth of at least $\frac{1}{8}$ inch. Sandblasting shall be used, if necessary, to remove laitance from pores and to expose the aggregate.

3.2 LAYING MASONRY UNITS

Coordinate masonry work with the work of other trades to accommodate built-in items and to avoid cutting and patching. Masonry units shall be laid in running or the indicated bond pattern. Facing courses shall be level with back-up courses, unless the use of adjustable ties has been approved in which case the tolerances shall be plus or minus $\frac{1}{2}$ inch. Each unit shall be adjusted to its final position while mortar is still soft and plastic. Units that have been disturbed after the mortar has stiffened shall be removed, cleaned, and relaid with fresh mortar. Air spaces, cavities, chases, expansion joints, and spaces to be grouted shall be kept free from mortar and other debris. Units used in exposed masonry surfaces shall be selected from those having the least amount of chipped edges or other imperfections detracting from the appearance of the finished work. Vertical joints shall be kept plumb. Units being laid and surfaces to receive units shall be free of water film and frost. Solid units shall be laid in a nonfurrowed full bed of mortar. Mortar for veneer wythes shall be beveled and sloped toward the center of the wythe from the cavity side. Units shall be shoved into place so that the vertical joints are tight. Vertical joints of brick and the vertical face shells of concrete masonry units, except where indicated at control, expansion, and isolation joints, shall be completely filled with mortar. Mortar will be permitted to protrude up to $\frac{1}{2}$ inch into the space or cells to be grouted. Means shall be provided to prevent mortar from dropping into the space below. In double wythe construction, the inner wythe may be brought up not more than 16 inches ahead of the outer wythe. Collar joints shall be filled with mortar or grout during the laying of the facing wythe, and filling shall not lag the laying of the facing wythe by more than 8 inches.

3.2.1 Forms and Shores

Provide bracing and scaffolding as required. Design bracing to resist wind pressure as required by local codes. Forms and shores shall be sufficiently rigid to prevent deflections which may result in cracking or other damage to supported masonry and sufficiently tight to prevent leakage of mortar and grout. Supporting forms and shores shall not be removed in less than 10 days.

3.2.2 Reinforced Concrete Masonry Units Walls

Where vertical reinforcement occurs, fill cores solid with grout. Lay units in such a manner as to preserve the unobstructed vertical continuity of cores to be filled. Embed the adjacent webs in mortar to prevent leakage of grout. Remove mortar fins protruding from joints before placing grout. Minimum clear dimensions of vertical cores shall be 2 by 3 inches. Position reinforcing accurately as indicated before placing grout. As masonry work progresses, secure vertical reinforcing in place at vertical intervals not to exceed 160 bar diameters. Use puddling rod or vibrator to consolidate the grout. Minimum clear distance between masonry and vertical reinforcement shall be not less than $\frac{1}{2}$ inch. Unless indicated or specified otherwise, form splices by lapping bars not less than 40 bar

diameters and wire tying them together.

3.2.3 Concrete Masonry Units

Units in piers, pilasters, columns, starting courses on footings, solid foundation walls, lintels, and beams, and where cells are to be filled with grout shall be full bedded in mortar under both face shells and webs. Other units shall be full bedded under both face shells. Head joints shall be filled solidly with mortar for a distance in from the face of the unit not less than the thickness of the face shell. Foundation walls below grade shall be grouted solid. Jamb units shall be of the shapes and sizes to conform with wall units. Solid units may be incorporated in the masonry work where necessary to fill out at corners, gable slopes, and elsewhere as approved. Double walls shall be stiffened at wall-mounted plumbing fixtures by use of strap anchors, two above each fixture and two below each fixture, located to avoid pipe runs, and extending from center to center of the double wall. Walls and partitions shall be adequately reinforced for support of wall-hung plumbing fixtures when chair carriers are not specified.

3.2.4 Tolerances

Masonry shall be laid plumb, true to line, with courses level. Bond pattern shall be kept plumb throughout. Corners shall be square unless noted otherwise. Except for walls constructed of prefaced concrete masonry units, masonry shall be laid within the following tolerances (plus or minus unless otherwise noted):

TABLE II

TOLERANCES

Variation from the plumb in the lines
and surfaces of columns, walls and arises

In adjacent masonry units	1/8 inch
In 10 feet	1/4 inch
In 20 feet	3/8 inch
In 40 feet or more	1/2 inch

Variations from the plumb for external corners,
expansion joints, and other conspicuous lines

In 20 feet	1/4 inch
In 40 feet or more	1/2 inch

Variations from the level for exposed lintels,
sills, parapets, horizontal grooves, and other
conspicuous lines

In 20 feet	1/4 inch
In 40 feet or more	1/2 inch

Variation from level for bed joints and top
surfaces of bearing walls

TOLERANCES

In 10 feet	1/4 inch
In 40 feet or more	1/2 inch

Variations from horizontal lines

In 10 feet	1/4 inch
In 20 feet	3/8 inch
In 40 feet or more	1/2 inch

Variations in cross sectional dimensions of
columns and in thickness of walls

Minus	1/4 inch
Plus	1/2 inch

3.2.5 Cutting and Fitting

Full units of the proper size shall be used wherever possible, in lieu of cut units. Cutting and fitting, including that required to accommodate the work of others, shall be done by masonry mechanics using power masonry saws. Concrete masonry units may be wet or dry cut. Wet cut units, before being placed in the work, shall be dried to the same surface-dry appearance as uncut units being laid in the wall. Cut edges shall be clean, true and sharp. Openings in the masonry shall be made carefully so that wall plates, cover plates or escutcheons required by the installation will completely conceal the openings and will have bottoms parallel with the masonry bed joints. Reinforced masonry lintels shall be provided above openings over 12 inches wide for pipes, ducts, cable trays, and other wall penetrations, unless steel sleeves are used.

3.2.6 Jointing

Joints shall be tooled when the mortar is thumbprint hard. Horizontal joints shall be tooled last. Joints shall be brushed to remove all loose and excess mortar. Mortar joints shall be finished as follows:

3.2.6.1 Flush Joints

Joints in concealed masonry surfaces (such as at stucco) and joints at electrical outlet boxes in wet areas shall be flush cut. Flush cut joints shall be made by cutting off the mortar flush with the face of the wall. Joints in unparged masonry walls below grade shall be pointed tight. Flush joints for architectural units, such as fluted units, shall completely fill both the head and bed joints.

3.2.6.2 Tooled Joints

Joints in exposed exterior and interior masonry surfaces shall be tooled slightly concave. Joints shall be tooled with a jointer slightly larger than the joint width so that complete contact is made along the edges of the unit. Tooling shall be performed so that the mortar is compressed and the joint surface is sealed. Jointer of sufficient length shall be used to obtain a straight and true mortar joint.

3.2.7 Joint Widths

Joint widths shall be as follows:

3.2.7.1 Concrete Masonry Units

Concrete masonry units shall have $3/8$ inch joints, except for prefaced concrete masonry units.

3.2.8 Embedded Items

Spaces around built-in items shall be filled with mortar. Openings around flush-mount electrical outlet boxes in wet locations shall be pointed with mortar. Anchors, ties, wall plugs, accessories, flashing, pipe sleeves and other items required to be built-in shall be embedded as the masonry work progresses. Anchors, ties and joint reinforcement shall be fully embedded in the mortar. Cells receiving anchor bolts and cells of the first course below bearing plates shall be filled with grout.

3.2.9 Unfinished Work

Unfinished work shall be stepped back for joining with new work. Toothing may be resorted to only when specifically approved. Loose mortar shall be removed and the exposed joints shall be thoroughly cleaned before laying new work.

3.2.10 Masonry Wall Intersections

Each course shall be masonry bonded at corners and elsewhere as shown. Masonry walls shall be anchored or tied together at corners and intersections with bond beam reinforcement and prefabricated corner or tee pieces of joint reinforcement as shown.

3.2.11 Partitions

Partitions shall be continuous from floor to underside of floor or roof deck where shown. Openings in firewalls around joists or other structural members shall be filled as indicated or approved. Where suspended ceilings on both sides of partitions are indicated, the partitions other than those shown to be continuous may be stopped approximately 4 inches above the ceiling level. An isolation joint shall be placed in the intersection between partitions and structural or exterior walls as shown. Interior partitions having 4 inch nominal thick units shall be tied to intersecting partitions of 4 inch units, 5 inches into partitions of 6 inch units, and 7 inches into partitions of 8 inch or thicker units. Cells within vertical plane of ties shall be filled solid with grout for full height of partition or solid masonry units may be used. Interior partitions having masonry walls over 4 inches thick shall be tied together with joint reinforcement. Partitions containing joint reinforcement shall be provided with prefabricated pieces at corners and intersections or partitions.

3.3 ANCHORED VENEER CONSTRUCTION

The inner and outer wythes shall be completely separated by a continuous airspace as shown on the drawings. Both the inner and the outer wythes shall be laid up together except when adjustable joint reinforcement assemblies are approved for use. When both wythes are not brought up together, through-wall flashings shall be protected from damage until they are fully enclosed in the wall. The airspace between the wythes shall be

kept clear and free of mortar droppings by temporary wood strips laid on the wall ties and carefully lifted out before placing the next row of ties. A coarse gravel or drainage material shall be placed behind the weep holes in the cavity to a minimum depth of 4 inches of coarse aggregate or 10 inches of drainage material to keep mortar droppings from plugging the weep holes.

3.4 WEEP HOLES

Wherever through-wall flashing occurs, provide weep holes to drain flashing to exterior. Weep holes shall be provided not more than 24 inches on centers in mortar joints of the exterior wythe above wall flashing, over foundations, bond beams, and any other horizontal interruptions of the cavity. Weep holes shall be constructed using weep hole ventilators. Weep holes shall be kept free of mortar and other obstructions.

3.5 MORTAR DROPPING COLLECTION MATERIAL INSTALLATION

Install mortar dropping collection material in accordance with manufacturer's written instructions, after flashing has been installed, the first 1 or 2 courses of brick have been laid, and weep holes have been created. Install before third or higher courses of brick have been laid. After mortar has set sufficiently to resist outward pressure from product, compress material horizontally to force into cavities slightly smaller than its nominal thickness.

3.6 COMPOSITE WALLS

Masonry wythes shall be tied together with joint reinforcement or with unit wall ties. The facing wythe shall be anchored or tied to the backup at a maximum spacing of 16 inches on center vertically and 24 inches on center horizontally. Unit ties shall be spaced not over 24 inches on centers horizontally, in courses not over 16 inches apart vertically, staggered in alternate courses. Ties shall be laid not closer than 5/8 inch to either masonry face. Ties shall not extend through control joints. Collar joints between masonry facing and masonry backup shall be filled solidly with grout.

3.7 MORTAR

Mortar shall be mixed in a mechanically operated mortar mixer for at least 3 minutes, but not more than 5 minutes. Measurement of ingredients for mortar shall be by volume. Ingredients not in containers, such as sand, shall be accurately measured by the use of measuring boxes. Water shall be mixed with the dry ingredients in sufficient amount to provide a workable mixture which will adhere to the vertical surfaces of masonry units. Mortar that has stiffened because of loss of water through evaporation shall be retempered by adding water to restore the proper consistency and workability. Mortar that has reached its initial set or that has not been used within 2-1/2 hours after mixing shall be discarded.

3.8 REINFORCING STEEL

Reinforcement shall be cleaned of loose, flaky rust, scale, grease, mortar, grout, or other coating which might destroy or reduce its bond prior to placing grout. Bars with kinks or bends not shown on the drawings shall not be used. Reinforcement shall be placed prior to grouting. Unless otherwise indicated, vertical wall reinforcement shall extend to within 2 inches of tops of walls.

3.8.1 Positioning Bars

Vertical bars shall be accurately placed within the cells at the positions indicated on the drawings. A minimum clearance of 1/2 inch shall be maintained between the bars and masonry units. Minimum clearance between parallel bars shall be one diameter of the reinforcement. Vertical reinforcing may be held in place using bar positioners located near the ends of each bar and at intermediate intervals of not more than 192 diameters of the reinforcement. Column and pilaster ties shall be wired in position around the vertical steel. Ties shall be in contact with the vertical reinforcement and shall not be placed in horizontal bed joints.

3.8.2 Splices

Bars shall be lapped a minimum of 48 diameters of the reinforcement. Welded or mechanical connections shall develop at least 125 percent of the specified yield strength of the reinforcement.

3.9 JOINT REINFORCEMENT INSTALLATION

Joint reinforcement shall be installed at 16 inches on center or as indicated. Reinforcement shall be lapped not less than 6 inches. Prefabricated sections shall be installed at corners and wall intersections. The longitudinal wires of joint reinforcement shall be placed to provide not less than 5/8 inch cover to either face of the unit.

3.10 PLACING GROUT

Cells containing reinforcing bars shall be filled with grout. Hollow masonry units in walls or partitions supporting plumbing, heating, or other mechanical fixtures, voids at door and window jambs, and other indicated spaces shall be filled solid with grout. Cells under lintel bearings on each side of openings shall be filled solid with grout for full height of openings. Walls below grade, lintels, and bond beams shall be filled solid with grout. Units other than open end units may require grouting each course to preclude voids in the units. Grout not in place within 1-1/2 hours after water is first added to the batch shall be discarded. Sufficient time shall be allowed between grout lifts to preclude displacement or cracking of face shells of masonry units. If blowouts, flowouts, misalignment, or cracking of face shells should occur during construction, the wall shall be torn down and rebuilt.

3.10.1 Vertical Grout Barriers for Fully Grouted Walls

Grout barriers shall be provided not more than 30 feet apart, or as required, to limit the horizontal flow of grout for each pour.

3.10.2 Horizontal Grout Barriers

Grout barriers shall be embedded in mortar below cells of hollow units receiving grout.

3.10.3 Grout Holes and Cleanouts

3.10.3.1 Grout Holes

Grouting holes shall be provided in slabs, spandrel beams, and other in-place overhead construction. Holes shall be located over vertical

reinforcing bars or as required to facilitate grout fill in bond beams. Additional openings spaced not more than 16 inches on centers shall be provided where grouting of all hollow unit masonry is indicated. Openings shall not be less than 4 inches in diameter or 3 by 4 inches in horizontal dimensions. Upon completion of grouting operations, grouting holes shall be plugged and finished to match surrounding surfaces.

3.10.3.2 Cleanouts for Hollow Unit Masonry Construction

Cleanout holes shall be provided at the bottom of every pour in cores containing vertical reinforcement when the height of the grout pour exceeds 5 feet. Where all cells are to be grouted, cleanout courses shall be constructed using bond beam units in an inverted position to permit cleaning of all cells. Cleanout holes shall be provided at a maximum spacing of 32 inches where all cells are to be filled with grout. A new series of cleanouts shall be established if grouting operations are stopped for more than 4 hours. Cleanouts shall not be less than 3 by 4 inch openings cut from one face shell. Manufacturer's standard cutout units may be used at the Contractor's option. Cleanout holes shall not be closed until masonry work, reinforcement, and final cleaning of the grout spaces have been completed and inspected. For walls which will be exposed to view, cleanout holes shall be closed in an approved manner to match surrounding masonry.

3.10.3.3 Cleanouts for Solid Unit Masonry Construction

Cleanouts for construction of walls consisting of a grout filled cavity between solid masonry wythes shall be provided at the bottom of every pour by omitting every other masonry unit from one wythe. A new series of cleanouts shall be established if grouting operations are stopped for more than 4 hours. Cleanout holes shall not be plugged until masonry work, reinforcement, and final cleaning of the grout spaces have been completed and inspected. For walls which will be exposed to view, cleanout holes shall be closed in an approved manner to match surrounding masonry.

3.10.4 Grouting Equipment

3.10.4.1 Grout Pumps

Pumping through aluminum tubes will not be permitted. Pumps shall be operated to produce a continuous stream of grout without air pockets, segregation, or contamination. Upon completion of each day's pumping, waste materials and debris shall be removed from the equipment, and disposed of outside the masonry.

3.10.4.2 Vibrators

Internal vibrators shall maintain a speed of not less than 5,000 impulses per minute when submerged in the grout. At least one spare vibrator shall be maintained at the site at all times. Vibrators shall be applied at uniformly spaced points not further apart than the visible effectiveness of the machine. Duration of vibration shall be limited to time necessary to produce satisfactory consolidation without causing segregation.

3.10.5 Grout Placement

Masonry shall be laid to the top of a pour before placing grout. Grout shall not be placed in two-wythe solid unit masonry cavity until mortar joints have set for at least 3 days during hot weather and 5 days during

cold damp weather. Grout shall not be placed in hollow unit masonry until mortar joints have set for at least 24 hours. Grout shall be placed using a hand bucket, concrete hopper, or grout pump to completely fill the grout spaces without segregation of the aggregates. Vibrators shall not be inserted into lower pours that are in a semi-solidified state. The height of grout pours and type of grout used shall be limited by the dimensions of grout spaces as indicated in Table III. Low-lift grout methods may be used on pours up to and including 5 feet in height. High-lift grout methods shall be used on pours exceeding 5 feet in height.

3.10.5.1 Low-Lift Method

Grout shall be placed at a rate that will not cause displacement of the masonry due to hydrostatic pressure of the grout. Mortar protruding more than 1/2 inch into the grout space shall be removed before beginning the grouting operation. Grout pours 12 inches or less in height shall be consolidated by mechanical vibration or by puddling. Grout pours over 12 inches in height shall be consolidated by mechanical vibration and reconsolidated by mechanical vibration after initial water loss and settlement has occurred. Vibrators shall not be inserted into lower pours that are in a semi-solidified state. Low-lift grout shall be used subject to the limitations of Table III.

3.10.5.2 High-Lift Method

Mortar droppings shall be cleaned from the bottom of the grout space and from reinforcing steel. Mortar protruding more than 1/4 inch into the grout space shall be removed by dislodging the projections with a rod or stick as the work progresses. Reinforcing, bolts, and embedded connections shall be rigidly held in position before grouting is started. CMU units shall not be pre-wetted. Grout, from the mixer to the point of deposit in the grout space shall be placed as rapidly as practical by pumping and placing methods which will prevent segregation of the mix and cause a minimum of grout splatter on reinforcing and masonry surfaces not being immediately encased in the grout lift. The individual lifts of grout shall be limited to 4 feet in height. The first lift of grout shall be placed to a uniform height within the pour section and vibrated thoroughly to fill all voids. This first vibration shall follow immediately behind the pouring of the grout using an approved mechanical vibrator. After a waiting period sufficient to permit the grout to become plastic, but before it has taken any set, the succeeding lift shall be poured and vibrated 12 to 18 inches into the preceding lift. If the placing of the succeeding lift is going to be delayed beyond the period of workability of the preceding, each lift shall be reconsolidated by reworking with a second vibrator as soon as the grout has taken its settlement shrinkage. The waiting, pouring, and reconsolidation steps shall be repeated until the top of the pour is reached. The top lift shall be reconsolidated after the required waiting period. The high-lift grouting of any section of wall between vertical grout barriers shall be completed to the top of a pour in one working day unless a new series of cleanout holes is established and the resulting horizontal construction joint cleaned. High-lift grout shall be used subject to the limitations in Table III.

TABLE III

POUR HEIGHT AND TYPE OF GROUT FOR VARIOUS GROUT SPACE DIMENSIONS

Maximum Grout Pour Height (feet) (4)	Grout Type	Grouting Procedure	Minimum Dimensions of the Total Clear Areas Within Grout Spaces and Cells (in.) (1,2)	
			Multiwythe Masonry (3)	Hollow-unit Masonry
1	Fine	Low Lift	3/4	1-1/2 x 2
5	Fine	Low Lift	2	2 x 3
8	Fine	High Lift	2	2 x 3
12	Fine	High Lift	2-1/2	2-1/2 x 3
24	Fine	High Lift	3	3 x 3
1	Coarse	Low Lift	1-1/2	1-1/2 x 3
5	Coarse	Low Lift	2	2-1/2 x 3
8	Coarse	High Lift	2	3 x 3
12	Coarse	High Lift	2-1/2	3 x 3
24	Coarse	High Lift	3	3 x 4

Notes:

- (1) The actual grout space or cell dimension must be larger than the sum of the following items:
 - a) The required minimum dimensions of total clear areas given in the table above;
 - b) The width of any mortar projections within the space;
 - c) The horizontal projections of the diameters of the horizontal reinforcing bars within a cross section of the grout space or cell.
- (2) The minimum dimensions of the total clear areas shall be made up of one or more open areas, with at least one area being 3/4 inch or greater in width.
- (3) For grouting spaces between masonry wythes.
- (4) Where only cells of hollow masonry units containing reinforcement are grouted, the maximum height of the pour shall not exceed the distance between horizontal bond beams.

3.11 BOND BEAMS

Bond beams shall be filled with grout and reinforced as indicated on the drawings. Grout barriers shall be installed under bond beam units to retain the grout as required. Reinforcement shall be continuous, including around corners, except through control joints or expansion joints, unless otherwise indicated on the drawings. Where splices are required for continuity, reinforcement shall be lapped 48 bar diameters. A minimum clearance of 1/2 inch shall be maintained between reinforcement and interior faces of units.

3.12 CONTROL JOINTS

Control joints shall be provided as indicated and shall be constructed by using special control-joint units in accordance with the details shown on the drawings. 3/4 by 3/4 inch The vertical mortar joint at control joint

locations shall be continuous, including through all bond beams. This shall be accomplished by utilizing half blocks in alternating courses on each side of the joint. 3/4 inch Backer rod and sealant shall be installed in accordance with Section 07 92 00 JOINT SEALANTS. Exposed interior control joints shall be raked to a depth of 1/4 inch. Concealed control joints shall be flush cut.

3.13 BRICK EXPANSION JOINTS AND CONCRETE MASONRY VENEER JOINTS

Brick expansion joints and concrete masonry veneer joints shall be provided and constructed as shown on the drawings. Joints shall be kept free of mortar and other debris.

3.14 LINTELS

3.14.1 Masonry Lintels

Masonry lintels shall be constructed with lintel units filled solid with grout in all courses and reinforced with a minimum of two No. 4 bars in the bottom course unless otherwise indicated on the drawings. Lintel reinforcement shall extend beyond each side of masonry opening 40 bar diameters or 24 inches, whichever is greater. Reinforcing bars shall be supported in place prior to grouting and shall be located 1/2 inch above the bottom inside surface of the lintel unit.

3.14.2 Steel Lintels

Steel lintels shall be as shown on the drawings. Lintels shall be set in a full bed of mortar with faces plumb and true. Steel lintels shall have a minimum bearing length of 8 inches unless otherwise indicated on the drawings.

3.15 SILLS AND COPINGS

Sills and copings shall be set in a full bed of mortar with faces plumb and true.

3.16 ANCHORAGE TO STRUCTURAL STEEL

3.16.1 Anchorage to Structural Steel

Masonry shall be anchored to vertical structural steel framing with adjustable steel wire anchors spaced not over 16 inches on centers vertically, and if applicable, not over 24 inches on centers horizontally.

3.17 INSULATION

Anchored veneer walls shall be insulated, where shown, by installing board-type insulation on the cavity side of the inner wythe. Board type insulation shall be applied directly to the masonry or thru-wall flashing with adhesive. Insulation shall be neatly fitted between obstructions without impaling of insulation on ties or anchors. The insulation shall be applied in parallel courses with vertical joints breaking midway over the course below and shall be applied in moderate contact with adjoining units without forcing, and shall be cut to fit neatly against adjoining surfaces.

3.18 POINTING AND CLEANING

After mortar joints have attained their initial set, but prior to hardening, mortar and grout daubs or splashings shall be completely removed from masonry-unit surfaces that will be exposed or painted. Before completion of the work, defects in joints of masonry to be exposed or painted shall be raked out as necessary, filled with mortar, and tooled to match existing joints. Immediately after grout work is completed, scum and stains which have percolated through the masonry work shall be removed using a high pressure stream of water and a stiff bristled brush. Masonry surfaces shall not be cleaned, other than removing excess surface mortar, until mortar in joints has hardened. Masonry surfaces shall be left clean, free of mortar daubs, dirt, stain, and discoloration, including scum from cleaning operations, and with tight mortar joints throughout. Metal tools and metal brushes shall not be used for cleaning.

3.18.1 Concrete Masonry Unit and Concrete Brick Surfaces

Exposed concrete masonry unit and concrete brick surfaces shall be dry-brushed at the end of each day's work and after any required pointing, using stiff-fiber bristled brushes.

3.19 BEARING PLATES

Bearing plates for beams, joists, joist girders and similar structural members shall be set to the proper line and elevation with damp-pack bedding mortar, except where non-shrink grout is indicated. Bedding mortar and non-shrink grout shall be as specified in Section 03 30 00 CAST-IN-PLACE STRUCTURAL CONCRETE.

3.20 PROTECTION

Facing materials shall be protected against staining. Top of walls shall be covered with nonstaining waterproof covering or membrane when work is not in progress. Covering of the top of the unfinished walls shall continue until the wall is waterproofed with a complete roof or parapet system. Covering shall extend a minimum of 2 feet down on each side of the wall and shall be held securely in place. Before starting or resuming, top surface of masonry in place shall be cleaned of loose mortar and foreign material.

3.21 TEST REPORTS

3.21.1 Field Testing of Mortar

At least three specimens of mortar shall be taken each day. A layer of mortar 1/2 to 5/8 inch thick shall be spread on the masonry units and allowed to stand for one minute. The specimens shall then be prepared and tested for compressive strength in accordance with ASTM C 780.

3.21.2 Field Testing of Grout

Field sampling and testing of grout shall be in accordance with the applicable provisions of ASTM C 1019. A minimum of three specimens of grout per day shall be sampled and tested. Each specimen shall have a minimum ultimate compressive strength of 2000 psi at 28 days.

3.21.3 Efflorescence Test

Brick which will be exposed to weathering shall be tested for efflorescence. Tests shall be scheduled far enough in advance of starting masonry work to permit retesting if necessary. Sampling and testing shall conform to the applicable provisions of [ASTM C 67](#). Units meeting the definition of "effloresced" will be subject to rejection.

3.21.4 Prism Tests

At least one prism test sample shall be made for each [5,000 square feet](#) of wall but not less than three such samples shall be made for any building. Three prisms shall be used in each sample. Prisms shall be tested in accordance with [ACI 530/530.1](#). Seven-day tests may be used provided the relationship between the 7- and 28-day strengths of the masonry is established by the tests of the materials used. Compressive strength shall not be less than [10.3 psi](#) at 28 days. If the compressive strength of any prism falls below the specified value by more than [500 psi](#), steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. If the likelihood of low-strength masonry is confirmed and computations indicate that the load-carrying capacity may have been significantly reduced, tests of cores drilled, or prisms sawed, from the area in question may be required. In such case, three specimens shall be taken for each prism test more than [500 psi](#) below the specified value. Masonry in the area in question shall be considered structurally adequate if the average compressive strength of three specimens is equal to at least 85 percent of the specified value, and if the compressive strength of no single specimen is less than 75 percent of the specified value. Additional testing of specimens extracted from locations represented by erratic core or prism strength test results shall be permitted.

3.22 SPECIAL INSPECTION AND TESTING FOR SEISMIC-RESISTING SYSTEMS

Special inspections and testing for seismic-resisting systems and components shall be done in accordance with Section 01 45 35 SPECIAL INSPECTION FOR SEISMIC-RESISTING SYSTEMS.

-- End of Section --

SECTION 04 72 00

ARCHITECTURAL CAST STONE
03/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ACI INTERNATIONAL (ACI)

ACI 315 (1999) Details and Detailing of Concrete Reinforcement

ACI 318/318M (2002) Building Code Requirements for Structural Concrete

ASTM INTERNATIONAL (ASTM)

ASTM A 82 (2002) Steel Wire, Plain, for Concrete Reinforcement

ASTM A 615/A 615M (2008b) Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM C 33 (2003) Concrete Aggregates

ASTM C 150 (2007) Standard Specification for Portland Cement

ASTM C 173 (1994a) Air Content of Freshly Mixed Concrete by the Volumetric Method

ASTM C 231 (2008c) Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C 260 (2006) Air-Entraining Admixtures for Concrete

ASTM C 270 (2008a) Mortar for Unit Masonry

ASTM C 494 (1992) Chemical Admixtures for Concrete

ASTM C 979 (2005) Pigments for Integrally Colored Concrete

ASTM C 1194 (2003) Standard Test Method for Compressive Strength of Architectural Cast Stone

ASTM C 1195 (2003) Standard Test Method for Absorption of Architectural Cast Stone

ASTM C 1364

(2003) Standard Specification for
Architectural Cast Stone

CAST STONE INSTITUTE (CSI)

Technical Manual

(2005) Technical Manual with Case Histories

1.2 DEFINITIONS

Cast Stone - A refined architectural concrete building unit manufactured to simulate natural cut stone, used in unit masonry applications.

1. Dry Cast Concrete Products - manufactured from zero slump concrete. Vibrant Dry Tamp (VDT) casting method: Vibratory ramming of earth moist, zero-slump concrete against a rigid mold until it is densely compacted.
2. Wet Cast Concrete Products - manufactured from measurable slump concrete. Wet casting method: manufactured from measurable slump concrete and vibrated into a mold until it becomes densely consolidated.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Cast stone unit

Shop drawings shall include all cast stone unit types. See paragraph 1.6.1 for listing of information required on shop drawings.

SD-03 Product Data

ARCHITECTURAL CAST STONE

Local/Regional Materials

Documentation indicating distance between manufacturing facility and the project site, and distance of raw material origin from the project site.

SD-04 Samples

ARCHITECTURAL CAST STONE

Submit pieces of the cast stone that are representative of the general range of finish and color proposed to be furnished for the project.

SD-06 Test Reports

Test Results

Submit manufacturer's test results of Cast Stone previously made by the manufacturer.

SD-07 Certificates

Cast Stone Unit

Certificate indicating that the manufacturer is a current member of the Cast Stone Institute and information concerning extent of related experience.

SD-08 Manufacturer's Instructions

Installation of cast stone units

CLEANING

Include cast stone manufacturer's written recommendations for installation and cleaning.

1.4 MODIFICATION OF REFERENCES

In the referenced ACI publications, consider the advisory provisions to be mandatory, as though the word "shall" had been substituted for the words "should" or "could" or "may," wherever they appear. Interpret reference to the "Building Official," the "Structural Engineer," and the "Architect/Engineer" to mean the Contracting Officer.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver packaged materials to the project site in the original, unbroken packages or containers, each bearing a label clearly identifying manufacturer's name, weight or volume, and other pertinent information. Store packaged materials, and materials in containers, in a weathertight and dry place until ready for use.

1.6 QUALITY ASSURANCE

1.6.1 Cast Stone Unit Drawings

- a. Cast stone unit dimensions, cross-section, and edge details; location, size, and type of reinforcement, including reinforcement necessary for safe handling and setting. Drawings shall indicate drips and wash surfaces. Comply with **ACI 315**.
- b. Layout, dimensions, and identification of cast stone units, corresponding to installation sequence.
- c. Setting drawings, instructions, and directions for installation of concrete inserts.
- d. Location and details of anchorage devices and lifting devices embedded in precast units (where required), and connection details to building structure.

1.6.2 Standards

Comply with the requirements of the Cast Stone Institute **Technical Manual** and the project specifications. Submit **Test Results** demonstrating compliance with requirements. The manufacturer of the cast stone units shall be a current member of the Cast Stone Institute with ten (10) years experience in the manufacture of cast stone. Where a conflict may occur, the contract documents shall prevail.

1.6.3 Cast Stone Unit Surface Finish Sample

Submit a cast stone sample **12 inches by 12 inches** by approximately **1 1/2 inches** minimum in thickness, to illustrate quality, color, and texture of both exposed-to-view surface finish and finish of the cast stone units that will be concealed by other construction. Color and finish of cast stone shall be as indicated in Color Legend on drawings.

1.7 SUSTAINABLE DESIGN REQUIREMENTS

1.7.1 Local/Regional Materials

See Section **01 33 29** LEED(tm) DOCUMENTATION for cumulative total local material requirements. Cast Stone materials may be locally available.

PART 2 PRODUCTS

2.1 ARCHITECTURAL CAST STONE

2.1.1 Physical Properties

ASTM C 1364. Provide the following:

1. Compressive Strength - **ASTM C 1194**: **6,500 psi** minimum for products at 28 days.
2. Absorption - **ASTM C 1195**: 6 percent maximum by the cold water method, or 10 percent maximum by the boiling method for products at 28 days.
3. Air Content - **ASTM C 173** or **ASTM C 231**, for wet cast product shall be 4-8 percent for units exposed to freeze-thaw environments. Air entrainment is not required for Vibrant Dry Tamp (VDT) products.

2.1.2 Job Site Testing

One sample from production units may be selected at random from the field for each **500 cubic feet** delivered to the job site.

1. Three (3) field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 85 percent with no single specimen testing less than 75 percent of design strength as allowed by **ACI 318/318M**.
2. Three (3) field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6 percent.
3. Field specimens shall be tested in accordance with **ASTM C 1194** and **ASTM C 1195**.

2.2 MATERIALS

2.2.1 Fine Aggregates

ASTM C 33, except for gradation. Manufactured or natural sand.

2.2.2 Coarse Aggregates

ASTM C 33, except for gradation. Aggregates shall be quartz, limestone, marble and/or other materials required to produce the referenced color and texture finish.

2.2.3 Portland Cement

Portland cement shall comply with ASTM C 150 Type I or Type III and be a combination of white cement and buff cement (equal to that produced by Texas Industries) and proportioned to achieve the referenced color and texture. The portland cement blend shall not consist of fly ash, pozzolan and/or ground slag.

2.2.4 Colors

Inorganic iron oxide pigments, ASTM C 979, except that carbon black pigments shall not be used.

2.2.5 Admixtures

ASTM C 260 for air-entraining admixtures. Other admixtures: ASTM C 494 for water reducing, retarding or accelerating. Certify that admixtures are free of chlorides.

2.2.6 Water

Fresh, clean, and potable.

2.2.7 Reinforcing

ASTM A 615/A 615M. Reinforcing steel shall be galvanized or epoxy coated when clearance to an exterior face is 1-1/2 inches or less. Reinforce the units as recommended by the CSI Technical Manual and for safe handling and structural stress.

- a. Minimum reinforcing shall be 0.25 percent of the cross section area.
- b. Panels and similar stones greater than 24 inches in one direction shall be reinforced in that direction. Units less than 24 inches 24 inches in both their length and width dimension shall be non-reinforced unless otherwise specified.
- c. Welded wire fabric shall be ASTM A 82 where applicable for wet cast units. Welded wire fabric reinforcing shall not be used in dry cast products.

2.2.8 Anchoring Devices

All anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available in non-corrosive stainless steel, Type 302 or 304.

2.3 CURING

Cure units in a warm curing chamber approximately 100 degrees F at 100 percent relative humidity for approximately 12 hours, or cure in a 100 percent moist environment at a minimum 70 degrees F for 16 hours after casting. Additional yard curing at 95 percent relative humidity shall be 350 degree-days (i.e. 7 days at 50 degrees F or 5 days at 70 degrees F) prior to shipping. Form cured units shall be protected from moisture evaporation with curing blankets or curing compounds after casting.

PART 3 EXECUTION

3.1 INSTALLATION OF CAST STONE UNITS

Verify that all parts of the supporting structure are complete and ready to receive the cast stone units and that site conditions are conducive to proper installation. Install cast stone units and accessories in accordance with approved detail drawings and descriptive data, and as specified below.

3.1.1 Setting Cast Stone Units

Drench units with clean water prior to setting. Fill dowel holes and anchor slots completely with mortar or non-shrink grout. Set units in full bed of mortar, unless otherwise detailed. Rake mortar joints 3/4 inch for pointing. Remove excess mortar from unit faces immediately after setting. Tuck point unit joints to a slight concave profile.

3.1.2 Setting Tolerances

Comply with Cast Stone Institute Technical Manual. Locate cast stone units to accommodate adjacent products, proper joint width, and alignment with adjacent members. Set stones 1/8 inch or less, within the plane of adjacent units. Joints, plus - 1/16 inch, minus - 1/8 inch.

3.1.3 Joints

Provide joints with sealants in accordance with Section 07 92 00 JOINT SEALANTS. Prime ends of units, insert properly sized backing rod and install required sealant.

- a. Joint size: At stone/brick joints 3/8 inch. At stone/stone joints in vertical position 1/4 inch (3/8 inch optional). Stone/stone joints exposed on top 3/8 inch.
- b. Joint materials: Mortar, Type N, ASTM C 270. Use a full bed of mortar at all bed joints. Flush vertical joints full with mortar. Leave all joints with exposed tops or under relieving angles open for sealant. Leave head joints in copings and projecting components open for sealant.
- c. Location of joints: As shown on shop drawings. At control and expansion joints unless otherwise shown.

3.1.4 Protection

Protect exposed-to-view facing from staining and other damage. Do not allow laitance to penetrate, stain, or harden on exposed surfaces.

3.2 CLEANING

Clean exposed-to-view surfaces of cast stone units thoroughly with detergent and water; use a brush to remove foreign matter. Remove stains that remain after washing in accordance with recommendations of the cast stone manufacturer. Surfaces shall be clean and uniform in color.

3.3 INSPECTION AND ACCEPTANCE

Inspect finished installation according to Bulletin #36. Do not field apply water repellant until repair, cleaning, inspection and acceptance is completed. Precast units may be rejected for any one of the following product defects or installation deficiencies remaining after repairs and cleaning have been accomplished. "Visible" means visible to a person with normal eyesight when viewed from a distance of 20 feet in broad daylight.

- a. Nonconformance to specified tolerances.
- b. Visible air voids (bugholes or blowholes).
- c. Visible casting lines.
- d. Visible form joints.
- e. Visible irregularities.
- f. Visible stains on panel surfaces.
- g. Visible differences between cast stone unit and approved sample.
- h. Visible nonuniformity of textures or color.
- i. Visible areas of backup concrete bleeding through the facing concrete.
- j. Visible foreign material embedded in the face.
- k. Visible repairs.
- l. Visible reinforcement shadow lines.
- m. Visible cracks.
- n. Color deviations and / or not matching specified color.

-- End of Section --

SECTION 05 30 00

STEEL DECKS

07/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI SG-913 (1991) LRFD Cold-formed Steel Design Manual

AISI SG03-3 (2002) Cold-Formed Steel Design Manual Set

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2008; Errata 2009) Structural Welding Code - Steel

AWS D1.3/D1.3M (2008; Errata 2008) Structural Welding Code - Sheet Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 1008/A 1008M (2009) Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened

ASTM A 123/A 123M (2009) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 36/A 36M (2008) Standard Specification for Carbon Structural Steel

ASTM A 653/A 653M (2009) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A 780/A 780M (2001; R 2006) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

ASTM A 792/A 792M (2009) Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

FM GLOBAL (FM)

FM DS 1-28 (2002) Design Wind Loads

FM P7825	(2005) Approval Guide
STEEL DECK INSTITUTE (SDI)	
SDI 30	(2001) Design Manual for Composite Decks, Form Decks, and Roof Decks
SDI DDMO3	(3rd Edition) Diaphragm Design Manual
SDI DDP	(1987; R 2000) Deck Damage and Penetrations
SDI MOC2	(2006) Manual of Construction with Steel Deck
THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)	
SSPC Paint 20	(2002; E 2004) Paint Specification No. 20 Zinc-Rich Coating Type I Inorganic and Type II Organic
U.S. DEPARTMENT OF DEFENSE (DOD)	
UFC 3-310-01	Load Assumptions for Buildings
UNDERWRITERS LABORATORIES (UL)	
UL 209	(2005; Rev thru May 2007) Cellular Metal Floor Raceways and Fittings
UL 580	(2006; Rev thru Jul 2009) Tests for Uplift Resistance of Roof Assemblies
UL Bld Mat Dir	(2009) Building Materials Directory

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication Drawings

Cant Strips

Ridge and Valley Plates

Metal Closure Strips

SD-03 Product Data

Accessories

Deck Units

Galvanizing Repair Paint

Joint Sealant Material

Mechanical Fasteners

Repair Paint

Welder Qualifications

Welding Equipment

Welding Rods and Accessories

SD-05 Design Data

Deck Units

Submit manufacturer's design calculations, or applicable published literature for the structural properties of the proposed deck units.

SD-07 Certificates

Welding Procedures

Fire Safety

Wind Storm Resistance

1.3 QUALITY ASSURANCE

1.3.1 Deck Units

Furnish deck units and accessory products from a manufacturer regularly engaged in manufacture of steel decking. Provide manufacturer's certificates attesting that the decking material meets the specified requirements.

1.3.2 OMITTED - Certification of Piston Tool Operator

1.3.3 Qualifications for Welding Work

Submit qualified Welder Qualifications in accordance with AWS D1.1/D1.1M, or under an equivalent approved qualification test. Perform tests on test pieces in positions and with clearances equivalent to those actually encountered. If a test weld fails to meet requirements, perform an immediate retest of two test welds until each test weld passes. Failure in the immediate retest will require the welder be retested after further practice or training, performing a complete set of test welds.

Submit manufacturer's catalog data for Welding Equipment and Welding Rods and Accessories.

1.3.4 Regulatory Requirements

1.3.4.1 Fire Safety

Test roof deck as a part of a roof deck construction assembly of the type

used for this project, listing as fire classified in the [UL Bld Mat Dir](#), or listing as Class I construction in the [FM P7825](#), and so labeled.

1.3.4.2 Wind Storm Resistance

Provide roof construction assembly capable of withstanding an uplift pressure of [60 pounds per square foot](#) when tested in accordance with the uplift pressure test described in the [FM DS 1-28](#) or as described in [UL 580](#) and in general compliance with [UFC 3-310-01](#).

1.3.5 Fabrication Drawings

Show type and location of units, location and sequence of connections, bearing on supports, methods of anchoring, attachment of accessories, adjusting plate details, size and location of holes to be cut and reinforcement to be provided, the manufacturer's erection instructions and other pertinent details.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver deck units to the site in a dry and undamaged condition. Store and handle steel deck in a manner to protect it from corrosion, deformation, and other types of damage. Do not use decking for storage or as working platform until units have been fastened into position. Exercise care not to damage material or overload decking during construction. Must not exceed the design live load. The maximum uniform distributed storage load. Stack decking on platforms or pallets and cover with weathertight ventilated covering. Elevate one end during storage to provide drainage. Maintain deck finish at all times to prevent formation of rust. Repair deck finish using touch-up paint. Replace damaged material.

1.5 DESIGN REQUIREMENTS FOR ROOF DECKS

1.5.1 Properties of Sections

Properties of metal roof deck sections must comply with engineering design width as limited by the provisions of [AISI SG-913](#).

1.5.2 Allowable Loads

Indicate total uniform dead and live load for detailing purposes.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Steel Sheet

Flat rolled carbon steel sheets of structural quality, thickness not less than indicated meeting the requirements of [AISI SG03-3](#), except as modified herein.

2.1.2 Steel Coating

[ASTM A 653/A 653M](#) designation [G90](#) galvanized, or [ASTM A 792/A 792M](#) designation [AZ55](#), aluminum-zinc alloy. Apply coating to both sides of sheet. Conform to [UL 209](#) for coating on decking provided as wire raceways.

2.1.3 Mixes

2.1.3.1 Galvanizing Repair Paint for Floor Decks

Provide a high-zinc-dust content paint for regalvanizing welds in galvanized steel conforming to ASTM A 780/A 780M.

2.1.4 Galvanized Steel Angles for Roof Decks

Provide hot-rolled carbon steel angles conforming to ASTM A 36/A 36M, merchant quality, Grade Designation SAE/AISI 1023 or SAE/AISI 1025, and hot-dip galvanized in accordance with ASTM A 123/A 123M.

2.1.5 Joint Sealant Material for Roof Decks

Provide a nonskinning, gun-grade, bulk compound material as recommended by the manufacturer.

2.1.6 Galvanizing Repair Paint for Roof Decks

Provide a high zinc-dust content paint for regalvanizing welds in galvanized steel and shall conform to ASTM A 780/A 780M.

2.1.7 Flexible Closure Strips for Roof Decks

Provide strips made of elastomeric material specified and premolded to the configuration required to provide tight-fitting closures at open ends and sides of steel roof decking.

2.1.8 OMITTED - Sound Absorbing Material

2.2 ACCESSORIES

Provide accessories of same material as deck, unless specified otherwise. Provide manufacturer's standard type accessories, as specified.

2.2.1 Adjusting Plates

Provide adjusting plates, or segments of deck units, of same thickness and configuration as deck units in locations too narrow to accommodate full size units. Provide factory cut plates of predetermined size where possible.

2.2.2 End Closures

Fabricated of sheet metal by the deck manufacturer. Provide end closures minimum 0.028 inch thick to close open ends at eaves and openings through deck.

2.2.3 Partition Closures

Provide closures for closing voids above interior walls and partitions that are perpendicular to the direction of the configurations. Provide rubber, plastic, or sheet steel closures above typical partitions.

- 2.2.4 OMITTED - Closure Plates for Composite Deck
- 2.2.5 OMITTED - Sheet Metal Collar
- 2.2.6 OMITTED - Cover Plates
- 2.2.7 OMITTED - Roof Sump Pans
- 2.2.8 OMITTED - Column Closures
- 2.2.9 OMITTED - Access Hole Covers
- 2.2.10 Hanger

Do not suspend pipes, ducts, or ceiling from roof deck.

- 2.2.11 OMITTED - Shear Connectors
- 2.2.12 [Mechanical Fasteners](#)

Provide mechanical fasteners, such as powder actuated or pneumatically driven fasteners, for anchoring the deck to structural supports and adjoining units that are designed to meet the loads indicated. Provide positive locking-type fasteners standard with the Steel Deck Institute and the steel deck manufacturer, as approved by the Contracting Officer.

2.2.13 Miscellaneous Accessories

Furnish the manufacturer's standard accessories to complete the deck installation. Furnish metal accessories of the same material as the deck and with the minimum design thickness as follows: saddles, [0.0474 inch](#); welding washers, [0.0598 inch](#) cant strip, [0.0295 inch](#) other metal accessories, [0.0358 inch](#) unless otherwise indicated. Accessories must include but not be limited to saddles, welding washers, fasteners, cant strips, butt cover plates, underlapping sleeves, and ridge and valley plates.

2.3 FABRICATION

Furnish sample of [Metal Roof Deck Units](#) used to illustrate actual cross section dimensions and configurations.

2.3.1 [Deck Units](#)

2.3.1.1 OMITTED - Cellular [Metal Floor Deck Units](#)

2.3.2 OMITTED - Open Beam, [Metal Floor Deck Units](#)

2.3.3 OMITTED - Length of Floor Deck Units

2.3.4 Roof Deck

Conform to [ASTM A 792/A 792M](#) or [ASTM A 1008/A 1008M](#) for deck used in conjunction with insulation and built-up roofing. Fabricate roof deck units of [0.0358 inch](#) design thickness or thicker steel zinc-coated in conformance with [ASTM A 653/A 653M](#), G90 coating class or aluminum-zinc coated in accordance with [ASTM A 792/A 792M](#) Coating Designation AZ55.

2.3.4.1 Cant Strips for Roof Decks

Fabricate cant strips from the specified commercial-quality steel sheets not less than nominal 0.0359 inch thick before galvanizing. Bend strips to form a 45-degree cant not less than 5 inch wide, with top and bottom flanges a minimum 3 inch wide. Length of strips 10 feet.

2.3.4.2 Ridge and Valley Plates for Roof Decks

Fabricate plates from the specified structural-quality steel sheets, not less than nominal 0.0359 inch thick before galvanizing. Provide plates of minimum 4-1/2 inch wide and bent to provide tight fitting closures at ridges and valleys. Provide a minimum length of ridge and valley plates of 10 feet.

2.3.4.3 Metal Closure Strips for Roof Decks

Fabricate strips from the specified commercial-quality steel sheets not less than nominal 0.0359 inch thick before galvanizing. Provide strips from the configuration required to provide tight-fitting closures at open ends and sides of steel roof decking.

2.3.5 OMITTED - Form Deck

2.3.6 OMITTED - Composite Deck

2.3.7 OMITTED - Acoustical Steel Deck

2.3.8 OMITTED - Venting

2.3.9 OMITTED - Shop Priming

2.3.10 Touch-Up Paint

Provide touch-up paint for zinc-coated units of an approved galvanizing repair paint with a high-zinc dust content. Touch-up welds with paint conforming to SSPC Paint 20 in accordance with ASTM A 780/A 780M. Maintain finish of deck units and accessories by using touch-up paint whenever necessary to prevent the formation of rust.

After roof decking installation, wire brush, clean, and touchup paint the scarred areas on top and bottom surfaces of metal roof decking. The scarred areas include welds, weld scars, bruises, and rust spots. Touchup galvanized surfaces with galvanizing repair paint.

PART 3 EXECUTION

3.1 EXAMINATION

Prior to installation of decking units and accessories, examine worksite to verify that as-built structure will permit installation of decking system without modification.

3.2 INSTALLATION

Install steel deck units in accordance with SDI 30, SDI DDMO3, and approved shop drawings. Place units on structural supports, properly adjusted, leveled, and aligned at right angles to supports before permanently securing in place. Damaged deck and accessories including material which

is permanently stained or contaminated, deformed, or with burned holes shall not be installed. Extend deck units over three or more supports unless absolutely impractical. Report inaccuracies in alignment or leveling to the Contracting Officer and make necessary corrections before permanently anchoring deck units. Locate deck ends over supports only. Do not use unanchored deck units as a work or storage platform. Permanently anchor units placed by the end of each working day. Do not support suspended ceilings, light fixtures, ducts, utilities, or other loads by steel deck. Distribute loads by appropriate means to prevent damage.

3.2.1 Attachment

Immediately after placement and alignment, and after correcting inaccuracies, permanently fasten steel deck units to structural supports and to adjacent deck units by welding with normal 5/8 inch diameter puddle welds as indicated on the design drawings and in accordance with manufacturer's recommended procedure and SDI 30. Clamp or weight deck units to provide firm contact between deck units and structural supports while performing welding. Attachment of adjacent deck units by button-punching is prohibited.

3.2.1.1 Welding

Perform welding in accordance with AWS D1.3/D1.3M using methods and electrodes recommended by the manufacturers of the base metal alloys being used. Ensure only operators previously qualified by tests prescribed in AWS D1.1/D1.1M and AWS D1.3/D1.3M make welds. Immediately recertify, or replace qualified welders, that are producing unsatisfactory welding. For location, size, and spacing of fastening, see Structural drawings. Do use welding washers at the connections of the deck to supports. Do not use welding washers at sidelaps. Holes and similar defects will not be acceptable. Lap 2 inch deck ends. Attach all partial or segments of deck units to structural supports in accordance with Section 2.5 of SDI DDMO3. Immediately clean welds by chipping and wire brushing. Heavily coat welds, cut edges and damaged portions of coated finish with zinc-dust paint conforming to ASTM A 780/A 780M.

3.2.1.2 OMITTED - Fastening

3.2.1.3 OMITTED - Fastening Floor Deck Units

3.2.2 Openings

Cut or drill all holes and openings required and be coordinated with the drawings, specifications, and other trades. Frame and reinforce openings through the deck in conformance with SDI DDP. Deck manufacturer shall approve holes or openings larger than 6 inch in diameter prior to drilling or cutting.

3.2.3 Deck Damage

SDI MOC2, for repair of deck damage.

3.2.4 Accessory Installation

3.2.4.1 Adjusting Plates

Install as shown on shop drawings.

3.2.4.2 End Closures

Provide end closure to close open ends of cells at columns, walls, and openings in deck.

3.2.4.3 Closures Above Partitions

Provide for closing voids between cells over partitions that are perpendicular to direction of cells. Provide a one-piece closure strip for partitions 4 inch nominal or less in thickness and two-piece closure strips for wider partitions.

3.2.4.4 OMITTED - Cover Plates

3.2.4.5 OMITTED - Column Closures

3.2.4.6 OMITTED - Access Hole Covers

3.2.4.7 OMITTED - Hangers

3.2.5 OMITTED - Sound Absorbing Material

3.2.6 OMITTED - Concrete Work

3.2.7 OMITTED - Preparation of Fire-Proofed Surfaces

3.3 JOINT SEALING FOR ROOF DECKS

Seal sidelaps and endlaps with manufacturer's recommended joint sealing material. Shop or field apply the material. Before applying the sealing material, completely remove dust, dirt, moisture, and other foreign material from the surfaces to which the sealing material is to be applied. Apply sealing material in strict accordance with the sealing material manufacturer's printed instructions.

3.4 OMITTED - ROOF SUMP PANS

3.5 CANT STRIPS FOR ROOF DECKS

Provide strips to be fusion welded to surface of roof decking, secured to wood nailers by galvanized screws or to steel framing by galvanized self-tapping screws or welds. Do not exceed spacing of welds and fasteners of 12 inch. Lap end joints a minimum 3 inch and secure with galvanized sheet metal screws spaced a maximum 4 inch on center.

3.6 RIDGE AND VALLEY PLATES FOR ROOF DECKS

Provide plates to be fusion welded to top surface of roof decking. Lap end joints a minimum 3 inch. For valley plates, provide endlaps to be in the direction of water flow.

3.7 CLOSURE STRIPS FOR ROOF DECKS

Provide closure strips at open, uncovered ends and edges of the roof decking and in voids between roof decking and top of walls and partitions where indicated. Install closure strips in position in a manner to provide a weathertight installation.

3.8 ROOF INSULATION SUPPORT FOR ROOF DECKS

Provide metal closure strips for support of roof insulation where rib openings in top surface of metal roof decking occur adjacent to edges and openings. Weld metal closure strips in position.

3.9 CLEANING AND PROTECTION FOR ROOF DECKS

Upon completion of the deck, sweep surfaces clean and prepare for installation of the roofing.

3.10 FIELD QUALITY CONTROL

3.10.1 Decks Not Receiving Concrete

Inspect the decking top surface for distortion after installation. For roof decks not receiving concrete, verify distortion by placing a straight edge across three adjacent top flanges. The maximum allowable gap between the straight edge and the top flanges is $1/16$ inch; when gap is more than $1/16$ inch, provide corrective measures or replacement. Reinspect decking after performing corrective measures or replacement.

-- End of Section --

SECTION 05 40 00

COLD-FORMED METAL FRAMING

04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI SG02-1 (2001) North American Specification for the Design of Cold-Formed Steel Structural Members

AISI SG03-3 (2002) Cold-Formed Steel Design Manual Set

AMERICAN WELDING SOCIETY (AWS)

AWS D1.3/D1.3M (2008; Errata 2008) Structural Welding Code - Sheet Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M (2009) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 153/A 153M (2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A 370 (2009a) Standard Test Methods and Definitions for Mechanical Testing of Steel Products

ASTM A 653/A 653M (2009) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM B 633 (2007) Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

ASTM C 955 (2009) Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases

ASTM E 329 (2008) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE J78 (1998) Steel Self Drilling Tapping Screws

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 25 (1997; E 2004) Paint Specification No.
25Zinc Oxide, Alkyd, Linseed Oil Primer
for Use Over Hand Cleaned Steel Type I and
Type II

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Framing Components and Trusses; G

- a. Cross sections, plans, and/or elevations showing component types and locations for each framing application; including shop coatings and material thicknesses for each framing component.
- b. Connection details showing fastener type, quantity, location, and other information to assure proper installation.
- c. Drawings depicting panel configuration temporary and/or permanent bracing size and location, dimensions, components, locations, and construction sequence if the Contractor elects to install prefabricated/prefinished frames.
- d. Calculations for design of trusses, sealed and signed by a Professional Engineer registered in the state of North Carolina.

SD-03 Product Data

Steel studs, joists, tracks, bracing, bridging and accessories

SD-05 Design Data

Metal framing calculations; G

SD-07 Certificates

Load-bearing cold-formed metal framing

Mill certificates or test reports from independent testing agency, qualified in accordance with ASTM E 329, showing that the steel sheet used in the manufacture of each cold-formed component complies with the minimum yield strengths and uncoated steel thickness specified. Test reports shall be based on the results of three coupon tests in accordance with ASTM A 370.

Welds

Certified copies of welder qualifications test records showing qualification in accordance with AWS D1.3/D1.3M.

1.3 DELIVERY, STORAGE, AND HANDLING

Deliver materials to job site and store in adequately ventilated, dry locations. Storage area shall permit easy access for inspection and handling. If necessary to store materials outside, stack off the ground, support on a level platform, and protect from the weather as approved. Handle materials to prevent damage. Finish of the framing members shall be maintained at all times, using an approved high zinc dust content, galvanizing repair paint whenever necessary to prevent the formation of rust. Replace damaged items with new, as directed by the Contracting Officer.

1.4 LOAD-BEARING COLD-FORMED METAL FRAMING

Include top and bottom tracks, bracing, fastenings, and other accessories necessary for complete installation. Framing members shall have the structural properties indicated. Where physical structural properties are not indicated, they shall be as necessary to withstand all imposed loads. Design framing in accordance with AISI SG03-3. Non-load-bearing metal framing, furring, and ceiling suspension systems are specified in Section 09 22 00 SUPPORTS FOR PLASTER AND GYPSUM BOARD. Metal suspension systems for acoustical ceilings are specified in Section 09 51 00 ACOUSTICAL CEILINGS.

1.5 MAXIMUM DEFLECTION

a. Exterior Studs:

<u>Deflection Criteria</u>	<u>Exterior Finish</u>
L/240 or L/360	Synthetic Plaster, Metal Panels
L/360	Cement Plaster, Wood Veneer
L/600	Brick Veneer, Stone Panels

Wall deflections shall be computed on the basis that studs withstand all lateral forces independent of any composite action from sheathing materials. Studs abutting windows or louvers shall also be designed not to exceed 1/4 inch maximum deflection.

b. Floor Joists:

L/360 - Live load only
L/240 - Total load

c. Roof Rafters:

L/240 - Live load only

1.6 QUALITY ASSURANCE

1.6.1 Drawing Requirements

Submit framing components to show sizes, thicknesses, layout, material designations, methods of installation, and accessories.

1.6.2 Design Data Required

Submit metal framing calculations to verify sizes, gages, and spacing of members and connections. Show methods and practices used in installation.

PART 2 PRODUCTS

2.1 STEEL STUDS, TRUSSES JOISTS, TRACKS, BRACING, BRIDGING AND ACCESSORIES

Framing components shall comply with ASTM C 955 and the following.

Material shall be corrosion-resistant steel complying with ASTM A 653/A 653M, Grade 33 or higher, having a minimum yield of 33,000 psi and a G60 minimum zinc coating. Sizes shall be in accordance with drawings, when shown. Design is the responsibility of the cold-form metal supplier's Engineer.

2.1.1 OMITTED - Studs and Joists of 16 Gage (0.0598 Inch) and Heavier

2.1.2 OMITTED - Studs and Joists of 18 Gage (0.0478 Inch) and Lighter

2.1.3 Sizes, Gages, Section Modulus, and Other Structural Properties

Size and gage as indicated. Steel stud deflection shall be limited to L/600 for exterior wall brick veneer construction.

2.2 MARKINGS

Studs and track shall have product markings stamped on the web of the section. The markings shall be repeated throughout the length of the member at a maximum spacing of 4 feet on center and shall be legible and easily read. The product marking shall include the following:

- a. An ICBO number.
- b. Manufacturer's identification.
- c. Minimum delivered uncoated steel thickness.
- d. Protective coating designator.
- e. Minimum yield strength.

2.3 CONNECTIONS

Screws for steel-to-steel connections shall be self-drilling tapping in compliance with SAE J78 of the type, size, and location as shown on the drawings. Electroplated screws shall have a Type II coating in accordance with ASTM B 633. Screws, bolts, and anchors shall be hot-dipped galvanized in accordance with ASTM A 123/A 123M or ASTM A 153/A 153M as appropriate. Screws bolts, and anchors shall be hot dipped galvanized in accordance with ASTM A 123/A 123M or ASTM A 153/A 153M as appropriate.

2.4 PAINT

Ungalvanized steel, if used, shall be thoroughly cleaned, phosphate treated, and coated with corrosion-inhibiting primer, SSPC Paint 25.

2.5 PLASTIC GROMMETS

Supply plastic grommets, recommended by stud manufacturer, to protect electrical wires. Prevent metal to metal contact for plumbing pipes.

PART 3 EXECUTION

3.1 FASTENING

Fasten framing members together by welding or by using self-drilling or self-tapping screws. Electrodes and screw connections shall be as required and indicated in the design calculations.

3.1.1 Welds

All welding shall be performed in accordance with AWS D1.3/D1.3M, as modified by AISI SG02-1. All welders, welding operations, and welding procedures shall be qualified according to AWS D1.3/D1.3M. All welds shall be cleaned and coated with rust inhibitive galvanizing paint. Do not field weld materials lighter than 18 gage.

3.1.2 Screws

Screws shall be of the self-drilling self-tapping type, size, and location shown on the drawings. Screw penetration through joined materials shall not be less than three exposed threads. Minimum spacings and edge distances for screws shall be as specified in AISI SG02-1. Screws covered by sheathing materials shall have low profile heads.

3.1.3 Anchors

Anchors shall be of the type, size, and location shown on the drawings.

3.2 INSTALLATION

3.2.1 Tracks

Provide accurately aligned runners at top and bottom of partitions. Anchor tracks as indicated in design calculations. Butt weld joints in tracks or splice with stud inserts. Fasteners shall be at least 3 inches from the edge of concrete slabs.

3.2.2 Studs

Cut studs square and set with firm bearing against webs of top and bottom tracks. Position studs vertically in tracks and space as indicated in design. Do not splice studs. Provide at least two studs at jambs of doors and other openings 2 feet wide or larger.

3.2.3 Joists and Trusses

Temporary bracing shall be provided and remain in place until work is permanently stabilized.

3.2.4 Erection Tolerances

- a. Framing members which will be covered by finishes such as wallboard, plaster, or ceramic tile set in a mortar setting bed, shall be within the following limits:

- (1) Layout of walls and partitions: 1/4 inch from intended position;
 - (2) Plates and runners: 1/4 inch in 8 feet from a straight line;
 - (3) Studs: 1/4 inch in 8 feet out of plumb, not cumulative; and
 - (4) Face of framing members: 1/4 inch in 8 feet from a true plane.
- b. Framing members which will be covered by ceramic tile set in dry-set mortar, latex-portland cement mortar, or organic adhesive shall be within the following limits:
- (1) Layout of walls and partitions: 1/4 inch from intended position;
 - (2) Plates and runners: 1/8 inch in 8 feet from a straight line;
 - (3) Studs: 1/8 inch in 8 feet out of plumb, not cumulative; and
 - (4) Face of framing members: 1/8 inch in 8 feet from a true plane.

3.2.5 Special Inspection and Testing for Seismic-Resisting Systems

Special inspections and testing for seismic-resisting systems and components shall be done in accordance with Section 01 45 35 SPECIAL INSPECTION FOR SEISMIC-RESISTING SYSTEMS.

-- End of Section --

SECTION 05 50 13

MISCELLANEOUS METAL FABRICATIONS
08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ALUMINUM ASSOCIATION (AA)

AA 46 (1978) Standards for Anodized
Architectural Aluminum

AA DAF-45 (2003) Designation System for Aluminum
Finishes

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 2603 (2002) Voluntary Specification,
Performance Requirements and Test
Procedures for Pigmented Organic Coatings
on Aluminum Extrusions and Panels

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 303 (2005) Code of Standard Practice for Steel
Buildings and Bridges

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.3 (2006) Operations - Safety Requirements
for Powder Actuated Fastening Systems

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2008; Errata 2009) Structural Welding
Code - Steel

ASME INTERNATIONAL (ASME)

ASME B18.2.1 (1996; Addenda A 1999; Errata 2003; R
2005) Square and Hex Bolts and Screws
(Inch Series)

ASME B18.2.2 (1987; R 2005) Standard for Square and Hex
Nuts

ASME B18.21.1 (1999; R 2005) Lock Washers (Inch Series)

ASME B18.22.1 (1965; R 2008) Plain Washers

ASME B18.6.2 (1998; R 2005) Slotted Head Cap Screws,

Square Head Set Screws, and Slotted
Headless Set Screws: Inch Series

ASME B18.6.3

(2003; R 2008) Machine Screws and Machine
Screw Nuts

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M

(2008) Standard Specification for Zinc
(Hot-Dip Galvanized) Coatings on Iron and
Steel Products

ASTM A 153/A 153M

(2009) Standard Specification for Zinc
Coating (Hot-Dip) on Iron and Steel
Hardware

ASTM A 307

(2007b) Standard Specification for Carbon
Steel Bolts and Studs, 60 000 PSI Tensile
Strength

ASTM A 36/A 36M

(2008) Standard Specification for Carbon
Structural Steel

ASTM A 47/A 47M

(1999; R 2004) Standard Specification for
Steel Sheet, Aluminum-Coated, by the
Hot-Dip Process

ASTM A 500/A 500M

(2007) Standard Specification for
Cold-Formed Welded and Seamless Carbon
Steel Structural Tubing in Rounds and
Shapes

ASTM A 53/A 53M

(2007) Standard Specification for Pipe,
Steel, Black and Hot-Dipped, Zinc-Coated,
Welded and Seamless

ASTM A 653/A 653M

(2009) Standard Specification for Steel
Sheet, Zinc-Coated (Galvanized) or
Zinc-Iron Alloy-Coated (Galvannealed) by
the Hot-Dip Process

ASTM A 687

(1993) Standard Specification for
High-Strength Nonheaded Steel Bolts and
Studs

ASTM A 780

(2001; R 2006) Standard Practice for
Repair of Damaged and Uncoated Areas of
Hot-Dip Galvanized Coatings

ASTM A 924/A 924M

(2009) Standard Specification for General
Requirements for Steel Sheet,
Metallic-Coated by the Hot-Dip Process

ASTM B 209

(2007) Standard Specification for Aluminum
and Aluminum-Alloy Sheet and Plate

ASTM B 210

(2004) Standard Specification for Aluminum
and Aluminum-Alloy Drawn Seamless Tubes

ASTM B 221	(2008) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 26/B 26M20	(2009) Standard Specification for Aluminum-Alloy Sand Castings
ASTM B 429/B 429M	(2006) Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
ASTM B 632/B 632M	(2008) Standard Specification for Aluminum-Alloy Rolled Tread Plate
ASTM D 1187	(1997; R 2002e1) Asphalt-Base Emulsions for Use as Protective Coatings for Metal
ASTM E 488	(1996; R 2003) Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements

MASTER PAINTERS INSTITUTE (MPI)

MPI 79	(Jan 2004) Alkyd Anti-Corrosive Metal Primer
--------	--

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM AMP 521	(2001) Pipe Railing Manual
---------------	----------------------------

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 3	(2004; E 2004) Power Tool Cleaning
SSPC SP 6	(2007) Commercial Blast Cleaning

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Expansion joint covers, installation drawings
TEMPORARY RAMP AND HANDRAILS

Embedded angles and plates, installation drawings

Submit fabrication drawings showing layout(s), connections to structural system, and anchoring details as specified in AISC 303.

Submit templates, erection and installation drawings indicating thickness, type, grade, class of metal, and dimensions. Show construction details, reinforcement, anchorage, and installation with relation to the building construction.

SD-03 Product Data

TEMPORARY RAMP AND HANDRAILS
Expansion joint covers
Preformed Foam Joint Systems
Television Mount
PROJECTOR MOUNTS
Fence and Gate

Local/Regional Materials

Documentation indicating distance between manufacturing facility and the project site, and distance of raw material origin from the project site.

Recycled Content

Manufacturer's descriptive data. Documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product.

SD-04 Samples

Expansion joint covers

Provide full size samples, taken from manufacturer's stock, and be complete as required for installation in the structure. Samples may be installed in the work, provided each sample is clearly identified and its location recorded.

Fence and Gate

Provide color samples.

1.3 QUALIFICATION OF WELDERS

Qualify welders in accordance with AWS D1.1/D1.1M. Use procedures, materials, and equipment of the type required for the work.

1.4 DELIVERY, STORAGE, AND PROTECTION

Protect from corrosion, deformation, and other types of damage. Store items in an enclosed area free from contact with soil and weather. Remove and replace damaged items with new items.

1.5 SUSTAINABLE DESIGN REQUIREMENTS

1.5.1 Local/Regional Materials

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Miscellaneous metal materials may be locally available.

1.5.2 Recycled Content

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total recycled material requirements. Miscellaneous metals made with recycled content may be used to meet cumulative project totals.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Structural Carbon Steel

ASTM A 36/A 36M.

2.1.2 Structural Tubing

ASTM A 500/A 500M.

2.1.3 Steel Pipe

ASTM A 53/A 53M, Type E or S, Grade B.

2.1.4 Fittings for Steel Pipe

Standard malleable iron fittings ASTM A 47/A 47M.

2.1.5 Anchor Bolts

ASTM A 307. Where exposed, shall be of the same material, color, and finish as the metal to which applied.

2.1.5.1 Expansion Anchors and Sleeve Anchors

Provide expansion anchors and sleeve anchors. Minimum masonry embedment shall be as indicated. Design values listed shall be as tested according to ASTM E 488.

2.1.5.2 Lag Screws and Bolts

ASME B18.2.1, type and grade best suited for the purpose.

2.1.5.3 Toggle Bolts

ASME B18.2.1.

2.1.5.4 Bolts, Nuts, Studs and Rivets

ASME B18.2.2 and ASTM A 687 or ASTM A 307.

2.1.5.5 Powder Driven Fasteners

Follow safety provisions of ASSE/SAFE A10.3.

2.1.5.6 Screws

ASME B18.2.1, ASME B18.6.2, and ASME B18.6.3.

2.1.5.7 Washers

Provide plain washers to conform to ASME B18.22.1. Provide beveled washers for American Standard beams and channels, square or rectangular, tapered in thickness, and smooth. Provide lock washers to conform to ASME B18.21.1.

2.1.6 Aluminum Alloy Products

Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.

- a. Aluminum Sheet Plate: [ASTM B 209](#), Alloy 6061-T6.
- b. Aluminum-alloy Rolled Tread Plate: [ASTM B 632/B 632M](#), Alloy 6063-T6.
- c. Extruded Bars and Tubing: [ASTM B 221](#), Alloy 6063-T5/T52.
- d. Extruded Structural Pipe and Round Tubing: [ASTM B 429/B 429M](#), Alloy 6063-T6.
- e. Drawn Seamless Tubing: [ASTM B 210](#), Alloy 6063-T832.
- f. Plate and Sheet: [ASTM B 209](#), Alloy 6061-T6.
- g. Castings: [ASTM B 26/B 26M](#), Alloy A356.0-T6.

Provide aluminum extrusions at least [1/8 inch](#) thick and aluminum plate or sheet at least [0.050 inch](#) thick.

2.2 FABRICATION FINISHES

2.2.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Galvanizing: [ASTM A 123/A 123M](#), [ASTM A 153/A 153M](#), [ASTM A 653/A 653M](#) or [ASTM A 924/A 924M](#), G90, as applicable.

2.2.2 Galvanize

Anchor bolts, grating fasteners, washers, and parts or devices necessary for proper installation, unless indicated otherwise.

2.2.3 Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint conforming to [ASTM A 780](#) or by application of stick or thick paste material specifically designed for repair of galvanizing, as approved by Contracting Officer. Clean areas to be repaired and remove slag from welds. Heat surfaces to which stick or paste material is applied, with a torch to a temperature sufficient to melt the metallics in stick or paste; spread molten material uniformly over surfaces to be coated and wipe off excess material.

2.2.4 Shop Cleaning and Painting

2.2.4.1 Surface Preparation

Blast clean surfaces in accordance with [SSPC SP 6](#). Surfaces that will be exposed in spaces above ceiling or in attic spaces, crawl spaces, furred spaces, and chases may be cleaned in accordance with [SSPC SP 3](#) in lieu of being blast cleaned. Wash cleaned surfaces which become contaminated with rust, dirt, oil, grease, or other contaminants with solvents until thoroughly clean. Steel to be embedded in concrete shall be free of dirt and grease. Do not paint or galvanize bearing surfaces, including contact surfaces within slip critical joints, but coat with rust preventative applied in the shop.

2.2.4.2 Pretreatment, Priming and Painting

Apply pretreatment, primer, and paint in accordance with manufacturer's printed instructions. On surfaces concealed in the finished construction or not accessible for finish painting, apply an additional prime coat to a minimum dry film thickness of 1.0 mil. Tint additional prime coat with a small amount of tinting pigment.

2.2.5 Nonferrous Metal Surfaces

Protect by plating, anodic, or organic coatings.

2.2.6 Aluminum Surfaces

2.2.6.1 Surface Condition

Before finishes are applied, remove roll marks, scratches, rolled-in scratches, kinks, stains, pits, orange peel, die marks, structural streaks, and other defects which will affect uniform appearance of finished surfaces.

2.2.6.2 Aluminum Finishes

Unexposed sheet, plate and extrusions may have mill finish as fabricated. Sandblast castings' finish, medium, AA DAF-45, or AA 46. Rolled tread plate may have mill finish as fabricated. Unless otherwise specified, provide all other aluminum items with a anodized finish. Provide a coating thickness not less than that specified for protective and decorative type finishes for items used in interior locations or architectural Class I type finish for items used in exterior locations in AA DAF-45. Provide a polished satin finish on items to be anodized.

2.3 MECHANICAL YARD FENCE AND GATE

Provide aluminum fence and gate as indicated. Gate shall be swing type. All welds shall be ground smooth. Gate frame shall be square aluminum tube and vertical pickets shall be square aluminum tubes. Provide square aluminum tube sag bars as required by manufacturer's design. Provide four (4) hinges for each gate and drop bolts. Provide hasp for padlock. Provide baked enamel or powder coat finish, complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mils.

2.4 TEMPORARY RAMP AND HANDRAILS

Provide temporary aluminum platform, ramp and handrails as shown on the Drawings.

2.4.1 Design Loads

Design platforms and ramps to sustain a live load of not less than 100 pounds per square foot, or a concentrated load of 300 applied where it is most critical.

Design handrails to resist a concentrated load of 200 lbs. in any direction at any point of the top of the rail or 50 lbs per foot applied horizontally to top of the rail, whichever is more severe. Design infill of guard rails to resist a concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft. NAAMM AMP 521, provide the same size rail and post. Provide pipe collars of the same material and finish as the handrail and posts.

2.4.2 Fabrication

Use materials of size and thicknesses indicated or, if not indicated, of required size and thickness to produce adequate strength and durability in finished product for intended use. Work materials to dimensions indicated on approved detail drawings, using proven details of fabrication and support. Use type of materials indicated or specified for the various components of work.

Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately $\frac{1}{32}$ inch, and bend metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.

Continuously weld corners and seams in accordance with the recommendations of AWS D1.1/D1.1M. Grind smooth exposed welds and flush to match and blend with adjoining surfaces.

Form exposed connections with hairline joints that are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type indicated or, if not indicated, use Phillips flathead (countersunk) screws or bolts.

Provide and coordinate anchorage of the type indicated with the supporting structure. Fabricate anchoring devices, space as indicated and required to provide adequate support for the intended use of the work.

2.5 EXPANSION JOINT COVERS

Provide expansion joint covers constructed of extruded aluminum with anodized satin aluminum finish for walls and ceilings. Furnish plates, backup angles, expansion filler strip and anchors as indicated and in accordance with manufacturer's written instructions. Expansion joint system shall provide the same fire rating as the wall or floor system in which it is installed.

2.5.1 Preformed Foam Joint Systems

Provide preformed, precompressed, open-cell foam joint system with silicone face that develops a watertight and airtight seal when compressed to the degree required by manufacturer, and complying with the following:

- a. Composition: High-density urethane foam impregnated with a polymer modified acrylic agent, containing no waxes or asphalts, wax compounds or asphalt compounds.
- b. Low-modulus silicone sealant applied to partially compressed face and cured before final compression.
- c. Precompressed sizes in roll or stick form to fit joint widths indicated.
- d. Coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.
- e. Permanently elastic, mildew resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.
- f. Minimum joint movement capability of +25 percent, -25 percent (50 percent total) of nominal material size.

2.6 MISCELLANEOUS PLATES AND SHAPES

Provide for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings and frames. Provide lintels fabricated from structural steel shapes over openings in masonry walls and partitions as indicated and as required to support wall loads over openings. Provide with connections and fasteners. Construct to have at least 8 inches bearing on masonry at each end.

Provide angles and plates, ASTM A 36/A 36M, for embedment as indicated. Galvanize embedded items exposed to the elements according to ASTM A 123/A 123M.

2.7 TELEVISION MOUNT

Provide pivot wall arm mount, constructed to accommodate 22 to 40 inch LCD screens. Mount shall have the ability to rotate in a minimum of 180 degrees horizontally, a minimum of 20 degrees vertically, and a minimum of 7 degrees roll in either direction. The mount shall be combined with the appropriate tamperproof mounting hardware for installation. Mount the unit in accordance with the instructions provided. Mount shall be UL and C-UL listed. The mount shall have anodized or powder paint finish of black color.

2.8 DOWNSPOUT BOOTS

Provide cast iron downspout boots with receiving bells sized to fit downspouts.

2.9 WINDOW SUB-SILL - Refer to Division 08 Specification.

2.10 PROJECTOR MOUNTS

Preassembled ceiling projector mount with adjustable pitch, roll and yaw, complete with hardware for installation. Coordinate installation with interactive whiteboards specified in 10 10 00 VISUAL COMMUNICATIONS SPECIALTIES. Refer to electrical drawings for special systems.

Ceiling Plates: Provide metal supporting plate for suspended ceiling with a minimum load bearing capacity of 250 lbs and knock-outs for electrical and data cabling.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

Install items at locations indicated, according to manufacturer's instructions. Verify all measurements and take all field measurements necessary before fabrication. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and harmonize with the material to which fastenings are applied. Include materials and parts necessary to complete each item, even though such work is not definitely shown or specified. Poor matching of holes for fasteners shall be cause for rejection. Conceal fastenings where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Form joints exposed to the weather shall be formed to exclude water. Items listed below require additional procedures.

3.2 WORKMANSHIP

Provide miscellaneous metalwork that is well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Provide continuous welding along the entire area of contact except where tack welding is permitted. Do not tack weld exposed connections of work in place and ground smooth. Provide a smooth finish on exposed surfaces of work in place and unless otherwise approved, flush exposed riveting. Mill joints where tight fits are required. Corner joints shall be coped or mitered, well formed, and in true alignment. Accurately set work to established lines and elevations and securely fastened in place. Install in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

3.3 ANCHORAGE, FASTENINGS, AND CONNECTIONS

Provide anchorage where necessary for fastening miscellaneous metal items securely in place. Include for anchorage not otherwise specified or indicated slotted inserts, expansion shields, and powder-driven fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screws for wood. Do not use wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish, to which fastenings are applied. Conceal fastenings where practicable.

3.4 BUILT-IN WORK

Form for anchorage metal work built-in with concrete or masonry, or provide with suitable anchoring devices as indicated or as required. Furnish metal work in ample time for securing in place as the work progresses.

3.5 WELDING

Perform welding, welding inspection, and corrective welding, in accordance with [AWS D1.1/D1.1M](#). Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

3.6 FINISHES

3.6.1 Dissimilar Materials

Where dissimilar metals are in contact, protect surfaces with a coat conforming to [MPI 79](#) to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect with [ASTM D 1187](#), asphalt-base emulsion.

3.6.2 Field Preparation

Remove rust preventive coating just prior to field erection, using a remover approved by the rust preventive manufacturer. Surfaces, when assembled, shall be free of rust, grease, dirt and other foreign matter.

3.6.3 Environmental Conditions

Do not clean or paint surface when damp or exposed to foggy or rainy weather, when metallic surface temperature is less than [5 degrees F](#) above

the dew point of the surrounding air, or when surface temperature is below 45 degrees F or over 95 degrees F, unless approved by the Contracting Officer.

3.7 ACCESS PANELS

Install a removable access panel not less than 12 by 12 inches directly below each valve, flow indicator, damper, or air splitter that is located above the ceiling, other than an acoustical ceiling, and that would otherwise not be accessible.

3.8 PREFORMED FOAM JOINT SYSTEMS

Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to joint material in compliance with manufacturer's written instructions.

3.9 INSTALLATION OF DOWNSPOUT BOOTS

Secure downspouts to building through integral lips with appropriate fasteners.

3.10 INSTALLATION OF TEMPORARY PLATFORM AND RAMPS

Comply with manufacturer's written instructions and approved shop drawings to ensure stable and compliant assembly. Provide anchorage devices and fasteners where necessary to securing platform and ramps to in-place construction.

-- End of Section --

SECTION 06 10 00

ROUGH CARPENTRY

11/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN FOREST & PAPER ASSOCIATION (AF&PA)

AF&PA T10 (2001) Wood Frame Construction Manual for One- and Two-Family Dwellings

AF&PA T101 (2001) National Design Specification (NDS) for Wood Construction

AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC)

AITC OT-01 (2004) Timber Construction Manual

AMERICAN LUMBER STANDARDS COMMITTEE (ALSC)

ALSC PS 20 (1970) American Softwood Lumber Standard

AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

AWPA C20 (2003) Structural Lumber Fire-Retardant Treatment by Pressure Processes

AWPA C27 (2002) Plywood - Fire-Retardant Treatment by Pressure Processes

AWPA M2 (2001) Standard for Inspection of Treated Wood Products

AWPA M6 (1996) Brands Used on Forest Products

AWPA P5 (2005) Standard for Waterborne Preservatives

AWPA T1 (2004; R 2005) Use Category System: Processing and Treatment Standard

AWPA U1 (2004; R 2005) Use Category System: User Specification for Treated Wood

APA - THE ENGINEERED WOOD ASSOCIATION (APA)

APA E445S (2001; R 2002) Performance Standards and Qualification Policy for Structural-Use Panels (APA PRP-108)

APA EWS T300E (2005) Technical Note: Glulam Connection

Details

APA F405L	(1999) Performance Rated Panels
APA PS 1	(1995) Voluntary Product Standard for Construction and Industrial Plywood
APA PS 2	(2004) Voluntary Product Standard for Wood-Based Structural-Use Panels
ASME INTERNATIONAL (ASME)	
ASME B18.2.1	(1996; Addenda A 1999; Errata 2003; R 2005) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987; R 2005) Standard for Square and Hex Nuts
ASME B18.5.2.1M	(2006) Metric Round Head Short Square Neck Bolts
ASME B18.5.2.2M	(1982; R 2005) Metric Round Head Square Neck Bolts
ASME B18.6.1	(1981; R 2008) Wood Screws (Inch Series)
ASTM INTERNATIONAL (ASTM)	
ASTM A 307	(2007b) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
ASTM A 687	(1993) Standard Specification for High-Strength Nonheaded Steel Bolts and Studs
ASTM C 1002	(2007) Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
ASTM C 1177/C 1177M	(2008) Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
ASTM C 1396/C 1396M	(2006a) Standard Specification for Gypsum Board
ASTM C 954	(2007) Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
ASTM D 2898	(2008e1) Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing

ASTM F 1667	(2005) Driven Fasteners: Nails, Spikes, and Staples
ASTM F 547	(2006) Nails for Use with Wood and Wood-Base Materials
FM GLOBAL (FM)	
FM DS 1-49	(2000) Perimeter Flashing
GYPSUM ASSOCIATION (GA)	
GA 253	(2007) Application of Gypsum Sheathing
INTERNATIONAL CODE COUNCIL (ICC)	
ICC IBC	(2006; Errata 2006; Errata 2007; Supplement 2007; Errata 2007) International Building Code
NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION (NELMA)	
NELMA Grading Rules	(2003) Standard Grading Rules for Northeastern Lumber
SOUTHERN CYPRESS MANUFACTURERS ASSOCIATION (SCMA)	
SCMA Spec	(1986; Supple. No. 1, Aug 1993) Standard Specifications for Grades of Southern Cypress
SOUTHERN PINE INSPECTION BUREAU (SPIB)	
SPIB 1003	(2002) Standard Grading Rules for Southern Pine Lumber
TRUSS PLATE INSTITUTE (TPI)	
TPI 1	(2002) National Design Standard for Metal Plate Connected Wood Truss Construction; Commentary and Appendices
U.S. GENERAL SERVICES ADMINISTRATION (GSA)	
CID A-A-1923	(Rev A; Notice 1) Shield, Expansion (Lag, Machine and Externally Threaded Wedge Bolt Anchors)
CID A-A-1924	(Rev A; Notice 1) Shield, Expansion (Self Drilling Tubular Expansion Shell Bolt Anchors)
CID A-A-1925	(Rev A; Notice 1) Shield Expansion (Nail Anchors)
FS FF-B-588	(Rev E) Bolt, Toggle: and Expansion Sleeve, Screw
FS FF-T-1813	(Basic) Tack

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Nailers and Nailing Strips

Drawings of field erection details, including materials and methods of fastening nailers in conformance with Factory Mutual wind uplift rated systems specified in other Sections of these specifications.

Blocking

SD-03 Product Data

Moisture Barrier

Submit manufacturer's written instructions for installation.

Gypsum Wall Sheathing

Local/Regional Materials; L

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site. Indicate relative dollar value of local/regional materials to total dollar value of products included in project.

Recycled Content; L

Submit documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project. Where recycled lumber materials are used for structural applications, include lumber Oriented Strand Board; (LEED); (LEED)

Composite Wood MaterialL

Documentation indicating that composite wood materials and shop-applied and field applied adhesives contain no added urea formaldehyde resins.

Adhesives; L

Submit manufacturer's product data, indicating VOC content.

SD-06 Test Reports

Preservative-treated lumber and plywood

SD-07 Certificates

Certificates of grade

Manufacturer's certificates (approved by an American Lumber Standards approved agency) attesting that lumber and material not normally grade marked meet the specified requirements. Certificate of Inspection for grade marked material by an American Lumber Standards Committee (ALSC) recognized inspection agency prior to shipment.

Preservative treatment

SD-11 Closeout Submittals

Local/Regional Materials; L

LEED documentation relative to local/regional materials credit in accordance with LEED Reference Guide. Include in LEED Documentation Notebook.

LEED documentation relative to recycled content credit in accordance with LEED Reference Guide. Include in LEED Documentation Notebook.

Adhesives; L

LEED documentation relative to low emitting materials credit in accordance with LEED Reference Guide. Include in LEED
Structural-use and OSB Panels; (LEED)

1.3 DELIVERY AND STORAGE

Deliver materials to the site in an undamaged condition. Store materials off the ground to provide proper ventilation, with drainage to avoid standing water, and protection against ground moisture and dampness. Store materials with a moisture barrier at both the ground level and as a cover forming a well ventilated enclosure. Remove defective and damaged materials and provide new materials.

1.4 INDOOR ENVIRONMENTAL QUALITY (IEQ)

1.4.1 Low-Emitting Materials

Adhesives and sealants used on the wood and plywood products for this project shall be low-emitting, non-irritating, nontoxic and chemically inert. Adhesives shall meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168. VOC content of wood adhesives shall not exceed 1 ounce per quart.

1.4.2 Composite Wood Material

Provide composite wood materials and shop and field-applied adhesives, that contain no added urea-formaldehyde resins.

1.5 GRADING AND MARKING

1.5.1 Lumber

Mark each piece of framing and board lumber or each bundle of small pieces of lumber with the grade mark of a recognized association or independent inspection agency. Such association or agency shall be certified by the

Board of Review, American Lumber Standards Committee, to grade the species used. Surfaces that are to be exposed to view shall not bear grademarks, stamps, or any type of identifying mark. Hammer marking will be permitted on timbers when all surfaces will be exposed to view.

1.5.2 Plywood

Mark each sheet with the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood. The mark shall identify the plywood by species group or span rating, exposure durability classification, grade, and compliance with **APA PS 1**. Surfaces that are to be exposed to view shall not bear grademarks or other types of identifying marks.

1.5.3 Structural-Use and OSB Panels

Mark each panel with the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the panel. The mark shall indicate end use, span rating, and exposure durability classification. Oriented Strand Board (OSB), **APA F405L**.

1.5.4 Preservative-Treated Lumber and Plywood

The Contractor shall be responsible for the quality of treated wood products. Each treated piece shall be inspected in accordance with **AWPA M2** and permanently marked or branded, by the producer, in accordance with **AWPA M6**. The Contractor shall provide Contracting Officer's Representative (COR) with the inspection report of an approved independent inspection agency that offered products comply with applicable AWPA Standards. The appropriate Quality Mark on each piece will be accepted, in lieu of inspection reports, as evidence of compliance with applicable AWPA treatment standards.

1.6 SIZES AND SURFACING

ALSC PS 20 for dressed sizes of yard and structural lumber. Lumber shall be surfaced four sides. Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced. Other measurements are IP or SI standard.

1.7 MOISTURE CONTENT

Air-dry or kiln-dry lumber. Kiln-dry treated lumber after treatment. Maximum moisture content of wood products shall be as follows at the time of delivery to the job site:

- a. Framing lumber and boards - 19 percent maximum
- b. Materials other than lumber - Moisture content shall be in accordance with standard under which the product is produced

1.8 PRESERVATIVE TREATMENT

Treat wood products with waterborne wood preservatives conforming to **AWPA P5**. Pressure treatment of wood products shall conform to the requirements of **AWPA U1** and **AWPA T1**. Pressure-treated wood products shall not contain arsenic, chromium, or other agents classified as carcinogenic, probably carcinogenic, or possibly carcinogenic to humans (compounds in Groups 1, 2A, or 2B) by the International Agency for Research on Cancer (IARC), Lyon,

France. Pressure-treated wood products shall not exceed the limits of the U.S. EPA's Toxic Characteristic Leaching Procedure (TCLP), and shall not be classified as hazardous waste. Submit certification from treating plant stating chemicals and process used and net amount of preservatives retained are in conformance with specified standards.. Provide treated material conforming to the requirements of the following use categories.

- a. AWP A U1-UC1: Interior, dry applications.
- b. AWP A U1-UC2: Interior, potentially damp applications, such as sole plates.
- c. AWP A U1-UC3A: Exterior, coated, not in ground contact.
- d. AWP A U1-UC3B: Exterior, uncoated, not in ground contact.
- a. AWP A U1-UC4A: Exterior, in normal ground contact, such as fence posts.

All wood shall be air or kiln dried after treatment. Specific treatments shall be verified by the report of an approved independent inspection agency, or the AWP A Quality Mark on each piece. Do not incise surfaces of lumber that will be exposed. Brush coat areas that are cut or drilled after treatment with either the same preservative used in the treatment or with a 2 percent copper naphthenate solution. The following items shall be preservative treated:

- 1. Wood members that are in contact with water.
- 2. Wood plates, soles, plates, furring, and sleepers that are less than 24 inches from the ground, furring and nailers that are set into or in contact with concrete or masonry.
- 3. Nailers, edge strips, crickets, curbs, and cants for roof decks.

1.9 FIRE-RETARDANT TREATMENT

Fire-retardant treated wood shall be pressure treated in accordance with AWP A C20 for lumber and AWP A C27 for plywood. Material use shall be defined in AWP A C20 and AWP A C27 for Interior Type A and B. Treatment and performance inspection shall be by an independent and qualified testing agency that establishes performance ratings. Each piece or bundle of treated material shall bear identification of the testing agency to indicate performance in accordance with such rating. Treated materials to be exposed to rain wetting shall be subjected to an accelerated weathering technique in accordance with ASTM D 2898 prior to being tested. Such items which will not be inside a building, and such items which will be exposed to heat or high humidity, shall receive exterior fire-retardant treatment. Fire-retardant-treated wood products shall be free of halogens, sulfates, ammonium phosphate, and formaldehyde. Items to be treated include the following:

- a. Plywood electrical backing panels.

1.10 QUALITY ASSURANCE

1.10.1 Certificates of Grade

Submit certificates attesting that products meet the grade requirements specified in lieu of grade markings where appearance is important and grade marks will deface material.

1.11 SUSTAINABLE DESIGN REQUIREMENTS

1.11.1 Local/Regional Materials

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Wood, wood products and gypsum sheathing may be locally available.

1.11.2 Recycled Content

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total for recycled content. Glass-mat gypsum sheathing may be available with recycled content.

PART 2 PRODUCTS

2.1 LUMBER

2.1.1 Framing Lumber

Framing lumber such as blocking and nailers. Minimum grade of species shall be as listed.

Table of Grades for Framing and Board Lumber

<u>Grading Rules</u>	<u>Species</u>	<u>Framing</u>	<u>Board Lumber</u>
SPIB 1003 standard grading rules	Southern Pine	Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	No. 2 Boards
SCMA Spec standard specifications	Cypress	No. 2 Common	No. 2 Common
NELMA Grading Rules standard grading rules	Balsam Fir Eastern Hemlock -Tamarack Eastern Spruce Eastern White Pine Northern Pine Northern Pine Cedar	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	All Species: No. 3 Common except Stan- dard for Eastern White and Northern Pine

2.2 PLYWOOD, STRUCTURAL-USE, AND ORIENTED STRAND BOARD (OSB) PANELS

APA PS 1, APA PS 2, APA E445S, and APA F405L respectively.

2.2.1 Structural-Use and OSB Panels

Structural-use and OSB panels for temporary closure structures.

2.3 OTHER MATERIALS

2.3.1 Glass-mat Gypsum Wall Sheathing

Glass-mat Gypsum sheathing that is installed on the exterior side of the framing system shall have a minimum thickness of 5/8 inch and shall be 4 feet wide. Glass mat gypsum sheathing shall conform to ASTM C 1396/C 1396M and ASTM C 1177/C 1177M. Glass mat gypsum sheathing shall have a water-resistant core with a water-resistant glass mat embedded onto core and shall have a zero flame, zero smoke developed, and shall have mold and mildew resistant surface.

2.3.1.1 Sheathing Tape

Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

2.3.2 Moisture Barrier

The moisture barrier shall be a Type I air barrier complying with ASTM E 1677; with a flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized, and complying with the following:

Water-vapor permeance: Not less than 150 g through 1 sq. m. of surface in 24 hours per ASTM E 96/E 96 M, Desiccant Method (Procedure A).

Air Permeance: Not more than 0.001 cfm/sq.ft. at 0.3-inch wg (0.02 L/s x sq. m at 75 Pa) when tested according to ASTM E 2178.

Minimum Weight: 2.7 oz/sq.yd.

Tear Strength: 20/10 per ASTM D 1117.

Allowable UV exposure: Not less than three months.

Available Product: DuPont: Tyvek "Commercial Wrap."

Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap."

2.3.2.1 Flexible Flashing

Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.040 inch (1.0 mm).

Available Products include the following:

DuPont (E. I. du Pont de Nemours and Company); DuPont Flashing Tape.

DuPont (E. I. du Pont de Nemours and Company); DuPont Flashing Tape.

Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Vycor Butyl Self Adhered Flashing.

2.3.3 Miscellaneous Wood Members

2.3.3.1 Nonstress Graded Members

Members shall include bridging, corner bracing, furring, grounds, and nailing strips. Members shall be in accordance with TABLE I for the

species used. Sizes shall be as follows unless otherwise shown:

Member	Size (inch)
Furring	1 x 3.
Grounds	Plaster thickness by 38.
Nailing strips	1 x 3 or 1 x 4 when used as shingle base or interior finish, otherwise 2 inch stock.

2.3.3.2 Blocking

Blocking shall be standard or number 2 grade.

a. Provide blocking inside of walls where required for loading of grab bars, casework, and other wall mounted items indicated. Contractor's Option: Provide metal blocking in lieu of wood blocking. Submit shop drawings and product data including metal types and gages, screw types, pull-out test reports, design analysis with live & dead loads for items supported such as casework and grab bars, and installation plans including fastener spacing.

2.3.4 Adhesives

Comply with applicable regulations regarding toxic and hazardous materials and as specified. Interior adhesives, sealants, primers and sealants used as filler must meet the requirements of LEED low emitting materials credit.

2.4 ROUGH HARDWARE

Unless otherwise indicated or specified, rough hardware shall be of the type and size necessary for the project requirements. Sizes, types, and spacing of fastenings of manufactured building materials shall be as recommended by the product manufacturer unless otherwise indicated or specified. Rough hardware exposed to the weather or embedded in or in contact with preservative treated wood, exterior masonry, or concrete walls or slabs shall be zinc-coated.

2.4.1 Bolts, Nuts, Studs, and Rivets

ASME B18.2.1, ASME B18.5.2.1M, ASME B18.5.2.2M, ASME B18.2.2, and ASTM A 687.

2.4.2 Anchor Bolts

ASTM A 307, size as indicated, complete with nuts and washers.

2.4.3 Expansion Shields

CID A-A-1923, CID A-A-1924, and CID A-A-1925. Except as shown otherwise, maximum size of devices shall be 3/8 inch.

2.4.4 Lag Screws and Lag Bolts

ASME B18.2.1.

2.4.5 Toggle Bolts

FS FF-B-588.

2.4.6 Screws

Wood Screws: ASME B18.6.1.

Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating.

- a. For steel framing less than 0.0329 inch (0.835 mm) thick, use screws that comply with ASTM C 1002.
- b. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C 954.

2.4.7 Wood Screws

ASME B18.6.1.

2.4.8 Nails and Staples

ASTM F 547, size and type best suited for purpose; staples shall be as recommended by the manufacturer of the materials to be joined. In general, 8-penny or larger nails shall be used for nailing through 1 inch thick lumber and for toe nailing 2 inch thick lumber; 16-penny or larger nails shall be used for nailing through 2 inch thick lumber. Nails used with treated lumber and sheathing shall be galvanized. Nailing shall be in accordance with the recommended nailing schedule contained in AF&PA T10. Where detailed nailing requirements are not specified, nail size and spacing shall be sufficient to develop an adequate strength for the connection. The connection's strength shall be verified against the nail capacity tables in AF&PA T101. Reasonable judgment backed by experience shall ensure that the designed connection will not cause the wood to split. If a load situation exceeds a reasonable limit for nails, a specialized connector shall be used.

2.4.9 Wire Nails

ASTM F 1667.

2.4.10 Tacks

FS FF-T-1813.

2.4.11 Timber Connectors

Unless otherwise specified, timber connectors shall be in accordance with TPI 1, APA EWS T300E or AITC OT-01.

2.4.12 Clip Angles

Steel, $3/16$ inch thick, size as indicated; or zinc-coated steel or iron commercial clips designed for connecting wood members.

PART 3 EXECUTION

3.1 INSTALLATION

Conform to **AF&PA T10** unless otherwise indicated or specified. Fit framing lumber and other rough carpentry, set accurately to the required lines and levels, and secure in place in a rigid manner. Spiking and nailing not indicated or specified otherwise shall be in accordance with the Nailing Schedule contained in **ICC IBC**; perform bolting in an approved manner. Spikes, nails, and bolts shall be drawn up tight.

3.1.1 Glass-mat Gypsum Sheathing Board

Comply with **GA 253** and manufacturer's written instructions. Fasten gypsum sheathing to cold-formed metal framing with screws. Apply gypsum sheathing board either horizontally or vertically. Butt joints and locate over the centerlines of supports. Horizontally applied sheathing shall be T&G, applied with tongued edge up. Stagger vertical joints and abut sheet closely to frames of openings. Nail sheathing with 11 gage, $3/8$ inch head, zinc-coated nails $1\ 1/2$ inches long for $1/2$ inch sheathing and $1\ 3/4$ inches long for $5/8$ inch sheathing, spaced $3/8$ inch minimum from edges. Provide 2 by 4 blocking for horizontal edges of 4 foot wide panels not otherwise supported.

Seal sheathing joints according to manufacturer's written instructions. Apply glass-fiber sheathing tap to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

- a. Gypsum Sheathing Board Used with Diagonal-Braced Framing: Sheathing shall be either 2 or 4 feet wide. Apply sheathing 2 feet wide horizontally. Nail 4 inches maximum o.c. at edges and over intermediate bearings. Apply sheathing 4 feet wide either horizontally or vertically. Nail 4 inches maximum o.c. at edges and 8 inches maximum o.c. at intermediate bearings.
- b. Gypsum Sheathing Board Used with Unbraced Frames: Sheathing shall be 4 feet wide and applied vertically. Extend sheathing over and nail to both sill and top plates. Nail 4 inches maximum o.c. at edges and 8 inches maximum o.c. at intermediate bearings.

3.2 MOISTURE PROTECTION

3.2.1 Moisture Barrier

The air barrier shall be installed on the outer face of the exterior sheathing. The moisture barrier shall be installed horizontally and shingled with each sheet lapped as recommended by manufacturer over the sheet below. Comply with **manufacturer's written instructions**.

Seal seams, edges, fasteners, and penetrations with tape. Extend into jambs of openings and seal corners with tape.

3.2.1.1 Flexible Flashing

Apply flexible flashing where indicated to comply with manufacturer's written instructions.

Prime substrates as recommended by manufacturer.

Lap seams and junctions with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed width of flange.

Lap moisture barrier over flashing at heads of openings.

After flashing has been applied, roll surfaces with hard rubber or metal roller to ensure that flashing is completely adhered to substrate.

3.3 MISCELLANEOUS

3.3.1 Wood Roof Nailers, Edge Strips, Crickets, Curbs, and Cants

Provide sizes and configurations indicated or specified and anchored securely to continuous construction.

3.3.1.1 Roof Nailing Strips

Provide roof nailing strips for roof decks as indicated and specified herein. Apply nailing strips in straight parallel rows in the direction and spacing. Strips shall be surface applied.

- a. Surface-Applied Nailers: Shall be 3 inches wide and of thickness to finish flush with the top of the insulation. Anchor strips securely to the roof deck with powder actuated fastening devices or expansion shields and bolts, spaced not more than 24 inches o.c.
- b. Embedded Nailers: Shall be nominal 2 by 3 with 2 inch sides beveled. Set and anchor nailers to finish flush with the roof deck surface.

3.3.1.2 Roof Edge Strips and Nailers

Provide at perimeter of roof, around openings through roof, and where roofs abut walls, curbs, and other vertical surfaces. Except where indicated otherwise, nailers shall be 6 inches wide and the same thickness as the insulation. Anchor nailers securely to underlying construction. Anchor perimeter nailers in accordance with FM DS 1-49.

3.3.1.3 Crickets, Cants, and Curbs

Provide wood saddles or crickets, cant strips, curbs for ventilators, and wood nailers bolted to tops of concrete or masonry curbs and at expansion joints, as indicated, specified, or necessary and of lumber.

3.3.2 Wood Blocking

Provide proper sizes and shapes at proper locations for the installation and attachment of wood and other finish materials, fixtures, equipment, and items indicated or specified.

3.3.3 Wood Grounds

Provide for fastening wood trim, finish materials, and other items to plastered walls and ceilings. Install grounds in proper alignment and true with an 8 foot straightedge.

3.3.4 Wood Furring

Provide where shown and as necessary for facing materials specified. Except as shown otherwise, furring strips shall be nominal one by 3, continuous, and spaced 16 inches o.c. Erect furring vertically or horizontally as necessary. Nail furring strips to masonry. Do not use wood plugs. Provide furring strips around openings, behind bases, and at angles and corners. Furring shall be plumb, rigid, and level and shall be shimmed as necessary to provide a true, even plane with surfaces suitable to receive the finish required. Form furring for offsets and breaks in walls or ceilings on 1 by 4 wood strips spaced 16 inches o.c.

3.3.5 Temporary Closures

Provide with hinged doors and padlocks and install during construction at exterior doorways and other ground level openings that are not otherwise closed. Cover windows and other unprotected openings with polyethylene or other approved material, stretched on wood frames. Provide dustproof barrier partitions to isolate areas as directed.

3.3.6 Temporary Centering, Bracing, and Shoring

Provide for the support and protection of masonry work during construction as specified in Section 04 20 00 MASONRY. Forms and centering for cast-in-place concrete work are specified in Section 03 30 00 CAST IN PLACE CONCRETE

-- End of Section --

SECTION 06 16 13

INSULATING SHEATHING

02/03

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 226 (2006) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

ASTM E 84 (2009) Standard Test Method for Surface Burning Characteristics of Building Materials

FM GLOBAL (FM)

FM P7825 (2005) Approval Guide

FM P7825c (2005) Approval Guide Building Materials

FM P9513 (2002) Specialist Data Book Set for Roofing Contractors; contains 1-22 (2001), 1-28 (2002), 1-29 (2002), 1-28R/1-29R (1998), 1-30 (2000), 1-31 (2000), 1-32 (2000), 1-33 (2000), 1-34 (2001), 1-49 (2000), 1-52 (2000), 1-54 (2001)

UNDERWRITERS LABORATORIES (UL)

UL Bld Mat Dir (2009) Building Materials Directory

APA - THE ENGINEERED WOOD ASSOCIATION (APA)

APA E445S (2001; R 2002) Performance Standards and Qualification Policies for Structural-Use Panels (APA PRP-108)

U.S. DEPARTMENT OF COMMERCE (DOC)

PS 2 (2004) Performance Standard for Wood-Based Structural-Use Panels (APA 5350)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Fasteners

VENTED, NAILABLE DECK SYSTEM

Include minimum thickness of insulation for vented, nailable decks and fastener pattern for insulation on steel decks.

SD-06 Test Reports

Flame spread and smoke developed ratings

Submit in accordance with [ASTM E 84](#).

SD-07 Certificates

Installer [qualifications](#)

SD-08 Manufacturer's Instructions

Nails and [fasteners](#)

1.3 MANUFACTURER'S CERTIFICATE

Submit certificate from the nailable deck/insulation manufacturer attesting that the installer has the proper [qualifications](#) for installing roof insulation systems.

Certificate attesting that the expanded perlite or polyisocyanurate insulation contains recovered material and showing estimated percent of recovered material. Certificates of compliance for felt materials.

1.4 QUALITY ASSURANCE

1.4.1 Vented, Nailable Deck and Insulation on Steel Decks

Roof insulation shall have a flame spread rating not greater than 75 and a smoke developed rating not greater than 150, exclusive of covering, when tested in accordance with [ASTM E 84](#). Insulation bearing the UL label and listed in the [UL Bld Mat Dir](#) as meeting the flame spread and smoke developed ratings will be accepted in lieu of copies of test reports. Compliance with [flame spread and smoke developed ratings](#) will not be required when insulation has been tested as part of a roof construction assembly of the type used for this project and the construction is listed as fire-classified in the [UL Bld Mat Dir](#) or listed as Class I roof deck construction in the [FM P7825](#). Insulation tested as part of a roof construction assembly shall bear UL or FM labels attesting to the ratings specified herein. Vented, nailable deck system over steel deck shall be rated Class I - 90 in accordance with [FM P7825c](#). Ratings from other independent laboratories may be substituted provided that the tests, requirements and ratings are documented to be equivalent, to the satisfaction of the Contracting Officer.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

Deliver materials to site in manufacturer's unopened and undamaged standard commercial containers bearing the following legible information:

- a. Name of manufacturer;
- b. Brand designation;
- c. Specification number, type, and class, as applicable, where materials are covered by a referenced specification; and

Deliver materials in sufficient quantity to allow continuity of the work.

1.5.2 Storage and Handling

Store and handle materials in a manner to protect from damage, exposure to open flame or other ignition sources, and from wetting, condensation or moisture absorption. Store in an enclosed building or trailer that provides a dry, adequately ventilated environment. Store felt rolls on ends. For the 24 hours immediately before application of felts, store felts in an area maintained at a temperature no lower than 50 degrees F above grade and having ventilation around all sides. Replace damaged material with new material.

1.6 ENVIRONMENTAL CONDITIONS

Do not install roof insulation during inclement weather or when air temperature is below 40 degrees F and interior humidity is 45 percent or greater, or when there is visible ice, frost, or moisture on the roof deck.

PART 2 PRODUCTS

2.1 VENTED, NAILABLE DECK SYSTEM

2.1.1 Insulation Types

Insulation shall be integrated into a vented, nailable deck system. Insulation shall be a standard product of the manufacturer and shall be factory marked with the manufacturer's name or trade mark, the material specification number, the aged R-value of the insulation at 75 degrees F, and the thickness. Minimum thickness shall be as recommended by the manufacturer. Panels shall be marked individually. The thermal resistance of insulation shall be not less than the aged R-value shown on the drawings. The insulation manufacturing process shall not include chlorofluorocarbons (CFC) or formaldehydes. Insulation and fiberboard shall contain the highest practicable percentage of material which has been recovered or diverted from solid waste (e.g., postconsumer waste), but not including material reused in a manufacturing process. Where two materials have comparable price and performance, the one having the higher recovered material content shall be selected.

2.1.2 Vented, Nailable Deck System

Vented, nailable deck system shall consist of polyisocynaurate core bonded to 1/2 inch by 3 inch wide fiberboard strips at 16 inches o.c. bonded to oriented strand board (OSB). System design shall allow for expansion of

oriented strand board..

2.1.3 Oriented Strand Board (OSB)

Oriented strand board shall be identified on the panel with an **APA E445S** or **TECO** performance rating mark, with an Exposure 1 durability rating; minimum physical properties shall be tested and meet **PS 2**.

2.1.4 Recovered Materials

Provide thermal insulation materials containing recycled materials to the extent practical. The required minimum recycled material content for the listed materials are:

Polyisocyanurate/polyurethane: 9 percent recovered material

2.1.5 Insulation Thickness

Thermal resistance (R value) of insulation shall be as indicated on drawings. Thickness shall be based on the "R" value for aged insulation.

2.2 MOISTURE CONTROL

2.2.1 Organic Roofing Felt

ASTM D 226, Type I.

2.3 FASTENERS

Fasteners shall be specifically designed screws and plates or spikes and plates of sufficient length to hold the insulation assembly in place. Fasteners shall conform to insulation assembly manufacturer's recommendations except that holding power, when driven, shall be not less than each in steel deck. Fasteners for steel decks shall conform to **FM P7825c** for Class I roof deck construction, and shall be spaced to withstand an uplift pressure of .

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

3.1.1 Surface Inspection

Surfaces shall be clean, smooth, and dry. Check roof deck surfaces for defects before starting work. The Contractor shall inspect and approve the surfaces immediately before starting installation. Prior to installing the nailable roof deck assembly, perform the following:

- a. Examine steel decks to ensure that panels are properly secured to structural members and to each other and that surfaces of top flanges are flat or slightly convex.

3.2 VENTED, NAILABLE DECK SYSTEM INSTALLATION

End joints of vented, nailable deck shall be staggered. Units shall be cut to fit neatly against adjoining surfaces. Joints between units shall not exceed **1/4 inch**.. Where system is applied over steel deck, long edge joints shall continuously bear on surfaces of the steel deck. Units which

can be readily lifted after installation is not considered to be adequately secured. System shall be applied so that all units applied each day are waterproofed the same day. Phased construction will not be permitted.A

3.2.1 Installation Using Only Mechanical Fasteners

Secure total thickness of insulation with penetrating type fasteners.

3.3 PROTECTION

3.3.1 Protection of Applied Insulation

Completely cover each day's installation of vented, nailable deck units with the asphalt felt specified in Section 07 31 13 ASPHALT SHINGLES on same day. Do not permit phased construction. Protect open spaces between nailable deck system and other walls, until permanent roofing and flashing are applied. Do not permit storing, walking, wheeling, or trucking directly on insulation or on roofed surfaces. Exposed edges of the insulation shall be protected at the end of each work day or whenever precipitation is imminent..

3.3.2 Damaged Work and Materials

Restore work and materials that become damaged during construction to original condition or replace with new materials.

3.4 INSPECTION

The Contractor shall establish and maintain an inspection procedure to assure compliance of the installed roof insulation with the contract requirements. Any work found not to be in compliance with the contract shall be promptly removed and replaced or corrected in an approved manner. Quality control shall include, but not be limited to, the following:

- a. Observation of environmental conditions; number and skill level of insulation workers; start and end time of work.
- b. Verification of certification, listing or label compliance with FM P9513.
- c. Inspection of mechanical fasteners; type, number, length, and spacing.
- d. Coordination with other materials.
- e. Inspection of insulation joint orientation, joint width and bearing of edges of insulation system on metal deck.

-- End of Section --

SECTION 07 11 13

BITUMINOUS DAMPPROOFING

04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 1227	(1995; R 2007) Emulsified Asphalt Used as a Protective Coating for Roofing
ASTM D 4263	(1983; R 2005) Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM D 4479	(2007) Asphalt Roof Coatings - Asbestos-Free

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Materials

1.3 DELIVERY AND STORAGE

Deliver materials in sealed containers bearing manufacturer's original labels. Labels shall include date of manufacture, contents of each container, performance standards that apply to the contents and recommended shelf life.

PART 2 PRODUCTS

2.1 FIBROUS ASPHALT

ASTM D 4479, Type I for horizontal surfaces, Type II for vertical surfaces.

2.2 EMULSION-BASED ASPHALT DAMPPROOFING

2.2.1 Fibrated Emulsion-Based Asphalt

Fibrated emulsion-based asphalt dampproofing shall be cold-applied type conforming to ASTM D 1227 Type IV, asbestos-free, manufactured of refined asphalt, emulsifiers and selected clay, fibrated with mineral fibers. For spray or brush application, emulsion shall contain a minimum of 59 percent solids by weight, 56 percent solids by volume. For trowel application,

emulsion shall contain a minimum of 58 percent solids by weight, 55 percent solids by volume.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Remove or cut form ties and repair all surface defects as required in Section 03 30 00 CAST-IN-PLACE CONCRETE. Clean masonry surfaces to receive dampproofing of foreign matter and loose particles. Apply dampproofing to clean dry surfaces. Moisture test in accordance with ASTM D 4263. If test indicates moisture, allow a minimum of 7 additional days after test completion for curing. If moisture still exists, redo test until substrate is dry.

3.1.1 Metal Surfaces

Metal surfaces shall be dry and be free of rust, scale, loose paint, oil, grease, dirt, frost and debris.

3.2 Protection of Surrounding Areas

Before starting the dampproofing work, the surrounding areas and surfaces shall be protected from spillage and migration of dampproofing material onto other work.

3.3 APPLICATION

Prime surfaces to receive fibrous asphaltic dampproofing unless recommended otherwise by dampproofing materials manufacturer. Apply dampproofing after priming coat is dry, but prior to any deterioration of primed surface, and when ambient temperature is above 40 degrees F.

3.3.1 Surface Priming

Prime surfaces to receive asphalt or fibrous asphalt dampproofing with asphalt primer. Apply primer when ambient temperature is above 40 degrees F and at rate of approximately one gallon per 100 square feet, fully covering entire surface to be dampproofed.

3.3.2 Cold-Application Method

3.3.2.1 Fibrous Asphalt

Apply two coats of fibrous asphalt to surfaces to be dampproofed. Apply each coat uniformly using not less than one gallon fibrous asphalt per 50 square feet. Apply first coat by brush or spray to provide full bond with primed surface. Brush or spray second coat over thoroughly dry first coat unless recommended otherwise by dampproofing materials manufacturer. Provide finished surface that is of uniform thickness and impervious to moisture. Recoat porous areas.

3.3.2.2 Emulsion-Based Asphalt

Emulsion-based asphalt dampproofing work shall not be performed in temperatures below 40 degrees F. Emulsions shall have a smooth and uniform consistency at time of application. Dampproofing materials shall be applied in accordance with manufacturer's published instructions to produce a smooth uniform dry film of not less than 12 mils thick without

voids or defects. Dull or porous spots shall be recoated. Dampproofing materials shall seal tightly around pipes and other items projecting through dampproofing. Rates of application shall be as follows:

- a. Primer: 1/2 gallon per 100 square feet, cold-applied.
- b. Fibrated Dampproofing: 2 gallons per 100 square feet, cold-applied with spray, brush or trowel.

-- End of Section --

SECTION 07 21 16

MINERAL FIBER BLANKET INSULATION
04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C 665	(2006) Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
ASTM C 930	(2005) Potential Health and Safety Concerns Associated with Thermal Insulation Materials and Accessories
ASTM E 136	(2009) Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C
ASTM E 84	(2009) Standard Test Method for Surface Burning Characteristics of Building Materials

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 211	(2006) Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances
NFPA 54	(2008) National Fuel Gas Code
NFPA 70	(2007; AMD 1 2008) National Electrical Code - 2008 Edition

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.134	Respiratory Protection
-----------------	------------------------

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Blanket insulation

Accessories

SD-08 Manufacturer's Instructions

Insulation

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery

Deliver materials to site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do not allow insulation materials to become wet, soiled, crushed, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

1.3.2 Storage

Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling.

1.4 SAFETY PRECAUTIONS

1.4.1 Respirators

Provide installers with dust/mist respirators, training in their use, and protective clothing, all approved by National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) in accordance with 29 CFR 1910.134.

1.4.2 Smoking

Do not smoke during installation of blanket thermal insulation.

1.4.3 Other Safety Concerns

Consider other safety concerns and measures as outlined in ASTM C 930.

PART 2 PRODUCTS

2.1 BLANKET INSULATION

ASTM C 665, Type I, blankets without membrane coverings ; Class A, membrane-faced surface with a flame spread of 25 or less , except a flame spread rating of 25 or less and a smoke developed rating of 150 or less when tested in accordance with ASTM E 84.

2.1.1 Thermal Resistance Value (R-VALUE)

As indicated

2.1.2 Recycled Materials

Provide Thermal Insulation containing recycled materials to the extent practicable, provided the material meets all other requirements of this section. The minimum required recycled materials content by weight are:

Rock Wool: 75 percent slag
Fiberglass: 20 to 25 percent glass cullet

2.1.3 Prohibited Materials

Do not provide asbestos-containing materials.

2.2 BLOCKING

Wood, metal, unfaced mineral fiber blankets in accordance with [ASTM C 665](#), Type I, or other approved materials. Use only non-combustible materials meeting the requirements of [ASTM E 136](#) for blocking around chimneys and heat producing devices.

2.3 ACCESSORIES

2.3.1 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

Before installing insulation, ensure that areas that will be in contact with the insulation are dry and free of projections which could cause voids, compressed insulation. If moisture or other conditions are found that do not allow the workmanlike installation of the insulation, do not proceed but notify Contracting Officer of such conditions.

3.2 PREPARATION

3.2.1 Blocking at Attic Vents and Access Doors

Prior to installation of insulation, install permanent blocking to prevent insulation from slipping over, clogging, or restricting air flow through soffit vents at eaves. Install permanent blocking to maintain accessibility to equipment or controls that require maintenance or adjustment.

3.2.2 Blocking Around Heat Producing Devices

Install non-combustible blocking around heat producing devices to provide the following clearances:

- a. Recessed lighting fixtures, including wiring compartments, ballasts, and other heat producing devices, unless these are certified by the manufacturer for installation surrounded by insulation: [3 inches](#) from outside face of fixtures and devices or as required by [NFPA 70](#) and, if insulation is to be placed above fixture or device, [24 inches](#) above fixture.

- b.. Vents and vent connectors used for venting the products of

combustion, flues, and chimneys other than masonry chimneys:
Minimum clearances as required by NFPA 211.

c.. Gas Fired Appliances: Clearances as required in NFPA 54.

Blocking around flues and chimneys is not required when insulation blanket, ,
passed ASTM E 136, in addition to meeting all other requirements stipulated
in Part 2. Blocking is also not required if the chimneys are certified by
the manufacturer for use in contact with insulating materials.

3.3 INSTALLATION

3.3.1 Insulation

Install and handle insulation in accordance with manufacturer's
instructions. Keep material dry and free of extraneous materials. Ensure
personal protective clothing and respiratory equipment is used as
required. Observe safe work practices.

3.3.1.1 Electrical wiring

Do not install insulation in a manner that would sandwich electrical wiring
between two layers of insulation.

3.3.1.2 Continuity of Insulation

Install blanket insulation to butt tightly against adjoining blankets and
to studs, rafters, joists, sill plates, headers and any obstructions.
Provide continuity and integrity of insulation at corners, wall to ceiling
joints, roof, and floor. Avoid creating thermal bridges.

3.3.1.3 Cold Climate Requirement

Place insulation to the outside of pipes.

3.3.1.4 Insulation without Affixed Vapor Retarder

Provide snug friction fit to hold insulation in place. Stuff pieces of
insulation into cracks between trusses, joists, studs and other framing,
such as at attic access doors, door and window heads, jambs, and sills,
band joists, and headers.

3.3.1.5 Sizing of Blankets

Provide only full width blankets when insulating between trusses, joists,
or studs. Size width of blankets for a snug fit where trusses, joists or
studs are irregularly spaced.

3.3.1.6 Access Panels and Doors

Affix blanket insulation to access panels greater than one square foot and
access doors in insulated floors and ceilings. Use insulation with same
R-Value as that for floor or ceiling.

-- End of Section --

SECTION 07 31 13

ASPHALT SHINGLES

04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 1970	(2009) Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
ASTM D 226	(2006) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D 3018	(2003; R 2009) Class A Asphalt Shingles Surfaced With Mineral Granules
ASTM D 3462	(2009) Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules
ASTM D 41	(2005) Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
ASTM D 4586	(2007) Asphalt Roof Cement, Asbestos-Free
ASTM D 4869	(2005; R 2006) Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing
ASTM D 6380	(2003; R 2009) Standard Specification for Asphalt Roll Roofing (Organic Felt)

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)

NRCA 0408	(Fifth Edition) Steep-slope Roofing Manual
-----------	--

UNDERWRITERS LABORATORIES (UL)

UL 790	(2004; Rev thru Oct 2008) Test Methods for Fire Tests of Roof Coverings
UL 997	(1995; Rev Jul 1998) Wind Resistance of Prepared Roof Covering Materials

1.2 DEFINITIONS

1.2.1 Top Lap

That portion of shingle overlapping shingle in course below.

1.2.2 Head Lap

The triple coverage portion of top lap which is the shortest distance from the butt edge of an overlapping shingle to the upper edge of a shingle in the second course below.

1.2.3 Exposure

That portion of a shingle exposed to the weather after installation.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Shingles

Submit data including type, weight, class, UL labels, and special types of underlayment and eave flashing.

SD-04 Samples

Shingles

Full shingle sample and manufacturer's standard size samples of materials and products requiring color or finish selection.

SD-08 Manufacturer's Instructions

Application

1.4 DELIVERY AND STORAGE

Deliver materials in the manufacturer's unopened bundles and containers bearing the manufacturer's brand name. Keep materials dry, completely covered, and protected from the weather. Store according to manufacturer's written instructions. Roll goods shall be stored on end in an upright position or in accordance with manufacturer's recommendations. Immediately before laying, roofing felt shall be stored for 24 hours in an area maintained at a temperature not lower than 50 degrees F.

1.5 WARRANTIES

Warranties shall begin on the date of Government acceptance of the work.

1.5.1 Manufacturer's Warranty

Furnish the asphalt shingle manufacturer's standard 25 year warranty for the asphalt shingles. The warranty shall run directly to the Government.

1.5.2 Contractor's Warranty

The Contractor shall warrant for 5 years that the asphalt shingle roofing

system, as installed, is free from defects in workmanship. When repairs due to defective workmanship are required during the Contractor's warranty period, the Contractor shall make such repairs within 72 hours of notification. When repairs are not performed within the specified time, emergency repairs performed by others will not void the warranty.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Shingles

Mineral granule-surfaced asphalt shingles, self-sealing, square tab, strip, fungus-resistant. [ASTM D 3018](#), Type I, and [ASTM D 3462](#), three-tab shingles weighing not less than 220 pounds per 100 square feet. Shingles shall meet the fire resistance requirements of [UL 790](#) for Class A and the wind resistance requirements of [UL 997](#). Shingle color shall match existing, which is TAMKO tile red blend..

2.1.2 Mineral-Surfaced Asphalt Roll Roofing

For starter strip installation: [ASTM D 6380](#) or manufacturer's standard starter strip..

2.1.3 Underlayment

Asphalt-saturated felt conforming to [ASTM D 4869](#) or [ASTM D 226](#), Type I, number 15, without perforations or other material specified by the shingle manufacturer for use as underlayment.

2.1.4 Self-Adhering Membrane

Self-adhering rubberized asphaltic membrane, a minimum of 40 mils thick, and recommended by the shingle manufacturer for use as eaves flashing. Membrane shall comply with [ASTM D 1970](#) for sealability around nails.

2.1.5 Nails for Applying Shingles and Asphalt-Saturated Felt

Aluminum or hot-dipped galvanized steel or equivalent corrosion resistant with sharp points and flat heads 3/8 to 7/16 inch in diameter. Shank diameter of nails shall be a minimum of 0.105 inch and a maximum of 0.135 inch with garb or otherwise deformed for added pull-out resistance. Nails shall be long enough to penetrate completely through or extend a minimum of 3/4 inch into roof deck, whichever is less, when driven through materials to be fastened.

2.1.6 Asphalt Roof Cement

[ASTM D 4586](#), Type II.

2.1.7 Asphalt Primer

[ASTM D 41](#).

2.1.8 Ventilators

2.1.8.1 Nailable Plastic Shingle Over Type Ridge Vents

Ridge vents shall be constructed of UV stabilized nailable rigid

polypropylene material, approximately 1 foot wide and 1 inch thick, and shall be in 4 foot long interlocking sections with self-aligning ends or corrugated polyethylene rigid roll or rigid strip ridge vent with aluminum wind deflectors on each side. Vents shall be designed to prevent infiltration of insects, rain, and snow.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

Ensure that roof deck is smooth, clean, dry, and without loose knots. Roof surfaces shall be firm and free from loose boards, large cracks, and projecting ends that might damage the roofing. Vents and other projections through roofs shall be properly flashed and secured in position, and projecting nails shall be driven flush with the deck.

3.2 SURFACE PREPARATION

Cover knotholes and cracks with sheet metal nailed securely to sheathing. Flash and secure vents and other roof projections, and drive projecting nails firmly home.

3.3 APPLICATION

Apply roofing materials as specified herein unless specified or recommended otherwise by shingle manufacturer's written instructions or by NRCA 0408.

3.3.1 Underlayment

Provide over entire roof, where not covered with self-adhering membrane. Apply one layer of shingle underlayment to roof deck. Lay underlayment parallel to roof eaves, starting at eaves. Provide minimum 2 inch head laps, 4 inch end laps, and 6 inch laps from both sides over hips and ridges. Nail sufficiently to hold until shingles are applied. Turn up vertical surfaces a minimum of 4 inches. Provide for roof slopes between 2 inches per foot and 4 inches per foot. Apply two layers to roof deck. Provide a 19 inch wide strip as starter sheet to maintain specified number of layers throughout roof. Lay parallel to eaves, starting at eaves. Provide minimum 19 inch head laps, 6 inch laps from both sides over hips and ridges, and 12 inch end laps in the field of the roof. Nail sufficiently to hold until shingles are applied. Turn up vertical surfaces a minimum of 4 inches. When a self-adhering membrane is used for eave flashing, start underlayment from upper edge of eave flashing.

3.3.2 Self-Adhering Membrane

Install at locations indicated below, lapped in direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends no less than 6 inches, staggered 24 inches between courses. Roll lasp with roller.

- a. Eaves: extend from edges of eaves 24 inches beyond interior face of exterior wall.
- b. Rakes: Extend from edges of rake 24 inches beyond interior face of exterior wall.
- c. Valleys (other than those with open metal flashing): Extend from lowest to highest point 18 inches on each side.
- d. Hips: Extend 18 inches on each side.
- e. Ridges: Extend 36 inches on each side, without obstructing ridge

vent.

f. Roof Slope Transitions: Extend 18 inches on each roof slope.

3.3.3 Drip Edges

Provide metal drip edges as specified in Section 07 60 00 FLASHING AND SHEET METAL applied directly on the wood deck at eaves and over the underlayment at rakes. Extend back from edge of deck a minimum of 3 inches, and secure with nails spaced a maximum of 10 inches o.c. along inner edge.

3.3.4 Starter Strip

Apply starter strip at eaves, using 9 inch wide strip of mineral-surfaced roll roofing of a color to match shingles. Optionally, use a row of shingles with tabs removed and trimmed to ensure that joints are not exposed at shingle cutouts. Apply starter strip along eaves, overhanging the metal drip edge at eaves and rake edges 1/4 inch to 3/8 inch; fasten in a line parallel to and 3 to 4 inches above eave edge. Place nails so top of nail is not exposed in cutouts of first course of shingles. When roll roofing is provided, seal tabs of first course of shingles with asphalt roof cement. Fasten with 6 nails per strip of shingles or space nails at 6 inches o.c. for roll roofing. Seal tabs of first course of shingles with asphalt roof cement as specified below.

3.3.5 Shingle Courses

Start first course with full shingle, and apply succeeding courses with joints staggered at thirds or halves. Butt-end joints of shingles shall not align vertically more often than every fourth course. Apply shingle courses as follows:

- a. Fastening: Do not drive fasteners into or above the factory-applied adhesive unless adhesive is located 5/8 inch or closer to top of cutouts. Place fasteners so they are concealed by shingle top lap and penetrate the head lap.
- b. Shingles applied with nails: Nominal 5 inch exposure. Apply each shingle with minimum of six nails. Place one nail one inch from each end, and evenly space nails on a horizontal line a minimum of 5/8 inch above top of cutouts.

3.3.6 Hips and Ridges

Form with 9 by 12 inch individual shingles or with 12 by 12 inch shingles cut from 12 by 36 inch strip shingles. Bend shingles lengthwise down center with equal exposure on each side of hip or ridge. Lap shingles to provide a maximum 5 inch exposure, and nail each side in unexposed area 5 1/2 inches from butt and one inch in from edge.

3.3.7 Valleys

Provide open sheet metal valleys.

3.3.7.1 Woven Valleys

Provide valley lining as specified for closed cut valley. Lay valley shingles over lining by either of the following methods:

- a. Method I: Apply regular shingles on both roofs simultaneously. Weave each course in turn over the valley. Lay the first regular course of shingles along eaves of roof up to and over valley. Extend course along adjoining roof deck at least 12 inches. Carry first regular course of shingles of adjoining roof over valley on top of previously applied shingles. Lay succeeding courses alternately, weaving valley shingles over each other for full length of valley.
- b. Method II: Apply regular shingles on each roof surface separately to a line about 3 feet from center of valley, and weave valley shingles in place later, as specified for Method I.

In following either method, press shingles tightly into valley, and fasten in normal manner; except apply nails not closer than 6 inches to valley centerline, and apply additional nail in top corner of terminal shingle on both sides of valley.

3.3.7.2 Open Sheet Metal Valleys

Sheet metal flashing for valleys is specified in Section 07 60 00 FLASHING AND SHEET METAL. Before installing and fastening flashing in place with metal cleats:

- a. Install single layer of 36 inch wide, asphalt-saturated felt, centered on valley and extending entire length of valley over felt underlayment.
- b. Cut regular shingle courses on each roof on true line 2 inches from valley centerline at top of valley, and increase width between lines by one inch for each 8 feet of valley length, continuing to eaves.
- c. Apply 2 inch band of asphalt roof cement over flashing, along and under side of shingles adjoining valley.
- d. Press shingles tightly into cement, and nail in normal manner, except apply nails not closer than 5 inches to valley centerline. Do not drive nails through valley flashing.
- e. Provide a 4 inch band of asphalt roof cement for fastening shingle tabs down along open metal gutters.

3.3.8 Flashing

3.3.8.1 Eave Flashing

Provide for roof slopes 4 inches per foot and greater. Provide eave flashing strips consisting of smooth-surfaced roll roofing. Flashing strips shall overhang metal drip edge 1/4 inch to 3/8 inch and extend up the slope far enough to cover a point 12 inches inside interior face of exterior wall. Where overhangs require flashings wider than 36 inches, locate laps outside exterior wall face. Laps shall be at least 2 inches wide and cemented with asphalt roof cement over entire length of lap. Lap end 12 inches and cement.

3.3.8.2 Stepped Flashing

For sloping roofs which abut vertical surfaces, provide stepped metal flashing as specified in Section 07 60 00 FLASHING AND SHEET METAL.

3.3.8.3 Vent and Stack Flashing

Apply shingles up to point where vent or stack pipe projects through roof, and cut nearest shingle to fit around pipe. Before applying shingles beyond pipe, prepare flange of metal pipe vent flashing as specified in Section 07 60 00 FLASHING AND SHEET METAL, by applying a 1/8 inch thick coating of asphalt roof cement on bottom side of flashing flange. Slip flashing collar and flange over pipe, and set coated flange in 1/16 inch coating of asphalt roof cement. After applying flashing flange, continue shingling up roof. Lap lower part of flange over shingles. Overlap flange with side and upper shingles. Fit shingles around pipe, and embed in 1/16 inch thick coating of asphalt roof cement where shingles overlay flange.

-- End of Section --

SECTION 07 60 00

FLASHING AND SHEET METAL

08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A 653/A 653M (2009) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM B 101 (2007) Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction

ASTM B 370 (2003) Standard Specification for Copper Sheet and Strip for Building Construction

ASTM B 69 (2008) Standard Specification for Rolled Zinc

ASTM D 226 (2006) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

ASTM D 41 (2005) Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing

ASTM D 4586 (2007) Asphalt Roof Cement, Asbestos-Free

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1793 (2006) Architectural Sheet Metal Manual, Sixth Edition, Second Printing

1.2 GENERAL REQUIREMENTS

Provide finished sheet metalwork to form a weathertight construction without waves, warps, buckles, fastening stresses or distortion, which allows for expansion and contraction. Sheet metal mechanic is responsible for cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades. Coordinate installation of sheet metal items used in conjunction with roofing with roofing work to permit continuous roofing operations. Sheet metalwork pertaining to heating, ventilating, and air conditioning is specified in Division 23.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Gutters

Downspouts

Fascias

Base flashing

Counterflashings

Flashing at roof penetrations

Reglets

Copings

Drip edge

Indicate thicknesses, dimensions, fastenings and anchoring methods, expansion joints, and other provisions necessary for thermal expansion and contraction. Scaled manufacturer's catalog data may be submitted for factory fabricated items.

SD-11 Closeout Submittals

Quality Control Plan

Submit for sheet metal work in accordance with paragraph entitled "Field Quality Control."

1.4 DELIVERY, HANDLING, AND STORAGE

Package and protect materials during shipment. Uncrate and inspect materials for damage, dampness, and wet-storage stains upon delivery to the job site. Remove from the site and replace damaged materials that cannot be restored to like-new condition. Handle sheet metal items to avoid damage to surfaces, edges, and ends. Store materials in dry, weather-tight, ventilated areas until immediately before installation.

PART 2 PRODUCTS

2.1 MATERIALS

Furnish sheet metal items in 8 to 10 foot lengths. Single pieces less than 8 feet long may be used to connect to factory-fabricated inside and outside corners, and at ends of runs. Factory fabricate corner pieces with minimum 12 inch legs. Provide accessories and other items essential to complete the sheet metal installation. Provide accessories made of the same or

compatible materials as the items to which they are applied. Fabricate sheet metal items of the materials specified below and to the gage, thickness, or weight shown in Table I at the end of this section. Provide sheet metal items with mill finish unless specified otherwise. Where more than one material is listed for a particular item in Table I, each is acceptable and may be used except as follows:

2.1.1 Exposed Sheet Metal Items

Must be of the same material. Consider the following as exposed sheet metal: gutters, including hangers; downspouts; gravel stops and fascias; cap, valley, steeped, base, and eave flashings and related accessories.

2.1.2 Drainage

Do not use copper for an exposed item if drainage from that item will pass over exposed masonry, stonework or other metal surfaces. In addition to the metals listed in Table I, lead-coated copper may be used for such items.

2.1.3 Copper, Sheet and Strip

ASTM B 370, cold-rolled temper, H 00 (standard).

2.1.4 Lead-Coated Copper Sheet

ASTM B 101.

2.1.5 Lead Sheet

Minimum weight 4 pounds per square foot.

2.1.6 Steel Sheet, Zinc-Coated (Galvanized)

ASTM A 653/A 653M.

2.1.6.1 Finish

Exposed exterior items of zinc-coated steel sheet must have a baked-on, factory-applied color coating of polyvinylidene fluoride or other equivalent fluorocarbon coating applied after metal substrates have been cleaned and pretreated. Provide finish coating dry-film thickness of 0.8 to 1.3 mils and color shall be as indicated in schedule on Drawings.

2.1.7 Zinc Sheet and Strip

ASTM B 69, Type I, a minimum of 0.024 inch thick.

2.1.8 Bituminous Plastic Cement

ASTM D 4586, Type I.

2.1.9 Roofing Felt

ASTM D 226 Type I .

2.1.10 Asphalt Primer

ASTM D 41.

2.1.11 Through-Wall Flashing

Through-wall flashing for masonry is specified in Section 04 20 00 UNIT MASONRY.

2.1.12 Fasteners

Use the same metal or a metal compatible with the item fastened. Use stainless steel fasteners to fasten dissimilar materials.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Workmanship

Make lines and angles sharp and true. Free exposed surfaces from visible wave, warp, buckle, and tool marks. Fold back exposed edges neatly to form a 1/2 inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA 1793, Architectural Sheet Metal Manual. Provide sheet metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight. Join sheet metal items together as shown in Table II.

3.1.2 Nailing

Confine nailing of sheet metal generally to sheet metal having a maximum width of 18 inch. Confine nailing of flashing to one edge only. Space nails evenly not over 3 inch on center and approximately 1/2 inch from edge unless otherwise specified or indicated. Face nailing will not be permitted. Where sheet metal is applied to other than wood surfaces, include in shop drawings, the locations for sleepers and nailing strips required to secure the work. Sleepers and nailing strips are specified in Section 06 10 00 ROUGH CARPENTRY.

3.1.3 Cleats

Provide cleats for sheet metal 18 inch and over in width. Space cleats evenly not over 12 inch on center unless otherwise specified or indicated. Unless otherwise specified, provide cleats of 2 inch wide by 3 inch long and of the same material and thickness as the sheet metal being installed. Secure one end of the cleat with two nails and the cleat folded back over the nailheads. Lock the other end into the seam. Where the fastening is to be made to concrete or masonry, use screws and drive in expansion shields set in concrete or masonry.

3.1.4 Bolts, Rivets, and Screws

Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection. Provide mechanically formed joints in aluminum sheets 0.040 inch or less in thickness.

3.1.5 Seams

Straight and uniform in width and height with no solder showing on the face.

3.1.5.1 Flat-lock Seams

Finish not less than $\frac{3}{4}$ inch wide.

3.1.5.2 Lap Seams

Finish soldered seams not less than one inch wide. Overlap seams not soldered, not less than 3 inch.

3.1.5.3 Loose-Lock Expansion Seams

Not less than 3 inch wide; provide minimum one inch movement within the joint. Completely fill the joints with the specified sealant, applied at not less than $\frac{1}{8}$ inch thick bed. Sealants are specified in Section 07 92 00 JOINT SEALANTS.

3.1.5.4 Flat Seams

Make seams in the direction of the flow.

3.1.6 Mechanical Fastening

3.1.6.1 Mechanical Fastening of Aluminum

Use No. 12, aluminum alloy, sheet metal screws or other suitable aluminum alloy or stainless steel fasteners. Drive fasteners in holes made with a No. 26 drill in securing side laps, end laps, and flashings. Space fasteners 12 inch maximum on center. Where end lap fasteners are required to improve closure, locate the end lap fasteners not more than 2 inch from the end of the overlapping sheet.

3.1.7 Protection from Contact with Dissimilar Materials

3.1.7.1 Aluminum

Do not allow aluminum surfaces in direct contact with other metals except stainless steel, zinc, or zinc coating. Where aluminum contacts another metal, paint the dissimilar metal with a primer followed by two coats of aluminum paint. Where drainage from a dissimilar metal passes over aluminum, paint the dissimilar metal with a non-lead pigmented paint.

3.1.7.2 Metal Surfaces

Paint surfaces in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.1.7.3 Wood or Other Absorptive Materials

Paint surfaces that may become repeatedly wet and in contact with metal with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.

3.1.8 Expansion and Contraction

Provide expansion and contraction joints at not more than 32 foot intervals for aluminum and at not more than 40 foot intervals for other metals.

Provide an additional joint where the distance between the last expansion joint and the end of the continuous run is more than half the required interval. Space joints evenly. Join extruded aluminum gravel stops and fascias by expansion and contraction joints spaced not more than 12 feet apart.

3.1.9 Base Flashing

Lay the base flashings with each course of the roof covering, shingle fashion, where practicable, where sloped roofs abut chimneys, curbs, walls, or other vertical surfaces. Extend up vertical surfaces of the flashing not less than 8 inch and not less than 4 inch under the roof covering. Where finish wall coverings form a counterflashing, extend the vertical leg of the flashing up behind the applied wall covering not less than 6 inch. Overlap the flashing strips or shingles with the previously laid flashing not less than 3 inch. Fasten the strips or shingles at their upper edge to the deck. Horizontal flashing at vertical surfaces must extend vertically above the roof surface and fastened at their upper edge to the deck a minimum of 6 inch on center with large headed aluminum roofing nails. Extend the metal flashings onto the roof covering not less than 4.5 inch at the lower side of vertical surfaces extending through the roof decks. Install and fit the flashings so as to be completely weathertight. Provide factory-fabricated base flashing for interior and exterior corners. Do not use metal base flashing on built-up roofing.

3.1.10 Counterflashing

Except where indicated or specified otherwise, insert counterflashing in reglets located from 9 to 10 inch above roof decks, extend down vertical surfaces over upturned vertical leg of base flashings not less than 3 inch. Fold the exposed edges of counterflashings 1/2 inch. Where stepped counterflashings are required, they may be installed in short lengths a minimum 8 inch by 10 inch or may be of the preformed one-piece type. Provide end laps in counterflashings not less than 3 inch and make it weathertight with plastic cement. Do not make lengths of metal counterflashings exceed 10 feet. Form the flashings to the required shapes before installation. Factory-form the corners not less than 12 inch from the angle. Secure the flashings in the reglets with lead wedges and space not more than 18 inch apart; on short runs, place wedges closer together. Fill caulked-type reglets or raked joints which receive counterflashing with caulking compound. Caulking is covered in Section 07 92 00 JOINT SEALTANTS. Turn up the concealed edge of counterflashings built into masonry or concrete walls not less than 1/4 inch and extend not less than 2 inch into the walls. Install counterflashing to provide a spring action against base flashing.

3.1.11 Metal Reglets

Provide factory fabricated caulked type or friction type reglets with a minimum opening of 1/4 inch and a depth of 1 1/4 inch, as approved.

3.1.11.1 Caulked Reglets

Provide with rounded edges and metal strap brackets or other anchors for securing to the concrete forms. Provide reglets with a core to protect them from injury during the installation. Provide built-up mitered corner pieces for internal and external angles. Wedge the flashing in the reglets with lead wedges every 18 inch, caulked full and solid with an approved compound.

3.1.11.2 Friction Reglets

Provide with flashing receiving slots not less than $5/8$ inch deep, one inch jointing tongues, and upper and lower anchoring flanges installed at 24 inch maximum snaplock receiver. Insert the flashing the full depth of the slot and lock by indentations made with a dull-pointed tool, wedges, and filled with a sealant. For friction reglets, install flashing snaplock receivers at 24 inch on center maximum. When the flashing has been inserted the full depth, caulk the slot and lock with wedges and fill with sealant.

3.1.12 Fascias

Prefabricate in the shapes and sizes indicated and in lengths not less than 8 feet. Extend flange at least 4 inch onto roofing. Provide prefabricated, mitered corners internal and external corners. Install fascias before the roofing membranes (asphalt felt underlayment and shingles have been applied. Nail flange securely to wood nailer with large-head, barbed-shank roofing nails 1.5 inch long spaced not more than 3 inch on center, in two staggered rows.

3.1.12.1 Edge Strip

Hook the lower edge of fascias at least $3/4$ inch over a continuous strip of the same material bent outward at an angle not more than 45 degrees to form a drip. Nail hook strip to a wood nailer at 6 inch maximum on center. Where fastening is made to concrete or masonry, use screws spaced 12 inch on center driven in expansion shields set in the concrete or masonry. Where horizontal wood nailers are slotted to provide for insulation venting, install strips to prevent obstruction of vent slots. Where necessary, install strips over $1/16$ inch thick compatible spacer or washers.

3.1.12.2 Joints

Leave open the section ends of gravel stops and fascias $1/4$ inch and backed with a formed flashing plate, mechanically fastened in place and lapping each section end a minimum of 4 inch set laps in plastic cement. Face nailing will not be permitted. Install prefabricated aluminum gravel stops and fascias in accordance with the manufacturer's printed instructions and details.

3.1.13 Metal Drip Edge

Provide a metal drip edge, designed to allow water run-off to drip free of underlying construction, at eaves and rakes prior to the application of roofing shingles. Apply directly on the wood deck at the eaves and over the underlay along the rakes. Extend back from the edge of the deck not more than 3 inch and secure with compatible nails spaced not more than 10 inch on center along upper edge.

3.1.14 Gutters

The hung type of shape indicated and supported on underside by brackets that permit free thermal movement of the gutter. Provide gutters in sizes indicated on the drawings, complete with mitered corners, end caps, outlets, brackets, and other accessories necessary for installation. Bead with hemmed edge or reinforce the outer edge of gutter with a stiffening bar not less than $3/4$ by $3/16$ inch of material compatible with gutter.

Fabricate gutters in sections not less than 8 feet. Lap the sections a minimum of one inch in the direction of flow or provide with concealed splice plate 6 inch minimum. Join the gutters, other than aluminum, by riveted and soldered joints. Join aluminum gutters with riveted sealed joints. Provide expansion-type slip joints midway between outlets. Install gutters below slope line of the roof so that snow and ice can slide clear. Support gutters on adjustable hangers spaced not more than 30 inch on center. Adjust gutters to slope uniformly to outlets, with high points occurring midway between outlets. Fabricate hangers and fastenings from metals.

3.1.15 Downspouts

Space supports for downspouts according to the manufacturer's recommendation for the masonry substrate. Types, shapes and sizes are indicated. Provide complete including elbows and offsets. Provide downspouts in approximately 10 foot lengths. Provide end joints to telescope not less than 1/2 inch and lock longitudinal joints. Provide gutter outlets with wire ball strainers for each outlet. Provide strainers to fit tightly into outlets and be of the same material used for gutters. Keep downspouts not less than one inch away from walls. Fasten to the walls at top, bottom, and at an intermediate point not to exceed 5 feet on center with leader straps or concealed rack-and-pin type fasteners. Form straps and fasteners of metal compatible with the downspouts.

3.1.15.1 Terminations

Neatly fit downspouts into the drainage connection of downspout boots or shoes for the downspouts terminating in drainage lines and fill the joints with a portland cement mortar cap sloped away from the downspout. Downspout boots shall be similar to McKinley Type DS4, length and size as required by size of downspout and for connection to drainage lines. Downspout boots shall be unpainted.

3.1.16 Eave Flashing

One piece in width, applied in 8 to 10 foot lengths with expansion joints spaced as specified in paragraph entitled "Expansion and Contraction." Provide a 3/4 inch continuous fold in the upper edge of the sheet to engage cleats spaced not more than 10 inch on center. Locate the upper edge of flashing not less than 18 inch from the outside face of the building, measured along the roof slope. Fold lower edge of the flashing over and loose-lock into a continuous edge strip on the fascia. Where eave flashing intersects metal valley flashing, secure with one inch flat locked joints with cleats that are 10 inch on center.

3.1.17 Expansion Joints

Provide expansion joints for roofs, walls, and floors as indicated. Conform to the requirements of Table I.

3.1.17.1 Roof Expansion Joints

Consist of curb with wood nailing members on each side of joint, and metal joint cover. Bituminous base flashing is specified in Roofing Section. Provide counterflashing as indicated in the details on drawings. Provide roof joint with a joint cover of the width indicated. Joints are specified in Table II.

3.1.17.2 Floor and Wall Expansion Joints

Provide U-shape with extended flanges for expansion joints in concrete and masonry walls and in floor slabs. Cover plates for wall and floor joints are specified in Section 05500 METAL: MISCELLANEOUS AND FABRICATIONS.

3.1.18 Flashing at Roof Penetrations and Equipment Supports

Provide metal flashing for all pipes, ducts, and conduits projecting through the roof surface and for equipment supports and similar items supported by or attached to the roof deck.

3.1.19 Single Pipe Vents

See Table I, footnote (d). Set flange of sleeve in bituminous plastic cement and nail 3 inch on center. Bend the top of sleeve over and extend down into the vent pipe a minimum of 2 inch. For long runs or long rises above the deck, where it is impractical to cover the vent pipe with lead, use a two-piece formed metal housing. Set metal housing with a metal sleeve having a 4 inch roof flange in bituminous plastic cement and nailed 3 inch on center. Extend sleeve a minimum of 8 inch above the roof deck and lapped a minimum of 3 inch by a metal hood secured to the vent pipe by a draw band. Seal the area of hood in contact with vent pipe with an approved sealant. Sealants are covered under Section 079200 JOINT SEALANTS.

3.1.20 Stepped Flashing

Stepped flashing shall be installed where sloping roofs surfaced with shingles abut vertical surfaces. Separate pieces of base flashing shall be placed in alternate shingle courses.

3.1.21 Copings

Provide coping using copper sheets 8 or 10 feet long joined by a 3/4 inch locked and soldered seam. . Terminate outer edges in edge strips. Install with sealed cover plate joints as indicated.

3.2 PAINTING

Field-paint sheet metal for separation of dissimilar materials. Finish painting is specified in Section 09 90 00 PAINTS AND COATINGS.

3.3 CLEANING

Clean exposed sheet metal work at completion of installation. Remove grease and oil films, handling marks, contamination from steel wool, fittings and drilling debris, and scrub-clean. Free the exposed metal surfaces of dents, creases, waves, scratch marks, and solder or weld marks.

3.4 REPAIRS TO FINISH

Scratches, abrasions, and minor surface defects of finish may be repaired in accordance with the manufacturer's printed instructions and as approved. Repair damaged surfaces caused by scratches, blemishes, and variations of color and surface texture. Replace items which cannot be repaired.

3.5 FIELD QUALITY CONTROL

Establish and maintain a Quality Control Plan for sheet metal used in

conjunction with roofing to assure compliance of the installed sheet metalwork with the contract requirements. Remove work that is not in compliance with the contract and replace or correct. Include quality control, but not be limited to, the following:

- a. Observation of environmental conditions; number and skill level of sheet metal workers; condition of substrate.
- b. Verification that specified material is provided and installed.
- c. Inspection of sheet metalwork, for proper size(s) and thickness(es), fastening and joining, and proper installation.

3.5.1 Procedure

Submit for approval prior to start of roofing work. Include a checklist of points to be observed. Document the actual quality control observations and inspections. Furnish a copy of the documentation to the Contracting Officer at the end of each day.

TABLE I. SHEET METAL WEIGHTS, THICKNESSES, AND GAGES

Sheet Metal Items	Aluminum, Inch	Stainless Steel, Inch	Zinc- Coated Steel, U.S. Std. Gage
<hr/>			
Building Expansion			
Joints			
Cover.....	.032	.015	24
Covering on minor flat, pitched or curved surfaces.....	.040	.018	-
Downspouts and leaders.....	.032	.015	24
Downspout clips and anchors.....	.040 clip .125 anchor	- -	- -
Downspout straps, 2-inch.....	.060	.050	-
Flashings:			
Base.....	.040	.018	24
Cap (Counter-flashing)	.032	.015	26
Eave.....	-	.015	24
Stepped.....	.032	.015	-
Pipe vent sleeve(d)			
Coping.....	-	-	-
Edge strip.....	.050	.025	-
Gutters:			
Gutter section.....	.032	.015	24
Continuous cleat.....	.032	.015	24
Hangers, dimensions.....	1 inch x .080 inch	1 inch x .037 inch	-

TABLE I. SHEET METAL WEIGHTS, THICKNESSES, AND GAGES

Sheet Metal Items	Aluminum, Inch	Stainless Steel, Inch	Zinc- Coated Steel, U.S. Std. Gage
(c)			
Joint Cover plates... (See Table II)	.032	.015	24
Reglets (c).....	-	.010	-

(c) May be polyvinyl chloride.

(d) 2.5 pound minimum lead sleeve with 4 inch flange. Where lead sleeve is impractical, refer to paragraph entitled "Single Pipe Vents" for optional material.

TABLE II. SHEET METAL JOINTS
TYPE OF JOINT

Item Designa- tion	Copper, Terne- Coated Steel, Zinc-Coated Steel and Stainless Steel	Aluminum	Remarks
Joint cap for building expansion seam, cleated joint at roof	1.25 inch single lock, standing seam, cleated	1.25 inch single lock, standing	- - -
Flashings			
Base	One inch 3 inch lap for expansion joint	One inch flat locked, soldered; sealed; 3 inch lap for expansion joint	Aluminum producer's recommended hard setting sealant for locked aluminum joints. Fill each metal expansion joint with a joint sealing compound compound.
Cap-in reglet	3 inch lap	3 inch lap	Seal groove with joint sealing compound.
Reglets	Butt joint	- - -	Seal reglet groove with joint sealing

TABLE II. SHEET METAL JOINTS
TYPE OF JOINT

Item Designation	Copper, Terne-Coated Steel, Zinc-Coated Steel and Stainless Steel	Aluminum	Remarks
			compound.
Eave	One inch flat locked, cleated One inch loose locked, expansion joint cleated	One inch flat locked, locked, cleated one inch loose locked, sealed expansion joints, cleated	Same as base flashing.
Stepped	3 inch lap	3 inch lap	- - -
Valley.	6 inch lap cleated	6 inch lap cleated	- - -
Edge strip	Butt	Butt	- - -
Gravel stops:			
Extrusions	- - -	Butt with 1/2 inch space	Use sheet flashing beneath and a cover plate.
Sheet, smooth	Butt with 1/4 inch space	Butt with 1/4 inch space	Use sheet flashing backup plate.
Sheet corrugated	Butt with 1/4 inch space	Butt with 1/4 inch space	Use sheet flashing beneath and a cover plate or a combination unit
Gutters	1.5 inch lap, riveted and soldered	One inch flat locked, riveted, and sealed	Aluminum producers recommended hard setting sealant for locked aluminum joints.
(a)	Provide a 3 inch lap elastomeric flashing with manufacturer's recommended sealant.		
(b)	Seal polyvinyl chloride reglet with manufacturer's recommended sealant.		
-- End of Section --			

SECTION 07 84 00

FIRESTOPPING
10/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E 119	(2008a) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E 1399	(1997; R 2005) Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems
ASTM E 1966	(2007) Fire-Resistive Joint Systems
ASTM E 814	(2008b) Standard Test Method for Fire Tests of Through-Penetration Fire Stops
ASTM E 84	(2009) Standard Test Method for Surface Burning Characteristics of Building Materials

FM GLOBAL (FM)

FM AS 4991	(2001) Approval of Firestop Contractors
FM P7825a	(2005) Approval Guide Fire Protection

UNDERWRITERS LABORATORIES (UL)

UL 1479	(2003; Rev thru Dec 2008) Standard for Fire Tests of Through-Penetration Fire Stops
UL 2079	(2004; Mar 2006) Tests for Fire Resistance of Building Joint Systems
UL 723	(2008) Standard for Test for Surface Burning Characteristics of Building Materials
UL Fire Resistance	(2009) Fire Resistance Directory

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When

used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Firestopping Materials.

Detail drawings including manufacturer's descriptive data, typical details conforming to UL Fire Resistance or other details certified by another nationally recognized testing laboratory, installation instructions or UL listing details for a firestopping assembly in lieu of fire-test data or report. For those firestop applications for which no UL tested system is available through a manufacturer, a manufacturer's engineering judgement, derived from similar UL system designs or other tests, shall be submitted for review and approval prior to installation. Submittal shall indicate the firestopping material to be provided for each type of application. When more than a total of 5 penetrations and/or construction joints are to receive firestopping, provide drawings that indicate location, "F" and "T" ratings, and type of application.

SD-07 Certificates

Firestopping Materials.

Certificates attesting that firestopping material complies with the specified requirements. In lieu of certificates, drawings showing UL classified materials as part of a tested assembly may be provided. Drawings showing evidence of testing by an alternate nationally recognized independent laboratory may be substituted.

Installer Qualifications.

Documentation of training and experience.

Inspection.

Manufacturer's representative certification stating that firestopping work has been inspected and found to be applied according to the manufacturer's recommendations and the specified requirements.

1.3 GENERAL REQUIREMENTS

Firestopping shall consist of furnishing and installing tested and listed firestop systems, combination of materials, or devices to form an effective barrier against the spread of flame, smoke and gases, and maintain the integrity of fire resistance rated walls, partitions, floors, and ceiling-floor assemblies, including through-penetrations and construction joints and gaps. Through-penetrations include the annular space around pipes, tubes, conduit, wires, cables and vents. Construction joints include those used to accommodate expansion, contraction, wind, or seismic movement; firestopping material shall not interfere with the required movement of the joint. Gaps requiring firestopping include gaps between the curtain wall and the floor slab and between the top of the fire-rated walls and the roof or floor deck above.

1.4 DELIVERY AND STORAGE

Materials shall be delivered in the original unopened packages or containers showing name of the manufacturer and the brand name. Materials shall be stored off the ground and shall be protected from damage and exposure to elements. Damaged or deteriorated materials shall be removed from the site.

1.5 INSTALLER QUALIFICATIONS

The Contractor shall engage an experienced Installer who is:

- a. FM Research approved in accordance with FM AS 4991, or
- b. Certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of 3 years experience in the installation of manufacturer's products in accordance with specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an installer engaged by the Contractor does not in itself confer qualification on the buyer. The Installer shall have been trained by a direct representative of the manufacturer (not distributor or agent) in the proper selection and installation procedures.

1.6 COORDINATION

The specified work shall be coordinated with other trades. Firestopping materials, at penetrations of pipes and ducts, shall be applied prior to insulating, unless insulation meets requirements specified for firestopping. Firestopping materials at building joints and construction gaps shall be applied prior to completion of enclosing walls or assemblies. Cast-in-place firestop devices shall be located and installed in place before concrete placement. Pipe, conduit or cable bundles shall be installed through cast-in-place device after concrete placement but before area is concealed or made inaccessible.

PART 2 PRODUCTS

2.1 FIRESTOPPING MATERIALS

Firestopping materials shall consist of commercially manufactured, asbestos-free, noncombustible products FM P7825a approved, or UL listed, for use with applicable construction and penetrating items, complying with the following minimum requirements:

2.1.1 Fire Hazard Classification

Material shall have a flame spread of 25 or less, and a smoke developed rating of 50 or less, when tested in accordance with ASTM E 84 or UL 723. Material shall be an approved firestopping material as listed in UL Fire Resistance or by a nationally recognized testing laboratory.

2.1.2 Toxicity

Material shall be nontoxic to humans at all stages of application or during fire conditions.

2.1.3 Fire Resistance Rating

Firestop systems shall be **UL Fire Resistance** listed or **FM P7825a** approved with "F" rating at least equal to fire-rating of fire wall or floor in which penetrated openings are to be protected, except that "F" rating may be 3 hours in through-penetrations of 4 hour fire rated wall or floor. Firestop systems shall also have "T" rating where required.

2.1.3.1 Through-Penetrations

Firestopping materials for through-penetrations, as described in paragraph GENERAL REQUIREMENTS, shall provide "F" and "T" fire resistance ratings in accordance with **ASTM E 814** or **UL 1479**. Fire resistance ratings shall be as follows:

2.1.3.2 Construction Joints and Gaps

Fire resistance ratings of construction joints, as described in paragraph GENERAL REQUIREMENTS, and gaps such as those between floor slabs or roof decks and curtain walls shall be the same as the construction in which they occur. Construction joints and gaps shall be provided with firestopping materials and systems that have been tested in accordance with **ASTM E 119**, **ASTM E 1966** or **UL 2079** to meet the required fire resistance rating. Systems installed at construction joints shall meet the cycling requirements of **ASTM E 1399** or **UL 2079**.

PART 3 EXECUTION

3.1 PREPARATION

Areas to receive firestopping shall be free of dirt, grease, oil, or loose materials which may affect the fitting or fire resistance of the firestopping system. For cast-in-place firestop devices, formwork or metal deck to receive device prior to concrete placement shall be sound and capable of supporting device. Surfaces shall be prepared as recommended by the manufacturer.

3.2 INSTALLATION

Firestopping material shall completely fill void spaces regardless of geometric configuration, subject to tolerance established by the manufacturer. Firestopping systems for filling floor voids **4 inches** or more in any direction shall be capable of supporting the same load as the floor is designed to support or shall be protected by a permanent barrier to prevent loading or traffic in the firestopped area. Firestopping shall be installed in accordance with manufacturer's written instructions. Tested and listed firestop systems shall be provided in the following locations, except in floor slabs on grade:

- a. Penetrations of duct, conduit, tubing, cable and pipe through floors and through fire-resistance rated walls, partitions, and ceiling-floor assemblies.
- b. Penetrations of vertical shafts such as pipe chases, elevator shafts, and utility chutes.
- c. Gaps at the intersection of floor slabs and curtain walls, including inside of hollow curtain walls at the floor slab.

d. Gaps at perimeter of fire-resistance rated walls and partitions, such as between the top of the walls and the bottom of roof decks.

e. Construction joints in floors and fire rated walls and partitions.

f. Other locations where required to maintain fire resistance rating of the construction.

3.2.1 Insulated Pipes and Ducts

Thermal insulation shall be cut and removed where pipes or ducts pass through firestopping, unless insulation meets requirements specified for firestopping. Thermal insulation shall be replaced with a material having equal thermal insulating and firestopping characteristics.

3.2.2 Fire Dampers

Fire dampers shall be installed and firestopped in accordance with Section 23 00 00 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM.

3.2.3 Data and Communication Cabling

Cabling for data and communication applications shall be sealed with re-enterable firestopping products that do not cure over time. Firestopping shall be modular devices, containing built-in self-sealing intumescent inserts. Firestopping devices shall allow for cable moves, adds or changes without the need to remove or replace any firestop materials.

3.3 INSPECTION

For all projects, the firestopped areas shall not be covered or enclosed until inspection is complete and approved by the manufacturer's technical representative. The manufacturer's representative shall inspect the applications initially to ensure adequate preparations (clean surfaces suitable for application, etc.) and periodically during the work to assure that the completed work has been accomplished according to the manufacturer's written instructions and the specified requirements. The Contractor shall submit written reports indicating locations of and types of penetrations and types of firestopping used at each location; type shall be recorded by UL listed printed numbers.

-- End of Section --

SECTION 07 92 00

JOINT SEALANTS

01/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C 509	(2006) Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM C 734	(2006) Low-Temperature Flexibility of Latex Sealants After Artificial Weathering
ASTM C 919	(2008) Use of Sealants in Acoustical Applications
ASTM C 920	(2008) Standard Specification for Elastomeric Joint Sealants
ASTM D 1056	(2007) Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D 1667	(2005) Flexible Cellular Materials - Poly (Vinyl Chloride) Foam (Closed-Cell)
ASTM D 217	(2002; R 2008) Cone Penetration of Lubricating Grease
ASTM E 84	(2009) Standard Test Method for Surface Burning Characteristics of Building Materials

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Sealants

For sealants and sealant primers used inside the weatherproofing system, include printed statement of voc content.

Primers

Bond breakers

Backstops

Manufacturer's descriptive data including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). Provide a copy of the Material Safety Data Sheet for each solvent, primer or sealant material.

SD-07 Certificates

Sealant

Certificates of compliance stating that the materials conform to the specified requirements.

1.3 ENVIRONMENTAL CONDITIONS

Apply sealant when the ambient temperature is between 40 and 90 degrees F.

1.4 DELIVERY AND STORAGE

Deliver materials to the job site in unopened manufacturers' external shipping containers, with brand names, date of manufacture, color, and material designation clearly marked thereon. Label elastomeric sealant containers to identify type, class, grade, and use. Carefully handle and store materials to prevent inclusion of foreign materials or subjection to sustained temperatures exceeding 90 degrees F or less than 0 degrees F.

PART 2 PRODUCTS

2.1 INDOOR ENVIRONMENTAL QUALITY (IBQ)

2.1.1 Low-Emitting Materials

Caulking and sealants used for this project shall be low-emitting, non-irritating, nontoxic and chemically inert. Sealants used as a filler shall meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51. VOC content of architectural sealants and primers shall not exceed 250 gm per liter.

2.2 SEALANTS

Provide sealant that has been tested and found suitable for the substrates to which it will be applied.

2.2.1 Interior Sealant

Provide ASTM C 920, Type S or M, Grade NS, Class 12.5, Use NT. Location(s) and color(s) of sealant for the following:

LOCATION	COLOR
a. Small voids between walls or partitions and adjacent lockers, casework, shelving, door frames, built-in or surface-mounted equipment and fixtures, and similar items.	Match adjacent surface color
b. Perimeter of frames at doors, windows,	Match adjacent

LOCATION	COLOR
and access panels which adjoin exposed interior concrete and masonry surfaces.	surface color
c. Joints of interior masonry walls and partitions which adjoin columns, pilasters, concrete walls, and exterior walls unless otherwise detailed.	Match adjacent surface color
d. Joints between edge members for acoustical tile and adjoining vertical surfaces.	Match adjacent surface color
e. Interior locations, not otherwise indicated or specified, where small voids exist between materials specified to be painted.	Match adjacent surface color
f. Joints between bathtubs and ceramic tile; joints between shower receptors and ceramic tile; joints formed where nonplaner tile surfaces meet.	Match adjacent surface color
g. Joints formed between tile floors and tile base cove; joints between tile and dissimilar materials; joints occurring where substrates change.	Match adjacent surface color
h. Behind escutcheon plates at valve pipe penetrations and showerheads in showers.	Clear

2.2.2 Exterior Sealant

For joints in vertical surfaces, provide [ASTM C 920](#), Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide [ASTM C 920](#), Type S or M, Grade P, Class 25, Use T. Provide location(s) and color(s) of sealant as follows:

LOCATION	COLOR
a. Joints and recesses formed where frames and subsills of windows, doors, louvers, and vents adjoin masonry, concrete, or metal frames. Use sealant at both exterior and interior surfaces of exterior wall penetrations.	Match mortar color
b. Expansion and control joints.	Match mortar color
c. Voids where items pass through exterior walls.	Match mortar color
d. Metal reglets, where flashing is inserted into masonry joints, and where flashing is penetrated by coping dowels.	Match adjacent surface color
e. Joints between ends of gravel stops, fascias, copings, and adjacent walls.	Match adjacent surface color

LOCATION

COLOR

2.2.3 Floor Joint Sealant

ASTM C 920, Type S or M, Grade P, Class 25, Use T. Provide location(s) and color(s) of sealant as follows:

LOCATION

COLOR

- | | |
|---|-------------------|
| a. Seats of metal thresholds for exterior doors. | Gray |
| b. Control and expansion joints in floors, slabs, ceramic tile, and walkways. | Match grout color |

2.2.4 Acoustical Sealant

Rubber or polymer-based acoustical sealant conforming to ASTM C 919 must have a flame spread of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E 84. Acoustical sealant must have a consistency of 250 to 310 when tested in accordance with ASTM D 217, and must remain flexible and adhesive after 500 hours of accelerated weathering as specified in ASTM C 734, and must be non-staining.

2.2.5 Preformed Sealant

Provide preformed sealant of polybutylene or isoprene-butylene based pressure sensitive weather resistant tape or bead sealant capable of sealing out moisture, air and dust when installed as recommended by the manufacturer. At temperatures from minus 30 to plus 160 degrees F, the sealant must be non-bleeding and no loss of adhesion.

2.2.5.1 Tape

Tape sealant: Provide cross-section dimensions as indicated. .

2.2.5.2 Foam Strip

Provide foam strip of polyurethane foam; with cross-section dimensions as indicated. Provide foam strip capable of sealing out moisture, air, and dust when installed and compressed as recommended by the manufacturer. Service temperature must be minus 40 to plus 275 degrees F. Furnish untreated strips with adhesive to hold them in place. Do not allow adhesive to stain or bleed into adjacent finishes. Saturate treated strips with butylene waterproofing or impregnated with asphalt.

2.3 PRIMERS

Provide a nonstaining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.

2.4 BOND BREAKERS

Provide the type and consistency recommended by the sealant manufacturer to prevent adhesion of the sealant to backing or to bottom of the joint.

2.5 BACKSTOPS

Provide glass fiber roving or neoprene, butyl, polyurethane, or polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer. Provide 25 to 33 percent oversized backing for closed cell and 40 to 50 percent oversized backing for open cell material, unless otherwise indicated. Make backstop material compatible with sealant. Do not use oakum and other types of absorptive materials as backstops.

2.5.1 Rubber

Conform to [ASTM D 1056](#), Type 2, closed cell, Class A, Grade 2, roundcross section for cellular rubber sponge backing.

2.5.2 PVC

Conform to [ASTM D 1667](#), Grade VO 12 12, open-cell foam, round cross section for Polyvinyl chloride (PVC) backing.

2.5.3 Synthetic Rubber

Conform to [ASTM C 509](#), Option I, Type I preformed rods or tubes for Synthetic rubber backing.

2.6 CLEANING SOLVENTS

Provide type(s) recommended by the sealant manufacturer except for aluminum and bronze surfaces that will be in contact with sealant.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Clean surfaces from dirt frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Remove oil and grease with solvent. Surfaces must be wiped dry with clean cloths. When resealing an existing joint, remove existing caulk or sealant prior to applying new sealant. For surface types not listed below, contact sealant manufacturer for specific recommendations.

3.1.1 Steel Surfaces

Remove loose mill scale by sandblasting or, if sandblasting is impractical or would damage finish work, scraping and wire brushing. Remove protective coatings by sandblasting or using a residue-free solvent.

3.1.2 Aluminum or Bronze Surfaces

Remove temporary protective coatings from surfaces that will be in contact with sealant. When masking tape is used as a protective coating, remove tape and any residual adhesive just prior to sealant application. For removing protective coatings and final cleaning, use nonstaining solvents recommended by the manufacturer of the item(s) containing aluminum or bronze surfaces.

3.1.3 Concrete and Masonry Surfaces

Where surfaces have been treated with curing compounds, oil, or other such

materials, remove materials by sandblasting or wire brushing. Remove laitance, efflorescence and loose mortar from the joint cavity.

3.1.4 Wood Surfaces

Keep wood surfaces to be in contact with sealants free of splinters and sawdust or other loose particles.

3.2 SEALANT PREPARATION

Do not add liquids, solvents, or powders to the sealant. Mix multicomponent elastomeric sealants in accordance with manufacturer's instructions.

3.3 APPLICATION

3.3.1 Joint Width-To-Depth Ratios

a. Acceptable Ratios:

<u>JOINT WIDTH</u>	<u>JOINT DEPTH</u>	
	Minimum	Maximum
For metal, glass, or other nonporous surfaces:		
1/4 inch (minimum)	1/4 inch	1/4 inch
over 1/4 inch	1/2 of width	Equal to width
For wood, concrete, masonry, :		
1/4 inch (minimum)	1/4 inch	1/4 inch
Over 1/4 inch to 1/2 inch	1/4 inch	Equal to width
Over 1/2 inch to 2 inch	1/2 inch	5/8 inch
Over 2 inch.	(As recommended by sealant manufacturer)	

- b. Unacceptable Ratios: Where joints of acceptable width-to-depth ratios have not been provided, clean out joints to acceptable depths and grind or cut to acceptable widths without damage to the adjoining work. Grinding is not required on metal surfaces.

3.3.2 Masking Tape

Place masking tape on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or sealant smears. Remove masking tape within 10 minutes after joint has been filled and tooled.

3.3.3 Backstops

Install backstops dry and free of tears or holes. Tightly pack the back or bottom of joint cavities with backstop material to provide a joint of the depth specified. Install backstops in the following locations:

- a. Where indicated.
- b. Where backstop is not indicated but joint cavities exceed the acceptable maximum depths specified in paragraph entitled, "Joint Width-to-Depth Ratios".

3.3.4 Primer

Immediately prior to application of the sealant, clean out loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete masonry units, wood, and other porous surfaces in accordance with sealant manufacturer's instructions. Do not apply primer to exposed finish surfaces.

3.3.5 Bond Breaker

Provide bond breakers to the back or bottom of joint cavities, as recommended by the sealant manufacturer for each type of joint and sealant used, to prevent sealant from adhering to these surfaces. Carefully apply the bond breaker to avoid contamination of adjoining surfaces or breaking bond with surfaces other than those covered by the bond breaker.

3.3.6 Sealants

Provide a sealant compatible with the material(s) to which it is applied. Do not use a sealant that has exceeded shelf life or has jelled and can not be discharged in a continuous flow from the gun. Apply the sealant in accordance with the manufacturer's printed instructions with a gun having a nozzle that fits the joint width. Force sealant into joints to fill the joints solidly without air pockets. Tool sealant after application to ensure adhesion. Make sealant uniformly smooth and free of wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints, apply sealant, and tool smooth as specified. Apply sealer over the sealant when and as specified by the sealant manufacturer.

3.4 PROTECTION AND CLEANING

3.4.1 Protection

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

3.4.2 Final Cleaning

Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

- a. Masonry and Other Porous Surfaces: Immediately scrape off fresh sealant that has been smeared on masonry and rub clean with a solvent as recommended by the sealant manufacturer. Allow excess sealant to cure for 24 hour then remove by wire brushing or sanding.
- b. Metal and Other Non-Porous Surfaces: Remove excess sealant with a solvent-moistened cloth.

-- End of Section --

SECTION 08 11 13

STEEL DOORS AND FRAMES

08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2008; Errata 2009) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 653/A 653M (2009) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A 879/A 879M (2006) Standard Specification for Steel Sheet, zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface

ASTM A 924/A 924M (2009) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

ASTM C 578 (2008b) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

ASTM C 591 (2008a) Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation

ASTM C 612 (2004e1) Mineral Fiber Block and Board Thermal Insulation

ASTM D 2863 (2008) Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)

ASTM F 1642 (2004) Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings

ASTM F 2248 (2003) Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing

Fabricated with Laminated Glass

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.115 (2006) Hardware Preparation in Steel Doors and Steel Frames

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 105 (2006; Errata 2007; Errata 2007) Installation of Smoke Door Assemblies

NFPA 252 (2007) Standard Methods of Fire Tests of Door Assemblies

NFPA 80 (2006; Errata 2008) Standard for Fire Doors and Other Opening Protectives

STEEL DOOR INSTITUTE (SDI/DOOR)

SDI/DOOR 111 (2004) Recommended Selection and Usage Guide for Standard Steel Doors, Frames and Accessories

SDI/DOOR 113 (2001) Determining the Steady State Thermal Transmittance of Steel Door and Frame Assemblies

SDI/DOOR A250.11 (2001) Recommended Erection Instructions for Steel Frames

SDI/DOOR A250.6 (2003) Hardware on Steel Doors (Reinforcement - Application)

SDI/DOOR A250.8 (2003) Recommended Specification for Standard Steel Doors and Frames

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 4-010-01 (2007) Unified Facilities Criteria - DoD Minimum Antiterrorism Standards for Buildings

UNDERWRITERS LABORATORIES (UL)

UL 10B (2008; Rev thru Apr 2009) Fire Tests of Door Assemblies

1.2 DEFINITIONS

Structural Silicone Sealant Glazed Systems: Opening systems in which glazing is bonded to both sides of the opening frame using an adhesive such as a high-strength, high performance silicone sealant.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office

that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Doors

Accessories

Show elevations, construction details, metal gages, hardware provisions, method of glazing, and installation details.

SD-03 Product Data

Doors

Frames

Accessories

Submit manufacturer's descriptive literature for doors, frames, and accessories. Include data and details on door construction, panel (internal) reinforcement, insulation, and door edge construction. When "custom hollow metal doors" are provided in lieu of "standard steel doors," provide additional details and data sufficient for comparison to SDI/DOOR A250.8 requirements.

Local/Regional Materials

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site.

Recycled Content

For products having recycled content, manufacturer's product data for percentages by weight of pre-consumer and post-consumer recycled content.

SD-05 Design Data

Structural calculations for deflection

Blast Resistance Design Analysis or Test Reports: Submit either of the following to demonstrate compliance with Blast Resistance indicated under Performance Requirements:

a. Computational Design Analysis Calculations: Manufacturer's design analysis prepared by Professional Engineer, with calculations showing that the design of each different size and type of opening framing system, their connections to the structure, and glazing system complies with requirements.

b. Standard Airblast Test Method: Test reports indicating system compliance.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver doors, frames, and accessories undamaged and with protective wrappings or packaging. Strap knock-down frames in bundles. Provide temporary steel spreaders securely fastened to the bottom of each welded

frame. Store doors and frames on platforms under cover in clean, dry, ventilated, and accessible locations, with 1/4 inch airspace between doors. Remove damp or wet packaging immediately and wipe affected surfaces dry. Replace damaged materials with new.

1.5 PERFORMANCE REQUIREMENTS

1.5.1 Blast Resistance

Provide Anti-Terrorism Force Protection (ATFP) minimum antiterrorism openings and frames for exterior openings. Comply with [UFC 4-010-01](#) using ATFP Performance Requirements for framing and glazing system. Conformance to performance requirements shall be validated by one of the following two methods:

- a. Computational Design Analysis Calculations: Refer to "Alternate Method of Analysis" in [UFC 4-010-01](#), and Table 2-1.
- b. Standard Airblast Test Method: Refer to "Testing" in [UFC 4-010-01](#), Table 2-1, and [ASTM F 1642](#).

Provide a minimum frame bite of 3/8 inch for structural silicone sealant glazed systems, or 1 inch for non-structurally glazed systems. Refer to ASTM F 2248 for further glazing frame bite requirements.

Provide non-structurally glazed system only if approved testing method can be determined and agreed upon based on careful review of current [UFC 4-010-01](#) and [ASTM F 2248](#); otherwise use only structural silicone sealant glazed system.

If structural sealant option is used, compatibility and adhesion shall be validated by field testing as indicated in PART 3 of this Section.

The glazing frame bite for the window frames must be adequate to accept the width of structural silicone sealant or glazing tape as specified in PART 2 paragraph "Provisions for Glazing" and subparagraph.

Glazing for antiterrorism openings shall be laminated glass as specified in Section [08 81 00 GLAZING](#)

1.5.2 Deflection of Framing Members

In accordance with [ASTM F 2248](#), ensure that the framing members restrict deflections of edges of the blast resistant glazing they support to L/160 of the length of the supported edge at allowable stress levels under the equivalent 3-second design loading of 35 pounds per square foot (psf), where L denotes the length of the glazing supported edge (L is to be based on edge length of glazing in frame and not on the distance between anchors that fasten frame to the structure).

1.5.3 Frame Anchors

Fasten window frames to the supporting structure with anchors designed to resist forces generated by a 3-second duration load of 70 pounds per square foot (psf) acting on the entire window unit.

1.6 QUALITY CONTROL

1.6.1 Shop Drawing Requirements

Drawings shall indicate elevations of doors and frames, full-size sections, thickness and gages of metal, fastenings, proposed method of anchoring, size and spacing of anchors, details of construction, method of glazing, details of operating hardware, mullion details, method and materials for weatherstripping, material and method of attaching subframes, trim, installation details, and other related items. Include frame bite for blast resistance of exterior frames.

1.6.2 Blast Resistance

Submit design analysis or test reports to substantiate compliance with Blast Resistance indicated under Performance Requirements. Design analysis shall include calculations by a Professional Engineer showing that the design of each different size and type of framing system and its anchorage to the structure meets the requirements indicated. Calculations verifying the structural performance of each window proposed for use, under the given loads, must be prepared and signed by a registered professional engineer. Indicate in shop drawings the framing components and anchorage devices to the structure, as determined by the design analysis or test reports.

1.11 SUSTAINABLE DESIGN REQUIREMENTS

1.7 Local/Regional Materials

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Steel Doors and Frames may be locally available.

1.8 Recycled Content

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total for recycled content. Steel Doors and Frames may be available with recycled content.

PART 2 PRODUCTS

2.1 STANDARD STEEL DOORS

SDI/DOOR A250.8, except as specified otherwise. Prepare doors to receive door hardware as specified in Section 08 71 00 BUILDERS' HARDWARE (FORT BRAGG PROJECTS). Undercut where indicated. Exterior doors shall have top edge closed flush and sealed to prevent water intrusion. Doors shall be 1-3/4 inch thick, unless otherwise indicated.

2.1.1 Classification - Level, Performance, Model

2.1.1.1 Heavy Duty Doors

SDI/DOOR A250.8, Level 2, physical performance Level B, Model 2, with core construction as required by the manufacturer for interior doors and for exterior doors, of size(s) and design(s) indicated in Door Schedule on drawings.. Where vertical stiffener cores are required, the space between the stiffeners shall be filled with mineral board insulation.

2.2 ACCESSORIES

2.2.1 Louvers

2.2.1.1 Interior Louvers

SDI/DOOR 111, Louvers shall be stationary sightproof type where scheduled. Detachable moldings on room or non security side of door; on security side of door, moldings to be integral part of louver. Form louver frames of 20 gage steel and louver blades of a minimum 24 gage. Sightproof louvers to be inverted "V" blade design with minimum 55 percent net-free opening.

2.2.1.2 Exterior Louvers

Louvers shall be inverted "V" type with minimum of 55 percent net-free opening. Weld or tenon louver blades to continuous channel frame and weld assembly to door to form watertight assembly. Form louvers of hot-dip galvanized steel of same gage as door facings. Louvers shall have steel-framed insect screens secured to room side and readily removable. Provide aluminum wire cloth, 18 by 18 or 18 by 16 inch mesh, for insect screens. Net-free louver area to be before screening.

2.2.2 OMITTED - Astragals

2.2.3 Moldings

Provide moldings around glass of interior and exterior doors and louvers of interior doors. Provide nonremovable moldings on outside of exterior doors and on corridor side of interior doors. Other moldings may be stationary or removable. Secure inside moldings to stationary moldings, or provide snap-on moldings. Muntins shall interlock at intersections and shall be fitted and welded to stationary moldings.

2.3 INSULATION CORES

Insulated cores shall be of type specified, and provide an apparent U-factor of .48 in accordance with SDI/DOOR 113 and shall conform to:

- a. Rigid Cellular Polyisocyanurate Foam: ASTM C 591, Type I or II, foamed-in-place or in board form, with oxygen index of not less than 22 percent when tested in accordance with ASTM D 2863; or
- b. Rigid Polystyrene Foam Board: ASTM C 578, Type I or II; or
- c. Mineral board: ASTM C 612, Type I.

2.4 STANDARD STEEL FRAMES

SDI/DOOR A250.8 except as otherwise specified. Form frames to sizes and shapes indicated, with welded corners. Provide steel frames for doors, transoms, sidelights, mullions, and interior glazed panels, unless otherwise indicated.

2.4.1 Welded Frames

Continuously weld frame faces at corner joints. Mechanically interlock or continuously weld stops and rabbets. Grind welds smooth.

Weld frames in accordance with the recommended practice of the Structural Welding Code Sections 1 through 6, AWS D1.1/D1.1M and in accordance with the practice specified by the producer of the metal being welded.

2.4.2 Knock-Down Frames (Only where required for existing openings)

Design corners for simple field assembly by concealed tenons, splice plates, or interlocking joints that produce square, rigid corners and a tight fit and maintain the alignment of adjoining members. Provide locknuts for bolted connections.

2.4.3 Mullions and Transom Bars

Mullions and transom bars shall be closed or tubular construction and be a member with heads and jambs butt-welded thereto. Bottom of door mullions shall have adjustable floor anchors and spreader connections. Provide removable mullions where indicated in Section 08 71 00 BUILDER'S HARDWARE.

2.4.4 Stops and Beads

Form stops and beads from 20 gage steel. Provide for glazed and other openings in standard steel frames. Secure beads to frames with oval-head, countersunk Phillips self-tapping sheet metal screws or concealed clips and fasteners. Space fasteners approximately 12 to 16 inch on center. Miter molded shapes at corners. Butt or miter square or rectangular beads at corners.

2.4.5 Anchors

Provide anchors to secure the frame to adjoining construction. Provide steel anchors, zinc-coated, not lighter than 18 gage.

2.4.5.1 Wall Anchors

Provide at least three anchors for each jamb. For frames which are more than 7.5 feet in height, provide one additional anchor for each jamb for each additional 2.5 feet or fraction thereof.

- a. Masonry: Provide anchors of corrugated or perforated steel straps or 3/16 inch diameter steel wire, adjustable or T-shaped;
- b. Stud partitions: Weld or otherwise securely fasten anchors to backs of frames. Design anchors to be fastened steel studs with sheet metal screws;
- c. Completed openings: Secure frames to previously placed concrete or masonry with expansion bolts in accordance with SDI/DOOR 111; and

2.4.5.2 Floor Anchors

Provide floor anchors drilled for 3/8 inch anchor bolts at bottom of each jamb member.

2.5 FIRE AND SMOKE DOORS AND FRAMES

NFPA 80 and NFPA 105 and this specification. The requirements of NFPA 80 and NFPA 105 shall take precedence over details indicated or specified.

2.5.1 Labels

Fire doors and frames shall bear the label of Underwriters Laboratories (UL), Factory Mutual Engineering and Research (FM), or Warnock Hersey International (WHI) attesting to the rating required. Testing shall be in accordance with NFPA 252 or UL 10B. Labels shall be metal with raised letters, and shall bear the name or file number of the door and frame manufacturer. Labels shall be permanently affixed at the factory to frames and to the hinge edge of the door. Door labels shall not be painted.

2.6 WEATHERSTRIPPING

As specified in Section 08 71 00 BUILDERS' HARDWARE.

2.7 HARDWARE PREPARATION

Provide minimum hardware reinforcing gages as specified in SDI/DOOR A250.6. Drill and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of SDI/DOOR A250.8 and SDI/DOOR A250.6. For additional requirements refer to ANSI/BHMA A156.115. Drill and tap for surface-applied hardware at the project site. Build additional reinforcing for surface-applied hardware into the door at the factory. Locate hardware in accordance with the requirements of SDI/DOOR A250.8, as applicable. Punch door frames, with the exception of frames that will have weatherstripping gasketing, to receive a minimum of two rubber or vinyl door silencers on lock side of single doors and one silencer for each leaf at heads of double doors. Set lock strikes out to provide clearance for silencers.

2.8 FINISHES

2.8.1 Factory-Primed Finish

All surfaces of doors and frames shall be thoroughly cleaned, chemically treated and factory primed with a rust inhibiting coating as specified in SDI/DOOR A250.8. Where coating is removed by welding, apply touchup of factory primer.

2.8.2 Hot-Dip Zinc-Coated and Factory-Primed Finish

Fabricate exterior doors and frames from hot dipped zinc coated steel, alloyed type, that complies with ASTM A 924/A 924M and ASTM A 653/A 653M. The coating weight shall meet or exceed the minimum requirements for coatings having 0.4 ounces per square foot, total both sides, i.e., A40. Repair damaged zinc-coated surfaces by the application of zinc dust paint. Thoroughly clean and chemically treat to insure maximum paint adhesion. Factory prime as specified in SDI/DOOR A250.8.

2.8.3 Electrolytic Zinc-Coated Anchors and Accessories

For interior applications only: Provide electrolytically deposited zinc-coated steel in accordance with ASTM A 879/A 879M, Commercial Quality, Coating Class A. Phosphate treat and factory prime zinc-coated surfaces as specified in SDI/DOOR A250.8.

2.9 FABRICATION AND WORKMANSHIP

Finished doors and frames shall be strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp,

and buckle. Molded members shall be clean cut, straight, and true, with joints coped or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door frame sections for use with the wall construction indicated. Corner joints shall be well formed and in true alignment. Conceal fastenings where practicable. On wraparound frames for masonry partitions, provide a throat opening $\frac{1}{8}$ inch larger than the actual masonry thickness. Design other frames in exposed masonry walls or partitions to allow sufficient space between the inside back of trim and masonry to receive calking compound.

2.9.1 Blast Resistance

For minimum antiterrorism openings, provide glazing attachment to supporting frame as indicated. Exterior openings shall comply with the minimum antiterrorism standards required by **UFC 4-010-01** and Blast Resistance indicated under Performance Requirements in PART 1 of this Section.

2.9.2 Grouted Frames

For frames to be installed in exterior walls and to be filled with mortar or grout, fill the stops with strips of rigid insulation to keep the grout out of the stops and to facilitate installation of stop-applied head and jamb seals.

2.10 PROVISIONS FOR GLAZING

Materials are specified in Section **08 81 00**, GLAZING.

2.10.1 Blast Resistant Glazing

For minimum antiterrorism openings, adhere glazing to its supporting frame using structural silicone sealant or adhesive glazing tape. The width of the structural silicone sealant bead must be at least equal to, but not larger than two times the thickness designation of the glass to which it adheres. The width of the adhesive glazing tape will be at least equal to two times, but not more than four times the thickness designation of the glass to which it adheres.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Frames

Set frames in accordance with **SDI/DOOR A250.11**. Plumb, align, and brace securely until permanent anchors are set. Anchor bottoms of frames with expansion bolts or powder-actuated fasteners. Build in or secure wall anchors to adjoining construction. Where frames require ceiling struts or overhead bracing, anchor frames to the struts or bracing. Backfill frames with mortar. Coat inside of frames with corrosion-inhibiting bituminous material. Rubber silencers shall be installed in door frames after finish painting has been completed; adhesively applied silencers are not acceptable. Weatherstripping shall be installed at exterior door opening to provide a weathertight installation. For frames in exterior walls, ensure that stops are filled with rigid insulation before grout is placed.

For structurally glazed applications, apply the structural silicone bead to both sides of the glass panel for single pane glazing but only to the

inboard side for insulating glass units.

3.1.2 Doors

Hang doors in accordance with clearances specified in [SDI/DOOR A250.8](#). After erection and glazing, clean and adjust hardware.

3.1.3 Fire and Smoke Doors and Frames

Install fire doors and frames, including hardware, in accordance with [NFPA 80](#). Install fire rated smoke doors and frames in accordance with [NFPA 80](#) and [NFPA 105](#).

3.2 FIELD QUALITY CONTROL

If structural silicone sealant glazed system is used, compatibility and adhesion shall be validated by the following: Structural sealant shall be tested according to recommendations in [ASTM C 1401](#). Destructive Test Method A, "Hand Pull Tab (Destructive)," in [ASTM C 1401](#), Appendix X2, shall be used. A minimum of two areas on each building face shall be tested. Repair installation areas damaged by testing.

3.3 FIELD PAINTED FINISH

Steel doors and frames shall be field painted in accordance with Section [09 90 00](#) PAINTS AND COATINGS. Weatherstrips shall be protected from paint. Finish shall be free of scratches or other blemishes. Color shall be as indicated in the Color Schedule on drawings.

3.4 PROTECTION

Protect doors and frames from damage. Repair damaged doors and frames prior to completion and acceptance of the project or replace with new, as directed. Wire brush rusted frames until rust is removed. Clean thoroughly. Apply an all-over coat of rust-inhibitive paint of the same type used for shop coat.

3.5 CLEANING

Upon completion, clean exposed surfaces of doors and frames thoroughly. Remove mastic smears and other unsightly marks.

-- End of Section --

SECTION 08 14 00

WOOD DOORS

07/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI Qual Stds (8th Edition) AWI Quality Standards

ASTM INTERNATIONAL (ASTM)

ASTM E 2074 (2000e1) Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 252 (2007) Standard Methods of Fire Tests of Door Assemblies

NFPA 80 (2006; Errata 2008) Standard for Fire Doors and Other Opening Protectives

UNDERWRITERS LABORATORIES (UL)

UL 10B (2008; Rev thru Apr 2009) Fire Tests of Door Assemblies

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)

WDMA I.S. 1-A (1997) Architectural Wood Flush Doors

WDMA TM-5 (1990) Split Resistance Test Method

WDMA TM-7 (1990) Cycle Slam Test Method

WDMA TM-8 (1990) Hinge Loading Test Method

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

SD-02 Shop Drawings

Doors

Submit drawings or catalog data showing each type of door unit. Drawings and data shall indicate door type and construction, sizes, thickness, methods of assembly.

SD-03 Product Data

Local/Regional Materials; L

For products having local/regional materials, submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site. Indicate relative dollar value of local/regional materials to total dollar value of products included in project. Include in LEED Documentation Notebook.

Recycled Content; L

For products having recycled content, manufacturer's product data for percentages by weight of pre-consumer and post-consumer recycled content, including costs for each type. Include in LEED Documentation Notebook.

Adhesives, sealants, and primers; L

Submit manufacturer's product data, indicating VOC content of adhesives and composite woods, and documentation indicating that products contains no added urea formaldehyde. Include in LEED Documentation Notebook.

Doors

Fire resistance rating

Accessories

Water-resistant sealer

Sample warranty

Fire resistance rating

SD-04 Samples

Doors

Prior to the delivery of wood doors, submit a sample section of each type of door which shows the stile, rail, veneer, finish, and core construction.

Door finish colors

Submit a minimum of three color selection samples .

SD-06 Test Reports

Split resistance

Cycle-slam

Hinge loading resistance

Submit split resistance test report for doors tested in accordance with **WDMA TM-5**, cycle-slam test report for doors tested in accordance with **WDMA TM-7**, and hinge loading resistance test report for doors tested in accordance with **WDMA TM-8**.

1.3 DELIVERY, STORAGE, AND HANDLING

Deliver doors to the site in an undamaged condition and protect against damage and dampness. Stack doors flat under cover. Support on blocking, a minimum of 4 inch thick, located at each end and at the midpoint of the door. Store doors in a well-ventilated building so that they will not be exposed to excessive moisture, heat, dryness, direct sunlight, or extreme changes of temperature and humidity. Do not store in a building under construction until concrete, masonry work, and plaster are dry. Replace defective or damaged doors with new ones.

1.4 WARRANTY

Warrant doors free of defects as set forth in the door manufacturer's standard door warranty.

1.5 SUSTAINABLE DESIGN REQUIREMENTS

1.5.1 Local/Regional Materials

See Section 01 33 29 LEED(TM) DOCUMENTATION for cumulative total local material requirements. Wood doors may be locally available.

1.5.2 Recycled Content

See Section 01 33 29 LEED(TM) DOCUMENTATION for cumulative total for recycled content. Wood doors may be available with recycled content.

1.5.3 Interior adhesives, sealants, and primers

Adhesives, sealants, and primers used on the wood and wood veneer products for this project shall be low-emitting, non-irritating, nontoxic and chemically inert. Adhesives shall meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168. VOC content of wood adhesives shall not exceed 30 grams per Liter.

PART 2 PRODUCTS

2.1 DOORS

Provide doors of the types, sizes, and designs indicated in Door Schedule on drawings. .

2.1.1 Flush Doors

Conform to **WDMA I.S. 1-A** for flush doors. Provide hollow core doors with lock blocks and 1 inch minimum thickness hinge stile. Hardwood stile edge

bands of doors receives a natural finish, compatible with face veneer. No visible finger joints will be accepted in stile edge bands. When used, locate finger-joints under hardware.

2.1.1.1 Interior Flush Doors

Provide staved lumber core, Type II flush doors conforming to [WDMA I.S. 1-A](#) with faces of premium grade red oak. Hardwood veneers shall be rotary cut book matched.

2.1.2 Composite-Type Fire Doors

Provide doors specified or indicated to have a [fire resistance rating](#) conforming to the requirements of [UL 10B](#), [ASTM E 2074](#), or [NFPA 252](#) for the class of door indicated. Affix a permanent metal label with raised or incised markings indicating testing agency's name and approved hourly fire rating to hinge edge of each door.

Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.

Edge Construction: Provide edge construction with intumescent seals concealed by outer stile.

Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals.

2.2 [ACCESSORIES](#)

2.2.1 Omitted

2.2.2 Door Light Openings

Provide glazed openings with the manufacturer's standard wood moldings. Provide moldings for doors to receive natural finish of the same wood species and color as the wood face veneers. Lip type moldings for flush doors. Provide glazed openings in fire-rated doors with fire rated frames. Glazing is specified in Section [08 81 00 GLAZING](#).

2.2.3 Additional Hardware Reinforcement

Provide fire rated doors with hardware reinforcement blocking. Size of lock blocks shall be as required to secure the hardware specified. Top, bottom and intermediate rail blocks shall measure [5 inches](#) minimum by full core width. Reinforcement blocking shall be in compliance with the manufacturer's labeling requirements and shall not be mineral material similar to the core..

2.3 FABRICATION

2.3.1 Marking

Stamp each door with a brand, stamp, or other identifying mark indicating quality and construction of the door.

2.3.2 Quality and Construction

Identify the standard on which the construction of the door was based.

2.3.3 Adhesives and Bonds

WDMA I.S. 1-A. Use Type II bond for interior doors. Provide a nonstaining adhesive on doors with a natural finish.

2.3.4 Prefitting

At the Contractor's option, provide factory prefitted doors for the specified hardware, door frame and door-swing indicated. Machine and size doors at the factory by the door manufacturer in accordance with the standards under which the doors are produced and manufactured. The work includes sizing, bevelling edges, mortising, and drilling for hardware and providing necessary beaded openings for glass and louvers. Provide the door manufacturer with the necessary hardware samples, and frame and hardware schedules to coordinate the work.

2.3.5 Finishes

2.3.5.1 Factory Finish

Provide doors finished at the factory by the door manufacturer as follows: **AWI Qual Stds** Section 1500, specification for System No. 4 Conversion varnish alkyd urea or System No. 5 Vinyl catalyzed. The coating is **AWI Qual Stds** premium, medium rubbed sheen, open grain effect. Use stain when required to produce the finish specified for color. Seal edges, cutouts, trim, and wood accessories, and apply two coats of finish compatible with the door face finish. Touch-up finishes that are scratched or marred, or where exposed fastener holes are filled, in accordance with the door manufacturer's instructions. Match color and sheen of factory finish using materials compatible for field application.

2.3.5.2 Color

Provide **door finish colors** as indicated in the Color Schedule on the drawings .

2.3.6 Water-Resistant Sealer

Provide manufacturer's standard water-resistant sealer compatible with the specified finishes.

2.4 SOURCE QUALITY CONTROL

Meet or exceed the following minimum performance criteria of stiles of "B" and "C" label fire doors utilizing standard mortise leaf hinges:

- a. **Split resistance:** Averages of ten test samples not less than 500 pounds load when tested in accordance with **WDMA TM-5**.
- b. **Cycle-slam:** 200,000 cycles with no loose hinge screws or other visible signs of failure when tested in accordance with the requirements of **WDMA TM-7**.
- c. **Hinge loading resistance:** Averages of ten test samples not less than 700 pounds load when tested for direct screw withdrawal in

accordance with **WDMA TM-8** using a No. 12, 1-1/4 inch long, steel, fully threaded wood screw. Drill 5/32 inch pilot hole, use 1-1/2 inch opening around screw for bearing surface, and engage screw full, except for last 1/8 inch. Do not use a steel plate to reinforce screw area.

PART 3 EXECUTION

3.1 INSTALLATION

Before installation, seal top and bottom edges of doors with the approved water-resistant sealer. Seal cuts made on the job immediately after cutting using approved water-resistant sealer. Fit, trim, and hang doors with a 1/16 inch minimum, 1/8 inch maximum clearance at sides and top, and a 3/16 inch minimum, 1/4 inch maximum clearance over thresholds. Provide 3/8 inch minimum, 7/16 inch maximum clearance at bottom where no threshold occurs. Bevel edges of doors at the rate of 1/8 inch in 2 inch. Door warp shall not exceed 1/4 inch when measured in accordance with **WDMA I.S. 1-A**.

3.1.1 Fire Doors

Install fire doors in accordance with **NFPA 80**. Do not paint over labels.

-- End of Section --

SECTION 08 51 14.00 10

ALUMINUM WINDOWS
09/04

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45 (2003) Designation System for Aluminum Finishes

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 101 (2005) Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors

AAMA 1302 (1976) Voluntary Specifications for Forced-Entry Resistant Aluminum Prime Windows

AAMA 1503 (1998) Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections

AAMA 2604 (2005) Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 90.1 - IP (2007; Supplement 2008; Errata 2009; Errata 2009; Errata 2009) Energy Standard for Buildings Except Low-Rise Residential Buildings, I-P Edition

ASTM INTERNATIONAL (ASTM)

ASTM E 2112 (2007) Standard Practice for Installation of Exterior Windows, Doors and Skylights

ASTM E 283 (2004) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

ASTM E 330 (2002) Structural Performance of Exterior Windows, Doors, Skylights and Curtain

Walls by Uniform Static Air Pressure Difference

ASTM E 547

(2009) Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference

ASTM F 1642

(2004) Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings

ASTM F 2248

(2003) Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass

INSECT SCREENING WEAVERS ASSOCIATION (ISWA)

ISWA IWS 089

(1990) Recommended Standards and Specifications for Insect Wire Screening (Wire Fabric)

NATIONAL FENESTRATION RATING COUNCIL (NFRC)

NFRC 100

(2004) Procedure for Determining Fenestration Product U-Factors

NFRC 200

(2004) Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101

(2008, Amendment 2009) Life Safety Code

SCREEN MANUFACTURERS ASSOCIATION (SMA)

SMA 1004

(1987; R 1998) Aluminum Tubular Frame Screens for Windows

1.2 DEFINITIONS

Structural Silicone Sealant Glazed Systems: Opening systems in which glazing is bonded to both sides of the opening frame using an adhesive such as a high-strength, high performance silicone sealant.

1.3 CERTIFICATION

Each prime window unit shall bear the AAMA Label warranting that the product complies with AAMA/NWWDA 101/I.S.2. Certified test reports attesting that the prime window units meet the requirements of AAMA/NWWDA 101/I.S.2, including test size, will be acceptable in lieu of product labeling.

1.4 PERFORMANCE REQUIREMENTS

1.4.1 Blast Resistance:

Provide Anti-Terrorism Force Protection (ATFP) minimum antiterrorism openings and frames for exterior openings. Comply with [UFC 4-010-01](#) using ATFP Performance Requirements for framing and glazing system. Conformance to performance requirements shall be validated by one of the following two methods:

- a. Computational Design Analysis Calculations: Refer to "Alternate Method of Analysis" in [UFC 4-010-01](#), and Table 2-1.
- b. Standard Airblast Test Method: Refer to "Testing" in [UFC 4-010-01](#), Table 2-1, and [ASTM F 1642](#).

Provide a minimum frame bite of [3/8 inch](#) for structural silicone sealant glazed systems, or [1 inch](#) for non-structurally glazed systems. Refer to [ASTM F 2248](#) for further glazing frame bite requirements.

Provide non-structurally glazed system only if approved testing method can be determined and agreed upon based on careful review of current [UFC 4-010-01](#) and [ASTM F 2248](#); otherwise use only structural silicone sealant glazed system.

If structural sealant option is used, compatibility and adhesion shall be validated by field testing as indicated in PART 3 of this Section.

The glazing frame bite for the window frames must be adequate to accept the width of structural silicone sealant or glazing tape as specified in PART 2 paragraph "Provisions for Glazing" and subparagraph.

Glazing for antiterrorism openings shall be laminated glass as specified in Section [08 81 00 GLAZING](#)

1.4.2 Deflection of Framing Members

In accordance with [ASTM F 2248](#), ensure that the framing members restrict deflections of edges of the blast resistant glazing they support to $L/160$ of the length of the supported edge at allowable stress levels under the equivalent 3-second design loading of 35 pounds per square foot (psf), where L denotes the length of the glazing supported edge (L is to be based on edge length of glazing in frame and not on the distance between anchors that fasten frame to the structure).

1.4.3 Frame Anchors

Fasten window frames to the supporting structure with anchors designed to resist forces generated by a 3-second duration load of 70 pounds per square foot (psf) acting on the entire window unit.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be

submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Aluminum Windows

Subsill

Insect Screens

Drawings indicating elevations of window, rough-opening dimensions for each type and size of window, full-size sections, thicknesses of metal, fastenings, methods of installation and anchorage, connections with other work, type of wall construction, size and spacing of anchors, method of glazing, types and locations of operating hardware, mullion details, weatherstripping details, screen details including method of attachment, , and window schedules showing locations of each window type.

SD-03 Product Data

Aluminum Windows

Hardware

Fasteners

Insect Screens

Weatherstripping

Accessories

Flexible Flashing

Manufacturer's descriptive data and catalog cut sheets.
Manufacturer's preprinted installation instructions and cleaning instructions.

Fenestration Ratings

Fenestration Labeling Data: For each fenestration system to be used in the Project, submit data for U-factor, solar heat gain, and air infiltration (leakage), in the form of photocopy of nameplate, or other acceptable means of indicating data.

Certification of Fenestration Rating: In lieu of permanent nameplate or NFRC certified products, provide signed and dated certification from manufacturer, attesting to the u-factor, solar heat gain coefficient, and air leakage rates for each fenestration system to be used in the Project.

SD-04 Samples

Aluminum Windows

Submit three color samples of the specified finishes.

Subsill

SD-05 Design Data

Blast Resistance **Design Analysis or Test Reports**: Submit either of the following to demonstrate compliance with Blast Resistance indicated under Performance Requirements:

- a. Computational Design Analysis Calculations: Manufacturer's design analysis prepared by Professional Engineer, with calculations showing that the design of each different size and type of opening framing system, their connections to the structure, and glazing system complies with requirements.
- b. Standard Airblast Test Method: Test reports indicating system compliance.

SD-06 Test Reports

Aluminum Windows

Condensation Index Rating

Resistance to forced entry

Reports for each type of aluminum window attesting that identical windows have been tested and meet all performance requirements established under paragraph WINDOW PERFORMANCE.

SD-07 Certificates

Aluminum Windows

Certificates stating that the aluminum windows are AAMA certified conforming to requirements of this section. Labels or markings permanently affixed to the window will be accepted in lieu of certificates. Product ratings determined using **NFRC 100** and **NFRC 200** shall be authorized for certification and properly labeled by the manufacturer.

SD-10 Operation and Maintenance Data

Aluminum Windows, Data Package 1

Submit in accordance with Section **01 78 23** OPERATION AND MAINTENANCE DATA.

1.6 QUALITY ASSURANCE

1.6.1 Shop Drawing Requirements

Drawings shall indicate elevations of windows, full-size sections, thickness and gages of metal, fastenings, proposed method of anchorage, size and spacing of anchors, details of construction, method of glazing, details of operating hardware, mullion details, method and materials for weatherstripping, method of attaching screens, material and method of attaching subframes, installation details, and other related items.

Show subsill. Do not penetrate flashing with fasteners.

1.6.2 Sample Requirements

1.6.2.1 Finish Sample Requirements

Submit color chart of standard factory color coatings when factory-finish color coating is to be provided.

Subsill: 6-inch factory fabricated unit with end dams installed.

1.6.2.2 Window Sample Requirements

Submit one full-size window of each type proposed for use, complete with AAMA Label, glazing, hardware, anchors, and other accessories. Where screens or weatherstripping is required, fit sample windows with such items that are to be used. After approval, install each sample in work, clearly identified, and record its location.

1.6.3 Design Data Requirements

Submit [design analysis or test reports](#) to substantiate compliance with Blast Resistance indicated under Performance Requirements. Design analysis shall include calculations by a Professional Engineer showing that the design of each different size and type of framing system and its anchorage to the structure meets the requirements indicated. Calculations verifying the structural performance of each window proposed for use, under the given loads, must be prepared and signed by a registered professional engineer. Indicate in shop drawings the framing components and anchorage devices to the structure, as determined by the design analysis or test reports.

1.6.4 Test Report Requirements

Submit test reports for each type of window attesting that identical windows have been tested and meet the requirements specified herein for conformance to AAMA/NWWDA 101/I.S.2 including test size, and minimum condensation resistance factor (CRF), and resistance to forced entry.

1.6.5 [Fenestration Ratings](#)

Fenestration Rating and Labeling: Comply with fenestration rating and labeling requirements of [ASHRAE 90.1 - IP](#).

- a. Coordinate glazing and framing systems for overall system performance and labeling.
- b. Provide permanent nameplate, installed by the manufacturer.
- c. List the following characteristics as determined by an independent laboratory acceptable to the Authority Having Jurisdiction:
 1. U-factor.
 2. Solar heat gain coefficient (SHGC).
 3. Air infiltration (Air leakage rate).
- d. For fenestration products that do not have a permanent nameplate, provide NFRC-certified product with an attached label, or signed and dated certification as indicated in Submittals in this Section.

1.7 WINDOW PERFORMANCE

Aluminum windows shall meet the following performance requirements. Testing requirements shall be performed by an independent testing laboratory or agency.

1.7.1 Structural Performance

Windows shall be heavy, commercial type designed so that structural loads, structural pressures, air infiltration and water penetration values meet or out perform the values established by AAMA 101 for each type of window when tested in accordance with ASTM E 330, ASTM E 283 and ASTM E 547. Structural test pressures on window units shall be for positive load (inward) and negative load (outward) in accordance with ASTM E 330. After testing, there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanisms or any other damage which could cause window to be inoperable. There shall be no permanent deformation of any main frame, sash or ventilator member in excess of the requirements established by AAMA 101 for the window types and classification specified in this section.

1.7.2 Air Infiltration

Air infiltration shall not exceed the amount established by AAMA 101 for each window type when tested in accordance with ASTM E 283.

1.7.3 Water Penetration

Water penetration shall not exceed the amount established by AAMA 101 for each window type when tested in accordance with ASTM E 547.

1.7.4 Thermal Performance

Thermal transmittance for thermally broken aluminum windows with insulating glass shall not exceed a U-factor of $0.45 \text{ Btu/hr-ft}^2\text{-F}$ determined according to NFRC 100 and AAMA 1503, and a solar heat gain coefficient (SHGC) of $0.25 \text{ Btu/hr-ft}^2\text{-F}$ determined according to NFRC 200. Window units shall comply with the U.S. Department of Energy, Energy Star Window Program for the Southern Climate Zone 3.

1.7.5 Condensation Index Rating

The condensation index rating shall be 85 as determined using NFRC approved software THERM.

1.7.6 Life Safety Criteria

Windows shall conform to NFPA 101 Life Safety Code when rescue and/or second means of escape are indicated.

1.8 QUALIFICATION

Window manufacturer shall specialize in designing and manufacturing the type of aluminum windows specified in this section, and shall have a minimum of five (5) years of documented successful experience. Manufacturer shall have the facilities capable of meeting contract requirements, single-source responsibility and warranty.

1.9 DELIVERY AND STORAGE

Aluminum windows shall be delivered to project site and stored in accordance with manufacturer's recommendations. Use care in handling and hoisting windows during transportation and at the jobsite. Store windows and components out of contact with the ground, under a weathertight covering, so as to prevent bending, warping, or otherwise damaging the windows. Damaged windows shall be replaced with new windows.

1.10 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

1.11 PROTECTION

Protect finished surfaces during shipping and handling using the manufacturer's standard method, except that no coatings or lacquers shall be applied to surfaces to which calking and glazing compounds must adhere.

PART 2 PRODUCTS

2.1 ALUMINUM WINDOW TYPES

Aluminum windows shall consist of complete units including sash, glass, frame, weatherstripping, and hardware. Windows shall conform to AAMA 101. Windows shall be thermal break type double-glazed. Thermal barrier shall be neoprene, rigid vinyl, or polyurethane and shall be resistant to weather. Window members shall be heli-arc welded or angle-reinforced and mechanically joined and sealed. Exposed welded joints shall be dressed and finished. Joints shall be permanent and weathertight. Frames shall be constructed to provide a minimum 1/4 inch thermal break between the exterior and interior frame surfaces. Sash corners shall be internally sealed to prevent air and water leaks.

- a. Provide Fenestration Labeling as indicated in Part 1 of this Section, installed by the manufacturer, applied to lower corner of inside lite of glass or other approved location that will be exposed to view after installation, and legible from eye level.

2.1.1 Casement Windows

Aluminum casement (C) windows shall conform to AAMA 101 Designation C-HC40 type with ventilators which swing on side jamb. Hinges shall be butt (close-up) type. Operators shall be as required for hinge type. Latching devices shall be provided to secure ventilators tightly in the frame in the closed position.

2.1.2 Fixed Windows

Aluminum fixed (F) windows shall conform to AAMA 101 F-HC40 type, non-operable glazed frame, complete with provisions for reglazing in the field.

2.1.3 Resistance to Forced Entry

In addition to meeting the requirements of AAMA/NWWDA 101/I.S.2, windows designated for resistance to forced entry shall conform to the requirements of AAMA 1302.

2.2 FABRICATION

Fabrication of window units shall comply with AAMA/NWWDA 101/I.S.2.

2.3 Blast Resistance

For minimum antiterrorism openings, provide glazing attachment to supporting frame as indicated. Exterior openings shall comply with the minimum antiterrorism standards required by [UFC 4-010-01](#) and Blast Resistance indicated under Performance Requirements in PART 1 of this Section.

2.4 SUBSILLS

Provide manufacturer's factory-fabricated aluminum [subsill](#) system with integral end dams, designed with vertical interior leg and sloped bottom to divert water to the exterior of building when installed horizontally at sill, finished to match windows.

- a. Finish: Factory-applied to match windows.
- b. Interior Leg Height: 1 inch minimum.

2.5 WEATHERSTRIPPING

Weatherstripping for ventilating sections shall be of type designed to meet water penetration and air infiltration requirements specified in this section in accordance with [AAMA 101](#), and shall be manufactured of material compatible with aluminum and resistant to weather. Weatherstrips shall be factory-applied and easily replaced in the field. Neoprene or polyvinylchloride weatherstripping are not acceptable where exposed to direct sunlight.

2.6 DRIPS AND WEEP HOLES

Provide continuous drips over heads of top ventilators. Where fixed windows adjoin ventilators, drips shall be continuous across tops of fixed windows. Provide drips and weep holes as required to return water to the outside.

2.7 COMBINATION WINDOWS

Windows used in combination shall be the same class and grade and shall be factory assembled. Where factory assembly of individual windows into larger units is limited by transportation considerations, prefabricate, match mark, transport, and field assemble.

2.7.1 Mullions and Transom Bars

Provide mullions between multiple window units which meet the design pressure of . Provide mullions with a structural thermal break. Secure mullions and transom bars to adjoining construction and window units in such a manner as to permit expansion and contraction and to form a weathertight joint. Provide mullion covers on the interior and exterior to completely close exposed joints and recesses between window units and to present a neat appearance. Provide special covers over structural support at mullions as indicated.

2.8 INSECT SCREENS

Insect screens shall be aluminum window manufacturer's standard design. Insect screens shall be fabricated of roll-formed tubular-shaped aluminum frames conforming to SMA 1004 and (18 x 16) aluminum mesh screening conforming with ISWA IWS 089, Type III. Provide insect screens at all operable windows.

2.9 ACCESSORIES

2.9.1 Fasteners

Fastening devices shall be window manufacturer's standard design made from aluminum, non-magnetic stainless steel, cadmium-plated steel, nickel/chrome-plated steel in compliance with AAMA 101. Self-tapping sheet metal screws will not be acceptable for material thicker than 1/16 inch.

2.9.2 Hardware

Hardware shall be as specified for each window type and shall be fabricated of aluminum, stainless steel, cadmium-plated steel, zinc-plated steel or nickel/chrome-plated steel in accordance with requirements established by AAMA 101. The item, type, and functional characteristics shall be the manufacturer's standard for the particular window type. Provide hardware of suitable design and of sufficient strength to perform the function for which it is used. Equip all operating ventilators with a lock or latching device which can be secured from the inside.

2.9.3 Window Anchors

Anchoring devices for installing windows shall be made of aluminum, cadmium-plated steel, stainless steel, or zinc-plated steel conforming to AAMA 101. Provide concealed anchors of the type recommended by the window manufacturer for the specific type of construction. Anchors and fasteners shall be compatible with the window and the adjoining construction. Provide a minimum of three anchors for each jamb located approximately from each end and at midpoint.

2.9.4 Flexible Flashing

Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.

2.10 GLASS AND GLAZING

Aluminum windows shall be designed for inside glazing, field glazing, and for glass types scheduled on drawings and specified in Section 08 81 00 GLAZING. Units shall be complete with glass and glazing provisions to meet AAMA 101. Glazing material shall be compatible with aluminum, and shall not require painting.

2.10.1 Blast Resistant Glazing

For minimum antiterrorism openings, adhere glazing to its supporting frame using structural silicone sealant or adhesive glazing tape. The width of the structural silicone sealant bead must be at least equal to, but not larger than two times the thickness designation of the glass to which it

adheres. The width of the adhesive glazing tape will be at least equal to two times, but not more than four times the thickness designation of the glass to which it adheres.

2.11 FINISH

Exposed aluminum surfaces shall be factory finished with a PVDF coating of color indicated in Color Legend.

2.11.1 Anodized Aluminum Finish

Exposed surfaces of aluminum windows shall be finished with anodic coating conforming to AA DAF-45: 0.4 to 0.7 mil 0.7 mil Architectural Class I, AA-M10-C22-A44, color anodic coating, 0.7 mil or thicker. Finish shall be free of scratches and other blemishes.

2.11.2 High-Performance Coating

Exposed surfaces of aluminum windows shall be finished with a two-coat fluoropolymer coating system containing at least 70 percent by weight polyvinylidene fluoride, PVF2 resin, factory-applied, oven-baked, conforming to AAMA 2604, with a primer coat of 0.20 to 0.30 mils and a color coat of minimum 1.0 mil, total dry film thickness of 1.20 to 1.3 mils. Finish shall be free of scratches and other blemishes.

2.11.3 Color

Color shall be as indicated in the Color Legend on the drawings. Color listed is not intended to limit the selection of equal colors from other manufacturers.

PART 3 EXECUTION

3.1 INSTALLATION

Aluminum windows shall be installed in accordance with ASTM E 2112 and approved shop drawings and manufacturer's published instructions. Aluminum surfaces in contact with masonry, concrete, wood and dissimilar metals other than stainless steel, zinc, cadmium or small areas of white bronze, shall be protected from direct contact using protective materials recommended by AAMA 101. The completed window installation shall be watertight in accordance with Section 07 92 00 JOINT SEALANTS. Glass and glazing shall be installed in accordance with requirements of this section and Section 08 81 00 GLAZING.

For structurally glazed applications, apply the structural silicone bead to both sides of the glass panel for single pane glazing but only to the inboard side for insulating glass units.

3.1.1 Subsill Installation

Install subsill in accordance with manufacturer's recommendations. Install to allow moisture to exit the system freely to the exterior. Do not apply sealant between subsill and bottom of frame. Do not penetrate subsill.

3.2 FIELD QUALITY CONTROL

If structural silicone sealant glazed system is used, compatibility and adhesion shall be validated by the following: Structural sealant shall be tested according to recommendations in ASTM C 1401. Destructive Test Method

A, "Hand Pull Tab (Destructive)," in [ASTM C 1401](#), Appendix X2, shall be used. A minimum of two areas on each building face shall be tested. Repair installation areas damaged by testing.

3.3 ADJUSTMENTS AND CLEANING

3.3.1 Hardware Adjustments

Final operating adjustments shall be made after glazing work is complete. Operating sash or ventilators shall operate smoothly and shall be weathertight when in locked position.

3.3.2 Cleaning

Aluminum window finish and glass shall be cleaned on exterior and interior sides in accordance with window manufacturer's recommendations. Alkaline or abrasive agents shall not be used. Precautions shall be taken to avoid scratching or marring window finish and glass surfaces.

-- End of Section --

SECTION 08 71 00

BUILDERS' HARDWARE (FORT BRAGG PROJECTS)

08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A117.1 (1992) Providing Accessibility and Usability for Physically Handicapped People

ASTM INTERNATIONAL (ASTM)

ASTM E 283 (2004) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA-01 (Effective thru Jun 1995) Directory of Certified Locks & Latches

BHMA-02 (Effective thru Jul 1995) Directory of Certified Door Closers

BHMA-03 (Effective thru Jul 1996) Directory of Certified Exit Devices

BHMA A156.1 (2006) Butts and Hinges

BHMA A156.2 (2003) Bored and Preassembled Locks and Latches

BHMA A156.3 (2008) Exit Devices

BHMA A156.4 (2008) Door Controls - Closers

BHMA A156.5 (2001) Auxiliary Locks & Associated Products

BHMA A156.6 (2005) Architectural Door Trim

BHMA A156.7 (2003) Template Hinge Dimensions

BHMA A156.13 (2005) Mortise Locks & Latches, Series 1000

BHMA A156.18 (2006) Materials and Finishes

BHMA A156.21 (2006) Thresholds

DOOR AND HARDWARE INSTITUTE (DHI)

DHI-04	(1976) Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames
DHI-05	(1990) Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames
DHI-A115.IG	(1994) Installation Guide for Doors and Hardware
DHI A115-W	(Varies) Wood Door Hardware Standards (Incl A115-W1 thru A115-W9)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(2006; Errata 2008) Standard for Fire Doors and Other Opening Protectives
NFPA 101	(2008, Amendment 2009) Life Safety Code, 2006 Edition
NFPA 105	(2006; Errata 2007; Errata 2007) Installation of Smoke Door Assemblies

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Bidding List.

SD-03 Product Data

Hardware and Accessories

Manufacturer's descriptive data, technical literature, catalog cuts, and installation instructions. Spare parts data for locksets, exit devices, closers, electric locks, electric strikes, electro-magnetic closer holder release devices, and electric exit devices, after approval of the detail drawings, and not later than 1 months prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

Hardware Schedule

Hardware schedule listing all items to be furnished. The schedule shall include for each item: the quantities; manufacturer's name and catalog numbers; the BHMA number specified, sizes; detail

information or catalog cuts; finishes; door and frame size and materials; location and hardware set identification cross-references to drawings; corresponding reference standard type number or function number from manufacturer's catalog if not covered by BHMA; and list of abbreviations and template numbers.

Keying Schedule; G, RO

The keying schedule shall be developed in accordance with the schedule shown on the drawings and with DHI publication "Keying Procedures, Systems, and Nomenclature." The keying schedule and bitting list shall be compatible with the installation's existing keying system and shall be submitted for approval by the installation prior to ordering any keying hardware.

SD-07 Certificates

Hardware and Accessories

The hardware manufacturer's certificates of compliance stating that the supplied material or hardware item meets specified requirements. Each certificate shall be signed by an official authorized to certify in behalf of the product manufacturer and shall identify quantity and date or dates of shipment or delivery to which the certificates apply. A statement that the proposed hardware items appear in BHMA-01, BHMA-02 and BHMA-03 directories of certified products may be submitted in lieu of certificates.

SD-11 Closeout Submittals

Bitting List

The bitting list shall be furnished (prior to the prefinal inspection) to the PWBC locksmith by certified mail from the manufacturer or registered locksmith originating the system. The bitting list will include the type of keying system used and actual identification of key cuts and codes or cylinders. The bitting list shall be prepared by the manufacturer. However, if the contract requires less than 50 cores or cylinders, the bitting list may be prepared by the manufacturer or a registered locksmith certified by the Associated Locksmiths of America, Inc.

1.3 HARDWARE SCHEDULE

Prepare and submit hardware schedule in the following form:

Hard- ware Item	Quan- tity	Size	Reference Publi- cation Type No.	Finish	Mfr. Name and Catalog No.	Key Con- trol Symbols	UL Mark (If fire rated and listed)	BHMA Finish Designa- tion
-----	-----	-----	-----	-----	-----	-----	-----	-----

1.4 KEY BITTING CHART REQUIREMENTS

Submit Bitting list charts to the Contracting Officer prior to completion of the work. Include:

- a. Complete listing of all keys (AA1, AA2, etc.).

- b. Complete listing of all key cuts (AA1-123456, AA2-123458).
- c. Tabulation showing which key fits which door.
- d. Copy of floor plan showing doors and door numbers.
- e. Listing of 20 percent more key cuts than are presently required in each master system.

1.5 PREDELIVERY CONFERENCE

Upon approval of the Hardware Schedule, the construction Contractor shall arrange a conference with the hardware supplier, Contracting Officer and the using agency to determine keying system requirements. Location of the key control storage system, set-up and key identification labeling will also be determined.

1.6 QUALITY ASSURANCE

1.5.1 Hardware Manufacturers and Modifications

Provide, as far as feasible, locks, hinges, pivots, and closers of one lock, hinge, pivot, or closer manufacturer's make. Modify hardware as necessary to provide features indicated or specified.

1.7 DELIVERY, STORAGE, AND HANDLING

Hardware shall be delivered to the project site in the manufacturer's original packages. Each article of hardware shall be individually packaged in the manufacturer's standard commercial carton or container, and shall be properly marked or labeled to be readily identifiable with the approved hardware schedule. Each change key shall be tagged or otherwise identified with the door for which its cylinder is intended. Where double cylinder functions are used or where it is not obvious which is the key side of a door, appropriate instructions shall be included with the lock and on the hardware schedule. Manufacturer's printed installation instructions, fasteners, and special tools shall be included in each package.

1.8 SPECIAL TOOLS

Special tools, such as those supplied by the manufacturer, unique wrenches, and dogging keys, shall be provided as required to adjust hardware items.

1.9 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.10 OPERATION AND MAINTENANCE MANUALS

Six(6) complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides shall be provided. The instructions for electric locks, electric strikes, electro-magnetic closer holder release devices, and electric exit devices shall include simplified diagrams as installed.

PART 2 PRODUCTS

2.1 GENERAL HARDWARE REQUIREMENTS

Hardware shall conform to the requirements specified herein and the HARDWARE SETS listing at the end of this section. Hardware set numbers correspond to the set numbers shown on the drawings. Hardware items providing accessibility and usability for physically handicapped shall comply with ANSI A117.1.

2.2 TEMPLATES

Requirements for hardware to be mounted on metal doors or metal frames shall be coordinated between hardware manufacturer and door or frame manufacturer by use of templates and other information to establish location, reinforcement required, size of holes, and similar details. Templates of hinges shall conform to BHMA A156.7.

2.3 HINGES

Hinges shall conform to BHMA A156.1. Hinges used on metal doors and frames shall also conform to BHMA A156.7. Except as otherwise specified, hinge sizes shall conform to the hinge manufacturer's printed recommendations.

2.3.1 Hinges for Reverse Bevel Doors with Locks

Hinges for reverse bevel doors with locks shall have pins that are made nonremovable by means such as a set screw in the barrel, or safety stud, when the door is in the closed position.

2.3.2 Contractor's Option

Hinges with antifriction bearings may be furnished in lieu of ball bearing hinges, except where prohibited for fire doors by the requirements of NFPA 80.

2.4 LOCKS AND LATCHES

To the maximum extent possible, locksets, latchsets and deadlocks shall be the products of a single manufacturer. Lock fronts for double-acting doors shall be rounded. Strikes for wood frames and pairs of wood doors shall be furnished with wrought boxes.

2.4.1 Mortise Lock and Latchsets

Mortise lock, latchsets, and strikes shall be series 1000 and shall conform to BHMA A156.13, operational Grade 1. Strikes for security doors shall be rectangular without curved lip. Mortise type locks and latches for doors 1-3/4 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door. Mortise locks shall have armored fronts.

2.4.2 Bored Lock and Latchsets

Bored lock, latchsets, and strikes shall be series 4000 and shall conform to BHMA A156.2, Grade 1. Bored type locks and latches for doors 1-3/8 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door.

2.4.3 Auxiliary Locks and Associated Products

Bored and mortise dead locks and dead latches, narrow style dead locks and dead latches, rim latches, dead latches, and dead bolts, and electric strikes shall conform to BHMA A156.5. Bolt and latch retraction shall be dead bolt style. Strike boxes shall be furnished with dead bolt and latch strikes for Grade 1.

2.4.4 Lock Cylinders (Mortise, Rim and Bored)

Lock cylinders shall comply with BHMA A156.5. Lock cylinder shall have not less than seven pins. Cylinders shall have key removable type cores. An extension of the existing keying system shall be provided. The cylinders shall be compatible with existing locks that were manufactured by Best Access Systems, have interchangeable cores. Construction interchangeable cores shall be provided. Disassembly of knob or lockset shall not be required to remove core from lockset. All locksets, lockable exit devices, and padlocks shall accept same interchangeable cores.

2.4.5 Lock Trim

Lock trim shall be cast, forged, or heavy wrought construction of commercial plain design. In addition to meeting the test requirement of BHMA A156.2 or BHMA A156.13, knobs, lever handles, roses, and escutcheons shall be 0.050 inch thick, if unreinforced. If reinforced, the outer shell shall be 0.035 inch thick and the combined thickness shall be 0.070 inch except that knob shanks shall be 0.060 inch thick. Knob diameter shall be 2-1/8 to 2-1/4 inches. Lever handles shall be of plain design with ends returned to no more than 1/2 inch from the door face.

2.5 EXIT DEVICES AND EXIT DEVICE ACCESSORIES

Exit devices and exit device accessories shall conform to BHMA A156.3, Grade 1. For exits that also have removable mullions, provide exit devices that are compatible with removable mullions.

2.5.1 Exit Devices and Auxiliary Items

Trim shall be of wrought construction and commercial plain design with straight, beveled, or smoothly rounded sides, corners, and edges. Adjustable strikes shall be provided for rim type and vertical rod devices. Open back strikes shall be provided for pairs of doors with mortise and vertical rod devices; except open back strikes shall be used on labeled doors only where specifically provided for in the published listings. Touch bars shall be provided in lieu of conventional crossbars and arms. Escutcheons shall be provided not less than 7 by 2-1/4 inches. Escutcheons shall be cut to suit cylinders and operating trim.

2.5.2 Removable Mullions

Provide removable mullions for all pairs of doors, of Type 22 of the box type, used only with exit devices for which the mullions were manufactured. Mullions shall be furnished with mullion stabilizers of the same manufacturer.

2.6 KEYING SCHEDULE

Locks shall be keyed in sets or subsets as scheduled. Locks shall be furnished with the manufacturer's standard construction key system. Change

keys for locks shall be stamped with change number and the inscription "U.S. Property - Do Not Duplicate." Keys shall be supplied as follows:

Locks:	3 change keys each lock
Master keyed sets:	2 keys each set.
Grand master keys:	2 keys total.
Construction keys:	10 keys total.
Blank keys:	250 keys total.

The keys will be furnished to the Contracting Officer as described below in a container arranged for key control system storage in sets or subsets as approved in the keying schedule along with a chart identifying key location as to door, room, and key numbers.

2.6.1 Keying System

All locks within each room shall be keyed to the lock for the room door. The different rooms shall be keyed differently. A master key system shall be provided to operate locks in all rooms. See Section 12 35 53 CLASSROOM AND LABORATORY CASEWORK for additional lock requirements for casework.

2.6.2 Manufacturing

Permanent core control keys, grand masters, masters, or any submasters and the bitting list will be sent to the DPWE locksmith by registered mail prior to the prefinal inspection. Keying will be done by the manufacturer, if over 50 cores or cylinders. If the contract requires less than 50 cores or cylinders, the keying may be prepared by the manufacturer or a registered locksmith certified by the Associated Locksmiths of America, Inc.

2.6.3 Installation

The permanent cores or cylinders will be installed by a registered locksmith certified by the Associated Locksmiths of America, Inc. The Contractor's locksmith will change out all construction cores prior to final inspection. After the prefinal inspection and once the Contracting Officer's Representative has determined that the work is ready for a final inspection, all interior keys will be inserted in the locks so that the hardware can be checked for proper operation during final inspection. The exterior keys will be available during final inspection so that the exterior hardware can be checked for proper operation. At the completion of final inspection, all exterior keys will be retained by the Contracting Officer's Representative and controlled access will be allowed the Contractor and DPWE until all work has been completed. Once all work has been completed, the Contracting Officer's Representative will transfer the exterior keys to the DPWE.

2.7 DOOR CLOSING DEVICES

Door closing devices shall conform to BHMA A156.4, Grade 1. Closing devices shall be products of one manufacturer for each type specified. The opening resistance of closing devices shall not exceed 15 lbf applied at the latch stile or exceed 5 lbf where low opening resistance is scheduled.

2.7.1 Surface Type Closers

Surface type closers shall be Grade 1, Series C02000 Full Cover with options PT-4H, Size 1 or 2 through Size 6, and PT-4D with back check position valve. Except as otherwise specified, sizes shall conform to the

manufacturer's published recommendations. Closers for outswinging exterior doors shall have parallel arms or shall be top jamb mounted. Closers for doors close to a wall shall be of narrow projection so as not to strike the wall at the 90-degree open position.

2.8 ARCHITECTURAL DOOR TRIM

Architectural door trim shall conform to BHMA A156.6.

2.8.1 Door Protection Plates

2.8.1.1 Kick Plates

Kick plates shall be of type as indicated. Width of plates shall be 2 inches less than door width for single doors and 1 inch less for pairs of doors. Height shall be 16 inches. Edges of metal plates shall be as indicated.

2.8.1.2 Mop Plates

Mop plates shall be of type as indicated. Width of plates shall be 2 inches less than door width for single doors and 1 inch less for pairs of doors. The height shall be 4 inches. Edges of metal plates shall be as indicated.

2.8.2 Push Plates

2.8.2.1 Flat Plates

Flat plates shall be Type J301 0.50 inch thick stainless steel 1/8 inch. Edges of metal plates shall be beveled.

2.9 MISCELLANEOUS

2.9.1 Metal Thresholds

Thresholds shall conform to BHMA A156.21. Thresholds for exterior doors shall be extruded aluminum of the type indicated and shall provide proper clearance and an effective seal with specified weather stripping. 1/8 inch 1/8 inch where required, thresholds shall be modified to receive projecting bolts of flush bolts or exit devices. Thresholds for doors accessible to the handicapped shall be beveled with slopes not exceeding 1:2 and with heights not exceeding 1/2 inch. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.9.2 Rain Drips

Extruded aluminum, not less than 0.07 inch thick, bronze anodized. Door sill rain drips shall be 1-1/2 inches to 1-3/4 inches high by 5/8 inch projection. Overhead rain drips shall be approximately 1-1/2 inches high by 2-1/2 inches projection and shall extend 2 inches on either side of the door opening width.

2.9.3 Aluminum Housed Type Weatherseals

Weatherseals of the type indicated shall consist of extruded aluminum retainers not less than 0.07 inch wall thickness with vinyl, neoprene, silicone rubber, polyurethane or vinyl brush inserts. Aluminum shall be

bronze anodized. Weatherseal material shall be of an industrial/commercial grade. Seals shall remain functional through all weather and temperature conditions. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.9.4 Gasketing

Gasketing shall be a compression type seal, silicon based, screw-applied product for use on steel door frames with wood or steel doors for rating as indicated on the drawings. Color shall be bronze. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.9.5 Key Control Storage System

Key control storage system shall conform to BHMA A156.5, wall hung type, with 150 percent capacity, and shall be properly labeled for key identification. Set up, identification labeling and location of the key control storage shall be as directed at the Predelivery Conference.

2.10 FASTENINGS

Fastenings of proper type, size, quantity, and finish shall be supplied with each article of hardware. Machine screws and expansion shields shall be used for attaching hardware to concrete or masonry. Fastenings exposed to the weather in the finished work shall be of brass, bronze, or stainless steel. Sex bolts, through bolts, or machine screws and grommet nuts, where used on reverse-bevel exterior doors equipped with half-surface or full-surface hinges, shall employ one-way screws or other approved tamperproof screws. Screws for the jamb leaf of half-mortise and full-surface hinges attached to structural steel frames shall be one-way or other approved tamperproof type.

2.11 FINISHES

Unless otherwise specified, finishes shall conform to those identified in BHMA A156.18. Provide finishes indicated in hardware sets at the end of this Section.

2.12 HARDWARE FOR FIRE DOORS

Hardware for fire doors shall conform to the requirements of NFPA 80 and NFPA 101.

2.13 HARDWARE FOR BLAST RESISTANT DOORS AND FRAMES

Hardware for blast resistant aluminum door and frame systems shall be as indicated and shall be supplied by storefront manufacturer.

PART 3 EXECUTION

3.1 APPLICATION

Hardware shall be located in accordance with DHI-04 and DHI-05, except that deadlocks shall be mounted 48 inches above finish floor. When approved, slight variations in locations or dimensions will be permitted. Application shall be in accordance with DHI-A115.IG or DHI A115-W. Door

control devices for exterior doors such as closers and holders, shall be attached to doors with thru bolts and nuts or sex bolts. Alternate fastening methods may be approved by the Contracting Officer when manufacturers' documentation is submitted to verify that the fastening devices and door reinforcements are adequate to resist wind induced stresses. Electric hardware items and access control devices shall be installed in accordance with manufacturer's printed installation procedures.

3.1.1 Hardware for Fire Doors and Smoke-Control Door Assemblies

Hardware for fire doors shall be installed in accordance with the requirements of [NFPA 80](#). Exit devices installed on fire doors shall have a visible label bearing the marking "Fire Exit Hardware". Other hardware installed on fire doors, such as locksets, closers, and hinges shall have a visible label or stamp indicating that the hardware items have been approved by an approved testing agency for installation on fire-rated doors. Hardware for smoke-control door assemblies shall be installed in accordance with [NFPA 105](#).

3.1.2 Door-Closing Devices

Door-closing devices shall be installed and adjusted in accordance with the templates and printed instructions supplied by the manufacturer of the devices. Insofar as practicable, doors opening to or from halls and corridors shall have the closer mounted on the room side of the door.

3.1.3 Key Control Storage Systems

Key control storage system shall be installed where directed.

3.1.4 Kick Plates and Mop Plates

Kick plates shall be installed on the push side of single-acting doors and on both sides of double-acting doors. Mop plates shall be installed on the pull side of the single acting doors.

3.1.5 Auxiliary Hardware

Lever extension flush bolts shall be installed at the top and bottom of the inactive leaf of pairs of doors. The bottom bolt shall operate into a dust-proof floor strike or threshold.

3.1.6 Thresholds

Thresholds shall be secured with a minimum of three fasteners per single door width and six fasteners per double door width with a maximum spacing of [12 inches](#). Exterior thresholds shall be installed in a bed of sealant with expansion anchors and stainless steel screws, except that bronze or anodized bronze thresholds shall be installed with expansion anchors with brass screws. Minimum screw size shall be No. 10 length, dependent on job conditions, with a minimum of [3/4 inch](#) thread engagement into the floor or anchoring device used.

3.1.7 Rain Drips

Door sill rain drips shall align with the bottom edge of the door. Overhead rain drips shall align with bottom edge of door frame rabbet. Drips shall be set in sealant and fastened with stainless steel screws.

3.1.8 Weatherseals

Weatherseals shall be located as indicated, snug to door face and fastened in place with color matched metal screws after door and frames have been finish painted. Screw spacing shall be as recommended by manufacturer.

3.1.9 Gasketing

Gasketing shall be installed at the inside edge of the hinge and head and latch sides of door frame. Frames shall be toleranced for a 1/8 inch clearance between door and frame. Frames shall be treated with tape primer prior to installation.

3.2 OPERATIONAL TESTS

Prior to acceptance of any electrical hardware system, an operational test shall be performed to determine if devices are operating as intended by the specifications. Wiring shall be tested for correct voltage, current carrying capacity, and proper grounding. Stray voltages in lock wiring shall be eliminated to prevent locking devices from releasing in critical situations.

3.3 HARDWARE SETS

Albritton Junior High School

HW-A

- 3 Hinges 8111 x 652
- 1 Lockset F109 x 652
- 1 Closer C02021, PT4G, PT4H x 689
- 1 Wall Stop L02101 x 630 (not required at Door 115)
- 2 Kickplate J1023, B3E x 630
- 2 Threshold J32193

HW-B

- 3 Hinges 8111 x 652
- 1 Lockset F86 x 626
- 1 Closer C02021, PT4G, PT4H x 689
- 1 Kick Plate J1023, B3E x 630

HW-C

- 2 Continuous Hinge Grade 1, Barrel Type
- 2 Exit Device Type 28, No 14 x 630
- 2 Closer C02021, PT4G, PT4H x 689
- 2 Kick Plate J1023, B3E x 630

HW-D

- 2 Continuous Hinge Grade 1, Barrel Type
- 2 Exit Device Type 28, No 8 x 630
- 2 Closer C02021, PT4G, PT4H, PT4D x 689
- 2 Kick Plate J1023, B3E x 630
- 2 Threshold J32193
- 2 Weatherseal R3Y165
- 2 Door Sweep R3Y415

HW-E

- 3 Hinges 5111 x NRP x 630
- 1 Lockset F84 x 626

1 Kick Plate J1023, B3E x 630

HW-F

2 Continuous Hinge Grade 1, Barrel Type
2 Exit Device Type 28, No 8 x 630
2 Closer C02021 PT4D x 690
2 Kick Plate J1023, B3E x 630
2 Magnetic Holders C00011 x 689 (install on bottom rail of door
frame at door 108

HW-G

1 Continuous Hinge Grade 1, Barrel Type
1 Exit Device Type 28, No 8 x 630
1 Closer C02021, PT4G, PT4H, PT4D x 689
1 Kick Plate J1023, B3E x 630
1 Threshold J32190
1 Weatherstrip R3Y165
1 Door Sweep R3Y415

HW-H

6 Hinges 5111 x NRP x 630
2 Lockset F86 x 626
2 Kick Plate J1023, B3E x 630
1 Threshold J32190
2 Weatherstrip R3Y165
2 Door Sweep R3Y515

HW-I

3 ea. Hinges A8111, 652
1 ea. Lockset F86, 626
1 ea. Door Closer C02021 PTG4, PT4C, PT4D, 689
1 ea. Kick Plate J1023 B3E, 630
1 ea. Mop Plate J103 B3E, 630

HW-J

3 ea. Hinges A8111 NRP, 652
1 ea. Lockset F82, 626
1 ea. Door Closer C02021 PR4G, PT4C, PT4D, 689
1 ea. Kick Plate J1023 B3E, 630
1 ea. Mop Plate J103 B3e, 630

-- End of Section --

SECTION 08 81 00

GLAZING

02/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (2004) Safety Glazing Materials Used in Buildings

ASTM INTERNATIONAL (ASTM)

ASTM C 1036 (2006) Standard Specification for Flat Glass

ASTM C 1048 (2004) Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass

ASTM C 1172 (2003) Laminated Architectural Flat Glass

ASTM C 1184 (2005) Structural Silicone Sealants

ASTM C 509 (2006) Elastomeric Cellular Preformed Gasket and Sealing Material

ASTM C 864 (2005) Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

ASTM C 920 (2008) Standard Specification for Elastomeric Joint Sealants

ASTM D 395 (2003; R 2008) Rubber Property - Compression Set

ASTM E 1300 (2007e1) Determining Load Resistance of Glass in Buildings

ASTM E 2010 (2001) Positive Pressure Fire Tests of Window Assemblies

ASTM E 773 (2001) Accelerated Weathering of Sealed Insulating Glass Units

ASTM E 774 (1997) Classification of the Durability of Sealed Insulating Glass Units

GLASS ASSOCIATION OF NORTH AMERICA (GANA)

GANA Glazing Manual (2004) Glazing Manual

GANA Sealant Manual	(1990) Sealant Manual
INSULATING GLASS MANUFACTURERS ALLIANCE (IGMA)	
SIGMA A1202	(1983) Commercial Insulating Glass Dimensional Tolerances
SIGMA TB-3001	(1990) Guidelines for Sloped Glazing
SIGMA TM-3000	(1997) Glazing Guidelines for Sealed Insulating Glass Units
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)	
NFPA 252	(2007) Standard Methods of Fire Tests of Door Assemblies
NFPA 257	(2006) Fire Test for Window and Glass Block Assemblies
NFPA 80	(2006; Errata 2008) Standard for Fire Doors and Fire Windows
U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)	
16 CFR 1201	Safety Standard for Architectural Glazing Materials

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Glass Setting

Drawings showing complete details of the proposed setting methods, mullion details, edge blocking, size of openings, frame details, materials, and types and thickness of glass.

SD-03 Product Data

Insulating Glass

Glazing Accessories

Manufacturer's descriptive product data, handling and storage recommendations, installation instructions, and cleaning instructions.

SD-04 Samples

Insulating Glass

Glazing Tape

Sealant

Two 8 x 10 inch samples of each of the following: tinted glass and insulating glass units.

Three samples of each indicated material.5 by 7 inches

SD-08 Manufacturer's Instructions

Setting and sealing materials

Glass setting

Submit glass manufacturer's recommendations for setting and sealing materials and for installation of each type of glazing material specified.

1.3 PERFORMANCE REQUIREMENTS

1.3.1 Blast Resistance

Provide Anti-Terrorism Force Protection (ATFP) minimum antiterrorism openings and frames for exterior openings. Comply with UFC 4-010-01 using ATFP Performance Requirements for framing and glazing system. Conformance to performance requirements shall be validated by one of the following two methods:

- a. Computational Design Analysis Calculations: Refer to "Alternate Method of Analysis" in UFC 4-010-01, and Table 2-1.
- b. Standard Airblast Test Method: Refer to "Testing" in UFC 4-010-01, Table 2-1, and ASTM F 1642.

Refer to Other Division 08 openings Sections for testing and submittal requirements.

1.4 SYSTEM DESCRIPTION

Glazing systems shall be fabricated and installed watertight and airtight to withstand thermal movement and wind loading without glass breakage, gasket failure, deterioration of glazing accessories, and defects in the work. Glazed panels shall comply with the safety standards, as indicated in accordance with ANSI Z97.1. Glazed panels shall comply with indicated wind/snow loading in accordance with ASTM E 1300.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver products to the site in unopened containers, labeled plainly with manufacturers' names and brands. Store glass and setting materials in safe, enclosed dry locations and do not unpack until needed for installation. Handle and install materials in a manner that will protect them from damage.

1.6 ENVIRONMENTAL REQUIREMENTS

Do not start glazing work until the outdoor temperature is above 40 degrees F and rising, unless procedures recommended by the glass manufacturer and approved by the Contracting Officer are made to warm the glass and rabbet

surfaces. Provide ventilation to prevent condensation of moisture on glazing work during installation. Do not perform glazing work during damp or rainy weather.

1.7 WARRANTY

1.7.1 Warranty for Insulating Glass Units

Warranty insulating glass units against development of material obstruction to vision (such as dust, fogging, or film formation on the inner glass surfaces) caused by failure of the hermetic seal, other than through glass breakage, for a 10-year period following acceptance of the work. Provide new units for any units failing to comply with terms of this warranty within 45 working days after receipt of notice from the Government.

PART 2 PRODUCTS

2.1 GLASS

ASTM C 1036, unless specified otherwise. In doors and sidelights, provide safety glazing material conforming to 16 CFR 1201.

Provide low-e insulating glass units for all exterior glazing unless specifically indicated otherwise

2.1.1 Wired Safety Glass

Glass for fire-rated windows shall be UL listed and shall be rated as indicated when tested in accordance with ASTM E 2010. Wired glass shall be Type II flat type, Class 1 - translucent, Quality q8 - glazing, Form 1 - wired and polished both sides **AND SHALL MEET SAFETY GLASS REQUIREMENTS CPSC 16 CFR, Part 1201 for Category 1 Provide safety glazing labeling.** Wire mesh shall be polished stainless steel Mesh 1 - diamond. Wired glass for fire-rated windows shall bear an identifying UL label or the label of a nationally recognized testing agency, and shall be rated as indicated when tested in accordance with NFPA 257. Wired glass for fire-rated doors shall be tested as part of a door assembly in accordance with NFPA 252.

Contractor's Option: Provide fire-rated ceramic glazing to meet ratings indicated, of type acceptable to Contracting Officer.

2.1.2 Laminated Glass

All exterior glass and glazing shall be laminated for fragment retention. Single glazing and the inner pane of insulated glass assemblies in exterior walls shall be annealed, laminated glass conforming to ASTM C 1172, Kind LA fabricated from two nominal 1/8 inch pieces of Type I, Class 1, Quality q3, flat annealed transparent glass conforming to ASTM C 1036. Flat glass shall be laminated together with a minimum of 0.030 inch thick, clear polyvinyl butyral interlayer. The total thickness shall be nominally 1/4 inch. Color shall be clear. Provide glazing sized to have a minimum frame bite for blast resistance as indicated in other Division 08 Sections for openings and framing systems, in accordance with approved shop drawings for structural glazed window systems or for window systems that are not structurally glazed.

2.1.3 Tempered Glass

ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I,

Class 1 (transparent), Quality q3, 1/4 inch thick. Provide Fully Tempered glass for all interior glass, and for exterior glass unless indicated as heat strengthened. Provide safety glazing labeling wherever safety glazing material is indicated or specified.

2.1.4 Heat-Strengthened Glass

ASTM C 1048, Kind HS (heat strengthened).

2.2 INSULATING GLASS UNITS

Two panes of glass separated by a dehydrated airspace and hermetically sealed. Dimensional tolerances shall be as specified in SIGMA A1202. The units shall conform to ASTM E 773 and ASTM E 774, Class A. Spacer shall be roll-formed, with bent or tightly welded or keyed and sealed joints to completely seal the spacer periphery and eliminate moisture and hydrocarbon vapor transmission into airspace through the corners. Primary seal shall be compressed polyisobutylene and the secondary seal shall be a specially formulated silicone.

2.2.1 Buildings

Provide 1/4 inch airspace. The inner lite shall be ASTM C 1172, clear, laminated, annealed flat glass Type I, Class I, Quality q3, 1/8 inch thick plus clear PVB interlayer and another 1/8 inch thickness of glass. The outer lite shall be ASTM C 1036, Type I, Class 1 (transparent), low-e coated, Quality q4, 1/4 inch thick. Overall thickness shall be nominally 1 inch.

2.2.2 Low Emissivity and Tinted Insulating Glass

Insulating glass units (IGU) shall have a low-emissivity coating applied to the 2nd surface of the unit. The U-value for the IGU shall be no greater than 0.45. Visible light transmittance (VLT) shall be a minimum of 55 percent, and solar heat gain coefficient (SHGC) shall be maximum of 0.25. Tinted glass color shall be to match existing glass.

2.3 SETTING AND SEALING MATERIALS

Provide as specified in the GANA Glazing Manual, SIGMA TM-3000, SIGMA TB-3001, and manufacturer's recommendations, unless specified otherwise herein. Do not use metal sash putty, nonskinning compounds, nonresilient preformed sealers, or impregnated preformed gaskets. Materials exposed to view and unpainted shall be gray or neutral color.

2.3.1 Sealants

Provide elastomeric and structural sealants.

2.3.1.1 Elastomeric Sealant

ASTM C 920, Type S or M, Grade NS, Class 12.5, Use G. Sealant shall be chemically compatible with setting blocks, edge blocks, and sealing tapes, with sealants used in manufacture of insulating glass units. Color of sealant shall be as indicated in the Color Legend on the drawings.

2.3.1.2 Structural Sealant

ASTM C 1184.

2.3.2 Preformed Channels

Neoprene, vinyl, or rubber, as recommended by the glass manufacturer for the particular condition. 1/4 inch

2.3.3 Sealing Tapes

Preformed, semisolid, polymeric-based material of proper size and compressibility for the particular condition. Use only where glazing rabbet is designed for tape and tape is recommended by the glass or sealant manufacturer. Provide spacer shims for use with compressible tapes. Tapes shall be chemically compatible with the product being set.

2.3.4 Setting Blocks and Edge Blocks

Neoprene setting blocks shall be dense extruded type conforming to ASTM D 395, Method B, Shore A durometer between 70 and 90. Edge blocking shall be Shore A durometer of 50 (+ or - 5). Silicone setting blocks shall be required when blocks are in contact with silicone sealant. Profiles, lengths and locations shall be as required and recommended in writing by glass manufacturer.

2.3.5 Glazing Gaskets

Glazing gaskets shall be extruded with continuous integral locking projection designed to engage into metal glass holding members to provide a watertight seal during dynamic loading, building movements and thermal movements. Glazing gaskets for a single glazed opening shall be continuous one-piece units with factory-fabricated injection-molded corners free of flashing and burrs. Glazing gaskets shall be in lengths or units recommended by manufacturer to ensure against pull-back at corners. Glazing gasket profiles shall be as indicated on drawings.

2.3.5.1 Fixed Glazing Gaskets

Fixed glazing gaskets shall be closed-cell (sponge) smooth extruded compression gaskets of cured elastomeric virgin neoprene compounds conforming to ASTM C 509, Type 2, Option 1.

2.3.5.2 Wedge Glazing Gaskets

Wedge glazing gaskets shall be high-quality extrusions of cured elastomeric virgin neoprene compounds, ozone resistant, conforming to ASTM C 864, Option 1, Shore A durometer between 65 and 75.

2.3.5.3 Aluminum Framing Glazing Gaskets

Glazing gaskets for aluminum framing shall be permanent, elastic, non-shrinking, non-migrating, watertight and weathertight.

2.3.6 Accessories

Provide as required for a complete installation, including glazing points, clips, shims, angles, beads, and spacer strips. Provide noncorroding metal accessories. Provide primer-sealers and cleaners as recommended by the glass and sealant manufacturers.

PART 3 EXECUTION

3.1 PREPARATION

Preparation, unless otherwise specified or approved, shall conform to applicable recommendations in the [GANA Glazing Manual](#), [GANA Sealant Manual](#), [SIGMA TB-3001](#), [SIGMA TM-3000](#), and manufacturer's recommendations.

Determine the sizes to provide the required edge clearances by measuring the actual opening to receive the glass. Grind smooth in the shop glass edges that will be exposed in finish work. Leave labels in place until the installation is approved, except remove applied labels on heat-absorbing glass and on insulating glass units as soon as glass is installed. Securely fix movable items or keep in a closed and locked position until glazing compound has thoroughly set.

3.2 GLASS SETTING

Shop glaze or field glaze items to be glazed using glass of the quality and thickness specified or indicated. Glazing, unless otherwise specified or approved, shall conform to applicable recommendations in the [GANA Glazing Manual](#), [GANA Sealant Manual](#), [SIGMA TB-3001](#), [SIGMA TM-3000](#), and manufacturer's recommendations. Aluminum windows, wood doors, and hollow metal doors and windows may be glazed in conformance with one of the glazing methods described in the standards under which they are produced, except that face puttying with no bedding will not be permitted. Handle and install glazing materials in accordance with manufacturer's instructions. Use beads or stops which are furnished with items to be glazed to secure the glass in place.

3.2.1 Sheet Glass

Cut and set with the visible lines or waves horizontal.

3.2.2 Insulating Glass Units

Do not grind, nip, or cut edges or corners of units after the units have left the factory. Springing, forcing, or twisting of units during setting will not be permitted. Handle units so as not to strike frames or other objects. Installation shall conform to applicable recommendations of [SIGMA TB-3001](#) and [SIGMA TM-3000](#).

3.2.3 Installation of Wire Glass

Install glass for fire doors in accordance with installation requirements of [NFPA 80](#).

3.2.4 Installation of Laminated Glass

Sashes which are to receive laminated glass shall be weeped to the outside to allow water drainage into the channel.

3.3 CLEANING

Clean glass surfaces and remove labels, paint spots, putty, and other defacement as required to prevent staining. Glass shall be clean at the time the work is accepted.

3.4 PROTECTION

Glass work shall be protected immediately after installation. Glazed openings shall be identified with suitable warning tapes, cloth or paper flags, attached with non-staining adhesives. Reflective glass shall be protected with a protective material to eliminate any contamination of the reflective coating. Protective material shall be placed far enough away from the coated glass to allow air to circulate to reduce heat buildup and moisture accumulation on the glass. Glass units which are broken, chipped, cracked, abraded, or otherwise damaged during construction activities shall be removed and replaced with new units.

-- End of Section --

SECTION 08 91 00

METAL WALL LOUVERS

08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL (AMCA)

AMCA 500-D (1998) Laboratory Methods of Testing
Dampers for Rating

AMCA 511 (1999; R 2004) Certified Ratings Program
for Air Control Devices

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 2603 (2002) Voluntary Specification,
Performance Requirements and Test
Procedures for Pigmented Organic Coatings
on Aluminum Extrusions and Panels

ASTM INTERNATIONAL (ASTM)

ASTM B 209 (2007) Standard Specification for Aluminum
and Aluminum-Alloy Sheet and Plate

ASTM B 221 (2008) Standard Specification for Aluminum
and Aluminum-Alloy Extruded Bars, Rods,
Wire, Profiles, and Tubes

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Wall louvers

SD-03 Product Data

Metal Wall Louvers

Recycled Content

For products having recycled content, manufacturer's product data for percentages by weight of pre-consumer and post-consumer recycled content.

SD-04 Samples

Wall louvers

1.3 DELIVERY, STORAGE, AND PROTECTION

Deliver materials to the site in an undamaged condition. Carefully store materials off the ground to provide proper ventilation, drainage, and protection against dampness. Louvers shall be free from nicks, scratches, and blemishes. Replace defective or damaged materials with new.

1.4 DETAIL DRAWINGS

Show all information necessary for fabrication and installation of wall louvers. Indicate materials, sizes, thicknesses, fastenings, and profiles.

1.5 COLOR SAMPLES

Colors of finishes for wall louvers and door louvers shall closely approximate colors indicated. Where color is not indicated, submit the manufacturer's standard colors to the Contracting Officer for selection.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

1.6.1 Recycled Content

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total for recycled content. Metal wall louvers may be available with recycled content.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Aluminum Sheet

ASTM B 209, alloy 3003 or 5005 with temper as required for forming.

2.1.2 Extruded Aluminum

ASTM B 221, alloy 6063-T5 or -T52.

2.2 METAL WALL LOUVERS

Weather resistant type, with bird screens and made to withstand a wind load of not less than 30 pounds per square foot. Wall louvers shall bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500-D and AMCA 511. The rating shall show a water penetration of 0.20 or less ounce per square foot of free area at a free velocity of 800 feet per minute. The louver depth shall be 6 inches, unless otherwise indicated. Provide aluminum louvers with 55 percent free area.

2.2.1 Extruded Aluminum Louvers

Fabricated of extruded 6063-T5 or -T52 aluminum with a wall thickness of not less than 0.081 inch.

2.2.2 Screens and Frames

For aluminum louvers, provide 1/2 inch square mesh, 14 or 16 gage aluminum or 1/4 inch square mesh, 16 gage aluminum bird screening. Mount screens in removable, rewirable frames of same material and finish as the louvers.

2.3 FASTENERS AND ACCESSORIES

Provide stainless steel screws and fasteners for aluminum louvers. Provide other accessories as required for complete and proper installation.

2.4 FINISHES

2.4.1 Aluminum

Exposed aluminum surfaces shall be factory finished with an organic coating. Color shall be as indicated.

2.4.1.1 Organic Coating

Clean and prime exposed aluminum surfaces. Provide a baked enamel finish conforming to AAMA 2603, with total dry film thickness not less than 0.8 mil with total dry film thickness of not less than 1.2 mil, color shall be as indicated in Color Legend on the drawings..

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Wall Louvers

Install using stops or moldings, flanges, strap anchors, or jamb fasteners as appropriate for the wall construction and in accordance with manufacturer's recommendations.

3.1.2 Sill Pan Flashing

Set wall louver sill members in watertight sill pan flashing. Provide 3/4 inch by 3/4 inch by 1/8 inch angle on inside face of frame. Attach to sill prior to installation of pan. To form pan, fold flashing ends and back up at least 1-1/2 inch, but not to exceed 1/4 inch below top of sill member. Seal corners of pan. Extend sloped pan to exterior face of building. Attach sill members to vertical leg of angle only if required by manufacturer. Do not penetrate bottom of flashing pan. Do not apply sealant between flashing pan and bottom of frame.

3.1.3 Screens and Frames

Attach frames to louvers with screws or bolts.

3.2 PROTECTION FROM CONTACT OF DISSIMILAR MATERIALS

3.2.1 Copper or Copper-Bearing Alloys

Paint copper or copper-bearing alloys in contact with dissimilar metal with heavy-bodied bituminous paint or separate with inert membrane.

3.2.2 Aluminum

Where aluminum contacts metal other than zinc, paint the dissimilar metal with a primer and two coats of aluminum paint.

3.2.3 Metal

Paint metal in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.2.4 Wood

Paint metal in contact with mortar, concrete, or other masonry materials with alkali-resistant coating such as heavy-bodied bituminous paint.

-- End of Section --

SECTION 09 22 00

SUPPORTS FOR GYPSUM BOARD

01/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 341 (2005; Supp 2005) Seismic Provisions for Structural Steel Buildings

ASTM INTERNATIONAL (ASTM)

ASTM A 463/A 463M (2006) Standard Specification for Steel Sheet, Aluminum-Coated

ASTM A 653/A 653M (2009) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM C 645 (2008a) Nonstructural Steel Framing Members

ASTM C 754 (2008) Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products

ASTM C 841 (2003e1; R 2008) Installation of Interior Lathing and Furring

ASTM C 847 (2006) Standard Specification for Metal Lath

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM ML/SFA 920 (1991) Metal Lathing and Furring

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Metal support systems

Submit for the erection of metal framing, furring, and ceiling suspension systems. Indicate materials, sizes, thicknesses, and

fastenings.

SD-03 Product Data

Local/Regional Materials; L

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site.

Recycled Content; L

For products having recycled content, manufacturer's product data for percentages by weight of pre-consumer and post-consumer recycled content.

1.3 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the job site and store in ventilated dry locations. Storage area shall permit easy access for inspection and handling. If materials are stored outdoors, stack materials off the ground, supported on a level platform, and fully protected from the weather. Handle materials carefully to prevent damage. Remove damaged items and provide new items.

1.4 SUSTAINABLE DESIGN REQUIREMENTS

1.4.1 Local/Regional Materials

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Steel framing material may be locally available.

1.4.2 Recycled Content

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total for recycled content. Steel Framing material may be available with recycled content.

PART 2 PRODUCTS

2.1 MATERIALS

Provide steel materials for metal support systems with galvanized coating ASTM A 653/A 653M, G-60; aluminum coating ASTM A 463/A 463M, T1-25; or a 55-percent aluminum-zinc coating. Provide support systems and attachments per AISC 341 in seismic zones.

2.1.1 Materials for Attachment of Lath

2.1.1.1 Suspended and Furred Ceiling Systems and Wall Furring

ASTM C 841, and ASTM C 847.

2.1.1.2 Non-loadbearing Wall Framing

NAAMM ML/SFA 920.

2.1.2 Materials for Attachment of Gypsum Wallboard

2.1.2.1 Suspended and Furred Ceiling Systems

ASTM C 645.

2.1.2.2 Nonload-Bearing Wall Framing and Furring

ASTM C 645, but not thinner than 0.0179 inch thickness, with 0.0329 inch minimum thickness supporting wall hung items such as cabinetwork, equipment and fixtures, or greater as indicated in the manufacturer's published performance data based on limiting heights, spans, applied loads, and deflections as follows:

Gypsum Wallboard: L/240.

2.2 SHAFTWALL FRAMING

Comply with ASTM C 754 for conditions indicated. ASTM C 645, but not thinner than 0.0270 inch thickness, or greater as indicated in the manufacturer's published performance data based on limiting heights, spans, applied loads, air pressure load, bending stress, end reaction shear, and deflections as follows:

Gypsum Wallboard: L/240.

Intermittent air pressure loads on elevator shafts shall be 5 psf.

2.2.1 Studs and Runners

Manufacturer's standard C, H, or CH profile studs for repetitive members, corner and end members, depth as indicated on Drawings. Provide runners of manufacturer's standard J-profile track, long leg at least 2 inches and depth matching track.

Provide runners of manufacturer's standard J-profile track, minimum 0.0270 inch thick with long leg at least 2 inches and depth matching track.

2.3 Slip-Type Head Joints

ASTM C 645, where indicated. Provide one of the following:

a. Single Long-Leg Runner System: Top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.

b. Double-Runner System: Top runners, inside runner with 2-inch- deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.

c. Proprietary Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs. Available products include the following:

1. Steel Network Inc. (The); VertiClip SLD and VertiTrack VTD Series.

2. Superior Metal Trim; Superior Flex Track System (SFT).

2.4 Firestop Tracks

Proprietary Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs. Available products include the following:

- a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
- b. Metal-Lite, Inc.; The System.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Systems for Attachment of Lath

3.1.1.1 Suspended and Furred Ceiling Systems and Wall Furring

ASTM C 841, except as indicated otherwise.

3.1.1.2 Non-loadbearing Wall Framing

NAAMM ML/SFA 920, except provide framing members 16 inches o.c. unless indicated otherwise.

3.1.2 Systems for Attachment of Gypsum Wallboard

3.1.2.1 Suspended and Furred Ceiling Systems

ASTM C 754, except provide framing members 16 inches o.c. unless indicated otherwise.

3.1.2.2 Non-loadbearing Wall Framing and Furring

ASTM C 754, except as indicated otherwise.

3.1.2.3 Shaftwall framing

ASTM C 754, except provide spacing of framing members as indicated.
Install supplementary framing in gypsum board shaft-wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, and similar items that cannot be supported directly by shaft-wall assembly framing.
At penetrations in shaft wall, maintain fire-resistance rating of shaft-wall assembly by installing supplementary steel framing around perimeter of penetration.

3.1.2.4 Furring

Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

3.2 ERECTION TOLERANCES

Provide framing members which will be covered by finish materials such as wallboard, plaster, or ceramic tile set in a mortar setting bed, within the following limits:

- a. Layout of walls and partitions: $\frac{1}{4}$ inch from intended position;
- b. Plates and runners: $\frac{1}{4}$ inch in 8 feet from a straight line;
- c. Studs: $\frac{1}{4}$ inch in 8 feet out of plumb, not cumulative; and
- d. Face of framing members: $\frac{1}{4}$ inch in 8 feet from a true plane.

Provide framing members which will be covered by ceramic tile set in dry-set mortar, latex-portland cement mortar, or organic adhesive within the following limits:

- a. Layout of walls and partitions: $\frac{1}{4}$ inch from intended position;
- b. Plates and runners: $\frac{1}{8}$ inch in 8 feet from a straight line;
- c. Studs: $\frac{1}{8}$ inch in 8 feet out of plumb, not cumulative; and
- d. Face of framing members: $\frac{1}{8}$ inch in 8 feet from a true plane.

-- End of Section --

SECTION 09 24 23

STUCCO

09/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A 653/A 653M	(2009) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM B 221	(2008) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM C 1002	(2007) Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
ASTM C 1063	(2008) Standard Practice for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster
ASTM C 150	(2007) Standard Specification for Portland Cement
ASTM C 206	(2003) Standard Specification for Finishing Hydrated Lime
ASTM C 207	(2006) Standard Specification for Hydrated Lime for Masonry Purposes
ASTM C 834	(2005) Latex Sealants
ASTM C 897	(2005) Aggregate for Job-Mixed Portland Cement-Based Plasters
ASTM C 926	(2006) Application of Portland Cement-Based Plaster
ASTM C 932	(2006) Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering
ASTM C 954	(2007) Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from

0.033 in. (0.84 mm) to 0.112 in. (2.84 mm)
in Thickness

ASTM D 1730

(2009) Standard Practices for Preparation
of Aluminum and Aluminum-Alloy Surfaces
for Painting

ASTM D 226

(2006) Standard Specification for
Asphalt-Saturated Organic Felt Used in
Roofing and Waterproofing

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Lath Accessories

Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.

SD-03 Product Data

Lath Plaster Materials Accessories

Detailed description of the proposed job-mix proportions for base and finish coats; including identification of thickness of coats.

Local/Regional Materials

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site.

SD-04 Samples

Color selection samples

For each type of factory-prepared finish coat indicated.

Color verification sample

For each type of factory-prepared finish coat indicated; 12 by 12 inches, and prepared on rigid backing.

1.3 QUALITY ASSURANCE

1.3.1 Mockups

Before plastering, install mockups of at least 100 sq. ft. in surface area

to demonstrate aesthetic effects and set quality standards for materials and execution.

- a. Install mockups for each type of finish indicated.
- b. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.3.2 Preinstallation Conference

Conduct Preparatory Meeting at Project site to comply with requirements in Section 01 45 01 USACE QUALITY CONTROL.

1.4 DELIVERY, STORAGE, AND HANDLING

Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.5 PROJECT CONDITIONS

Comply with ASTM C 926 requirements.

1.5.1 Exterior Plasterwork:

- a. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
- b. Apply plaster when ambient temperature is greater than 40 deg F.
- c. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
- d. Apply sealant upon full cure of surfaces to be sealed and in accordance with sealant manufacturer's recommendations.

1.5.2 Factory-Prepared Finishes

Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

1.6.1 Local/Regional Materials

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Stucco may be locally available.

PART 2 PRODUCTS

2.1 METAL LATH

2.1.1 Expanded-Metal Lath

ASTM C 847 with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.

- a. Diamond-Mesh Lath, unless noted otherwise: Self-furring.
 - 1. Weight: 3.4 lb/sq. yd.
- b. Flat Rib Lath, at horizontal applications: Rib depth of not more than 1/8 inch.
 - 1. Weight: 3.4 lb/sq. yd..

2.2 ACCESSORIES

Comply with [ASTM C 1063](#) and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

2.2.1 Zinc and Zinc-Coated (Galvanized) Accessories:

- a. External-Corner Reinforcement: Fabricated from metal lath with [ASTM A 653/A 653M](#), G60, hot-dip galvanized zinc coating.
- b. Cornerbeads: Fabricated from zinc.
 - 1. Small nose cornerbead with expanded flanges; use unless otherwise indicated.
- c. Casing Beads: Fabricated from zinc; square-edged style; with expanded flanges.
- d. Control Joints: Fabricated from zinc; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
- e. Expansion Joints: Fabricated from zinc; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.

2.2.2 Aluminum Trim

Extruded accessories of profiles and dimensions indicated on Drawings.

- a. Accessories:
 - 1. Channel Reveals, depth and profile as indicated on drawings.
- b. Aluminum: Alloy and temper with not less than the strength and durability properties of [ASTM B 221](#), Alloy 6063-T5.
- c. Finish: Chemical-conversion coating, [ASTM D 1730](#), Type B, compatible with field-applied finish coatings specified.
- d. Weeps: Provide open weeps at 16" oc. for all horizontal applications.

2.3 PLASTER MATERIALS

2.3.1 Portland Cement

[ASTM C 150](#), Type I.

2.3.2 Lime

ASTM C 206, Type S; or ASTM C 207, Type S.

2.3.3 Sand Aggregate

ASTM C 897.

2.3.4 Acrylic-Based Finish Coatings

Factory-mixed acrylic-emulsion coating systems, formulated with colorfast mineral pigments and very fine aggregates; for use over portland cement plaster base coats. Include manufacturer's recommended primers and sealing topcoats for acrylic-based finishes.

- a. Color: As indicated on drawings.
- b. Texture: Smooth steel trowel finish.

2.4 MISCELLANEOUS MATERIALS

2.4.1 Water for Mixing

Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

2.4.2 Fiber for Base Coat

Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in portland cement plaster.

2.4.3 Bonding Compound

ASTM C 932.

2.4.4 Steel Drill Screws

For metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of not fewer than three exposed threads.

2.4.5 Fasteners for Attaching Metal Lath to Substrates

Complying with ASTM C 1063.

2.4.6 Isolation Strip at Exterior Walls:

- a. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), unperforated.
- b. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

2.4.7 Acoustical Sealant for Exposed and Concealed Joints

Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter

joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.4.8 Acoustical Sealant for Concealed Joints

Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.5 PLASTER MIXES

Comply with ASTM C 926 for applications indicated.

2.5.1 Fiber Content

Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. ft. of cementitious materials. Reduce aggregate quantities accordingly to maintain workability.

2.5.2 Base-Coat Mixes for Use over Metal Lath

Scratch and brown coats for three-coat plasterwork as follows:

a. Portland Cement Mixes:

1. Scratch Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material (sum of separate volumes of each component material).
2. Brown Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 3 to 5 parts aggregate per part of cementitious material (sum of separate volumes of each component material).

2.5.3 Base-Coat Mixes for Use over Monolithic Concrete

Single base coats for two-coat plasterwork as follows:

- a. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 0 to 3/4 part lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material (sum of separate volumes of each component material).

2.5.4 Base-Coat Mixes for Use over Concrete Unit Masonry

Single base coats for two-coat plasterwork as follows:

- a. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material (sum of separate volumes of each component material).

2.5.5 Factory-Prepared Finish-Coat Mixes

Submit color selection samples and color verification sample.

For acrylic-based finish coatings, comply with manufacturer's written instructions.

PART 3 EXECUTION

3.1 EXAMINATION

Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering. Prepare solid-plaster bases that are smooth or that do not have the suction capability required to bond with plaster according to [ASTM C 926](#).

3.3 INSTALLATION, GENERAL - Omitted

3.4 INSTALLING METAL LATH

Install expanded-metal lath according to [ASTM C 1063](#).

- a. Vertical Furring: Install self-furring diamond-mesh lath.
- b. Flat-Ceiling and Horizontal Framing: Install flat rib lath.
- c. On Solid Surfaces, Not Otherwise Furred: Install self-furring diamond-mesh lath.

3.5 INSTALLING ACCESSORIES

Install according to [ASTM C 1063](#) and at locations indicated on Drawings.

3.5.1 Reinforcement for External Corners:

- a. Install lath-type external-corner reinforcement at exterior locations.

3.5.2 Control Joints

Install control joints at locations indicated on Drawings, or, if not located, in specific locations approved by Architect for visual effect as follows:

- a. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - 1. Vertical Surfaces: [144 sq. ft.](#)
 - 2. Horizontal and other Nonvertical Surfaces: [100 sq. ft.](#)
- b. At distances between control joints of not greater than [18 feet](#) o.c.
- c. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.

- d. Where control joints occur in surface of construction directly behind plaster.
- e. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.6 PLASTER APPLICATION

Comply with ASTM C 926.

- a. Do not deviate more than plus or minus $1/4$ inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
- b. Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6 inches at each jamb anchor.
- c. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
- d. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

3.6.1 Bonding Compound

Apply on unit masonry and concrete plaster bases.

3.6.2 Acrylic-Based Finish Coatings

Apply coating system, including primers, finish coats, and sealing topcoats, according to manufacturer's written instructions and to match approved sample.

3.7 CUTTING AND PATCHING

Cut, patch, replace, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.8 CLEANING AND PROTECTION

3.8.1 Remove temporary protection and enclosure of other work. Promptly remove plaster from doorframes, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

-- End of Section --

SECTION 09 29 00

GYPSUM BOARD
10/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C 1002	(2007) Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
ASTM C 1047	(2005) Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
ASTM C 1396/C 1396M	(2006a) Standard Specification for Gypsum Board
ASTM C 475/C 475M	(2002; R 2007) Joint Compound and Joint Tape for Finishing Gypsum Board
ASTM C 840	(2008) Application and Finishing of Gypsum Board
ASTM C 954	(2007) Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness

GYPSUM ASSOCIATION (GA)

GA 214	(2007) Recommended Levels of Gypsum Board Finish
GA 216	(2007) Application and Finishing of Gypsum Board
GA 600	(2006) Fire Resistance Design Manual

UNDERWRITERS LABORATORIES (UL)

UL Fire Resistance	(2009) Fire Resistance Directory
--------------------	----------------------------------

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Gypsum Board

Accessories

Submit for each type of gypsum board

Adhesives; (LEED)

Local/Regional Materialss

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site.

Recycled Content

For products having recycled content, manufacturer's product data for percentages by weight of pre-consumer and post-consumer recycled content.

SD-07 Certificates

Non-contaminated Materials

Certify that gypsum board types and joint treating materials do not contain asbestos, sulfur or other contaminants.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery

Deliver materials in the original packages, containers, or bundles with each bearing the brand name, applicable standard designation, and name of manufacturer, or supplier.

1.3.2 Storage

Keep materials dry by storing inside a sheltered building. Where necessary to store gypsum board outside, store off the ground, properly supported on a level platform, and protected from direct exposure to rain, snow, sunlight, and other extreme weather conditions. Provide adequate ventilation to prevent condensation.

1.3.3 Handling

Neatly stack gypsum board flat to prevent sagging or damage to the edges, ends, and surfaces.

1.4 ENVIRONMENTAL CONDITIONS

1.4.1 Temperature

Maintain a uniform temperature of not less than 50 degrees F in the structure for at least 48 hours prior to, during, and following the application of gypsum board, and joint treatment materials, or the bonding of adhesives.

1.4.2 Exposure to Weather

Protect gypsum board and cementitious backer unit products from direct exposure to rain, snow, sunlight, and other extreme weather conditions.

1.5 QUALIFICATIONS

Manufacturer shall specialize in manufacturing the types of material specified and shall have a minimum of 5 years of documented successful experience. Furnish type of gypsum board work specialized by the installer with a minimum of 3 years of documented successful experience.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

1.6.1 Local/Regional Materials

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Gypsum Board may be locally available.

1.6.2 Recycled Content

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total for recycled content. Gypsum Board may be available with recycled content.

PART 2 PRODUCTS

2.1 MATERIALS

Conform to specifications, standards and requirements specified. Provide gypsum board types and joint treating materials manufactured from non-contaminated materials only.

2.1.1 Gypsum Board

ASTM C 1396/C 1396M.

2.1.1.1 Regular

48 inch wide, 5/8 inch thick tapered edges.

2.1.1.2 Type X (Special Fire-Resistant)

48 inch wide, 5/8 inch thick, tapered edges.

2.1.2 Glass Mat Covered or Reinforced Gypsum Sheathing

Refer to Section 06 10 00 ROUGH CARPENTRY for exterior wall sheathing.

2.1.3 Joint Treatment Materials

ASTM C 475/C 475M.

2.1.3.1 Embedding Compound

Specifically formulated and manufactured for use in embedding tape at gypsum board joints and compatible with tape, substrate and fasteners.

2.1.3.2 Finishing or Topping Compound

Specifically formulated and manufactured for use as a finishing compound.

2.1.3.3 All-Purpose Compound

Specifically formulated and manufactured to serve as both a taping and a finishing compound and compatible with tape, substrate and fasteners.

2.1.3.4 Setting or Hardening Type Compound

Specifically formulated and manufactured for use with fiber glass mesh tape.

2.1.3.5 Joint Tape

Use cross-laminated or tapered edge tape recommended by the manufacturer.

2.1.4 Fasteners

2.1.4.1 Screws

ASTM C 1002, Type "G", Type "S" or Type "W" steel drill screws for fastening gypsum board to gypsum board, wood framing members and steel framing members less than 0.033 inch thick. ASTM C 954 steel drill screws for fastening gypsum board to steel framing members 0.033 to 0.112 inch thick.

2.1.5 Accessories

ASTM C 1047. Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges shall be free of dirt, grease, and other materials that may adversely affect bond of joint treatment.

2.1.6 Water

Provide clean, fresh, and potable water.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Framing and Furring

Verify that framing and furring are securely attached and of sizes and spacing to provide a suitable substrate to receive gypsum board. Verify that all blocking, headers and supports are in place to support plumbing fixtures and to receive soap dishes, grab bars, towel racks, and similar items. Do not proceed with work until framing and furring are acceptable for application of gypsum board.

3.2 APPLICATION OF GYPSUM BOARD

Apply gypsum board to framing and furring members in accordance with [ASTM C 840](#) or [GA 216](#) and the requirements specified. Apply gypsum board with separate panels in moderate contact; do not force in place. Stagger end joints of adjoining panels. Neatly fit abutting end and edge joints. Use gypsum board of maximum practical length; select panel sizes to minimize waste. Cut out gypsum board to make neat, close, and tight joints around openings. In vertical application of gypsum board, provide panels in lengths required to reach full height of vertical surfaces in one continuous piece. Lay out panels to minimize waste; reuse cutoffs whenever feasible. Surfaces of gypsum board and substrate members may be bonded together with an adhesive, except where prohibited by fire rating(s). Treat edges of cutouts for plumbing pipes, screwheads, and joints with water-resistant compound as recommended by the gypsum board manufacturer. Provide type of gypsum board for use in each system specified herein as indicated.

3.2.1 Application of Gypsum Board to Steel Framing and Furring

Apply in accordance with [ASTM C 840](#), System VIII or [GA 216](#).

3.2.2 Floating Interior Angles

Minimize framing by floating corners with single studs and drywall clips. Locate the attachment fasteners adjacent to ceiling and wall intersections in accordance with [ASTM C 840](#), System XII.

3.2.3 Control Joints

Install expansion and contraction joints in ceilings and walls in accordance with [ASTM C 840](#), System XIII or [GA 216](#). [Fill control joints between studs in fire-rated construction with firesafing insulation to match the fire-rating of construction.](#) Install expansion joint covers from same manufacturer as exterior joint material.

3.3 FINISHING OF GYPSUM BOARD

Tape and finish gypsum board in accordance with [ASTM C 840](#), [GA 214](#) and [GA 216](#). Finish plenum areas above ceilings to Level 1 in accordance with [GA 214](#). Finish walls and ceilings to receive a heavy-grade wall covering or heave textured finish before painting to Level 3 in accordance with [GA 214](#). Finish all gypsum board walls, partitions and ceilings to Level 4 in accordance with [GA 214](#). Provide joint, fastener depression, and corner treatment. Tool joints as smoothly as possible to minimize sanding and dust. Do not use fiber glass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer.

3.4 SEALING

Seal openings around pipes, fixtures, and other items projecting through gypsum board as specified in Section [07 92 00 JOINT SEALANTS](#). Apply material with exposed surface flush with gypsum board.

3.4.1 Sealing for Glass Mat or Reinforced Gypsum Board Sheathing - Omitted

3.5 FIRE-RESISTANT ASSEMBLIES

Wherever fire-rated construction is indicated, provide materials and application methods, including types and spacing of fasteners, wall and ceiling framing in accordance with the specifications contained in **UL Fire Resistance** for the Design Number(s) indicated, or **GA 600** for the File Number(s) indicated. Joints of fire-rated gypsum board enclosures shall be closed and sealed in accordance with UL test requirements or GA requirements. Seal penetrations through rated partitions and ceilings tight in accordance with tested systems.

3.6 PATCHING

Patch surface defects in gypsum board to a smooth, uniform appearance, ready to receive finishes.

3.7 SHAFTWALL FRAMING

Install the shaftwall system in accordance with the system manufacturer's published instructions. Coordinate bucks, anchors, blocking and other items placed in or behind shaftwall framing with electrical and mechanical work. Patch or replace fireproofing materials which are damaged or removed during shaftwall construction.

-- End of Section --

SECTION 09 30 00

CERAMIC TILE
01/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- | | |
|---------------------------|---|
| ANSI A137.1 | (2008) "American National Standards Specifications for Ceramic Tile |
| ANSI/CTI A108/A118/A136.1 | (2005) Specification for the Installation of Ceramic Tile |

ASTM INTERNATIONAL (ASTM)

- | | |
|-------------------|--|
| ASTM A 185/A 185M | (2007) Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete |
| ASTM C 1027 | (1999; R 2004) Standard Test Method for Determining Visible Abrasion Resistance of Glazed Ceramic Tile |
| ASTM C 1028 | (2007) Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method |
| ASTM C 144 | (2004) Standard Specification for Aggregate for Masonry Mortar |
| ASTM C 150 | (2007) Standard Specification for Portland Cement |
| ASTM C 206 | (2003) Standard Specification for Finishing Hydrated Lime |
| ASTM C 207 | (2006) Standard Specification for Hydrated Lime for Masonry Purposes |
| ASTM C 241 | (1990; R 2005) Standard Specification for Abrasion Resistance of Stone Subjected to Foot Traffic |
| ASTM C 33/C 33M | (2008) Standard Specification for Concrete Aggregates |
| ASTM C 373 | (1988; R 2006) Water Absorption, Bulk |

Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products

ASTM C 648

(2004; R 2009) Breaking Strength of Ceramic Tile

ASTM C 847

(2006) Standard Specification for Metal Lath

BAY AREA AIR QUALITY MANAGEMENT DISTRICT (Bay Area AQMD)

Bay Area AQMD Rule 8-51

(1992; R 2001) Adhesive and Sealant Products

MARBLE INSTITUTE OF AMERICA (MIA)

MIA Design Manual

(2003) Dimension Stone Design Manual

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

SCAQMD Rule 1168

(1989; R 2005) Adhesive and Sealant Applications

TILE COUNCIL OF AMERICA (TCA)

TCA Hdbk

(2009) Handbook for Ceramic Tile Installation

1.2 SYSTEM DESCRIPTION

1.2.1 General Requirements

Close space, in which tile is being set, to traffic and other work. Keep closed until tile is firmly set. Do not walk or work on newly tiled floors without using kneeling boards or equivalent protection of the tiled surface. Keep traffic off horizontal portland cement mortar installations for at least 72 hours.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings

Drawings showing ceramic tile pattern floor plans.

SD-03 Product Data

Mortar, Grout, and Adhesive_]]

Manufacturer's catalog data and preprinted installation and cleaning instructions. Indicate VOC content.

SD-04 Samplesng Wire Fabric; (LEED)

Tile
Marble Thresholds
Grout

Samples of sufficient size to show color range, pattern, type and joints.

SD-07 Certificates

Tile
Mortar, Grout, and Adhesive

Certificates indicating conformance with specified requirements. Furnish a master grade certificate for tile.

1.4 QUALITY ASSURANCE

Dimension and draw detail drawings at a minimum scale of 1/4 inch = 1 foot. Include drawings of pattern at inside corners, outside corners, termination points and location of all equipment items such as thermostats, switch plates, mirrors and toilet accessories mounted on surface.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the project site in manufacturer's original unopened containers with seals unbroken and labels and hallmarks intact. Protect materials from weather, and store them under cover in accordance with manufacturer's printed instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

Do not perform ceramic tile work unless the substrate and ambient temperature is at least 50 degrees F and rising. Maintain temperature above 50 degrees F while the work is being performed and for at least 7 days after completion of the work. When temporary heaters are used, ventilate the area to the outside to avoid carbon dioxide damage to new tilework.

1.7 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1-year period.

1.8 EXTRA MATERIALS

Supply an extra two percent of each type tile used in clean and marked cartons.

PART 2 PRODUCTS

2.1 TILE

ANSI/CTI A108/A118/A136.1: A108.A&B, and A108.5. Conform to TCA Hdbk for standard grade tile. Provide grade sealed containers. Mark seals with the marks on the signed master grade certificate. Provide an impact resistant tile with a minimum floor breaking strength for floor tile of 250 pound in accordance with ASTM C 648. Provide a 0.50 maximum percent water

absorption in accordance with ASTM C 373. Provide a minimum coefficient of friction of 0.60 for level surfaces, and 0.80 on ramps and stairs, tested both wet and dry in accordance with ASTM C 1028. Identify floor tile as Class III-Medium Heavy Traffic, durability classification as rated by the manufacturer when tested in accordance with ASTM C 1027 for abrasion resistance as related to foot traffic.

2.1.1 Mosaic Tile

Furnish ceramic mosaic tile and trim. Provide tile size and color as indicated on Drawings. Provide matching trim units and accessories with tile work. Provide where indicated for a complete and finished installation, in accordance with ANSI A137.1. Provide coved base units. Internal corners shall be squared and external corners rounded using appropriate matching trim units.

2.2 SETTING-BED

Compose the setting-bed of the following materials:

2.2.1 Aggregate for Concrete Fill

Conform to ASTM C 33/C 33M for aggregate fill. Do not exceed one-half the thickness of concrete fill for maximum size of coarse aggregate.

2.2.2 Portland Cement

Conform to ASTM C 150 for cement, Type I, white for wall mortar and gray for other uses.

2.2.3 Sand

Conform to ASTM C 144 for sand.

2.2.4 Hydrated Lime

Conform to ASTM C 206 for hydrated lime, Type S or ASTM C 207, Type S.

2.2.5 Metal Lath

Conform to ASTM C 847 for flat expanded type metal lath, and weighing a minimum 2.5 pound/square yard.

2.2.6 Reinforcing Wire Fabric

Conform to ASTM A 185/A 185M for wire fabric.

2.3 WATER

Provide potable water.

2.4 MORTAR, GROUT, AND ADHESIVE

Provide interior sealants, primers and sealants used as filler that conform to SCAQMD Rule 1168 and Bay Area AQMD Rule 8-51, and to the following for mortar, grout, adhesive, and sealant:

2.4.1 Dry-Set Portland Cement Mortar

TCA Hdbk. Zero-volatile organic compound (VOC) content.

2.4.2 Latex-Portland Cement Mortar

TCA Hdbk. Zero-VOC content.

2.4.3 Ceramic Tile Grout

TCA Hdbk; petroleum-free and plastic-free commercial portland cement grout. Maximum VOC content of 150 grams/liter.

2.4.4 Sealants

Comply with applicable regulations regarding toxic and hazardous materials and as specified. Single-component polyurethane sealant shall have a zero-VOC content. Two-component polyurethane sealant shall have a maximum VOC content of 45 grams/liter.

2.5 MARBLE THRESHOLDS

Provide marble thresholds of size required by drawings or conditions. Categorize marble Group A as classified by MIA Design Manual. Provide a fine sand-rubbed finish marble with white in color as approved by the Contracting Officer. Provide minimum 12.0 marble abrasion when tested in accordance with ASTM C 241.

PART 3 EXECUTION

3.1 PREPARATORY WORK AND WORKMANSHIP

Inspect surface to receive tile in conformance to the requirements of TCA Hdbk for surface conditions for the type setting bed specified and for workmanship. Provide variations of tiled surfaces that fall within maximum values shown below:

TYPE	WALLS	FLOORS
Dry-Set Mortar	1/8 inch in 8 ft.	1/8 inch in 10 ft.
Latex Portland Cement Mortar	1/8 inch in 8 ft.	1/8 inch in 10 ft.

3.2 GENERAL INSTALLATION REQUIREMENTS

Do not start tile work until roughing in for mechanical and electrical work has been completed and tested. Do not start floor tile installation in spaces requiring wall tile until after wall tile has been installed. Apply tile in colors and patterns indicated in the area shown on the drawings. Install tile with the respective surfaces in true even planes to the elevations and grades shown. Provide special shapes as required for sills, jambs, recesses, offsets, external corners, and other conditions to provide a complete and neatly finished installation. Solidly back tile bases and coves with mortar.

3.3 INSTALLATION OF FLOOR TILE

Install floor tile in accordance with TCA Hdbk method F113 (thin-set mortar bed bonded to concrete) where slab recess not indicated, and F112 (thickset cement mortar bed bonded to concrete) where slab recess indicated..

3.3.1 Workable or Cured Mortar Bed

Install floor tile over a workable mortar bed or a cured mortar bed at the option of the Contractor. Conform to TCA Hdbk for workable mortar bed materials and installation. Conform to TCA Hdbk for cured mortar bed materials and installation. Provide minimum 1/4 inch to maximum 3/8 inch joints in uniformed width.

3.3.2 Mortaring

Use dry-set or Latex-Portland cement mortar to install tile directly over properly cured, plane, clean concrete slabs (thinset applications), and Portland cement mortar over recessed concrete slabs (thickset applications), in accordance with TCA Hdbk. For installations in recessed slabs with floor drains, provide recommended slope to drain in accordance with TCA Hdbk.

3.3.3 Ceramic Tile Grout

Prepare and install ceramic tile grout in accordance with TCA Hdbk.

3.3.4 Concrete Fill

Provide a 3500 psi concrete fill mix to dry as consistency as practicable. Spread, tamp, and screed concrete fill to a true plane, and pitch to drains or levels as shown. Thoroughly damp concrete fill before applying setting-bed material. Reinforce concrete fill with one layer of reinforcement, with the uncut edges lapped the width of one mesh and the cut ends and edges lapped a minimum 2 inch. Tie laps together with 18 gauge wire every 10 inch along the finished edges and every 6 inch along the cut ends and edges. Provide reinforcement with support and secure in the centers of concrete fills. Provide a continuous mesh; except where expansion joints occur, cut mesh and discontinue across such joints. Provide reinforced concrete fill under the setting-bed where the distance between the under-floor surface and the finished tiles floor surface is a minimum 2 inch, and of the same thickness that the mortar setting-bed over the concrete fill with the thickness required in the specified TCA Hdbk method.

3.4 INSTALLATION OF MARBLE THRESHOLDS

Install thresholds where indicated, in a manner similar to that of the ceramic tile floor. Provide thresholds full width of the opening. Install head joints at ends not exceeding 1/4 inch in width and grouted full.

3.5 EXPANSION JOINTS

Form and seal joints as specified in Section 07 92 00 JOINT SEALANTS.

3.5.1 Floors

Provide expansion joints over construction joints, control joints, and expansion joints in concrete slabs. Provide expansion joints where tile abuts restraining surfaces such as perimeter walls, curbs and columns and at intervals of 24 to 36 feet each way in large interior floor areas and 12 to 16 feet each way in large exterior areas or areas exposed to direct sunlight or moisture. Extend expansion joints through setting-beds and fill.

3.6 CLEANING AND PROTECTING

Upon completion, thoroughly clean tile surfaces in accordance with manufacturer's approved cleaning instructions. Do not use acid for cleaning glazed tile. Clean floor tile with resinous grout or with factory mixed grout in accordance with printed instructions of the grout manufacturer. After the grout has set, provide a protective coat of a noncorrosive soap or other approved method of protection for tile wall surfaces. Cover tiled floor areas with building paper before foot traffic is permitted over the finished tile floors. Provide board walkways on tiled floors that are to be continuously used as passageways by workmen. Replace damaged or defective tiles.

3.7 WASTE MANAGEMENT

Separate waste, including metal and cardboard, in accordance with the Waste Management Plan and recycle or reuse. Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in designated containers and areas. Close and seal tightly partly used sealant and adhesive containers and store in protected, well-ventilated, fire-safe area at moderate temperature. Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in designated containers and areas and dispose of properly.

-- End of Section --

SECTION 09 51 00

ACOUSTICAL CEILINGS

10/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A 641/A 641M (2009a) Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

ASTM C 423 (2008a) Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

ASTM C 635/C 635M (2007) Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings

ASTM C 636/C 636M (2008) Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels

ASTM C 834 (2005) Latex Sealants

ASTM E 1264 (2008) Acoustical Ceiling Products

ASTM E 1414 (2006) Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

ASTM E 1477 (1998a; R 2008) Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers

ASTM E 580/E 580M (2009a) Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Moderate Seismic Restraint

UNDERWRITERS LABORATORIES (UL)

UL Fire Resistance (2009) Fire Resistance Directory

1.2 SYSTEM DESCRIPTION

Provide sound controlling units mechanically mounted on a ceiling suspension system for acoustical treatment. The unit size, texture, finish, and color must be as specified. The location and extent of acoustical treatment shall be as shown on the [approved detail drawings](#). Coordinate with paragraph RECLAMATION PROCEDURES for reclamation of mineral

fiber acoustical ceiling panels to be removed from the job site.

1.2.1 Ceiling Attenuation Class and Test

Provide a ceiling system with an attenuation class (CAC) of 35 - 39 when determined in accordance with [ASTM E 1414](#). Provide fixture attenuators over light fixtures and other ceiling penetrations, and provide acoustical blanket insulation adjacent to partitions, as required to achieve the specified CAC. Provide test ceiling continuous at the partition and assembled in the suspension system in the same manner that the ceiling will be installed on the project.

1.2.2 Ceiling Sound Absorption

Determine the Noise Reduction Coefficient (NRC) in accordance with [ASTM C 423](#) Test Method.

1.2.3 Light Reflectance

Determine light reflectance factor in accordance with [ASTM E 1477](#) Test Method.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section [01 33 00](#) SUBMITTAL PROCEDURES:

[SD-02 Shop Drawings](#)

[Approved Detail Drawings](#)

Drawings showing suspension system, method of anchoring and fastening, details, and reflected ceiling plan.

[SD-03 Product Data](#)

[Acoustical Units](#)

[Exposed Grid System Units](#)

a. Manufacturer's data indicating percentage of recycle material in acoustic ceiling tiles to verify affirmative procurement compliance.

b. Total weight and volume quantities of acoustic ceiling tiles with recycle material.

c. Manufacturer's catalog showing UL classification of fire-rated ceilings giving materials, construction details, types of floor and roof constructions to be protected, and UL design number and fire protection time rating for each required floor or roof construction and acoustic ceiling assembly.

[ACOUSTICAL SEALANT](#)

For sealants used inside the weatherproofing system, include printed statement of voc content

[Local/Regional Materials; L](#)

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site.

Recycled Content; L

For products having recycled content, manufacturer's product data for percentages by weight of pre-consumer and post-consumer recycled content.

SD-04 Samples

Acoustical Units Exposed Grid System Units

Two samples of each type of acoustical unit and each type of suspension grid tee section showing texture, finish, and color.

SD-06 Test Reports

Ceiling Attenuation Class and Test

Reports by an independent testing laboratory attesting that acoustical ceiling systems meet specified requirements. Data attesting to conformance of the proposed system to Underwriters Laboratories requirements for the fire endurance rating listed in **UL Fire Resistance** may be submitted in lieu of test reports.

SD-07 Certificates

Acoustical Units Acoustic Ceiling Tiles

Certificate attesting that the mineral based acoustical units furnished for the project contain recycled material and showing an estimated percent of such material.

1.4 DELIVERY, STORAGE. AND HANDLING

Deliver materials to the site in the manufacturer's original unopened containers with brand name and type clearly marked. Carefully handle and store materials in dry, watertight enclosures. Immediately before installation, store acoustical units for not less than 24 hours at the same temperature and relative humidity as the space where they will be installed in order to assure proper temperature and moisture acclimation.

1.5 ENVIRONMENTAL REQUIREMENTS

Maintain a uniform temperature of not less than **60 degrees F** nor more than **85 degrees F** and a relative humidity of not more than 70 percent for 24 hours before, during, and 24 hours after installation of acoustical units.

1.6 SCHEDULING

Complete and dry interior finish work such as plastering, concrete and terrazzo work before ceiling installation. Complete mechanical, electrical, and other work above the ceiling line; install and start

operating heating, ventilating, and air conditioning systems in order to maintain temperature and humidity requirements.

1.7 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a one year period. Include an agreement to repair or replace acoustical panels that fail within the warranty period in the standard performance guarantee or warranty. Failures include, but are not limited to, sagging and warping of panels; rusting and manufacturers defects of grid system.

1.8 EXTRA MATERIALS

Furnish spare tiles, from the same lot as those installed, of each color at the rate of 5 tiles for each 1000 tiles installed.

1.9 SUSTAINABLE DESIGN REQUIREMENTS

1.9.1 Local/Regional Materials

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Acoustical Ceiling components may be locally available.

1.9.2 Recycled Content

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total for recycled content. Acoustical ceiling components may be available with recycled content.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

Comply with EPA requirements in accordance with Section 01 62 35 RECYCLED / RECOVERED MATERIALS. Conform acoustical units to ASTM E 1264, Class A, and the following requirements:

2.1.1 Units for Exposed-Grid System

- a. Type: III (non-asbestos mineral fiber with painted finish) .
- b. Flame Spread: Class A, 25 or less
- c. Pattern: Fine fissured
- d. Minimum NRC: 0.75
- e. Minimum Light Reflectance Coefficient: 0.75 or greater.
- f. Nominal size: 24 by 24 inch.
- g. Edge detail: Square
- h. Finish: Factory-applied standard finish.
- i. Minimum CAC: 40.

2.2 SUSPENSION SYSTEM

Provide standard width flange suspension system conforming to [ASTM C 635/C 635M](#) for medium-duty systems. Provide surfaces exposed to view of aluminum or steel with a factory-applied white baked-enamel finish. Provide wall molding having a flange of not less than [15/16 inch](#). Provide inside and outside corner caps. Suspended ceiling framing system must have the capability to support the finished ceiling, light fixtures, air diffusers, and accessories, as shown. Provide a suspension system with a maximum deflection of 1/360 of the span length.

2.3 HANGERS

Provide hangers and attachment capable of supporting a minimum [300 pound](#) ultimate vertical load without failure of supporting material or attachment.

2.3.1 Wires

Conform wires to [ASTM A 641/A 641M](#), Class 1, [0.11 inch](#) in diameter.

2.4 FINISHES

Use manufacturer's standard textures, patterns and finishes as specified for acoustical units and suspension system members. Treat ceiling suspension system components to inhibit corrosion.

2.5 COLORS AND PATTERNS

Use colors and patterns for acoustical units and suspension system components as specified indicated on Drawings.

2.6 ACOUSTICAL SEALANT

Conform acoustical sealant to [ASTM C 834](#), nonstaining. Comply with the South Coast Air Quality Management District (SCAQMD) Rule # 1168, limiting VOC content to 50 g/L for porous material.

PART 3 EXECUTION

3.1 INSTALLATION

Examine surfaces to receive directly attached acoustical units for unevenness, irregularities, and dampness that would affect quality and execution of the work. Remove areas, where acoustical units will be cemented, of oils, form residue, or other materials that reduce bonding capabilities of the adhesive. Complete and dry interior finish work such as plastering, concrete, and terrazzo work before installation. Complete and approve mechanical, electrical, and other work above the ceiling line prior to the start of acoustical ceiling installation. Provide acoustical work complete with necessary fastenings, clips, and other accessories required for a complete installation. Do not expose mechanical fastenings in the finished work. Lay out hangers for each individual room or space. Provide hangers to support framing around beams, ducts, columns, grilles, and other penetrations through ceilings. Keep main runners and carrying channels clear of abutting walls and partitions. Provide at least two main runners for each ceiling span. Wherever required to bypass an object with the hanger wires, install a subsuspension system so that all hanger wires will be plumb.

3.1.1 Suspension System

Install suspension system in accordance with **ASTM C 636/C 636M** and as specified herein. Do not suspend hanger wires or other loads from underside of steel decking.

3.1.1.1 Plumb Hangers

Install hangers plumb and not pressing against insulation covering ducts and pipes. Where lighting fixtures are supported from the suspended ceiling system, provide hangers at a minimum of four hangers per fixture and located not more than **6 inch** from each corner of each fixture.

3.1.1.2 Splayed Hangers

Where hangers must be splayed (sloped or slanted) around obstructions, offset the resulting horizontal force by bracing, countersplaying, or other acceptable means.

3.1.2 Wall Molding

Provide wall molding where ceilings abut vertical surfaces. Miter corners where wall moldings intersect or install corner caps. Secure wall molding not more than **3 inch** from ends of each length and not more than **16 inch** on centers between end fastenings. Provide wall molding springs at each acoustical unit in semi-exposed or concealed systems.

3.1.2.1 Hold Down Clips

Provide hold down clips for all panels in ceiling system. Omit hold down clips at one panel at each VAV box.

3.1.3 Acoustical Units

Install acoustical units in accordance with the approved installation instructions of the manufacturer. Ensure that edges of acoustical units are in close contact with metal supports, with each other, and in true alignment. Arrange acoustical units so that units less than one-half width are minimized. Hold units in exposed-grid system in place with manufacturer's standard hold-down clips, if units weigh less than **1 psf** or if required for fire resistance rating.

3.1.4 Caulking

Seal all joints around pipes, ducts or electrical outlets penetrating the ceiling. Apply a continuous ribbon of acoustical sealant on vertical web of wall or edge moldings.

3.1.5 Antiterroism/Force Protection Restraint System

Provide antiterrorism/force protection restraint for the suspension system in accordance with **ASTM E 580/E 580M** **ASTM E 580**. Restraints for antiterrorism/force protection shall be based on severe seismic disturbances.

3.2 CLEANING

Following installation, clean dirty or discolored surfaces of acoustical units and leave them free from defects. Remove units that are damaged or

improperly installed and provide new units as directed.

3.3 RECLAMATION PROCEDURES

Neatly stack ceiling tile, designated for recycling by the Contracting Officer, on 4 by 4 foot pallets not higher than 4 foot. Panels must be completely dry. Shrink wrap and symmetrically stack pallets on top of each other without falling over.

-- End of Section --

SECTION 09 65 00

RESILIENT FLOORING

02/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 4078	(2002; R 2008) Water Emulsion Floor Polish
ASTM E 648	(2008b) Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
ASTM F 1066	(2004) Standard Specification for Vinyl Composition Floor Tile
ASTM F 1482	(2004) Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
ASTM F 1861	(2008) Resilient Wall Base
ASTM F 1869	(2004) Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
ASTM F 2170	(2002) Determining Relative Humidity in Concrete Floor Slabs in situ Probes
ASTM F 710	(2008) Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

SCAQMD Rule 1168	(1989; R 2005) Adhesive and Sealant Applications
------------------	--

1.2 SYSTEM DESCRIPTION

1.2.1 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 500 mile radius from the project site, if available from a minimum of three sources.

1.2.2 Fire Resistance Requirements

Provide a minimum average critical radiant flux of 0.22 watts per square

centimeter for flooring in corridors and exits when tested in accordance with ASTM E 648.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Resilient Flooring and Accessories

Adhesives

Manufacturer's descriptive data, documentation stating physical characteristics, and mildew and germicidal characteristics. Provide Material Safety Data Sheets (MSDS) for all primers and adhesives to the Contracting Officer. Highlight VOC emissions.

Vinyl Composition Tile

Wall Base

Local/Regional Materials

LEED documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site. Indicate relative dollar value of local/regional materials to total dollar value of products included in project.

SD-04 Samples

Resilient Flooring and Accessories

Three(3) samples of each indicated color and type of flooring, base, mouldings, and accessories. Sample size shall be minimum 2-1/2 x 4 inches.

SD-06 Test Reports

Moisture, Alkalinity and Bond Tests

Copy of test reports for moisture and alkalinity content of concrete slab, and bond test stating date of test, person conducting the test, and the area tested.

SD-08 Manufacturer's Instructions

Surface Preparation Installation

Manufacturer's printed installation instructions for all flooring materials and accessories, including preparation of substrate, seaming techniques, and recommended adhesives.

SD-10 Operation and Maintenance Data

Resilient Flooring and Accessories

Data Package 1 in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the building site in original unopened containers bearing the manufacturer's name, style name, pattern color name and number, production run, project identification, and handling instructions. Store materials in a clean, dry, secure, and well-ventilated area free from strong contaminant sources and residues with ambient air temperature maintained above 68 degrees F and below 85 degrees F, stacked according to manufacturer's recommendations. Remove resilient flooring products from packaging to allow ventilation prior to installation. Protect materials from the direct flow of heat from hot-air registers, radiators and other heating fixtures and appliances. Observe ventilation and safety procedures specified in the MSDS. Do not store rubber surface products with materials that have a high capacity to adsorb volatile organic compound (VOC) emissions. Do not store exposed rubber surface materials in occupied spaces.

1.5 ENVIRONMENTAL REQUIREMENTS

Maintain areas to receive resilient flooring at a temperature above 68 degrees F and below 85 degrees F for 3 days before application, during application and 2 days after application, unless otherwise directed by the flooring manufacturer for the flooring being installed. Maintain a minimum temperature of 55 degrees F thereafter. Provide adequate ventilation to remove moisture from area and to comply with regulations limiting concentrations of hazardous vapors.

1.6 SCHEDULING

Schedule resilient flooring application after the completion of other work which would damage the finished surface of the flooring.

1.7 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a one year period.

1.8 EXTRA MATERIALS

Extra flooring material of each color and pattern as listed below. Package all extra materials in original properly marked containers bearing the manufacturer's name, brand name, pattern color name and number, production run, and handling instructions. Provide extra materials from the same lot as those installed. Leave extra stock at the site in location assigned by Contracting Officer.

- a. Vinyl-composition tile: 5 percent quantity installed and Resilient textile flooring: 5 percent of quantity installed.
- b. Wall base: 15

- c. Premolded inside base corners: 10 pieces.
- d. Premolded outside base corners: 10 pieces

1.9 VOC LIMITS

Adhesives shall meet or exceed the VOC limits of South Coast Air Quality Management District Rule No. 1168. All sealants used as a filler shall meet or exceed Bay Area Air Resources Board Regulation 8, Rule 51.

PART 2 PRODUCTS

2.1 VINYL COMPOSITION TILE

Conform to ASTM F 1066 Class 2, (through pattern tile), Composition 1, asbestos-free, 12 inch square and 1/8 inch thick. Provide color and pattern uniformly distributed throughout the thickness of the tile.

2.2 WALL BASE

Conform to ASTM F 1861, Type TS (vulcanized thermoset rubber) or Type TP (thermoplastic rubber) Style B (coved - installed with resilient flooring). Base shall be 4 inches high and a minimum 1/8 inch thick. Preformed corners in matching height, shape, and color shall be furnished.

2.3 MOULDING

Provide tapered mouldings of vinyl or rubber and types as recommended by flooring manufacturer for both edges and transitions of flooring materials specified. Provide vertical lip on moulding of maximum 1/4 inch. Provide bevel change in level between 1/4 and 1/2 inch with a slope no greater than 1:2.

2.4 ADHESIVES

Provide adhesives for flooring, base and accessories as recommended by the manufacturer and comply with local indoor air quality standards. VOC content shall be less than the current VOC content limits of SCAQMD Rule 1168.

2.5 SURFACE PREPARATION MATERIALS

Provide surface preparation materials, such as panel type underlayment, lining felt, and floor crack fillers as recommended by the flooring manufacturer for the subfloor conditions. Comply with ASTM F 1482 for panel type underlayment products.

2.6 POLISH/FINISH

Provide polish finish as recommended by the manufacturer and conform to ASTM D 4078 for polish.

2.7 CAULKING AND SEALANTS

Provide caulking and sealants in accordance with Section 07 92 00 JOINT SEALANTS.

2.8 MANUFACTURER'S COLOR, PATTERN AND TEXTURE

Provide color, pattern and texture for resilient flooring and accessories as indicated on the drawings. Color listed is not intended to limit the selection of equal colors from other manufacturers. Provide flooring in any one continuous area or replacement of damaged flooring in continuous area from same production run with same shade and pattern.

PART 3 EXECUTION

3.1 EXAMINATION

Examine and verify that site conditions are in agreement with the design package. Report all conditions that will prevent a proper installation. Do not take any corrective action without written permission from the Government. Work will proceed only when conditions have been corrected and accepted by the installer.

3.2 SURFACE PREPARATION

Provide a smooth, true, level plane for surface preparation of the flooring, except where indicated as sloped. Floor to be flat to within 3/16 inch in 10 feet. Prepare subfloor in accordance with flooring manufacturer's recommended instructions. Prepare the surfaces of lightweight concrete slabs (as defined by the flooring manufacturer) as recommended by the flooring manufacturer. Comply with ASTM F 710 for concrete subfloor preparation. Floor fills or toppings may be required as recommended by the flooring manufacturer. Install underlayments, when required by the flooring manufacturer, in accordance with manufacturer's recommended printed installation instructions. Comply with ASTM F 1482 for panel type underlayments. Before any work under this section is begun, correct all defects such as rough or scaling concrete, chalk and dust, cracks, low spots, high spots, and uneven surfaces. Repair all damaged portions of concrete slabs as recommended by the flooring manufacturer. Remove concrete curing and sealer compounds from the slabs, other than the type that does not adversely affect adhesion. Remove paint, varnish, oils, release agents, sealers, waxes, and adhesives, as required by the flooring product in accordance with manufacturer's printed installation instructions.

3.3 MOISTURE, ALKALINITY AND BOND TESTS

Determine the suitability of the concrete subfloor for receiving the resilient flooring with regard to moisture content and pH level by moisture and alkalinity tests. Conduct moisture testing in accordance with ASTM F 1869 or ASTM F 2170, unless otherwise recommended by the flooring manufacturer. Conduct alkalinity testing as recommended by the flooring manufacturer. Determine the compatibility of the resilient flooring adhesives to the concrete floors by a bond test in accordance with the flooring manufacturer's recommendations.

3.4 PLACING VINYL COMPOSITION, VINYL TILES

Install tile flooring and accessories in accordance with manufacturer's printed installation instructions. Prepare and apply adhesives in accordance with manufacturer's directions. Keep tile lines and joints square, symmetrical, tight, and even. Keep each floor in true, level plane, except where slope is indicated. Vary edge width as necessary to maintain full-size tiles in the field, no edge tile to be less than one-half the field tile size, except where irregular shaped rooms make it

impossible. Cut flooring to fit around all permanent fixtures, built-in furniture and cabinets, pipes, and outlets. Cut, fit, and scribe edge tile to walls and partitions after field flooring has been applied.

3.5 PLACING MOULDING

Provide moulding where flooring termination is higher than the adjacent finished flooring and at transitions between different flooring materials. When required, locate moulding under door centerline. Moulding is not required at doorways where thresholds are provided. Secure moulding with adhesive as recommended by the manufacturer. Prepare and apply adhesives in accordance with manufacturer's printed directions.

3.6 PLACING WALL BASE

Install wall base in accordance with manufacturer's printed installation instructions. Prepare and apply adhesives in accordance with manufacturer's printed directions. Tighten base joints and make even with adjacent resilient flooring. Fill voids along the top edge of base at masonry walls with caulk. Roll entire vertical surface of base with hand roller, and press toe of base with a straight piece of wood to ensure proper alignment. Avoid excess adhesive in corners.

3.7 CLEANING

Immediately upon completion of installation of flooring in a room or an area, dry/clean the flooring and adjacent surfaces to remove all surplus adhesive. Clean flooring as recommended in accordance with manufacturer's printed maintenance instructions. No sooner than 5 days after installation, wash flooring with a nonalkaline cleaning solution, rinse thoroughly with clear cold water, and, except for rubber flooring and stair treads, risers and stringers, vinyl and other flooring not requiring polish finish by manufacturer, apply the number of coats of polish in accordance with manufacturer's written instructions. Clean and maintain all other flooring as recommended by the manufacturer.

3.8 WASTE MANAGEMENT

Separate offcuts and waste materials and reuse or recycle in accordance with the Waste Management Plan, keeping sheet materials larger than 2 square feet and tiles larger than 1/2 tiles separate for reuse. Identify manufacturer's policy for collection or return of construction scrap, unused material, demolition scrap, and/or packaging material. Place materials defined as hazardous or toxic waste in designated containers and dispose of properly. Close and seal tightly partly used sealant and adhesive containers and store protected in a well ventilated fire-safe area at moderate temperature.

3.9 PROTECTION

From the time of installation until acceptance, protect flooring from damage as recommended by the flooring manufacturer. Remove and replace flooring which becomes damaged, loose, broken, or curled and wall base which is not tight to wall or securely adhered.

-- End of Section --

SECTION 09 66 23

RESINOUS TERRAZZO FLOORING

05/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 56 (2005) Flash Point by Tag Closed Cup Tester

NATIONAL TERRAZZO & MOSAIC ASSOCIATION (NTMA)

NTMA Info Guide (2000) Terrazzo Information Guide

1.2 SYSTEM DESCRIPTION

Apply resinous terrazzo flooring, in the colors indicated, in the areas shown on the approved detail drawings. Flooring shall be an epoxy terrazzo system that conforms to the requirements specified in paragraphs 2.01A and B of NTMA Info Guide

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Approved Detail Drawings
Strips
Control Joint Strips

Drawings indicating the type, size, and layout of divider strips and control joint strips.

SD-03 Product Data

Resin
Mixing, Proportioning, and Installation
Cleaning and Sealing

Resin manufacturer's descriptive data, mixing, proportioning, and installation instructions. Maintenance literature for terrazzo cleaning and sealing shall be included.

SD-04 Samples

Resinous Terrazzo Flooring

Two 6 x 6 inches, (minimum) samples of each color of resinous terrazzo and two 6 inches lengths, of each type of strip.

1.4 QUALITY ASSURANCE

Applicator shall be approved by the resin manufacturer and shall have a minimum of 3 years experience in the application of the materials to be used and shall have completed 8 successful installations within the past 2 years.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the project site in manufacturer's original unopened containers. Keep materials in a clean, dry, area with temperatures controlled between 50 and 90 degrees F.

1.6 ENVIRONMENTAL REQUIREMENTS

Areas to receive terrazzo shall be maintained at a temperature above 50 degrees F for 2 days prior to installation and for 7 days following installation.

PART 2 PRODUCTS

2.1 PRIMER

Primer shall be a material recommended by the resin manufacturer which will penetrate the pores of the substrate and bond with the topping to form a permanent monolithic bond between the substrate and the topping.

2.2 RESIN

Resin for the specified terrazzo flooring shall conform to the requirements shown in NTMA Info Guide.

2.3 FILLERS

Fillers, if required, shall be inert mineral or cellulosic material as recommended by the manufacturer and best suited for the resin binder used. Fillers shall be furnished in the quantity necessary to impart the required color and physical characteristics.

2.4 MARBLE CHIPS

Marble chips shall be of domestic origin of sizes and colors to match existing. Chips shall be a range of sizes up to and including the NTMA Standard No. 0 and Standard No. 1 for 1/4 inch thick floors and Standard No. 0 through Standard No. 2 for 3/8 inch thick floors.

2.5 STRIPS

2.5.1 Divider Strips

Divider strips shall be as deep as required, 1/8 inch gauge and of brass .

2.5.2 Control Joint Strips

Control joint strips shall be as deep as required, 1/8 inch gauge and of brass.

2.6 GROUT

Grout shall be as recommended by the manufacturer of the resin.

2.7 SEALER

Sealer shall have a pH factor between 7 and 10 and shall be a penetrating type specially prepared for use on terrazzo. The sealer shall not discolor or amber the terrazzo and shall produce a slip resistant surface. Flash point of sealer shall be a minimum of 80 degrees F when tested in accordance with ASTM D 56.

PART 3 EXECUTION

3.1 PREPARATION OF CONCRETE SUBFLOOR

Installation of the floor topping shall not commence until the concrete substrate is at least 28 days old. The concrete surfaces shall be prepared in accordance with the instructions of the resin manufacturer.

3.2 MIXING, PROPORTIONING, AND INSTALLATION

Mixing, proportioning, and installing shall be in accordance with the approved instructions of the manufacturer. Strips shall be installed in locations indicated. The topping shall be applied to give a finish thickness of 3/8 inch. Bases shall be cove type cast-in-place with 1 inch radius cove and shall be 4 inch high.

3.3 CLEANING AND SEALING

The terrazzo shall be washed with a neutral cleaner and where required shall be cleaned with a fine abrasive to remove any stains or cement smears. The cleaned surfaces shall be rinsed. When dry, a terrazzo sealer shall be applied in accordance with the manufacturer's directions.

3.4 PROTECTION

The terrazzo work shall be covered and protected from damage until completion of the work of all other trades.

-- End of Section --

SECTION 09 90 00

PAINTS AND COATINGS

08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH 0100Doc (2005) Documentation of the Threshold
Limit Values and Biological Exposure
Indices

ASTM INTERNATIONAL (ASTM)

ASTM D 2092 (1995; R 2001e1) Standard Guide for
Preparation of Zinc-Coated (Galvanized)
Steel Surfaces for Painting

ASTM D 235 (2002; R 2008) Mineral Spirits (Petroleum
Spirits) (Hydrocarbon Dry Cleaning Solvent)

ASTM D 4214 (2007) Standard Test Method for Evaluating
the Degree of Chalking of Exterior Paint
Films

ASTM D 4263 (1983; R 2005) Indicating Moisture in
Concrete by the Plastic Sheet Method

ASTM D 4444 (2008) Use and Calibration of Hand-Held
Moisture Meters

ASTM D 523 (2008) Standard Test Method for Specular
Gloss

ASTM F 1869 (2004) Measuring Moisture Vapor Emission
Rate of Concrete Subfloor Using Anhydrous
Calcium Chloride

MASTER PAINTERS INSTITUTE (MPI)

MPI 107 (Jan 2004) Rust Inhibitive Primer
(Water-Based)

MPI 134 (Jan 2004) Galvanized Primer (Waterbased)

MPI 141 (Jan 2004) Interior High Performance Latex
MPI Gloss Level 5

MPI 144 (Jan 2004) Institutional Low Odor / VOC
Interior Latex, MPI Gloss Level 2

MPI 145	(Jan 2004) Institutional Low Odor / VOC Interior Latex, MPI Gloss Level 3
MPI 146	(Jan 2004) Institutional Low Odor/VOC Interior Latex, MPI Gloss Level 4
MPI 153	(Jan 2006) Interior W.B. Light Industrial Coating, Semi-Gloss, MPI Gloss Level 5
MPI 163	(Jan 2006) Exterior W.B. Light Industrial Coating, Semi-Gloss, MPI Gloss Level 5
MPI 21	(Jan 2004) Heat Resistant Enamel, Gloss (up to 205 degrees C and 400 degrees F), MPI Gloss Level 6
MPI 4	(Jan 2004) Interior/Exterior Latex Block Filler
MPI 50	(Jan 2004) Interior Latex Primer Sealer
MPI 79	(Jan 2004) Alkyd Anti-Corrosive Metal Primer
MPI 95	(Jan 2004) Quick Drying Primer for Aluminum

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS SP-01	(2000) Environmentally Preferable Product Specification for Architectural and Anti-Corrosive Paints
-----------	---

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 1	(2000; E 2004) Shop, Field, and Maintenance Painting
SSPC PA Guide 3	(1982; E 1995) A Guide to Safety in Paint Application
SSPC SP 1	(1982; E 2004) Solvent Cleaning
SSPC SP 10	(2007) Near-White Blast Cleaning
SSPC SP 12	(2002) Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating
SSPC SP 2	(1982; E 2004) Hand Tool Cleaning
SSPC SP 3	(2004; E 2004) Power Tool Cleaning
SSPC SP 6	(2007) Commercial Blast Cleaning
SSPC SP 7	(2007) Brush-Off Blast Cleaning
SSPC VIS 1	(2002; E 2004) Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning

SSPC VIS 3	(2004) Visual Standard for Power-and Hand-Tool Cleaned Steel
SSPC VIS 4	(1998; E 2000; E 2004) Guide and Reference Photographs for Steel Surfaces Prepared by Waterjetting
U.S. ARMY CORPS OF ENGINEERS (USACE)	
EM 385-1-1	(2008) Safety and Health Requirements Manual
U.S. DEPARTMENT OF DEFENSE (DOD)	
MIL-STD-101	(Rev B) Color Code for Pipelines & for Compressed Gas Cylinders
U.S. GENERAL SERVICES ADMINISTRATION (GSA)	
FED-STD-313	(Rev D; Am 1) Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities
U.S. GREEN BUILDING COUNCIL (USGBC)	
LEED	(2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)
U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)	
29 CFR 1910.1000	Air Contaminants

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

The current MPI, "Approved Product List" which lists paint by brand, label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Samples of specified materials may be taken and tested for compliance with specification requirements.

In keeping with the intent of Executive Order 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition", products certified by SCS as meeting SCS SP-01 shall be given preferential consideration over registered products. Products that are registered shall

be given preferential consideration over products not carrying any EPP designation.

SD-02 Shop Drawings

Piping identification

Submit color stencil codes

SD-03 Product Data

Coatings; (LEED)

Manufacturer's Technical Data Sheets

Indicate VOC content.

SD-04 Samples

Color

Submit manufacturer's samples of paint colors. Cross reference color samples to color scheme as indicated.

Test Reports

CRI Green Label Requirements for Indoor Air Quality Test Criteria;

SD-07 Certificates

Applicator's qualifications

Qualification Testing laboratory for coatings

SD-08 Manufacturer's Instructions

Application instructions

Mixing

Detailed mixing instructions, minimum and maximum application temperature and humidity, potlife, and curing and drying times between coats.

Manufacturer's Material Safety Data Sheets

Submit manufacturer's Material Safety Data Sheets for coatings, solvents, and other potentially hazardous materials, as defined in FED-STD-313.

SD-10 Operation and Maintenance Data

Coatings:

Preprinted cleaning and maintenance instructions for all coating systems shall be provided.

SD-11 Closeout Submittals

Local/Regional Materials; (LEED)

LEED documentation relative to local/regional materials credit in accordance with LEED Reference Guide. Include in LEED Documentation Notebook.

Materials; (LEED)

LEED documentation relative to low emitting materials credit in accordance with LEED Reference Guide. Include in LEED Documentation Notebook.

1.3 APPLICATOR'S QUALIFICATIONS

1.3.1 Contractor Qualification

Submit the name, address, telephone number, FAX number, and e-mail address of the contractor that will be performing all surface preparation and coating application. Submit evidence that key personnel have successfully performed surface preparation and application of coatings on a minimum of three similar projects within the past three years. List information by individual and include the following:

a. Name of individual and proposed position for this work.

b. Information about each previous assignment including:

Position or responsibility

Employer (if other than the Contractor)

Name of facility owner

Mailing address, telephone number, and telex number (if non-US) of facility owner

Name of individual in facility owner's organization who can be contacted as a reference

Location, size and description of structure

Dates work was carried out

Description of work carried out on structure

1.4 QUALITY ASSURANCE

1.4.1 Field Samples and Tests

The Contracting Officer may choose up to two coatings that have been delivered to the site to be tested at no cost to the Government. Take samples of each chosen product as specified in the paragraph "Sampling Procedures." Test each chosen product as specified in the paragraph

"Testing Procedure." Products which do not conform, shall be removed from the job site and replaced with new products that conform to the referenced specification. Testing of replacement products that failed initial testing shall be at no cost to the Government.

1.4.1.1 Sampling Procedure

The Contracting Officer will select paint at random from the products that have been delivered to the job site for sample testing. The Contractor shall provide [one quart](#) samples of the selected paint materials. The samples shall be taken in the presence of the Contracting Officer, and labeled, identifying each sample. Provide labels in accordance with the paragraph "Packaging, Labeling, and Storage" of this specification.

1.4.1.2 Testing Procedure

Provide Batch Quality Conformance Testing for specified products, as defined by and performed by MPI. As an alternative to Batch Quality Conformance Testing, the Contractor may provide [Qualification Testing](#) for specified products above to the appropriate MPI product specification, using the third-party laboratory approved under the paragraph "Qualification Testing" laboratory for coatings. The qualification testing lab report shall include the backup data and summary of the test results. The summary shall list all of the reference specification requirements and the result of each test. The summary shall clearly indicate whether the tested paint meets each test requirement. Note that Qualification Testing may take 4 to 6 weeks to perform, due to the extent of testing required.

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party laboratory selected to perform testing of coating samples for compliance with specification requirements. Submit documentation that laboratory is regularly engaged in testing of paint samples for conformance with specifications, and that employees performing testing are qualified. If the Contractor chooses MPI to perform the Batch Quality Conformance testing, the above submittal information is not required, only a letter is required from the Contractor stating that MPI will perform the testing.

1.5 REGULATORY REQUIREMENTS

1.5.1 Environmental Protection

In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the local Air Pollution Control District and regional jurisdiction. Notify Contracting Officer of any paint specified herein which fails to conform.

1.5.2 Lead Content

Do not use coatings having a lead content over 0.06 percent by weight of nonvolatile content.

1.5.3 Chromate Content

Do not use coatings containing zinc-chromate or strontium-chromate.

1.5.4 Asbestos Content

Materials shall not contain asbestos.

1.5.5 Mercury Content

Materials shall not contain mercury or mercury compounds.

1.5.6 Silica

Abrasive blast media shall not contain free crystalline silica.

1.5.7 Human Carcinogens

Materials shall not contain ACGIH 0100Doc and ACGIH 0100Doc confirmed human carcinogens (A1) or suspected human carcinogens (A2).

1.6 Indoor Environmental Quality

1.6.1 Low-Emitting Materials

Paints and coatings used for interior work for this project shall be low-emitting, non-irritating, nontoxic and chemically inert. Paints and coatings shall meet or exceed the VOC and chemical component limits and restrictions of Green Seal Requirements. For paints and coatings not accounted for in the Green Seal Requirements, the California Air Resources Board (ARB) Suggested Control Measure for Architectural Coatings, June 2000 may be referenced. VOC content of primers, paints and coatings shall not exceed the following:

- a. Interior Coatings: 5.0 ounces per quart for non-flat coatings and 1.67 ounces per quart for flat coatings.

1.7 PACKAGING, LABELING, AND STORAGE

Paints shall be in sealed containers that legibly show the contract specification number, designation name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name and address of manufacturer. Pigmented paints shall be furnished in containers not larger than 5 gallons. Paints and thinners shall be stored in accordance with the manufacturer's written directions, and as a minimum, stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors, and at temperatures between 40 to 95 degrees F.

1.8 SAFETY AND HEALTH

Apply coating materials using safety methods and equipment in accordance with the following:

Work shall comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis as specified in Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS and in Appendix A of EM 385-1-1. The Activity Hazard Analysis shall include analyses of the potential impact of painting operations on painting personnel and on others involved in and adjacent to the work zone.

1.8.1 Safety Methods Used During Coating Application

Comply with the requirements of [SSPC PA Guide 3](#).

1.8.2 Toxic Materials

To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:

- a. The applicable [manufacturer's Material Safety Data Sheets](#) (MSDS) or local regulation.
- b. [29 CFR 1910.1000](#).
- c. [ACGIH 0100Doc](#), threshold limit values.

1.9 ENVIRONMENTAL CONDITIONS

Comply, at minimum, with manufacturer recommendations for space ventilation during and after installation.

1.9.1 Coatings

Do not apply coating when air or substrate conditions are:

- a. Less than [5 degrees F](#) above dew point;
- b. Below [50 degrees F](#) or over [95 degrees F](#), unless specifically pre-approved by the Contracting Officer and the product manufacturer. Under no circumstances shall application conditions exceed manufacturer recommendations.

1.10 [COLOR](#) SELECTION

Colors of finish coats shall be as indicated or specified. Where not indicated or specified, colors shall be selected by the Contracting Officer. Manufacturers' names and color identification are used for the purpose of color identification only. Named products are acceptable for use only if they conform to specified requirements. Products of other manufacturers are acceptable if the colors approximate colors indicated and the product conforms to specified requirements.

Tint each coat progressively darker to enable confirmation of the number of coats.

Color, texture, and pattern of wall coating systems shall be as indicated .

1.11 LOCATION AND SURFACE TYPE TO BE PAINTED

1.11.1 Painting Included

Where a space or surface is indicated to be painted, include the following unless indicated otherwise.

- a. Surfaces behind portable objects and surface mounted articles readily detachable by removal of fasteners, such as screws and

bolts.

- b. New factory finished surfaces that require identification or color coding and factory finished surfaces that are damaged during performance of the work.
- c. Existing coated surfaces that are damaged during performance of the work.

1.11.1.1 Exterior Painting

Includes new surfaces of the buildings and appurtenances. Also included are existing coated surfaces made bare by cleaning operations.

1.11.1.2 Interior Painting

Includes new surfaces of the buildings and appurtenances as indicated and existing coated surfaces made bare by cleaning operations. Where a space or surface is indicated to be painted, include the following items, unless indicated otherwise.

- a. Exposed columns, girders, beams, joists, and metal deck; and
- b. Other contiguous surfaces.

1.11.2 Painting Excluded

Do not paint the following unless indicated otherwise.

- a. Surfaces concealed and made inaccessible by panelboards, fixed ductwork, machinery, and equipment fixed in place.
- b. Surfaces in concealed spaces. Concealed spaces are defined as enclosed spaces above suspended ceilings, furred spaces, attic spaces, crawl spaces, elevator shafts and chases.
- c. Steel to be embedded in concrete.
- d. Copper, stainless steel, aluminum, brass, and lead except existing coated surfaces.
- e. Hardware, fittings, and other factory finished items.

1.11.3 Mechanical and Electrical Painting

Includes field coating of interior new surfaces.

- a. Where a space or surface is indicated to be painted, include the following items unless indicated otherwise.
 - (1) Exposed piping, conduit, and ductwork;
 - (2) Exposed Supports, hangers, air grilles, and registers;
 - (3) Miscellaneous metalwork and insulation coverings.
- b. Do not paint the following, unless indicated otherwise:

*2

- (1) New zinc-coated, aluminum, and copper surfaces under insulation
- (2) New aluminum jacket on piping
- (3) New interior ferrous piping under insulation.

1.11.4 Definitions and Abbreviations

1.11.4.1 Qualification Testing

Qualification testing is the performance of all test requirements listed in the product specification. This testing is accomplished by MPI to qualify each product for the MPI Approved Product List, and may also be accomplished by Contractor's third party testing lab if an alternative to Batch Quality Conformance Testing by MPI is desired.

1.11.4.2 Batch Quality Conformance Testing

Batch quality conformance testing determines that the product provided is the same as the product qualified to the appropriate product specification. This testing shall only be accomplished by MPI testing lab.

1.11.4.3 Coating

A film or thin layer applied to a base material called a substrate. A coating may be a metal, alloy, paint, or solid/liquid suspensions on various substrates (metals, plastics, wood, paper, leather, cloth, etc.). They may be applied by electrolysis, vapor deposition, vacuum, or mechanical means such as brushing, spraying, calendaring, and roller coating. A coating may be applied for aesthetic or protective purposes or both. The term "coating" as used herein includes emulsions, enamels, stains, varnishes, sealers, epoxies, and other coatings, whether used as primer, intermediate, or finish coat. The terms paint and coating are used interchangeably.

1.11.4.4 DFT or dft

Dry film thickness, the film thickness of the fully cured, dry paint or coating.

1.11.4.5 DSD

Degree of Surface Degradation, the MPI system of defining degree of surface degradation. Five (5) levels are generically defined under the Assessment sections in the MPI Maintenance Repainting Manual.

1.11.4.6 EPP

Environmentally Preferred Products, a standard for determining environmental preferability in support of Executive Order 13101.

1.11.4.7 EXT

MPI short term designation for an exterior coating system.

1.11.4.8 INT

MPI short term designation for an interior coating system.

1.11.4.9 micron / microns

The metric measurement for 0.001 mm or one/one-thousandth of a millimeter.

1.11.4.10 mil / mils

The English measurement for 0.001 in or one/one-thousandth of an inch, equal to 25.4 microns or 0.0254 mm.

1.11.4.11 mm

The metric measurement for millimeter, 0.001 meter or one/one-thousandth of a meter.

1.11.4.12 MPI Gloss Levels

MPI system of defining gloss. Seven (7) gloss levels (G1 to G7) are generically defined under the Evaluation sections of the MPI Manuals. Traditionally, Flat refers to G1/G2, Eggshell refers to G3, Semigloss refers to G5, and Gloss refers to G6.

Gloss levels are defined by MPI as follows:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat	0 to 5	10 max
G2	Velvet	0 to 10	10 to 35
G3	Eggshell	10 to 25	10 to 35
G4	Satin	20 to 35	35 min
G5	Semi-Gloss	35 to 70	
G6	Gloss	70 to 85	
G7	High Gloss		

Gloss is tested in accordance with [ASTM D 523](#). Historically, the Government has used Flat (G1 / G2), Eggshell (G3), Semi-Gloss (G5), and Gloss (G6).

1.11.4.13 MPI System Number

The MPI coating system number in each Division found in either the MPI Architectural Painting Specification Manual or the Maintenance Repainting Manual and defined as an exterior (EXT/REX) or interior system (INT/RIN). The Division number follows the CSI Master Format.

1.11.4.14 Paint

See Coating definition.

1.11.4.15 REX

MPI short term designation for an exterior coating system used in repainting projects or over existing coating systems.

1.11.4.16 RIN

MPI short term designation for an interior coating system used in repainting projects or over existing coating systems.

PART 2 PRODUCTS

2.1 MATERIALS

Conform to the [coating](#) specifications and standards referenced in PART 3. Submit [manufacturer's technical data sheets](#) for specified [coatings](#) and solvents.

PART 3 EXECUTION

3.1 PROTECTION OF AREAS AND SPACES NOT TO BE PAINTED

Prior to surface preparation and coating applications, remove, mask, or otherwise protect, hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.

3.2 Omitted

3.3 SURFACE PREPARATION

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. Oil and grease shall be removed prior to mechanical cleaning. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

3.3.1 Additional Requirements for Preparation of Surfaces With Existing Coatings

Before application of coatings, perform the following on surfaces covered by soundly-adhered coatings, defined as those which cannot be removed with a putty knife:

- a. Wipe previously painted surfaces to receive solvent-based coatings, except stucco and similarly rough surfaces clean with a clean, dry cloth saturated with mineral spirits, [ASTM D 235](#). Allow surface to dry. Wiping shall immediately precede the application of the first coat of any coating, unless specified otherwise.
- b. Sand existing glossy surfaces to be painted to reduce gloss. Brush, and wipe clean with a damp cloth to remove dust.
- c. The requirements specified are minimum. Comply also with the [application instructions](#) of the paint manufacturer.
- d. Previously painted surfaces specified to be repainteddamaged

during construction shall be thoroughly cleaned of all grease, dirt, dust or other foreign matter.

- e. Blistering, cracking, flaking and peeling or other deteriorated coatings shall be removed.
- f. Chalk shall be removed so that when tested in accordance with ASTM D 4214, the chalk resistance rating is no less than 8.
- g. Slick surfaces shall be roughened. Damaged areas such as, but not limited to, nail holes, cracks, chips, and spalls shall be repaired with suitable material to match adjacent undamaged areas.
- h. Edges of chipped paint shall be feather edged and sanded smooth.
- i. Rusty metal surfaces shall be cleaned as per SSPC requirements. Solvent, mechanical, or chemical cleaning methods shall be used to provide surfaces suitable for painting.
- j. New, proposed coatings shall be compatible with existing coatings.

3.3.2 Existing Coated Surfaces with Minor Defects

Sand, spackle, and treat minor defects to render them smooth. Minor defects are defined as scratches, nicks, cracks, gouges, spalls, alligating, chalking, and irregularities due to partial peeling of previous coatings. Remove chalking by sanding so that when tested in accordance with [ASTM D 4214](#), the chalk rating is not less than 8.

3.3.3 Removal of Existing Coatings

Remove existing coatings from the following surfaces:

- a. Surfaces containing large areas of minor defects;
- b. Surfaces containing more than 20 percent peeling area; and
- c. Surfaces designated by the Contracting Officer, such as surfaces where rust shows through existing coatings.

3.3.4 Substrate Repair

- a. Repair substrate surface damaged during coating removal;
- b. Sand edges of adjacent soundly-adhered existing coatings so they are tapered as smooth as practical to areas involved with coating removal; and
- c. Clean and prime the substrate as specified.

3.4 PREPARATION OF METAL SURFACES

3.4.1 Existing and New Ferrous Surfaces

- a. Ferrous Surfaces including Shop-coated Surfaces and Small Areas That Contain Rust, Mill Scale and Other Foreign Substances: Solvent clean or detergent wash in accordance with [SSPC SP 1](#) to remove oil and grease. Where shop coat is missing or damaged, clean according to [SSPC SP 2](#), [SSPC SP 3](#), [SSPC SP 6](#), or [SSPC SP 10](#).

Brush-off blast remaining surface in accordance with [SSPC SP 7](#); Water jetting to [SSPC SP 12](#) WJ-4 may be used to remove loose coating and other loose materials. Use inhibitor as recommended by coating manufacturer to prevent premature rusting. Shop-coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

- b. Surfaces With More Than 20 Percent Rust, Mill Scale, and Other Foreign Substances: Clean entire surface in accordance with [SSPC SP 6/SSPC SP 12](#) WJ-3.

3.4.2 Final Ferrous Surface Condition:

For tool cleaned surfaces, the requirements are stated in [SSPC SP 2](#) and [SSPC SP 3](#). As a visual reference, cleaned surfaces shall be similar to photographs in [SSPC VIS 3](#).

For abrasive blast cleaned surfaces, the requirements are stated in [SSPC SP 7](#), [SSPC SP 6](#), and [SSPC SP 10](#). As a visual reference, cleaned surfaces shall be similar to photographs in [SSPC VIS 1](#).

For waterjet cleaned surfaces, the requirements are stated in [SSPC SP 12](#). As a visual reference, cleaned surfaces shall be similar to photographs in [SSPC VIS 4](#).

3.4.3 Galvanized Surfaces

- a. New or Existing Galvanized Surfaces With Only Dirt and Zinc Oxidation Products: Clean with solvent, steam, or non-alkaline detergent solution in accordance with [SSPC SP 1](#). If the galvanized metal has been passivated or stabilized, the coating shall be completely removed by brush-off abrasive blast. New galvanized steel to be coated shall not be "passivated" or "stabilized" If the absence of hexavalent stain inhibitors is not documented, test as described in [ASTM D 2092](#), Appendix X2, and remove by one of the methods described therein.
- b. Galvanized with Slight Coating Deterioration or with Little or No Rusting: Water jetting to [SSPC SP 12](#) WJ3 to remove loose coating from surfaces with less than 20 percent coating deterioration and no blistering, peeling, or cracking. Use inhibitor as recommended by the coating manufacturer to prevent rusting.

3.4.4 Non-Ferrous Metallic Surfaces

Aluminum and aluminum-alloy, lead, copper, and other nonferrous metal surfaces.

- a. Surface Cleaning: Solvent clean in accordance with [SSPC SP 1](#) and wash with mild non-alkaline detergent to remove dirt and water soluble contaminants.

3.5 PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE

3.5.1 Concrete and Masonry

- a. Curing: Concrete, stucco and masonry surfaces shall be allowed to cure at least 30 days before painting, except concrete slab on grade, which shall be allowed to cure 90 days before painting.

b. Surface Cleaning: Remove the following deleterious substances.

(1) Dirt, Chalking, Grease, and Oil: Wash new surfaces with a solution composed of 1/2 cup trisodium phosphate, 1/4 cup household detergent, and 4 quarts of warm water. Then rinse thoroughly with fresh water.

(2) Fungus and Mold: Wash new surfaces with a solution composed of 1/2 cup trisodium phosphate, 1/4 cup household detergent, 1 quart 5 percent sodium hypochlorite solution and 3 quarts of warm water. Rinse thoroughly with fresh water.

(3) Paint and Loose Particles: Remove by wire brushing.

(4) Efflorescence: Remove by scraping or wire brushing followed by washing with a 5 to 10 percent by weight aqueous solution of hydrochloric (muriatic) acid. Do not allow acid to remain on the surface for more than five minutes before rinsing with fresh water. Do not acid clean more than 4 square feet of surface, per workman, at one time.

c. Cosmetic Repair of Minor Defects: Repair or fill mortar joints and minor defects, including but not limited to spalls, in accordance with manufacturer's recommendations and prior to coating application.

d. Allowable Moisture Content: Latex coatings may be applied to damp surfaces, but not to surfaces with droplets of water. Do not apply epoxies to damp vertical surfaces as determined by ASTM D 4263 or horizontal surfaces that exceed 3 lbs of moisture per 1000 square feet in 24 hours as determined by ASTM F 1869. In all cases follow manufacturers recommendations. Allow surfaces to cure a minimum of 30 days before painting.

3.5.2 Gypsum Board, Plaster, and Stucco

a. Surface Cleaning: Plaster and stucco shall be clean and free from loose matter; gypsum board shall be dry. Remove loose dirt and dust by brushing with a soft brush, rubbing with a dry cloth, or vacuum-cleaning prior to application of the first coat material. A damp cloth or sponge may be used if paint will be water-based.

b. Repair of Minor Defects: Prior to painting, repair joints, cracks, holes, surface irregularities, and other minor defects with patching plaster or spackling compound and sand smooth.

c. Allowable Moisture Content: Latex coatings may be applied to damp surfaces, but not surfaces with droplets of water. Do not apply epoxies to damp surfaces as determined by ASTM D 4263. New plaster to be coated shall have a maximum moisture content of 8 percent, when measured in accordance with ASTM D 4444, Method A, unless otherwise authorized. In addition to moisture content requirements, allow new plaster to age a minimum of 30 days before preparation for painting.

3.6 PREPARATION OF WOOD AND PLYWOOD SURFACES

3.6.1 Interior Wood Surfaces, Stain Finish

Interior wood surfaces to receive stain shall be sanded. Oak and other open-grain wood to receive stain shall be given a coat of wood filler not less than 8 hours before the application of stain; excess filler shall be removed and the surface sanded smooth.

3.7 APPLICATION

3.7.1 Coating Application

Painting practices shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates, except as modified herein.

At the time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application.

Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. Use trigger operated spray nozzles for water hoses. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated. Wear protective clothing and respirators when applying oil-based paints or using spray equipment with any paints.

Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch.

Thoroughly work coating materials into joints, crevices, and open spaces. Special attention shall be given to insure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces.

Each coat of paint shall be applied so dry film shall be of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete.

Touch up damaged coatings before applying subsequent coats. Interior areas shall be broom clean and dust free before and during the application of coating material.

- a. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying, but not to present topcoat adhesion problems. Provide each coat in specified condition to receive next coat.
- b. Primers, and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by manufacturer, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each coat shall cover surface of preceding coat or surface completely, and there shall be a visually perceptible difference in shades of

successive coats.

- c. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.
- d. Thermosetting Paints: Topcoats over thermosetting paints (epoxies and urethanes) should be applied within the overcoating window recommended by the manufacturer.

3.7.2 Mixing and Thinning of Paints

Reduce paints to proper consistency by adding fresh paint, except when thinning is mandatory to suit surface, temperature, weather conditions, application methods, or for the type of paint being used. Obtain written permission from the Contracting Officer to use thinners. The written permission shall include quantities and types of thinners to use.

When thinning is allowed, paints shall be thinned immediately prior to application with not more than 0.125 L of suitable thinner per gallon. The use of thinner shall not relieve the Contractor from obtaining complete hiding, full film thickness, or required gloss. Thinning shall not cause the paint to exceed limits on volatile organic compounds. Paints of different manufacturers shall not be mixed.

3.7.3 Two-Component Systems

Two-component systems shall be mixed in accordance with manufacturer's instructions. Any thinning of the first coat to ensure proper penetration and sealing shall be as recommended by the manufacturer for each type of substrate.

3.7.4 Coating Systems

- a. Systems by Substrates: Apply coatings that conform to the respective specifications listed in the following Tables:

Table

Division 5. Exterior Metal, Ferrous and Non-Ferrous

Paint Table

- Division 3. Interior Concrete Paint Table
- Division 4. Interior Concrete Masonry Units Paint Table
- Division 5. Interior Metal, Ferrous and Non-Ferrous Paint Table

Division 9: Interior Plaster, Gypsum Board, Textured Surfaces Paint Table

- b. Minimum Dry Film Thickness (DFT): Apply paints, primers, varnishes, enamels, undercoats, and other coatings to a minimum dry film thickness of 1.5 mil each coat unless specified otherwise in the Tables. Coating thickness where specified, refers to the minimum dry film thickness.
- c. Coatings for Surfaces Not Specified Otherwise: Coat surfaces which have not been specified, the same as surfaces having similar conditions of exposure.
- d. Existing Surfaces Damaged During Performance of the Work, Including New Patches In Existing Surfaces: Coat surfaces with

the following:

- (1) One coat of primer.
 - (2) One coat of undercoat or intermediate coat.
 - (3) One topcoat to match adjacent surfaces.
- e. Existing Coated Surfaces To Be Painted: Apply coatings conforming to the respective specifications listed in the Tables herein, except that pretreatments, sealers and fillers need not be provided on surfaces where existing coatings are soundly adhered and in good condition. Do not omit undercoats or primers.

3.8 COATING SYSTEMS FOR METAL

Apply coatings of Tables in Division 5 for Exterior and Interior.

- a. Apply specified ferrous metal primer on the same day that surface is cleaned, to surfaces that meet all specified surface preparation requirements at time of application.
- b. Inaccessible Surfaces: Prior to erection, use one coat of specified primer on metal surfaces that will be inaccessible after erection.
- c. Shop-primed Surfaces: Touch up exposed substrates and damaged coatings to protect from rusting prior to applying field primer.
- d. Surface Previously Coated with Epoxy or Urethane: Apply MPI 101, 1.5 mils DFT immediately prior to application of epoxy or urethane coatings.
- e. Pipes and Tubing: The semitransparent film applied to some pipes and tubing at the mill is not to be considered a shop coat, but shall be overcoated with the specified ferrous-metal primer prior to application of finish coats.
- f. Exposed Nails, Screws, Fasteners, and Miscellaneous Ferrous Surfaces. On surfaces to be coated with water thinned coatings, spot prime exposed nails and other ferrous metal with latex primer MPI 107.

3.9 COATING SYSTEMS FOR CONCRETE AND CEMENTITIOUS SUBSTRATES

Apply coatings of Tables in Division 3, 4 and 9 for Exterior and Interior.

3.10 PIPING IDENTIFICATION

Piping Identification, Including Surfaces In Concealed Spaces: Provide in accordance with MIL-STD-101. Place stenciling in clearly visible locations. On piping not covered by MIL-STD-101, stencil approved names or code letters, in letters a minimum of 1/2 inch high for piping and a minimum of 2 inches high elsewhere. Stencil arrow-shaped markings on piping to indicate direction of flow using black stencil paint.

3.11 FIRE RATED AND SMOKE CONTAINMENT ASSEMBLIES

Fire walls, fire barriers, fire partitions, smoke barriers and smoke

partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently indentified with signs or stenciling. Such identification shall:

1. Be located in accessible concealed floor, floor-ceiling or attic spaces; and
2. Be repeated at intervals not exceeding 20 feet measured horizontally along both sides of the wall or partition; and
3. Include red lettering not less than 2 inch in height, incorporating the suggested wording: " X FIRE AND/OR SMOKE BARRIER-PROTECT ALL OPENINGS" or other wording approved or required by AHJ (Authority Having Jurisdiction). Replace "X" with the appropriate designated hourly rating.
4. Apply a minimum one-inch wide bright red horizontal line, both sides of wall, interrupted for approved text, at the required interval

Refer to Drawings for locations of walls and applicable ratings.

3.12 INSPECTION AND ACCEPTANCE

In addition to meeting previously specified requirements, demonstrate mobility of moving components, including swinging and sliding doors, cabinets, and windows with operable sash, for inspection by the Contracting Officer. Perform this demonstration after appropriate curing and drying times of coatings have elapsed and prior to invoicing for final payment.

3.13 PAINT TABLES

All DFT's are minimum values. Use DFT indicated, or DFT in manufacturers written instructions, whichever is greater.

3.13.1 EXTERIOR PAINT TABLES

DIVISION 5: EXTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

STEEL / FERROUS SURFACES

- A. New Steel that has been blast-cleaned to **SSPC SP 6:**

EXTERIOR GALVANIZED SURFACES

- ### C. Galvanized surfaces

1. Waterborne Light Industrial Coating
MPI REX 5.3J-G5 (Semigloss)
Primer: Intermediate: Topcoat:
MPI 134 N/A MPI 163
System DFT: 4.5 mils

EXTERIOR SURFACES, OTHER METALS (NON-FERROUS)

Painting system as recommended by expansion joint cover manufacturer and Master Painters Institute standards.

- K. Hot metal surfaces including smokestacks subject to temperatures up to

EXTERIOR SURFACES, OTHER METALS (NON-FERROUS)

205 degrees C (400 degrees F):

1. Heat Resistant Enamel

MPI EXT 5.2A

Primer:

Intermediate:

Topcoat:

MPI 21 Surface preparation and number of coats per manufacturer's instructions.

System DFT: Per Manufacturer

3.13.2 INTERIOR PAINT TABLES

DIVISION 3: INTERIOR CONCRETE PAINT TABLE

A. New concrete floors where scheduled:

Refer to Section 03 30 00 CAST-IN-PLACE CONCRETE for clear concrete sealer.

DIVISION 4: INTERIOR CONCRETE MASONRY UNITS PAINT TABLE

A. New Concrete masonry:

1. Institutional Low Odor / Low VOC Latex

New; MPI INT 4.2E-G2 (Flat)

Filler

Primer:

Intermediate:

Topcoat:

New; MPI INT 4.2E-G4 (Satin)

Filler

Primer:

Intermediate:

Topcoat:

MPI 4

N/A

MPI 146

MPI 146

System DFT: 4 mils

B. Existing, previously painted Concrete masonry:

1. Institutional Low Odor / Low VOC Latex

Existing; MPI RIN 4.2L-G4 (Satin)

Spot Primer:

Intermediate:

Topcoat:

MPI 50

MPI 146

MPI 146

System DFT: 4 mils

Fill all holes in masonry surface

DIVISION 5: INTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

INTERIOR STEEL / FERROUS SURFACES

A. Metal, not otherwise specified except floors, hot metal surfaces, and new prefinished equipment:

1. High Performance Architectural Latex

MPI INT 5.1R-G5 (Semigloss)

Primer:

Intermediate:

Topcoat:

MPI 79

MPI 141

MPI 141

System DFT: 5 mils

B. Miscellaneous non-ferrous metal items not otherwise specified except floors, hot metal surfaces, and new prefinished equipment. Match surrounding finish:

1. High Performance Architectural

Latex

MPI INT 5.4F-G5 (Semigloss)

INTERIOR STEEL / FERROUS SURFACES

Primer:	Intermediate:	Topcoat:
MPI 95	MPI 141	MPI 141
System DFT: 5 mils		

DIVISION 9: INTERIOR GYPSUM BOARD PAINT TABLE

A. New and Existing, previously painted Wallboard not otherwise specified:

1. Institutional Low Odor / Low VOC Latex

New, ceilings; MPI INT 9.2M-G2 (Flat) / Existing; MPI RIN 9.2M-G2 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 144	MPI 144
System DFT: 4 mils		

New, walls; MPI INT 9.2M-G3 (Eggshell) / Existing; MPI RIN 9.2M-G3 (Eggshell)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 145	MPI 145
System DFT: 4 mils		

B. New in toilets and other high humidity areas not otherwise specified.:

1. Waterborne Light Industrial Coating

New; MPI INT 9.2L-G5 (Semigloss) / Existing; MPI RIN 9.2L-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 153	MPI 153
System DFT: 4 mils		

-- End of Section --

SECTION 10 10 00

VISUAL COMMUNICATIONS SPECIALTIES
02/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 2604 (2005) Voluntary Specification,
Performance Requirements and Test
Procedures for High Performance Organic
Coatings on Aluminum Extrusions and Panels

ASTM INTERNATIONAL (ASTM)

ASTM B 221 (2008) Standard Specification for Aluminum
and Aluminum-Alloy Extruded Bars, Rods,
Wire, Profiles, and Tubes

ASTM E 84 (2009) Standard Test Method for Surface
Burning Characteristics of Building
Materials

ASTM F 152 (1995; R 2002) Tension Testing of
Nonmetallic Gasket Materials

1.2 SYSTEM DESCRIPTION

The term **visual display board** when used herein includes presentation boards, marker boards, and interactive whiteboards. Visual display boards shall be from manufacturer's standard product line.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data**Visual Display Board**

Manufacturer's descriptive data and catalog cuts.
Manufacturer's installation instructions, and cleaning and
maintenance instructions.

Interactive Whiteboards; G

Manufacturer's descriptive data and catalog cuts.
Manufacturer's installation instructions, and cleaning and
maintenance instructions.

SD-04 Samples

Aluminum

Sections of frame, map rail, and chalktray, and two map hooks.

Porcelain Enamel

Section showing porcelain enamel coating, steel, core material
and backing.

SD-07 Certificates

Visual Display Board

Certificate of compliance signed by Contractor attesting that
visual display board conform to the requirements specified.

1.4 QUALITY ASSURANCE

Provide resilient cork/linoleum tackboards with surface burning
characteristics indicated below, as determined by testing assembled
materials composed of facings and backings identical to those required in
this section, in accordance with [ASTM E 84](#), by testing organization
acceptable to authorities having jurisdiction.

1.4.1 Flame Spread

25 or less.

1.4.2 Smoke Developed

10 or less.

1.5 Field Measurements

Take field measurements prior to preparation of shop drawings and
fabrication to ensure proper fitting. Show recorded measurements on final
shop drawings. Coordinate fabrication schedule with construction progress
to avoid delay.

Allow for trimming and fitting wherever taking field measurements before
fabrication might delay the work.

1.6 DELIVERY, STORAGE, AND HANDLING

Deliver Materials to the building site in the manufacturer's original
unopened containers and store them in a clean dry area with temperature
maintained above [50 degrees F](#). Stach materials according to manufacturer's
recommendations. Visual display boards shall be allowed to acclimate to
the building temperature for 24 hours prior to installation.

1.7 WARRANTY

a. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within 50 years from date of Substantial Completion.

b. Special Warranty for Interactive Whiteboards: Manufacturer's standard form in which manufacturer agrees to repair or replace interactive whiteboard systems that fail in materials or workmanship within 2 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Porcelain Enamel

Provide marker board writing surface composed of porcelain enamel fused to a nominal 28 gauge thick steel, laminated to a minimum 1/4 inch thick core material with a steel or foil backing sheet. Writing surface shall be capable of supporting paper by means of magnets. Marker board surface for display track system may be a powder paint dry erase surface adhered to a nominal 18 gauge thick steel.

2.1.2 Cork

Cork shall be a continuous resilient sheet made from soft, clean, granulated cork relatively free from hardback and dust and bonded with a binder suitable for the purpose intended. The wearing surface shall be free from streaks, spots, cracks or other imperfections that would impair its usefulness or appearance. The material shall be seasoned, and a clean cut made not less than 1/2 inch from the edge shall show no evidence of soft sticky binder.

2.1.2.1 OMITTED - Colored Cork

2.1.2.2 Natural Cork

Material shall be a single layer of pure grain natural cork without backing or facing. The color shall be light tan. The cork sheet shall have a tensile strength of not less than 40 psi when tested in accordance with ASTM F 152.

2.1.3 OMITTED - Woven Fabric

2.1.4 OMITTED - Non-Woven Fabric

2.1.5 OMITTED - Vinyl Wall Covering

2.1.6 Aluminum

Aluminum frame extrusions shall be alloy 6063-T5 or 6063-T6, conform to ASTM B 221, and be a minimum 0.06 inches thick. Exposed aluminum shall have an anodized, satin finish. Straight, single lengths shall be used wherever possible. Joints shall be kept to a minimum. Corners shall be mitered and shall have a hairline closure.

2.1.7 OMITTED - Hardwood

2.1.8 OMITTED - Glass

2.2 OMITTED - PRESENTATION BOARD

2.3 MARKERBOARD

Markerboard shall have a porcelain enamel writing surface and a chalktray. Markerboard shall be a factory assembled unit complete in one piece, without joints whenever possible. When markerboard dimensions require delivery in separate sections, components shall be prefabricated at the factory, disassembled for delivery and jointed at the site. Frame shall be aluminum. Chalktray shall be the same material as the frame. The markerboard shall have a map rail. The map rail with a tackable insert shall extend the full length of the liquid chalkboard, and shall have map hooks with clips for holding sheets of paper. Two map hooks shall be provided for each 4 foot of map rail. Dry erase markings shall be removable with a felt eraser or dry cloth without ghosting. Each unit shall come complete with an eraser and four different color compatible dry erase markers. The size shall be as shown in the drawings.

2.3.1 Additional Accessories

- a. End Stops: Provide one end stop at each end of the map rail.
- b. Flagholder: Provide one flagholder for each classroom.

2.4 TACKBOARDS

2.4.1 Cork

Tackboard shall consist of a minimum 1/8 inch thick natural cork laminated to a minimum 3/8 inch thick insulation board or fiber board, and shall have an aluminum frame. The size shall be as shown in the drawings.

2.4.2 Linoleum Covered

Resilient homogenous tackable surface consisting of linseed oil, granulated cork, rosin binders and dry pigments calendered onto natural burlap backing. Color shall extend through material. Provide fabric that has a flame spread rating of Class B or less when tested in accordance with ASTM E 84. Provide color and texture as indicated.

2.4.3 OMITTED - Vinyl Covered

2.4.4 OMITTED - Fabric Covered

2.4.5 Aluminum

Provide factory-applied organic coating.

2.4.6 Organic Coating

Clean and prime exposed aluminum surfaces and apply a baked enamel finish conforming to AAMA 2604, 50 percent PVDF, color as indicated.

2.5 OMITTED - CASE FOR BOARD UNIT

2.6 INTERACTIVE WHITEBOARDS

Size approximately 55 inches width by 42 inches height, wall mounted with wireless connection. Provide software, pen tray, pens and eraser. 4000 x 4000 touch resolution.

2.7 COLOR

Finish colors: As selected by the Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 PLACEMENT SCHEDULE

Location and mounting height of visual display boards shall be as shown on the drawings.

Mounting height is defined as distance from finished floor to top of the display board frame.

3.2 INSTALLATION

Perform installation and assembly in accordance with manufacturer's printed instructions. Use concealed fasteners. Visual display boards shall be attached to the walls with suitable devices to anchor each unit. furnish and install trim items, accessories and miscellaneous items in total, including but not limited to hardware, grounds, clips, backing materials, adhesives, brackets, and anchorages incidental to or necessary for a sound, secure, complete and finished installation. Installation shall not be initiated until completion of room painting and finishing operations. Visual display boards shall be installed in locations and at mounting heights indicated. Visual display boards shall be installed level and plumb. Damaged units shall be repaired or replaced as directed by the Contracting Officer.

3.3 CLEANING

Writing surfaces shall be cleaned in accordance with manufacturer's instructions.

-- End of Section --

SECTION 10 14 02

INTERIOR SIGNAGE
02/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 635 (2006) Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities

1.2 SYSTEM DESCRIPTION

Provide interior signage of the design, detail, sizes, types, and message content shown on the drawings/attachments/signage placement schedule (as applicable), conforming to the requirements specified, and placed at the locations indicated. Signs shall be complete with lettering, framing as detailed, and related components for a complete installation. Signage shall be obtained from a single manufacturer with edges and corners of finished letterforms and graphics true and clean. Recyclable materials shall conform to EPA requirements in accordance with Section 01 62 35 RECYCLED / RECOVERED MATERIALS.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings

Drawings showing elevations of each type of sign, dimensions, details and methods of mounting or anchoring, mounting height, shape and thickness of materials, and details of construction. A schedule showing the location, each sign type, and message shall be included.

SD-03 Product Data

Installation

Manufacturer's descriptive data, catalogs cuts, installation and cleaning instructions.

SD-04 Samples

Interior Signage

One sample of each of the following sign types showing typical quality, workmanship and color. The samples may be installed in the work, provided each sample is identified and location recorded.

- a. Standard Room sign.

Protection and Cleaning1.4 DELIVERY, STORAGE, AND HANDLING

Materials shall be packaged to prevent damage and deterioration during shipment, handling, storage and installation. Product shall be delivered to the jobsite in manufacturer's original packaging and stored in a clean, dry area in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

Signs, plaques, and dimensional letters shall be the standard product of a manufacturer regularly engaged in the manufacture of such products that essentially duplicate signs that have been in satisfactory use at least 2 years prior to bid opening.

2.2 ROOM IDENTIFICATION/DIRECTIONAL SIGNAGE SYSTEM

2.2.1 Standard Room Signs

Signs shall consist of laminated thermosetting Type MP plastic (three-ply melamine plastic laminate with phenolic core) and shall conform to the following:

- a. End caps shall be molded acrylic with square style corners.

2.2.2 Type of Mounting For Signs

Surface mounted signs shall be mounted with countersunk mounting holes in plaques and mounting screws fabricated from materials that are not corrosive to sign material and mounting surface.

2.2.3 Graphics

Signage graphics for modular signs shall conform to the following:

- a. Surface Applied Photopolymer: Integral graphics and braille achieved by photomechanical stratification processes. Photopolymer used for ADA compliant graphics shall be of the type that has a minimum durometer reading of 90. Tactile graphics shall be raised 1/32 inch from the first surface of plaque by photomechanical stratification process.

b. Engraved Copy: Machine engrave letters, numbers, symbols, and other graphics into panel sign on face to produce precisely formed copy and sharp images, incised to uniform depth. Melamine plastic engraving stock used for ADA compliant graphic shall be three-ply lamination contrasting color core meeting [ASTM D 635](#).

c. Graphic Blast Raised Copy: Background is sandblasted to a uniform depth of [1/32 inch](#) leaving raised text and Braille. Background shall be painted with polyurethane paint.

2.2.4 Character Proportions and Heights

Letters and numbers on signs conform to [36 CFR 1191](#).

2.2.5 Raised and Braille Characters and Pictorial Symbol Signs (Pictograms)

Raised letters and numbers on signs shall conform to [36 CFR 1191](#).

2.3 DIMENSIONAL BUILDING LETTERS

2.3.1 Fabrication

Letters shall be fabricated from cast aluminum. Letters shall be cleaned by chemical etching or cleaned ultrasonically in a special degreasing bath. Letters shall be packaged for protection until installation.

2.3.2 Typeface

Typeface shall be consistent with base appearance standards.

2.3.3 Size

Letter size shall be as indicated on drawings.

2.3.4 Finish

Natural satin aluminum finish shall be provided.

2.3.5 Mounting

Threaded studs of number and size recommended by manufacturer, shall be supplied for concealed anchorage. Letters which project from the mounting surface shall have stud spacer sleeves. Letters, studs, and sleeves shall be of the same material. Templates for mounting shall be supplied.

2.4 FABRICATION AND MANUFACTURE

2.4.1 Factory Workmanship

Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practicable.

2.4.2 Dissimilar Materials

Where dissimilar metals are in contact, the surfaces will be protected to

prevent galvanic or corrosive action.

2.5 COLOR, FINISH, AND CONTRAST

Color shall be as indicated on the drawings. Finish of all signs shall be eggshell, matte, or other non-glare finish as required in handicapped-accessible buildings.

PART 3 EXECUTION

3.1 INSTALLATION

Signs shall be installed plumb and true and in accordance with approved manufacturer's instructions at locations shown on the detail drawings] . Mounting height and mounting location shall conform to 36 CFR 1191. Required blocking shall be installed. Signs on doors or other surfaces shall not be installed until finishes on such surfaces have been installed.

SIGNAGE PLACEMENT SCHEDULE: As shown on Drawings.

]

3.1.1 Anchorage

Anchorage shall be in accordance with approved manufacturer's instructions. Anchorage not otherwise specified or shown shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood. Exposed anchor and fastener materials shall be compatible with metal to which applied and shall have matching color and finish.

3.1.2 Protection and Cleaning

Protect the work against damage during construction. Hardware and electrical equipment shall be adjusted for proper operation. Glass, frames, and other sign surfaces shall be cleaned at completion of sign installation in accordance with the manufacturer's approved instructions.

-- End of Section --

SECTION 10 21 13

TOILET COMPARTMENTS
01/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-60003 (Basic) Partitions, Toilet, Complete

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED (2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities

1.2 SYSTEM DESCRIPTION

Provide a complete and usable toilet partition system, including toilet enclosures, system of panels, hardware, and support components. The Contractor shall comply with EPA requirements in accordance with Section 01 62 35 RECYCLED / RECOVERED MATERIALS and Affirmative Procurement guidelines. Furnish the partition system from a single manufacturer, with a standard product as shown in the most recent catalog data. S

1.2.1 Sustainable Design Requirements

1.2.1.1 Omitted

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation Drawings

Drawings showing plans, elevations, details of construction, hardware, reinforcing, fittings, mountings.

SD-03 Product Data

Toilet Partition System

Manufacturer's technical data and catalog cuts including installation and cleaning instructions.

SD-04 Samples.closures; (LEED)

Colors and Finishes

Manufacturer's standard color charts and color samples.

SD-07 Certificatesls

Certification

Documentation of product quality, as specified.

1.4 Omitted

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials in the manufacturer's original unopened packages with the brand, item identification, and project reference clearly marked. Store components in a dry location that is adequately ventilated; free from dust, water, other contaminants, and damage during delivery, storage, and construction.

1.6 WARRANTY

Provide [Certification](#) or warranties that toilet partitions will be free of defects in materials, fabrication, finish, and installation and will remain so for a period of not less than 1 year after completion.

PART 2 PRODUCTS

2.1 MATERIALS

2.2 PARTITION PANELS AND DOORS

Provide [partition panels](#) and doors not less than 1 inch thick with face sheets not less than 0.0396 inch thick.

2.2.1 Toilet Enclosures

Conform toilet enclosures to [CID A-A-60003](#), Type I, Style C, overhead braced. Furnish width, length, and height of toilet enclosures as shown. Finish surface of panels shall be solid plastic fabricated of facing polymer resins (polyethylene) formed under high pressure forming a single component section not less than 1 inch thick. Colors shall extend throughout the panel thickness. Exposed finish surfaces shall be smooth waterproof, non-absorbant, and resistant to staining and marking with pens, pencils or other writing devices. Solid plastic partitions shall not show any sign of deterioration when immersed in the following chemicals and maintained at a temperature of 80 degrees for a minimum of 30 days.

2.3 HARDWARE

Hardware for the toilet partition system shall conform to **CID A-A-60003** for the specified type and style of partitions. Each compartment shall be complete with all stainless steel surface mounted hardware including; door hinges, latch, stop and keeper, coat hook, as well as all the necessary fittings and fastenings for a complete installation. Mounting brackets shall be full-height (continuous) type in manufacturer's standard design of stainless steel materials. Hardware finish shall be highly resistant to alkalies, urine, and other common toilet room acids. Latching devices and hinges for handicap compartments shall comply with **36 CFR 1191** and shall be stainless steel door latches that operate without either tight grasping or twisting of the wrist of the operator.

2.4 COLORS AND FINISHES

2.4.1 Colors

Provide manufacturer's standard color charts for color of finishes for toilet partition system components as indicated in Color Legend on the drawings.

2.4.2 Omitted

2.4.3 Omitted

PART 3 EXECUTION

3.1 Omitted

3.2 Omitted

3.3 INSTALLATION

Install partitions rigid, straight, plumb with uniform clearance of $1/2$ inch between pilasters and panels; 1 inch between pilasters and walls; and not more than $3/16$ inch between pilasters and doors, in accordance with approved manufacturer's instructions with horizontal lines level and rigidly anchored to the supporting construction. Drilling and cutting for installation of anchors shall be at locations that will be concealed in the finished work. In the finished work, conceal evidence of drilling in floors and walls. Screws and bolts shall be stainless steel.

- a. Submit **Installation Drawings** for toilet partitions showing plans, elevations, details of construction, hardware, reinforcing and blocking, fittings, mountings and escutcheons. Indicate on drawings the type of partition, location, mounting height, cutouts, and reinforcement required for toilet-room accessories.

3.4 ADJUSTING AND CLEANING

Doors shall have a uniform vertical edge clearance of approximately $3/16$ inch and shall rest open at approximately 30 degrees when unlatched. Clean all surfaces of the work, and adjacent surfaces soiled as a result of the

work, in an approved manner compliant with the manufacturer's recommended cleaning and protection from damage procedures until accepted. Remove all equipment, tools, surplus materials, and work debris from the site.

-- End of Section --

SECTION 10 28 13

TOILET ACCESSORIES
07/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C 1036 (2006) Standard Specification for Flat Glass

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191 Americans with Disabilities Act (ADA)
Accessibility Guidelines for Buildings and Facilities

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Accessory Items

Manufacturer's descriptive data and catalog cuts indicating materials of construction, fasteners proposed for use for each type of wall construction, mounting instructions, operation instructions, and cleaning instructions.

SD-04 Samples

Accessory Items

One sample of each accessory proposed for use, including exposed finish. Incorporate approved samples into the finished work, provided they are identified and their locations noted.

SD-07 Certificates

Accessory Items

Certificate for each type of accessory specified, attesting that the items meet the specified requirements.

SD-10 Operation and Maintenance Data

1.3 DELIVERY, STORAGE, AND HANDLING

Wrap toilet accessories for shipment and storage, then deliver to the jobsite in manufacturer's original packaging, and store in a clean, dry area protected from construction damage and vandalism.

1.4 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period.

- a. Mirrors shall be warranted for a minimum of 10 years against silver soilage.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

Provide toilet accessories where indicated in accordance with paragraph SCHEDULE. Provide each accessory item complete with the necessary mounting plates of sturdy construction with corrosion resistant surface.

2.1.1 Anchors and Fasteners

Provide anchors and fasteners capable of developing a restraining force commensurate with the strength of the accessory to be mounted and suited for use with the supporting construction. Provide tamperproof design exposed fasteners with finish to match the accessory.

2.1.2 Finishes

Except where noted otherwise, provide the following finishes on metal:

Metal	Finish
_____	_____
Stainless steel	No. 4 satin finish
Carbon steel, copper alloy, and brass	Chromium plated, bright

2.2 ACCESSORY ITEMS

Conform to the requirements for accessory items specified below.

2.2.1 Grab Bar (GB)

Provide an 18 gauge, 1-1/4 inch grab bar OD, 18-8 S Type 304 stainless steel. Provide form and length for grab bar as indicated. Provide concealed mounting snap flange. Provide grab with peened non-slip surface. Furnish installed bars capable of withstanding a 500 pound vertical load without coming loose from the fastenings and without obvious permanent deformation. Allow 1-1/2 inch space between wall and grab bar. Comply with 36 CFR 1191 (ADAAG barrier-free accessibility guidelines).

2.2.2 Mirrors, Glass (MF-1)

Provide Type I transparent flat type, Class 1-clear glass for mirrors.

Glazing Quality q1 1/4 inch thick conforming to ASTM C 1036. Coat glass on one surface with silver coating, copper protective coating, and mirror backing paint. Provide highly adhesive pure silver coating of a thickness which provides reflectivity of 83 percent or more of incident light when viewed through 1/4 inch thick glass, free of pinholes or other defects. Provide copper protective coating with pure bright reflective copper, homogeneous without sludge, pinholes or other defects, of proper thickness to prevent "adhesion pull" by mirror backing paint. Provide mirror backing paint with two coats of special scratch and abrasion-resistant paint and baked in uniform thickness to provide a protection for silver and copper coatings which will permit normal cutting and edge fabrication. Size as indicated in schedule on Drawings. Provide channel type frame fabricated of 18-8 S type 304, or type 430 stainless steel with bright polish finish, formed from 20 gauge sheet, with mitered corners. Top and bottom wall mounting brackets shall be spot welded into "H" hanger. Mirror shall be secured to lower bracket with a locking screw. Finish of unit shall be protected from marring by easily removed self adhesive polyvinyl (PVC) film.

2.2.3 Combination Paper Towel Dispenser/Waste Receptacle (PTDWR)

Provide semi-recessed dispenser/receptacle with a capacity of 600 sheets of C-fold towel. Design dispenser and waste receptacle in a combined fully locking unit, with full-length stainless steel piano hinge. Waste receptacle shall be removable for service. Provide two tumbler key locking mechanisms keyed alike to other toilet accessories. Provide minimum waste receptacle capacity of 12 gallons, with leakproof molded plastic concealed lining. Fabricate a minimum 0.04 inch 18-8 S Type 304 stainless steel all-welded construction unit with all exposed surfaces having a satin finish. Provide waste receptacle that accepts reusable liner standard for unit manufacturer.

2.2.4 Sanitary Napkin Disposer (SND)

Provide 18-8 S Type 304 stainless steel all-welded, surface-mounted sanitary napkin disposal with removable leak-proof concealed molded plastic receptacle for disposable liners, with a minimum of 1.2 gallon capacity, and with self-closing panel covering disposal opening, hemmed edges, and full length stainless steel piano hinges. Provide fifty disposable liners of the type standard with the manufacturer. Retain receptacle in cabinet by tumbler lock keyed alike to other toilet accessories. Provide disposer with a door for inserting disposed napkins. Provide with satin finish for all exposed surfaces.

2.2.5 Soap Dispenser (SD-S)

Provide soap dispenser wall-mounted, liquid type consisting of a horizontal 22 gage 18-8 S Type 304, stainless steel tank, with transparent unbreakable refill-indicator window, a lid for top filling with tumbler lock keyed alike to other toilet accessories and continuous stainless steel piano hinge, and minimum holding capacity of 40 fluid ounces, with a corrosion-resistant all-purpose valve that dispenses liquid soaps, lotions, detergents and antiseptic soaps. Valve shall be operable with one hand and with less than 5 pounds of force to comply with 36 CFR 1191 (ADAAG barrier-free accessibility guidelines).

2.2.6 Toilet Tissue Dispenser (TH-S)

Furnish Type II - surface mounted toilet tissue holder with two rolls of standard tissue stacked vertically. Provide all-welded 18-8 S Type 304

stainless steel, satin finish cabinet. Front of toilet tissue dispenser door shall be drawn, one-piece, seamless construction. Door shall have a tumbler lock keyed alike to other toilet accessories. Unit shall dispense two standard-core toilet tissue rolls up to 5-1/4" diameter (1800 sheets). Extra roll shall automatically drop in place when bottom roll is depleted. Unit shall be equipped with two vandal-resistant heavy-duty one-piece molded plastic spindles.

2.2.7 Mop Rack and Shelf (MHS)

18-8 S Type 304 or Type 302 stainless steel, 18 gauge (0.047 inches), satin finish. Provide surface-mounted 36-inch utility shelf with 1-1/2 inch return edge, with minimum of 4 mop and broom spring loaded holders, rubber cam with plated steel retainer, and 3 rag holders. Provide welded mounting brackets of same metal type and thickness as shelf.

PART 3 EXECUTION

3.1 INSTALLATION

Provide the same finish for the surfaces of fastening devices exposed after installation as the attached accessory. Provide oval exposed screw heads. Install accessories at the location and height indicated. Protect exposed surfaces of accessories with strippable plastic or by other means until the installation is accepted. After acceptance of accessories, remove and dispose of strippable plastic protection. Coordinate accessory manufacturer's mounting details with other trades as their work progresses. After installation, thoroughly clean exposed surfaces and restore damaged work to its original condition or replace with new work.

3.1.1 Recessed Accessories

Set anchors in mortar in masonry construction. Fasten to metal studs or framing with sheet metal screws in metal construction.

3.1.2 Surface Mounted Accessories

Mount on concealed backplates, unless specified otherwise. Conceal fasteners on accessories without backplates. Install accessories with sheet metal screws or wood screws in lead-lined braided jute, teflon or neoprene sleeves, or lead expansion shields, or with toggle bolts or other approved fasteners as required by the construction. Install backplates in the same manner, or provide with lugs or anchors set in mortar, as required by the construction. Fasten accessories mounted on gypsum board and plaster walls without solid backing into the metal or wood studs or to solid wood blocking secured between wood studs, or to metal backplates secured to metal studs.

3.2 CLEANING

Clean material in accordance with manufacturer's recommendations. Do not use alkaline or abrasive agents. Take precautions to avoid scratching or marring exposed surfaces.

3.3 SCHEDULE

See Toilet Accessory Schedule on the drawings.
-- End of Section --

SECTION 10 44 16

PORTABLE FIRE EXTINGUISHERS

05/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INTERNATIONAL CODE COUNCIL (ICC)

IFC 1414 (2004) Portable Fire Extinguishers (Where Required) (Construction, Alteration, Demolition)

IFC 906 (2004) Portable Fire Extinguishers

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 1 (2008) Uniform Fire Code, 2006 Edition

NFPA 10 (2007; Errata 2007; AMD 1 2007) Standard for Portable Fire Extinguishers

NFPA 101 (2008, Amendment 2009) Life Safety Code, 2006 Edition

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.106 Flammable and Combustible Liquids

29 CFR 1910.157 (2003) Portable Fire Extinguishers

UNDERWRITERS LABORATORIES (UL)

UL 299 (2002; Rev thru Aug 2007) Standards for Dry Chemical Fire Extinguishers

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Manufacturer's Data for each type of required Fire Extinguisher with all related details, cabinets, accessories, and recommended operation manuals.

SD-02 Shop Drawings

Submit fabrication drawings for the following items consisting of fabrication and assembly details performed in the factory. Submit installation drawings for the following items in accordance with the paragraph entitled, "Installation," of this section.

Fire Extinguishers
Accessories
Cabinets
Wall Brackets

SD-03 Product Data

Submit Manufacturer's catalog and warranty data for the following items:

Fire Extinguishers
Accessories
Cabinets
Wall Brackets
Replacement Parts

SD-04 Samples

One of each type of [Fire Extinguisher](#) being installed

One full-sized sample of each type of [Cabinet](#) being installed

One sample of [Wall Brackets](#) and [Accessories](#) of each type being used

Approved samples may be used for installation, with proper identification and storage.

SD-07 Certificates

Submit Certificates showing the following:

Certification that [Fire Extinguishers](#) comply with local codes and regulations.

Certification that Fire Extinguishers comply with OSHA, NFPA, and UL requirements.

Submit [Manufacturer's Warranty with Inspection Tag](#) on each extinguisher.

Guarantee that Fire Extinguishers are free of defects in materials, fabrication, finish, and installation and that they will remain so for a period of not less than 5 years after completion.

1.3 DELIVERY, HANDLING, AND STORAGE

Protect materials from weather, soil, and damage during delivery, storage, and construction.

Deliver materials in their original packages, containers, or bundles bearing the brand name and the name and type of the material.

PART 2 PRODUCTS

2.1 TYPES

Provide Fire Extinguishers conforming to NFPA 10. Provide quantity and placement in compliance with the applicable sections of IFC 1414, IFC 906, NFPA 1, NFPA 101, 29 CFR 1910.106 and 29 CFR 1910.157.

Provide dry chemical type fire extinguishers compliant with UL 299.

Submit Manufacturer's Data for each type of Fire Extinguisher required, detailing all related Cabinet, Wall Mounting and Accessories information, complete with Manufacturer's Warranty with Inspection Tag.

2.2 MATERIAL

Provide enameled steel extinguisher shell.

2.3 ACCESSORIES

Forged brass valve

Safety release

Pressure gage

2.4 CABINETS

2.4.1 Material

Provide clear anodized aluminum cabinets.

2.5 WALL BRACKETS

Provide wall-hook fire extinguisher wall brackets.

Provide wall bracket and accessories as approved.

PART 3 EXECUTION

3.1 INSTALLATION

Install Fire Extinguishers where indicated on the drawings. Verify exact locations prior to installation.

Comply with the manufacturer's recommendations for all installations.

Provide extinguishers which are fully charged and ready for operation upon installation. Provide extinguishers complete with Manufacturer's Warranty with Inspection Tag attached.

3.2 ACCEPTANCE PROVISIONS

3.2.1 Repairing

Remove and replace damaged and unacceptable portions of completed work with new work at no additional cost to the Government.

Provide [Replacement Parts](#) list indicating specified items replacement part, replacement cost, and name, address and contact for replacement parts distributor.

3.2.2 Cleaning

Clean all surfaces of the work, and adjacent surfaces which are soiled as a result of the work. Remove from the site all construction equipment, tools, surplus materials and rubbish resulting from the work.

-- End of Section --

SECTION 10 51 13

METAL LOCKERS

07/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A 1008/A 1008M (2008a) Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened

ASTM B 456 (2003) Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS AA-L-00486 (Rev J) Lockers, Clothing, Steel

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Types

Location

Installation

Numbering system

SD-03 Product Data

Material

Locking Devices

Handles

Finish

Locker components

Assembly instructions
Local/Regional Materials; L

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site.

Recycled Content; L

For products having recycled content, manufacturer's product data for percentages by weight of pre-consumer and post-consumer recycled content.

SD-04 Samples

Color chips

1.3 DELIVERY, HANDLING, AND STORAGE

Deliver lockers and associated materials in their original packages, containers, or bundles bearing the manufacturer's name and the name of the material. Protect from weather, soil, and damage during delivery, storage, and construction.

1.4 FIELD MEASUREMENTS

To ensure proper fits, make field measurements prior to the preparation of drawings and fabrication. Verify correct location

1.5 QUALITY ASSURANCE

1.5.1 Color Chips

Provide a minimum of three color chips, not less than 3 inches square, of each color indicated.

Government may request performance-characteristic tests on assembled lockers. Tests and results must conform to FS AA-L-00486. Lockers not conforming will be rejected.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

1.6.1 Local/Regional Materials

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Steel Lockers may be locally available.

1.6.2 Recycled Content

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total for recycled content. Steel Lockers may be available with recycled content.

PART 2 PRODUCTS

2.1 TYPES

Locker must have the following type and size in the location and quantities indicated. Locker finish colors will be as scheduled.

2.1.1 Double-Tier

Double-tier lockers must be as follows:

Type DTL-1: Double-tier locker 12 inches wide, 12 inches deep, and 72 inches high, attached to 4-inch high closed base

Type DTL-2: Double-tier locker 15 inches wide, 18 inches deep, and 72 inches high, attached to 6-inch high legs

2.2 MATERIAL

2.2.1 Steel Sheet

ASTM A 1008/A 1008M , commercial quality, minimized spangle material. Prepare material surfaces for powder coated finishing in accordance with FS AA-L-00486. Fabricate locker bodies door frames from not less than 16 gauge thick steel sheet.

2.2.2 Chromium Coating

Nickel and chromium electrodeposited on the specified base metal. Conform to ASTM B 456, SC-3, as applicable to the base metal.

2.2.3 Finish

FS AA-L-00486.

2.2.3.1 Color

As indicated on drawings.

2.3 COMPONENTS

2.3.1 Built-In Locks

FS AA-L-00486. Provide locking devices as a padlock eye in the door latching mechanism for user-furnished combination locks.

2.3.2 Coat Hooks

FS AA-L-00486, chromium plated.

2.3.3 Door Handles

FS AA-L-00486. Provide zinc alloy or steel handles with a chromium coating. Stainless steel may be provided if standard with the manufacturer.

2.3.4 Doors

FS AA-L-00486, not less than 14 gauge thick steel sheet.

2.3.4.1 Hinges

In addition to the requirements of FS AA-L-00486, provide height piano hinge. Weld or bolt hinges to the door frame. Weld, bolt, or rivet hinges to the door.

2.3.4.2 Latching Mechanisms

FS AA-L-00486.

2.3.5 Latch Strikes

FS AA-L-00486. Fabricate from not less than 0.0787 inch thick steel sheet, except latch strike may be continuous from top to bottom and fabricated as part of the door framing.

2.3.6 Silencers

FS AA-L-00486.

2.3.7 Back and Side Panels, Tops, and Bottoms

FS AA-L-00486, not less than 24 gauge thick steel sheet.

2.3.8 Sloping Locker Tops

Provide sloping locker tops in addition to the locker-section flat tops. Sloping tops must be continuous in length. Provide fillers or closures at the exposed end of sloping tops. Fabricate sloping tops from not less than 0.0478-inch thick steel sheet.

2.3.9 Base Panels

FS AA-L-00486.

2.3.10 Base

Provide 14 gauge sheet steel recessed base.

2.3.11 Number Plates

FS AA-L-00486. Aluminum. Provide consecutive numbers.

2.3.12 Fastening Devices

Provide bolts, nuts, and rivets as specified in FS AA-L-00486.

PART 3 EXECUTION

3.1 ASSEMBLY AND INSTALLATION

Assemble lockers according to the locker manufacturer's instructions. Align lockers horizontally and vertically. Secure lockers to wall and base

with screws as indicated. Bolt adjacent lockers together. Adjust doors to operate freely without sticking or binding and to ensure they close tightly.

3.2 NUMBERING SYSTEM

Install number plates on lockers consecutively with odd numbers on top and even numbers on bottom .

3.3 FIELD QUALITY CONTROL

3.3.1 Testing

Government may request performance-characteristic tests on assembled lockers in accordance with FS AA-L-00486. Lockers not conforming will be rejected.

3.3.2 Repairing

Remove and replace damaged and unacceptable portions of completed work with new.

3.3.3 Cleaning

Clean surfaces of the work, and adjacent surfaces soiled as a result of the work, in an approved manner. Remove equipment, surplus materials, and rubbish from the site.

-- End of Section --

SECTION 10 56 13

STEEL SHELVING

04/06

PART 1 GENERAL

1.1 BID ITEM (ALTERNATE)

Refer to Section 00 41 00 BID SCHEDULES for Bid Item pricing that affects the Work of this Section.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

MATERIAL HANDLING INDUSTRY OF AMERICA INC (MHIA)

MHI MH28.1 (1997) Specification: Industrial Steel
Grade Shelving

1.3 DEFINITIONS

For the purposes of this specification the shelf category, "medium weight," "heavy weight," will be as follows. Load is given per shelf in pounds for evenly distributed load. This does not limit the shelf size, only the shelving category.

Minimum Evenly Distributed Load Per Shelf in Pounds

Shelf Size	Type	Type
	Medium Duty	Heavy Duty
18 by 36 in.	700	1300
18 by 48 in.	500	900

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Shelving Units

Installation instructions

Local/Regional Materials; L

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site.

Recycled Content; L

For products having recycled content, manufacturer's product data for percentages by weight of pre-consumer and post-consumer recycled content.

SD-04 Samples

Finish

SD-06 Test Reports

Shelving Units

Finish

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials in original packages, containers or bundles bearing the brand name and identification of the manufacturer. Store inside under cover. Protect surfaces from damage.

1.11 SUSTAINABLE DESIGN REQUIREMENTS

1.6 Local/Regional Materials

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Steel shelving may be locally available.

1.7 Recycled Content

See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total for recycled content. Steel shelving may be available with recycled content.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

MHI MH28.1. Provide shelving units indicated. Provide shelving units designed for full dead and live load, designated medium duty unless indicated otherwise. Provide wall connections to top shelf.

2.2 FINISH

Provide the shelving units in the manufacturer's standard colors as chosen by the Contracting Officer. Clean metal by multiple stage phosphatizing and sealing process, for rust resistance and paint adhesion. Provide electrostatically applied enamel finish coats, baked hard for a minimum of 30 minutes at 300 degrees F.

2.3 SOURCE QUALITY CONTROL

- a. MHI MH28.1, for tests of shelf capacity, lateral stability and shelf connections.

PART 3 EXECUTION

3.1 EXAMINATION

Before installation, examine shelving units for dents and scratches.
Replace damaged shelving.

3.2 INSTALLATION

Install shelving according to manufacturer's [installation instructions](#).
Make wall connections as indicated.

3.3 PROTECTION

Cover and protect shelving from damage during the completion of
construction. Remove prior to acceptance of project.

-- End of Section --

SECTION 12 21 00

WINDOW BLINDS
02/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701 (2004) Fire Tests for Flame Propagation of
Textiles and Films

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES

SD-02 Shop Drawings

Installation

Drawings showing fabrication and installation details. Show layout and locations of track, direction of draw, mounting heights, and details.

SD-03 Product Data

Window Blinds
Installation

Manufacturer's data composed of catalog cuts, brochures, product information, and maintenance instructions.

SD-04 Samples

Window Blinds

Samples of each type and color of window treatment. Provide aluminum horizontal louver blind slats 6 inch in length for each color. Provide 6 inch sample of horizontal blind slats in each color specified.

SD-06 Test Reports

Window Blinds

Fire resistance, Flame Spread, and smoke contribution data.

SD-08 Manufacturer's Instructions

Window Blinds

SD-10 Operation and Maintenance Data

Window Blinds

1.3 SYSTEM DESCRIPTION

Provide window treatment, conforming to NFPA 701, complete with necessary brackets, fittings, and hardware. Each window treatment type shall be a complete unit provided in accordance with paragraph WINDOW TREATMENT PLACEMENT SCHEDULE. Mount and operate equipment in accordance with manufacturer's instructions. Windows to receive a treatment shall be completely covered.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver components to the jobsite in the manufacturer's original packaging with the brand or company name, item identification, and project reference clearly marked. Store components in a dry location that is adequately ventilated and free from dust, water, or other contaminants and has easy access for inspection and handling. Store materials flat in a clean dry area with temperature maintained above 50 degrees F. Do not open containers until needed for installation unless verification inspection is required.

1.5 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period.

PART 2 PRODUCTS

2.1 WINDOW BLINDS

Provide each blind, including hardware, accessory items, mounting brackets and fastenings, as a complete unit produced by one manufacturer. All parts shall be one color, unless otherwise indicated, to match the color of the blind slat. Treat steel features for corrosion resistance.

2.1.1 Horizontal Blinds

Provide horizontal blinds with 1 inch slats. Blind units shall be capable of nominally 180 degree partial tilting operation and full-height raising. Blinds shall be inside mount. Tapes for 1 inch slats shall be braided polyester or nylon.

2.1.1.1 Head Channel and Slats

Provide head channel made of steel or aluminum with corrosion-resistant finish nominal 0.024 inch for 1 inch slats. Provide slats of aluminum, not less than 0.006 inch thick, and of sufficient strength to prevent sag or bow in the finished blind. Provide a sufficient amount of slats to assure proper control, uniform spacing, and adequate overlap. Enclose all hardware in the headrail.

2.1.1.2 Controls

The slats shall be tilted by a transparent tilting wand, hung vertically by its own weight, and shall swivel for easy operation. Provide a tilter control of enclosed construction. Provide moving parts and mechanical drive made of compatible materials which do not require lubrication during normal expected life. The tilter shall tilt the slats to any desired angle and hold them at that angle so that any vibration or movement of ladders and slats will not drive the tilter and change the angle of slats. Include a mechanism to prevent over tightening. Provide a wand of sufficient length to reach to within 5 feet of the floor.

2.1.1.3 Intermediate Brackets

Provide intermediate brackets for installation, as recommended by the manufacturer, of blinds over 48 inch wide.

2.1.1.4 Bottom Rail

Provide bottom rail made of corrosion-resistant steel with factory applied finish. Provide closed oval shaped bottom rail with double-lock seam for maximum strength. Bottom rail and end caps to match slats in color.

2.1.1.5 Braided Ladders

Provide braided ladders of 100 percent polyester yarn, color to match the slat color. Space ladders 15.2 slats per foot of drop in order to provide a uniform overlap of the slats in a closed position.

2.1.1.6 Hold-Down Brackets

Provide universal type hold-down brackets for sill or jamb mount where indicated on placement list.

2.2 COLOR

Provide color, pattern and texture selected from manufacturer's standard colors

PART 3 EXECUTION

3.1 EXAMINATION

After becoming familiar with details of the work, verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing the work.

3.2 WINDOW TREATMENT PLACEMENT SCHEDULE

Provide horizontal louver blinds at all exterior windows.

3.3 INSTALLATION

3.3.1 Horizontal Blinds

Perform installation of Horizontal Blinds in accordance with the approved detail drawings and manufacturer's installation instructions. Install units level, plumb, secure, and at proper height and location relative to window units. Provide and install supplementary or miscellaneous items in

total, including clips, brackets, or anchorages incidental to or necessary for a sound, secure, and complete installation. Do not start installation until completion of room painting and finishing operations.

3.4 CLEAN-UP

Upon completion of the installation, free window treatments from soiling, damage or blemishes; and adjust them for form and appearance and proper operating condition. Repair or replace damaged units as directed by the Contracting Officer. Isolate metal parts from direct contact with concrete, mortar, or dissimilar metals. Include all hardware, brackets, anchors, fasteners, and accessories necessary for a complete, finished installation.

-- End of Section --

SECTION 12 35 53

CLASSROOM AND LABORATORY CASEWORK

10/09

PART 1 GENERAL

1.1 BID ITEM (ALTERNATE)

Refer to Section 00 41 00 BID SCHEDULES for Bid Item pricing that affects the Work of this Section.

1.2 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA A135.4 (2004) Basic Hardboard

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A208.1 (1999) Particleboard

ANSI A208.2 (2002) Medium Density Fiberboard (MDF) for Interior Applications

ANSI Z358.1 (2009) Emergency Eyewash and Shower Equipment

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-05 (2006; Errata 2007) Minimum Design Loads for Buildings and Other Structures

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI Qual Stds (8th Edition) AWI Quality Standards

ASME INTERNATIONAL (ASME)

ASME A112.18.1 (2005) Standard for Plumbing Fixture Fittings

AMERICAN SOCIETY OF SANITARY ENGINEERS

ASSE 1035 (2008) Laboratory Faucet Backflow Preventers

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA A156.11 (2004) American National Standard for Cabinet Locks

BHMA A156.9 (2003) Cabinet Hardware

HARDWOOD PLYWOOD AND VENEER ASSOCIATION (HPVA)

HPVA HP-1 (2004) American National Standard for
Hardwood and Decorative Plywood

LAMINATING MATERIALS ASSOCIATION (LMA)

LMA EDG-1 (1992) Voluntary Product Standard and
Typical Physical Properties of Edgebanding
Materials

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LD 3 (2005) Standard for High-Pressure
Decorative Laminates

NEMA WD 1 (1999; R 2005) Standard for General
Requirements for Wiring Devices

NEMA WD 6 (2002; R 2008) Standard for Wiring Devices
- Dimensional Requirements

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 30 (2007; Errata 2008) Flammable and
Combustible Liquids Code

NFPA 70 (2008; AMD 1 2008) National Electrical
Code - 2008 Edition

SCIENTIFIC EQUIPMENT AND FURNITURE ASSOCIATION (SEFA)

SEFA 2.3 (1997) Installation of Scientific
Laboratory Furniture and Equipment -
Recommended Practices

SEFA 7 (1996) Recommended Practice for Laboratory
and Hospital Service Fittings

SEFA 8 (1999) Laboratory Furniture - Casework,
Shelving and Tables - Recommended Practices

UNDERWRITERS LABORATORIES (UL)

UL 498 (2001; Rev thru Jul 2009) Attachment Plugs
and Receptacles

1.3 PERFORMANCE REQUIREMENTS

Seismic Performance: ASCE 7-05

1.4 DEFINITIONS

1.4.1 MDF

Medium-density fiberboard.

1.4.2 Exposed Surfaces of Casework

Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches above floor, and visible surfaces in open cabinets or behind glass doors.

- a. Ends of cabinets indicated to be installed directly against and completely concealed by walls or other cabinets are defined as "concealed."

1.4.3 Semiexposed Surfaces of Casework

Surfaces behind opaque doors, such as cabinet interiors, shelves, and dividers; interiors and sides of drawers; and interior faces of doors. Tops of cabinets 78 inches or more above floor are defined as "semiexposed."

1.4.4 Concealed Surfaces of Casework

Include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

1.4.5 Hardwood Plywood

A panel product composed of layers or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive and faced both front and back with hardwood veneers.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings; D Installation

Shop drawings showing all fabricated casework items in plan view, elevations and cross-sections to accurately indicate materials used, details of construction, dimensions, methods of fastening and erection, and installation methods proposed. Shop drawing casework items shall be clearly cross-referenced to casework items located on the project drawings. Indicate locations of hardware and keying of locks, locations and types of service fittings, and locations of blocking and reinforcements required for installing laboratory casework.

SD-03 Product Data

Local/Regional Materials; D, L

Documentation indicating distance between manufacturing facility and the project site, and distance of raw material origin from the project site.

Wood Materials; D**Composite Wood Materials; D, L**

Documentation indicating that composite wood materials and shop-applied and field applied adhesives contain no added urea formaldehyde resins.

Adhesives, Caulks and Sealants; D, L

Printed statement of VOC content of adhesive, caulks and sealants applied on-site.

Submit Manufacturer's catalog data for the following items:

Cabinets**Corrosion-Resistant Steel****Plywood****Medium Density Fiberboard (MDF)****Hardwood****Hardwood Plywood****Adhesives****Filler Material****Particle Board****Varnish****Fasteners****Service Fixtures****Accessories and Hardware****Plastic Laminate****Countertops****SD-04 Samples; G, D****Plastic Laminates; D**

Two samples of each plastic laminate pattern and color. Color shall be as indicated on drawings. Samples shall be a minimum of 5 by 7 inches in size.

Accessories and Hardware; D

One sample of each cabinet hardware item specified to include hinges, pulls, drawer glides.

Submit **Manufacturer's Standard Color Charts** in accordance with paragraph entitled, "General," of this section.

Maintain Samples at Project site during construction in an undisturbed condition as a standard for judging the completed Work. Unless otherwise directed, approved Sample units in an undisturbed condition at the time of Substantial Completion may become part of the completed Work. Notify Architect of their exact locations. If not incorporated into the Work, retain acceptable Sample units at Project site and remove when directed by Architect.

SD-06 Test Reports

Product Test Reports for **Casework**: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework with requirements of

specified product standard.

Product Test Reports for [Countertop](#) Surface Material: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory countertop surface materials with requirements specified for chemical and physical resistance.

[SD-07 Certificates](#)

[Plastic Laminate; D](#)
[Countertops; D](#)

1.6 QUALITY ASSURANCE

- a. Quality Standard: Unless otherwise noted on the drawings, all materials, construction methods, and fabrication shall conform to and comply with the Custom grade quality standards as outlined in [AWI Qual Stds](#), including installation, for plastic laminate-faced Architectural Cabinets, Closet & Utility Shelving, and Modular Cabinets. These standards shall apply in lieu of omissions of specific requirements in this specification. Contractors and their personnel engaged in the work shall be able to demonstrate successful experience with work of comparable extent, complexity and quality to that shown and specified. Contractor must demonstrate knowledge and understanding of [AWI Qual Stds](#) requirements for the quality grade indicated.
- b. Manufacturer Qualifications: For wood laboratory casework, a qualified manufacturer that produces casework of types indicated for this Project that has been tested for compliance with [SEFA 8](#).
- c. Source Limitations: Obtain casework from single source from single manufacturer unless otherwise indicated.
- d. Casework Product Standard for wood laboratory casework (except where plastic laminate is indicated): Comply with [SEFA 8](#), "Laboratory Furniture - Casework, Shelving and Tables - Recommended Practices."
- e. Flammable Liquid Storage: Where cabinets are indicated for solvent or flammable liquid storage, provide units that are listed and labeled as complying with requirements in [NFPA 30](#) by a testing and inspecting agency acceptable to authorities having jurisdiction.
- f. Electrical Components, Devices, and Accessories: Listed and labeled as defined in [NFPA 70](#), by a qualified testing agency, and marked for intended location and application.
- g. Keying Conference: Conduct conference at Project site.
Incorporate keying conference decisions into final keying requirements.

1.7 MOCK-UP

Prior to final approval of [shop drawings](#), a full-size mock-up shall be provided of a typical floor cabinet and wall cabinet. The mock-up shall include all components and hardware necessary to illustrate a completed unit and shall include a minimum of one door and one drawer assembly. The completed mock-up shall include countertops and back splashes where

specified. The mock-up shall utilize specified finishes in the patterns and colors as indicated on the drawings. Upon disapproval, the Contractor shall rework or remake the mock-up until approval is secured. Rejected units shall be removed from the jobsite. Approved mock-up may remain as part of the finished work.

1.8 DELIVERY, STORAGE, AND HANDLING

Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.9 PROJECT CONDITIONS

Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, utility roughing-in and wet work are complete and dry, and temporary HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.10 EXTRA MATERIALS

Furnish complete touchup kit for each type and color of wood laboratory casework provided. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged laboratory casework finish.

PART 2 PRODUCTS

2.1 WOOD CABINET MATERIALS

General:

- a. Adhesives: Do not use adhesives that contain urea formaldehyde.
- b. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- c. Hardwood Plywood: **HPVA HP-1**, either veneer core or particleboard core, unless otherwise indicated.
- d. MDF: **ANSI A208.2**, Grade 130 Insert grade.
- e. Particleboard: **ANSI A208.1**, Grade M-2,.
- f. Hardboard: **AHA A135.4**, Class 1 Tempered.
- g. Edgebanding for Wood-Veneered Construction: Minimum **1/8-inch** thick, solid wood of same species as face veneer.

2.1.1 Exposed Materials:

- a. General: Provide materials that are selected and arranged for compatible grain and color. Do not use materials adjacent to one another that are noticeably dissimilar in color, grain, figure, or natural character markings.
- b. Wood Species: White maple.
- c. Plywood: Hardwood plywood with face veneer of species indicated,

selected for compatible color and grain. Grade A exposed faces at least 1/50 inch thick, and Grade J crossbands. Provide backs of same species as faces.

1. Face Veneer Cut: Plain sliced.

- d. Solid Wood: Clear hardwood lumber of species indicated and selected for grain and color compatible with exposed hardwood plywood.

2.1.2 Semiexposed Materials:

- a. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects, of any species similar in color and grain to exposed solid wood.
- b. Plywood: Hardwood plywood of any species similar in color and grain to exposed plywood. Grade C faces and Grade J crossbands. Provide backs of same species as faces.
- c. Provide solid wood or hardwood plywood for semiexposed surfaces unless otherwise indicated.

2.1.3 Concealed Materials:

- a. Solid Wood: Any species, with no defects affecting strength or utility.
- b. Plywood: Hardwood plywood. Provide backs of same species as faces.
- c. Particleboard.

2.2 PLASTIC-LAMINATE CABINET MATERIALS

General:

- a. Adhesives: Do not use adhesives that contain no added urea formaldehyde.
- b. Hardwood Plywood: HPVA HP-1, either veneer core or particleboard core, unless otherwise indicated, made without no added urea formaldehyde.
- c. MDF: ANSI A208.2, Grade 130, made with binder containing no added urea formaldehyde.
- d. Particleboard: ANSI A208.1, Grade M-2.
- e. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no added urea formaldehyde or straw-based particleboard complying with ANSI A208.1, Grade M-2, except for density, made with binder containing no urea formaldehyde.
- f. Hardboard: AHA A135.4, Class 1 Tempered.
- g. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3, "High Wear" (withstanding 3,000 cycles of wear test).
- h. Edgebanding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3 mm thick at doors and drawer fronts, 1 mm thick

elsewhere.

i. Colors: As selected by Architect from manufacturer's full range.

j. Edgebanding for Thermoset Decorative Panels: PVC or polyester edge banding complying with LMA EDG-1 and matching thermoset decorative panels.

2.2.1 Exposed Materials:

a. Plastic Laminate: Grade HGS .

1. Colors: As indicated on drawings.

2.2.2 Semiexposed Materials:

a. Plastic Laminate: Grade VGS.

1. Colors: As indicated on drawings.

2. Provide plastic laminate for semiexposed surfaces unless otherwise indicated.

b. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects.

c. Plywood: Hardwood plywood. Grade C faces and Grade J crossbands. Provide backs of same species as faces.

2.2.3 Concealed Materials:

a. Solid Wood: Any species, with no defects affecting strength or utility.

b. Plywood: Hardwood plywood.

c. Plastic Laminate: Type BKL.

d. Particleboard.

2.3 COUNTERTOP, TABLE TOP, SHELF, AND SINK MATERIALS

2.3.1 Epoxy

Factory-molded, modified epoxy-resin formulation with smooth, nonspecular finish.

a. Physical Properties:

1. Flexural Strength: Not less than 10,000 psi.

2. Modulus of Elasticity: Not less than 2,000,000 psi.

3. Hardness (Rockwell M): Not less than 100.

4. Water Absorption (24 Hours): Not more than 0.02 percent.

5. Heat Distortion Point: Not less than 260 deg F.

- b. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
 - 1. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
 - 2. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
- c. Color: Black.

2.4 WOOD CABINETS

Provide wood laboratory cabinets in lieu of plastic laminate-faced wood cabinets in Science Lab 118, as an alternate to base bid.

2.4.1 Design

Lipped overlay with radiused edges.

- a. Provide 1/8-inch reveals between doors and drawers that are adjacent.

2.4.2 Grain Direction:

- b. Vertical on doors, horizontal on drawer fronts.
- c. Lengthwise on face frame members.
- d. Vertical on end panels.
- e. Side to side on bottoms and tops of units.
- f. Vertical on knee-space panels.
- g. Horizontal on aprons and table frames.

2.4.3 Veneer Matching:

- a. None required; select and arrange veneers for compatible grain and color.

2.4.4 Construction

Provide wood-faced laboratory casework of the following minimum construction:

- a. Bottoms of Base Cabinets and Tall Cabinets: 3/4-inch- thick hardwood plywood.
- b. Tops and Bottoms of Wall Cabinets and Tops of Tall Cabinets: 1-inch-thick veneer-core hardwood plywood.
- c. Ends of Cabinets: 3/4-inch- thick hardwood plywood.
- d. Shelves: 3/4-inch- thick veneer-core hardwood plywood at base cabinets and 1-inch thick veneer-core hardwood plywood at wall cabinets.

- e. Base Cabinet Top Frames: 1-by-2-inch solid wood with mortise and tenon or doweled connections, glued and pinned or screwed.
- f. Backs of Cabinets: 3/4-inch- thick, hardwood plywood where exposed, 1/4-inch- thick, hardwood plywood dadoed into sides, bottoms, and tops where not exposed. Unexposed interiors shall have 1/4-inch hardboard faced with thermoset decorative panels.
- g. Drawer Fronts: 3/4-inch- thick, hardwood plywood or solid hardwood.
- h. Drawer Sides and Backs: 1/2-inch- thick, solid hardwood or hardwood plywood, with glued dovetail or multiple-dowel joints.
- i. Drawer Bottoms: 1/4-inch- thick, veneer-core hardwood plywood or tempered hardboard glued and dadoed into front, back, and sides of drawers. Use 1/2-inch- thick material for drawers more than 24 inches wide.
- j. Doors 48 Inches High or Less: 3/4 inch thick, with particleboard or MDF cores, solid hardwood stiles and rails, and hardwood face veneers and crossbands.

2.4.5 Utilities

Provide space, cutouts, and holes for pipes, conduits, and fittings in cabinet bodies to accommodate utility services and their support-strut assemblies.

2.4.6 Filler and Closure Panels

Provide where indicated and as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as adjacent exposed cabinet surfaces unless otherwise indicated.

- a. Provide knee-space panels (modesty panels) at spaces between base cabinets, where cabinets are not installed against a wall or where space is not otherwise closed. Fabricate from same material and with same finish as exposed cabinet backs.

2.5 PLASTIC LAMINATE CABINETS

2.5.1 Design

Reveal overlay.

2.5.2 Construction

Provide plastic-laminate-faced casework of the following minimum construction:

- a. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch- thick particleboard, plastic-laminate faced.
- d. Shelves: 3/4-inch- thick plywood, plastic-laminate faced.
- c. Backs of Cabinets: 1/2-inch- thick particleboard, plastic-laminate faced.

- d. Drawer Fronts: 3/4-inch- thick particleboard, plastic-laminate faced.
- e. Drawer Sides and Backs: 1/2-inch- thick solid-wood or veneer-core hardwood plywood , with glued dovetail or multiple-dowel joints.
- f. Drawer Bottoms: 1/4-inch- thick hardwood plywood glued and dadoed into front, back, and sides of drawers. Use 1/2-inch- thick material for drawers more than 24 inches wide.
- j. Doors 48 Inches High or Less: 3/4 inch thick, with particleboard or MDF cores and solid-wood stiles and rails, plastic-laminate faced.

2.5.3 Filler and Closure Panels

Provide where indicated and as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets and with hemmed or flanged edges unless otherwise indicated.

- a. Provide knee-space panels (modesty panels) at spaces between base cabinets, where cabinets are not installed against a wall or where space is not otherwise closed, and where indicated. Fabricate from back-to-back panels or of hollow construction to eliminate exposed hemmed or flanged edges.

2.6 WOOD FINISH (Bid Item)

2.6.1 Preparation

Sand lumber and plywood before assembling. Sand edges of doors, drawer fronts, and molded shapes with profile-edge sander. Sand after assembling for uniform smoothness at least equivalent to that produced by 220-grit sanding and without machine marks, cross sanding, or other surface blemishes.

2.6.2 Staining

Remove fibers and dust and apply stain to exposed and semiexposed surfaces as necessary to match approved Samples. Apply stain in a manner that will produce a consistent appearance. Apply wash-coat sealer before applying stain to closed-grain wood species.

- a. Stain Color: Match Architect's samples.

2.6.3 Chemical-Resistant Finish

Apply laboratory casework manufacturer's standard two-coat, chemical-resistant, transparent finish. Sand and wipe clean between coats. Topcoat(s) may be omitted on concealed surfaces.

- a. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.

2.7 HARDWARE

General: Provide casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.

2.7.1 Hinges

Stainless-steel, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors 48 inches high or less and 3 for doors more than 48 inches high.

2.7.2 Hinged Door and Drawer Pulls

Solid aluminum, stainless steel, or chrome-plated brass back-mounted pulls. Provide 2 pulls for drawers more than 24 inches wide.

2.7.3 Door Catches

Nylon-roller spring catches. Provide 2 catches on doors more than 48 inches high.

2.7.4 Drawer Slides

Side mounted, epoxy-coated steel, self-closing; designed to prevent rebound when drawers are closed; complying with BHMA A156.9, Type B05091, and full-extension ball bearing type.

- a. Provide Grade 1HD-100; for drawers not more than 6 inches high and 24 inches wide.
- b. Provide Grade 1HD-200; for drawers more than 6 inches high or 24 inches wide.

2.7.5 Locks for Wood Cabinets

Cam type with 5-pin tumbler, brass with chrome-plated finish; complying with BHMA A156.11, Type E07281.

- a. Provide a minimum of two keys per lock and two master keys.
- b. Provide on drawers and doors where indicated on drawings.
- c. Keying: Key locks within each room alike, key each room separately.
- d. Master Key System: Key all locks to be operable by master key.

2.7.6 Adjustable Shelf Supports for Wood Cabinets

Mortise-type, powder-coated steel standards and shelf rests complying with BHMA A156.9, Types B04071 and B04091.

2.8 COUNTERTOPS, TABLE TOPS, SHELVES AND SINKS

2.8.1 Countertops, General

Provide units with smooth surfaces in uniform plane free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of 1 inch, with continuous drip groove on underside 1/2 inch from edge.

2.8.2 Sinks, General

Provide 16 inch x 16 inch x 7 1/2 inches sinks, except where designated as

ADA, provide 14 inch x 14 inch x 5 inch sinks. Provide manufacturer's closest standard size of equal or greater volume.

- a. Outlets: Provide with strainers and tailpieces, NPS 1-1/2, unless otherwise indicated.
- b. Overflows: For each sink, provide overflow of standard beehive or open-top design with separate strainer. Height 2 inches less than sink depth. Provide in same material as strainer.

2.8.3 Epoxy Countertops Table Tops and Sinks:

- a. Countertop Fabrication: Fabricate with factory cutouts for sinks, holes for service fittings and accessories, and with butt joints assembled with epoxy adhesive and concealed metal splines.
 1. Countertop Configuration: Flat, 1 inch thick, with beveled edge and corners, and with drip groove and integral coved backsplash.
 2. Countertop Construction: Uniform throughout full thickness.
- b. Table-Top Fabrication:
 1. Table-Top Configuration: Flat, 1 inch thick, with rounded edge and corners, and with drip groove at perimeter.
 2. Table-Top Construction: Uniform throughout full thickness.
- c. Sink Fabrication: Molded in 1 piece with smooth surfaces, coved corners, and bottom sloped to outlet; 1/2-inch minimum thickness. Select from the following (Contractor's option):
 1. Provide with polypropylene strainers and tailpieces.
 2. Provide sinks for drop-in installation with 1/4-inch- thick lip around perimeter of sink.
 3. Provide integral sinks in epoxy countertops, bonded to countertops with invisible joint line.
 4. Provide manufacturer's recommended adjustable support system for table- and cabinet-type installations.

2.9 LABORATORY CABINET AND ACCESSORIES

2.9.1 Demonstration Table

61 inches width x 32 inches depth x 36 inches height resin top with 18 inches width sink cabinet, 18 inches width 4-drawer cabinet, 24 inches width x 5 inches height apron panel and 60" width finished back panel. Provide 14 inch x 10 inch epoxy resin sink with sink outlet and hot/cold mixing faucet. Provide one duplex receptacle at apron panel.

2.9.2 Pegboards

Polypropylene, epoxy, or phenolic-composite pegboards with removable polypropylene pegs, 30 inches width x 30 inches height minimum size.

2.9.3 Flammable Storage Cabinet

2-door floor cabinet with 45-gallon capacity, complying with OSHA and NFPA standards. Provide one adjustable shelf and door locks.

2.9.4 Goggle Storage Cabinet

wall-mounted.

- a. Construction: Reinforced steel.
- b. Capacity: 35 pairs of goggles.
- c. Germicidal lamp with automatic five-minute timer.
- d. Lock: Vandal-resistant.
- e. Finish: White, baked enamel.

2.9.5 Emergency Eyewash and Shower Cabinet

Provide floor-mounted handicapped accessible combination emergency shower and eyewash station complying with ANSI Z358.1 "Standard for Emergency Eyewash and Shower Equipment." Provide dust cover for eye-wash spray heads. Provide two adjustable shelves and removable angled plumbing access panel.

2.10 WATER GAS SERVICE FITTINGS

Connections, General: Casework manufacturer and installer shall provide all faucets, fittings and connections up to the point of each rough-in service supply.

2.10.1 Service Fittings

Provide units that comply with SEFA 7, "Laboratory and Hospital Fixtures - Recommended Practices." Provide fittings complete with washers, locknuts, nipples, and other installation accessories. Include wall and deck flanges, escutcheons, handle extension rods, and similar items.

- a. Provide units that comply with "Vandal-Resistant Faucets and Fixtures" recommendations in SEFA 7.

2.10.2 Materials

Fabricated from cast or forged red brass unless otherwise indicated.

- a. Reagent-Grade Water Service Fittings: Polypropylene, PVC, or PVDF for parts in contact with water.

2.10.3 Finish

Chromium plated.

- a. Provide chemical-resistant powder coating in laboratory casework manufacturer's standard metallic brown, aluminum, white, or other color as approved by Architect.

2.10.4 Water Valves and Faucets

Provide units complying with ASME A112.18.1, with renewable seats, designed for working pressure up to 80 psig.

- a. Vacuum Breakers: Provide ASSE 1035 vacuum breakers on water fittings with serrated outlets.
- b. Aerators: Provide aerators on water fittings that do not have serrated outlets.

2.10.5 Hand of Fittings

Furnish right-hand fittings unless fitting designation is followed by "L."

2.10.6 Handles

Provide lever-type, forged-brass handles for valves unless otherwise indicated. Lever handle aligns with outlet when valve is closed and is perpendicular to outlet when valve is fully open.

2.10.7 Service-Outlet Identification

Provide color-coded plastic discs with embossed identification, secured to each service-fitting handle to be tamper resistant. Comply with SEFA 7 for colors and embossed identification.

2.11 ELECTRICAL SERVICE FITTINGS

2.11.1 Service Fittings, General

Provide units complete with metal housings, receptacles, terminals, switches, pilot lights, device plates, accessories, and gaskets required for mounting on laboratory casework.

2.11.2 Receptacles

Comply with NEMA WD 1, NEMA WD 6, and UL 498. Duplex type, Configuration 5 20R.

- a. Receptacle Grade: Hospital grade unless otherwise indicated.
- b. Color of Receptacles: As selected by Architect unless otherwise indicated or required by NFPA 70.

2.11.3 Line-Type Fittings

Provide with cast-metal boxes with threaded holes for mounting on rigid steel conduit. Provide cover plates same size as boxes.

2.11.4 Cover Plates

Provide satin finish, Type 304, stainless-steel cover plates with formed, beveled edges.

PART 3 EXECUTION

3.1 EXAMINATION

- a. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of casework.
- b. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

- a. For plastic laminate-faced casework, comply with installation requirements in **AWI Qual Stds** for custom grade. Install level, plumb, and true; shim as required, using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

- a. For wood laboratory casework, comply with installation requirements in **SEFA 2.3**. Install level, plumb, and true; shim as required, using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:

1. Variation of Tops of Base Cabinets from Level: **1/16 inch in 10 feet.**
2. Variation of Bottoms of Upper Cabinets from Level: **1/8 inch in 10 feet.**
3. Variation of Faces of Cabinets from a True Plane: **1/8 inch in 10 feet.**
4. Variation of Adjacent Surfaces from a True Plane (Lippage): **1/32 inch.**
5. Variation in Alignment of Adjacent Door and Drawer Edges: **1/16 inch.**

- b. Base Cabinets: Fasten cabinets to partitions or wood blocking with fasteners spaced not more than **24 inches** o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- c. Wall Cabinets: Fasten to hanging strips or masonry. Fasten each cabinet through back, near top, at not less than **24 inches** o.c.
- d. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- e. Adjust casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF COUNTERTOPS

- a. Comply with installation requirements in **SEFA 2.3**. Abut top and edge

surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where shown on Shop Drawings.

- b. Field Jointing: Where possible, make in same manner as shop-made joints using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Prepare edges in shop for field-made joints.
 - 1. Use concealed clamping devices for field-made joints in plastic-laminate countertops. Locate clamping devices within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.
- c. Fastening:
 - 1. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
 - 2. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches o.c.
 - 3. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.
- d. Provide required holes and cutouts for service fittings.
- e. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.
- f. Provide scribe moldings for closures at junctures of countertop, curb, and splash with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.
- g. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.4 INSTALLATION OF SINKS

- a. Comply with installation requirements in SEFA 2.3.
- b. Underside Installation of Epoxy Sinks: Use laboratory casework manufacturer's recommended adjustable support system for table- and cabinet-type installations. Set top edge of sink unit in sink and countertop manufacturers' recommended chemical-resistant sealing compound or adhesive and firmly secure to produce a tight and fully leakproof joint. Adjust sink and securely support to prevent movement. Remove excess sealant or adhesive while still wet and finish joint for neat appearance.
- c. Drop-in Installation of Epoxy Sinks: Rout groove in countertop to receive sink rim if not prepared in shop. Set sink in adhesive and

fill remainder of groove with sealant or adhesive. Use procedures and products recommended by sink and countertop manufacturers. Remove excess adhesive and sealant while still wet and finish joint for neat appearance.

3.5 INSTALLATION OF LABORATORY ACCESSORIES

- a. Install accessories according to Shop Drawings, installation requirements in [SEFA 2.3](#), and manufacturer's written instructions.
- b. Securely fasten pegboards to partition or wood blocking.

3.6 INSTALLATION OF SERVICE FITTINGS

- a. Comply with requirements in Divisions 22 and 26 Sections for installing water and laboratory gas service fittings and electrical devices.
- b. Install fittings according to Shop Drawings, installation requirements in [SEFA 2.3](#), and manufacturer's written instructions. Set bases and flanges of sink- and countertop-mounted fittings in sealant recommended by manufacturer of sink or countertop material. Securely anchor fittings to laboratory casework unless otherwise indicated.

3.7 CLEANING AND PROTECTING

- a. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- b. Protect countertop surfaces during construction with [6-mil](#) plastic or other suitable water-resistant covering. Tape to underside of countertop at a minimum of [48 inches](#) o.c.

-- End of Section --

SECTION 12 48 16

ENTRANCE FLOOR GRILLES

05/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

- | | |
|-------------------|--|
| ASTM A 276 | (2008a) Standard Specification for
Stainless Steel Bars and Shapes |
| ASTM A 479/A 479M | (2008) Standard Specification for
Stainless Steel Bars and Shapes for Use in
Boilers and Other Pressure Vessels |
| ASTM A 653/A 653M | (2009) Standard Specification for Steel
Sheet, Zinc-Coated (Galvanized) or
Zinc-Iron Alloy-Coated (Galvannealed) by
the Hot-Dip Process |
| ASTM A 924/A 924M | (2009) Standard Specification for General
Requirements for Steel Sheet,
Metallic-Coated by the Hot-Dip Process |
| ASTM B 209 | (2007) Standard Specification for Aluminum
and Aluminum-Alloy Sheet and Plate |
| ASTM B 221 | (2008) Standard Specification for Aluminum
and Aluminum-Alloy Extruded Bars, Rods,
Wire, Profiles, and Tubes |

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

- | | |
|-----------|------------------------------|
| NAAMM MFM | (1988) Metal Finishes Manual |
|-----------|------------------------------|

U.S. GREEN BUILDING COUNCIL (USGBC)

- | | |
|------|---|
| LEED | (2002; R 2005) Leadership in Energy and
Environmental Design(tm) Green Building
Rating System for New Construction
(LEED-NC) |
|------|---|

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

- | | |
|-------------|---|
| 36 CFR 1191 | Americans with Disabilities Act (ADA)
Accessibility Guidelines for Buildings and
Facilities |
|-------------|---|

1.2 PERFORMANCE REQUIREMENTS

1.2.1 Structural Performance

Provide foot grilles and frames capable of withstanding the following loads and stresses:

- a. Uniform floor load of 300 lbf/sq. ft..

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation. Submittals having a "D" designation are for approval by the Contractor's Designer, either the Architect or Engineer as appropriate for the discipline. All other submittals are for Contractor Quality Control Approval. When used, the designation "L" following the "D" designation indicates that the Project LEED Accredited Professional will review the submittal. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Foot Grilles; D

Show items penetrating foot grilles and frames, including door control devices. Show divisions between grille sections. Show perimeter floor moldings.

Show oversize recess for deferred installation of pan or frames with concrete work.

SD-03 Product Data

Foot Grilles; D

Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for foot grilles and frames.

Regional Materials; D, L

If selected by the Contractor's LEED Coordinator to meet cumulative total for the project, provide products harvested/extracted, and/or processed/manufactured within 500 miles of the Project Site. Submit documentation indicating distance between manufacturing facility and the project site, and distance of raw material origin from the project site. Indicate relative dollar value of regional materials to total dollar value of products included in project. Include in LEED Documentation Notebook.

Recycled Content; D, L

If selected by the Contractor's LEED Coordinator to meet LEED recycled content cumulative total for the project, submit manufacturer's descriptive data indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.

Include in LEED Documentation Notebook.

Indoor Chemical and Pollutant Source Control; D, L

Submit product data to document LEED credit compliance for entrance mats and grilles.

SD-04 Samples; D

Submit manufacturer's standard color charts for Foot Grilles showing the manufacturer's color and finish selections.

For each type of **foot grilles** indicated, submit sample **12 inch** square, assembled section of foot grille, and **12 inch** long sample of frame members.

SD-10 Operation and Maintenance Data

For **foot grilles** and frames to include in maintenance manuals.

1.4 QUALITY ASSURANCE

1.4.1 Source Limitations

Obtain foot grilles and frames through one source from a single manufacturer.

1.4.2 Accessibility Requirements

Provide installed foot grilles that comply with Section 4.5 in **36 CFR 1191**

1.5 PROJECT CONDITIONS

1.5.1 Field Measurements

Indicate measurements on Shop Drawings.

1.6 COORDINATION

1.6.1 Coordinate size and location of recesses in concrete to receive foot grilles and frames.

1.7 SUSTAINABLE DESIGN REQUIREMENTS

1.7.1 Regional Materials

See Section **01 33 29** LEED(TM) DOCUMENTATION for cumulative total regional material requirements. Foot grilles may be available regionally.

1.7.2 Recycled Content

See Section **01 33 29** LEED(TM) DOCUMENTATION for cumulative total recycled material requirements for LEED. Foot grilles made with recycled content may be used to meet cumulative project totals.

1.7.3 Indoor Chemical and Pollutant Source Control

Submit documentation to demonstrate compliance with LEED Indoor Chemical and Pollutant Source Control credit requirements for entrance grilles.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Metallic-Coated Steel Sheet

ASTM A 653/A 653M, Commercial Steel (CS), Type B, with A60 zinc-iron-alloy (galvannealed) coating or with G60 mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.

2.1.2 Stainless-Steel Sheet, Strip, Plate, and Flat Bars

ASTM A 666, Type 304.

2.1.3 Aluminum Sheet

ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15.

2.1.4 Extruded Aluminum

ASTM B 221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52 as standard with manufacturer. Coat surface of frame in contact with cementitious materials with manufacturer's standard protective coating.

2.1.5 Extruded Architectural Bronze

ASTM B 455, Alloy No. C38500.

2.1.6 Stainless-Steel Angles

ASTM A 276 or ASTM A 479/A 479M, corrosion resistant, Type 304.

2.2 FOOT GRILLES

General: Provide manufacturer's standard foot-grille assemblies consisting of treads of type and profile indicated, interlocked or joined together by cross members, and with support legs (if any) and other components needed to produce a complete installation.

2.2.1 Aluminum Foot Grilles

Provide manufacturer's standard foot grilles with extruded members, top-surfaced tread rails, and as follows:

- a. Tread Rails: Extruded-aluminum tread rails with extruded-aluminum frame.
- c. Aluminum Finish: Mill.
 - 1. Colors: Clear natural aluminum.
- d. Top Surface: Fusion-bonded, level-cut-pile nylon carpet insert; 1/4 inch high, 28 oz./sq. yd..
 - 1. Colors: As selected by Architect from manufacturer's full range.

- e. Grille Size: As indicated.

2.3 FRAMES

2.3.1 Provide manufacturer's standard frames of size and style for grille type, for permanent recessed installation in subfloor, complete with installation anchorages and accessories. Unless otherwise indicated, fabricate frame of same material and finish as grilles.

2.4 SUPPORT SYSTEM

2.4.1 Level Bed Applications

Provide manufacturer's standard, vinyl cushion support system.

2.5 FABRICATION

- a. Shop fabricate foot grilles to greatest extent possible in sizes as indicated. Unless otherwise indicated, provide each grille as a single unit; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in grilles are necessary, space symmetrically and away from normal traffic lanes.
- b. Fabricate frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

2.6 FINISHES, GENERAL

- a. Comply with **NAAMM MFM** for recommendations for applying and designating finishes.
- b. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.7 ALUMINUM FINISHES

Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

- a. Mill Finish: AA-M10 (Mechanical Finish: as fabricated); grind and buff as required to remove scratches, welding, or abrasions produced in fabrication process.

PART 3 EXECUTION

3.1 EXAMINATION

Examine substrates and floor conditions for compliance with requirements for location, size, minimum recess depth, and other conditions affecting installation of foot grilles and frames. Examine roughing-in for drainage piping systems to verify actual locations of piping connections before foot grille and frame and drain pan installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

Install recessed foot grilles and frames to comply with manufacturer's

written instructions at locations indicated and with top of foot grilles and frames in relationship to one another and to adjoining finished flooring as recommended by manufacturer. Set foot-grille tops at height for most effective cleaning action. Coordinate top of foot-grille surfaces with doors that swing across grilles to provide clearance under door.

3.3 PROTECTION

After completing frame installations, provide temporary filler of plywood or fiberboard in foot-grille recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

-- End of Section --

SECTION 12 93 00

SITE FURNISHINGS
02/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 303 (2005) Code of Standard Practice for Steel Buildings and Bridges

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2008; Errata 2009) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME B18.2.1 (1996; Addenda A 1999; Errata 2003; R 2005) Square and Hex Bolts and Screws (Inch Series)

ASME B18.2.2 (1987; R 2005) Standard for Square and Hex Nuts

ASME B18.21.1 (1999; R 2005) Lock Washers (Inch Series)

ASME B18.22.1 (1965; R 2008) Plain Washers

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M (2009) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 153/A 153M (2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A 185/A 185M (2007) Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

ASTM A 307 (2007b) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

ASTM A 36/A 36M (2008) Standard Specification for Carbon Structural Steel

ASTM A 47/A 47M	(1999; R 2004) Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM A 500/A 500M	(2007) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 501	(2007) Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A 53/A 53M	(2007) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 615/A 615M	(2009) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A 653/A 653M	(2009) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM B 108/B 108M	(2008) Standard Specification for Aluminum-Alloy Permanent Mold Castings
ASTM B 209	(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 221	(2008) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 26/B 26M	(2009) Standard Specification for Aluminum-Alloy Sand Castings
ASTM C 150	(2007) Standard Specification for Portland Cement
ASTM C 94/C 94M	(2009) Standard Specification for Ready-Mixed Concrete
ASTM E 488	(1996; R 2003) Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements
ASTM F 1487	(2007ae1) Playground Equipment for Public Use

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS A-A-1925	(Rev A; Notice 1) Shield, Expansion (Nail Anchors)
-------------	--

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Bicycle Racks; G, D Assembly Instruction Drawings

Drawings showing scaled details of proposed site furnishings, elevations for each type of site furnishing; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction.

SD-03 Product Data

Bicycle Racks

Manufacturer's descriptive data and catalog cuts.

SD-04 Samples

Finish; G, D

Two sets of color data for each furnishing displaying manufacturer's color selections and finishes, and identifying those colors and finishes proposed for use.

SD-06 Test Reports

Testing

A report of post-installation test results.

1.3 QUALITY ASSURANCE

Qualify welders in accordance with AWS D1.1/D1.1M using procedures, materials, and equipment of the type required for the work.

1.3.1 Fabrication Drawings

Submit fabrication drawings showing layout(s), connections to structural system, and anchoring details as specified in AISC 303.

1.3.2 Installation Drawings

Submit templates, erection and installation drawings indicating thickness, type, grade, class of metal, and dimensions. Show construction details, reinforcement, anchorage, and installation.

1.3.3 Assembly Instruction Drawings

Submit assembly instruction drawings showing layout(s), connections, bolting and anchoring details in accordance with manufacturer's standards.

1.3.4 OMITTED - Primer Certificate

1.3.5 OMITTED - Powder Coatings Certificate

1.4 DELIVERY, STORAGE, AND HANDLING

Ship items knocked-down (KD) ready for site assembly. Packaged components shall be complete including all accessories and hardware. Materials shall be delivered, handled, and stored in accordance with the manufacturer's recommendations. Site furnishings shall be inspected upon arrival at the job site for conformity to specifications and quality in accordance with paragraph MATERIALS. Protect from corrosion, staining, and other types of damage. Store items in designated area free from contact with soil and weather. Remove and replace damaged items with new items.

PART 2 PRODUCTS

2.1 MATERIALS

Provide materials which are the standard products of a manufacturer regularly engaged in the manufacture of such products. The materials provided shall be of a type with proven satisfactory usage for at least 2 years.

2.1.1 Metals

Metallic materials and products shall conform to Section 05 50 13 MISCELLANEOUS METAL FABRICATIONS. Furnish metal components with factory drilled holes and free of excess weld and spatter. Metal components with holes that will not be filled by hardware or hidden by other components will be rejected. Structural steel products shall conform to ASTM A 36/A 36M, ASTM A 500/A 500M and ASTM A 501.

2.1.2 Structural Tubing

ASTM A 500/A 500M.

2.1.3 Steel Pipe and Fittings

Steel pipe shall conform to ASTM A 53/A 53M, Type E or S, Grade B; standard malleable iron fittings shall conform to ASTM A 47/A 47M.

2.1.4 OMITTED - Gray Cast Iron

2.1.5 OMITTED - Cast Aluminum

2.1.6 Aluminum Alloy Products

Conform to ASTM B 209 for sheet plate, ASTM B 221 for extrusions and ASTM B 26/B 26M or ASTM B 108/B 108M for castings, as applicable. Provide aluminum extrusions at least 1/8 inch thick and aluminum plate or sheet at least 0.050 inch thick.

2.1.7 Anchors and Hardware

Provide anchors, where necessary, for fastening site furnishings securely in place and in accordance with approved manufacturer's instructions. Anchoring devices that may be used, when no anchors are otherwise specified or indicated, include anchor bolts, slotted inserts, expansion shields for

concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; and lag bolts and screws for wood. Anchor bolts shall conform to [ASTM A 307](#). Hardware shall be stainless steel in accordance with [ASTM A 153/A 153M](#) and compatible with the material to which applied. All exposed hardware shall match in color and finish. Mounting hardware shall be concealed, recessed, and plugged.

2.1.7.1 Threaded Inserts and Expansion Anchors

Provide inserts recessed not less than [2.5 inches](#) into concrete or masonry. Pullout [198 pounds](#) in concrete with f'c of [3,000 psi](#), as tested in accordance with [ASTM E 488](#). Expansion shields shall conform to [FS A-A-1925](#), group II, type 4, class 1. Provide embedment required by manufacturer.

2.1.7.2 Lag Screws and Bolts

[ASME B18.2.1](#), type and grade best suited for the purpose.

2.1.7.3 OMITTED - Toggle Bolts

2.1.7.4 Bolts, Nuts, Studs and Rivets

[ASME B18.2.2](#) or [ASTM A 307](#).

2.1.7.5 OMITTED - Power Driven Fasteners

2.1.7.6 OMITTED - Screws

2.1.7.7 Washers

Provide plain washers to conform to [ASME B18.22.1](#). Provide beveled washers for American Standard beams and channels, square or rectangular, tapered in thickness, and smooth. Provide lock washers to conform to [ASME B18.21.1](#).

2.1.8 OMITTED - Ounce Metals

2.1.9 Concrete

Ready-mixed concrete shall conform to [ASTM C 94/C 94M](#), using [3/4 inch](#) maximum size aggregate, and having minimum compressive strength of [3000 psi](#) at 28 days. Portland cement shall conform to [ASTM C 150](#). Cast-in-place concrete materials and products shall conform to Section [03 30 00](#) CAST-IN-PLACE CONCRETE. Precast concrete material and products shall conform to Section [03 45 33](#) PRECAST STRUCTURAL CONCRETE. Reinforcing steel shall conform to [ASTM A 615/A 615M](#). Welded wire fabric shall conform to [ASTM A 185/A 185M](#).

2.1.10 OMITTED - Masonry

2.1.11 OMITTED - Tempered Glass

2.1.12 OMITTED - Plastics

2.1.13 OMITTED - Lumber

2.1.14 OMITTED - Fiberglass

2.2 OMITTED - PRETREATMENT, PRIMING AND PAINTING

2.3 COATINGS AND FINISHES

2.3.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Galvanizing shall conform to [ASTM A 123/A 123M](#), [ASTM A 153/A 153M](#) or [ASTM A 653/A 653M](#), as applicable. Tailings and sharp protrusions formed as a result of the hot-dip process shall be removed and exposed edges burnished. Galvanize anchor bolts, grating fasteners, washers and parts or devices necessary for proper installation, unless otherwise indicated.

2.3.2 OMITTED - Polyester Powder

2.3.3 OMITTED - Polyvinyl-Chloride (PVC)

2.3.4 [Finish](#)

Finish shall be as specified by the manufacturer or as indicated. Exposed surfaces and edges shall be rounded, polished, or sanded. Finish shall be non-toxic, non-glare, and resistant to corrosion. Exposed surfaces shall be smooth and splinter-free exposed surfaces.

2.3.4.1 OMITTED - Wood Sealants

2.3.4.2 OMITTED - Paint

2.3.4.3 OMITTED - Color

2.4 SITE STANDARDS

Site furnishings shall be furnished with the dimensions and requirements indicated. Site furnishings placed in children's outdoor play areas shall meet the safety requirements of [ASTM F 1487](#) for entrapment; sharp points, edges, and protrusions; entanglement; pinch, crush, and shear points. Site furnishings to be included in children's outdoor play areas shall be free from sharp vertical edges and any protruding elements and designed with a minimum radius of [1/2 inch](#) on all vertical edges; this includes, but is not limited to, seat walls, containment curbs and planters. Where practical, horizontal edges exposed to children's activities shall be rounded.

2.5 OMITTED - BENCHES AND CHAIRS

2.6 [BICYCLE RACKS](#)

Design bicycle racks (stanchions) in accordance with manufacturer's standards and to meet design conditions indicated. Locate as shown on the

drawings. Provide finish in color as selected from manufacturer's standards. Racks shall accommodate locking devices and secure, as a minimum, one wheel and part of the frame simultaneously. The spacing between racks shall be a minimum of 24 inches.

2.6.1 Metal Pipe Bicycle Racks

Provide ASTM A 53/A 53M schedule 40 steel pipe bicycle racks in configuration and of 2-3/8 inch pipe size. Type of mounting, bicycle rack capacity and height above the ground as shown on the drawings.

2.6.2 OMITTED - Precast Concrete Bicycle Rack

2.7 OMITTED - BOLLARDS

2.8 OMITTED - PLANTERS, WASTE RECEPTACLES, ASH RECEPTACLES

2.9 OMITTED - SHELTERS

2.10 OMITTED - TABLES

2.11 OMITTED - TREE GRATES

PART 3 EXECUTION

3.1 CHILDREN'S PLAY AREAS

Install the site furnishings outside the play structure use zone in accordance with ASTM F 1487. Verify and mark the locations of the use zone. These zones are to be free from obstacles and hard surfaces. When child accessibility requirements are to be met, child anthropometric dimensions must be used and not adult anthropometric dimensions.

3.2 INSTALLATION

Verify that finished grades and other operations affecting mounting surfaces have been completed prior to the installation of site furnishings. Site furnishings shall be installed plumb and true, at locations indicated, in accordance with the approved manufacturer's instructions.

3.2.1 Assembly and Erection of Components

New parts shall be acquired from the manufacturer; substitute parts will not be accepted unless approved by the manufacturer. When the inspection of parts has been completed, the site furnishings shall be assembled and anchored according to manufacturer's instructions or as indicated. When site furnishings are assembled at the site, assembly shall not interfere with other operations or pedestrian and vehicular circulation.

3.2.2 Anchorage, Fastenings, and Connections

Furnish metal work, mounting bolts or hardware in ample time for securing into concrete or masonry as the work progresses. Provide anchorage where necessary for fastening furniture or furnishings securely in place. Provide, for anchorage not otherwise specified or indicated, slotted inserts, expansion shields, and power-driven fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screws for wood. Do not use

wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish the fastenings to which they are applied. Conceal fastenings where practicable.

3.3 WELDING

Perform welding, welding inspection, and corrective welding, in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

3.4 TESTING

Test each site furnishing to ascertain a secure and correct installation. A correct installation shall be according to the manufacturer's recommendations and by the following procedure: Measure the physical dimensions and clearance of each installed site furnishing for compliance with manufacturer's recommendations and as indicated. Site furnishings which do not comply shall be reinstalled. Fasteners and anchors determined to be non-compliant shall be replaced. Provide a written report describing the results of the testing.

3.5 OMITTED - FINISHES

3.6 OMITTED - BOLLARDS

3.7 BICYCLE RACKS

Affix to base structure by flanges anchored to concrete or other existing masonry by expansion shields. Provide Series 300 stainless steel bolts to anchor aluminum alloy flanges, of a size appropriate to the standard product of the manufacturer. Where aluminum or alloy fittings or extrusions are to be in contact with dissimilar metals or concrete, give the contact surface a heavy coating of bituminous paint.

3.8 OMITTED - SHELTERS

3.9 RESTORATION AND CLEAN UP

When the installation has been completed, clean up and protect the site. Existing areas that have been damaged from the installation operation shall be restored to original condition at Contractor's expense.

3.9.1 Clean Up

The site shall be cleaned of all materials associated with the installation. Site furnishing surfaces shall be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents shall be according to manufacturer's instructions or as indicated.

3.9.2 Protection

The area shall be protected as required or directed by providing barricades and signage. Signage shall be in accordance with Section 10 14 01 EXTERIOR SIGNAGE.

3.9.3 Disposal of Materials

Excess and waste material shall be removed and disposed off Government property.

3.10 OMITTED - RE-INSTALLATION

-- End of Section --