

**Department of Veterans Affairs  
Radiology North Renovations  
Cleveland, Ohio**

VA Project No. 541-10-1003



Issued for Bidding  
Volume One  
August 15, 2012

**DEPARTMENT OF VETERANS AFFAIRS  
LOUIS STOKES VAMC CLEVELAND  
RADIOLOGY NORTH**

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**SECTION 01 00 00  
GENERAL REQUIREMENTS**

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GENERAL REQUIREMENTS

**SECTION 01 00 00  
GENERAL REQUIREMENTS**

**1.1 GENERAL INTENTION**

- A. Contractor shall completely prepare site for building operations, including demolition and removal of existing structures, and furnish labor and materials and perform work for Radiology North as required by drawings and specifications.
- B. Visits to the site, by Bidders, will be conducted as indicated in the Solicitation to Bidders.
- C. Offices of Westlake Reed Leskosky, as Architect-Engineers, will render certain technical services during construction. Such services shall be considered as advisory to the Government and shall not be construed as expressing or implying a contractual act of the Government without affirmations by Contracting Officer or his duly authorized representative.
- D. Before placement and installation of work subject to tests by testing laboratory retained and paid for by the Contractor, the Contractor shall notify the COTR in sufficient time to enable testing laboratory personnel to be present at the site in time for proper taking and testing of specimens and field inspection. Such prior notice shall be not less than three work days unless otherwise designated by the COTR.
- E. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission of the VA police, be identified by project and employer, and restricted from unauthorized access.
- F. Prior to commencing work, general contractor shall provide proof that a OSHA certified "competent person" (CP) (29 CFR 1926.20(b)(2) will maintain a presence at the work site whenever the general or subcontractors are present.
  - 1. General contractor is required to provide a full time project manager or superintendent, dedicated to this project.
- G. Training:

**GENERAL REQUIREMENTS**

1. All employees of general contractor or subcontractors shall have the following required hours of OSHA certified Construction Safety course and /or other relevant competency training, as determined by VA CP with input from the ICRA team.
  - a. Superintendent: 30 hours
  - b. All other Workers: 10 hours
2. Submit training records of all such employees for approval before the start of work.

#### **1.2 STATEMENT OF BID ITEM(S)**

- A. ITEM 1, Radiology North Renovations: Work includes general construction, alterations, mechanical and electrical work, fire protection, asbestos abatement, and necessary removal of existing structures and construction and certain other items.

#### **1.3 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR**

- A. AFTER AWARD OF CONTRACT, zero (0) sets of specifications and drawings will be furnished.

#### **1.4 CONSTRUCTION SECURITY REQUIREMENTS**

- A. Security Plan:
  1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
  2. The General Contractor is responsible for assuring that all subcontractors working on the project and their employees also comply with these regulations.
- B. Security Procedures:
  1. General Contractor's employees shall not enter the project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
  2. For working outside the "regular hours" as defined in the contract, The General Contractor shall give 3 days notice to the Contracting

GENERAL REQUIREMENTS

Officer so that security arrangements can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this section.

3. No photography of VA premises is allowed without written permission of the Contracting Officer.
4. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the Contracting Officer.

C. Key Control:

1. The General Contractor shall provide duplicate keys and lock combinations to the COTR for the purpose of security inspections of every area of project including tool boxes and parked machines and take any emergency action.
2. The General Contractor shall turn over all permanent lock cylinders to the VA locksmith for permanent installation. See Section 08 71 00, DOOR HARDWARE and coordinate.
3. All construction doors/access doors must use VA key system, and remain locked at all times from the corridor/exterior side.

D. Motor Vehicle Restrictions

1. Vehicle authorization request shall be required for any vehicle entering the site and such request shall be submitted 24 hours before the date and time of access. Access shall be restricted to picking up and dropping off materials and supplies.
2. No parking is available at Medical Center for contractors and Contractor commuter vehicles shall be parked off-site.

### 1.5 FIRE SAFETY

- A. Applicable Publications: Publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.

### GENERAL REQUIREMENTS

1. American Society for Testing and Materials (ASTM):

E84-2008.....Surface Burning Characteristics of Building  
Materials

2. National Fire Protection Association (NFPA):

10-2006.....Standard for Portable Fire Extinguishers

30-2007.....Flammable and Combustible Liquids Code

51B-2003.....Standard for Fire Prevention During Welding,  
Cutting and Other Hot Work

70-2007.....National Electrical Code

241-2004.....Standard for Safeguarding Construction,  
Alteration, and Demolition Operations

3. Occupational Safety and Health Administration (OSHA):

29 CFR 1926.....Safety and Health Regulations for Construction

B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to COTR and Facility Safety Manager for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the general contractor's competent person per OSHA requirements. This briefing shall include information on the construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, etc. Documentation shall be provided to the COTR that individuals have undergone contractor's safety briefing.

1. A Hazardous Work Activity Checklist must be completed by the Contractor. Any activity with a YES response is to be detailed in the Site Specific Safety Plan. A sample Hazardous Work Activity Checklist is included at the end of this specification.

GENERAL REQUIREMENTS

- C. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.
- D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).
- E. Temporary Construction Partitions:
  - 1. Install and maintain temporary construction partitions to provide smoke-tight separations between construction areas and adjoining areas. Construct partitions of gypsum board or treated plywood (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of fire retardant treated wood or metal steel studs. Extend the partitions through suspended ceilings to floor slab deck or roof. Seal joints and penetrations. At door openings, install Class C, ¾ hour fire/smoke rated doors with self-closing devices and VA locking system (storeroom type lock always locked from the corridor side).
  - 2. Install temporary construction partitions as shown on drawings to maintain integrity of existing exit stair enclosures, exit passageways, fire-rated enclosures of hazardous areas, horizontal exits, smoke barriers, vertical shafts and openings enclosures.
  - 3. Close openings in smoke barriers and fire-rated construction to maintain fire ratings. Seal penetrations with listed through-penetration firestop materials in accordance with Section 07 84 00, FIRESTOPPING.
  - 4. Temporary partitions shall be constructed outside of normal working hours, as defined in Article 1.6, Paragraph F.
- F. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- G. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with COTR.
- H. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to

## GENERAL REQUIREMENTS

COTR. Any construction materials found in exit stairs or corridors will be disposed of at Contractor's expense.

- I. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- J. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- K. Sprinklers: Install, test and activate new automatic sprinklers prior to removing existing sprinklers.
- L. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in a 24-hour period. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with COTR. All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with the medical center. Parameters for the testing and results of any tests performed shall be recorded by the medical center and copies provided to the COTR.
- M. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with COTR.
- N. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with COTR. Obtain permits from COTR at least 48 hours in advance.
- O. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to COTR.
- P. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.

#### GENERAL REQUIREMENTS

- Q. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily. (Refer to Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT for GEMS Policy Requirements)
- R. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.
- S. If required, submit documentation to the COTR that personnel have been trained in the fire safety aspects of working in areas with impaired structural or compartmentalization features.
- T. See additional OSHA Requirements and Safety and Health Regulations attachment at the end of this specification section.

#### **1.6 OPERATIONS AND STORAGE AREAS**

- A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.
- C. The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

#### **GENERAL REQUIREMENTS**



- D. Working space and space available for storing materials shall be as determined by the COTR.
- E. Workmen are subject to rules of Medical Center applicable to their conduct.
- F. Execute work so as to interfere as little as possible with normal functioning of Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by COTR where required by limited working space.
  - 1. Schedule delivery of materials and equipment to immediate construction working areas within buildings in use by Department of Veterans Affairs in quantities sufficient that do not impede with Medical Center activities. Provide unobstructed access to Medical Center areas required to remain in operation.
  - 2. Where access by Medical Center personnel to vacated portions of buildings is not required, storage of Contractor's materials and equipment will be permitted subject to fire and safety requirements and review and approval by COTR.
  - 3. Disruptive work to the VAMC, such as excessive noise, vibration, etc., is prohibited during normal working hours, 8 a.m. to 4:30 p.m., Monday through Friday. The COTR has sole discretion to stop work and require that it be performed after normal business hours, with no additional cost to the Government. Additionally, such work performed adjacent to occupied rooms is prohibited.
  - 4. The contractor shall thoroughly investigate the impact of shutdowns on patient and staff prior to proceeding with shutdown.
- G. Phasing: To insure such executions, Contractor shall furnish the COTR with a schedule of approximate phasing dates on which the Contractor intends to accomplish work in each specific area of site, building or portion thereof. In addition, Contractor shall notify the COTR two weeks in advance for final approval of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such

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dates to insure accomplishment of this work in successive sequences mutually agreeable to COTR and Contractor. Final inspection of each phase before moving to the next will be required through the Contracting Officer and COTR.

H. When a building is turned over to Contractor, Contractor shall accept entire responsibility therefore.

1. Contractor shall maintain a minimum temperature of 4 degrees C (40 degrees F) at all times, except as otherwise specified.

2. Contractor shall maintain in operating condition existing fire protection and alarm equipment. In connection with fire alarm equipment, Contractor shall make arrangements for pre-inspection of site with Fire Department or Company (Department of Veterans Affairs or municipal) whichever will be required to respond to an alarm from Contractor's employee or watchman.

I. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by COTR.

1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of COTR. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without the Medical Center Director's prior knowledge and written approval. Refer to specification Sections 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, 27 05 11 REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS and 28 05 11, REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY INSTALLATIONS for additional requirements.

2. Contractor shall submit a request to interrupt any such services to COTR, in writing, three (3) days in advance of a minor shut down and

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- two (2) weeks in advance of major a interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
3. Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of Medical Center. Interruption time approved by Medical Center may occur at other than Contractor's normal working hours.
  4. Major interruptions of any system, including crane and dock usage, must be requested, in writing, at least 14 calendar days prior to the desired time and shall be performed as directed by the COTR.
  5. In case of a contract construction emergency, service will be interrupted on approval of COTR. Such approval will be confirmed in writing as soon as practical.
  6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.
  7. All utility service shutdowns such as water, gas, steam, sewers, electricity, or fire protection shall occur during off-hours or weekends at no additional cost to the Government.
- J. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged at project boundary line. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.
- K. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:
1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles.

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2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the COTR.

L. Coordinate the work for this contract with other construction operations as directed by COTR. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.

#### **1.7 ALTERATIONS**

A. Survey: Before any work is started, the Contractor shall make a thorough survey with the COTR areas of buildings in which alterations occur and areas which are anticipated routes of access, and furnish a report, signed by both, to the Contracting Officer. This report shall list by rooms and spaces:

1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout affected areas of building.
2. Existence and conditions of items such as plumbing fixtures and accessories, electrical fixtures, equipment, venetian blinds, shades, etc., required by drawings to be either reused or relocated, or both.
3. Shall note any discrepancies between drawings and existing conditions at site.
4. Shall designate areas for working space, materials storage and routes of access to areas within buildings where alterations occur and which have been agreed upon by Contractor and COTR.

B. Any items required by drawings to be either reused or relocated or both, found during this survey to be nonexistent, or in opinion of COTR, to be in such condition that their use is impossible or impractical, shall be furnished and/or replaced by Contractor with new items in accordance with specifications which will be furnished by Government. Provided the contract work is changed by reason of this subparagraph B, the contract will be modified accordingly, under provisions of clause entitled "DIFFERING SITE CONDITIONS" (FAR 52.236-2) and "CHANGES" (FAR 52.243-4 and VAAR 852.236-88).

C. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and COTR together shall make a thorough re-survey of the areas of buildings involved. They shall furnish a report on conditions

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then existing, of resilient flooring, doors, windows, walls and other surfaces as compared with conditions of same as noted in first condition survey report:

1. Re-survey report shall also list any damage caused by Contractor to such flooring and other surfaces, despite protection measures; and, will form basis for determining extent of repair work required of Contractor to restore damage caused by Contractor's workmen in executing work of this contract.

D. Protection: Provide the following protective measures:

1. Wherever existing roof surfaces are disturbed they shall be protected against water infiltration. In case of leaks, they shall be repaired immediately upon discovery.
2. Temporary protection against damage for portions of existing structures and grounds where work is to be done, materials handled and equipment moved and/or relocated.
3. Protection of interior of existing structures at all times, from damage, dust and weather inclemency. Wherever work is performed, floor surfaces that are to remain in place shall be adequately protected prior to starting work, and this protection shall be maintained intact until all work in the area is completed.

#### **1.8 INFECTION PREVENTION MEASURES**

- A. Infection Control permits (see sample at the end of this specification section) will be issued by the COTR. The Infection Control Permits will be posted outside the appropriate construction area. More than one permit may be issued for a construction project if the work is located in separate areas requiring separate classes. The primary project scope area for this project is: **Class III**, however, work outside the primary project scope area may vary. The required infection control precautions are denoted on the following table:

<b>Description of Required Infection Control Precautions <i>by Class</i></b>	
<b>During Construction Project</b>	<b>Upon Completion of Project</b>

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<b>CLASS I</b>	<ol style="list-style-type: none"> <li>1. Notify and receive permission from the COTR to perform requested work.</li> <li>2. Execute work by methods to minimize raising dust from construction operations.</li> <li>3. Immediately replace a ceiling tile displaced for visual inspection.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify COTR for inspection once the work is complete.</li> </ol>
<b>CLASS II</b>	<ol style="list-style-type: none"> <li>1. Notify and receive permission from the COTR to perform requested work.</li> <li>2. Provide active means to prevent airborne dust from dispersing into atmosphere.</li> <li>3. Water mist work surfaces to control dust while cutting.</li> <li>4. Seal unused doors with duct tape.</li> <li>5. Block off and seal air vents.</li> <li>6. Place dust mat at entrance and exit of work area.</li> <li>7. Remove or isolate HVAC system in areas where work is being performed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Wipe work surfaces with disinfectant.</li> <li>2. Contain construction waste before transport in tightly covered containers.</li> <li>3. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.</li> <li>4. Remove isolation of HVAC system in areas where work is being performed.</li> </ol>
<b>CLASS III</b>	<ol style="list-style-type: none"> <li>1. Obtain and post valid Infection Control Construction Permit at each work site. Permit must be signed by COTR, I.C. Nurse and General Contractor to be valid.</li> <li>2. Remove or isolate HVAC system in area where work is being done to prevent contamination of duct system.</li> <li>3. Complete all critical barriers, i.e., sheetrock, plywood, 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. Construction of barrier will need to occur outside normal work shifts with approval of COTR.</li> </ol>	<ol style="list-style-type: none"> <li>1. Do not remove barriers from work area until completed project is inspected by the owner's Safety Department.</li> <li>2. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction. Barriers are required to be removed after hours with approval of COTR.</li> <li>3. Vacuum work area with HEPA filtered vacuums.</li> <li>4. Wet mop area with disinfectant.</li> <li>5. Remove isolation of HVAC system in areas where work is being performed.</li> </ol>

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	<ol style="list-style-type: none"> <li>4. Construct anteroom where possible and directed by COTR.</li> <li>5. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.</li> <li>6. Contain construction waste before transport in tightly covered containers.</li> <li>7. Cover transport receptacles or carts. Tape covering unless solid lid.</li> <li>8. If the spread of dust from construction personnel is not contained workers may be required to wear shoe covers and or be vacuumed prior to leaving worksite at the discretion of the COTR or I.C. Nurse.</li> <li>9. Seal holes, pipes, conduits and punctures appropriately.</li> <li>10. Include particle count readings on daily logs against baseline points as required by COTR or I.C. Nurse.</li> </ol>	
<p><b>CLASS IV</b></p>	<ol style="list-style-type: none"> <li>1. Follow all requirements listed in Class III as well as additional requirements listed below.</li> <li>2. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site, or they can wear cloth or paper coveralls that are removed each time they leave the work site.</li> <li>3. All personnel entering work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.</li> </ol>	<ol style="list-style-type: none"> <li>1. Before work is turned over and accepted by the VA a certified I.H. must be used to certify cleaning as well as swab and air sampling of the area. These tests shall meet or exceed industry standards for the type of area being renovated.</li> </ol>

B. An infection control orientation will be provided by the VA Infection Control Personnel to the Contractor prior to construction start.

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- C. Implement the requirements of VAMC's Infection Control Risk Assessment (ICRA) team. ICRA Group may monitor dust in the vicinity of the construction work and require the Contractor to take corrective action immediately if the safe levels are exceeded.
- D. Establish and maintain a dust control program as part of the contractor's infection preventive measures in accordance with the guidelines provided by ICRA Group as specified here. Prior to start of work, prepare a plan detailing project-specific dust protection measures, including periodic status reports, and submit to COTR for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
  - 1. All personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.
- E. Medical Center Infection Control personnel shall monitor for airborne disease (e.g. aspergillosis) as appropriate during construction. A baseline of conditions may be established by the medical center prior to the start of work and periodically during the construction stage to determine impact of construction activities on indoor air quality. In addition:
  - 1. The COTR and VAMC Infection Control personnel shall review pressure differential monitoring documentation to verify that pressure differentials in the construction zone and in the patient-care rooms are appropriate for their settings. The requirement for negative air pressure in the construction zone shall be maintained at all times. Upon notification, the contractor shall implement corrective measures to restore proper pressure differentials as needed.
  - 2. In case of any problem, the medical center, along with assistance from the contractor, shall conduct an environmental assessment to find and eliminate the source.
- F. In general, following preventive measures shall be adopted during construction to keep down dust and prevent mold.
  - 1. Dampen debris to keep down dust and provide temporary construction partitions in existing structures where directed by COTR. Blank off

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ducts and diffusers to prevent circulation of dust into occupied areas during construction.

2. Do not perform dust producing tasks within occupied areas without the approval of the COTR. For construction in any areas that will remain jointly occupied by the medical Center and Contractor's workers, the Contractor shall:
  - a. Provide dust proof temporary drywall construction barriers to completely separate construction from the operational areas of the hospital in order to contain dirt debris and dust. Barriers shall be sealed and made presentable on hospital occupied side. Install a self-closing rated door in a metal frame, commensurate with the partition, to allow worker access. Maintain negative air at all times. Barrier installation to be done outside normal Medical Center hours.
  - b. HEPA filtration is required where the exhaust dust may reenter the breathing zone. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. Install HEPA (High Efficiency Particulate Accumulator) filter vacuum system rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. Insure continuous negative air pressures occurring within the work area. HEPA filters should have ASHRAE 85 or other prefilter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Exhaust hoses shall be heavy duty, flexible steel reinforced and exhausted so that dust is not reintroduced to the Medical Center.
  - c. Adhesive Walk-off/Carpet Walk-off Mats, minimum 600mm x 900mm (24" x 36"), shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often as required to maintain clean work areas directly outside construction area at all times.
  - d. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as they are created. Transport these outside the

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construction area in containers with tightly fitting lids at the end of each shift.

- e. The contractor shall not haul debris through patient-care areas without prior approval of the COTR and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools, material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.
- f. Using a HEPA vacuum, clean inside the barrier and vacuum ceiling tile prior to replacement. Any ceiling access panels opened for investigation beyond sealed areas shall be sealed immediately when unattended.
- g. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.
- h. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.

G. Final Cleanup:

- 1. Upon completion of project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.
- 2. Perform HEPA vacuum cleaning of all surfaces in the construction area. This includes walls, ceilings, cabinets, furniture (built-in or free standing), partitions, flooring, etc.
- 3. All new air ducts shall be cleaned prior to final inspection with reports submitted to COTR.

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**1.9 DISPOSAL AND RETENTION**

A. Materials and equipment accruing from work removed and from demolition of buildings or structures, or parts thereof, shall be disposed of as follows:

1. Reserved items which are to remain property of the Government are identified by attached tags or noted on drawings or in specifications as items to be stored. Items that remain property of the Government shall be removed or dislodged from present locations in such a manner as to prevent damage which would be detrimental to re-installation and reuse. Store such items where directed by COTR.
2. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.
3. Items of portable equipment and furnishings located in rooms and spaces in which work is to be done under this contract shall remain the property of the Government. When rooms and spaces are vacated by the Department of Veterans Affairs during the alteration period, such items which are NOT required by drawings and specifications to be either relocated or reused will be removed by the Government in advance of work to avoid interfering with Contractor's operation.

**1.10 RESTORATION**

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of the COTR. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the COTR before it is disturbed. Materials and workmanship used in restoring work, shall conform in type and quality to that of original existing construction, except as otherwise shown or specified.
- B. Upon completion of contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and electrical work, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.

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- C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are indicated on drawings and which are not scheduled for discontinuance or abandonment.
- D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled "CHANGES" (FAR 52.243-4 and VAAR 852.236-88) and "DIFFERING SITE CONDITIONS" (FAR 52.236-2).
- E. 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 decreased operational life or safety. This includes all fire-rated assemblies. Provide submittals indicating UL listed methods for patching all fire-rated assemblies.

#### **1.11 AS-BUILT DRAWINGS**

- A. The contractor shall maintain two full size sets of as-built drawings which will be kept current during construction of the project, to include all contract changes, modifications and clarifications.
- B. All variations shall be shown in the same general detail as used in the contract drawings. To insure compliance, as-built drawings shall be made available for the COTR's review, as often as requested.
- C. Contractor shall deliver two approved completed sets of as-built drawings to the COTR within 15 calendar days after each completed phase and after the acceptance of the project by the COTR.
- D. Paragraphs A, B, & C shall also apply to all shop drawings.

#### **1.12 USE OF ROADWAYS**

- A. For hauling, use only established public roads and roads on Medical Center property and, when authorized by the COTR, such temporary roads which are necessary in the performance of contract work. Temporary roads shall be constructed by the Contractor at Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well-constructed bridges.

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**1.13 TEMPORARY USE OF MECHANICAL AND ELECTRICAL EQUIPMENT**

A. Use of new installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to compliance with the following provisions:

1. Permission to use each unit or system must be given by COTR. If the equipment is not installed and maintained in accordance with the following provisions, the COTR will withdraw permission for use of the equipment.
2. Electrical installations used by the equipment shall be completed in accordance with the drawings and specifications to prevent damage to the equipment and the electrical systems, i.e. transformers, relays, circuit breakers, fuses, conductors, motor controllers and their overload elements shall be properly sized, coordinated and adjusted. Voltage supplied to each item of equipment shall be verified to be correct and it shall be determined that motors are not overloaded. The electrical equipment shall be thoroughly cleaned before using it and again immediately before final inspection including vacuum cleaning and wiping clean interior and exterior surfaces.
3. Units shall be properly lubricated, balanced, and aligned. Vibrations must be eliminated.
4. Automatic temperature control systems for preheat coils shall function properly and all safety controls shall function to prevent coil freeze-up damage.
5. The air filtering system utilized shall be that which is designed for the system when complete, and all filter elements shall be replaced at completion of construction and prior to testing and balancing of system.
6. All components of heat production and distribution system, metering equipment, condensate returns, and other auxiliary facilities used in temporary service shall be cleaned prior to use; maintained to prevent corrosion internally and externally during use; and cleaned, maintained and inspected prior to acceptance by the Government.

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- B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Government.
- C. This paragraph shall not reduce the requirements of the mechanical and electrical specifications sections.

#### **1.14 TEMPORARY USE OF EXISTING ELEVATORS**

- A. Use of existing elevators for handling building materials and Contractor's personnel will be permitted subject to following provisions:
  - 1. Contractor makes all arrangements with the COTR for use of elevators. The COTR will ascertain that elevators are in proper condition. Contractor may use elevators for daily use for personnel only between the hours of 7:00 am and 6:00 pm and for special nonrecurring time intervals when permission is personnel for operating elevators will not be provided by the Department of Veterans Affairs.
  - 2. Contractor to develop a proposed elevator usage plan for review and approval by COTR.
  - 3. Contractor covers and provides maximum protection of following elevator components:
    - a. Entrance jambs, heads soffits and threshold plates.
    - b. Entrance columns, canopy, return panels and inside surfaces of car enclosure walls.
    - c. Finish flooring.
  - 4. If brake lining of elevators are excessively worn or damaged during temporary use, they shall be removed and replaced by new brake lining.
  - 5. All parts of main controller, starter, relay panel, selector, etc., worn or damaged during temporary use shall be removed and replaced with new parts, if recommended by elevator inspector after elevator is released by Contractor.
  - 6. Place elevator in condition equal, less normal wear, to that existing at time it was placed in service of Contractor as approved by Contracting Officer.

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**1.15 TEMPORARY TOILETS**

- A. Provide where directed by COTR, ample temporary sanitary toilet accommodations with suitable sewer and water connections; or, when approved by COTR, provide suitable dry closets where directed. Keep such places clean and free from flies, and all connections and appliances connected therewith are to be removed prior to completion of contract, and premises left perfectly clean.

**1.16 AVAILABILITY AND USE OF UTILITY SERVICES**

- A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The amount to be paid by the Contractor for chargeable electrical services shall be the prevailing rates charged to the Government. The Contractor shall carefully conserve any utilities furnished without charge.
- B. The Contractor, at Contractor's expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.
- C. Heat: Furnish temporary heat necessary to prevent injury to work and materials through dampness and cold. Use of open salamanders or any temporary heating devices which may be fire hazards or may smoke and damage finished work, will not be permitted. Maintain minimum temperatures as specified for various materials:
- D. Electricity (for Construction and Testing): Furnish all temporary electric services.
1. Obtain electricity by connecting to the Medical Center electrical distribution system. The Contractor shall meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Electricity for all other uses is available at no cost to the Contractor.
- E. Water (for Construction and Testing): Furnish temporary water service.

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1. Obtain water by connecting to the Medical Center water distribution system. Provide reduced pressure backflow preventer at each connection. Water is available at no cost to the Contractor.
2. Maintain connections, pipe, fittings and fixtures and conserve water-use so none is wasted. Failure to stop leakage or other wastes will be cause for revocation (at COTR's discretion) of use of water from Medical Center's system.

F. Steam: Furnish steam system for testing required in various sections of specifications.

1. Obtain steam for testing by connecting to the Medical Center steam distribution system. Steam is available at no cost to the Contractor.
2. Maintain connections, pipe, fittings and fixtures and conserve steam-use so none is wasted. Failure to stop leakage or other waste will be cause for revocation (at COTR's discretion), of use of steam from the Medical Center's system.

#### **1.17 NEW TELEPHONE EQUIPMENT**

- A. The contractor shall coordinate with the work of installation of telephone equipment by others if required. This work shall be completed before the building is turned over to VA.

#### **1.18 TESTS**

- A. Pre-test mechanical and electrical equipment and systems and make corrections required for proper operation of such systems before requesting final tests. Final test will not be conducted unless pre-tested.
- B. Conduct final tests required in various sections of specifications in presence of an authorized representative of the Contracting Officer. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.
- C. Mechanical and electrical systems shall be balanced, controlled and coordinated. A system is defined as the entire complex which must be coordinated to work together during normal operation to produce results for which the system is designed. For example, air conditioning supply air is only one part of entire system which provides comfort conditions for a building. Other related components are return air, exhaust air,

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steam, chilled water, refrigerant, hot water, controls and electricity, etc. Another example of a complex which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of fuel, combustion air, controls, steam, feedwater, condensate and other related components.

- D. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonably short period of time during which operating and environmental conditions remain reasonably constant.
- E. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components and of the entire system.

#### **1.19 INSTRUCTIONS**

- A. Contractor shall furnish Maintenance and Operating manuals and verbal instructions when required by the various sections of the specifications and as hereinafter specified.
- B. Manuals: Maintenance and operating manuals (four copies each) for each separate piece of equipment shall be delivered to the COTR coincidental with the delivery of the equipment to the job site. Manuals shall be complete, detailed guides for the maintenance and operation of equipment. They shall include complete information necessary for starting, adjusting, maintaining in continuous operation for long periods of time and dismantling and reassembling of the complete units and sub-assembly components. Manuals shall include an index covering all component parts clearly cross-referenced to diagrams and illustrations. Illustrations shall include "exploded" views showing and identifying each separate item. Emphasis shall be placed on the use of special tools and instruments. The function of each piece of equipment, component, accessory and control shall be clearly and thoroughly explained. All necessary precautions for the operation of the equipment and the reason for each precaution shall be clearly set forth. Manuals must reference the exact model, style and size of the piece of equipment and system being furnished. Manuals referencing equipment similar to but of a different model, style, and size than that furnished will not be accepted.

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C. Instructions: Contractor shall provide qualified, factory-trained manufacturers' representatives to give detailed instructions to assigned Department of Veterans Affairs personnel in the operation and complete maintenance for each piece of equipment. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. Instructions for different items of equipment that are component parts of a complete system, shall be given in an integrated, progressive manner. All instructors for every piece of component equipment in a system shall be available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems. All instruction periods shall be at such times as scheduled by the COTR and shall be considered concluded only when the COTR is satisfied in regard to complete and thorough coverage. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the COTR, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

#### **1.20 GOVERNMENT-FURNISHED PROPERTY**

- A. The Government shall deliver to the Contractor, the Government-furnished property shown on the drawings.
  - B. Equipment furnished by Government to be installed by Contractor will be furnished to Contractor at the Medical Center.
  - C. Storage space for equipment will be provided by the Government and the Contractor shall be prepared to unload and store such equipment therein upon its receipt at the Medical Center.
  - D. Notify Contracting Officer in writing, 60 days in advance, of date on which Contractor will be prepared to receive equipment furnished by Government. Arrangements will then be made by the Government for delivery of equipment.
1. Immediately upon delivery of equipment, Contractor shall arrange for a joint inspection thereof with a representative of the Government. At such time the Contractor shall acknowledge receipt of equipment described, make notations, and immediately furnish the Government representative with a written statement as to its condition or shortages.

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2. Contractor thereafter is responsible for such equipment until such time as acceptance of contract work is made by the Government.

- E. Equipment furnished by the Government will be delivered in a partially assembled (knock down) condition in accordance with existing standard commercial practices, complete with all fittings, fastenings, and appliances necessary for connections to respective services installed under contract. All fittings and appliances (i.e., couplings, ells, tees, nipples, piping, conduits, cables, and the like) necessary to make the connection between the Government furnished equipment item and the utility stub-up shall be furnished and installed by the contractor at no additional cost to the Government.
- F. Completely assemble and install the Government furnished equipment in place ready for proper operation in accordance with specifications and drawings.
- G. Furnish supervision of installation of equipment at construction site by qualified factory trained technicians regularly employed by the equipment manufacturer.

#### **1.21 RELOCATED EQUIPMENT AND ITEMS**

- A. Contractor shall disconnect, dismantle as necessary, remove and reinstall in new location, all existing items indicated to be relocated by Contractor.
- B. Perform relocation of such equipment or items at such times and in such a manner as directed by the COTR.
- C. Suitably cap existing service lines, such as steam, condensate return, water, drain, gas, air, vacuum and/or electrical, whenever such lines are disconnected from equipment to be relocated. Remove abandoned lines in finished areas and cap as specified herein before under paragraph "Abandoned Lines".
- D. Provide all mechanical and electrical service connections, fittings, fastenings and any other materials necessary for assembly and installation of relocated equipment; and leave such equipment in proper operating condition.
- E. All service lines such as noted above for relocated equipment shall be in place at point of relocation ready for use before any existing equipment

#### **GENERAL REQUIREMENTS**

is disconnected. Make relocated existing equipment ready for operation or use immediately after reinstallation.

- - - E N D - - -

GENERAL REQUIREMENTS

## Pre-Construction Risk Assessment

Project: \_\_\_\_\_ Project/Contract #: \_\_\_\_\_

This form may be used for projects or activities to determine if a Site Specific Safety Plan (SSSP) is necessary. If the contractor or vendor is not working independently (VAMC Supervisor is present and in control of the contractor) and the job is short duration (less than five working days) and the hazard analysis does not include any high risk activities, then Occupational Health and Safety may allow work without submitting a SSSP.

Activity	Yes	High Risk
1. Respiratory protection is required for the work being conducted  List specifics: (activity being preformed, PPE Being used, Training, Fit testing).		
2. Hearing protection is required for the work being conducted  List specifics: (Type of noise; impact, constant, start up).		
3. Other personal protective equipment is required for the work being conducted, what activity? _____  List specifics: (Gloves, safety Glasses, hard hat, steel toes, overalls).		
4. Are there overhead hazards associated with the activity being conducted?  Wires, power, communication, grounding, location(s), signage.  List specifics:		Yes
5. Work is being conducted in a confined space. Permit required? Training?		PRCS

GENERAL REQUIREMENTS

01 00 00 -1 RISK ASSESSMENT

## Pre-Construction Risk Assessment

List specifics: Tanks, sewer, tunnels, Rescue Team notification.		Only
6. Ladders will be necessary for the work being conducted.		
7. Scaffolding will be necessary for the work being conducted.  List specifics:		Greater than six feet
8. Other work platforms will be necessary for the work being conducted.  List specifics: Rails, toe boards, netting		Greater than six feet
9. Fall protection is required for the work being conducted.  List specifics:		Yes
10. ASBESTOS Abatement  Exposure to asbestos may be associated with the work being conducted.  List specifics: Renovation, Demolition, Emergency Response  <u>29 CFR 1910.1001.</u>		Yes unless approved by the Asbestos Manager
Activity	Yes	High Risk
11. Hazardous materials will be used.  MSDSs will be provided for known substances  List specifics: 29 CFR 1910.1200.		

GENERAL REQUIREMENTS

## Pre-Construction Risk Assessment

<p>12. Hot work (Cutting, Welding, Brazing, etc).</p> <p>Use of VAMC Cleveland Hot Work Policy (ECP 138-047) is required.</p>		
<p>13. Additional ventilation will be necessary for the work being conducted.</p> <p>List specifics: Reason for need of ventilation, confined space, foul odor, excessive heat.</p>		
<p>14. Operation and maintenance of electric power generation, control, transformation, transmission, and distribution lines and equipment are necessary for the work being conducted.</p> <p>List specifics:</p>		Yes
<p>15. Work will be conducted on energized equipment.</p> <p>Use of VAMC Cleveland Working on Energized Equipment policy (138-034) is required.</p> <p>List specifics: list voltages in area, emergency procedures.</p>		Yes
<p>16. Other electrical work will be conducted.</p> <p>List specifics:</p>		
<p>17. Lock Out/Tag Out will be necessary for the work being conducted.</p>		

GENERAL REQUIREMENTS

01 00 00 -3 RISK ASSESSMENT

## Pre-Construction Risk Assessment

List specifics:		
18. Cranes, derricks, or slings will be necessary for the work being conducted. List specifics:		Yes
19. Excavating will be necessary for work being conducted.  List site specifics:		Yes



## Pre-Construction Risk Assessment

Activity	Yes	High Risk
20. Excavating or earthmoving equipment will be used.  List specifics:		
21. Industrial trucks will be used.  List specifics:		
22. Other motorized vehicles will be used.  List specifics:		
23. Concrete and masonry construction operations will be necessary for work being conducted.  List specifics: % of recycled components		
24. Steel erection activities will be necessary for the work being conducted.  List specifics:  New Steel % of recycled material,		Yes

GENERAL REQUIREMENTS

## Pre-Construction Risk Assessment

25. Alteration, conversion, or improvement of existing electric transmission and distribution lines and equipment will be necessary for the work being conducted.  List specifics:		Yes
26. Hand and portable powered tools or other hand-held equipment will be used.		
27. Compressed gas or compressed air equipment is necessary for work being conducted.		
28. List all other hazardous activities that will be conducted or potentially hazardous equipment that will be used including vibration hazards.		

## Pre-Construction Risk Assessment

Activity	Yes	High Risk
29. Infection Control Risks identified. Infection Control Risk Assessment (ICRA) required- refer to Enclosure (1).		Yes unless approved by IC
30. Life Safety Risks identified.  Interim Life Safety Risk Assessment Form -Attachment (4) - must be completed and submitted.		
31. Emergency Procedures Identified.  Fire, severe weather, utility failure, etc.		
32. Demolition will be necessary for the work being conducted.		Yes
33. <i>New Construction:</i> Minimum ___%___ of total project waste shall be diverted from landfill.  Recycled aggregate, Concrete, Steel.		
34. <i>Interior Remodeling:</i> Minimum ___%___ of total project waste shall be diverted from landfill.  a) Ceiling tile  b) Steel  c) Carpet		

GENERAL REQUIREMENTS

01 00 00 -7 RISK ASSESSMENT

## Pre-Construction Risk Assessment

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Submitted by (Contractor) \_\_\_\_\_ Date: \_\_\_\_\_

Reviewed by (COTR) \_\_\_\_\_ Date: \_\_\_\_\_

Reviewed by (CSM) \_\_\_\_\_ Date: \_\_\_\_\_

SSSP Required                      Yes    No

Project: \_\_\_\_\_ Project/Contract #: \_\_\_\_\_

GENERAL REQUIREMENTS

01 00 00 -8 RISK ASSESSMENT

## Infection Control Construction Permit

<b>Construction Class:</b>	
<b>Project Name and Number:</b>	<b>Permit #:</b>
<b>Location of Construction:</b>	
<b>COTR:</b>	<b>Telephone:</b>
<b>Contractor Performing Work:</b>	
<b>Supervisor:</b>	<b>Telephone:</b>
<b>CLASS I</b>	<ol style="list-style-type: none"> <li>1. Obtain approval from COTR before activities begin</li> <li>2. Work performed is limited to inspections and minor installations</li> <li>3. Execute work by methods to minimize raising dust from inspection operations</li> <li>4. Permit does not need to be posted for this classification.</li> </ol>
<b>CLASS II</b>	<ol style="list-style-type: none"> <li>1. Obtain and post infection control permit at work location before work begins</li> <li>2. Provide active means to prevent air borne dust from dispersing into atmosphere</li> <li>3. Place dust mat at entrances and exits of work sites</li> <li>4. Tools and equipment must be cleaned prior to entrance to the medical center</li> <li>5. Isolate HVAC and seal unused doors with duct tape</li> <li>6. Contain construction waste before transport in tightly covered containers</li> </ol>
<b>CLASS III</b>	<ol style="list-style-type: none"> <li>1. Obtain and post infection control permit at work location before work begins</li> <li>2. Follow all requirements listed for Class II in addition to requirements listed below</li> <li>3. Isolate supply and return ductwork to prevent contamination of system.</li> <li>4. Complete all critical dust barriers as well as the creation of an anti-room where required for inspection by COTR before work begins.</li> <li>5. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.</li> <li>6. Construct anteroom where required by COTR and I.C. Nurse</li> </ol>

GENERAL REQUIREMENTS

01 00 00 -1 ICRA PERMIT

	<p>7. Obtain COTR approval before construction and removal of any dust partitions</p> <p>8. Include particle count readings on daily logs against baseline points as required by COTR or I.C. Nurse.</p>
<p><b>CLASS IV</b></p>	<p>1. Obtain and post infection control permit at work location before work begins</p> <p>2. Follow all requirements listed for Class III in addition to requirements listed below</p> <p>3. Workers are required to wear clean suites on site</p> <p>4. All personnel entering and leaving work site must be vacuumed using a HEPA filtered vacuum cleaner.</p> <p>5. This class of permit will require additional specialized precautions unique to each activity which will be listed below</p>
<p><b>Additional Requirements:</b></p>	
<p><b>Infection Control Nurse:</b></p>	<p><b>Date:</b></p>
<p><b>COTR:</b></p>	<p><b>Date:</b></p>
<p><b>Contractor:</b></p>	<p><b>Date:</b></p>

GENERAL REQUIREMENTS

01 00 00 -2 ICRA PERMIT

(Name) CONSTRUCTION  
COMPANY

# **SITE SPECIFIC ACCIDENT PREVENTION PLAN**

**+**

**CONSTRUCTION HEALTH AND SAFETY PROGRAM**

**FOR**

GENERAL REQUIREMENTS

01 00 00 -3 SAFETY PLAN

# Name of Project

Location

**Veterans Affairs Medical Center – Wade Park**

**Cleveland, Ohio**

**Project number given by contracting avoid confusion**

**PROJECT # 541-AB-XYZ**

**CONTRACT # VA541-A-XYZ**

Template date 4/16/2010

**RESPONSIBILITIES AND LINES OF AUTHORITY OF NAME CONSTRUCTION COMPANY**

The following people have responsibilities and authority for corporate safety:

## **BACKGROUND INFORMATION (Prime)**

I. Contractor: **Name**

GENERAL REQUIREMENTS

01 00 00 -4 ACCIDENT PREVENTION PLAN



**Address**

**City, State Zip**

II. Project Name: **Wade Park Name**

III. Project Description: **Brief Description (541-xx-xxx)**

IV. Contractor Accident Record: **Contractor provide OSHA Log information**

**A. RESPONSIBILITIES**

1. Chief Corporate Safety Officer: **Contact Name (Contact telephone #)**

**Name** Construction Company

**Title**

2. Site Safety Responsibilities: **Contact Name (Contact telephone #)**

**Name** Construction Company

**Title**

3. Project Safety Consulting: **Contact Name (Contact telephone #)**

**Name** Construction Company

**Title**

**BACKGROUND INFORMATION (SUBCONTRACTOR)**

**GENERAL REQUIREMENTS**

- |      |                             |   |
|------|-----------------------------|---|
| I.   | Contractor:                 | <b>Name</b><br><b>Address</b><br><b>City, State Zip</b> |
| II.  | Project Name:               | <b>Wade Park    Name</b>                                |
| III. | Project Description:        | <b>Brief Description</b>                                |
| IV.  | Contractor Accident Record: | <b>Contractor provide OSHA Log information</b>          |

### A. RESPONSIBILITIES

- |    |                                 |   |
|----|---------------------------------|---|
| 1. | Chief Corporate Safety Officer: | <b>Contact Name (Contact telephone #)</b><br><b>Name</b> Construction Company<br><b>Title</b> |
| 2. | Site Safety Responsibilities:   | <b>Contact Name (Contact telephone #)</b><br><b>Name</b> Construction Company<br><b>Title</b> |
| 3. | Project Safety Consulting:      | <b>Contact Name (Contact telephone #)</b><br><b>Name</b> Construction Company<br><b>Title</b> |

The overall lines of authority concerning safety and health will be as follows:

## GENERAL REQUIREMENTS

**Name – Title**

**Name – Title**

A Site Safety and Health Officer will be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor and subcontractors. The SSHO will be employed by the prime. SSHO qualifications with education certificates will be listed in Appendix B.

The competent person for Health Hazard Control and Respiratory Protection Program will conduct and document a hazard assessment in accordance with Section 06 to identify and evaluate. (What form of documentation).

Site Safety and Health Officer (SSHO) shall 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. Safety inspection logs shall be attached to the Contractors daily quality control report. Current "Safety Logs" shall be readily available upon request.

## **SIGNATURE SHEET**

The following persons are responsible for preparing and approving this plan:

***Preparer:***

**Contact Name (Phone #)**

**Contact Title**

**Name** Construction Company

GENERAL REQUIREMENTS

01 00 00 -7 ACCIDENT PREVENTION PLAN

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Date\_\_\_\_\_

GENERAL REQUIREMENTS

01 00 00 -8 ACCIDENT PREVENTION PLAN

## SCOPE OF WORK SUMMARY

### Summary

This job consists of **(Basic Description)** Please include the scope of work submitted for the project

### Pre-demolition:

Describe the activity in sufficient detail to determine the safety program elements that will be required to be addressed in the body of the procedure – Section 6. Use the PCRA (Pre-Construction Risk Assessment) along with the Scope of Work to determine which elements need to be addressed for the pre-demolition phase.

### Demolition:

Describe the activity in sufficient detail to determine the safety program elements that will be required to be addressed in the body of the procedure – Section 6. PCRA (Pre-Construction Risk Assessment) along with the Scope of Work to determine which elements need to be addressed for each of the demolition phase.

### Construction:

Describe the activity in sufficient detail to determine the safety program elements that will be required to be addressed in the body of the procedure Section - 6. PCRA (Pre-Construction Risk Assessment) along with the Scope of Work to determine which elements need to be addressed for the construction phase.

## GENERAL REQUIREMENTS

**1. SITE ACCESS:**

- a) Parking onsite is not provided by the VAMC Cleveland at the Wade Park Facility
- b) Access into the facility will be through entrances located close to the work area to avoid patient care areas. The following entrance that will be used by **Name** Construction Company employees will be submitted in writing or on the drawings:  
(Enter the specific building access to be used)

**2. WORK AREA SECURITY:**

- a) All **Name** Construction Company employees will wear company identification badges or those provided by VAMC Cleveland Police Service.
- b) Patients, visitors and unauthorized VAMC Cleveland employees will be kept out of work areas using locked doors, barricades and safety postings as appropriate.

**3. PLAN FOR PREVENTION OF ALCOHOL AND DRUG ABUSE**

(Review – replace with your own company policy if this doesn't work for you)

- a) Due to the nature of our work, it is critical that all employees are free from the adverse effects of drugs and/or alcohol. The company is committed to providing a safe workplace for all its employees. The goal of this policy is to maintain a safe and secure work environment that is free from the effects of alcohol and drug abuse.
- b) The intent of this policy is to be responsive to the employees health needs by the early recognition and treatment of chemical dependency problems and behavioral/medical disorder, and to support the rights of the company and its employees to work within an alcohol / drug free environment.
- c) This policy is not applicable to physician prescribed drugs. Employees on such medication(s), which may adversely affect their job performance, should promptly discuss the matter with their supervisor.
  - Failure of the employee to so notify their supervisor can result in disciplinary action including discharge.
  - It should be noted that while legal, prescribed drugs could adversely affect the safety of the employee and other employees on the site.
  - All **Name** Construction employees are drug tested before hiring, periodically, and annually.

**4. SITE SAFETY AUDITS (Inspections):**

GENERAL REQUIREMENTS

#### a) INTERNAL INSPECTIONS

The site supervisor, who is the **Name** Construction competent person, will conduct the Site Safety and Health inspections. The competent person's certifications are located in Appendix B. **(Put the Certifications in the Appendix B.)** There will two types of safety inspections that will be performed on this job site.

- (1) A weekly Safety and Health inspection and report will be conducted by the site supervisor. The inspection forms will document and track the following information:

- Any Violations
- Date of violation
- Nature of violation
- Needed corrective action
- Date of correction
- Name of responsible person(s)

- (a) In addition to the above items he will also notify any employee and/or subcontractor in writing of any violations.
- (b) This information will be followed up on by the COTR or Construction Safety Group, as needed and/or requires immediate attention to the violations. (Should he notify VA of findings?)
- (c) All safety inspection forms are reviewed to ensure that all noted corrective actions are within the applicable OSHA and Veterans Affairs Safety and Health Manual guidelines.
- (d) This documentation will be kept (readily available?) at the project field office, and will aid in the audits of the Accident Prevention Plan.

- (2) The second type of Safety and Health Inspection will be a daily checklist.

- (a) This too, will be performed each workday onsite, by the site supervisor.

- (b) This documentation will be kept at the project field office, and will aid in the audits of the Accident Prevention Plan. (this too Should be made readily available?)

#### b) EXTERNAL INSPECTORS/CONSTRUCTION ROUNDS

- (1) At various times there may be announced and unannounced visits to the work area of any of the Contracted Construction Projects. They may be visited by some or all of the members of the Construction Safety Inspection Group.

- (2) Prior to the activity of cutting and/or welding, the COTR for the Veterans

#### GENERAL REQUIREMENTS

Affairs will be contacted to assist in scheduling a site inspection and submission for a burn permit.

(3) Prior to any activity including digging and/or excavating, the COTR for the Veterans Affairs will be contacted to assist in scheduling a site inspection and submission for a permit.

(4) Prior to any activity including the renovation and/or penetration of rated walls, the COTR for the Veterans Affairs will be contacted to assist in scheduling a site inspection and submission for a permit.

(5) Prior to any activity including the removal or repair of Asbestos Containing Building Material, the COTR for the Veterans Affairs will be contacted to assist in scheduling a site inspection and submission for a permit.

c) INSPECTIONS BY OUTSIDE PARTIES i.e., OSHA, EPA, etc.

(1) Presentation of Credentials - Upon arrival at the work site or facility, the Compliance Officer must display his or her credentials and will ask to meet with the appropriate employer representative.

(2) The contractor must notify the projects COTR immediately upon the initial contact of the Compliance Officer's contact.

(3) Opening Conference – During an opening conference, the compliance officer will explain the purpose of the inspection. The contractor's management representative must be prepared to discuss actions that have been taken to demonstrate their company's commitment to the health and safety of employees (e.g. work practices, safety and industrial hygiene standards, safety manuals, training conducted, internal inspections, etc).

(4) An authorized employee representative will be given the opportunity to attend the opening conference and to accompany the compliance officer during the inspection. Employees may also be consulted during the conduct of the inspection. Employees

GENERAL REQUIREMENTS



who participate in the inspection, or are consulted by the compliance officer, are protected from discrimination for exercising their safety and health rights under the "Whistle Blowers Act".

(5) A contractor management representative and a VAMC Cleveland Safety representative must accompany the compliance officer during the inspection and keep accurate notes of any actual or possible violations found by the compliance officer. Obvious violations detected by the compliance officer should be corrected on the spot where possible.

(6) It is imperative that existing operations, reports, logs, etc. not be misrepresented to the compliance officer. The penalty for making false statements or representation to OSHA or its compliance officers is a maximum of \$10,000 and 6 months imprisonment. In addition, the offending party can be subject to discipline by the company up to and including discharge.

(7) Closing Conference - After the inspection has been conducted, a closing conference will be held between the compliance officer, the employer and employee representatives and VAMC Cleveland. This is the best time, before possible issuance of a citation, to explain the company's position. It is imperative that we question any proposed findings or abatement periods that are unreasonable. Request that any citations be sent to the company with a copy to the VAMC Cleveland safety office.

## **5. SAFETY TRAINING /EDUCATION:**

### **a) Site orientation training:**

All employees on site will be required to attend a Safety Training Orientation at the start of the project, or before they begin work at the job site. The site supervisor, competent person, will conduct the training. Training on the applicable requirements of this Site Specific Training Plan is mandatory and must be documented.

### **b) Supervisor and employee safety meetings:**

## **GENERAL REQUIREMENTS**

The primary site supervisor, who is the competent person (certifications located in Appendix B), will conduct the initial employee site safety orientation. Mandatory safety meetings will be held on a weekly basis. Safety and health topics will vary from week to week on subject matter, utilizing the 29 CFR 1910 and 29 CFR 1926 standards, along with the Veterans Affairs Safety and Health Program and issues raised during construction.

**(Place documentation of training sign-in sheets and agenda in Appendix B)**

c) Employee training:

**Name** Construction Company employees will be trained, at the site safety orientation on the following topics:

- When PPE is necessary.
- What PPE is necessary and which PPE has been selected for each process the employee operates.
- How to properly put on, take off, adjust, and wear PPE.

## **6. ACCIDENT REPORTING:**

All **Name** Construction employees on site will be required to attend an "Accident and Event Reporting" Orientation class at the start of the project, or before they begin work at the job site. The site supervisor, competent person, will conduct the above mentioned training.

a) Accident investigations, reports, and logs:

The project manager and site supervisor will conduct all accident and near miss investigations. The site supervisor will maintain the OSHA 300 log. All documentation will be kept on the job site. Certifications for competent person(s) are located in Appendix B.

b) Immediate notification of major accidents:

Should a major accident occur, the following notifications will take place as soon as any injured person(s) are cared for:

**Contact Name, Title**

**Contact Name, Title**

**Contact Name, Title**

GENERAL REQUIREMENTS

VA Safety Representative: Frank Wunderle

### Local Emergency Services:

#### For Wade Park

Hospital	VA Wade Park Medical Facility 10701 East Blvd. Cleveland, Ohio 44106 Dial 2222 from any VA Phone
Hospital	University Hospitals 11100 Euclid Avenue Cleveland, Ohio 44106 911 / (216) 844-1000
Fire Department	911 / 216-664-6813
Security	Dial 4207 from any VA Phone

This listing will be posted in the field office.

#### c) Accident response plan:

**Name** Construction Company intends to make certain all emergency incidents are handled in a proper and safe manner giving priority to the following:

- Life Safety
- Property Conservation
- Emergency Situation Investigation
- Return to Normal Operations

#### d) Exposure data / man hours worked:

(1) This section covers the following operations **(Fill in operation/s requiring additional training)** unless the employer can demonstrate that the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards. Example; (a negative impact statement or asbestos abatement)

(2) This information will be maintained by the site supervisor and verified by **Contact Name**. A daily log will be maintained of all man hours worked. This information will also be used to determine the final **TIR** for the project. Any data collected will be submitted to the COTR for their report.

#### GENERAL REQUIREMENTS

## 7. EMERGENCY RESPONSE PLAN:

This plan covers the actions of all **Name** Construction employees. All subcontractors on site will be required to submit for approval, to **Name** Construction Company, their own site specific Emergency Response Plan. If not adequate, the subcontractor and their employees must be orientated to the **Name** Construction Company's "SITE SPECIFIC EMERGENCY RESPONSE PLAN", before they can begin work at this site.

### a) Chemical Safety:

As part of this program, **Name** Construction Company will inform subcontractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety, or other hazards.

The following procedures address emergency response as follows:

- Pre-emergency planning and coordination with outside parties:  
VAMC (COTR) will receive notification of date to start work, along with MSDS's of all substances brought onto the facility.
- Personal roles, lines of authority, training, and communication:

The personnel utilizing chemicals will contain the substances brought onto the facility. Plumbers will contain and handle all compressed gas cylinders, providing they have been trained and documented.

In the case where a situation occurs that they cannot handle, all employees will be trained on evacuating the area, notifying the on-site supervisor, and workers in the immediate worksite.

- Emergency recognition and prevention:

All workers will, at the safety orientation, be informed of this site-specific emergency response plan and procedures.

All workers will be responsible to recognize hazards and their prevention, practice this at all times on the worksite.

All workers will be responsible to answer question from surveyors about general safety, health, and emergency procedures wherever they are on site.

### b) Emergency plan for severe weather:

For the site-specific severe weather conditions that employees may encounter during the project, **Name** Construction Company has developed the following procedures.

First, **Name** Construction Company employees will adhere to all NWS warnings and advisories. For snowfall, the policy for workers is that a Level Three emergency, which is predicted heavy snow fall, or other dangerous weather conditions.

- Safe distances and places of refuge:

GENERAL REQUIREMENTS

All workers at this site will be informed of the designated location of the safe zone. This will also be posted in the field office for all to be reminded of. In the event of an emergency occurrence, and the Local Fire Department, or any other entity is summoned, all workers will report to this zone to be accounted for.

- Site security and control:

In the event of an emergency, workers will notify the site supervisor or project manager of the situation, at that time, workers will report to the safe zone. The site supervisor and/or project manager will notify security and any other applicable authorities. Staying away from the immediate situation and not allowing any unauthorized personnel to enter until proper authorities arrive.

- Evacuation routes and procedures:

Any work will be performed on the interior of the building. Evacuation plans are posted in various locations throughout work area by the VA.

- Decontamination:

This would be required if there is a possibility of a large spill of hazardous material with the potential of contaminating contractor employees. Small spills and personnel contaminations are expected to be cleaned up using the contractors Hazard Communication program and associated MSDS requirements.

c) Medical support:

It will be the duty of all workers onsite, including subcontractors, to immediately report to the site supervisor and/or project manager, COTR's any and all emergencies.

The following are items of concern regarding the handling of all medical support requirements:

(1) On site:

- For incidents occurring on site at Wade Park Veterans Affairs Medical Center; the victim(s) will be stabilized prior to be relocated to another institution.
- For non-emergency support first aid supplies will be kept at the **Name** Construction Company field office. All subcontractors will be required to supply properly trained personnel as well as their own first aid supplies.
- All supplies will be subject to our safety inspections. No one will perform first aid or CPR unless properly trained, and verification of certification is on file at the jobsite.

GENERAL REQUIREMENTS

## (2) Off site:

- For the Wade Park location, University Hospital Medical Center is located at 11100 Euclid Avenue (216) 844-1000.
- Maps are posted and available for all contractors on site (See Appendix A).
- Emergency medical treatment and first aid:
- Emergency alerting and response procedures:
- It will be the duty of all workers onsite, including subcontractors, to immediately respond to the COTR's, Construction Safety Team or Outside Inspectors from governmental agencies or agencies approving accreditation regarding their function during an emergency.

## (3) Posting of emergency telephone numbers:

The posting of these Emergency Telephone Numbers will be in the job field office, where all workers will have access to them. All employees and subcontractors will be made aware of these and the location at the safety orientation. The numbers are as follows:

Hospital	Wade Park Veterans Affairs Medical Center Dial 2222 from any VA Phone University Hospital 911 / (216) 844-1000
Fire Department	911 / (216) 664-6813
Security	Dial 4207 from any VA Phone

## d) Hazard communication program:

This site specific Hazard Communication Plan has been implemented in accordance with 29 CFR 1910.1200.

All areas in which hazardous chemicals will be stored shall have the proper label and/or signs. The MSDS for all chemicals on site will be located in a book labeled MSDS, in the project field office.

The training of employees and subcontractors will be as follows:

- Where to find this program

## GENERAL REQUIREMENTS

- What is in this program
- All chemicals on this jobsite
- What is an MSDS
- How to find specific information on an MSDS
- Labeling system
- What area these chemicals are stored in, map indicating
- The proper handling procedures for these chemicals
- Spill/release clean up protocol

Should there be an immediate threat to life or property, the emergency response plan for the installation, which is to be on file at the field office.

It is mandatory that all subcontractors submit, before a new chemical is introduced to the worksite, that the proper MSDS is submitted to the site supervisor/project manager. It will be the responsibility of the site supervisor to inform all employees and subcontractors of the new chemical(s), introduce the MSDS, and the potential hazards of that chemical. The site supervisor and/or project manager will have the responsibility to notify the Contracting Officer / COTR of any and all new chemicals brought onto the facility.

Chemical storage areas, if needed, to be located per VA designated location.

**e) CORRECTIVE ACTIONS INVOLVING CLEAN-UP OPERATIONS AT SITES COVERED BY THE RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 (RCRA) AS AMENDED (42 W.S.C. 6901 ET SEQ).**

Clean-up operations required by a governmental body, whether Federal, state, local or other involving hazardous substance that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority Site List (NPL), state priority site lists, sites recommended for the EPA, NPL, and initial investigations of government identified sites which area conducted before the presence or absence of hazardous substances has been ascertained;

Voluntary clean-up operations at sites recognized by Federal, state, local or other governmental bodies as uncontrolled hazardous waste sites;

Operations involving hazardous waste that area conducted at treatment, storage, disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or by agencies under agreement with U.S.E.P.A. to implement RCRA regulations; and Emergency response operations for releases of, or substantial threats of releases of, hazardous substances with regard to the location of the hazard.

## **8. FIRE PREVENTION PLAN:**

We at **Name** Construction Company limit our employees participation to the use of portable fire extinguishers. The site supervisor at safety orientation will cover this Plan. The following topics will include:

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- a) All areas controlled by the primary contractor are required to maintain fire protection during their occupancy. As a minimum smoke detectors and heat sensors shall be in place whenever the areas original fire protection has been compromised.
- b) All fire extinguishers must be checked and tagged every thirty day
- c) The general principles of fire extinguisher use and the hazards involved with incipient stage firefighting.
- d) Actions to be taken by authorized person(s)
- (1) Evacuate area.
  - (2) Notify site supervisor and/or project manager.
  - (3) Determine if fire is incipient
  - (4) Utilize fire extinguisher.
  - (5) If fire or smoke is too great, report to safe zone.
  - (6) Make call to Fire Department if instructed by supervisor and/or project manager.
- e) Actions to be taken by unauthorized person(s)
- (1) Evacuate area
  - (2) Notify supervisor and/or project manager.
  - (3) Report to safe zone.
  - (4) Make call to Fire Department if instructed by site supervisor and/or project manager.
- f) Only approved fire extinguishers will be onsite and checked on a daily basis by the site supervisor. These will be located in the following areas, but not limited to:
- (1) Portable Fire Extinguishers
  - (2) Individual Roles and Responsibilities
  - (3) Fire Watch
  - (4) Response Plans
  - (5) Safe Zone
  - (6) Notification
  - (7) Site Mapping
  - (8) Inside field office.
  - (9) In any area where cutting or welding is taking place
- g) The following sections listed below are all part of this Accident Prevention Plan. The information below contains additional requirements that are part of this Fire Prevention Plan:
- Safety and Health Inspections
  - Firefighting Plan
  - Posting of Emergency Numbers
  - Hazard Communication Program
  - Site Sanitation Plan

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- (1) The risk of a job site fire can be avoided through; safety and health inspections, housekeeping, proper maintenance, proper storage and handling, ensuring all employees and subcontractors are performing their designated work duties properly, the handling of supplies and equipment as directed, following all guidelines set forth through operating manuals, instructions, and training,
- (2) All employees and subcontractors require the proper storage of combustibles. Combustible liquids must be stored and covered in approved containers.
- (3) All chemical spills including, of course, combustible liquids, must be cleaned up immediately.
- (4) All chemical and chemical products will be handled and stored in accordance with the procedures noted on their individual MSDS

**Note:** Care must be taken when cleaning up chemical spills. Information on appropriate personal protective equipment, proper disposal, proper cleanup procedures, required ventilation, etc is found on the products MSDS.

- (5) Cleanup materials and damaged containers must be properly disposed.
  - (6) Combustible liquids and trash must be segregated and stored away from ignition sources.
  - (7) Approved portable fire extinguishers will be checked on daily basis, ensuring they are charged and ready for use.
  - (8) Smoking is not permitted inside the facility. Only designated areas by the VA will be permitted (outside), with smoking debris discarded in designated areas..
  - (9) Debris will not be allowed to accumulate on the job site and will be maintained daily.
- h) Submission of a Burn Permit. **Name** Construction will submit a Burn Permit to the COTR to perform acetylene oxygen welding, brazing and cutting, the following precautionary measures will be required as part of this permit along with any additional requirements by the VA Medical Center Policy **138-012 (Hot Work)**:
- (1) Inspect all surroundings and equipment to insure that combustible substances are not present in any area where contact of metal at a temperature above the flashpoint of any compound is possible.
  - (2) Ensure that no open containers or spills of combustible substances are present.

#### GENERAL REQUIREMENTS

- (3) Ensure that ignition is not possible by conduction, convection, radiation, or dispersion of molten metal.
- (4) Proper protection equipment and practices will be used, i.e., fireproof blankets, removal of combustible materials where practicable, and portable fire extinguishers of proper type on hand.
- (5) When the above operations are in use a continuous Fire Watch will be performed while equipment is being used.
- (6) Training in fire protection will occur at the site safety orientation. This training shall include the following topics, but not limited to:

## 9. SITE SAFETY RULES:

**Name** Construction Company has developed a comprehensive safety and health program that addresses our specific safety and health concerns and provides guidance for the performance of our individual job tasks within the framework of appropriate Occupational Safety and Health Administration (OSHA) standards.

Safety requires not only that each person understand and perform individual tasks in a safe manner, but also that each individual is aware of his/her surroundings and is actively involved in the safety and health of others.

a) No Smoking: Smoking is not permitted inside the facility. Only designated areas by the VA will be permitted (outside), with smoking debris discarded in designated areas.

b) Accidents: In the event of an emergency, workers will notify the site supervisor or project manager of the situation, at that time, workers will report to the safe zone. The site supervisor and/or project manager will notify security and any other applicable authorities.

The goals for all projects are as follows:

- (1) Zero accident rate
- (2) Zero injury/illness rate
- (3) Compliance with all applicable Local, State, OSHA standards and Veterans Affairs Safety Directives

c) Hard Hats: Head Protection will be as follows:

- All workers on this site will be required to wear approved hard hats when working in the close proximity of heavy equipment and where structural steel is being hoisted

## GENERAL REQUIREMENTS

- In the area where another workers activities may exposing them to injury.
- d) Hazard Reporting: Each employee is encouraged to contact their Supervisor immediately should a safety or health risk exist so that corrective action may be taken immediately.
- e) Controlled Substances: Therefore, the following actions are strictly prohibited and will prompt disciplinary action up to and including consideration for immediate discharge:
- (1) The illegal use, sale, arranging for sale, possession or manufacturing of narcotics, drugs or controlled substances while on the job or on VA property.
  - (2) The use of alcohol or illegal drugs while on the job or VA property.
- f) Safety Devices: **Name** Construction Company has fulfilled all required Safety and Health Plans and Programs according to regulation, and has installed all required safety device for the equipment being used for the tasks. Failure to use or to disable the mentioned safety device relating to CFR 1910 and 1926 standards to ensure 100% safety will be grounds for review .

The goal is to provide the company and its workers protection against those individuals who refuse to act in a consistently safe manner.

Without proper enforcement, the policy will not be able to deliver the intended results. Therefore, it is essential that all employees be held accountable to these guidelines for disciplinary actions up to and including discharge.

g) Personnel Protective Equipment: Procedures for implementing an effective PPE policy in accordance with 29 CFR 1910.132, will be as follows:

(1) During a pre-construction walk through, **Contact Name**, the Project Manager, will perform a job site hazard assessment.

(a) HAZARD ASSESSMENT: The purpose of the survey is to identify sources of hazards to workers and co-workers. The documentation of this hazard assessment is located in PCRA (Pre-Construction Risk Assessment)

(b) POTENTIAL HAZARD SOURCES (**Adjust based on scope of work**)

- **Surfaces that could become slick, uneven walking and working surfaces**
- **Welding / Brazing Hazards**
- **Quality Air Control**
- **Electrical Hazards**

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- **Potential Overhead Obstructions (above ceiling)**
- **Fall Protection**
- **Rolling or pinching objects**
- **Sharp objects that might pierce feet or cut hands**
- **Motion that includes tool movement, moving machinery, or machine parts, or movement of personnel that could result in collision with stationary objects.**

(c) EMPLOYEE TRAINING: **Name** Construction Company employees will be trained, at the site safety orientation on the following topics:

- When PPE is necessary.
- What PPE is necessary and which PPE has been selected for each process the employee operates.
- How to properly put on, take off, adjust and wear PPE.

(2) Each of the basic hazards has been reviewed and a determination made as to the type, level of risk, and seriousness of potential injury.

- When exposure to hazards cannot be engineered completely out of normal operations or maintenance work.
- When safe work practices cannot provide sufficient additional protection.
- A Final method of control is through the use of protective clothing or equipment. These include eye protection, steel-toed shoes, hard hats, hearing protection, gloves, and fall protection

(3) Consideration has been given to the possibility of exposure to several hazards at once. The general procedure for determining appropriate protective equipment is to:

- Identify the potential hazards and the type of protective equipment that is available, and what protection it provides.
- Compare the capabilities of various types of PPE with the hazards associated with the environment.
- Select the PPE, which provides a level of protection greater than the minimum required to protect employees from the hazards.
- Select PPE that will fit each employee properly and provides protection from the hazard.
- The Hazard Assessment Worksheet is located in Appendix D.

h) Horseplay: Safety training needs will be identified by continual reassessment of our work methods, equipment and job sites as well as employee and management input. Observation of unsafe acts will be addressed immediately.

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- i) Reporting Under the Influence:
  - (1) Arriving at work or working under the influence of alcohol or illegal drugs, narcotics or controlled substances.
  - (2) Any illegal substance confiscated pursuant to this policy will be turned over to the proper authorities.
- j) Flammable Liquid Storage: It is mandatory that all subcontractors submit, before a new chemical is introduced to the worksite, that the proper MSDS is submitted to the site supervisor/project manager. It will be the responsibility of the site supervisor to inform all employees and subcontractors of the new chemical(s), introduce the MSDS, and the potential hazards of that chemical. The site supervisor and/or project manager will have the responsibility to notify the Contracting Officer / COTR of any and all new chemicals brought onto the facility.
- k) Heavy Equipment Operation

#### **10. WEEKLY CONTRACTOR REVIEWS:**

- a) The primary site supervisor, who is the competent person (certifications in Appendix will conduct the initial employee site safety orientation.
- b) Mandatory safety meetings will be held on a weekly basis. Safety and health topics will vary from week to week on subject matter, utilizing the 29 CFR 1910 and 29 CFR 1926 standards, along with the Veterans Affairs Safety and Health Program and issues raised during construction.(Place documentation of training sign-in sheets and agenda in Appendix B)
- c) Safety takes a commitment from all personnel within our organization. Weekly Training will be interactive with an opportunity for all to actively participate, ask questions, make suggestions, and refer to our written policies and procedures.

#### **11. COMPETENT PERSON:**

- a) A Site Safety and Health Officer (SSHO) will be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor and subcontractors.
- b) The SSHO will be employed by the prime. SSHO qualifications with education certificates will be listed in Appendix B.
- d) There will be a competent person for maintaining a Health Hazard Control and Respiratory Protection Program. They will conduct and document a hazard assessment in accordance with Section 06 to identify and evaluate the need and level of protection required for the activities being scheduled. (What form of documentation).
- d) Conduct daily safety and health inspections and maintain a written log which includes

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area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors daily quality control report. Current "Safety Logs" shall be readily available upon request.

## **12. WRITTEN PROTOCOLS FOR OUTSIDE INSPECTIONS:**

a) Presentation of Credentials - Upon arrival at the work site or facility, the OSHA compliance officer must display his or her credentials and will ask to meet with the appropriate employer representative.

b) The contractor must notify the COTR immediately upon the initial OSHA Contact.

(1) Opening Conference – During an opening conference, the compliance officer will explain the purpose of the inspection. Contractor Management representatives must be prepared to discuss actions that have been taken to demonstrate their company's commitment to the health and safety of employees (e.g. work practices, safety and industrial hygiene standards, safety manuals, training conducted, internal inspections, etc).

(2) An authorized employee representative will be given the opportunity to attend the opening conference and to accompany the compliance officer during the inspection. Employees may also be consulted during the conduct of the inspection. Employees who participate in the inspection, or are consulted by the compliance officer, are protected under the OSHA act from discrimination for exercising their safety and health rights.

(3) A contractor management representative and a VAMC Cleveland Safety representative must accompany the compliance officer during the inspection and keep accurate notes of any actual or possible violations found by the compliance officer. Obvious violations detected by the compliance officer should be corrected on the spot where possible.

(4) It is imperative that existing operations, reports, logs, etc. not be misrepresented to the compliance officer. The penalty for making false statements or representation to OSHA or its compliance officers is a maximum of \$10,000 and 6 months imprisonment. In addition, the offending party can be subject to discipline by the company up to and including discharge

(5) Closing Conference - After the inspection has been conducted, a closing conference will be held between the compliance officer, the employer and employee representatives and VAMC Cleveland. This is the best time, before possible issuance of a citation, to explain the company's position. It is imperative that we question any proposed findings or abatement periods that are unreasonable. Request that any citations be sent to the company with a copy to the VAMC Cleveland safety office.

### 13. SUBCONTRACTOR SITE SPECIFIC SAFETY PLAN:

As part of employment with **Name** Construction Company, **employees** are required to comply with all aspects **of their** corporate level "Safety and Health Plan".

- Supervisors are expected and required to comply with all aspects of the corporate level "Safety and Health Plan" as well as to enforce all applicable requirements at the jobsite.
- Supervisors are expected and required to complete all necessary site safety documentation in a complete and timely manner.
- Supervisors are required to report all safety incidents to the main office as soon as possible. The projects COTR is to be notified ASAP. The above items represent the method used to ensure our goals are met.

### 14. REQUIRED POSTERS:

This Policy Statement will be conspicuously posted in the job site office along with all other required postings including the OSHA Form 300, Log and Summary of Occupational Injuries and Illnesses.

### 15. SUBCONTRACTOR/SUPPLIERS ORIENTATION PROGRAM:

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- a) Identification of subcontractors:  
**Name of Subcontractor** (List all subcontractors expected to be on site)

- b) Controlling and coordination of subcontractors and suppliers:

Suppliers will be under close supervision during material delivery and pick-up. Communication with suppliers will be important to ensure loads are put in designated areas, and supplier is made aware of any immediate hazards in the area he/she will be in. A project schedule has been coordinated and submitted for approval for the coordination of the scope of work being performed.

- c) SAFETY RESPONSIBILITIES OF SUBCONTRACTORS AND SUPPLIERS:

All subcontractors will be responsible to Submit and implement their corporate level Safety and Health Plan as appropriate for the project. Subcontractor shall submit these documents to **Name** Construction Company for approval prior to the start of their activities on the work site. In addition, they will be responsible for adhering to all applicable OSHA and the Veterans Affairs Safety and Health Program requirements. These documents will be verified through our own site safety inspections and meetings.

In the event that a subcontractor does not have the required safety and health programs, their employees will receive training utilizing **Name** Construction Company's safety and health programs prior to accessing the work site. This training will be documented and compliance with the provisions of **Name** Construction Company's Safety and Health programs will be mandatory as well as being readily accessible.

## 16. REPORTING OF CATASTROPHIC EVENTS:

It is the policy of **Name** Construction Company to provide a work environment that is inherently safe. The safety and health of our employees is of primary importance as they are our most important resource

- Pre-emergency planning and coordination with outside parties:

VAMC (COTR) will receive notification of date to start work, along with MSDS's of all substances brought onto the facility.

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- Personal roles, lines of authority, training, and communication:

The personnel utilizing chemicals will contain the substances brought onto the facility. Plumbers will contain and handle all compressed gas cylinders, providing they have been trained and documented.

In the case where a situation occurs that they cannot handle, all employees will be trained on evacuating the area, notifying the on-site supervisor, and workers in the immediate worksite.

- Emergency recognition and prevention:

All workers will, at the safety orientation, be informed of this site-specific emergency response plan and procedures.

All workers will be responsible to recognize hazards and their prevention, practice this at all times on the worksite.

All workers will be responsible to answer question from surveyors about general safety, health, and emergency procedures wherever they are on site.

- Safe distances and places of refuge:

All workers at this site will be informed of the designated location of the safe zone. This will also be posted in the field office for all to be reminded of. In the event of an emergency occurrence, and the Local Fire Department, or any other entity is summoned, all workers will report to this zone to be accounted for.

- Site security and control:

In the event of an emergency, workers will notify the site supervisor or project manager of the situation, at that time, workers will report to the safe zone. The site supervisor and/or project manager will notify security and any other applicable authorities. Staying away from the immediate situation and not allowing any unauthorized personnel to enter until proper authorities arrive.

- Evacuation routes and procedures:

Any work will be performed on the interior of the building. Evacuation plans are posted in various locations throughout work area by the VA.

- Decontamination:

This would be required if there is a possibility of a large spill of hazardous material with the potential of contaminating contractor employees. Small spills and personnel contaminations are expected to be cleaned up using the contractors Hazard Communication program and associated MSDS requirements.

- Emergency medical treatment and first aid:

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- Emergency alerting and response procedures:

It will be the duty of all workers onsite, including subcontractors, to immediately report to the site supervisor and/or project manager, COTR's any and all emergencies

**17. Site specific plans to address PCRA:**

- a. Only those hazards identified as "yes" on the PCRA need to be addressed.
- b. Modify the description of the safety precautions as needed to address the specific concern. You may refer to a company policy or company rule book to describe the safety precautions or safety plan; however, we will need to have a copy of your plan or policy on file.
- c. To place a check in the box
  - right click on the box
  - Click "Properties"
  - Click "Checked"
  - Click "OK"

## Pre Construction Risk Assessment (PCRA)

	Description of safety precautions or reference to contractor Safety Procedures
<input type="checkbox"/>	(1) Respiratory Protection Plan <ul style="list-style-type: none"> <li>○ Describe of <b>ACTIVITY</b> requiring respiratory protection if applicable</li> <li>○ <b>NEED</b> documentation of training.</li> <li>○ <b>Need</b> documentation of fit test.</li> </ul>
<input type="checkbox"/>	(2) Hearing: Protection Plan Any area with noise levels at or above 85dba will be required to wear hearing protection. When workers are utilizing loud equipment, or being exposed to such levels, hearing protection shall be provided.
<input type="checkbox"/>	(3) PPE other: Personal protective equipment (PPE) includes hard hats, gloves, safety glasses, steel-toed shoes/boots, hearing protection, and personal fall protection. <p style="margin-left: 40px;">Eye protection will be as follows:</p> <ul style="list-style-type: none"> <li>○ Safety glasses used for any worker performing, observing tasks that may result in flying objects, dust, or in the area where another workers activities may exposing them to eye injury.</li> <li>○ During welding/cutting operations, the required filter lenses will be utilized according to the operation, electrode size and arc current.</li> </ul> <p style="margin-left: 40px;">Foot Protection:</p> <ul style="list-style-type: none"> <li>○ All workers will be required to wear the appropriate foot protection.</li> <li>○ Steel-toed shoes/boots are mandatory.</li> </ul> <p style="margin-left: 40px;">Hand Protection:</p> <ul style="list-style-type: none"> <li>○ Workers may be exposed to hand injuries from;               <ul style="list-style-type: none"> <li>▪ sharp objects,</li> <li>▪ abrasive materials</li> <li>▪ and weather.</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>○ Gloves designed to protect against the specific hazard encountered are an effective means of reducing such risks and will be used on this project.</li> </ul>
<input type="checkbox"/>	<p>(4) Overhead hazards: <b>(Example)There will be X critical lifts required on this project. A crane will be utilized to load new materials onto X<sup>th</sup> floor roof and remove demolished material from the roof. A plan will be submitted and approved prior to this work being performed.</b></p>
<input type="checkbox"/>	<p>(5) Confined space: Procedures for entering a confined space depend on the type of confined space and the scope of work associated with the entry.</p> <ul style="list-style-type: none"> <li>a) The VAMC Cleveland Confined Space Entry Program provides the detailed information necessary for regulatory compliance. The contractor may use the VAMC Program or their own providing that it meets regulatory compliance and is reviewed and approved before entry is made.</li> <li>b) Under no circumstances should a person enter into a posted confined space without notifying the COTR. A "Shutdown Request" reviewed by Occupational Health and Safety and approved by the COTR will be used for this notification.</li> <li>c) Sub-basements are considered non-permit required confined spaces unless welding is performed or other hazards introduced that may create a hazardous atmosphere. When atmospheric hazards are identified then the sub-basements will be worked under the alternate procedure provisions provided that continuous ventilation is used to control the atmospheric hazard.</li> <li>d) Areas posted as "Permit Required" confined spaces will not be entered unless the hazards are eliminated and the space is reclassified. All tanks, voids, ventilation ducts and sewers are considered "Permit Required" confined spaces unless a hazard assessment is conducted and the space is reclassified.</li> <li>e) Employees entering confined spaces will be trained. Training will be based on the Confined Space Entry Program, ANSI National Standard "Safety Requirements for working in Tanks and other Confined Spaces" (ANSI Z117.1), or equivalent training</li> </ul>
<input type="checkbox"/>	<p>(6) Ladders: Workers that may be performing work on ladders are instructed to adhere to the following:</p> <ul style="list-style-type: none"> <li>▪ Inspect before using</li> <li>▪ Place ladder using 4 to 1 rule</li> <li>▪ Never place base of ladder on objects</li> <li>▪ Never place ladder in front of door unless</li> </ul>

## GENERAL REQUIREMENTS

	<ul style="list-style-type: none"> <li>▪ Door is blocked in open position</li> <li>▪ Door is demarcated off</li> <li>▪ Door is locked</li> </ul>
<input type="checkbox"/>	<p>(7) Scaffolding: For work that requires scaffolding use for employees and subcontractors, personal fall protection shall be mandatory, unless working less than 6 ft. The following topics listed will be conveyed to workers prior to scaffolding use</p> <ul style="list-style-type: none"> <li>▪ Review scaffolding supplier pamphlet for proper construction</li> <li>▪ Inspect scaffolding structure before initial use/and daily</li> <li>▪ Report any defects immediately / do not use / tag out of service</li> <li>▪ Placement of structure</li> <li>▪ When fall protection is required</li> <li>▪ What you can tie off to</li> </ul>
<input type="checkbox"/>	<p>(8) Work platforms: Describe type of platform required and specific requirements for its use.</p>
<input type="checkbox"/>	<p>(9) Fall protection: Personal Fall Protection <b>Name</b> Construction Company requires all employees working at or above 6' to wear personal fall protection, unless the personal fall protection creates a safety hazard by utilizing it. In that case, other means of fall protection shall be provided.</p>
<input type="checkbox"/>	<p>(10) Asbestos: As part of the Asbestos program, <b>Name</b> Construction Company will inform subcontractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety, or other hazards. The substances listed in Section 13, paragraph c, under MSDS, have the potential to be released or spilled. Section 13.c, Hazard Communication, lists some potential hazards that contractors and/or subcontractors may encounter. Also listed are the response actions to be taken and the proper notification.</p>
<input type="checkbox"/>	<p>(11) Hazardous materials: The substances listed in Section 13 paragraph c, under MSDS, have the potential to be released or spilled. Section 13 c, Hazard Communication, lists some potential hazards that contractors and/or subcontractors may encounter. Also listed are the response actions to be taken and the proper notification. MSDS sheets must be made available for review by the VAMC and contracted employees.</p>

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<input type="checkbox"/>	<p>(12) Hot work: The <b>Name</b> Construction Company will follow VAMC Cleveland's Hot work Policy (MCP 138-012), <b>Name</b> Construction will submit a Hot Work Permit to the COTR to perform acetylene oxygen welding, brazing and cutting, the following precautionary measures will be required.</p> <ul style="list-style-type: none"> <li>▪ Inspect all surroundings and equipment to insure that combustible substances are not present in any area where contact of metal at a temperature above the flashpoint of any compound is possible.</li> <li>▪ Ensure that no open containers or spills of combustible substances are present.</li> <li>▪ Ensure that ignition is not possible by conduction, convection, radiation, or dispersion of molten metal.</li> <li>▪ Proper protection equipment and practices will be used, i.e., fireproof blankets, removal of combustible materials where practicable, and portable fire extinguishers of proper type on hand.</li> <li>▪ When the above operations are in use a continuous Fire Watch will be performed while equipment is being used.</li> <li>▪ Training in fire protection will occur at the site safety orientation.</li> </ul>
<input type="checkbox"/>	<p>(13) Ventilation: <b>Describe the type of forced ventilation that will be used and the reason it is required. Example: A 500 CFM Red Devil blower will be set up for welding operations in the sub-basement. The exhaust of this blower will be directed to the outside.</b></p>
<input type="checkbox"/>	<p>(14) Power distribution: Describe the circumstances that would make it necessary for disruption of power from the main power lines or associated transformers entering the facility.</p>
<input type="checkbox"/>	<p>(15) Work being done on energized equipment: Any work to be done on Energized Equipment must be done in accordance with Medical Center Policy (MCP) 138 – 03 (Working on Energized Equipment). The Medical Centers Directors permission is required to work any circuit energized. A Energized Circuit Work permit must be approved before starting work.</p>
<input type="checkbox"/>	<p>(16) Other electric: List Specifics</p>
<input type="checkbox"/>	<p>(17) Loto:</p> <ul style="list-style-type: none"> <li>▪ Only VA Employees will manipulate breakers or valves to perform a Lock Out Tag unless specific permission (in writing) is obtained by the Assistant Chief Engineering, M&amp;O.</li> <li>▪ The VA will hang Locks or tags on valves or breakers as requested by the project manager.</li> </ul>

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	<ul style="list-style-type: none"> <li>▪ After the VA places their lock on the device, then <b>Name</b> Construction Company will be allowed to place their lock on the device.</li> <li>▪ When clearing the Lock Out Tag Out, <b>Name</b> Construction.</li> <li>▪ Company will remove <b>Name</b> Construction's locks and notify the COTR.</li> <li>▪ The VA will then remove the VA locks and reposition the valve or breaker at the request of <b>Name</b> Construction Company.</li> </ul>
<input type="checkbox"/>	(18) Crane operation: <b>(Example) There will be X critical lifts required on this project. A crane will be utilized to load new materials onto Xth floor roof and remove demolished material from the roof. A plan will be submitted and approved prior to this work being performed.</b>
<input type="checkbox"/>	(19) Excavating; Trenches, ditches – Describe the type, name of competent person, trench boxes required and if necessary air sampling requirements.
<input type="checkbox"/>	(20) Earthmoving: <b>(Example)</b> The use of this equipment will be required on this project for moving of earth. Safety will be the responsibility of the company performing the work.
<input type="checkbox"/>	(21) Industrial trucks: <b>(Example)</b> The use of this equipment will be required on this project for loading materials onto the X <sup>th</sup> floor roof. Industrial truck safety will be the responsibility of the company performing the work.
<input type="checkbox"/>	(22) Other motorized equipment: List type and specific use. Only qualified operators will be allowed to operate motorized equipment. Diesel powered equipment will not be used near medical Center Ventilation Intakes.
<input type="checkbox"/>	(23) Concrete, Masonry operations: Describe the work to be performed and what fall protection will be provided for workers on forms that are higher than six feet.
<input type="checkbox"/>	(24) Steel Erection: Describe the type of steel erection, fire protection coatings used and fall protection requirements if not already addressed in (10) Fall Protection.

## GENERAL REQUIREMENTS

<input type="checkbox"/>	(25) Alteration or Improvement of existing Electrical transmission and distribution lines and equipment. – Describe the scope of work and provisions made to ensure that the facility does not lose power during the work.
<input type="checkbox"/>	<p>(26) Hand &amp; portable tools</p> <p>a) Hand Tools</p> <ol style="list-style-type: none"> <li>.1 For your own protection, do not misuse your tools. Use tools only for the purpose for which they were designed.</li> <li>.2 Your job will be easier and much safer if tools are in good condition. Take care in handling and storing tools.</li> <li>.3 You and the person in charge must be satisfied that all the tools you use on the job, whether they are Company- or personally-owned, are in safe condition.</li> <li>.4 Tools with mushroomed heads, loose, split or broken handles, broken screw drivers, defective pliers, wrenches with spread jaws, defective cords, ground wires and plugs, etc., must not be used.</li> <li>.5 Never use a defective tool. Defective tools are to be removed from service and marked defective.</li> <li>.6 For your own protection, do not misuse your tools.</li> <li>.7 Cover sharp-edged and pointed tools with scabbards and guards. Always use the guards when the tools are not in use.</li> <li>.8 Never strike the hardened part of one tool against the hardened part of another tool or against any hardened surface.</li> <li>.9 Never use a file with a tang unless it is equipped with a handle.</li> <li>.10 Never throw tools from one person to another or from one level to another.</li> <li>.11 Hot tools, equipment or materials on tables or benches, even if they are metal covered, shall be properly identified.</li> <li>.12 Never use improper handles when you work with jacks. Always remove</li> </ol>



	<p>handles when they are not being used.</p> <p>.13 Never use metal-shielded spotlights or flashlights around exposed electrical equipment.</p> <p>b) Extension Cords</p> <p>.1 Use only approved extension cords and lamp guards. Extension cord lamps used in explosion-hazard atmospheres, such as oil vapor or flammable gases, must be equipped with guards and vapor-proof globes. Do not use a lamp with a switch.</p> <p>.2 When you use an extension cord around switchboards, switch structures or electrical equipment, it must have a non-metallic socket and guard.</p> <p>.3 Use only specially approved low voltage (6 or 12 Volt) extension cords or ground fault circuit interrupter (GFCI) when you need portable lighting in wet locations. This type of cord should be used when you work outdoors, in tanks or in other areas where moisture or condensation may be a hazard.</p> <p>.4 Use GFCI protected circuits where required by the electric code. If there is a question about the requirements, contact Engineering Service for resolution.</p> <p>c) Tool Containers</p> <p>.1 Cover any grating to prevent your tools or material from falling. When you are working on scaffolds or platforms, use a suitable container for any of your tools that are not actually being used.</p> <p>d) Power Tools</p> <p>.1 Always wear the proper personal protective equipment including but not limited to eye protection.</p>
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GENERAL REQUIREMENTS

	<p>.2 Before you use any power tool, check to make sure:</p> <ul style="list-style-type: none"><li>• .it is properly tested;</li><li>• all guards are in place;</li><li>• all material is properly secured;</li><li>• you disconnect the tool electrically before inserting or removing any attachments; and</li><li>• you use GFCI protected circuits when required.</li></ul> <p>.3 While a machine is in operation:</p> <ul style="list-style-type: none"><li>• never remove chips with your hand; always use a suitable brush, hook or stick;</li><li>• do not let the machine run unattended;</li><li>• do not place tools or materials on machines where they can be jarred or pushed off;</li><li>• never try to stop a machine using your hands or any other part of your body as a brake; and</li><li>• both hands shall be used when working with portable tools.</li></ul> <p>.4 You must unplug power tools when they are left unattended. You must shut off and de-pressurize (bleed down) pneumatic- or hydraulic-operated tools when they are left unattended.</p> <p>.5 Keep the floor around machines clean and free from oil. If you spill any oil, wipe it up immediately or use an oil absorbent. Slipping is one of the most common causes of accidents.</p> <p>.6 Carefully inspect grinding machines before you use them. Be sure that:</p> <ul style="list-style-type: none"><li>• you perform a ring test prior to installing a new wheel;</li><li>• the wheel is secure on the driving shaft;</li><li>• the wheel is in good condition; dress or replace the wheel as necessary;</li><li>• the work rest is adjusted properly; and</li></ul>
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	<ul style="list-style-type: none"> <li>• the safety guard is in place and allows proper visibility to do the work.</li> <li>• Do not use the side of the wheel for grinding, unless it is specifically designed for side grinding.</li> <li>• Many wheels cannot stand up under side grinding.</li> <li>• Never drive a grinding wheel at speeds above that specified by the manufacturer.</li> <li>• When you grind small objects, hold them firmly in place with a suitable tool, not with your fingers.</li> <li>• Do not grind soft metals such as aluminum</li> </ul>
<input type="checkbox"/>	<p>(27) Compressed Gasses: Compressed gas cylinders may be used at this worksite. These cylinders and gases present an injury hazard in the event that a regulator or cylinder is damaged and/or broken. The particular gases used will be <b>(Name Gas)</b>. These hazards will be reduced by routine inspections and maintenance of compressed gas cylinders and by assuring all the units are secured from tipping. Safety caps will be installed on all cylinders that are not in use.</p> <p>Compressed gas cylinder will be kept away from excessive heat, will not be stored where they might be damaged or knocked over by passing or falling objects. The storage of oxygen and fuel gas compressed cylinders will be separated by at least 20 ft.</p>
<input type="checkbox"/>	<p>(28) Other hazardous activities <b>(Name and describe safety precautions)</b></p>
<input type="checkbox"/>	<p>(29) Infection Control : Infection Control (216-791-3800 Ext 4791) has been contacted for work in patient care or high risk areas to conduct an Infection Control Risk Assessment (ICRA). Provisions of the ICRA will be followed unless changed by Infection Control.</p>
<input type="checkbox"/>	<p>(30) Life Safety: Occupational Health and Safety 216-791-3800 Ext 4172 has been contacted to conduct a Life Safety Risk Assessment. Interim Life Safety measures have been determined and will be posted outside of the construction area. Fire extinguishers will be provided inside the construction area and they will</p>

## GENERAL REQUIREMENTS

	be inspected at a minimum of 30 day intervals. Provisions of the Interim Life Safety measures will be followed unless modified by Occupational Health and Safety. If penetrations are made in smoke/fire barriers the COTR will verify that they have been appropriately sealed before project completion.
<input type="checkbox"/>	(31) Emergency Procedures: Standard Emergency Response Plan is described in section 7. Additional provisions required for rescuing employees working at heights or working in Permit Required Confined Spaces will be as follows: <b>Describe Specifics</b>
<input type="checkbox"/>	(32) Demolition: Demolition is described in the Scope of Work Summary. Collection of demolition debris for recycling will minimize dust generation. All containers will be covered and employees will use appropriate methods for controlling the spread of dust outside the construction zone.
<input type="checkbox"/>	(33) New Construction Recycling: A minimum of X% of total project waste will be diverted to a landfill. a) Concrete  b) Steel
<input type="checkbox"/>	(34) Interior Remodeling Recycling: A minimum of X% of total project waste will be diverted to a landfill. a) Ceiling Tile  b) Steel  c) Carpet
<input type="checkbox"/>	(35) General Recycling: The following categories of waste shall be diverted from a landfill (Check all that apply):
	<input type="checkbox"/> Green Waste (Biodegradable landscaping material)
	<input type="checkbox"/> Soil
	<input type="checkbox"/> Inserts (concrete, asphalt, masonry)

## GENERAL REQUIREMENTS

<input type="checkbox"/>	Clean dimensional wood, palette wood
<input type="checkbox"/>	Engineered wood products, plywood, particle board, I joints, etc.
<input type="checkbox"/>	Cardboard Paper packaging
<input type="checkbox"/>	Asphalt Roofing materials
<input type="checkbox"/>	Insulation
<input type="checkbox"/>	Gypsum board
<input type="checkbox"/>	Carpet and pad
<input type="checkbox"/>	Paint
<input type="checkbox"/>	Plastics: ABX, PVC
<input type="checkbox"/>	Beverage containers

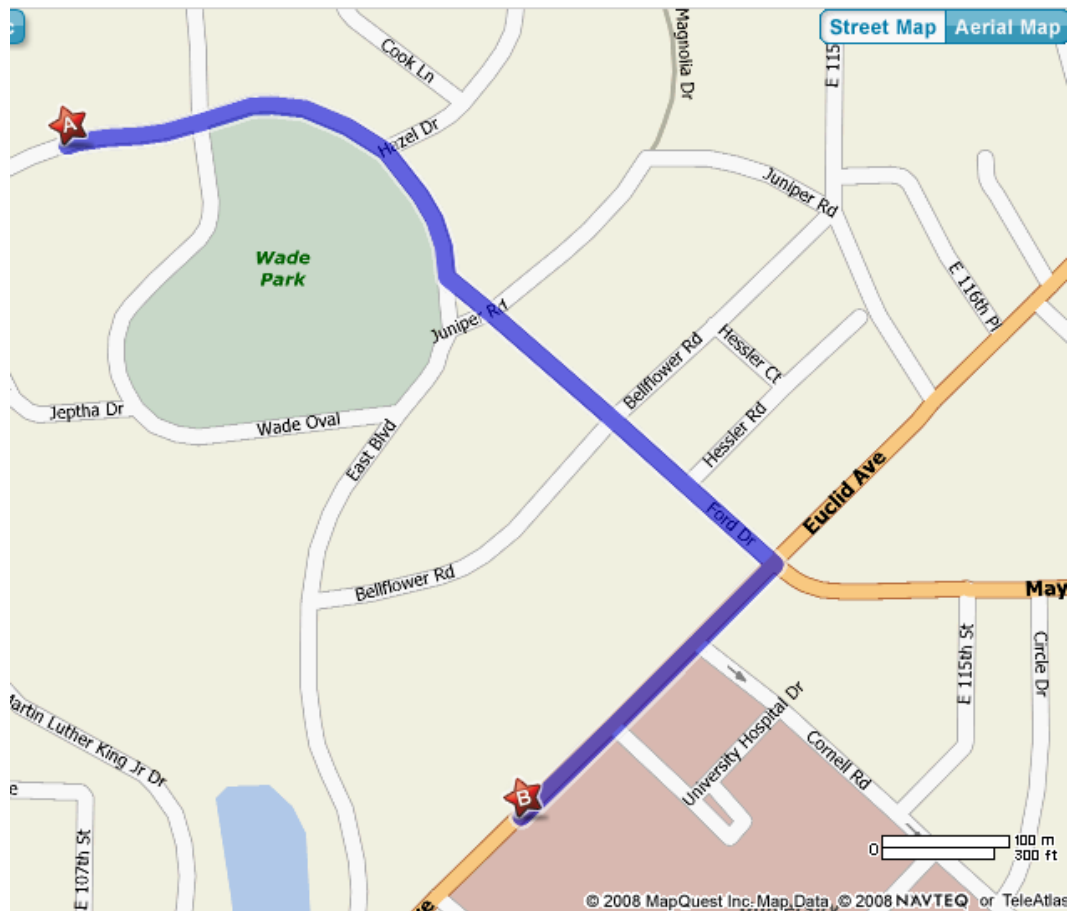
## GENERAL REQUIREMENTS

## **APPENDIX A**

### **Evacuation Routes Work Zone Layouts and Maps to Emergency Services**

Contractor and subcontractors working in the Medical Center will follow the posted exit signs and maps to evacuate the medical Center. To ensure all employees have been evacuated, they will meet at **(Location)**.

### Map from VAMC Cleveland (Wade Park Division) to University Hospital



GENERAL REQUIREMENTS

01 00 00 -43 ACCIDENT PREVENTION PLAN

# **APPENDIX B**

## **CERTIFICATIONS**

### **&**

## **JOBSITE DOCUMENTATION PROGRAM**

List all individuals including their titles, who have completed

1. OSHA 30 Hour Construction Safety Course
2. OSHA 10 Hour construction Safety Course
3. Competent Person Certifications for Respiratory Protection, Fall Protection, Trenching and Shoring, etc. as required by the Scope of Work and applicable regulations.

GENERAL REQUIREMENTS



## **APPENDIX C**

### **CONTRACTOR ACCIDENT RECORD**

#### **OSHA 300 FORM**

To be updated and maintained in the on site construction office or the  
service company if an office is not located on station.

GENERAL REQUIREMENTS

01 00 00 -45 ACCIDENT PREVENTION PLAN

## Site Specific Safety Plan Review Sheet

Project: \_\_\_\_\_ Date: \_\_\_\_\_

Plan Element	Yes	No	See Comments
1. Site Access and Control.			
2. Site Security.			
3. Substance Abuse Policy.			
4. Site Safety Audits (Inspections).			
5. Safety Training/Education Agenda.			
6. Accident Reporting and Investigation.			
7. Emergency Action Plan			
8. Fire Protection and Prevention.			
9. Site Safety Rules.			
a. <i>No Smoking</i> , except in designated areas.			
b. <i>All</i> accidents, no matter how minor, shall be reported immediately to your supervisor.			
c. Hard hats, construction-grade safety shoes, safety glasses, long pants, and shirts (with minimum 1/4-length sleeve) <i>must</i> be worn while on site.			
d. Report all hazards immediately to your supervisor.			
e. The possession, use, sale or distribution of controlled substances or alcohol on site is strictly prohibited, and is grounds for immediate dismissal.			
f. The overriding or defeating of any safety device is strictly prohibited and grounds for immediate dismissal.			
g. Failure to wear personal protective equipment when and where applicable is			

GENERAL REQUIREMENTS

grounds for immediate dismissal.			
h. Horseplay is strictly prohibited and is grounds for immediate dismissal.			
i. Reporting for work under the influence of drugs and/or alcohol is grounds for immediate dismissal.			
j. Flammable liquids and gases shall be stored in approved containers, and marked with content and appropriate hazard warnings.			
k. Only authorized employees shall be allowed to operate heavy equipment. Do not use tools for which you have not been trained. Contact your supervisor for appropriate training.			
10. Scheduling of weekly contractor safety reviews, site safety training, employee site orientation			
11. Provisions for Identification of Competent Person.			
12. Written protocols for addressing inspections by outside parties, i.e.,			
13. The General Contractor should receive and review the subcontractors Safety Plan to ensure the program is compliant with the site-specific plan. Subcontractors should be required, at a minimum, to submit written protocols relative to the hazards primary to the contractors line(s) of work (i.e., cranes, trenching and excavation, scaffolding, etc.).			
14. The required posters informing all employees of their rights and responsibilities should be posted in a prominent location within the workplace.			
15. A subcontractor orientation program			
16. Reporting of any fatality or catastrophic accident within 8 hours to the nearest OSHA Regional Office. Additionally, it is required that the local facility			

## GENERAL REQUIREMENTS

Safety Officer be included in this report chain.			
17. Specific Plans to address hazards identified on the Hazardous Work Activity Checklist.			

	Plan not approved
	Plan Approved as Written
	Plan approved with the following items needed before a specific activity can begin

	Activity	Required documentation
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Comments:

GENERAL REQUIREMENTS

01 00 00 -48 SAFETY PLAN

Construction Safety Manager	
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GENERAL REQUIREMENTS

01 00 00 -49 SAFETY PLAN

**LOUIS STOKES CLEVELAND****MEDICAL CENTER POLICY 138-061****VA MEDICAL CENTER****December 6, 2010****10701 East Boulevard****Cleveland, OH 44106****GREEN ENVIRONMENTAL MANAGEMENT SYSTEM (GEMS) POLICY****1. PURPOSE**

a. Executive Order 13148, Greening the Government through Leadership in Environmental Management, directed federal agencies to have a governing environmental policy in place for the operation of its facilities and required VHA facilities to implement an environmental management system. The Federal government has made significant progress in improving environmental and energy performance through a series of executive orders, Memoranda of Understanding, and other guidance. Implementing Executive Order 13423 *Strengthening Federal Environmental, Energy, and Transportation Management*, intends to build on that body of work and success by integrating and updating prior practices and requirements into a cohesive, strategic approach to further ensure enhanced performance and compliance with statutory and other legal requirements.

b. The most recent environmental EO (13514), "Federal Leadership in Environmental, Energy, and Economic Performance," was signed by President Obama on October 5, 2009. This EO does not rescind or eliminate the requirements of EO 13423 but instead expands on the energy reduction and environmental performance requirements for federal agencies.

c. The Louis Stokes VA Medical Center facilitates the use of its Green Environmental Management System (GEMS) Policy to attain continual improvement in environmental programs.

**2. POLICY**

a. The mission of the Louis Stokes Cleveland VA Medical Center is to deliver quality healthcare to our nation's veterans. In order to accomplish this mission, the VA Medical Center recognizes that it must operate so as to protect both the environment and the health and safety of patients, employees, and visitors. This governing environmental policy establishes a governing environmental policy to accomplish this mission. In

GENERAL REQUIREMENTS

accomplishing this mission of providing quality healthcare to our nation's veterans, it is this VA Medical Center's policy to:

(1) Further develop the VA Medical Center's GEMS program and implement Executive Order 13423 Strengthening Federal Environmental, Energy, and Transportation Management and 13514, "Federal Leadership in Environmental, Energy, and Economic Performance".

(2) Ensure VAMC employees at all levels be good stewards of the environment by complying with federal, state, and local environmental laws and other legal requirements, preventing pollution, minimizing waste, conserving cultural and natural resources, and continually improving environmental programs.

(3) Ensure top management commitment and accountability through the incorporation of position description elements and performance standards and/or measures related to environmental program management for appropriate senior-level VHA managers and other employees who have responsibilities related to the management of environmental programs.

(4) Place a high priority on obtaining funds and other necessary resources to ensure compliance by VA medical centers with Federal, state, and local environmental requirements, including implementation of GEMS. Top VHA managers must provide necessary support and resources to ensure the effectiveness of GEMS.

(5) Utilize sustainable practices to eliminate, minimize or mitigate adverse environmental impacts.

(6) Evaluate the operation of the VA Medical Center to incorporate actions into facility planning and procedures to reduce environmental vulnerabilities and ensure environmental compliance.

(7) Manage the operation of the medical center throughout its life cycle, from planning and acquisition through disposal and/or decommissioning to protect human

#### GENERAL REQUIREMENTS

health and the environment and minimize adverse effects on the natural environment consistent with VHA's mission.

(8) Comply with the requirements of VHA policy regarding Pollution Prevention (P2) Programs and integrate pollution prevention, waste minimization, natural resource conservation, affirmative procurement or "green" purchasing, life cycle costing, and environmental compliance into VA Medical Center operations, purchasing, planning, and decision making, wherever practical. Source reduction is the pollution prevention method of choice, followed by recycling, treatment of waste, and proper disposal.

(9) Use natural resources efficiently, maintain and protect plant and wildlife habitat consistent with the VA Medical Center's mission.

(10) Recognize that the development and construction at the VA Medical Center must consider the unique conditions of the environment of which the facility is a part.

(11) Train VA Medical Center staff as needed to carry out the environmental responsibilities of their position.

(12) Solicit input as appropriate, from stakeholders including staff, patients, visitors and the local community regarding environmental matters affecting the operation of the VHA facilities.

3. **RESPONSIBILITY.** All VA Medical Center employees must perform their functions consistent with regulatory requirements, VA environmental and other policies and its overall mission.

a. The Medical Center Director is responsible for supporting the VA Medical Center GEMS. The Medical Center Director ensures that adequate resources are provided to maintain effective monitoring and measuring and shall approve GEMS monitoring and measuring procedures.

b. GEMS Coordinator:

#### GENERAL REQUIREMENTS



(1) Is the key member and facilitator of the VA Medical Center GEMS Committee with technical expertise in environmental management systems, environmental technology and regulatory compliance.

(2) Is responsible for coordinating the various activities as well as periodic environmental compliance audits.

c. The GEMS Committee:

(1) Includes representatives from:

- (a) The Director's Office
- (b) Canteen Service
- (c) Contracting
- (d) Engineering
- (e) Engineering/Energy Manager
- (f) Chief, Environmental Management Service (Chairperson)
- (g) Infection Control
- (h) Material Management
- (i) Nutrition and Food Service
- (j) Nuclear Medicine
- (k) Nursing
- (l) Pathology and Laboratory Medicine Service
- (m) Pharmacy
- (n) Radiology
- (o) Research
- (p) Safety/Industrial Hygiene

(2) An effective GEMS Committee is vital for a successful GEMS Program. It should be used to facilitate organizational involvement in the GEMS Program. The GEMS Committee is responsible for:

- (a) Developing a comprehensive written GEMS Program.
- (b) Performing an annual review of the GEMS Program and making updates based on new information and results of audits and inspections.
- (c) Overseeing the development of GEMS and the implementation of EO 13423 and 13514.
- (d) Identifying significant aspects and impacts.
- (e) Setting and measuring objectives and targets.

GENERAL REQUIREMENTS

(f) Approving corrective action plans to ensure an effective, continuously-improving program.

(g) Reviewing and approving monitoring and measuring for significant aspects.

(h) Submitting an annual report on the effectiveness of the GEMS to the Medical Center Director for approval.

4. **PROCEDURES.** GEMS procedures are contained within the GEMS Manual.

## 5. REFERENCES

a. VA Directive 0057, VA Environmental Management System and Governing Environmental Policy

b. VHA Directive 2005-011, VHA Green Environmental Management System (GEMS) and Governing Environmental Policy Statement

c. ISO 14001, Environmental Management Systems

d. Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management

e. Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance"

6. **RESCISSION.** Medical Center Policy 138-061, Green Environmental Management Systems (GEMS) Policy dated June 1, 2009.

7. **REVIEW DATE.** The review date of this policy is December 6, 2013.

GENERAL REQUIREMENTS

01 00 00 -54 GEMS POLICY

**8. FOLLOW-UP RESPONSIBILITY.** Chief, Engineering Service.

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SUSAN M. FUEHRER

Medical Center Director

GENERAL REQUIREMENTS

01 00 00 -55 GEMS POLICY

## ***OSHA Requirements and Safety and Health Regulations***

### **PART 1 - OSHA Requirements**

#### **1.1 General**

- A. Contractors are required to comply with the Occupational Safety and Health Act of 1970. This will include the safety and health standard found in Code of Federal Regulations (CFR) 1910 and 1926. Copies of those standards can be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20420.
- B. In addition, Contractor will be required to comply with other applicable Medical Center policies and safety regulations. These policies and regulations will be presented to the Contractor at the pre-construction meeting. Each of the Contractor's employees will be required to read the statement of policies and regulations, and sign an acknowledgment that such policies and regulations are understood. Signed acknowledgment will be returned to the Contract Officer Technical Representative (COTR).
- C. Contractors involved with the removal, alteration or disturbance of asbestos-type insulation or materials or lead paint will be required to comply strictly with the regulations found in CFR 1910.1001 and the appropriate Environmental Protection Agency (EPA) lead regulations regarding disposal of asbestos or lead paint. Assistance in identifying asbestos or lead can be requested from the Medical Center's Industrial Hygienist and the COTR.
- D. Contractors entering locations of asbestos contamination or lead paint residue (i.e., pipe, basements, walls, windows) shall be responsible for providing respiratory protection to their employees and ensuring respirators are worn in accordance with the Occupational Safety and Health Administration (OSHA) [CFR 1910.1001(g)]. Asbestos-or lead paint-contaminated areas shall be defined on project drawings. The minimum equipment requirements will be a half-mask air-purifying respirator equipped with high efficiency filters and disposable coveralls, or as determined by air monitoring results.
- E. Contractor, along with other submittals and at least two weeks prior to bringing any materials on-site, must submit a complete list of chemicals the Contractor will use and Material Safety Data Sheets (MSDS) for all hazardous materials as defined in OSHA 1910.1200(d), Hazard Determination. Contracting Officer shall have final approval of all materials brought on site.
- F. The Contractor will be held solely responsible for the safety and health of

GENERAL REQUIREMENTS

their employees. The contractor will also be held responsible for protecting the health and safety of the VA Community (patients, staff, and visitors) from the unwanted effects of construction. VA staff will monitor the Contractor's performance in complying with all safety and health aspects of the project. Severe or constant violations may result in an immediate work stoppage or request for a Compliance Officer from the Occupational Safety and Health Administration.

- G. During all phases of demolition, construction and alterations, Contractors are required to understand and strictly follow National Fire Protection Association (NFPA) 241, Standard for Safeguarding Construction, Alteration and Demolition Operations. The Medical Center's Safety and Occupational Health Specialist or Industrial Hygienist will closely monitor the work area for compliance. Appropriate action will be taken for non-compliance.

## **PART 2 - Specific VA Medical Center Fire and Safety Policies, Procedures and Regulations**

### **2.1 Introduction.**

- A. The safety and fire protection of patients, employees, members of the public and government is one of continuous concern to this Medical Center.
- B. Contractors, their supervisors and employees are required to comply with Medical Center policies to ensure the occupational safety and health of all. Failure to comply may result in work stoppage.
- C. While working at this Medical Center, contractors are responsible for the occupational safety and health of their employees. Contractors are required to comply with the applicable OSHA standards found in 29 CFR 1910 for general industry and 29 CFR 1926 for construction. Failure to comply with these standards may result in work stoppage and a request to the Area Director of OSHA for a Compliance Officer to inspect your work site.
- D. Contractors are to comply with the requirements found in the National Fire Protection Association (NFPA) 241, Building Construction and Demolition Operation, and NFPA 51B, Fire Prevention in Use of Cutting and Welding Processes.
- E. Questions regarding occupational safety and health issues can be addressed to the Medical Center Safety and Occupational Health

GENERAL REQUIREMENTS

Specialist (ext. 4172) or Industrial Hygienist (ext. 4628).

- F. Smoking is not permitted in any interior areas of the Medical Center, including all interior stairwells, tunnels, construction and/or service/maintenance sites. Compliance with this policy by your direct and subcontracted labor force is required.

## **2.2 Hazard Communication**

- A. Contractors shall comply with OSHA Standard 29 CFR 1926.59, Hazard Communication.
- B. Contractors shall submit to the COTR, copies of MSDS covering all hazardous materials to which the Contractor and VA employees are exposed.
- C. Contractors shall inform the Safety Officer of the hazards to which VA personnel and patients may be exposed.
- D. Contractors shall have a written Hazard Communication Program available at the construction site, which details how the Contractor will comply with 29 CFR 1926.59.

## **2.3 Fires**

- A. All fires must be reported. In the event of a fire in your work area, use the nearest pull box station, and also notify Medical Center staff in the immediate area. Emergency notification can also be accomplished by dialing ext. 2222.
- B. Be sure to give the exact location from where you are calling and the nature of the emergency. If a Contractor experiences a fire that was rapidly extinguished by your staff, you still must notify the COTR within an hour of the event so that an investigation of the fire can be accomplished.

## **2.4 Fire Alarms, Smoke Detection and Sprinkler System**

If the nature of your work requires the deactivation of the fire alarm, smoke detection or sprinkler system, you must notify the COTR. Notification must be made in accordance with the major and minor shutdown requirements of the specification so time can be allowed to deactivate the system and provide alternative measures for fire protection. Under no circumstance is a Contractor allowed to deactivate any of the fire protection systems in this Medical Center.

### **GENERAL REQUIREMENTS**

## 2.5 Smoke Detectors

False alarms will not be tolerated. You are required to be familiar with the location of the smoke detectors in your work area. When performing cutting, burning or welding or any other operations that may cause smoke or dust, you must take steps to temporarily cover smoke detectors in order to prevent false alarms. Failure to take the appropriate action will result in the Contracting Officer assessing actual costs for government response for each false alarm that is preventable. Prior to covering the smoke detectors, the Contractor will notify the COTR, who will also be notified when the covers are removed.

## 2.6 Hot Work Permit

- A. Hot work is defined as operations including, but not limited to, cutting, welding, thermal welding, brazing, soldering, grinding, thermal spraying, thawing pipes or any similar situation. If such work is required, whenever possible the Contractor must notify the COTR no less than three (3) days in advance of such work. The Competent Hot Work Supervisor (CHWS) will inspect the work area and issue a Hot Work Permit, authorizing the performance of such work.
- B. All hot work will be performed in compliance with the Medical Center's policy 138-012 regarding Hot Work Permits and NFPA 241, Safeguarding Construction, Alteration and Demolition Operations; and NFPA 51B, Fire Prevention in Use of Cutting and Welding Processes; and applicable OSHA standard. A hot work permit will only be issued to individuals familiar with these regulations.
- C. A Hot Work Permit will be issued only for the period necessary to perform such work. In the event the time necessary will exceed one day, a Hot Work Permit may be issued for the period needed; however, the CHWS will inspect the area daily. Hot Work Permit will apply only to the location identified on the permit. If additional areas involve hot work, then additional permits must be requested.
- D. Contractors will not be allowed to perform hot work processes without the appropriate permit.
- E. Any work involving the Medical Center's fire protection system will require advance notification. Under no circumstance will the Contractor or employee attempt to alter or tamper with the existing fire protection system.
- F. Thirty minutes following completion of the hot work, the Fire Watch will

GENERAL REQUIREMENTS

perform an inspection of the area to confirm that sparks or drops of hot metal are not present.

## **2.7 Temporary Enclosures**

Only non-combustible materials will be used to construct temporary enclosures or barriers at this Medical Center. Materials used to construct dust barriers must conform to NFPA 701, Standard Methods of Fire Tests for Flame-Resistant Textiles and Films.

## **2.8 Flammable Liquids**

All flammable liquids will be kept in approved safety containers. Only the amount necessary for your immediate work will be allowed in the building. Flammable liquids must be removed from the building at the end of each day.

## **2.9 Compressed Gas Cylinders**

Compressed gas shall be secured in an upright position at all times. A suitable cylinder cart will be used to transport compressed gas cylinders. Only those compressed gas cylinders necessary for immediate work will be allowed in occupied buildings. All other compressed gas cylinders will be stored outside of buildings in a designated area. Contractors will comply with applicable standards compressed gas cylinders found in 29 CFR 1910 and 1926 (OSHA).

## **2.10 Internal Combustion Engine-Powered Equipment**

Equipment powered by an internal combustion engine (such as saws, compressors, generators, etc.) will not be used in an occupied building. Special consideration may be given for unoccupied buildings only if the OSHA and NFPA requirements have been met.

## **2.11 Powder-Activated Tools**

The operator of powder-activated tools must be trained and certified to use them. Powder-activated tools will be kept secured at all times. When not in use, the tools will be locked up. When in use, the operator will have the tool under his immediate control.

## **2.12 Tools**

- A. Under no circumstances will equipment, tools and other items of work to be left unattended for any reason. All tools, equipment and items of work must be under the immediate control of your employee.



- B. If for some reason a work area must be left unattended, then tools and other equipment must be placed in an appropriate box or container and locked. All tool boxes, containers or any other device used for the storage of tools and equipment will be provided with a latch and padlock, and will be kept locked at all times, except for putting in and removing tools.
- C. All doors to work areas will be closed and locked when rooms are left unattended. Failure to comply with this policy will be considered a violation of VA Regulations 1.218(b), Failure to comply with signs of a directive and restrictive nature posted for safety purposes, and subject to a \$50.00 fine. Subsequent similar violations may result in both imposition of such a fine as well as the Contracting Officer taking action under the contract's Accident Prevention Clause [Federal Acquisition Regulation (FAR) 52.236-13] to suspend all contract work until violations may be satisfactorily resolved, or under FAR 52.236-5, Material and Workmanship Clause, to remove from the worksite any personnel deemed by the Contracting Officer to be careless to the point of jeopardizing the welfare of facility patients or staff.
- D. You must report any tools or equipment that are missing to the VA Police Department.
- E. Tools and equipment found unattended will be confiscated and removed from the work area.

### **2.13 Ladders**

Ladders must not be left unattended in an upright position. Ladders must be attended at all times or taken down, and chained securely to a stationary object.

### **2.14 Scaffolds**

All scaffolds will be attended at all times. When not in use, an effective barricade (fence) will be erected around the scaffold to prevent use by unauthorized personnel (Reference OSHA 1926, Subpart L).

### **2.15 Excavations**

The contractor shall comply with OSHA 1926, Subpart P. An OSHA Competent Person must be on site during the excavation. The contractor shall coordinate with COTR and utility companies prior to the excavation to identify underground utilities tanks, etc. All excavations left unattended will be provided with a barricade suitable to prevent entry by unauthorized persons.

#### **GENERAL REQUIREMENTS**

## **2.16 Storage**

You must make prior arrangements with the COTR for the storage of building materials. Storage will not be allowed to accumulate in the Medical Center buildings.

## **2.17 Trash and Debris**

You must remove all trash and debris from the work area on a daily basis. Trash and debris will not be allowed to accumulate inside or outside of the buildings. You are responsible for making arrangements for removal of trash from the Medical Center facility.

## **2.18 Protection of Floors**

It may be necessary at times to take steps to protect floors from dirt, debris, paint, etc. A tarp or other protective covering may be used in accordance with specifications outlined in the general requirements section. However, you must maintain the proper amount of floor space for the safe passage of pedestrian traffic.

## **2.19 Signs**

Signs must be placed at the entrance to work areas warning people of your work. Signs must be suitable for the condition of the work. Small pieces of paper with printing or writing are not acceptable. The VA Medical Center (VAMC) Safety Officer or COTR can be consulted in this matter.

## **2.20 Accidents and Injuries**

Contractors must report all accidents and injuries involving their employees.

## **2.21 Infection Control**

Contractors must control the generation of dust and the contamination of patient care surfaces, supplies and equipment. During demolition phases of the construction:

- A. The construction area shall be under negative pressure, ensuring there is an appreciable flow of clean air from the VA-occupied portion of the facility into the construction area. The airflow shall be sufficiently strong enough to draw in the plastic door flaps commonly located at the construction entrance or at the specific site within the construction area.

- B. Construction debris being transported through the VA-occupied portion of the facility shall be covered and/or wetted.
- C. Construction employees shall remove dust-laden clothing before entering the VA-occupied portion of the facility.
- D. Carpet/sticky mats shall be placed at all construction entrances, and be satisfactorily maintained so as to minimize the tracking of dust into the VA-occupied portion of the facility.
- E. Dry sweeping of dust and debris is not to be performed.
- F. Contractor must obtain an Infection Control Construction permit from the COTR before work can begin. A separate permit is required for each area work is being done. Permit must be signed by the I.C. Nurse, COTR, and Contractor. Permit is required to be posted outside work site at all times.

(Control measures B - E above must be practiced during the construction phase.)

## **2.22 Confined Space Entry**

- A. Contractor will be notified if a project work area contains spaces requiring a confined space work permit. Entry to these confined space areas will only be permitted through compliance with a permit space program meeting the requirements of 29 CFR 1910.146 and 1926.21(b)(6).
- B. Contractor will be apprised of the elements including the hazards identified and the Medical Center's (last employer) experience with the space that makes the space in question a permit space.
- C. Contractor will be apprised of any precautions or procedures that the Medical Center has implemented for the protection of employees in or near permit space where Contractor personnel will be working.
- D. Medical Center and Contractor will coordinate entry operations when both Medical Center personnel and Contractor personnel will be working in or near permit spaces as required by 29 CFR 1910.146(d)(ii) and 1926.21(b)(6).
- E. Contractor will obtain any available information regarding permit space hazards and entry operation from the Medical Center.
- F. At the conclusion of the entry operations, the Medical Center and

GENERAL REQUIREMENTS

Contractor will discuss any hazards confronted or created in permit spaces.

- G. The Contractor is responsible for complying with 29 CFR 1910.246(d) through (g) and 1926.21(b)(6). The Medical Center, does not provide rescue and emergency services required by 29 CFR 1910.246(k) and 1926.21(b)(6).

### **2.23 Contractor Parking and Material Delivery**

Contractor's parking is not available at the medical center and the delivery of building materials tools, etc., must be pre-arranged with the COTR.

**SECTION 01 32 16.14  
CONSTRUCTION PROGRESS SCHEDULES**

**PART 1- GENERAL**

**1.1 DESCRIPTION:**

- A. The Contractor shall develop a Construction Progress Schedule demonstrating fulfillment of the contract requirements, shall keep the schedule up-to-date in accordance with the requirements of this section and shall utilize the plan for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers). Conventional Critical Path Method (CPM) Precedence Diagramming Method (PDM) technique will be utilized to satisfy both time and cost applications. All schedule data and reports required under this specification section shall be based upon regular total float, not relative total float schedules.
- B. Contractor shall not perform any work onsite until the schedule associated with that work is first approved by the VA.

**1.2 CONTRACTOR'S REPRESENTATIVE:**

- A. The Contractor shall designate an authorized representative in the firm who will be responsible for the preparation of the contract schedule, review and report progress of the project with and to the Contracting Officer's representative.
- B. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section and such authority shall not be interrupted throughout the duration of the project.

**1.3 CONTRACTOR'S CONSULTANT:**

- A. To prepare the schedule and electronic copy, which reflects the Contractor's project plan, the Contractor may engage an independent CPM consultant who is skilled in the time and cost application of scheduling using (PDM) network techniques for construction projects, the cost of which is included in the Contractor's bid; or prepared by Contractor's own qualified staff member.

**1.4 COMPUTER PRODUCED SCHEDULES**

- A. The contractor shall provide to the VA weekly computer processing of all computer-produced time/cost schedules and reports generated from weekly project updates. This weekly computer service will include: three copies of up to five different reports (inclusive of all pages) to the contracting officer's representative; a hard copy listing of all project

schedule changes, and associated data, made at the update; and the resulting weekly updated schedule. These must be submitted with and substantively support the contractor's monthly payment request and the signed lookahead report. The COTR shall identify the five different report formats that the contractor shall provide based upon the weekly schedule updates.

- B. The contractor is responsible for the correctness and timeliness of the computer-produced reports. The Contractor is also responsible for the accurate and timely submittal of the updated project schedule and all CPM data necessary to produce the computer reports and payment request that is specified.
- C. The VA shall report errors in computer-produced reports to the Contractor's representative within ten calendar days from receipt of reports. The Contractor will reprocess the computer-produced reports and associated electronic copy, when requested by the Contracting Officer's representative, to correct errors which affect the payment and schedule for the project.

#### **1.5 THE COMPLETE PROJECT NETWORK DIAGRAM SUBMITTAL**

- A. Within 14 calendar days after receipt of Notice to Proceed, the Contractor shall submit for the Contracting Officer's review; three blue line copies of the complete schedule on sheets of paper 765 x 1070 mm (30 x 42 inches). The submittal shall also include three copies of a computer-produced activity/event ID schedule showing project duration; phase completion dates; and other data, including event cost. Each activity/event on the computer-produced schedule shall contain as a minimum, but not limited to, activity/event ID, duration, predecessor and successor relationships, trade code, area code, description, budget amount, early start date, early finish date, late start date, late finish date and total float. Work activity/event relationships shall be restricted to finish-to-start, only, without lead or lag constraints. Activity/event date constraints, not required by the contract, will not be accepted unless submitted to and approved by the Contracting Officer. The contractor shall make a separate written detailed request to the Contracting Officer identifying these date constraints and secure the Contracting Officer's written approval before incorporating them into the schedule. The Contracting Officer's separate approval of the schedule shall not excuse the contractor of this requirement. Logic events (non-work) will be permitted where necessary to reflect proper logic among work events, but must have a zero duration. The complete working schedule shall reflect the Contractor's approach to scheduling

the complete project. The final schedule in its original form shall contain no contract changes or delays which may have been incurred during the final schedule development period and shall reflect the Contractors as bid schedule. These changes/delays shall be entered at the first update after the final schedule has been approved. The Contractor should provide their requests for time and supporting time extension analysis for contract time as a result of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION.

- B. Within 14 calendar days after receipt of the complete project schedule, the Contracting Officer or his representative, will accept or reject the schedule.
- C. The VA will process and return the approved baseline schedule data to the contractor for subsequent project schedule reporting and updating. This approved baseline schedule and the computer-produced schedule(s) generated there from shall constitute the approved baseline schedule until subsequently revised in accordance with the requirements of this section.
- D. The Complete Project Schedule will contain approximately 100 work activities/events.

#### **1.6 WORK ACTIVITY/EVENT COST DATA**

- A. The Contractor shall cost load all work activities/events except procurement activities. The cumulative amount of all cost loaded work activities/events (including alternates) shall equal the total contract price. Prorate overhead, profit and general conditions on all work activities/events for the entire project length. The contractor shall generate from this information cash flow curves indicating graphically the total percentage of work activity/event dollar value scheduled to be in place on early finish, late finish. These cash flow curves will be used by the Contracting Officer to assist him in determining approval or disapproval of the cost loading. In the event of disapproval, the Contractor shall revise and resubmit in accordance with Article, THE COMPLETE PROJECT SCHEDULE SUBMITTAL. Negative work activity/event cost data will not be acceptable, except on VA issued contract changes.
- B. In accordance with Article PERFORMANCE OF WORK BY THE CONTRACTOR in the GENERAL CONDITIONS, the Contractor shall submit, simultaneously with the cost per work activity/event of the construction schedule required by this Section, a responsibility code for all activities/events (referred to as "branches" in the GENERAL CONDITIONS) of the project for which the Contractor's forces will perform the work.

- C. The Contractor shall cost load work activities/events for ASBESTOS ABATEMENT. The sum of asbestos abatement work activity/event costs shall equal the value of the asbestos bid item in the Contractors' bid.
- D. The Contractor shall cost load work activities/events for all BID ITEMS. The sum of the cost loading for each bid item work activities/events shall equal the value of the item in the Contractors' bid.
- E. Work activities/events for Contractor bond shall have a trade code and area code of BOND.

#### **1.7 SCHEDULE REQUIREMENTS**

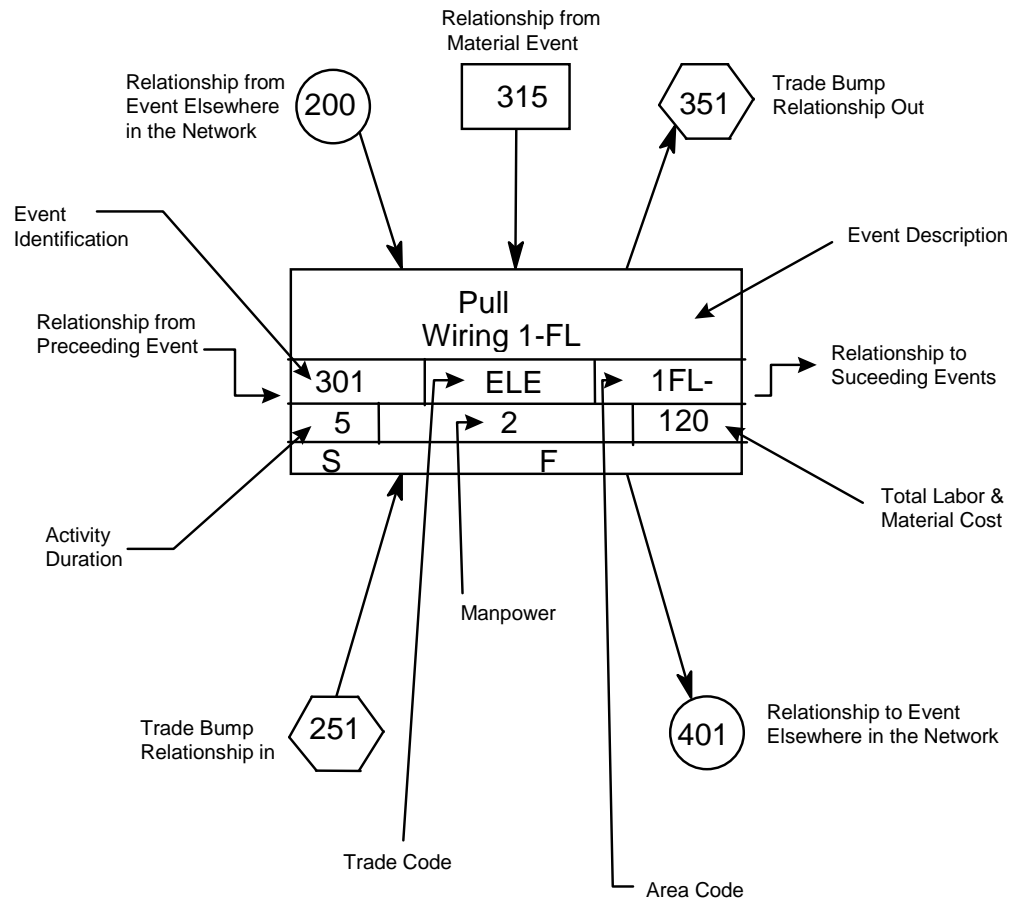
- A. Show on the schedule the sequence and interdependence of work activities/events required for complete performance of all items of work. In preparing the schedule, the Contractor shall:
  - 1. **Exercise sufficient care to produce a clear, legible and accurate schedule. Computer plotted schedules shall legibly display and plot all information required by the VA CPM activity/event legend or the computer plotted schedule will not be acceptable. If the computer plotted schedule is not found acceptable by the contracting officer's representative, then the schedule will need to be hand drafted and meet legibility requirements. Group activities related to specific physical areas of the project, on the schedule for ease of understanding and simplification. Provide a key plan on each schedule sheet showing the project area associated with the work activities/events shown on that sheet.**
  - 2. Show the following on each work activity/event:
    - a. Activity/Event ID number.
    - b. Concise description of the work represented by the activity/event. (35 characters or less including spaces preferred).
    - c. Performance responsibility or trade code (five alpha characters or less): GEN, MECH, ELEC, CARP, PLAST, or other acceptable abbreviations.
    - d. Duration (in work days.)
    - e. Cost (in accordance with Article, ACTIVITY/EVENT COST DATA of this section and less than \$9,999,999 per activity).
    - f. Work location or area code (five characters or less), descriptive of the area involved.
    - g. Manpower required (average number of men per day).
    - h. The SYMBOL LEGEND format shown below and on the drawing, CPM-1 (Sample CPM Network) is mandatory and shall be followed in



preparing final schedules.

## SYMBOL LEGEND

Show Network Diagram page number location(s) for all incoming/outgoing node connector(s).



3. Show activities/events as:

- a. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
- b. Contracting Officer's and Architect-Engineer's review and approval of shop drawings, equipment schedules, samples, template, or similar items.
- c. Interruption of VA Medical Center utilities, delivery of Government furnished equipment, and rough-in drawings, project phasing and any other specification requirements.
- d. Test, balance and adjust various systems and pieces of equipment, maintenance and operation manuals, instructions and preventive maintenance tasks.

- e. VA inspection and acceptance activity/event with a minimum duration of five work days at the end of each phase and immediately preceding any VA move activity/event required by the contract phasing for that phase. Schedule these activities/events so that only one phase is scheduled for completion within the same 30 consecutive calendar day period (except for those phases immediately preceding the final acceptance). Maintain this scheduling condition throughout the length of the contract unless waived by the Contracting Officer's representative in writing.
  - f. Work activities/events for the asbestos abatement bid item shall have a trade code of ASB.
  - g. Bid items other than the Base Bid (ITEM 1) and Asbestos Abatement item shall have trade codes corresponding to the appropriate bid item number (e.g., ITM 3, ITM 4 and other items).
- 4. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area, floor, or building, to another area, floor, or building, for at least five trades who are performing major work under this contract.
  - 5. Break up the work into activities/events of a duration no longer than 30 work days each, except as to non-construction activities/events (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities/events for which the Contracting Officer may approve the showing of a longer duration. The duration for VA approval of any required submittal, shop drawing, or other submittals shall not be less than 20 work days. Refer to drawing CPM-1 for VA approval activities/events which will require minimum duration longer than 30 workdays. The construction time as determined by the CPM schedule from early start to late finish for any sub-phase, phase or the entire project shall not exceed the contract time(s) specified or shown.
  - 6. Describe work activities/events clearly, so the work is readily identifiable for assessment of completion. Activities/events labeled "start," "continue," or "completion," are not specific and will not be allowed. Lead and lag time activities will not be acceptable.
  - 7. Uniquely number each activity/event with numbers ranging from 1 to 99998 only. The schedule should be generally numbered in sequence; left to right; top to bottom, and omitting numbers ending in 3, 6, and 9.

- B. Submit the following supporting data in addition to the schedule, activity/event ID schedule and electronic file (s). Failure of the Contractor to include this data will delay the review of the submittal until the Contracting Officer is in receipt of the missing data:
1. The proposed number of working days per week.
  2. The holidays to be observed during the life of the contract (by day, month, and year).
  3. The planned number of shifts per day.
  4. The number of hours per shift.
  5. List the major construction equipment to be used on the site, describing how each piece relates to and will be used in support of the submitted schedule work activities/events.
  6. Provide a typed, doubled spaced, description, at least one page in length, of the plan and your approach to constructing the project.
- C. To the extent that the schedule or any revised schedule shows anything not jointly agreed upon, it shall not be deemed to have been approved by the Contracting Officer. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase regardless of the Contracting Officer's approval of the schedule.
- D. Electronic Copy Requirements and CPM Activity/Event Record  
Specifications: Submit to the VA an electronic file(s) containing one file of the data required to produce the schedule, reflecting all the activities/events of the complete project schedule being submitted.

#### **1.8 PAYMENT TO THE CONTRACTOR:**

- A. Monthly, the contractor shall submit the AIA application and certificate for payment documents G702 & G703 reflecting updated schedule activities and cost data in accordance with the provisions of the following Article, PAYMENT AND PROGRESS REPORTING, as the basis upon which progress payments will be made pursuant to Article, PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS of the GENERAL CONDITIONS. The Contractor is entitled to a monthly progress payment upon approval of estimates as determined from the currently approved updated computer-produced calendar-dated schedule unless, in special situations, the Contracting Officer permits an exception to this requirement. Monthly payment requests shall include: three copies of up to five different reports (inclusive of all pages) to the contracting officer's representative; a listing of all project schedule changes, and associated data, made at the update; and an electronic file (s) of the

resulting weekly updated schedule. These must be submitted with and substantively support the contractor's monthly application and certificate for payment request documents.

- B. When the Contractor fails or refuses to furnish to the Contracting Officer the information and schedule in electronic format, which, in the sole judgment of the Contracting Officer, is necessary for processing the monthly progress payment, the Contractor shall not be deemed to have provided an estimate and supporting schedule data upon which progress payment may be made.

#### **1.9 PAYMENT AND PROGRESS REPORTING**

- A. Weekly job site progress meetings shall be held on dates mutually agreed to by the Contracting Officer (or Contracting Officer's representative) and the Contractor. Contractor and the CPM consultant will be required to attend all weekly progress meetings. Presence of Subcontractors during progress meeting is optional unless required by the Contracting Officer (or Contracting Officer's representative). The Contractor shall update the project schedule and all other data required by this section shall be accurately filled in and completed prior to the weekly progress meeting. The Contractor shall provide this information to the Contracting Officer or the VA representative in completed form three work days in advance of the progress meeting. Job progress will be reviewed to verify:
1. Actual start and/or finish dates for updated/completed activities/events.
  2. Remaining duration, required to complete each activity/event started, or scheduled to start, but not completed.
  3. Logic, time and cost data for change orders, and supplemental agreements that are to be incorporated into the schedule and computer-produced schedules. Changes in activity/event sequence and duration which have been made pursuant to the provisions of following Article, ADJUSTMENT OF CONTRACT COMPLETION.
  4. Percentage for completed and partially completed activities/events.
  5. Logic and duration revisions required by this section of the specifications.
  6. Activity/event duration and percent complete shall be updated independently.
- B. The Contractor shall submit a narrative report as a part of his weekly review and update, in a form agreed upon by the Contractor and the Contracting Officer. The narrative report shall include a description of problem areas; current and anticipated delaying factors and their

estimated impact on performance of other activities/events and completion dates; and an explanation of corrective action taken or proposed. This report is in addition to the daily reports pursuant to the provisions of Article, DAILY REPORT OF WORKERS AND MATERIALS in the GENERAL CONDITIONS.

- C. After completion of the joint review and the Contracting Officer's approval of all entries, the contractor will generate an updated computer-produced calendar-dated schedule and supply the Contracting Officer's representative with reports in accordance with the Article, COMPUTER PRODUCED SCHEDULES, specified.
- D. After completing the weekly schedule update, the contractor's scheduling consultant shall rerun all current period contract change(s) against the prior approved weekly project schedule. The analysis shall only include original workday durations and schedule logic agreed upon by the contractor and COTR for the contract change(s). When there is a disagreement on logic and/or durations, the consultant shall use the schedule logic and/or durations provided and approved by the COTR. After each rerun update, the resulting electronic project schedule data file shall be appropriately identified and submitted to the VA in accordance to the requirements listed in articles 1.4 and 1.7. This electronic submission is separate from the regular weekly project schedule update requirements and shall be submitted to the COTR within fourteen (14) calendar days of completing the regular schedule update. **Before inserting the contract changes durations, care must be taken to ensure that only the original durations will be used for the analysis, not the reported durations after progress. In addition, once the final schedule is approved, the contractor must recreate all manual progress payment updates on this approved schedule and associated reruns for contract changes in each of these update periods as outlined above for regular update periods. This will require detailed record keeping for each of the manual progress payment updates.**
- E. After VA acceptance and approval of the final schedule, and after each weekly update, the contractor shall submit to the Contracting Officer three blue line copies of a revised complete schedule showing all completed and partially completed activities/events, contract changes and logic changes made on the intervening updates or at the first update on the final diagram. The Contracting Officer may elect to have the contractor do this on a less frequent basis, but it shall be done on a quarterly basis as a minimum.

F. Following approval of the CPM schedule, the VA, the General Contractor, its approved CPM Consultant, COTR office representatives, and all subcontractors needed, as determined by the SRE, shall meet to discuss the weekly updated schedule. The main emphasis shall be to address work activities to avoid slippage of project schedule and to identify any necessary actions required to maintain project schedule during the reporting period. The Government representatives and the Contractor should conclude the meeting with a clear understanding of those work and administrative actions necessary to maintain project schedule status during the reporting period. This schedule coordination meeting will occur after each weekly project schedule update meeting utilizing the resulting schedule reports from that schedule update. If the project is behind schedule, discussions should include ways to prevent further slippage as well as ways to improve the project schedule status, when appropriate.

#### **1.10 RESPONSIBILITY FOR COMPLETION**

- A. Whenever it becomes apparent from the current weekly progress review meeting or the weekly computer-produced calendar-dated schedule that phasing or contract completion dates will not be met, the Contractor shall execute some or all of the following remedial actions:
1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.
  2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
  3. Reschedule the work in conformance with the specification requirements.
- B. Prior to proceeding with any of the above actions, the Contractor shall notify and obtain approval from the Contracting Officer for the proposed schedule changes. If such actions are approved, the CPM revisions shall be incorporated by the Contractor into the schedule before the next update, at no additional cost to the Government.

#### **1.11 CHANGES TO SCHEDULE**

- A. Within 30 calendar days after VA acceptance and approval of any updated computer-produced schedule, the Contractor will submit a revised schedule, the associated electronic copy, and a list of any activity/event changes including predecessors and successors for any of the following reasons:
1. Delay in completion of any activity/event or group of activities/events, indicate an extension of the project completion by

- 20 working days or 10 percent of the remaining project duration, whichever is less. Such delays which may be involved with contract changes, strikes, unusual weather, and other delays will not relieve the Contractor from the requirements specified unless the conditions are shown on the CPM as the direct cause for delaying the project beyond the acceptable limits.
2. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary.
  3. The schedule does not represent the actual prosecution and progress of the project.
  4. When there is, or has been, a substantial revision to the activity/event costs of the schedule regardless of the cause for these revisions.
- B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished equipment, vacating of areas by the VA Medical Center, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, must be furnished in writing to the Contracting Officer for approval.
- C. Contracting Officer's approval for the revised schedule and all relevant data is contingent upon compliance with all other paragraphs of this section and any other previous agreements by the Contracting Officer or the VA representative.
- D. The cost of revisions to the schedule resulting from contract changes will be included in the proposal for changes in work as specified in Article, CHANGES of the GENERAL CONDITIONS, and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.
- E. The cost of revisions to the schedule not resulting from contract changes is the responsibility of the Contractor.

#### **1.12 ADJUSTMENT OF CONTRACT COMPLETION**

- A. The contract completion time will be adjusted only for causes specified in this contract. Request for an extension of the contract completion date by the Contractor shall be supported with a justification, CPM data and supporting evidence as the Contracting Officer may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof based on revised activity/event logic, durations (in work days) and costs is obligatory to any approvals. The schedule must clearly display that the Contractor has used, in full, all the float time

available for the work involved in this request. The Contracting Officer's determination as to the total number of days of contract extension will be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information.

- B. Actual delays in activities/events which, according to the computer-produced calendar-dated schedule, do not affect the extended and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Contracting Officer will within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Contracting Officer's decision.
- C. The Contractor shall submit each request for a change in the contract completion date to the Contracting Officer in accordance with the provisions specified under Article, CHANGES, in the GENERAL CONDITIONS. The Contractor shall include, as a part of each change order proposal, a sketch showing all CPM logic revisions, duration (in work days) changes, and cost changes, for work in question and its relationship to other activities on the approved schedule.
- D. All delays due to non-work activities/events such as RFI's, WEATHER, STRIKES, and similar non-work activities/events shall be analyzed on a month by month basis.

- - - E N D - - -



**SECTION 01 33 23**  
**SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES**

- 1-1. For the purposes of this contract, samples, test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.
- 1-2. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:
- A. Satisfactory written evidence is presented to, and approved by Contracting Officer, that manufacturer cannot make scheduled delivery of approved item or;
  - B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;
  - C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.
- 1-3. SUBMITTAL REGISTER: The Contractor shall prepare a Submittal Register and submit all items specified in other sections of these specifications on that Submittal Register. Submit electronic file(one working spreadsheet file and one copy in PDF format) to the Contracting Officer for approval within 10 calendar days after Notice to Proceed. The Contractor shall keep this electronic file up-to-date and shall submit it to the Government (in PDF format) together with the monthly payment request. The approved Submittal Register will become the scheduling document and will be used to control submittals throughout the life of the contract. The Submittal Register and the progress schedules shall be coordinated. At a minimum the Submittal Register will include the following information for each submittal:
- 1. Specification section
  - 2. Description of submittal
  - 3. Date submittal will be issued for review/approval
  - 4. Date submittal to be returned to contractor
- 1-4. SCHEDULING: Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and

submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the Submittal Register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals. The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

- 1-5. Submittals will be reviewed for compliance with contract requirements by Architect-Engineer, and action thereon will be taken by the Contracting Officer's Technical Representative (COTR) on behalf of the Contracting Officer.
- 1-6. Upon receipt of submittals, Contractor will assign a file number thereto. In any subsequent correspondence, all parties shall refer to this file and identification number to expedite replies relative to previously approved or disapproved submittals.
- 1-7. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are furnished pursuant to request therefor by Contracting Officer, adjustment in contract price and time will be made in accordance with Articles titled CHANGES (FAR 52.243-4) and CHANGES - SUPPLEMENT (VAAR 852.236-88) of the GENERAL CONDITIONS.
- 1-8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and Architect-Engineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and Architect-Engineer assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.
- 1-9. Submittals - Electronic submittals shall be required in lieu of paper copies. Electronic submittals shall be submitted to the COTR in PDF format along with an executable transmittal file. Submittals shall be printed out, marked up, processed, and returned electronically to the Contractor's Project Manager.
  - A. Submit samples required by Section 09 06 00, SCHEDULE FOR FINISHES, in quadruplicate. Submit other samples in single units unless otherwise

specified. Sample submittals must be submitted by Contractor only and shipped prepaid to the COTR.

- B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via electronic mail and shall contain the list of items, name of Medical Center, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.
  - 1. A copy of letter must be included with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.
  - 2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Medical Center, name of Contractor, manufacturer, brand, contract number and ASTM or Federal Specification Number as applicable and location(s) on project.
  - 3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.
- C. In addition to complying with all applicable requirements specified in this section, samples which are required to have Laboratory Tests (those preceded by symbol "LT" under the separate sections of the specification shall be tested, at the expense of Contractor, in a commercial laboratory approved by Contracting Officer.
  - 1. Laboratory shall furnish Contracting Officer with a certificate stating that it is fully equipped and qualified to perform intended work, is fully acquainted with specification requirements and intended use of materials and is an independent establishment in no way connected with organization of Contractor or with manufacturer or supplier of materials to be tested.
  - 2. Certificates shall also set forth a list of comparable projects upon which laboratory has performed similar functions during past five years.
  - 3. Samples and laboratory tests shall be sent directly to approved commercial testing laboratory.

4. Contractor shall send a copy of transmittal letter to both the COTR and to Architect-Engineer simultaneously with submission of material to a commercial testing laboratory.
  5. Laboratory test reports shall be sent directly to the COTR for appropriate action.
  6. Laboratory reports shall list contract specification test requirements and a comparative list of the laboratory test results. When tests show that the material meets specification requirements, the laboratory shall so certify on test report.
  7. Laboratory test reports shall also include a recommendation for approval or disapproval of tested item.
- D. If submittal samples have been disapproved, resubmit new samples as soon as possible after notification of disapproval. Such new samples shall be marked "Resubmitted Sample" in addition to containing other previously specified information required on label and in transmittal letter.
- E. Approved samples will be kept on file by the COTR at the site until completion of contract, at which time such samples will be delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request should be made prior to completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.
- F. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.
1. Each drawing shall have marked thereon, proper descriptive title, including Medical Center location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
  2. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.

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**SECTION 01 42 19**  
**REFERENCE STANDARDS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies the availability and source of references and standards specified in the project manual under paragraphs APPLICABLE PUBLICATIONS and/or shown on the drawings.

**1.2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS FPMR PART 101-29 (FAR 52.211-1) (AUG 1998)**

- A. The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29 and copies of specifications, standards, and commercial item descriptions cited in the solicitation may be obtained for a fee by submitting a request to - GSA Federal Supply Service, Specifications Section, Suite 8100, 470 East L'Enfant Plaza, SW, Washington, DC 20407, Telephone (202) 619-8925, Facsimile (202) 619-8978.
- B. If the General Services Administration, Department of Agriculture, or Department of Veterans Affairs issued this solicitation, a single copy of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained free of charge by submitting a request to the addressee in paragraph (a) of this provision. Additional copies will be issued for a fee.

**1.3 AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-4) (JUN 1988)**

The specifications and standards cited in this solicitation can be examined at the following location:

DEPARTMENT OF VETERANS AFFAIRS  
Office of Construction & Facilities Management  
Facilities Quality Service (00CFM1A)  
425 Eye Street N.W, (sixth floor)  
Washington, DC 20001  
Telephone Numbers: (202) 632-5249 or (202) 632-5178  
Between 9:00 AM - 3:00 PM

**1.4 AVAILABILITY OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-3) (JUN 1988)**

The specifications cited in this solicitation may be obtained from the associations or organizations listed below.

AA	Aluminum Association Inc. <a href="http://www.aluminum.org">http://www.aluminum.org</a>
AABC	Associated Air Balance Council <a href="http://www.aabchg.com">http://www.aabchg.com</a>
AAMA	American Architectural Manufacturer's Association <a href="http://www.aamanet.org">http://www.aamanet.org</a>
AAN	American Nursery and Landscape Association <a href="http://www.anla.org">http://www.anla.org</a>
AASHTO	American Association of State Highway and Transportation Officials <a href="http://www.aashto.org">http://www.aashto.org</a>
AATCC	American Association of Textile Chemists and Colorists <a href="http://www.aatcc.org">http://www.aatcc.org</a>
ACGIH	American Conference of Governmental Industrial Hygienists <a href="http://www.acgi.org">http://www.acgi.org</a>
ACI	American Concrete Institute <a href="http://www.aci-int.net">http://www.aci-int.net</a>
ACPA	American Concrete Pipe Association <a href="http://www.concrete-pipe.org">http://www.concrete-pipe.org</a>
ACPPA	American Concrete Pressure Pipe Association <a href="http://www.acppa.org">http://www.acppa.org</a>
ADC	Air Diffusion Council <a href="http://flexibleduct.org">http://flexibleduct.org</a>
AGA	American Gas Association <a href="http://www.aga.org">http://www.aga.org</a>
AGC	Associated General Contractors of America <a href="http://www.agc.org">http://www.agc.org</a>

AGMA	American Gear Manufacturers Association, Inc. <a href="http://www.agma.org">http://www.agma.org</a>
AHAM	Association of Home Appliance Manufacturers <a href="http://www.aham.org">http://www.aham.org</a>
AISC	American Institute of Steel Construction <a href="http://www.aisc.org">http://www.aisc.org</a>
AISI	American Iron and Steel Institute <a href="http://www.steel.org">http://www.steel.org</a>
AITC	American Institute of Timber Construction <a href="http://www.aitc-glulam.org">http://www.aitc-glulam.org</a>
AMCA	Air Movement and Control Association, Inc. <a href="http://www.amca.org">http://www.amca.org</a>
ANLA	American Nursery & Landscape Association <a href="http://www.anla.org">http://www.anla.org</a>
ANSI	American National Standards Institute, Inc. <a href="http://www.ansi.org">http://www.ansi.org</a>
APA	The Engineered Wood Association <a href="http://www.apawood.org">http://www.apawood.org</a>
ARI	Air-Conditioning and Refrigeration Institute <a href="http://www.ari.org">http://www.ari.org</a>
ASAE	American Society of Agricultural Engineers <a href="http://www.asae.org">http://www.asae.org</a>
ASCE	American Society of Civil Engineers <a href="http://www.asce.org">http://www.asce.org</a>
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers <a href="http://www.ashrae.org">http://www.ashrae.org</a>
ASME	American Society of Mechanical Engineers <a href="http://www.asme.org">http://www.asme.org</a>
ASSE	American Society of Sanitary Engineering <a href="http://www.asse-plumbing.org">http://www.asse-plumbing.org</a>

ASTM	American Society for Testing and Materials <a href="http://www.astm.org">http://www.astm.org</a>
AWI	Architectural Woodwork Institute <a href="http://www.awinet.org">http://www.awinet.org</a>
AWS	American Welding Society <a href="http://www.aws.org">http://www.aws.org</a>
AWWA	American Water Works Association <a href="http://www.awwa.org">http://www.awwa.org</a>
BHMA	Builders Hardware Manufacturers Association <a href="http://www.buildershardware.com">http://www.buildershardware.com</a>
BIA	Brick Institute of America <a href="http://www.bia.org">http://www.bia.org</a>
CAGI	Compressed Air and Gas Institute <a href="http://www.cagi.org">http://www.cagi.org</a>
CGA	Compressed Gas Association, Inc. <a href="http://www.cganet.com">http://www.cganet.com</a>
CI	The Chlorine Institute, Inc. <a href="http://www.chlorineinstitute.org">http://www.chlorineinstitute.org</a>
CISCA	Ceilings and Interior Systems Construction Association <a href="http://www.cisca.org">http://www.cisca.org</a>
CISPI	Cast Iron Soil Pipe Institute <a href="http://www.cispi.org">http://www.cispi.org</a>
CLFMI	Chain Link Fence Manufacturers Institute <a href="http://www.chainlinkinfo.org">http://www.chainlinkinfo.org</a>
CPMB	Concrete Plant Manufacturers Bureau <a href="http://www.cpmc.org">http://www.cpmc.org</a>
CRA	California Redwood Association <a href="http://www.calredwood.org">http://www.calredwood.org</a>
CRSI	Concrete Reinforcing Steel Institute <a href="http://www.crsi.org">http://www.crsi.org</a>



CTI	Cooling Technology Institute <a href="http://www.cti.org">http://www.cti.org</a>
DHI	Door and Hardware Institute <a href="http://www.dhi.org">http://www.dhi.org</a>
EGSA	Electrical Generating Systems Association <a href="http://www.egsa.org">http://www.egsa.org</a>
EEI	Edison Electric Institute <a href="http://www.eei.org">http://www.eei.org</a>
EPA	Environmental Protection Agency <a href="http://www.epa.gov">http://www.epa.gov</a>
ETL	ETL Testing Laboratories, Inc. <a href="http://www.etl.com">http://www.etl.com</a>
FAA	Federal Aviation Administration <a href="http://www.faa.gov">http://www.faa.gov</a>
FCC	Federal Communications Commission <a href="http://www.fcc.gov">http://www.fcc.gov</a>
FPS	The Forest Products Society <a href="http://www.forestprod.org">http://www.forestprod.org</a>
FM	Factory Mutual Insurance <a href="http://www.fmglobal.com">http://www.fmglobal.com</a>
GA	Gypsum Association <a href="http://www.gypsum.org">http://www.gypsum.org</a>
GANA	Glass Association of North America <a href="http://www.cssinfo.com/info/gana.html/">http://www.cssinfo.com/info/gana.html/</a>
GSA	General Services Administration <a href="http://www.gsa.gov">http://www.gsa.gov</a>
HI	Hydraulic Institute <a href="http://www.pumps.org">http://www.pumps.org</a>
HPVA	Hardwood Plywood & Veneer Association <a href="http://www.hpva.org">http://www.hpva.org</a>

ICBO	International Conference of Building Officials <a href="http://www.icbo.org">http://www.icbo.org</a>
ICEA	Insulated Cable Engineers Association Inc. <a href="http://www.icea.net">http://www.icea.net</a>
ICAC	Institute of Clean Air Companies <a href="http://www.icac.com">http://www.icac.com</a>
IEEE	Institute of Electrical and Electronics Engineers <a href="http://www.ieee.org/">http://www.ieee.org/</a>
IGMA	Insulating Glass Manufacturers Alliance <a href="http://www.igmaonline.org">http://www.igmaonline.org</a>
IMSA	International Municipal Signal Association <a href="http://www.imsasafety.org">http://www.imsasafety.org</a>
IPCEA	Insulated Power Cable Engineers Association
MBMA	Metal Buildings Manufacturers Association <a href="http://www.mbma.com">http://www.mbma.com</a>
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry Inc. <a href="http://www.mss-hq.com">http://www.mss-hq.com</a>
NAAMM	National Association of Architectural Metal Manufacturers <a href="http://www.naamm.org">http://www.naamm.org</a>
NAPHCC	Plumbing-Heating-Cooling Contractors Association <a href="http://www.phccweb.org">http://www.phccweb.org</a>
NBS	National Bureau of Standards See - NIST
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors <a href="http://www.nationboard.org">http://www.nationboard.org</a>
NEC	National Electric Code See - NFPA National Fire Protection Association
NEMA	National Electrical Manufacturers Association <a href="http://www.nema.org">http://www.nema.org</a>

NFPA      National Fire Protection Association  
<http://www.nfpa.org>

NHLA      National Hardwood Lumber Association  
<http://www.natlhardwood.org>

NIH        National Institute of Health  
<http://www.nih.gov>

NIST      National Institute of Standards and Technology  
<http://www.nist.gov>

NLMA      Northeastern Lumber Manufacturers Association, Inc.  
<http://www.nelma.org>

NPA        National Particleboard Association  
18928 Premiere Court  
Gaithersburg, MD 20879  
(301) 670-0604

NSF        National Sanitation Foundation  
<http://www.nsf.org>

NWWDA    Window and Door Manufacturers Association  
<http://www.nwwda.org>

OSHA      Occupational Safety and Health Administration  
Department of Labor  
<http://www.osha.gov>

PCA        Portland Cement Association  
<http://www.portcement.org>

PCI        Precast Prestressed Concrete Institute  
<http://www.pci.org>

PPI        The Plastic Pipe Institute  
<http://www.plasticpipe.org>

PEI        Porcelain Enamel Institute, Inc.  
<http://www.porcelainenamel.com>

PTI        Post-Tensioning Institute  
<http://www.post-tensioning.org>

RFCI      The Resilient Floor Covering Institute  
<http://www.rfci.com>

RIS      Redwood Inspection Service  
See - CRA

RMA      Rubber Manufacturers Association, Inc.  
<http://www.rma.org>

SCMA      Southern Cypress Manufacturers Association  
<http://www.cypressinfo.org>

SDI      Steel Door Institute  
<http://www.steeldoor.org>

SJI      Steel Joist Institute  
<http://www.steeljoist.org>

SMACNA      Sheet Metal and Air-Conditioning Contractors  
National Association, Inc.  
<http://www.smacna.org>

SSPC      The Society for Protective Coatings  
<http://www.sspc.org>

STI      Steel Tank Institute  
<http://www.steeltank.com>

SWI      Steel Window Institute  
<http://www.steelwindows.com>

TCA      Tile Council of America, Inc.  
<http://www.tileusa.com>

TEMA      Tubular Exchange Manufacturers Association  
<http://www.tema.org>

TPI      Truss Plate Institute, Inc.  
583 D'Onofrio Drive; Suite 200  
Madison, WI 53719  
(608) 833-5900

UBC      The Uniform Building Code  
See ICBO

UL Underwriters' Laboratories Incorporated  
<http://www.ul.com>

ULC Underwriters' Laboratories of Canada  
<http://www.ulc.ca>

WCLIB West Coast Lumber Inspection Bureau  
6980 SW Varns Road, P.O. Box 23145  
Portland, OR 97223  
(503) 639-0651

WRCLA Western Red Cedar Lumber Association  
P.O. Box 120786  
New Brighton, MN 55112  
(612) 633-4334

WWPA Western Wood Products Association  
<http://www.wwpa.org>

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**SECTION 01 45 29**  
**TESTING LABORATORY SERVICES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained and paid for by Contractor.

**1.2 APPLICABLE PUBLICATIONS:**

- A. 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.
- B. American Association of State Highway and Transportation Officials (AASHTO):
- T27-06.....Sieve Analysis of Fine and Coarse Aggregates
- T96-02 (R2006).....Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- T99-01 (R2004).....The Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop
- T104-99 (R2003).....Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
- T180-01 (R2004).....Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop
- T191-02(R2006).....Density of Soil In-Place by the Sand-Cone Method
- C. American Concrete Institute (ACI):
- 506.4R-94 (R2004).....Guide for the Evaluation of Shotcrete
- D. American Society for Testing and Materials (ASTM):
- A325-06.....Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- A370-07.....Definitions for Mechanical Testing of Steel Products
- A416/A416M-06.....Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
- A490-06.....Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
- C31/C31M-06.....Making and Curing Concrete Test Specimens in the Field
- C33-03.....Concrete Aggregates

C39/C39M-05.....Compressive Strength of Cylindrical Concrete  
Specimens

C109/C109M-05.....Compressive Strength of Hydraulic Cement Mortars

C138-07.....Unit Weight, Yield, and Air Content  
(Gravimetric) of Concrete

C140-07.....Sampling and Testing Concrete Masonry Units and  
Related Units

C143/C143M-05.....Slump of Hydraulic Cement Concrete

C172-07.....Sampling Freshly Mixed Concrete

C173-07.....Air Content of freshly Mixed Concrete by the  
Volumetric Method

C330-05.....Lightweight Aggregates for Structural Concrete

C567-05.....Density Structural Lightweight Concrete

C780-07.....Pre-construction and Construction Evaluation of  
Mortars for Plain and Reinforced Unit Masonry

C1019-08.....Sampling and Testing Grout

C1064/C1064M-05.....Freshly Mixed Portland Cement Concrete

C1077-06.....Laboratories Testing Concrete and Concrete  
Aggregates for Use in Construction and Criteria  
for Laboratory Evaluation

C1314-07.....Compressive Strength of Masonry Prisms

D698-07.....Laboratory Compaction Characteristics of Soil  
Using Standard Effort

D1143-07.....Piles Under Static Axial Compressive Load

D1188-07.....Bulk Specific Gravity and Density of Compacted  
Bituminous Mixtures Using Paraffin-Coated  
Specimens

D1556-07.....Density and Unit Weight of Soil in Place by the  
Sand-Cone Method

D1557-07.....Laboratory Compaction Characteristics of Soil  
Using Modified Effort

D2166-06.....Unconfined Compressive Strength of Cohesive Soil

D2167-94(R2001).....Density and Unit Weight of Soil in Place by the  
Rubber Balloon Method

D2216-05.....Laboratory Determination of Water (Moisture)  
Content of Soil and Rock by Mass

D2922-05.....Density of soil and Soil-Aggregate in Place by  
Nuclear Methods (Shallow Depth)

D2974-07.....Moisture, Ash, and Organic Matter of Peat and  
Other Organic Soils

D3666-(2002).....Minimum Requirements for Agencies Testing and  
Inspection Bituminous Paving Materials  
D3740-07.....Minimum Requirements for Agencies Engaged in the  
Testing and Inspecting Road and Paving Material  
E94-04.....Radiographic Testing  
E164-03.....Ultrasonic Contact Examination of Weldments  
E329-07.....Agencies Engaged in Construction Inspection  
and/or Testing  
E543-06.....Agencies Performing Non-Destructive Testing  
E605-93(R2006).....Thickness and Density of Sprayed Fire-Resistive  
Material (SFRM) Applied to Structural Members  
E709-(2001).....Guide for Magnetic Particle Examination  
E1155-96(R2008).....Determining FF Floor Flatness and FL Floor  
Levelness Numbers

E. American Welding Society (AWS):

D1.1-07.....Structural Welding Code-Steel

### **1.3 REQUIREMENTS:**

- A. Accreditation Requirements: Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (i.e.; E 329, C 1077, D 3666, D3740, A 880, E 543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the "Corporate Office."
- B. Inspection and Testing: Testing laboratory shall inspect materials and workmanship and perform tests described herein and additional tests requested by Contracting Officer's Technical Representative (COTR). When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall direct attention of COTR to such failure.
- C. Written Reports: Testing laboratory shall submit test reports to COTR, Contractor, unless other arrangements are agreed to in writing by the COTR. Submit reports of tests that fail to meet construction contract requirements on colored paper.
- D. Verbal Reports: Give verbal notification to COTR immediately of any irregularity.



**PART 2 - PRODUCTS (NOT USED)****PART 3 - EXECUTION****3.1 EARTHWORK:**

- A. General: The Testing Laboratory shall provide qualified personnel, materials, equipment, and transportation as required to perform the services identified/required herein, within the agreed to schedule and/or time frame. The work to be performed shall be as identified herein and shall include but not be limited to the following:
1. Observe fill and subgrades during proof-rolling to evaluate suitability of surface material to receive fill or base course. Provide recommendations to the Resident Engineer regarding suitability or unsuitability of areas where proof-rolling was observed. Where unsuitable results are observed, witness excavation of unsuitable material and recommend to Resident Engineer extent of removal and replacement of unsuitable materials and observe proof-rolling of replaced areas until satisfactory results are obtained.
  2. Provide part time observation of fill placement and compaction and field density testing in building areas and provide part time observation of fill placement and compaction and field density testing in pavement areas to verify that earthwork compaction obtained is in accordance with contract documents.
  3. Provide supervised geotechnical technician to inspect excavation, subsurface preparation, and backfill for structural fill.
- B. Testing Compaction:
1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with AASHTO T99/T180.
  2. Make field density tests in accordance with the primary testing method following AASHTO T238 wherever possible. Field density tests utilizing AASHTO T191 or AASHTO T205 shall be utilized on a case by case basis only if there are problems with the validity of the results from the primary method due to specific site field conditions. Should the testing laboratory propose these alternative methods, they should provide satisfactory explanation to the COTR before the tests are conducted.
    - a. Building Slab Subgrade: At least one test of subgrade for every 185 m<sup>2</sup> (2000 square feet) of building slab, but in no case fewer than three tests. In each compacted fill layer, perform one test for every 185 m<sup>2</sup> (2000 square feet) of overlaying building slab, but in no case fewer than three tests.

- b. Foundation Wall Backfill: One test per 30 m (100 feet) of each layer of compacted fill but in no case fewer than two tests.
  - c. Pavement Subgrade: One test for each 335 m<sup>2</sup> (400 square yards), but in no case fewer than two tests.
  - d. Curb, Gutter, and Sidewalk: One test for each 90 m (300 feet), but in no case fewer than two tests.
  - e. Trenches: One test at maximum 30 m (100 foot) intervals per 1200 mm (4 foot) of vertical lift and at changes in required density, but in no case fewer than two tests.
  - f. Footing Subgrade: At least one test for each layer of soil on which footings will be placed. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested subgrade when acceptable to Resident Engineer. In each compacted fill layer below wall footings, perform one field density test for every 30 m (100 feet) of wall. Verify subgrade is level, all loose or disturbed soils have been removed, and correlate actual soil conditions observed with those indicated by test borings.
- C. Testing for Footing Bearing Capacity: Evaluate if suitable bearing capacity material is encountered in footing subgrade.
- D. Testing Materials: Test suitability of on-site and off-site borrow as directed by COTR.

### **3.2 FOUNDATION CAISSONS:**

- A. Concrete Testing: Test concrete including materials for concrete as required in Article, CONCRETE of this section, except make two test cylinders for each day's placement of concrete.
- B. Maintain a record of concrete used in each caisson. Compare records with calculated volumes.
- C. Inspect percussion hole in bottom of each caisson to determine that material is capable of supporting design load.
- D. Inspect sides and bottom of each caisson for compliance with contract documents.
- E. Submit a certified "Caisson Field Record" for each caisson, recording actual elevation at bottom of shaft; final center line location of top; variation of shaft from plumb; results of all tests performed; actual allowable bearing capacity of bottom; depth of socket into rock; levelness of bottom; seepage of water; still water level (if allowed to flood); variation of shaft (from dimensions shown); location and size of reinforcement, and evidence of seams, voids, or channels below the

bottom. Verify the actual bearing capacity of the rock strata by the use of a calibrated penetrometer or other acceptable method.

- F. Caissons Bearing on Hardpan: Take undisturbed samples, suitable for tests required, from caisson bottom. Make auger probe to a depth of 2.5 meters (8 feet) below bottom and visually inspect and classify soil. Verify continuity of strata and thickness.

1. Conduct the following test on each sample, and report results and evaluations to the COTR:
  - a. Unconfined Compression Test (ASTM D2166).
  - b. Moisture Content (ASTM D2216).
  - c. Density.

### **3.3 LANDSCAPING:**

- A. Test topsoil for organic materials, pH, phosphate, potash content, and gradation of particles.
1. Test for organic material by using ASTM D2974.
  2. Determine percent of silt, sand, clay, and foreign materials such as rock, roots, and vegetation.
- B. Submit laboratory test report of topsoil to COTR.
- C. Stockpiled Topsoil - From isolated locations, gather two (2) random samples for each 100 cubic yards of stockpiled topsoil and submit test data for each sample.

### **3.4 SITE WORK CONCRETE:**

- A. Test site work concrete including materials for concrete as required in Article CONCRETE of this section.

### **3.5 CONCRETE:**

- A. Batch Plant Inspection and Materials Testing:
1. Perform continuous batch plant inspection until concrete quality is established to satisfaction of COTR with concurrence of Contracting Officer and perform periodic inspections thereafter as determined by COTR.
  2. Periodically inspect and test batch proportioning equipment for accuracy and report deficiencies to COTR.
  3. Sample and test mix ingredients as necessary to insure compliance with specifications.
  4. Sample and test aggregates daily and as necessary for moisture content. Test the dry rodded weight of the coarse aggregate whenever a sieve analysis is made, and when it appears there has been a change in the aggregate.
  5. Certify, in duplicate, ingredients and proportions and amounts of ingredients in concrete conform to approved trial mixes. When

concrete is batched or mixed off immediate building site, certify (by signing, initialing or stamping thereon) on delivery slips (duplicate) that ingredients in truck-load mixes conform to proportions of aggregate weight, cement factor, and water-cement ratio of approved trial mixes.

B. Field Inspection and Materials Testing:

1. Provide a technician at site of placement at all times to perform concrete sampling and testing.
2. Review the delivery tickets of the ready-mix concrete trucks arriving on-site. Notify the Contractor if the concrete cannot be placed within the specified time limits or if the type of concrete delivered is incorrect. Reject any loads that do not comply with the Specification requirements. Rejected loads are to be removed from the site at the Contractor's expense. Any rejected concrete that is placed will be subject to removal.
3. Take concrete samples at point of placement in accordance with ASTM C172. Mold and cure compression test cylinders in accordance with ASTM C31. Make at least three cylinders for each 40 m<sup>3</sup> (50 cubic yards) or less of each concrete type, and at least three cylinders for any one day's pour for each concrete type. Label each cylinder with an identification number. COTR may require additional cylinders to be molded and cured under job conditions.
4. Perform slump tests in accordance with ASTM C143. Test the first truck each day, and every time test cylinders are made. Test pumped concrete at the hopper and at the discharge end of the hose at the beginning of each day's pumping operations to determine change in slump.
5. Determine the air content of concrete per ASTM C173. For concrete required to be air-entrained, test the first truck and every 20 m<sup>3</sup> (25 cubic yards) thereafter each day. For concrete not required to be air-entrained, test every 80 m<sup>3</sup> (100 cubic yards) at random. For pumped concrete, initially test concrete at both the hopper and the discharge end of the hose to determine change in air content.
6. If slump or air content fall outside specified limits, make another test immediately from another portion of same batch.
7. Perform unit weight tests in compliance with ASTM C138 for normal weight concrete and ASTM C567 for lightweight concrete. Test the first truck and each time cylinders are made.
8. Notify laboratory technician at batch plant of mix irregularities and request materials and proportioning check.

9. Verify that specified mixing has been accomplished.
10. Environmental Conditions: Determine the temperature per ASTM C1064 for each truckload of concrete during hot weather and cold weather concreting operations:
  - a. When ambient air temperature falls below 4.4 degrees C (40 degrees F), record maximum and minimum air temperatures in each 24 hour period; record air temperature inside protective enclosure; record minimum temperature of surface of hardened concrete.
  - b. When ambient air temperature rises above 29.4 degrees C (85 degrees F), record maximum and minimum air temperature in each 24 hour period; record minimum relative humidity; record maximum wind velocity; record maximum temperature of surface of hardened concrete.
11. Inspect the reinforcing steel placement, including bar size, bar spacing, top and bottom concrete cover, proper tie into the chairs, and grade of steel prior to concrete placement. Submit detailed report of observations.
12. Observe conveying, placement, and consolidation of concrete for conformance to specifications.
13. Observe condition of formed surfaces upon removal of formwork prior to repair of surface defects and observe repair of surface defects.
14. Observe curing procedures for conformance with specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.
15. Observe preparations for placement of concrete:
  - a. Inspect handling, conveying, and placing equipment, inspect vibrating and compaction equipment.
  - b. Inspect preparation of construction, expansion, and isolation joints.
16. Observe preparations for protection from hot weather, cold weather, sun, and rain, and preparations for curing.
17. Observe concrete mixing:
  - a. Monitor and record amount of water added at project site.
  - b. Observe minimum and maximum mixing times.
18. Measure concrete flatwork for levelness and flatness as follows:
  - a. Perform Floor Tolerance Measurements  $F_F$  and  $F_L$  in accordance with ASTM E1155. Calculate the actual overall F- numbers using the inferior/superior area method.
  - b. Perform all floor tolerance measurements within 48 hours after slab installation and prior to removal of shoring and formwork.

- c. Provide the Contractor and the COTR with the results of all profile tests, including a running tabulation of the overall  $F_F$  and  $F_L$  values for all slabs installed to date, within 72 hours after each slab installation.
19. Other inspections:
- a. Grouting under base plates.
  - b. Grouting anchor bolts and reinforcing steel in hardened concrete.
- C. Laboratory Tests of Field Samples:
- 1. Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test one cylinder at 7 days and one cylinder at 28 days. Use remaining cylinder as a spare tested as directed by COTR. Compile laboratory test reports as follows:  
Compressive strength test shall be result of one cylinder, except when one cylinder shows evidence of improper sampling, molding or testing, in which case it shall be discarded and strength of spare cylinder shall be used.
  - 2. Make weight tests of hardened lightweight structural concrete in accordance with ASTM C567.
  - 3. Furnish certified compression test reports (duplicate) to COTR. In test report, indicate the following information:
    - a. Cylinder identification number and date cast.
    - b. Specific location at which test samples were taken.
    - c. Type of concrete, slump, and percent air.
    - d. Compressive strength of concrete in MPa (psi).
    - e. Weight of lightweight structural concrete in  $\text{kg/m}^3$  (pounds per cubic foot).
    - f. Weather conditions during placing.
    - g. Temperature of concrete in each test cylinder when test cylinder was molded.
    - h. Maximum and minimum ambient temperature during placing.
    - i. Ambient temperature when concrete sample in test cylinder was taken.
    - j. Date delivered to laboratory and date tested.

### **3.6 REINFORCEMENT:**

- A. Review mill test reports furnished by Contractor.

### **3.7 MASONRY:**

- A. Mortar Tests:
  - 1. Laboratory compressive strength test:
    - a. Comply with ASTM C780.

- b. Obtain samples during or immediately after discharge from batch mixer.
  - c. Furnish molds with 50 mm (2 inch), 3 compartment gang cube.
  - d. Test one sample at 7 days and 2 samples at 28 days.
- 2. Two tests during first week of operation; one test per week after initial test until masonry completion.
- B. Grout Tests:
  - 1. Laboratory compressive strength test:
    - a. Comply with ASTM C1019.
    - b. Test one sample at 7 days and 2 samples at 28 days.
    - c. Perform test for each 230 m<sup>2</sup> (2500 square feet) of masonry.
- C. Masonry Unit Tests:
  - 1. Laboratory Compressive Strength Test:
    - a. Comply with ASTM C140.
    - b. Test 3 samples for each 460 m<sup>2</sup> (5000 square feet) of wall area.
- D. Prism Tests: For each type of wall construction indicated, test masonry prisms per ASTM C1314 for each 460 m<sup>2</sup> (5000 square feet) of wall area. Prepare one set of prisms for testing at 7 days and one set for testing at 28 days.

### **3.8 STRUCTURAL STEEL:**

- A. General: Provide shop and field inspection and testing services to certify structural steel work is done in accordance with contract documents. Welding shall conform to AWS D1.1 Structural Welding Code.
- B. Prefabrication Inspection:
  - 1. Review design and shop detail drawings for size, length, type and location of all welds to be made.
  - 2. Approve welding procedure qualifications either by pre-qualification or by witnessing qualifications tests.
  - 3. Approve welder qualifications by certification or retesting.
  - 4. Approve procedure for control of distortion and shrinkage stresses.
  - 5. Approve procedures for welding in accordance with applicable sections of AWS D1.1.
- C. Fabrication and Erection:
  - 1. Weld Inspection:
    - a. Inspect welding equipment for capacity, maintenance and working condition.
    - b. Verify specified electrodes and handling and storage of electrodes in accordance with AWS D1.1.
    - c. Inspect preparation and assembly of materials to be welded for conformance with AWS D1.1.

- d. Inspect preheating and interpass temperatures for conformance with AWS D1.1.
  - e. Measure 25 percent of fillet welds.
  - f. Welding Magnetic Particle Testing: Test in accordance with ASTM E709 for a minimum of:
    - 1) 20 percent of all shear plate fillet welds at random, final pass only.
    - 2) 20 percent of all continuity plate and bracing gusset plate fillet welds, at random, final pass only.
    - 3) 100 percent of tension member fillet welds (i.e., hanger connection plates and other similar connections) for root and final passes.
    - 4) 20 percent of length of built-up column member partial penetration and fillet welds at random for root and final passes.
    - 5) 100 percent of length of built-up girder member partial penetration and fillet welds for root and final passes.
  - g. Welding Ultrasonic Testing: Test in accordance with ASTM E164 and AWS D1.1 for 100 percent of all full penetration welds, braced and moment frame column splices, and a minimum of 20 percent of all other partial penetration column splices, at random.
  - h. Verify that correction of rejected welds are made in accordance with AWS D1.1.
  - i. Testing and inspection do not relieve the Contractor of the responsibility for providing materials and fabrication procedures in compliance with the specified requirements.
2. Bolt Inspection:
- a. Inspect high-strength bolted connections in accordance AISC Specifications for Structural Joints Using ASTM A325 or A490 Bolts.
  - b. Slip-Critical Connections: Inspect 10 percent of bolts, but not less than 2 bolts, selected at random in each connection in accordance with AISC Specifications for Structural Joints Using ASTM A325 or A490 Bolts. Inspect all bolts in connection when one or more are rejected.
  - c. Fully Pre-tensioned Connections: Inspect 10 percent of bolts, but not less than 2 bolts, selected at random in 25 percent of connections in accordance with AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts. Inspect all bolts in connection when one or more are rejected.



- d. Bolts installed by turn-of-nut tightening may be inspected with calibrated wrench when visual inspection was not performed during tightening.
  - e. Snug Tight Connections: Inspect 10 percent of connections verifying that plies of connected elements have been brought into snug contact.
  - f. Inspect field erected assemblies; verify locations of structural steel for plumbness, level, and alignment.
- D. Submit inspection reports, record of welders and their certification, and identification, and instances of noncompliance to COTR.

### **3.9 STEEL DECKING:**

- A. Provide field inspection of welds of metal deck to the supporting steel, and testing services to insure steel decking has been installed in accordance with contract documents and manufacturer's requirements.
- B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1. Refer to the "Plug Weld Qualification Procedure" in Part 3 "Field Quality Control."
- C. Submit inspection reports, certification, and instances of noncompliance to COTR.

### **3.10 SPRAYED-ON FIREPROOFING:**

- A. Provide field inspection and testing services to certify sprayed-on fireproofing has been applied in accordance with contract documents.
- B. Obtain a copy of approved submittals from COTR.
- C. Use approved installation in test areas as criteria for inspection of work.
- D. Test sprayed-on fireproofing for thickness and density in accordance with ASTM E605.
  - 1. Thickness gauge specified in ASTM E605 may be modified for pole extension so that overhead sprayed material can be reached from floor.
- E. Location of test areas for field tests as follows:
  - 1. Thickness: Select one bay per floor, or one bay for each 930 m<sup>2</sup> (10,000 square feet) of floor area, whichever provides for greater number of tests. Take thickness determinations from each of following locations: Metal deck, beam, and column.
  - 2. Density: Take density determinations from each floor, or one test from each 930 m<sup>2</sup> (10,000 square feet) of floor area, whichever provides for greater number of tests, from each of the following areas: Underside of metal deck, beam flanges, and beam web.

F. Submit inspection reports, certification, and instances of noncompliance to COTR.

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**SECTION 01 57 19**  
**TEMPORARY ENVIRONMENTAL CONTROLS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the control of environmental pollution and damage that the Contractor must consider for air, water, and land resources. It includes management of visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.
- B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:
1. Adversely effect human health or welfare,
  2. Unfavorably alter ecological balances of importance to human life,
  3. Effect other species of importance to humankind, or;
  4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.
- C. Definitions of Pollutants:
1. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
  2. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
  3. Sediment: Soil and other debris that has been eroded and transported by runoff water.
  4. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
  5. 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 "water of the United States" and would require a permit to discharge water from the governing agency.
  6. Rubbish: Combustible and noncombustible wastes such as paper, boxes, glass and crockery, metal and lumber scrap, tin cans, and bones.

7. Sanitary Wastes:

- a. Sewage: Domestic sanitary sewage and human and animal waste.
- b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

**1.2 QUALITY CONTROL**

- A. Establish and maintain quality control for the environmental protection of all items set forth herein.
- B. Record on daily reports any problems in complying with laws, regulations, and ordinances. Note any corrective action taken.

**1.3 REFERENCES**

- A. 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.
- B. U.S. National Archives and Records Administration (NARA):  
33 CFR 328.....Definitions

**1.4 SUBMITTALS**

- A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
  - 1. Environmental Protection Plan: After the contract is awarded and prior to the commencement of the work, the Contractor shall meet with the Contracting Officer's Technical Representative (COTR) to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to details of environmental protection. Not more than 20 days after the meeting, the Contractor shall prepare and submit to the COTR for approval, a written and/or graphic Environmental Protection Plan including, but not limited 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.
    - 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. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control and abatement that are applicable to the Contractor's

proposed operations and the requirements imposed by those laws, regulations, and permits.

- f. Methods for protection of features to be preserved within authorized work areas including trees, shrubs, vines, grasses, ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, and archeological and cultural resources.
  - g. Procedures to provide the environmental protection that comply with the applicable laws and regulations. Describe the procedures to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.
  - h. Permits, licenses, and the location of the solid waste disposal area.
  - i. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials. Include as part of an Erosion Control Plan approved by the District Office of the U.S. Soil Conservation Service and the Department of Veterans Affairs.
  - j. Environmental Monitoring Plans for the job site including land, water, air, and noise.
  - k. 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. This plan may be incorporated within the Erosion Control Plan.
- B. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

#### **1.5 PROTECTION OF ENVIRONMENTAL RESOURCES**

- A. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract. Confine activities to areas defined by the specifications and drawings.
- B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from the COTR. Do not fasten or attach ropes, cables, or guys to trees for

anchorage unless specifically authorized, or where special emergency use is permitted.

1. Work Area Limits: Prior to any construction, mark the areas that require work to be performed under this contract. Mark or fence isolated areas within the general work area that are to be saved and protected. Protect monuments, works of art, and markers before construction operations begin. Convey to all personnel the purpose of marking and protecting all necessary objects.
2. Protection of Landscape: Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using any other approved techniques.
  - a. Box and protect from damage existing trees and shrubs to remain on the construction site.
  - b. Immediately repair all damage to existing trees and shrubs by trimming, cleaning, and painting with antiseptic tree paint.
  - c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
3. Reduction of Exposure of Unprotected Erodible Soils: Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas in reasonably sized increments only as needed to use. Form earthwork to final grade as shown. Immediately protect side slopes and back slopes upon completion of rough grading.
4. Temporary Protection of Disturbed Areas: Construct diversion ditches, benches, and berms to retard and divert runoff from the construction site to protected drainage areas approved under paragraph 208 of the Clean Water Act.
5. Erosion and Sedimentation Control Devices: 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 the Contractor's activities. Construct or install all temporary and permanent erosion and sedimentation control features on the Environmental Protection Plan. Maintain temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing, and mulching, until permanent drainage and erosion control facilities are completed and operative.
6. Manage borrow areas on Government property to minimize erosion and to prevent sediment from entering nearby water courses or lakes.

7. Manage and control spoil areas on Government property to limit spoil to areas on the Environmental Protection Plan and prevent erosion of soil or sediment from entering nearby water courses or lakes.
  8. Protect adjacent areas from despoilment by temporary excavations and embankments.
  9. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in containers that are emptied on a regular schedule. Transport all solid waste off Government property and dispose of waste in compliance with Federal, State, and local requirements.
  10. Store chemical waste away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.
  11. Handle discarded materials other than those included in the solid waste category as directed by the COTR.
- C. Protection of Water Resources: Keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and sewer systems. Implement management techniques to control water pollution by the listed construction activities that are included in this contract.
1. Washing and Curing Water: Do not allow wastewater directly derived from construction activities to enter water areas. Collect and place wastewater in retention ponds allowing the suspended material to settle, the pollutants to separate, or the water to evaporate.
- D. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict accordance with the State of Ohio, Ohio EPA Division of Air Pollution Control, and Federal emission and performance laws and standards. Maintain ambient air quality standards set by the Environmental Protection Agency, for those construction operations and activities specified.
1. Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials (such as from asphaltic batch plants) at all times, including weekends, holidays, and hours when work is not in progress.

2. Particulates Control: Maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause a hazard or a nuisance. Sprinklering, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators, or other methods are permitted to control particulates in the work area.
  3. Hydrocarbons and Carbon Monoxide: Control monoxide emissions from equipment to Federal and State allowable limits.
  4. Odors: Control odors of construction activities and prevent obnoxious odors from occurring.
- E. Reduction of Noise: Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the COTR. Maintain noise-produced work at or below the decibel levels and within the time periods specified.
1. Perform construction activities involving repetitive, high-level impact noise only between 8:00 a.m. and 6:00 p.m. unless otherwise permitted by local ordinance or the COTR. Repetitive impact noise on the property shall not exceed the following dB limitations:

Time Duration of Impact Noise	Sound Level in dB
More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

2. Provide sound-deadening devices on equipment and take noise abatement measures that are necessary to comply with the requirements of this contract, consisting of, but not limited to, the following:
  - a. Maintain maximum permissible construction equipment noise levels at 15 m (50 feet) (dBA):

EARTHMOVING		MATERIALS HANDLING	
FRONT LOADERS	75	CONCRETE MIXERS	75
BACKHOES	75	CONCRETE PUMPS	75
DOZERS	75	CRANES	75
TRACTORS	75	DERRICKS IMPACT	75
SCAPERS	80	PILE DRIVERS	95
GRADERS	75	JACK HAMMERS	75
TRUCKS	75	ROCK DRILLS	80



PAVERS, STATIONARY	80	PNEUMATIC TOOLS	80
PUMPS	75	BLASTING	75
GENERATORS	75	SAWS	75
COMPRESSORS	75	VIBRATORS	75

- b. Use shields or other physical barriers to restrict noise transmission.
  - c. Provide soundproof housings or enclosures for noise-producing machinery.
  - d. Use efficient silencers on equipment air intakes.
  - e. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.
  - f. Line hoppers and storage bins with sound deadening material.
  - g. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.
3. Measure sound level for noise exposure due to the construction at least once every five successive working days while work is being performed above 55 dB(A) noise level. Measure noise exposure at the property line or 15 m (50 feet) from the noise source, whichever is greater. Measure the sound levels on the A weighing network of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face. Submit the recorded information to the COTR noting any problems and the alternatives for mitigating actions.
- F. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
- G. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor shall leave the construction area in a clean condition satisfactory to the COTR. Cleaning shall include off the station disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition and new work operations.

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**SECTION 01 58 16**  
**TEMPORARY INTERIOR SIGNAGE**

**PART 1 GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies temporary interior signs.

**PART 2 PRODUCTS**

**2.1 TEMPORARY SIGNS**

- A. Fabricate from 50 Kg (110 pound) mat finish white paper.
- B. Cut to 100 mm (4-inch) wide by 300 mm (12 inch) long size tag.
- C. Punch 3 mm (1/8-inch) diameter hole centered on 100 mm (4-inch) dimension of tag. Edge of Hole spaced approximately 13 mm (1/2-inch) from one end on tag.
- D. Reinforce hole on both sides with gummed cloth washer or other suitable material capable of preventing tie pulling through paper edge.
- E. Ties: Steel wire 0.3 mm (0.0120-inch) thick, attach to tag with twist tie, leaving 150 mm (6-inch) long free ends.

**PART 3 EXECUTION**

**3.1 INSTALLATION**

- A. Install temporary signs attached to room door frame or room door knob, lever, or pull for doors on corridor openings.
- B. Mark on signs with felt tip marker having approximately 3 mm (1/8-inch) wide stroke for clearly legible numbers or letters.
- C. Identify room with numbers as designated on floor plans.

**3.2 LOCATION**

- A. Install on doors that have room, corridor, and space numbers shown.
- B. Doors that do not require signs are as follows:
1. Corridor barrier doors (cross-corridor) in corridor with same number.
  2. Folding doors or partitions.
  3. Toilet or bathroom doors within and between rooms.
  4. Communicating doors in partitions between rooms with corridor entrance doors.
  5. Closet doors within rooms.
- C. Replace missing, damaged, or illegible signs.

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**SECTION 01 74 19**  
**CONSTRUCTION WASTE MANAGEMENT**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the requirements for the management of non-hazardous building construction and demolition waste.
- B. Waste disposal in landfills shall be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much of the waste material as economically feasible shall be salvaged, recycled or reused.
- C. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:
  - 1. Waste Management Plan development and implementation.
  - 2. Techniques to minimize waste generation.
  - 3. Sorting and separating of waste materials.
  - 4. Salvage of existing materials and items for reuse or resale.
  - 5. Recycling of materials that cannot be reused or sold.
- D. At a minimum the following waste categories shall be diverted from landfills:
  - 1. Soil.
  - 2. Inerts (eg, concrete, masonry and asphalt).
  - 3. Clean dimensional wood and palette wood.
  - 4. Green waste (biodegradable landscaping materials).
  - 5. Engineered wood products (plywood, particle board and I-joists, etc).
  - 6. Metal products (eg, steel, wire, beverage containers, copper, etc).
  - 7. Cardboard, paper and packaging.
  - 8. Bitumen roofing materials.
  - 9. Plastics (eg, ABS, PVC).
  - 10. Carpet and/or pad.
  - 11. Gypsum board.
  - 12. Insulation.
  - 13. Paint.
  - 14. Fluorescent lamps.

**1.2 RELATED WORK**

- A. Section 02 41 00, DEMOLITION.
- B. Section 01 00 00, GENERAL REQUIREMENTS.

### 1.3 QUALITY ASSURANCE

- A. Contractor shall practice efficient waste management when sizing, cutting and installing building products. Processes shall be employed to ensure the generation of as little waste as possible. Construction /Demolition waste includes products of the following:
1. Excess or unusable construction materials.
  2. Packaging used for construction products.
  3. Poor planning and/or layout.
  4. Construction error.
  5. Over ordering.
  6. Weather damage.
  7. Contamination.
  8. Mishandling.
  9. Breakage.
- B. Establish and maintain the management of non-hazardous building construction and demolition waste set forth herein. Conduct a site assessment to estimate the types of materials that will be generated by demolition and construction.
- C. Contractor shall develop and implement procedures to reuse and recycle new materials to a minimum of 50 percent.
- D. Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling. Any revenues or savings obtained from salvage or recycling shall accrue to the contractor.
- E. Contractor shall provide all demolition, removal and legal disposal of materials. Contractor shall ensure that facilities used for recycling, reuse and disposal shall be permitted for the intended use to the extent required by local, state, federal regulations. The Whole Building Design Guide website <http://www.cwm.wbdg.org> provides a Construction Waste Management Database that contains information on companies that haul, collect, and process recyclable debris from construction projects.
- F. Contractor shall assign a specific area to facilitate separation of materials for reuse, salvage, recycling, and return. Such areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.

- G. Contractor shall provide on-site instructions and supervision of separation, handling, salvaging, recycling, reuse and return methods to be used by all parties during waste generating stages.
- H. Record on daily reports any problems in complying with laws, regulations and ordinances with corrective action taken.

#### **1.4 TERMINOLOGY**

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
- C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
- D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
- E. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
- F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
- H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.
- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.

- L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
  - 1. On-site Recycling - Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
  - 2. Off-site Recycling - Materials hauled to a location and used in an altered form in the manufacture of new products.
- M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.
- N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.
- O. Return: To give back reusable items or unused products to vendors for credit.
- P. Salvage: To remove waste materials from the site for resale or re-use by a third party.
- Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.
- R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.
- S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

#### **1.5 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish the following:
- B. Prepare and submit to the Contracting Officer's Technical Representative (COTR) a written demolition debris management plan. The plan shall include, but not be limited to, the following information:
  - 1. Procedures to be used for debris management.
  - 2. Techniques to be used to minimize waste generation.
  - 3. Analysis of the estimated job site waste to be generated:

- a. List of each material and quantity to be salvaged, reused, recycled.
- b. List of each material and quantity proposed to be taken to a landfill.
4. Detailed description of the Means/Methods to be used for material handling.
  - a. On site: Material separation, storage, protection where applicable.
  - b. Off site: Transportation means and destination. Include list of materials.
    - 1) Description of materials to be site-separated and self-hauled to designated facilities.
    - 2) Description of mixed materials to be collected by designated waste haulers and removed from the site.
  - c. The names and locations of mixed debris reuse and recycling facilities or sites.
  - d. The names and locations of trash disposal landfill facilities or sites.
  - e. Documentation that the facilities or sites are approved to receive the materials.
- C. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.
- D. Monthly summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

#### **1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced by the basic designation only. In the event that criteria requirements conflict, the most stringent requirements shall be met.
- B. U.S. Green Building Council (USGBC):  
LEED Green Building Rating System for New Construction

#### **1.7 RECORDS**

Maintain records 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. Records shall be kept in accordance with the LEED Reference Guide and LEED Template.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. List of each material and quantity to be salvaged, recycled, reused.
- B. List of each material and quantity proposed to be taken to a landfill.
- C. Material tracking data: Receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices, net total costs or savings.

**PART 3 - EXECUTION****3.1 COLLECTION**

- A. Provide all necessary containers, bins and storage areas to facilitate effective waste management.
- B. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.
- C. Hazardous wastes shall be separated, stored, disposed of according to local, state, federal regulations.

**3.2 DISPOSAL**

- A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.
- B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled shall be disposed of at a landfill or incinerator.

**3.3 REPORT**

- A. With each application for progress payment, submit a summary of construction and demolition debris diversion and disposal including beginning and ending dates of period covered.
- B. Quantify all materials diverted from landfill disposal through salvage or recycling during the period with the receiving parties, dates removed, transportation costs, weight tickets, manifests, invoices. Include the net total costs or savings for each salvaged or recycled material.
- C. Quantify all materials disposed of during the period with the receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices. Include the net total costs for each disposal.



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**SECTION 02 41 00  
DEMOLITION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. This section specifies selective demolition and debris removal of demolished materials and removal of designated equipment within the contract limit lines for this Project.
- B. Include removal of existing slab and trenching as required for new sanitary lines.

**1.2 RELATED WORK:**

- A. Safety Requirements: GENERAL CONDITIONS Article, ACCIDENT PREVENTION.
- B. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.
- C. Reserved items that are to remain the property of the Government: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Asbestos Removal: Section 02 82 13.13, GLOVEBAG ASBESTOS ABATEMENT and Section 02 82 13.19, ASBESTOS FLOOR TILE AND MASTIC ABATEMENT.
- E. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- F. Infectious Control: Section 01 00 00, GENERAL REQUIREMENTS, Article 1.8, INFECTION PREVENTION MEASURES.

**1.3 PROTECTION:**

- A. Perform demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures. Comply with requirements of GENERAL CONDITIONS Article, ACCIDENT PREVENTION.
- B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations. Comply with requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article 1.9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS.
- C. Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled.
- D. Provide enclosed dust chutes with control gates from each floor to carry debris to truck beds and govern flow of material into truck. Provide overhead bridges of tight board or prefabricated metal construction at dust chutes to protect persons and property from falling debris.

- E. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.
- F. In addition to previously listed fire and safety rules to be observed in performance of work, include following:
  - 1. No wall or part of wall shall be permitted to fall outwardly from structures.
  - 2. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. Instruct all possible users in use of fire extinguishers.
  - 3. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 4500 mm (15 feet) of fire hydrants.
- G. Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Medical Center; any damaged items shall be repaired or replaced as approved by the Contracting Officer's Technical Representative(COTR). The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have COTR's approval.
- H. The work shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- I. The work shall comply with the requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article 1.8 INFECTION PREVENTION MEASURES.

#### **1.4 UTILITY SERVICES:**

- A. Demolish and remove utility service lines shown to be removed.
- B. Remove abandoned utility lines that would interfere with installation of new utility lines and new construction.

**PART 2 - PRODUCTS (NOT USED)****PART 3 - EXECUTION****3.1 DEMOLITION:**

- A. Debris, including masonry, concrete, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off the Medical Center Property to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the COTR. Contractor shall dispose of debris in compliance with applicable federal, state or local permits, rules and/or regulations.
- B. Remove and legally dispose of all designated materials. Materials removed shall become property of Contractor and shall be disposed of in compliance with applicable federal, state or local permits, rules and/or regulations. Materials that are discovered to be hazardous, shall be handled as unforeseen. The removal of hazardous material shall be referred to Hazardous Materials specifications.
- C. Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the COTR. When Utility lines are encountered that are not indicated on the drawings, the COTR shall be notified prior to further work in that area.

**3.2 CLEAN-UP:**

- A. On completion of work of this Section and after removal of all debris, leave site in clean condition satisfactory to COTR. Clean-up shall include disposal of all items and materials not required to remain property of the Government as well as all debris and rubbish resulting from demolition operations.

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**PART 1 - GENERAL****1.1 SUMMARY OF THE WORK****1.1.1 CONTRACT DOCUMENTS AND RELATED REQUIREMENTS**

Drawings, general provisions of the contract, including general and supplementary conditions and other Division 01 specifications, shall apply to the work of this section. The contract documents show the work to be done under the contract and related requirements and conditions impacting the project. Related requirements and conditions include applicable codes and regulations, notices and permits, existing site conditions and restrictions on use of the site, requirements for partial owner occupancy during the work, coordination with other work and the phasing of the work. In the event the Asbestos Abatement Contractor (Contractor) discovers a conflict in the contract documents and/or requirements or codes, the conflict must be brought to the immediate attention of the Contracting Officer for resolution. Whenever there is a conflict or overlap in the requirements, the most stringent shall apply. Any actions taken by the Contractor without obtaining guidance from the Contracting Officer shall become the sole risk and responsibility of the Contractor. All cost incurred due to such action are also the responsibility of the Contractor.

**1.1.2 EXTENT OF WORK**

- A. Below is a brief description of the estimated quantities of asbestos flooring materials to be abated. These quantities are for informational purposes only and are based on the best information available at the time of the specification preparation. The Contractor shall satisfy himself as the actual quantities to be abated. Nothing in this section may be interpreted as limiting the extent of work otherwise required by this contract and related documents.
- B. Removal, clean-up and disposal of ACM floor tile mastic in an appropriate regulated area in the following approximate quantities; 3,600 sq ft of asbestos-containing mastic below non-asbestos-containing 12"x12" floor tiles, 830 square feet of asbestos-containing mastic below carpeting, 3,900 sq ft of asbestos-containing mastic below linoleum, and 645 sq ft of asbestos-containing mastic below laminate flooring.

**1.1.3 RELATED WORK**

- A. Section 07 84 00, FIRESTOPPING.
- B. Section 02 41 00, DEMOLITION.
- C. Division 09; FINISHES.

**1.1.4 TASKS**

The work tasks are summarized briefly as follows:



- A. Pre-abatement activities including pre-abatement meeting(s), inspection(s), notifications, permits, submittal approvals, work-site preparations, emergency procedures arrangements, and standard operating procedures for Class II asbestos abatement work.
- B. Abatement activities including removal, clean-up and disposal of ACM waste, recordkeeping, security, monitoring, and inspections.
- C. Cleaning and decontamination activities including final visual inspection, air monitoring and certification of decontamination.

#### **1.1.5 ABATEMENT CONTRACTOR USE OF PREMISES**

- A. The Contractor and Contractor's personnel shall cooperate fully with the VA representative/consultant to facilitate efficient use of buildings and areas within buildings. The Contractor shall perform the work in accordance with the VA specifications, drawings, phasing plan and in compliance with any/all applicable Federal, State and Local regulations and requirements.
- B. The Contractor shall use the existing facilities in the building strictly within the limits indicated in contract documents as well as the approved pre-abatement work plan. Asbestos abatement drawings of partially occupied buildings will show the limits of regulated areas; the placement of decontamination facilities; the temporary location of bagged waste ACM; the path of transport to outside the building; and the temporary waste storage area for each building/regulated area. Any variation from the arrangements shown on drawings shall be secured in writing from the VA representative through the pre-abatement plan of action.

#### **1.2 VARIATIONS IN QUANTITY**

The quantities and locations of ACM as indicated on the drawings and the extent of work included in this section are estimates which are limited by the physical constraints imposed by occupancy of the buildings. Accordingly, minor variations (+/- 5%) in quantities of ACM within the regulated area are considered as having no impact on contract price and time requirements of this contract. Where additional work is required beyond the above variation, the Contractor shall provide unit prices for additional work that is newly discovered materials and those prices will be used for additional work under the contract.

#### **1.3 STOP ASBESTOS REMOVAL**

If the Contracting Officer or their field representative presents a written **Stop Asbestos Removal Order**, the Contractor/Personnel shall immediately stop all asbestos removal and adequately wet any exposed ACM. The Contractor shall not resume any asbestos removal activity until

authorized to do so by the VA. A stop asbestos removal order may be issued at any time the VA determines abatement conditions/ activities are not within specification requirements. Work stoppage will continue until conditions have been corrected to the satisfaction of the VA. Standby time and costs for corrective actions will be borne by the Contractor, including the industrial hygienist's time. The occurrence of any of the following events shall be reported immediately by the Contractor in writing to the VA representative and shall require the Contractor to immediately stop asbestos removal activities and initiate fiber reduction activities:

- A.  $\geq$  0.01 f/cc outside a regulated area or  $>0.05$  f/cc inside a regulated area;
- B. breach/break in regulated area critical barrier(s)/floor;
- C. serious injury/death at the site;
- D. fire/safety emergency at the site;
- E. respiratory protection system failure;
- F. power failure loss of wetting agent; or
- G. any visible emissions observed outside the regulated area.

#### **1.4 DEFINITIONS**

##### **1.4.1 GENERAL**

Definitions and explanations here are neither complete nor exclusive of all terms used in the contract documents, but are general for the work to the extent they are not stated more explicitly in another element of the contract documents. Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated therein.

##### **1.4.2 GLOSSARY**

**Abatement** - Procedures to control fiber release from asbestos-containing materials, typically during removal. Includes removal, encapsulation, enclosure, demolition and renovation activities related to asbestos.

**ACE** - Asbestos contaminated elements.

**ACM** - Asbestos containing material.

**Aerosol** - Solid or liquid particulate suspended in air.

**Adequately wet** - Sufficiently mixed or penetrated with liquid to prevent the release of particulates. If visible emissions are observed coming from the ACM, then that material has not been adequately wetted.

**Aggressive method** - Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact ACM.

**Aggressive sampling** - EPA AHERA defined clearance sampling method using air moving equipment such as fans and leaf blowers to aggressively disturb and maintain in the air residual fibers after abatement.

**AHERA** - Asbestos Hazard Emergency Response Act. Asbestos regulations for schools issued in 1987.

**Aircell** - Pipe or duct insulation made of corrugated cardboard which contains asbestos.

**Air monitoring** - The process of measuring the fiber content of a known volume of air collected over a specified period of time. The NIOSH 7400 Method, Issue 2 is used to determine the fiber levels in air.

**Air sample filter** - The filter used to collect fibers which are then counted. The filter is made of mixed cellulose ester membrane for PCM (Phase Contrast Microscopy) and polycarbonate for TEM (Transmission Electron Microscopy)

**Amended water** - Water to which a surfactant (wetting agent) has been added to increase the penetrating ability of the liquid.

**Asbestos** - Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated or altered. Asbestos also includes PACM, as defined below.

**Asbestos-containing material (ACM)** - Any material containing more than one percent asbestos.

**Asbestos contaminated elements (ACE)** - Building elements such as ceilings, walls, lights, or ductwork that are contaminated with asbestos.

**Asbestos-containing waste material** - Asbestos-containing material or asbestos contaminated objects requiring disposal.

**Asbestos waste decontamination facility** - A system consisting of drum/bag washing facilities and a temporary storage area for cleaned containers of asbestos waste. Used as the exit for waste and equipment leaving the regulated area. In an emergency, it may be used to evacuate personnel.

**Authorized person** - Any person authorized by the VA, the Contractor, or government agency and required by work duties to be present in regulated areas.

**Authorized visitor** - Any person approved by the VA; the contractor; or any government agency having jurisdiction over the regulated area.

**Barrier** - Any surface that isolates the regulated area and inhibits fiber migration from the regulated area.

**Containment Barrier** - An airtight barrier consisting of walls, floors, and/or ceilings of sealed plastic sheeting which surrounds and seals the outer perimeter of the regulated area.

**Critical Barrier** - The barrier responsible for isolating the regulated area from adjacent spaces, typically constructed of plastic sheeting secured in place at openings such as doors, windows, or any other opening into the regulated area.

**Primary Barrier** - Barriers placed over critical barriers and exposed directly to abatement work.

**Secondary Barrier** - Any additional sheeting used to isolate and provide protection from debris during abatement work.

**Breathing zone** - The hemisphere forward of the shoulders with a radius of about 150 - 225 mm (6 - 9 inches) from the worker's nose.

**Bridging encapsulant** - An encapsulant that forms a layer on the surface of the ACM.

**Building/facility owner** - The legal entity, including a lessee, which exercises control over management and recordkeeping functions relating to a building and/or facility in which asbestos activities take place.

**Bulk testing** - The collection and analysis of suspect asbestos containing materials.

**Certified Industrial Hygienist (CIH)** - One certified in practice of industrial hygiene by the American Board of Industrial Hygiene. An industrial hygienist Certified in Comprehensive Practice by the American Board of Industrial Hygiene.

**Class I asbestos work** - Activities involving the removal of Thermal System Insulation (TSI) and surfacing ACM and Presumed Asbestos Containing Material (PACM).

**Class II asbestos work** - Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic.

**Clean room/Changing room** - An uncontaminated room having facilities for the storage of employee's street clothing and uncontaminated materials and equipment.

**Clearance sample** - The final air sample taken after all asbestos work has been done and visually inspected.  
Performed by the VA's industrial hygiene consultant (VPIH).

**Closely resemble** - The major workplace conditions which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

**Competent person** - In addition to the definition in 29 CFR 1926.32(f), one who is 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, as specified in 29 CFR 1926.32(f); in addition, for Class I and II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

**Contractor's Professional Industrial Hygienist (CPIH)** - The Contractor's industrial hygienist. The industrial hygienist must meet the qualification requirements of the PIH.

**Count** - Refers to the fiber count or the average number of fibers greater than five microns in length per cubic centimeter of air.

**Decontamination area/unit** - An enclosed area adjacent to and connected to the regulated area and consisting of an equipment room, shower room, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

**Demolition** - The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

**Disposal bag** - Typically 6 mil thick siftproof, dustproof, leaktight container used to package and transport asbestos waste from regulated areas to the approved landfill. Each bag/container must be labeled/marked in accordance with EPA, OSHA and DOT requirements.

**Disturbance** - Activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. Disturbance includes cutting away small amounts of ACM or PACM, no greater than the amount that can be contained in one standard sized glove bag or waste bag in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or disposal bag which shall not exceed 60 inches in length or width.

**Drum** - A rigid, impermeable container made of cardboard fiber, plastic, or metal which can be sealed in order to be siftproof, dustproof, and leaktight.

**Employee exposure** - The exposure to airborne asbestos that would occur if the employee were not wearing respiratory protection equipment.

**Encapsulant** - A material that surrounds or embeds asbestos fibers in an adhesive matrix and prevents the release of fibers.

**Encapsulation** - Treating ACM with an encapsulant.

**Enclosure** - The construction of an air tight, impermeable, permanent barrier around ACM to control the release of asbestos fibers from the material and also eliminate access to the material.

**Equipment room** - A contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

**Fiber** - A particulate form of asbestos, 5 microns or longer, with a length to width ratio of at least 3 to 1.

**Fibers per cubic centimeter (f/cc)** - Abbreviation for fibers per cubic centimeter, used to describe the level of asbestos fibers in air.

**Filter** - Media used in respirators, vacuums, or other machines to remove particulate from air.

**Firestopping** - Material used to close the open parts of a structure in order to prevent a fire from spreading.

**Friable asbestos containing material** - Any material containing more than 1 percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR 763, Section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

**Glovebag** - Not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which materials and tools may be handled.

**High efficiency particulate air (HEPA) filter** - A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 microns or greater in diameter.

**HEPA vacuum** - Vacuum collection equipment equipped with a HEPA filter system capable of collecting and retaining asbestos fibers.

**Homogeneous area** - An area of surfacing, thermal system insulation or miscellaneous ACM that is uniform in color, texture and date of application.

**HVAC** - Heating, Ventilation and Air Conditioning

**Industrial hygienist** - A professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards. Meets definition requirements of the American Industrial Hygiene Association (AIHA).

**Industrial hygienist technician** - A person working under the direction of an IH or CIH who has special training, experience, certifications and licenses required for the industrial hygiene work assigned.

**Intact** - The ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

**Lockdown** - Applying encapsulant, after a final visual inspection, on all abated surfaces at the conclusion of ACM removal prior to removal of critical barriers.

**National Emission Standards for Hazardous Air Pollutants (NESHAP's)** - EPA's rule to control emissions of asbestos to the environment.

**Negative initial exposure assessment** - A demonstration by the employer which complies with the criteria in 29 CFR 1926.1101 (f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PEL's.

**Negative pressure** - Air pressure which is lower than the surrounding area, created by exhausting air from a sealed regulated area through HEPA equipped filtration units. OSHA requires maintaining -0.02" water gauge inside the negative pressure enclosure.

**Negative pressure respirator** - A respirator in which the air pressure inside the facepiece is negative during inhalation relative to the air outside the respirator.

**Non-friable ACM** - Material that contains more than 1 percent asbestos but cannot be crumbled, pulverized, or reduced to powder by hand pressure.

**Organic vapor cartridge** - The type of cartridge used on air purifying respirators for organic vapor exposures.

**Outside air** - The air outside buildings and structures, including, but not limited to, the air under a bridge or in an open ferry dock.

**Owner/operator** - Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

**Penetrating encapsulant** - Encapsulant that is absorbed into the ACM matrix without leaving a surface layer.

**Personal sampling/monitoring** - Representative air samples obtained in the breathing zone of the person using a cassette and battery operated pump to determine asbestos exposure.

**Permissible exposure limit (PEL)** - The level of exposure OSHA allows for an 8 hour time weighted average. For asbestos fibers, the PEL is 0.1 fibers per cc.

**Polarized light microscopy (PLM)** - Light microscopy using dispersion staining techniques and refractive indices to identify and quantify the type(s) of asbestos present in a bulk sample.

**Polyethylene sheeting** - Strong plastic barrier material 4 to 6 mils thick, semi-transparent, sometimes flame retardant in compliance with NFPA 241.

**Positive/negative fit check** - A method of verifying the fit of a respirator by closing off the filters and breathing in or closing off the exhalation valve and breathing out while detecting leakage of the respirator.

**Presumed ACM (PACM)** - Thermal system insulation, surfacing, and flooring material installed in buildings prior to 1981. If the building owner has actual knowledge, or should have known through the exercise of due diligence that other materials are ACM, they too must be treated as PACM. The designation of PACM may be rebutted pursuant to 29 CFR 1926.1101 (k) (5).

**Professional IH** - An IH who meets the definition requirements of AIHA; meets the definition requirements of OSHA as a "Competent Person" at 29 CFR 1926.1101 (b); has completed two specialized EPA approved courses on management and supervision of asbestos abatement projects; has formal training in respiratory protection and waste disposal; and has a minimum of four projects of similar complexity with this project of which at least three projects serving as the supervisory IH.

**Project designer** - A person who has successfully completed the training requirements for an asbestos abatement project designer as required by 40 CFR 763 Appendix C, Part I; (B) (5).

**Protection factor** - A value assigned by OSHA/NIOSH to indicate the assigned protection a respirator should provide if worn properly. The number indicates the reduction of exposure level from outside to inside the respirator.

**Qualitative fit test (QLFT)** - A fit test using a challenge material that can be sensed by the wearer if leakage in the respirator occurs.

**Quantitative fit test (QNFT)** - A fit test using a challenge material which is quantified outside and inside the respirator thus allowing the determination of the actual fit factor.

**Regulated area** - An area established by the employer to demarcate where Class I, II, III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work may accumulate; and a work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed the PEL.



**Regulated ACM (RACM)** - Friable ACM; Category I nonfriable ACM that has become friable; Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or; Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of the demolition or renovation operation.

**Removal** - All operations where ACM, PACM and/or RACM is taken out or stripped from structures or substrates, including demolition operations.

**Renovation** - Altering a facility or one or more facility components in any way, including the stripping or removal of asbestos from a facility component which does not involve demolition activity.

**Repair** - Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

**Shower room** - The portion of the PDF where personnel shower before leaving the regulated area. Also used for bag/drum decontamination in the EDF.

**Standard operating procedures (SOP's)** - Asbestos work procedures required to be submitted by the contractor before work begins.

**Supplied air respirator (SAR)** - A respirator that utilizes an air supply separate from the air in the regulated area.

**Surfacing ACM** - A material containing more than 1 percent asbestos that is sprayed, troweled on or otherwise applied to surfaces for acoustical, fireproofing and other purposes.

**Surfactant** - A chemical added to water to decrease water's surface tension thus making it more penetrating into ACM.

**Thermal system ACM** - A material containing more than 1 percent asbestos applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.

**Transmission electron microscopy (TEM)** - A microscopy method that can identify and count asbestos fibers.

**VA Industrial Hygienist (VPIH/CIH)** - Department of Veterans Affairs Professional Industrial Hygienist.

**VA Representative** - The VA official responsible for on-going project work.

**Visible emissions** - Any emissions, which are visually detectable without the aid of instruments, coming from ACM/PACM/RACM or ACM waste material.

**Waste/Equipment decontamination area (W/EDA)** - The area in which waste is packaged and equipment is decontaminated before removal from the regulated area.

**Waste generator** - Any owner or operator whose act or process produces asbestos-containing waste material.

**Waste shipment record** - The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

**Wet cleaning** - The process of thoroughly eliminating, by wet methods, any asbestos contamination from surfaces or objects.

#### 1.4.3 REFERENCED STANDARDS ORGANIZATIONS

The following acronyms or abbreviations as referenced in contract/specification documents are defined to mean the associated names. Names and addresses may be subject to change.

- A. VA Department of Veterans Affairs  
810 Vermont Avenue, NW  
Washington, DC 20420
- B. AIHA American Industrial Hygiene Association  
2700 Prosperity Avenue, Suite 250  
Fairfax, VA 22031  
703-849-8888
- C. ANSI American National Standards Institute  
1430 Broadway  
New York, NY 10018  
212-354-3300
- D. ASTM American Society for Testing and Materials  
1916 Race St.  
Philadelphia, PA 19103  
215-299-5400
- E. CFR Code of Federal Regulations  
Government Printing Office  
Washington, DC 20420
- F. CGA Compressed Gas Association  
1235 Jefferson Davis Highway  
Arlington, VA 22202  
703-979-0900
- G. CS Commercial Standard of the National Institute of Standards and Technology (NIST)  
U. S. Department of Commerce  
Government Printing Office  
Washington, DC 20420
- H. EPA Environmental Protection Agency  
401 M St., SW

- Washington, DC 20460  
202-382-3949
- I. MIL-STD Military Standards/Standardization Division  
Office of the Assistant Secretary of Defense  
Washington, DC 20420
- J. MSHA Mine Safety and Health Administration  
Respiratory Protection Division  
Ballston Tower #3  
Department of Labor  
Arlington, VA 22203  
703-235-1452
- K. NIST National Institute for Standards and Technology  
U. S. Department of Commerce  
Gaithersburg, MD 20234  
301-921-1000
- L. NEC National Electrical Code (by NFPA)
- M. NEMA National Electrical Manufacturer's Association  
2101 L Street, NW  
Washington, DC 20037
- N. NFPA National Fire Protection Association  
1 Batterymarch Park  
P.O. Box 9101  
Quincy, MA 02269-9101  
800-344-3555
- O. NIOSH National Institutes for Occupational Safety and Health  
4676 Columbia Parkway  
Cincinnati, OH 45226  
513-533-8236
- P. OSHA Occupational Safety and Health Administration  
U.S. Department of Labor  
Government Printing Office  
Washington, DC 20402
- Q. UL Underwriters Laboratory  
333 Pfingsten Rd.  
Northbrook, IL 60062  
312-272-8800
- R. USA United States Army  
Army Chemical Corps  
Department of Defense  
Washington, DC 20420

**1.5 APPLICABLE CODES AND REGULATIONS****1.5.1 GENERAL APPLICABILITY OF CODES, REGULATIONS, AND STANDARDS**

- A. All work under this contract shall be done in strict accordance with all applicable Federal, State, and local regulations, standards and codes governing asbestos abatement, and any other trade work done in conjunction with the abatement. All applicable codes, regulations and standards are adopted into this specification and will have the same force and effect as this specification.
- B. The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirement(s) shall be utilized.
- C. Copies of all standards, regulations, codes and other applicable documents, including this specification and those listed in Section 1.5 shall be available at the worksite in the clean change area of the worker decontamination system.

**1.5.2 CONTRACTOR RESPONSIBILITY**

The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and Local regulations related to any and all aspects of the abatement project. The Contractor is responsible for providing and maintaining training, accreditations, medical exams, medical records, personal protective equipment as required by applicable Federal, State and Local regulations. The contractor shall hold the VA and VPIH/CIH consultants harmless for any failure to comply with any applicable work, packaging, transporting, disposal, safety, health, or environmental requirement on the part of himself, his employees, or his subcontractors. The contractor will incur all costs of the CPIH, including all sampling/analytical costs to assure compliance with OSHA/EPA/State requirements.

**1.5.3 FEDERAL REQUIREMENTS**

Federal requirements which govern some aspect of asbestos abatement include, but are not limited to, the following regulations.

- A. Occupational Safety and Health Administration (OSHA)
  - 1. Title 29 CFR 1926.1101 - Construction Standard for Asbestos
  - 2. Title 29 CFR 1910.132 - Personal Protective Equipment
  - 3. Title 29 CFR 1910.134 - Respiratory Protection
  - 4. Title 29 CFR 1926 - Construction Industry Standards
  - 5. Title 29 CFR 1910.20 - Access to Employee Exposure and Medical Records
  - 6. Title 29 CFR 1910.1200 - Hazard Communication

7. Title 29 CFR 1910.151 - Medical and First Aid

B. Environmental Protection Agency (EPA)

1. 40 CFR 61 Subpart A and M (Revised Subpart B) - National Emission Standard for Hazardous Air Pollutants - Asbestos.

2. 40 CFR 763.80 - Asbestos Hazard Emergency Response Act (AHERA)

C. Department of Transportation (DOT)

Title 49 CFR 100 - 185 - Transportation

**1.5.4 STATE REQUIREMENTS**

State requirements that apply to the asbestos abatement work, disposal, clearance, etc., include, but are not limited to, the following:

State requirements that apply to the asbestos abatement work, disposal, clearance, etc., include, but are not limited to, the following:

**ASBESTOS ABATEMENT CONTRACTOR LICENSING AND TRAINING, OHIO  
ADMINISTRATIVE CODE, RULES 3701-34-01 THROUGH 3701-34-7**

**1.5.5 LOCAL REQUIREMENTS**

If local requirements are more stringent than federal or state standards, the local standards are to be followed.

**1.5.6 STANDARDS**

A. Standards which govern asbestos abatement activities include, but are not limited to, the following:

1. American National Standards Institute (ANSI) Z9.2-79 - Fundamentals Governing the Design and Operation of Local Exhaust Systems Z88.2 - Practices for Respiratory Protection.

2. Underwriters Laboratories (UL) 586-90 - UL Standard for Safety of HEPA filter Units, 7th Edition.

B. Standards which govern encapsulation work include, but are not limited to, the following:

1. American Society for Testing and Materials (ASTM)

C. Standards which govern the fire and safety concerns in abatement work include, but are not limited to, the following:

1. National Fire Protection Association (NFPA) 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

2. NFPA 701 - Standard Methods for Fire Tests for Flame Resistant Textiles and Film.

3. NFPA 101 - Life Safety Code

**1.5.7 EPA GUIDANCE DOCUMENTS**

A. EPA guidance documents which discuss asbestos abatement work activities are listed below. These documents are made part of this section by reference. EPA publications can be ordered from (800) 424-9065.

B. Guidance for Controlling ACM in Buildings (Purple Book) EPA 560/5-85-024

- C. Asbestos Waste Management Guidance EPA 530-SW-85-007
- D. A Guide to Respiratory Protection for the Asbestos Abatement Industry  
EPA-560-OPTS-86-001
- E. Guide to Managing Asbestos in Place (Green Book) TS 799 20T July 1990

#### **1.5.8 NOTICES**

- A. State and Local agencies: Send written notification as required by state and local regulations including the local fire department prior to beginning any work on ACM as follows:

Send written notification as required by USEPA National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Asbestos regulations (40 CFR 61, Subpart M) to the regional Asbestos NESHAPS Contact at least 10 days prior to beginning any work on asbestos abatement or related work. Send notification to the following address:

Department of Public Health  
Division of Air Quality  
1925 St. Clair Avenue  
Cleveland, Ohio 44114-2080

Send written notification as required by Ohio Department of Health at least 10 days prior to beginning any work on any planned asbestos hazard abatement project as required by chapter 3701-34. Send notification to the following address:

Ohio Department of Health  
P.O. Box 15278  
Columbus, Ohio 43215

- B. Copies of notifications shall be submitted to the VA for the facility's records in the same time frame notification is given to EPA, State, and Local authorities.

#### **1.5.9 PERMITS/LICENSES**

- A. The contractor shall apply for and have all required permits and licenses to perform asbestos abatement work as required by Federal, State, and Local regulations.
- B. Contractor shall maintain a current Ohio Department of Health "Asbestos Abatement Contractor" license in accordance with paragraph (C) of rule 3701-34-01 of the Administrative Code

#### **1.5.10 POSTING AND FILING OF REGULATIONS**

- A. Maintain two (2) copies of applicable federal, state, and local regulations. Post one copy of each at the regulated area where workers will have daily access to the regulations and keep another copy in the Contractor's office.

**1.5.11 VA RESPONSIBILITIES**

Prior to commencement of work:

- A. Notify occupants adjacent to regulated areas of project dates and requirements for relocation, if needed. Arrangements must be made prior to starting work for relocation of desks, files, equipment and personal possessions to avoid unauthorized access into the regulated area. **Note: Notification of adjacent personnel is required by OSHA in 29 CFR 1926.1101 (k) to prevent unnecessary or unauthorized access to the regulated area.**
- B. Submit to the Contractor results of background air sampling; including location of samples, person who collected the samples, equipment utilized and method of analysis. During abatement, submit to the Contractor, results of bulk material analysis and air sampling data collected during the course of the abatement. This information shall not release the Contractor from any responsibility for OSHA compliance.

**1.5.12 SITE SECURITY**

- A. Regulated area access is to be restricted only to authorized, trained/accredited and protected personnel. These may include the Contractor's employees, employees of Subcontractors, VA employees and representatives, State and local inspectors, and any other designated individuals. A list of authorized personnel shall be established prior to commencing the project and be posted in the clean room of the decontamination unit.
- B. Entry into the regulated area by unauthorized individuals shall be reported immediately to the Competent Person by anyone observing the entry. The Competent person shall immediately notify the VA.
- C. A log book shall be maintained in the clean room of the decontamination unit. Anyone who enters the regulated area must record their name, affiliation, time in, and time out for each entry.
- D. Access to the regulated area shall be through of a critical barrier doorway. All other access (doors, windows, hallways, etc.) shall be sealed or locked to prevent entry to or exit from the regulated area. The only exceptions for this requirement are the waste/equipment load-out area which shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits. Emergency exits shall not be locked from the inside, however, they shall be sealed with poly sheeting and taped until needed.
- E. The Contractor's Competent Person shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel. A 24 hour security system shall be provided at the

entrance to the regulated area to assure that all entrants are logged in/out and that only authorized personnel are allowed entrance.

- F. The Contractor will have the VA's assistance in notifying adjacent personnel of the presence, location and quantity of ACM in the regulated area and enforcement of restricted access by the VA's employees.
- G. The regulated area shall be locked during non-working hours and secured by VA security guards.

#### **1.5.13 EMERGENCY ACTION PLAN AND ARRANGEMENTS**

- A. An Emergency Action Plan shall be developed by the Contractor prior to commencing abatement activities and shall be agreed to by the Contractor and the VA. The Plan shall meet the requirements of 29 CFR 1910.38 (a); (b) .
- B. Emergency procedures shall be in written form and prominently posted and available in the regulated area. Everyone, prior to entering the regulated area, must read and sign these procedures to acknowledge understanding of the regulated area layout, location of emergency exits and emergency procedures.
- C. Emergency planning shall include written notification of police, fire, and emergency medical personnel of planned abatement activities; work schedule and layout of regulated area, particularly barriers that may affect response capabilities.
- D. Emergency planning shall include consideration of fire, explosion, hazardous atmospheres, electrical hazards, slips/trips and falls, confined spaces, and heat stress illness. Written procedures for response to emergency situations shall be developed and employee training in procedures shall be provided.
- E. Employees shall be trained in regulated area/site evacuation procedures in the event of workplace emergencies.
  - 1. For non life-threatening situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the regulated area to obtain proper medical treatment.
  - 2. For life-threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, remove them from the regulated area, and secure proper medical treatment.
- F. Telephone numbers of all emergency response personnel shall be prominently posted in the clean room, along with the location of the nearest telephone.



- G. The Contractor shall provide verification of first aid/CPR training for personnel responsible for providing first aid/CPR. OSHA requires medical assistance within 3 minutes of a life-threatening injury/illness. Bloodborne Pathogen training shall also be verified for those personnel required to provide first aid/CPR.
- H. The Emergency Action Plan shall provide for a Contingency Plan in the event that an incident occurs that may require the modification of the standard operating procedures during abatement. Such incidents include, but are not limited to, fire; accident; and power failure. The Contractor shall detail procedures to be followed in the event of an incident assuring that work is stopped and wetting is continued until correction of the problem.

#### **1.5.14 PRE-START MEETING**

Prior to commencing the work, the Contractor shall meet with the VPCIH to present and review, as appropriate, the items following this paragraph. The Contractor's Competent Person(s) who will be on-site shall participate in the pre-start meeting. The pre-start meeting is to discuss and determine procedures to be used during the project. At this meeting, the Contractor shall provide:

- A. Proof of Contractor licensing.
- B. Proof the Competent Person is trained and accredited and approved for working in this State. Verification of the experience of the Competent Person shall also be presented.
- C. A list of all workers who will participate in the project, including experience and verification of training and accreditation.
- D. A list of and verification of training for all personnel who have current first-aid/CPR training. A minimum of one person per shift must have adequate training.
- E. Current medical written opinions for all personnel working on-site meeting the requirements of 29 CFR 1926.1101 (m).
- F. Current fit-tests for all personnel wearing respirators on-site meeting the requirements of 29 CFR 1926.1101 (h) and Appendix C.
- G. A copy of the Contractor's Standard Operating Procedures for Class I Glovebag Asbestos Abatement. In these procedures, the following information must be detailed, specific for this project.
  - 1. Regulated area preparation procedures;
  - 2. Notification requirements procedure of Contractor as required in 29 CFR 1926.1101 (d);
  - 3. and Decontamination procedures for employees;
  - 4. Class II abatement methods/procedures and equipment to be used;

- 5. Personal protective equipment to be used;
- H. At this meeting the Contractor shall provide all submittals as required.
- I. Procedures for handling, packaging and disposal of asbestos waste.
- J. Emergency Action Plan and Contingency Plan procedures.

#### **1.6 PROJECT COORDINATION**

The following are the minimum administrative and supervisory personnel necessary for coordination of the work.

##### **1.6.1 PERSONNEL**

- A. Administrative and supervisory personnel shall consist of a qualified Competent Person as defined by OSHA in the Construction Standards and the Asbestos Construction Standard; Contractor Professional Industrial Hygienist and Industrial Hygiene Technicians. These employees are the Contractor's representatives responsible for compliance with these specifications and all other applicable requirements.
- B. Non-supervisory personnel shall consist of an adequate number of qualified personnel to meet the schedule requirements of the project. Personnel shall meet required qualifications. Personnel utilized on-site shall be pre-approved by the VA representative. A request for approval shall be submitted for any person to be employed during the project giving the person's name; social security number; qualifications; accreditation card with picture; Certificate of Worker's Acknowledgment; and Affidavit of Medical Surveillance and Respiratory Protection and current Respirator Fit Test.
- C. Minimum qualifications for Contractor and assigned personnel are:
  - 1. The Contractor has conducted within the last three (3) years, three (3) projects of similar complexity and dollar value as this project; has not been cited and penalized for serious violations of asbestos regulations in the past three (3) years; has adequate liability/occurrence insurance for asbestos work; is licensed in applicable states; has adequate and qualified personnel available to complete the work; has comprehensive standard operating procedures for asbestos work; has adequate materials, equipment and supplies to perform the work.
  - 2. The Competent Person has three (3) years of abatement experience of which two (2) years were as the Competent Person on the project; meets the OSHA definition of a Competent Person; has been the Competent Person on two (2) projects of similar size and complexity as this project; has completed EPA AHERA/OSHA/State/Local training requirements/accreditation(s) and refreshers; and has all required OSHA documentation related to medical and respiratory protection.

3. The Contractor Professional Industrial Hygienist (CPIH) shall have three (3) years of monitoring experience and supervision of asbestos abatement projects; has participated as senior IH on five (5) abatement projects, three (3) of which are similar in size and complexity as this project; has developed at least one complete standard operating procedure for asbestos abatement; has trained abatement personnel for three (3) years; has specialized EPA AHERA/OSHA training in asbestos abatement management, respiratory protection, waste disposal and asbestos inspection; has completed the NIOSH 582 Course, Contractor/Supervisor course; and has appropriate medical/respiratory protection records/documentation.
4. The Abatement Personnel shall have completed the EPA AHERA/OSHA abatement worker course; have training on the standard operating procedures of the Contractor; has one year of asbestos abatement experience; has applicable medical and respiratory protection documentation; has certificate of training/current refresher and State accreditation/license.

#### **1.7 RESPIRATORY PROTECTION**

##### **1.7.1 GENERAL - RESPIRATORY PROTECTION PROGRAM**

The Contractor shall develop and implement a Respiratory Protection Program (RPP) which is in compliance with the January 8, 1998 OSHA requirements found at 29 CFR 1926.1101 and 29 CFR 1910.132;134. ANSI Standard Z88.2-1992 provides excellent guidance for developing a respiratory protection program. All respirators used must be NIOSH approved for asbestos abatement activities. The written respiratory protection shall, at a minimum, contain the basic requirements found at 29 CFR 1910.134 (c) (1) (i - ix) - Respiratory Protection Program.

##### **1.7.2 RESPIRATORY PROTECTION PROGRAM COORDINATOR**

The Respiratory Protection Program Coordinator (RPPC) must be identified and shall have two (2) years experience coordinating the program. The RPPC must provide a signed statement attesting to the fact that the program meets the above requirements.

##### **1.7.3 SELECTION AND USE OF RESPIRATORS**

The procedure for the selection and use of respirators must be submitted to the VA as part of the Contractor's qualification. The procedure must be written clearly enough for workers to understand. A copy of the Respiratory Protection Program must be available in the clean room of the decontamination unit for reference by employees or authorized visitors.

**1.7.4 MINIMUM RESPIRATORY PROTECTION**

Minimum respiratory protection shall be a half face, HEPA filtered, air purifying respirator when fiber levels are maintained consistently at or below 0.1 f/cc. A higher level of respiratory protection may be provided or required, depending on fiber levels. Respirator selection shall meet the requirements of 29 CFR 1926.1101 (h); Table 1, except as indicated in this paragraph. Abatement personnel must have a respirator for their exclusive use.

**1.7.5 MEDICAL WRITTEN OPINION**

No employee shall be allowed to wear a respirator unless a physician has determined they are capable of doing so and has issued a current written opinion for that person.

**1.7.6 RESPIRATOR FIT TEST**

All personnel wearing respirators shall have a current qualitative/quantitative fit test which was conducted in accordance with 29 CFR 1910.134 (f) and Appendix A. Fit tests shall be done for PAPR's which have been put into a failure mode.

**1.7.7 RESPIRATOR FIT CHECK**

The Competent Person shall assure that the positive/negative fit check is done each time the respirator is donned by an employee. Headcoverings must cover respirator headstraps. Any situation that prevents an effective facepiece to face seal as evidenced by failure of a fit check shall preclude that person from wearing a respirator until resolution of the problem.

**1.7.8 MAINTENANCE AND CARE OF RESPIRATORS**

The Respiratory Protection Program Coordinator shall submit evidence and documentation showing compliance with 29 CFR 1910.134 (h) Maintenance and care of respirators.

**1.8 WORKER PROTECTION****1.8.1 TRAINING OF ABATEMENT PERSONNEL**

Prior to beginning any abatement activity, all personnel shall be trained in accordance with OSHA 29 CFR 1926.1101 (k) (9) and any additional State/Local requirements. Training must include, at a minimum, the elements listed at 29 CFR 1926.1101 (k) (9) (viii). Training shall have been conducted by a third party, EPA/State approved trainer meeting the requirements of EPA 40 CFR 763 Appendix C (AHERA MAP). Initial training certificates and current refresher and accreditation proof must be submitted for each person working at the site.

**1.8.2 MEDICAL EXAMINATIONS**

Medical examinations meeting the requirements of 29 CFR 1926.1101 (m) shall be provided for all personnel working in the regulated area, regardless of exposure levels. The physician's written opinion as required by 29 CFR 1926.1101 (m) (4) shall be provided for each person and shall include in the opinion the person has been evaluated for working in a heat stress environment while wearing personal protective equipment and is able to perform the work.

**1.8.3 PERSONAL PROTECTIVE EQUIPMENT**

Provide whole body clothing, head coverings, foot coverings and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA at 29 CFR 1910.132 (d). The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the project. Duct tape shall be used to secure all suit sleeves to wrists and to secure foot coverings at the ankle.

**1.8.4 REGULATED AREA ENTRY PROCEDURE**

Worker protection shall meet the most stringent requirements. The Competent Person shall ensure that each time workers enter the regulated area, they remove ALL street clothes in the clean room of the decontamination unit and put on new disposable coveralls, head coverings, a clean respirator, and then proceed through the shower room to the equipment room where they put on non-disposable required personal protective equipment.

**1.8.5 DECONTAMINATION PROCEDURE**

The Competent Person shall require all personnel to adhere to following decontamination procedures whenever they leave the regulated area.

- A. When exiting the regulated area, remove all disposable PPE and dispose of in a disposal bag provided in the regulated area.
- B. Carefully decontaminate and clean the respirator. Put in a clean container/bag.

**1.8.6 REGULATED AREA REQUIREMENTS**

The Competent Person shall meet all requirements of 29 CFR 1926.1101 (o) and assure that all requirements for Class I glovebag regulated areas at 29 CFR 1926.1101 (e) are met applicable to Class II work. All personnel in the regulated area shall not be allowed to eat, drink, smoke, chew tobacco or gum, apply cosmetics, or in any way interfere with the fit of their respirator.

**1.9 DECONTAMINATION FACILITIES:****1.9.1 DESCRIPTION:**

Provide each regulated area with a fiber drum with a disposal bag in it for personnel waste materials.

**1.9.2 WASTE/EQUIPMENT DECONTAMINATION AREA (W/EDA)** - The Competent Person shall provide a W/EDA for removal of all waste, equipment and contaminated material from the regulated area.

**1.9.3 WASTE/EQUIPMENT DECONTAMINATION PROCEDURES:** Contain all waste in 6 mil poly bags. Clean/decontaminate bags and pass through a double 6 mil flap doorway into another bag or fiber drum. Remove to disposal dumpster/gondola/vehicle. At no time shall unprotected personnel from the clean side be allowed to enter the regulated area.

## **PART 2 - PRODUCTS, MATERIALS AND EQUIPMENT**

### **2.1 MATERIALS AND EQUIPMENT**

#### **2.1.1 GENERAL REQUIREMENTS (ALL ABATEMENT PROJECTS)**

Prior to the start of work, the Contractor shall provide and maintain a sufficient quantity of materials and equipment to assure continuous and efficient work throughout the duration of the project. Work shall not start unless the following items have been delivered to the site and the CPIH has submitted verification to the VA's representative to this effect:

- A. All materials shall be delivered in their original package, container or bundle bearing the name of the manufacturer and the brand name (where applicable).
- B. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Flammable materials cannot be stored inside buildings. Replacement materials shall be stored outside of the regulated/work area until abatement is completed.
- C. The Contractor shall not block or hinder use of buildings by patients, staff, and visitors to the VA in partially occupied buildings by placing materials/equipment in any unauthorized place.
- D. The Competent Person shall inspect for damaged, deteriorating or previously used materials. Such materials shall not be used and shall be removed from the worksite and disposed of properly.
- E. Poly sheeting for critical barriers/floors in the regulated area shall be 6 mil.
- F. If required, the method of attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and the VA and selected to minimize damage to equipment and surfaces.
- G. An adequate number of infra-red heating units, HEPA vacuums, scrapers, sprayers, nylon brushes, brooms, disposable mops, rags, sponges, staple

guns, shovels, ladders and scaffolding of suitable height and length as well as meeting OSHA requirements shall be provided. Fall protection devices, water hose to reach all areas in the regulated area, airless spray equipment, and any other tools, materials or equipment required to conduct the abatement project shall also be provided. All electrically operated hand tools, equipment, electric cords shall be equipped with GFCI protection.

- H. Special protection for objects in the regulated area shall be detailed. (e.g., plywood over carpeting or hardwood floors to prevent damage from scaffolds, water, and falling material.)
- I. Impermeable fiberboard drums and disposal bags 2 layers of 6 mil, for asbestos waste shall be pre-printed with labels, markings and address as required by OSHA, EPA and DOT regulations.
- J. The VA shall be provided a copy of the MSDS as required for all hazardous chemicals under OSHA 29 CFR 1910.1200 - Hazard Communication. Chlorinated compounds shall not be used with any spray adhesive or other product. Appropriate encapsulant(s) shall be provided.
- K. OSHA DANGER demarcation signs, as many and as required by OSHA 29 CFR 1926.1101(k) (7) shall be provided and placed by the Competent Person. All other posters and notices required by Federal and State regulations shall be posted in the Clean Room.
- L. Adequate and appropriate PPE for the project and number of personnel/shifts shall be provided. All personal protective equipment issued must be based on a hazard assessment conducted under 29 CFR 1910.132(d).

## **2.2 CONTAINMENT BARRIERS AND COVERINGS IN THE REGULATED AREA**

### **2.2.1 GENERAL**

- A. Using critical barriers, seal off the perimeter to the regulated area to completely isolate the regulated area from adjacent spaces. All horizontal surfaces, as required, in the regulated area must be covered with 2 layers of 6 mil fire retardant poly to prevent contamination and to facilitate clean-up. Should adjacent areas become contaminated, immediately stop work and clean up the contamination at no additional cost to the Government. Provide firestopping and identify all fire barrier penetrations due to abatement work as specified in Section 2.2.7; Section 07 92 00, FIRESTOPPING.

### **2.2.2 PREPARATION PRIOR TO SEALING THE REGULATED AREA**

- B. Place all tools, scaffolding, materials and equipment needed for working in the regulated area prior to erecting any plastic sheeting. Remove all uncontaminated removable furniture, equipment and/or supplies from the

regulated area before commencing work, or completely cover with two layers of 6-mil fire retardant poly sheeting and secure with duct tape. Lock out and tag out any HVAC systems in the regulated area.

#### **2.2.3 CONTROLLING ACCESS TO THE REGULATED AREA**

Access to the regulated area is allowed only through the personnel decontamination facility (PDF), if required. All other means of access shall be eliminated and OSHA DANGER demarcation signs posted as required by OSHA. If the regulated area is adjacent to or within view of an occupied area, provide a visual barrier of 6 mil opaque fire retardant poly sheeting to prevent building occupant observation. If the adjacent area is accessible to the public, the barrier must be solid.

#### **2.2.4 CRITICAL BARRIERS**

Completely separate any openings into the regulated area from adjacent areas using fire retardant poly at least 6 mils thick and duct tape. Individually seal with two layers of 6 mil poly and duct tape all HVAC openings into the regulated area. Individually seal all lighting fixtures, clocks, doors, windows, convectors, speakers, or any other objects in the regulated area. Heat must be shut off any objects covered with poly.

#### **2.2.5 SECONDARY BARRIERS:**

A loose layer of 6 mil fire retardant poly shall be used as a drop cloth to protect the floor/horizontal surfaces from debris generated during the Class II work, except for floor tile abatement. This layer shall be replaced as needed during the work.

#### **2.2.6 EXTENSION OF THE REGULATED AREA**

If the enclosure of the regulated area is breached in any way that could allow contamination to occur, the affected area shall be included in the regulated area and constructed as per this section. If the affected area cannot be added to the regulated area, decontamination measures must be started immediately and continue until air monitoring indicates background levels are met.

#### **2.2.7 FIRESTOPPING:**

- A. Through penetrations caused by cables, cable trays, pipes, sleeves must be firestopped with a fire-rated firestop system providing an air tight seal.
- B. Firestop materials that are not equal to the wall or ceiling penetrated shall be brought to the attention of the VA Representative. The Contractor shall list all areas of penetration, the type of sealant used, and whether or not the location is fire rated. Any discovery of penetrations during abatement shall be brought to the attention of the



VA Representative immediately. All walls, floors and ceilings are considered fire rated unless otherwise determined by the VA Representative or Fire Marshall.

- C. Any visible openings whether or not caused by a penetration shall be reported by the Contractor to the VA Representative for a sealant system determination. Firestops shall meet ASTM E814 and UL 1479 requirements for the opening size, penetrant, and fire rating needed.

## **2.3 MONITORING, INSPECTION AND TESTING**

### **2.3.1 GENERAL**

- A. Perform throughout abatement work monitoring, inspection and testing inside and around the regulated area in accordance with the OSHA requirements and these specifications. The CPIH shall periodically inspect and oversee the performance of the Contractor IH Technician. The IH Technician shall continuously inspect and monitor conditions inside the regulated area to ensure compliance with these specifications. In addition, the CPIH shall personally manage air sample collection, analysis, and evaluation for personnel, regulated area, and adjacent area samples to satisfy OSHA requirements. Additional inspection and testing requirements are also indicated in other parts of this specification.
- B. The VA will employ an independent industrial hygienist (VPIH/CIH) consultant and/or use its own IH to perform various services on behalf of the VA. The VPIH/CIH will perform the necessary monitoring, inspection, testing, and other support services to ensure that VA patients, employees, and visitors will not be adversely affected by the abatement work, and that the abatement work proceeds in accordance with these specifications, that the abated areas or abated buildings have been successfully decontaminated. The work of the VPIH/CIH consultant in no way relieves the Contractor from their responsibility to perform the work in accordance with contract/specification requirements, to perform continuous inspection, monitoring and testing for the safety of their employees, and to perform other such services as specified. The cost of the VPIH/CIH and their services will be borne by the VA except for any repeat of final inspection and testing that may be required due to unsatisfactory initial results. Any repeated final inspections and/or testing, if required, will be paid for by the Contractor.
- C. If fibers counted by the VPIH/CIH during abatement work inside the regulated area, utilizing the NIOSH 7400 air monitoring method, exceed 0.05 f/cc, the Contractor shall stop work. If fiber levels exceed 0.01 f/cc outside the regulated area, the Contractor shall stop work. The

Contractor may request confirmation of the results by analysis of the samples by TEM. Request must be in writing and submitted to the VA's representative. Cost for the confirmation of results will be borne by the Contractor for both the collection and analysis of samples and for the time delay that may/does result for this confirmation. Confirmation sampling and analysis will be the responsibility of the CPIH with review and approval of the VPIH/CIH. An agreement between the CPIH and the VPIH/CIH shall be reached on the exact details of the confirmation effort, in writing, including such things as the number of samples, location, collection, quality control on-site, analytical laboratory, interpretation of results and any follow-up actions. This written agreement shall be co-signed by the IH's and delivered to the VA's representative.

#### **2.3.2 SCOPE OF SERVICES OF THE VPIH/CIH CONSULTANT**

- A. The purpose of the work of the VPIH/CIH is to: assure quality; resolve problems; and prevent the spread of contamination beyond the regulated area. In addition, their work includes performing the final inspection and testing to determine whether the regulated area or building has been adequately decontaminated. All air monitoring is to be done utilizing PCM/TEM. The VPIH/CIH will perform the following tasks:
1. Task 1: Establish background levels before abatement begins by collecting background samples. Retain samples for possible TEM analysis.
  2. Task 2: Perform continuous air monitoring, inspection, and testing outside the regulated area during actual abatement work to detect any faults in the regulated area isolation and any adverse impact on the surroundings from regulated area activities.
  3. Task 3: Perform unannounced visits to spot check overall compliance of work with contract/specifications. These visits may include any inspection, monitoring, and testing inside and outside the regulated area and all aspects of the operation except personnel monitoring.
  4. Task 4: Provide support to the VA representative such as evaluation of submittals from the Contractor, resolution of unforeseen developments, etc.
  5. Task 5: Perform, in the presence of the VA representative, final inspection and testing of a decontaminated regulated area or building at the conclusion of the abatement and clean-up work to certify compliance with all regulations and the VA requirements/specifications.

6. Task 6: Issue certificate of decontamination for each regulated area or building and project report.
- B. All documentation, inspection results and testing results generated by the VPIH/CIH will be available to the Contractor for information and consideration. The Contractor shall cooperate with and support the VPIH/CIH for efficient and smooth performance of their work.
- C. The monitoring and inspection results of the VPIH/CIH will be used by the VA to issue any Stop Removal orders to the Contractor during abatement work and to accept or reject a regulated area or building as decontaminated.
- D. All air sampling and analysis data will be recorded on VA Form 10-0018.

### **2.3.3 MONITORING, INSPECTION AND TESTING BY CONTRACTOR CPIH**

The CPIH is responsible for managing all monitoring, inspections, and testing required by these specifications, as well as any and all regulatory requirements adopted by these specifications. The CPIH is responsible for the continuous monitoring of all subsystems and procedures which could affect the health and safety of the Contractor's personnel. Safety and health conditions and the provision of those conditions inside the regulated area for all persons entering the regulated area is the exclusive responsibility of the Contractor /Competent Person. The person performing the personnel and area air monitoring inside the regulated area shall be an IH Technician, who shall be trained and shall have specialized field experience in air sampling and analysis. The IH Technician shall have a NIOSH 582 Course or equivalent and show proof. The IH Technician shall participate in the AIHA Asbestos Analysis Registry or participate in the Proficiency Analytic Testing program of AIHA for fiber counting quality control assurance. The IH Technician shall also be an accredited EPA/State Contractor/Supervisor and Building Inspector. The IH Technician shall have participated in five abatement projects collecting personal and area samples as well as responsibility for documentation. The analytic laboratory used by the Abatement Contractor to analyze the samples shall be AIHA accredited for asbestos PAT. A daily log documenting all OSHA requirements for air monitoring for asbestos in 29 CFR 1926.1101(f), (g) and Appendix A. This log shall be made available to the VA representative and the VPIH/CIH. The log will contain, at a minimum, information on personnel or area sampled, other persons represented by the sample, the date of sample collection, start and stop times for sampling, sample volume, flow rate, and fibers/cc. The CPIH shall collect and analyze samples for each representative job being done in

the regulated area, i.e., removal, wetting, clean-up, and load-out. No fewer than two personal samples per shift shall be collected and one area sample per 1,000 square feet of regulated area where abatement is taking place and one sample per shift in the clean room area shall be collected. In addition to the continuous monitoring required, the CPIH will perform inspection and testing at the final stages of abatement for each regulated area as specified in the CPIH responsibilities.

## **2.4 STANDARD OPERATING PROCEDURES**

The Contractor shall have established Standard Operating Procedures (SOP's) in printed form and loose leaf folder consisting of simplified text, diagrams, sketches, and pictures that establish and explain clearly the ways and procedures to be followed during all phases of the work by the contractor's personnel. The SOP's must be modified as needed to address specific requirements of the project. The SOP's shall be submitted for review and approval prior to the start of any abatement work. The minimum topics and areas to be covered by the SOP's are:

- A. Minimum Personnel Qualifications
- B. Contingency Plans and Arrangements
- C. Security and Safety Procedures
- D. Respiratory Protection/Personal Protective Equipment Program and Training
- E. Medical Surveillance Program and Recordkeeping
- F. Regulated Area Requirements for Class II work
- G. Decontamination Facilities and Entry/Exit Procedures (PDF and W/EDF)
- H. Monitoring, Inspections, and Testing
- I. Removal Procedures for Class II Materials
- J. Disposal of ACM Waste
- K. Regulated Area Decontamination/Clean-up
- L. Regulated Area Visual and Air Clearance
- M. Project Completion/Closeout

## **2.5 SUBMITTALS**

### **2.5.1 PRE-START MEETING SUBMITTALS**

Submit to the VA a minimum of 14 days prior to the pre-start meeting the following for review and approval. Meeting this requirement is a prerequisite for the pre-start meeting for this project.

- A. Submit a detailed work schedule for the entire project reflecting contract documents and the phasing/schedule requirements from the CPM chart.
- B. Submit a staff organization chart showing all personnel who will be working on the project and their capacity/function. Provide their

qualifications, training, accreditations, and licenses, as appropriate. Provide a copy of the "Certificate of Worker's Acknowledgment" and the "Affidavit of Medical Surveillance and Respiratory Protection" for each person.

- C. Submit Standard Operating Procedures developed specifically for this project, incorporating the requirements of the specifications, prepared, signed and dated by the CPIH.
- D. Submit the specifics of the materials and equipment to be used for this project with brand names, model numbers, performance characteristics, pictures/diagrams, and number available for the following:
  - 1. HEPA vacuums, air monitoring pumps, calibration devices, infrared heating machines, and emergency power generating system.
  - 2. Encapsulants, surfactants, hand held sprayers, airless sprayers, fire extinguishers.
  - 3. Personal protective equipment.
  - 4. Fire safety equipment to be used in the regulated area.
- E. Submit the name, location, and phone number of the approved landfill; proof/verification the landfill is approved for ACM disposal; the landfill's requirements for ACM waste; the type of vehicle to be used for transportation; and name, address, and phone number of subcontractor, if used. Proof of asbestos training for transportation personnel shall be provided.
- F. Submit required notifications and arrangements made with regulatory agencies having regulatory jurisdiction and the specific contingency/emergency arrangements made with local health, fire, ambulance, hospital authorities and any other notifications/arrangements.
- G. Submit the name, location and verification of the laboratory and/or personnel to be used for analysis of air and/or bulk samples. Air monitoring must be done in accordance with OSHA 29 CFR 1926.1101(f) and Appendix A.
- H. Submit qualifications verification: Submit the following evidence of qualifications. Make sure that all references are current and verifiable by providing current phone numbers and documentation.
  - 1. Asbestos Abatement Company: Project experience within the past 3 years; listing projects first most similar to this project:  
Project Name; Type of Abatement; Duration; Cost; Reference Name/Phone Number; Final Clearance; Completion Date
  - 2. List of project(s) halted by owner, A/E, IH, regulatory agency in the last 3 years:

- Project Name; Reason; Date; Reference Name/Number; Resolution
3. List asbestos regulatory citations, penalties, damages paid and legal actions taken against the company in the last 3 years. Provide copies and all information needed for verification.
- I. Submit information on personnel: Provide a resume; address each item completely; provide references; phone numbers; copies of certificates, accreditations, and licenses. Submit an affidavit signed by the CPIH stating that all personnel submitted below have medical records in accordance with OSHA 29 CFR 1926.1101(m) and 29 CFR 1910.20 and that the company has implemented a medical surveillance program and maintains recordkeeping in accordance with the above regulations. Submit the phone number and doctor/clinic/hospital used for medical evaluations.
1. CPIH: Name; years of abatement experience; list of projects similar to this one; certificates, licenses, accreditations for proof of AHERA/OSHA specialized asbestos training; professional affiliations; number of workers trained; samples of training materials; samples of SOP's developed; medical opinion; current respirator fit test.
  2. Competent Person(s)/Supervisor(s): Number; names; social security numbers; years of abatement experience as Competent Person/Supervisor; list of similar projects as Competent Person/Supervisor; as a worker; certificates, licenses, accreditations; proof of AHERA/OSHA specialized asbestos training; maximum number of personnel supervised on a project; medical opinion; current respirator fit test.
  3. Workers: Numbers; names; social security numbers; years of abatement experience; certificates, licenses, accreditations; training courses in asbestos abatement and respiratory protection; medical opinion; current respirator fit test.
- J. Submit copies of State license for asbestos abatement; copy of insurance policy, including exclusions with a letter from agent stating in plain English the coverage provided and the fact that asbestos abatement activities are covered by the policy; copy of SOP's incorporating the requirements of this specification; information on who provides your training, how often; who provides medical surveillance, how often; who does and how is air monitoring conducted; a list of references of independent laboratories/IH's familiar with your air monitoring and standard operating procedures; copies of monitoring results of the five referenced projects listed and analytical method(s) used.
- K. When rental equipment is to be used in regulated areas or used to transport asbestos waste, the contractor shall assure complete

decontamination of the rental equipment before return to the rental agency.

#### **2.5.2 SUBMITTALS DURING ABATEMENT**

- A. The Competent Person shall maintain and submit a daily log at the regulated area documenting the dates and times of the following: purpose, attendees and summary of meetings; all personnel entering/exiting the regulated area; document and discuss the resolution of unusual events such as critical barrier breeching, equipment failures, emergencies, and any cause for stopping work; representative air monitoring and results/TWA's/EL's. Submit this daily log to VA's representative.
- B. The CPIH shall document and maintain the following during abatement and submit as appropriate to the VA's representative.
  - 1. Inspection and approval of the regulated area preparation prior to start of work and daily during work.
  - 2. Removal of any poly critical/floor barriers.
  - 3. Visual inspection/testing by the CPIH.
  - 4. Packaging and removal of ACM waste from regulated area.
  - 5. Disposal of ACM waste materials; copies of Waste Shipment Records/landfill receipts to the VA's representative on a weekly basis.

#### **2.5.3 SUBMITTALS AT COMPLETION OF ABATEMENT**

The CPIH shall submit a project report consisting of the daily log book requirements and documentation of events during the abatement project including Waste Shipment Records signed by the landfill's agent. The report shall include a certificate of completion, signed and dated by the CPIH, in accordance with Attachment #1. The VA Representative will forward the abatement report to the Medical Center after completion of the project.

### **PART 3 - EXECUTION**

#### **3.1 PRE-ABATEMENT ACTIVITIES**

##### **3.1.1 PRE-ABATEMENT MEETING**

The VA representative, upon receipt, review, and substantial approval of all pre-abatement submittals and verification by the CPIH that all materials and equipment required for the project are on the site, will arrange for a pre-abatement meeting between the Contractor, the CPIH, Competent Person(s), the VA representative(s), and the VPIH/CIH. The purpose of the meeting is to discuss any aspect of the submittals needing clarification or amplification and to discuss any aspect of the project execution and the sequence of the operation. The Contractor

shall be prepared to provide any supplemental information/ documentation to the VA's representative regarding any submittals, documentation, materials or equipment. Upon satisfactory resolution of any outstanding issues, the VA's representative will issue a written order to proceed to the Contractor. No abatement work of any kind described in the following provisions shall be initiated prior to the VA written order to proceed.

### **3.1.2 PRE-ABATEMENT INSPECTIONS AND PREPARATIONS**

Before any work begins on the construction of the regulated area, the Contractor will:

- A. Conduct a space-by-space inspection with an authorized VA representative and prepare a written inventory of all existing damage in those spaces where asbestos abatement will occur. Still or video photography may be used to supplement the written damage inventory. Document will be signed and certified as accurate by both parties.
- B. The VA Representative, the Contractor, and the VPIH/CIH must be aware of 10/95 A/E Quality Alert indicating the failure to identify asbestos as applicable to glovebag abatement in the areas listed. Make sure these areas are looked at/reviewed on the project:  
Lay-in ceilings concealing ACM; ACM behind walls/windows from previous renovations; inside chases/walls; transite piping/ductwork/sheets; behind radiators; below window sills; water/sewer lines; electrical conduit coverings; steam line trench coverings.
- C. Ensure that all furniture, machinery, equipment, curtains, drapes, blinds, and other movable objects which the Contractor is required to remove from the regulated area have been cleaned and removed or properly protected from contamination.
- D. Shut down and seal with a minimum of 2 layers of 6 mil fire retardant poly all HVAC systems and critical openings in the regulated area. The regulated area critical barriers shall be completely isolate the regulated area from anyother air in the building. The VA's representative will monitor the isolation provision.
- E. Shut down and lock out in accordance with 29 CFR 1910.147 all electrical circuits which pose a potential hazard. Electrical arrangements will be tailored to the particular regulated area and the systems involved. All electrical circuits affected will be turned off at the circuit box outside the regulated area, not just the wall switch. The goal is to eliminate the potential for electrical shock which is a major threat to life in the regulated area due to water use and possible energized circuits. Electrical lines used to power equipment in the regulated area shall conform to all electrical safety standards and shall be isolated



by the use of a ground fault circuit interrupter (GFCI). All GFCI shall be tested prior to use. The VA's representative will monitor the electrical shutdown.

- F. If required, remove and dispose of carpeting from floors in the regulated area.
- G. Inspect existing firestopping in the regulated area. Correct as needed.

### **3.1.3 PRE-ABATEMENT CONSTRUCTION AND OPERATIONS**

- A. Perform all preparatory work for the first regulated area in accordance with the approved work schedule and with this specification.
- B. Upon completion of all preparatory work, the CPIH will inspect the work and systems and will notify the VA's representative when the work is completed in accordance with this specification. The VA's representative may inspect the regulated area and the systems with the VPIH/CIH and may require that upon satisfactory inspection, Contractor's employees perform all major aspects of the approved SOP's, especially worker protection, respiratory systems, contingency plans, decontamination procedures, and monitoring to demonstrate satisfactory operation.
- C. The CPIH shall document the pre-abatement activities described above and deliver a copy to the VA's representative.
- D. Upon satisfactory inspection of the installation of and operation of systems the VA's representative will notify the Contractor in writing to proceed with the Class II asbestos abatement work in accordance with this specification.

## **3.2 REGULATED AREA PREPARATIONS**

### **3.2.1 OSHA DANGER SIGNS**

Post OSHA DANGER signs meeting the specifications of OSHA 29 CFR 1926.1101 at any location and approaches to the regulated area where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the regulated area to permit any personnel to read the sign and take the necessary measures to avoid exposure. Additional signs will be posted following construction of the regulated area enclosure.

### **3.2.2 SHUT DOWN - LOCK OUT ELECTRICAL**

Shut down and lock out electric power to the regulated area. Provide temporary power and lighting. Insure safe installation including GFCI of temporary power sources and equipment by compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems. Electricity shall be provided by the VA.

**3.2.3 SHUT DOWN - LOCK OUT HVAC**

Shut down and lock out heating, cooling, and air conditioning system (HVAC) components that are in, supply or pass through the regulated area. Investigate the regulated area and agree on pre-abatement condition with the VA's representative. Seal all intake and exhaust vents in the regulated area with duct tape and 2 layers of 6-mil poly. Also, seal any seams in system components that pass through the regulated area. Remove all contaminated HVAC system filters and place in labeled 6 mil poly disposal bags for disposal as asbestos waste.

**3.2.4 SANITARY FACILITIES**

The Contractor shall provide sanitary facilities for abatement personnel and maintain them in a clean and sanitary condition throughout the abatement project.

**3.2.5 WATER FOR ABATEMENT**

The VA will provide water for abatement purposes. The Contractor shall connect to the existing VA system. The service to the shower(s) shall be supplied with backflow prevention.

**3.2.6 PRE-CLEANING MOVABLE OBJECTS**

Pre-clean all movable objects within the regulated area using a HEPA filtered vacuum and/or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the regulated area and carefully stored in an uncontaminated location.

**3.2.7 PRE-CLEANING FIXED OBJECTS**

Pre-clean all fixed objects in the regulated area using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery behind grills or gratings where access may be difficult but contamination may be significant. Also, pay particular attention to wall, floor and ceiling penetration behind fixed items. After pre-cleaning, enclose fixed objects with 2 layers of 6-mil poly and seal securely in place with duct tape. Objects (e.g., permanent fixtures, shelves, electronic equipment, laboratory tables, sprinklers, alarm systems, closed circuit TV equipment and computer cables) which must remain in the regulated area and that require special ventilation or enclosure requirements should be designated here along with specified means of protection. Contact the manufacturer for special protection requirements.

**3.2.8 PRE-CLEANING SURFACES IN THE REGULATED AREA**

Pre-clean all surfaces in the regulated area using HEPA filtered vacuums and/or wet cleaning methods as appropriate. Do not use any methods that would raise dust such as dry sweeping or vacuuming with equipment not

equipped with HEPA filters. Do not disturb asbestos-containing materials during this pre-cleaning phase.

### **3.3 CONTAINMENT BARRIERS AND COVERINGS FOR THE REGULATED AREA**

#### **3.3.1 GENERAL**

Seal off any openings at the perimeter of the regulated area with critical barriers to completely isolate the regulated area and to contain all airborne asbestos contamination created by the abatement activities. Should the adjacent area past the regulated area become contaminated due to improper work activities, the Contractor shall suspend work inside the regulated area, continue wetting, and clean the adjacent areas in accordance with procedures described in these specifications. Any and all costs associated with the adjacent area cleanup shall not be borne by the VA.

#### **3.3.2 PREPARATION PRIOR TO SEALING OFF**

Place all infrared machines, materials, equipment and supplies necessary to isolate the regulated area inside the regulated area. Remove all movable material/equipment as described above and secure all unmovable material/equipment as described above. Properly secured material/equipment shall be considered to be outside the regulated area.

#### **3.3.3 CONTROLLING ACCESS TO THE REGULATED AREA**

Access to the regulated area shall be permitted only by the competent person. All other means of access shall be closed off by proper sealing and OSHA DANGER demarcation signs posted on the clean side of the regulated area where it is adjacent to or within view of any occupiable area. An opaque visual barrier of 6 mil poly shall be provided so that the abatement work is not visible to any building occupants. If the area adjacent to the regulated area is accessible to the public, construct a solid barrier on the public side of the sheeting for protection and isolation of the project. The barrier shall be constructed with normal 2" x 4" (50mm x 100mm) wood or metal studs 16" (400mm) on centers, securely anchored to prevent movement and covered with a minimum of ½" (12.5mm) plywood. Provide an appropriate number of OSHA DANGER signs for each visual and physical barrier. Any alternative method must be given a written approval by the VA's representative.

#### **3.3.4 CRITICAL BARRIERS**

The regulated area must be completely separated from the adjacent areas, and the outside by at least 2 layers of 6 mil fire retardant poly and duct tape/spray adhesive. Individually seal all supply and exhaust ventilation openings, lighting fixtures, clocks, doorways, windows, convectors, speakers, and other openings into the regulated area with 2

layers of 6 mil fire retardant poly, and taped securely in place with duct tape/spray adhesive. Critical barriers must remain in place until all work and clearances have been completed.

### **3.3.5 EXTENSION OF THE REGULATED AREA**

If the regulated area barrier is breached in any manner that could allow the passage of asbestos fibers or debris, the Competent Person shall immediately stop work, continue wetting, and proceed to extend the regulated area to enclose the affected area as per procedures described in this specification. If the affected area cannot be enclosed, decontamination measures and cleanup shall start immediately. All personnel shall be isolated from the affected area until decontamination/cleanup is completed as verified by visual inspection and air monitoring. Air monitoring at completion must indicate background levels or less than 0.01 f/cc.

### **3.3.6 FLOOR BARRIERS**

If floor removal is not being done, all floors in the regulated area shall be covered with 2 layers of 6 mil fire retardant poly and brought up the wall 12 inches.

## **3.4 REMOVAL OF CLASS II FLOORING; ROOFING; AND TRANSITE MATERIALS:**

### **3.4.1 GENERAL**

All applicable requirements of OSHA, EPA, and DOT shall be followed during Class II work. Keep materials intact; do not disturb; wet while working with it; wrap as soon as possible with 2 layers of 6 mil plastic for disposal.

### **3.4.2 REMOVAL OF FLOORING MATERIALS:**

- A. All requirements of OSHA Flooring agreement provisions shall be followed:
  - 1. Negative air machine shall be used to effect some negative pressure in the regulated area. A spare machine shall be available.
  - 2. Flooring shall be removed intact, as much as possible. Do not rip or tear flooring.
  - 3. Mechanical chipping or sanding is not allowed.
  - 4. Flooring shall be removed with an infra-red heating unit operated by trained personnel following the manufacturer's instructions.
  - 5. Wet clean and HEPA vacuum the floor before and after removal of flooring.
  - 6. Place a 6 mil poly layer 4' by 10' adjacent to the regulated area for use as a decontaminated area. All waste must be contained in the regulated area.
  - 7. Package all waste in 6 mil poly lined fiberboard drums.

**3.4.3 REMOVAL OF MASTIC**

- A. Mastic removal material must have a flash point above 140°F.
- B. The mastic removal material must be a "low odor" or "no odor" material.
- C. A negative air machine as required under flooring removal shall be provided.
- D. Follow all manufacturers' instructions in the use of the mastic removal material.
- E. Package all waste in 6 mil poly lined fiberboard drums.
- F. Prior to application of any liquid material, check the floor for penetrations and seal before removing mastic.

**3.5 DISPOSAL OF CLASS II WASTE MATERIAL:****3.5.1 GENERAL**

Package and dispose of waste materials as per this specification. All OSHA, EPA, and DOT requirements must be met. Landfill requirements for packaging must also be met. Disposal of non-friable waste must be done in accordance with applicable regulations.

**3.6 PROJECT DECONTAMINATION****3.6.1 GENERAL**

- A. The entire work related to project decontamination shall be performed under the close supervision and monitoring of the CPIH.
- B. If the asbestos abatement work is in an area which was contaminated prior to the start of abatement, the decontamination will be done by cleaning the primary barrier poly prior to its removal and cleaning of the regulated area surfaces after the primary barrier removal.
- C. If the asbestos abatement work is in an area which was uncontaminated prior to the start of abatement, the decontamination will be done by cleaning the primary barrier poly prior to its removal, thus preventing contamination of the building when the regulated area critical barriers are removed.

**3.6.2 REGULATED AREA CLEARANCE**

Air testing and other requirements which must be met before release of the Contractor and re-occupancy of the regulated area space are specified in Final Testing Procedures.

**3.6.3 WORK DESCRIPTION**

Decontamination includes the cleaning and clearance of the air in the regulated area and the decontamination and removal of the enclosures/facilities installed prior to the abatement work including primary/critical barriers, PDF and W/EDF facilities.

**3.6.4 PRE-DECONTAMINATION CONDITIONS**

- A. Before decontamination starts, all ACM waste from the regulated area shall be removed, all waste collected and removed, and the secondary barrier of poly removal and disposed of along with any gross debris generated by the work.
- B. At the start of decontamination, the following shall be in place:
  - 1. Critical barriers over all openings consisting of two layers of 6 mil poly which is the sole barrier between the regulated area and the rest of the building or outside.
  - 2. Decontamination facilities, if required for personnel and equipment in operating condition.

**3.6.5. CLEANING:**

Clean all surfaces of the regulated area by wet methods and/or HEPA vacuuming. Do not use dry dusting/sweeping methods. If determined by the CPIH/VPIH/CIH additional cleaning(s) may be needed.

**3.7 VISUAL INSPECTION AND AIR CLEARANCE TESTING****3.7.1 GENERAL**

Notify the VA representative 24 hours in advance for the performance of the final visual inspection and testing. The final visual inspection and testing will be performed by the VPIH/CIH after the cleaning.

**3.7.2 VISUAL INSPECTION**

Final visual inspection will include the entire regulated area, all poly sheeting, seals over HVAC openings, doorways, windows, and any other openings. If any debris, residue, dust or any other suspect material is detected, the cleaning shall be repeated at no cost to the VA. Dust/material samples may be collected and analyzed at no cost to the VA at the discretion of the VPIH/CIH to confirm visual findings. When the regulated area is visually clean the final testing can be done.

**3.7.3 AIR CLEARANCE TESTING**

- A. After an acceptable final visual inspection by the VPIH/CIH and VA Representative, the VPIH/CIH will perform the final testing. Air samples will be collected and analyzed in accordance with procedures for PCM in this specification. If the release criteria are not met, the Contractor shall repeat the final cleaning and continue decontamination procedures. Additional inspection and testing will be done at the expense of the Contractor.
- B. If the results of the PCM are acceptable, remove the critical barriers. Any small quantities of residue material found upon removal of the poly shall be removed with a HEPA vacuum and localized isolation. If significant quantities are found as determined by the VPIH/CIH, then the

entire area affected shall be cleaned as specified in the final cleaning.

- C. If release criteria are met, proceed to perform the abatement closeout and to issue the certificate of completion in accordance with these specifications.

#### **3.7.4 FINAL AIR CLEARANCE PROCEDURES**

- A. Contractor's Release Criteria: Work in a regulated area is complete when the regulated area is visually clean and airborne fiber levels have been reduced to or below 0.01 f/cc as measured with PCM methods.
- B. Air Monitoring and Final Clearance Sampling: To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to the specified level, the VPIH/CIH will secure samples and analyze them according to the following procedures:
1. Fibers Counted: "Fibers" referred to in this section shall be either all fibers regardless of composition as counted in the NIOSH 7400 PCM method.
  2. All clearance air testing samples shall be collected on 0.8 $\mu$  MCE filters for PCM analysis. Air samples will be collected in areas subject to normal air circulation. A minimum of 5 PCM samples will be collected with at least 1200 Liters of air sampled. All results must be less than 0.01 f/cc for clearance.

### **3.8 ABATEMENT CLOSEOUT AND CERTIFICATE OF COMPLIANCE**

#### **3.8.1 COMPLETION OF ABATEMENT WORK**

- A. After thorough decontamination, complete asbestos abatement work upon meeting the regulated area clearance criteria and fulfilling the following:
1. Remove all equipment, materials, and debris from the project area.
  2. Package and dispose of all asbestos waste as required.
  3. Repair or replace all interior finishes damaged during the abatement work.
  4. Fulfill other project closeout requirements as specified elsewhere in this specification.

#### **3.8.2 CERTIFICATE OF COMPLETION BY CONTRACTOR**

The CPIH shall complete and sign the "Certificate of Completion" in accordance with Attachment 1 at the completion of the abatement and decontamination of the regulated area.

#### **3.8.3 WORK SHIFTS**

All work shall be done during administrative hours (8:00 AM to 4:30 PM) Monday - Friday excluding Federal Holidays. Any change in the work schedule must be approved in writing by the VA Representative.

**ATTACHMENT #1****CERTIFICATE OF COMPLETION**

DATE:

PROJECT NAME:

VAMC/ADDRESS:

1. I certify that I have personally inspected, monitored and supervised the abatement work of (specify regulated area or Building):  
which took place from        /        /        to        /        /
2. That throughout the work all applicable requirements/regulations and the VA's specifications were met.
3. That any person who entered the regulated area was protected with the appropriate personal protective equipment and respirator and that they followed the proper entry and exit procedures and the proper operating procedures for the duration of the work.
4. That all employees of the Abatement Contractor engaged in this work were trained in respiratory protection, were experienced with abatement work, had proper medical surveillance documentation, were fit-tested for their respirator, and were not exposed at any time during the work to asbestos without the benefit of appropriate respiratory protection.
5. That I performed and supervised all inspection and testing specified and required by applicable regulations and VA specifications.
6. That the conditions inside the regulated area were always maintained in a safe and healthy condition and the maximum fiber count never exceeded 0.5 f/cc, except as described below.
7. That all glovebag work was done in accordance with OSHA requirements and the manufacturer's recommendations.

CPIH Name:

Signature/Date:

Asbestos Abatement Contractor's Name:

Signature/Date:



**ATTACHMENT #2****CERTIFICATE OF WORKER'S ACKNOWLEDGMENT**

PROJECT NAME:

DATE:

PROJECT ADDRESS:

ABATEMENT CONTRACTOR'S NAME:

**WORKING WITH ASBESTOS CAN BE HAZARDOUS TO YOUR HEALTH. INHALING ASBESTOS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCERS. IF YOU SMOKE AND INHALE ASBESTOS FIBERS YOUR CHANCES OF DEVELOPING LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.**

Your employer's contract with the owner for the above project requires that: You must be supplied with the proper personal protective equipment including an adequate respirator and be trained in its use. You must be trained in safe and healthy work practices and in the use of the equipment found at an asbestos abatement project. You must receive/have a current medical examination for working with asbestos. These things shall be provided at no cost to you. By signing this certificate you are indicating to the owner that your employer has met these obligations.

RESPIRATORY PROTECTION: I have been trained in the proper use of respirators and have been informed of the type of respirator to be used on the above indicated project. I have a copy of the written Respiratory Protection Program issued by my employer. I have been provided for my exclusive use, at no cost, with a respirator to be used on the above indicated project.

TRAINING COURSE: I have been trained by a third party, State/EPA accredited trainer in the requirements for an AHERA/OSHA Asbestos Abatement Worker training course, 32 hours minimum duration. I currently have a valid State accreditation certificate. The topics covered in the course include, as a minimum, the following:

- Physical Characteristics and Background Information on Asbestos
- Potential Health Effects Related to Exposure to Asbestos
- Employee Personal Protective Equipment
- Establishment of a Respiratory Protection Program
- State of the Art Work Practices
- Personal Hygiene
- Additional Safety Hazards
- Medical Monitoring
- Air Monitoring
- Relevant Federal, State and Local Regulatory Requirements, Procedures, and Standards
- Asbestos Waste Disposal

MEDICAL EXAMINATION: I have had a medical examination within the past 12 months which was paid for by my employer. This examination included: health history, occupational history, pulmonary function test, and may have included a chest x-ray evaluation. The physician issued a positive written opinion after the examination.

Signature:

Printed Name:

Social Security Number:

Witness:

**ATTACHMENT #3****AFFIDAVIT OF MEDICAL SURVEILLANCE, RESPIRATORY PROTECTION AND  
TRAINING/ACCREDITATION**

VA PROJECT NAME AND NUMBER:

VA MEDICAL FACILITY:

ABATEMENT CONTRACTOR'S NAME AND ADDRESS:

1. I verify that the following individual

Name: Social Security Number:

who is proposed to be employed in asbestos abatement work associated with the above project by the named Abatement Contractor, is included in a medical surveillance program in accordance with 29 CFR 1926.1101(m), and that complete records of the medical surveillance program as required by 29 CFR 1926.1101(m)(n) and 29 CFR 1910.20 are kept at the offices of the Abatement Contractor at the following address.

Address:

2. I verify that this individual has been trained, fit-tested and instructed in the use of all appropriate respiratory protection systems and that the person is capable of working in safe and healthy manner as expected and required in the expected work environment of this project.
3. I verify that this individual has been trained as required by 29 CFR 1926.1101(k). This individual has also obtained a valid State accreditation certificate. Documentation will be kept on-site.
4. I verify that I meet the minimum qualifications criteria of the VA specifications for a CPIH.

Signature of CPIH:

Date:

Printed Name of CPIH:

Signature of Contractor:

Date:

Printed Name of Contractor:

**ATTACHMENT #4**

ABATEMENT CONTRACTOR/COMPETENT PERSON(S) REVIEW AND ACCEPTANCE OF THE VA'S  
ASBESTOS SPECIFICATIONS

VA Project Location:

VA Project #:

VA Project Description:

This form shall be signed by the Asbestos Abatement Contractor Owner and the Asbestos Abatement Contractor's Competent Person(s) prior to any start of work at the VA related to this Specification. If the Asbestos Abatement Contractor's/Competent Person(s) has not signed this form, they shall not be allowed to work on-site.

I, the undersigned, have read VA's Asbestos Specification regarding the asbestos abatement requirements. I understand the requirements of the VA's Asbestos Specification and agree to follow these requirements as well as all required rules and regulations of OSHA/EPA/DOT and State/Local requirements. I have been given ample opportunity to read the VA's Asbestos Specification and have been given an opportunity to ask any questions regarding the content and have received a response related to those questions. I do not have any further questions regarding the content, intent and requirements of the VA's Asbestos Specification.

At the conclusion of the asbestos abatement, I will certify that all asbestos abatement work was done in accordance with the VA's Asbestos Specification and all ACM was removed properly and no fibrous residue remains on any abated surfaces.

Abatement Contractor Owner's Signature \_\_\_\_\_ Date \_\_\_\_\_

Abatement Contractor Competent Person(s)	Date
--	------

Date \_\_\_\_\_

Date \_\_\_\_\_

- - - END- - - -

**SECTION 02 82 13.13**  
**GLOVEBAG ASBESTOS ABATEMENT**

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**PART 1 - GENERAL****1.1 SUMMARY OF THE WORK****1.1.1 CONTRACT DOCUMENTS AND RELATED REQUIREMENTS**

Drawings, general provisions of the contract, including general and supplementary conditions and other Division 01 specifications, shall apply to the work of this section. The contract documents show the work to be done under the contract and related requirements and conditions impacting the project. Related requirements and conditions include applicable codes and regulations, notices and permits, existing site conditions and restrictions on use of the site, requirements for partial owner occupancy during the work, coordination with other work and the phasing of the work. In the event the Asbestos Abatement Contractor (Contractor) discovers a conflict in the contract documents and/or requirements or codes, the conflict must be brought to the immediate attention of the Contracting Officer for resolution. Whenever there is a conflict or overlap in the requirements, the most stringent shall apply. Any actions taken by the Contractor without obtaining guidance from the Contracting Officer shall become the sole risk and responsibility of the Contractor. All cost incurred due to such action are also the responsibility of the Contractor.

**1.1.2 EXTENT OF WORK**

- A. Below is a brief description of the estimated quantities of asbestos containing materials to be abated by the glovebag method. These quantities are for informational purposes only and are based on the best information available at the time of the specification preparation. The Contractor shall satisfy himself as the actual quantities to be abated. Nothing in this section may be interpreted as limiting the extent of work otherwise required by this contract and related documents.
- B. Removal, clean-up and disposal of ACM piping and fittings and asbestos contaminated elements in an appropriate regulated area in the following approximate quantities;  
(300) fittings 50 - 150 mm (2" - 6") in diameter

**1.1.3 RELATED WORK**

- A. Section 07 84 00; FIRESTOPPING.
- B. Section 02 41 00; DEMOLITION.
- C. Division 09; FINISHES.
- D. Division 22; PLUMBING.



- E. Section 21 05 11, COMMON WORK RESULTS FOR FIRE SUPPRESSION / Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING / Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION
- F. Section 23 07 11, HVAC, PLUMBING, AND BOILER PLANT INSULATION.
- G. Section 22 05 23, GENERAL-DUTY VALVES FOR PLUMBING PIPING / Section 22 11 00, FACILITY WATER DISTRIBUTION / Section 22 13 00, FACILITY SANITARY SEWERAGE / Section 22 14 00, FACILITY STORM DRAINAGE / FACILITIES.
- H. Section 23 21 13, HYDRONIC PIPING.
- I. Section 23 31 00, HVAC DUCTS AND CASINGS / Section 23 37 00, AIR OUTLETS AND INLETS.

#### **1.1.4 TASKS**

The work tasks are summarized briefly as follows:

- A. Pre-abatement activities including pre-abatement meeting(s), inspection(s), notifications, permits, submittal approvals, work-site preparations, emergency procedures arrangements, and standard operating procedures for glovebag asbestos abatement work.
- B. Abatement activities including removal, clean-up and disposal of ACM waste, recordkeeping, security, monitoring, and inspections.
- C. Cleaning and decontamination activities including final visual inspection, air monitoring and certification of decontamination.

#### **1.1.5 ABATEMENT CONTRACTOR USE OF PREMISES**

- A. The Contractor and Contractor's personnel shall cooperate fully with the VA representative/consultant to facilitate efficient use of buildings and areas within buildings. The Contractor shall perform the work in accordance with the VA specifications, drawings, phasing plan and in compliance with any/all applicable Federal, State, and Local regulations and requirements.
- B. The Contractor shall use the existing facilities in the building strictly within the limits indicated in contract documents as well as the approved pre-abatement work plan. Asbestos abatement drawings of partially occupied buildings will show the limits of regulated areas; the placement of decontamination facilities; the temporary location of bagged waste ACM; the path of transport to outside the building; and the temporary waste storage area for each building/regulated area. Any variation from the arrangements shown on drawings shall be secured in writing from the VA representative through the pre-abatement plan of action.

## 1.2 VARIATIONS IN QUANTITY

The quantities and locations of ACM as indicated on the drawings and the extent of work included in this section are estimates which are limited by the physical constraints imposed by occupancy of the buildings. Accordingly, minor variations (+/- 5%) in quantities of ACM within the regulated area are considered as having no impact on contract price and time requirements of this contract. Where additional work is required beyond the above variation, the Contractor shall provide unit prices for additional footage for newly discovered materials and those prices will be used for additional work under the contract.

## 1.3 STOP ASBESTOS REMOVAL

If the Contracting Officer or their field representative presents a written **Stop Asbestos Removal Order**, the Abatement Contractor/Personnel shall immediately stop all asbestos removal and adequately wet any exposed ACM. The Contractor shall not resume any asbestos removal activity until authorized to do so by the VA. A stop asbestos removal order may be issued at any time the VA determines abatement conditions/activities are not within specification requirements. Work stoppage will continue until conditions have been corrected to the satisfaction of the VA. Standby time and costs for corrective actions will be borne by the Contractor, including the industrial hygienist's time. The occurrence of any of the following events shall be reported immediately by the Contractor in writing to the VA representative and shall require the Contractor to immediately stop asbestos removal activities and initiate fiber reduction activities:

- A.  $\geq 0.01$  f/cc outside a regulated area or  $>0.05$  f/cc inside a regulated area;
- B. breach/break in regulated area critical barrier(s)/floor;
- C. serious injury/death at the site;
- D. fire/safety emergency at the site;
- E. respiratory protection system failure;
- F. power failure or loss of wetting agent; or
- G. any visible emissions observed outside the regulated area.

## 1.4 DEFINITIONS

### 1.4.1 GENERAL

Definitions and explanations here are neither complete nor exclusive of all terms used in the contract documents, but are general for the work

to the extent they are not stated more explicitly in another element of the contract documents. Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated therein.

#### 1.4.2 GLOSSARY

**Abatement** - Procedures to control fiber release from asbestos-containing materials, typically during removal. Includes removal, encapsulation, enclosure, demolition and renovation activities related to asbestos.

**ACE** - Asbestos contaminated elements.

**ACM** - Asbestos containing material.

**Aerosol** - Solid or liquid particulate suspended in air.

**Adequately wet** - Sufficiently mixed or penetrated with liquid to prevent the release of particulates. If visible emissions are observed coming from the ACM, then that material has not been adequately wetted.

**Aggressive method** - Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact ACM.

**Aggressive sampling** - EPA AHERA defined clearance sampling method using air moving equipment such as fans and leaf blowers to aggressively disturb and maintain in the air residual fibers after abatement.

**AHERA** - Asbestos Hazard Emergency Response Act. Asbestos regulations for schools issued in 1987.

**Aircell** - Pipe or duct insulation made of corrugated cardboard which contains asbestos.

**Air monitoring** - The process of measuring the fiber content of a known volume of air collected over a specified period of time. The NIOSH 7400 Method, Issue 2 is used to determine the fiber levels in air.

**Air sample filter** - The filter used to collect fibers which are then counted. The filter is made of mixed cellulose ester membrane for PCM (Phase Contrast Microscopy) and polycarbonate for TEM (Transmission Electron Microscopy)

**Amended water** - Water to which a surfactant (wetting agent) has been added to increase the penetrating ability of the liquid.

**Asbestos** - Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated or altered. Asbestos also includes PACM, as defined below.

**Asbestos-containing material (ACM)** - Any material containing more than one percent asbestos.

**Asbestos contaminated elements (ACE)** - Building elements such as ceilings, walls, lights, or ductwork that are contaminated with asbestos.

**Asbestos-containing waste material** - Asbestos-containing material or asbestos contaminated objects requiring disposal.

**Asbestos waste decontamination facility** - A system consisting of drum/bag washing facilities and a temporary storage area for cleaned containers of asbestos waste. Used as the exit for waste and equipment leaving the regulated area. In an emergency, it may be used to evacuate personnel.

**Authorized person** - Any person authorized by the VA, the Contractor, or government agency and required by work duties to be present in regulated areas.

**Authorized visitor** - Any person approved by the VA; the contractor; or any government agency having jurisdiction over the regulated area.

**Barrier** - Any surface that isolates the regulated area and inhibits fiber migration from the regulated area.

**Containment Barrier** - An airtight barrier consisting of walls, floors, and/or ceilings of sealed plastic sheeting which surrounds and seals the outer perimeter of the regulated area.

**Critical Barrier** - The barrier responsible for isolating the regulated area from adjacent spaces, typically constructed of plastic sheeting secured in place at openings such as doors, windows, or any other opening into the regulated area.

**Primary Barrier** - Barriers placed over critical barriers and exposed directly to abatement work.

**Secondary Barrier** - Any additional sheeting used to isolate and provide protection from debris during abatement work.

**Breathing zone** - The hemisphere forward of the shoulders with a radius of about 150 - 225 mm (6 - 9 inches) from the worker's nose.

**Bridging encapsulant** - An encapsulant that forms a layer on the surface of the ACM.

**Building/facility owner** - The legal entity, including a lessee, which exercises control over management and recordkeeping functions relating to a building and/or facility in which asbestos activities take place.

**Bulk testing** - The collection and analysis of suspect asbestos containing materials.

**Certified Industrial Hygienist (CIH)** - One certified in practice of industrial hygiene by the American Board of Industrial Hygiene. An industrial hygienist Certified in Comprehensive Practice by the American Board of Industrial Hygiene.

**Class I asbestos work** - Activities involving the removal of Thermal System Insulation (TSI) and surfacing ACM and Presumed Asbestos Containing Material (PACM).

**Class II asbestos work** - Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic.

**Clean room/Changing room** - An uncontaminated room having facilities for the storage of employee's street clothing and uncontaminated materials and equipment.

**Clearance sample** - The final air sample taken after all asbestos work has been done and visually inspected. Performed by the VA's industrial hygiene consultant (VPIH/CIH).

**Closely resemble** - The major workplace conditions which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

**Competent person** - In addition to the definition in 29 CFR 1926.32(f), one who is 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, as specified in 29 CFR 1926.32(f); in addition, for Class I and II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

**Contractor's Professional Industrial Hygienist (CPIH)** - The Contractor's industrial hygienist. The industrial hygienist must meet the qualification requirements of the PIH.

**Count** - Refers to the fiber count or the average number of fibers greater than five microns in length per cubic centimeter of air.

**Decontamination area/unit** - An enclosed area adjacent to and connected to the regulated area and consisting of an equipment room, shower room,

and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

**Demolition** - The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

**Disposal bag** - Typically 6 mil thick siftproof, dustproof, leaktight container used to package and transport asbestos waste from regulated areas to the approved landfill. Each bag/container must be labeled/marked in accordance with EPA, OSHA and DOT requirements.

**Disturbance** - Activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. Disturbance includes cutting away small amounts of ACM or PACM, no greater than the amount that can be contained in one standard sized glove bag or waste bag in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or disposal bag which shall not exceed 60 inches in length or width.

**Drum** - A rigid, impermeable container made of cardboard fiber, plastic, or metal which can be sealed in order to be siftproof, dustproof, and leaktight.

**Employee exposure** - The exposure to airborne asbestos that would occur if the employee were not wearing respiratory protection equipment.

**Encapsulant** - A material that surrounds or embeds asbestos fibers in an adhesive matrix and prevents the release of fibers.

**Encapsulation** - Treating ACM with an encapsulant.

**Enclosure** - The construction of an air tight, impermeable, permanent barrier around ACM to control the release of asbestos fibers from the material and also eliminate access to the material.

**Equipment room** - A contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

**Fiber** - A particulate form of asbestos, 5 microns or longer, with a length to width ratio of at least 3 to 1.

**Fibers per cubic centimeter (f/cc)** - Abbreviation for fibers per cubic centimeter, used to describe the level of asbestos fibers in air.

**Filter** - Media used in respirators, vacuums, or other machines to remove particulate from air.

**Firestopping** - Material used to close the open parts of a structure in order to prevent a fire from spreading.

**Friable asbestos containing material** - Any material containing more than 1 percent asbestos as determined using the method specified in appendix A, Subpart F, 40 CFR 763, section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

**Glovebag** - Not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which materials and tools may be handled.

**High efficiency particulate air (HEPA) filter** - A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 microns or greater in diameter.

**HEPA vacuum** - Vacuum collection equipment equipped with a HEPA filter system capable of collecting and retaining asbestos fibers.

**Homogeneous area** - An area of surfacing, thermal system insulation or miscellaneous ACM that is uniform in color, texture and date of application.

**HVAC** - Heating, Ventilation and Air Conditioning

**Industrial hygienist** - A professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards. Meets definition requirements of the American Industrial Hygiene Association (AIHA).

**Industrial hygienist technician** - A person working under the direction of an IH or CIH who has special training, experience, certifications and licenses required for the industrial hygiene work assigned.

**Intact** - The ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

**Lockdown** - Applying encapsulant, after a final visual inspection, on all abated surfaces at the conclusion of ACM removal prior to removal of critical barriers.

**National Emission Standards for Hazardous Air Pollutants (NESHAP's)** - EPA's rule to control emissions of asbestos to the environment.

**Negative initial exposure assessment** - A demonstration by the employer which complies with the criteria in 29 CFR 1926.1101 (f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PEL's.

**Negative pressure** - Air pressure which is lower than the surrounding area, created by exhausting air from a sealed regulated area through HEPA equipped filtration units. OSHA requires maintaining -0.02" water gauge inside the negative pressure enclosure.

**Negative pressure respirator** - A respirator in which the air pressure inside the facepiece is negative during inhalation relative to the air outside the respirator.

**Non-friable ACM** - Material that contains more than 1 percent asbestos but cannot be crumbled, pulverized, or reduced to powder by hand pressure.

**Organic vapor cartridge** - The type of cartridge used on air purifying respirators for organic vapor exposures.

**Outside air** - The air outside buildings and structures, including, but not limited to, the air under a bridge or in an open ferry dock.

**Owner/operator** - Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

**Penetrating encapsulant** - Encapsulant that is absorbed into the ACM matrix without leaving a surface layer.

**Personal sampling/monitoring** - Representative air samples obtained in the breathing zone of the person using a cassette and battery operated pump to determine asbestos exposure.

**Permissible exposure limit (PEL)** - The level of exposure OSHA allows for an 8 hour time weighted average. For asbestos fibers, the PEL is 0.1 fibers per cc.

**Polarized light microscopy (PLM)** - Light microscopy using dispersion staining techniques and refractive indices to identify and quantify the type(s) of asbestos present in a bulk sample.

**Polyethylene sheeting** - Strong plastic barrier material 4 to 6 mils thick, semi-transparent, sometimes flame retardant in compliance with NFPA 241.

**Positive/negative fit check** - A method of verifying the fit of a respirator by closing off the filters and breathing in or closing off the exhalation valve and breathing out while detecting leakage of the respirator.

**Presumed ACM (PACM)** - Thermal system insulation, surfacing, and flooring material installed in buildings prior to 1981. If the building



owner has actual knowledge, or should have known through the exercise of due diligence that other materials are ACM, they too must be treated as PACM. The designation of PACM may be rebutted pursuant to 29 CFR 1926.1101 (k)(5).

**Professional IH** - An IH who meets the definition requirements of AIHA; meets the definition requirements of OSHA as a "Competent Person" at 29 CFR 1926.1101 (b); has completed two specialized EPA approved courses on management and supervision of asbestos abatement projects; has formal training in respiratory protection and waste disposal; and has a minimum of four projects of similar complexity with this project of which at least three projects serving as the supervisory IH.

**Project designer** - A person who has successfully completed the training requirements for an asbestos abatement project designer as required by 40 CFR 763 Appendix C, Part I; (B)(5).

**Protection factor** - A value assigned by OSHA/NIOSH to indicate the assigned protection a respirator should provide if worn properly. The number indicates the reduction of exposure level from outside to inside the respirator.

**Qualitative fit test (QLFT)** - A fit test using a challenge material that can be sensed by the wearer if leakage in the respirator occurs.

**Quantitative fit test (QNFT)** - A fit test using a challenge material which is quantified outside and inside the respirator thus allowing the determination of the actual fit factor.

**Regulated area** - An area established by the employer to demarcate where Class I, II, III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work may accumulate; and a work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed the PEL.

**Regulated ACM (RACM)** - Friable ACM; Category I nonfriable ACM that has become friable; Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or; Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of the demolition or renovation operation.

**Removal** - All operations where ACM, PACM and/or RACM is taken out or stripped from structures or substrates, including demolition operations.

**Renovation** - Altering a facility or one or more facility components in any way, including the stripping or removal of asbestos from a facility component which does not involve demolition activity.

**Repair** - Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

**Shower room** - The portion of the PDF where personnel shower before leaving the regulated area. Also used for bag/drum decontamination in the EDF.

**Standard operating procedures (SOP's)** - Asbestos work procedures required to be submitted by the contractor before work begins.

**Supplied air respirator (SAR)** - A respirator that utilizes an air supply separate from the air in the regulated area.

**Surfacing ACM** - A material containing more than 1 percent asbestos that is sprayed, troweled on or otherwise applied to surfaces for acoustical, fireproofing and other purposes.

**Surfactant** - A chemical added to water to decrease water's surface tension thus making it more penetrating into ACM.

**Thermal system ACM** - A material containing more than 1 percent asbestos applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.

**Transmission electron microscopy (TEM)** - A microscopy method that can identify and count asbestos fibers.

**VA Industrial Hygienist (VPIH/CIH)** - Department of Veterans Affairs Professional Industrial Hygienist.

**VA Representative** - The VA official responsible for on-going project work.

**Visible emissions** - Any emissions, which are visually detectable without the aid of instruments, coming from ACM/PACM/RACM or ACM waste material.

**Waste generator** - Any owner or operator whose act or process produces asbestos-containing waste material.

**Waste/Equipment decontamination facility (W/EDF)** - The area in which equipment is decontaminated before removal from the regulated area.

**Waste shipment record** - The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

**Wet cleaning** - The process of thoroughly eliminating, by wet methods, any asbestos contamination from surfaces or objects.

#### **1.4.3 REFERENCED STANDARDS ORGANIZATIONS**

The following acronyms or abbreviations as referenced in contract/ specification documents are defined to mean the associated names. Names and addresses may be subject to change.

- A. VA Department of Veterans Affairs  
810 Vermont Avenue, NW  
Washington, DC 20420
- B. AIHA American Industrial Hygiene Association  
2700 Prosperity Avenue, Suite 250  
Fairfax, VA 22031  
703-849-8888
- C. ANSI American National Standards Institute  
1430 Broadway  
New York, NY 10018  
212-354-3300
- D. ASTM American Society for Testing and Materials  
1916 Race St.  
Philadelphia, PA 19103  
215-299-5400
- E. CFR Code of Federal Regulations  
Government Printing Office  
Washington, DC 20420
- F. CGA Compressed Gas Association  
1235 Jefferson Davis Highway  
Arlington, VA 22202  
703-979-0900
- G. CS Commercial Standard of the National Institute of Standards and Technology(NIST)  
U. S. Department of Commerce  
Government Printing Office  
Washington, DC 20420
- H. EPA Environmental Protection Agency  
401 M St., SW  
Washington, DC 20460  
202-382-3949

- I. MIL-STD Military Standards/Standardization Division  
Office of the Assistant Secretary of Defense  
Washington, DC 20420
- J. MSHA Mine Safety and Health Administration  
Respiratory Protection Division  
Ballston Tower #3  
Department of Labor  
Arlington, VA 22203  
703-235-1452
- K. NIST National Institute for Standards and Technology  
U. S. Department of Commerce  
Gaithersburg, MD 20234  
301-921-1000
- L. NEC National Electrical Code (by NFPA)
- M. NEMA National Electrical Manufacturer's Association  
2101 L Street, NW  
Washington, DC 20037
- N. NFPA National Fire Protection Association  
1 Batterymarch Park  
P.O. Box 9101  
Quincy, MA 02269-9101  
800-344-3555
- O. NIOSH National Institutes for Occupational Safety and Health  
4676 Columbia Parkway  
Cincinnati, OH 45226  
513-533-8236
- P. OSHA Occupational Safety and Health Administration  
U.S. Department of Labor  
Government Printing Office  
Washington, DC 20402
- Q. UL Underwriters Laboratory  
333 Pfingsten Rd.  
Northbrook, IL 60062  
312-272-8800
- R. USA United States Army  
Army Chemical Corps  
Department of Defense  
Washington, DC 20420

**1.5 APPLICABLE CODES AND REGULATIONS****1.5.1 GENERAL APPLICABILITY OF CODES, REGULATIONS, AND STANDARDS**

- A. All work under this contract shall be done in strict accordance with all applicable Federal, State, and local regulations, standards and codes governing asbestos abatement, and any other trade work done in conjunction with the abatement. All applicable codes, regulations and standards are adopted into this specification and will have the same force and effect as this specification.
- B. The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with these specification exists, the most stringent requirement(s) shall be utilized.
- C. Copies of all standards, regulations, codes and other applicable documents, including this specification and those listed in Section 1.5 shall be available at the worksite in the clean change area of the worker decontamination system.

**1.5.2 CONTRACTOR RESPONSIBILITY**

The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and Local regulations related to any and all aspects of the abatement project. The contractor is responsible for providing and maintaining training, accreditation, medical exams, medical records, personal protective equipment as required by applicable Federal, State and Local regulations. The contractor shall hold the VA and VPIH/CIH consultants harmless for any failure to comply with any applicable work, packaging, transporting, disposal, safety, health, or environmental requirement on the part of himself, his employees, or his subcontractors. The contractor will incur all costs of the CPIH, including all sampling/analytical costs to assure compliance with OSHA/EPA/State requirements.

**1.5.3 FEDERAL REQUIREMENTS**

Federal requirements which govern some aspect of asbestos abatement include, but are not limited to, the following regulations.

- A. Occupational Safety and Health Administration (OSHA)
  - 1. Title 29 CFR 1926.1101 - Construction Standard for Asbestos
  - 2. Title 29 CFR 1910.132 - Personal Protective Equipment
  - 3. Title 29 CFR 1910.134 - Respiratory Protection
  - 4. Title 29 CFR 1926 - Construction Industry Standards

5. Title 29 CFR 1910.20 - Access to Employee Exposure and Medical Records
6. Title 29 CFR 1910.1200 - Hazard Communication
7. Title 29 CFR 1910.151 - Medical and First Aid
- B. Environmental Protection Agency (**EPA**)
  1. 40 CFR 61 Subpart A and M (Revised Subpart B) - National Emission Standard for Hazardous Air Pollutants - Asbestos.
  2. 40 CFR 763.80 - Asbestos Hazard Emergency Response Act (AHERA)
- C. Department of Transportation (**DOT**)

Title 49 CFR 100 - 185 - Transportation

#### **1.5.4 STATE REQUIREMENTS:**

State requirements that apply to the asbestos abatement work, disposal, clearance, etc., include, but are not limited to, the following:

**ASBESTOS ABATEMENT CONTRACTOR LICENSING AND TRAINING, OHIO  
ADMINISTRATIVE CODE, RULES 3701-34-01 THROUGH 3701-34-7**

#### **1.5.5 LOCAL REQUIREMENTS**

If local requirements are more stringent than federal or state standards, the local standards are to be followed.

#### **1.5.6 STANDARDS**

- A. Standards which govern asbestos abatement activities include, but are not limited to, the following:
  1. American National Standards Institute (ANSI) Z9.2-79 - Fundamentals Governing the Design and Operation of Local Exhaust Systems Z88.2 - Practices for Respiratory Protection.
  2. Underwriters Laboratories (UL) 586-90 - UL Standard for Safety of HEPA filter Units, 7th Edition.
- B. Standards which govern encapsulation work include, but are not limited to, the following:
  1. American Society for Testing and Materials (ASTM)
- C. Standards which govern the fire and safety concerns in abatement work include, but are not limited to, the following:
  1. National Fire Protection Association (NFPA) 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.
  2. NFPA 701 - Standard Methods for Fire Tests for Flame Resistant Textiles and Film.
  3. NFPA 101 - Life Safety Code

**1.5.7 EPA GUIDANCE DOCUMENTS**

- A. EPA guidance documents which discuss asbestos abatement work activities are listed below. These documents are made part of this section by reference. EPA publications can be ordered from (800) 424-9065.
- B. Guidance for Controlling ACM in Buildings (Purple Book) EPA 560/5-85-024
- C. Asbestos Waste Management Guidance EPA 530-SW-85-007.
- D. A Guide to Respiratory Protection for the Asbestos Abatement Industry EPA-560-OPTS-86-001
- E. Guide to Managing Asbestos in Place (Green Book) TS 799 20T July 1990

**1.5.8 NOTICES**

- A. State and Local agencies: Send written notification as required by state and local regulations including the local fire department prior to beginning any work on ACM as follows:

Send written notification as required by USEPA National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Asbestos regulations (40 CFR 61, Subpart M) to the regional Asbestos NESHAPS Contact at least 10 days prior to beginning any work on asbestos abatement or related work. Send notification to the following address:

Department of Public Health  
Division of Air Quality  
1925 St. Clair Avenue  
Cleveland, Ohio 44114-2080

Send written notification as required by Ohio Department of Health at least 10 days prior to beginning any work on any planned asbestos hazard abatement project as required by chapter 3701-34. Send notification to the following address:

Ohio Department of Health  
P.O. Box 15278  
Columbus, Ohio 43215

- B. Copies of notifications shall be submitted to the VA for the facility's records in the same time frame notification is given to EPA, State, and Local authorities.

**1.5.9 PERMITS/LICENSES**

- A. The contractor shall apply for and have all required permits and licenses to perform asbestos abatement work as required by Federal, State, and Local regulations.
- B. Contractor shall maintain a current Ohio Department of Health "Asbestos Abatement Contractor" license in accordance with paragraph (C) of rule 3701-34-01 of the Administrative Code

**1.5.10 POSTING AND FILING OF REGULATIONS**

Maintain two (2) copies of applicable federal, state, and local regulations. Post one copy of each at the regulated area where workers will have daily access to the regulations and keep another copy in the Contractor's office.

**1.5.11 VA RESPONSIBILITIES**

Prior to commencement of work:

- A. Notify occupants adjacent to regulated areas of project dates and requirements for relocation, if needed. Arrangements must be made prior to starting work for relocation of desks, files, equipment and personal possessions to avoid unauthorized access into the regulated area. **Note: Notification of adjacent personnel is required by OSHA in 29 CFR 1926.1101 (k) to prevent unnecessary or unauthorized access to the regulated area.**
- B. Submit to the Contractor results of background air sampling; including location of samples, person who collected the samples, equipment utilized and method of analysis.
- C. During abatement, submit to the Contractor, results of bulk material analysis and air sampling data collected during the course of the abatement. This information shall not release the Contractor from any responsibility for OSHA compliance.

**1.5.12 SITE SECURITY**

- A. Regulated area access is to be restricted only to authorized, trained/accredited and protected personnel. These may include the Contractor's employees, employees of Subcontractors, VA employees and representatives, State and local inspectors, and any other designated individuals. A list of authorized personnel shall be established prior to commencing the project and be posted in the clean room of the decontamination unit.



- B. Entry into the regulated area by unauthorized individuals shall be reported immediately to the Competent Person by anyone observing the entry. The Competent Person shall immediately notify the VA.
- C. A log book shall be maintained in the clean room of the decontamination unit. Anyone who enters the regulated area must record their name, affiliation, time in, and time out for each entry.
- D. Access to the regulated area shall be through a single decontamination unit, if required. All other access (doors, windows, hallways, etc.) shall be sealed or locked to prevent entry to or exit from the regulated area. The only exceptions for this requirement are the waste/equipment load-out area which shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits. Emergency exits shall not be locked from the inside, however, they shall be sealed with poly sheeting and taped until needed.
- E. The Contractor's Competent Person shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel. A 24 hour security system shall be provided at the entrance to the regulated area to assure that all entrants are logged in/out and that only authorized personnel are allowed entrance.
- F. The Abatement Contractor will have the VA's assistance in notifying adjacent personnel of the presence, location and quantity of ACM in the regulated area and enforcement of restricted access by the VA's employees.
- G. The regulated area shall be locked during non-working hours and secured by VA security guards.

#### **1.5.13 EMERGENCY ACTION PLAN AND ARRANGEMENTS**

- A. An Emergency Action Plan shall be developed by the Contractor prior to commencing abatement activities and shall be agreed to by the Contractor and the VA. The Plan shall meet the requirements of 29 CFR 1910.38 (a);(b).
- B. Emergency procedures shall be in written form and prominently posted and available in the regulated area. Everyone, prior to entering the regulated area, must read and sign these procedures to acknowledge understanding of the regulated area layout, location of emergency exits and emergency procedures.
- C. Emergency planning shall include written notification of police, fire, and emergency medical personnel of planned abatement activities; work

schedule and layout of regulated area, particularly barriers that may affect response capabilities.

- D. Emergency planning shall include consideration of fire, explosion, hazardous atmospheres, electrical hazards, slips/trips and falls, confined spaces, and heat stress illness. Written procedures for response to emergency situations shall be developed and employee training in procedures shall be provided.
- E. Employees shall be trained in regulated area/site evacuation procedures in the event of workplace emergencies.
  - 1. For non life-threatening situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the regulated area to obtain proper medical treatment.
  - 2. For life-threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, remove them from the regulated area, and secure proper medical treatment.
- F. Telephone numbers of all emergency response personnel shall be prominently posted in the clean room, along with the location of the nearest telephone.
- G. The Contractor shall provide verification of first aid/CPR training for personnel responsible for providing first aid/CPR. OSHA requires medical assistance within 3 minutes of a life-threatening injury/illness. Bloodborne Pathogen training shall also be verified for those personnel required to provide first aid/CPR.
- H. The Emergency Action Plan shall provide for a Contingency Plan in the event that an incident occurs that may require the modification of the standard operating procedures during abatement. Such incidents include, but are not limited to, fire; accident; and power failure. The Contractor shall detail procedures to be followed in the event of an incident assuring that work is stopped and wetting is continued until correction of the problem.

#### **1.5.14 PRE-CONSTRUCTION MEETING**

Prior to commencing the work, the Contractor shall meet with the VPCIH to present and review, as appropriate, the items following this paragraph. The Contractor's Competent Person(s) who will be on-site shall participate in the pre-start meeting. The pre-start meeting is to

discuss and determine procedures to be used during the project. At this meeting, the Contractor shall provide:

- A. Proof of Contractor licensing.
- B. Proof the Competent Person is trained and accredited and approved for working in this State. Verification of the experience of the Competent Person shall also be presented.
- C. A list of all workers who will participate in the project, including experience and verification of training and accreditation.
- D. A list of and verification of training for all personnel who have current first-aid/CPR training. A minimum of one person per shift must have adequate training.
- E. Current medical written opinions for all personnel working on-site meeting the requirements of 29 CFR 1926.1101 (m).
- F. Current fit-tests for all personnel wearing respirators on-site meeting the requirements of 29 CFR 1926.1101 (h) and Appendix C.
- G. A copy of the Contractor's Standard Operating Procedures for Class I Glovebag Asbestos Abatement. In these procedures, the following information must be detailed, specific for this project.
  - 1. Regulated area preparation procedures;
  - 2. Notification requirements procedure of Contractor as required in 29 CFR 1926.1101 (d);
  - 3. If required, decontamination area set-up/layout and decontamination procedures for employees;
  - 4. Glovebag abatement methods/procedures and equipment to be used;
  - 5. Personal protective equipment to be used;
- H. At this meeting the Contractor shall provide all submittals as required.
- I. Procedures for handling, packaging and disposal of asbestos waste.
- J. Emergency Action Plan and Contingency Plan Procedures.

#### **1.6 PROJECT COORDINATION**

The following are the minimum administrative and supervisory personnel necessary for coordination of the work.

##### **1.6.1 PERSONNEL**

- A. Administrative and supervisory personnel shall consist of a qualified Competent Person as defined by OSHA in the Construction Standards and the Asbestos Construction Standard; Contractor Professional Industrial Hygienist and Industrial Hygiene Technicians. These employees are the

Contractor's representatives responsible for compliance with these specifications and all other applicable requirements.

- B. Non-supervisory personnel shall consist of an adequate number of qualified personnel to meet the schedule requirements of the project. Personnel shall meet required qualifications. Personnel utilized on-site shall be pre-approved by the VA representative. A request for approval shall be submitted for any person to be employed during the project giving the person's name; social security number; qualifications; accreditation card with picture; Certificate of Worker's Acknowledgment; and Affidavit of Medical Surveillance and Respiratory Protection and current Respirator Fit Test.
- C. Minimum qualifications for Contractor and assigned personnel are:
1. The Contractor has conducted within the last three (3) years, three (3) projects of similar complexity and dollar value as this project; has not been cited and penalized for serious violations of asbestos regulations in the past three (3) years; has adequate liability/occurrence insurance for asbestos work; is licensed in applicable states; has adequate and qualified personnel available to complete the work; has comprehensive standard operating procedures for asbestos work; has adequate materials, equipment and supplies to perform the work.
  2. The Competent Person has three (3) years of abatement experience of which two (2) years were as the Competent Person on the project; meets the OSHA definition of a Competent Person; has been the Competent Person on two (2) projects of similar size and complexity as this project; has completed EPA AHERA/OSHA/State/Local training requirements/accreditation(s) and refreshers; and has all required OSHA documentation related to medical and respiratory protection.
  3. The Contractor Professional Industrial Hygienist (CPIH) shall have three (3) years of monitoring experience and supervision of asbestos abatement projects; has participated as senior IH on five (5) abatement projects, three (3) of which are similar in size and complexity as this project; has developed at least one complete standard operating procedure for asbestos abatement; has trained abatement personnel for three (3) years; has specialized EPA AHERA/OSHA training in asbestos abatement management, respiratory protection, waste disposal and asbestos inspection; has completed

- the NIOSH 582 Course, Contractor/Supervisor course; and has appropriate medical/respiratory protection records/documentation.
4. The Abatement Personnel shall have completed the EPA AHERA/OSHA abatement worker course; have training on the standard operating procedures of the Contractor; has one year of asbestos abatement experience; has applicable medical and respiratory protection documentation; has certificate of training/current refresher and State accreditation/license.

## **1.7 RESPIRATORY PROTECTION**

### **1.7.1 GENERAL - RESPIRATORY PROTECTION PROGRAM**

The Contractor shall develop and implement a Respiratory Protection Program (RPP) which is in compliance with the January 8, 1998 OSHA requirements found at 29 CFR 1926.1101 and 29 CFR 1910.132;134. ANSI Standard Z88.2-1992 provides excellent guidance for developing a respiratory protection program All respirators used must be NIOSH approved for asbestos abatement activities. The written respiratory protection shall, at a minimum, contain the basic requirements found at 29 CFR 1910.134 (c)(1)(i - ix) - Respiratory Protection Program.

### **1.7.2 RESPIRATORY PROTECTION PROGRAM COORDINATOR**

The Respiratory Protection Program Coordinator (RPPC) must be identified and shall have two (2) years experience coordinating the program. The RPPC must provide a signed statement attesting to the fact that the program meets the above requirements.

### **1.7.3 SELECTION AND USE OF RESPIRATORS**

The procedure for the selection and use of respirators must be submitted to the VA as part of the Contractor's qualification. The procedure must written clearly enough for workers to understand. A copy of the Respiratory Protection Program must be available in the clean room of the decontamination unit for reference by employees or authorized visitors.

### **1.7.4 MINIMUM RESPIRATORY PROTECTION**

Minimum respiratory protection shall be a full face powered air purifying respirator when fiber levels are maintained consistently at or below 0.5 f/cc. A higher level of respiratory protection may be provided or required, depending on fiber levels. Respirator selection shall meet the requirements of 29 CFR 1926.1101 (h); Table 1, except as indicated in this paragraph. Abatement personnel must have a respirator for their exclusive use.

**1.7.5 MEDICAL WRITTEN OPINION**

No employee shall be allowed to wear a respirator unless a physician has determined they are capable of doing so and has issued a written opinion for that person.

**1.7.6 RESPIRATOR FIT TEST**

All personnel wearing respirators shall have a current quantitative fit test which was conducted in accordance with 29 CFR 1910.134 (f) and Appendix A. Fit tests shall be done for PAPR's which have been put into a failure mode.

**1.7.7 RESPIRATOR FIT CHECK**

The Competent Person shall assure that the positive/negative fit check is done each time the respirator is donned by an employee. Headcoverings must cover respirator headstraps. Any situation that prevents an effective facepiece to face seal as evidenced by failure of a fit check shall preclude that person from wearing a respirator until resolution of the problem.

**1.7.8 MAINTENANCE AND CARE OF RESPIRATORS**

The Respiratory Protection Program Coordinator shall submit evidence and documentation showing compliance with 29 CFR 1910.134 (h) maintenance and care of respirators.

**1.8 WORKER PROTECTION****1.8.1 TRAINING OF ABATEMENT PERSONNEL**

Prior to beginning any abatement activity, all personnel shall be trained in accordance with OSHA 29 CFR 1926.1101 (k)(9) and any additional State/Local requirements. Training must include, at a minimum, the elements listed at 29 CFR 1926.1101 (k)(9)(viii). Training shall have been conducted by a third party, EPA/State approved trainer meeting the requirements of EPA 40 CFR 763 Appendix C (AHERA MAP). Initial training certificates and current refresher and accreditation proof must be submitted for each person working at the site.

**1.8.2 MEDICAL EXAMINATIONS**

Medical examinations meeting the requirements of 29 CFR 1926.1101 (m) shall be provided for all personnel working in the regulated area, regardless of exposure levels. The physician's written opinion as required by 29 CFR 1926.1101 (m)(4) shall be provided for each person and shall include in the opinion the person has been evaluated for working in a heat stress environment while wearing personal protective equipment and is able to perform the work.

**1.8.3 PERSONAL PROTECTIVE EQUIPMENT**

Provide whole body clothing, head coverings, foot coverings and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA at 29 CFR 1910.132 (d). The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the project. Duct tape shall be used to secure all suit sleeves to wrists and to secure foot coverings at the ankle.

**1.8.4 REGULATED AREA ENTRY PROCEDURE**

Worker protection shall meet the most stringent requirement. The Competent Person shall ensure that each time workers enter the regulated area, they remove ALL street clothes in the clean room of the decontamination unit and put on new disposable coveralls, head coverings, a clean respirator, and then proceed through the shower room to the equipment room where they put on non-disposable required personal protective equipment.

**1.8.5 DECONTAMINATION PROCEDURE - PAPR**

The Competent Person shall require all personnel to adhere to following decontamination procedures whenever they leave the regulated area.

- A. When exiting the regulated area, remove disposable coveralls, and ALL other clothes, disposable head coverings, and foot coverings or boots in the equipment room.
- B. Still wearing the respirator and completely naked, proceed to the shower. Showering is MANDATORY. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:
  1. Thoroughly wet body including hair and face. If using a PAPR hold blower above head to keep filters dry.
  2. With respirator still in place, thoroughly decontaminate body, hair, respirator face piece, and all other parts of the respirator except the blower and battery pack on a PAPR. Pay particular attention to cleaning the seal between the face and respirator facepiece and under the respirator straps.
  3. Take a deep breath, hold it and/or exhale slowly, completely wetting hair, face, and respirator. While still holding breath, remove the respirator and hold it away from the face before starting to breathe.

- C. Carefully decontaminate the facepiece of the respirator inside and out. If using a PAPR, shut down using the following sequence: a) first cap inlets to filters; b) turn blower off to keep debris collected on the inlet side of the filter from dislodging and contaminating the outside of the unit; c) thoroughly decontaminate blower and hoses; d) carefully decontaminate battery pack with a wet rag being cautious of getting water in the battery pack thus preventing destruction. **THIS PROCEDURE IS NOT A SUBSTITUTE FOR RESPIRATOR CLEANING!**
- D. Shower and wash body completely with soap and water. Rinse thoroughly.
- E. Rinse shower room walls and floor to drain prior to exiting.
- F. Proceed from shower to clean room; dry off and change into street clothes or into new disposable work clothing.

#### **1.8.6 REGULATED AREA REQUIREMENTS**

The Competent Person shall meet all requirements of 29 CFR 1926.1101 (o) and assure that all requirements for Class I glovebag regulated areas at 29 CFR 1926.1101 (e) are met. All personnel in the regulated area shall not be allowed to eat, drink, smoke, chew tobacco or gum, apply cosmetics, or in any way interfere with the fit of their respirator.

### **1.9 DECONTAMINATION FACILITIES**

#### **1.9.1 DESCRIPTION**

Provide each regulated area with separate personnel (PDF) and waste/equipment decontamination facilities (W/EDF). Ensure that the PDF is the only means of ingress and egress to the regulated area and that all equipment, bagged waste, and other material exit the regulated area only through the W/EDF.

#### **1.9.2 GENERAL REQUIREMENTS**

All personnel entering or exiting a regulated area shall follow the requirements at 29 CFR 1926.1101 (j)(1) and these specifications. All equipment and materials must exit the regulated area through the W/EDF and be decontaminated in accordance with these specifications. Walls and ceilings of the PDF and W/EDF must be constructed of a minimum of 3 layers of 6 mil opaque fire retardant polyethylene sheeting and be securely attached to existing building components and/or an adequate temporary framework. A minimum of 3 layers of 6 mil poly shall also be used to cover the floor under the PDF and W/EDF units. Construct doors so that they overlap and secure to adjacent surfaces. Weigh sheets with layers of duct tape so that they close quickly after release. Put



arrows on sheets so they show direction of travel and overlap. If the building adjacent area is occupied, construct a solid barrier on the occupied side(s) to protect the sheeting.

#### **1.9.3 TEMPORARY FACILITIES TO THE PDF AND W/EDF**

The Competent Person shall provide temporary water service connections to the PDF and W/EDF. Backflow prevention must be provided at the point of connection to the VA system. Water supply must be of adequate pressure and meet requirements of 29 CFR 1910.141(d)(3). Provide adequate temporary electric power with ground fault protection and overhead wiring in the PDF and W/EDF. Provide a sub-panel for all temporary power in the clean room. Provide adequate lighting to provide a minimum of 50 foot candles in the PDF and W/EDF. Provide temporary heat to maintain 70°F throughout the PDF and W/EDF..

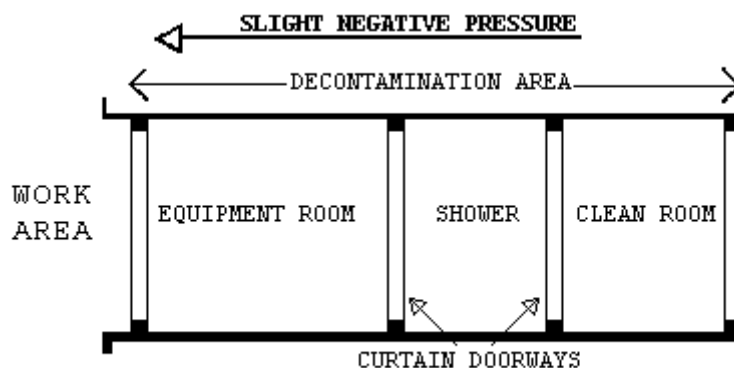
#### **1.9.4 PERSONNEL DECONTAMINATION FACILITY (PDF)**

The Competent Person shall provide a PDF consisting of shower room which is contiguous to a clean room and equipment room. The PDF must be sized to accommodate the number of personnel scheduled for the project. The shower room, located in the center of the PDF, shall be fitted with as many portable showers as necessary to insure all employees can complete the entire decontamination procedure within 15 minutes. The PDF shall be constructed of opaque poly for privacy. The PDF shall be constructed to eliminate any parallel routes of egress without showering.

1. Clean Room: The clean room must be physically and visually separated from the rest of the building to protect the privacy of personnel changing clothes. The clean room shall be constructed of at least 2 layers of 6 mil fire retardant poly to provide an air tight room. Provide a minimum of 2 - 900 mm (3 foot) wide flapped doorways. One doorway shall be the entry from outside the PDF and the second doorway shall be to the shower room of the PDF. The floor of the clean room shall be maintained in a clean, dry condition. Shower overflow shall not be allowed into the clean room. An adequate supply of disposable towels shall be provided. Provide storage lockers per person. A portable fire extinguisher, Type ABC, shall be provided in accordance with OSHA and NFPA Standard 10. All persons entering the regulated area shall remove all street clothing in the clean room and dress in disposable protective clothing and respiratory protection. Any person entering the clean room does so

- either from the outside with street clothing on or is coming from the shower room completely naked and thoroughly washed. Females required to enter the regulated area shall be ensured of their privacy throughout the entry/exit process by posting guards at both entry points to the PDF so no male can enter or exit the PDF during her stay in the PDF.
2. Shower Room: The Competent Person shall assure that the shower room is a completely water tight compartment to be used for the movement of all personnel from the clean room to the equipment room and for the showering of all personnel going from the regulated area to the clean room. Each shower shall be constructed so water runs down the walls of the shower and into a drip pan. Install a freely draining smooth floor on top of the shower pan. The shower room shall be separated from the rest of the building and from the clean room and equipment room using air tight walls made from at least 3 layers of 6 mil fire retardant poly. The shower shall be equipped with a shower head and controls, hot and cold water, drainage, soap dish and continuous supply of soap, and shall be maintained in a sanitary condition throughout its use. The controls shall be arranged so an individual can shower without assistance. Provide a flexible hose shower head, hose bibs and all other items shown on Shower Schematic. Waste water will be pumped to a drain after being filtered through a minimum of a 100 micron sock in the shower drain; a 20 micron filter; and a final 5 micron filter. Filters will be changed a minimum of daily or more often as needed. Filter changes must be done in the shower to prevent loss of contaminated water. Hose down all shower surfaces after each shift and clean any debris from the shower pan. Residue is to be disposed of as asbestos waste.
3. Equipment Room: The Competent Person shall provide an equipment room which shall be an air tight compartment for the storage of work equipment, reusable footwear and for use as a change station for personnel exiting the regulated area. The equipment room shall be separated from the regulated area by a minimum 3 foot wide door made of 2 layers of 6 mil fire retardant poly. The equipment room shall be separated from the regulated area, the shower room and the rest of the building by air tight walls and ceiling constructed of a

- minimum of 3 layers of 6 mil fire retardant poly. Damp wipe all surfaces of the equipment room after each shift change. Provide an additional loose layer of 6 mil fire retardant poly per shift change and remove this layer after each shift. Provide a temporary electrical sub-panel equipped with GFCI in this room to accommodate any equipment required in the regulated area.
4. The PDF shall consist of the following: Clean room at the entrance followed by a shower room followed by an equipment room leading to the regulated area. Each doorway in the PDF is minimum of 2 layers of 6 mil fire retardant poly.

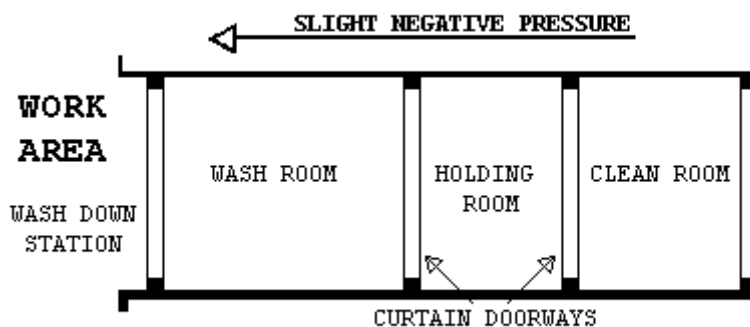


#### 1.9.5 WASTE/EQUIPMENT DECONTAMINATION FACILITY (W/EDF)

The Competent Person shall provide a W/EDF consisting of a wash room, holding room, and clean room for removal of all waste, equipment and contaminated material from the regulated area. Personnel shall not enter or exit the W/EDF except in the event of an emergency. Clean debris and residue in the W/EDF daily. All surfaces in the W/EDF shall be wiped/hosed down after each shift and all debris shall be cleaned from the shower pan. The W/EDF shall consist of the following:

1. Wash Down Station: Provide an enclosed shower unit in the regulated area just outside the Wash Room as an equipment, bag and container cleaning station.
2. Wash Room: Provide a wash room for cleaning of bagged or containerized asbestos containing waste materials passed from the regulated area. Construct the wash room using 50 x 100 mm (2" x 4") wood framing and 3 layers of 6 mil fire retardant poly. Locate the wash room so that packaged materials, after being wiped clean, can be passed to the

- Holding Room. Doorways in the wash room shall be constructed of 2 layers of 6 mil fire retardant poly.
3. Holding Room: Provide a holding room as a drop location for bagged materials passed from the wash room. Construct the holding room using 50 x 100 mm (2" x 4") wood framing and 3 layers of 6 mil fire retardant poly. The holding room shall be located so that bagged material cannot be passed from the wash room to the clean room unless it goes through the holding room. Doorways in the holding room shall be constructed of 2 layers of 6 mil fire retardant poly.
  4. Clean Room: Provide a clean room to isolate the holding room from the building exterior. Construct the clean room using 2 x 4 wood framing and 2 layers of 6 mil fire retardant poly. The clean room shall be located so as to provide access to the holding room from the building exterior. Doorways to the clean room shall be constructed of two layers of 6 mil fire retardant poly.
  5. The W/EDF shall be provided as follows: Wash Room leading to a Holding Room followed by a Clean Room leading to outside the regulated area. See diagram.



#### 1.9.6 WASTE/EQUIPMENT DECONTAMINATION PROCEDURES

At washdown station in the regulated area, thoroughly wet clean contaminated equipment and/or sealed polyethylene bags and pass into Wash Room after visual inspection. When passing anything into the Wash Room, close all doorways of the W/EDF, other than the doorway between the washdown station and the Wash Room. Keep all outside personnel clear of the W/EDF. Once inside the Wash Room, wet clean the equipment and/or bags. After cleaning and inspection, pass items into the Holding

Room. Close all doorways except the doorway between the Holding Room and the Clean Room. Workers from the Clean Room/Exterior shall enter the Holding Room and remove the decontaminated/cleaned equipment/bags for removal and disposal. These personnel will not be required to wear PPE. At no time shall personnel from the clean side be allowed to enter the Wash Room.

## **PART 2 - PRODUCTS, MATERIALS AND EQUIPMENT**

### **2.1 MATERIALS AND EQUIPMENT**

#### **2.1.1 GENERAL REQUIREMENTS (ALL ABATEMENT PROJECTS)**

Prior to the start of work, the Contractor shall provide and maintain a sufficient quantity of materials and equipment to assure continuous and efficient work throughout the duration of the project. Work shall not start unless the following items have been delivered to the site and the CPIH has submitted verification to the VA's representative to this effect:

- A. All materials shall be delivered in their original package, container or bundle bearing the name of the manufacturer and the brand name (where applicable).
- B. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Flammable materials cannot be stored inside buildings. Replacement materials shall be stored outside of the regulated/work area until abatement is completed.
- C. The Contractor shall not block or hinder use of buildings by patients, staff, and visitors to the VA in partially occupied buildings by placing materials/equipment in any unauthorized place.
- D. The Competent Person shall inspect for damaged, deteriorating or previously used materials. Such materials shall not be used and shall be removed from the worksite and disposed of properly.
- E. Poly sheeting put under the glovebag regulated area shall be a minimum of 6 mils in thickness.
- F. If required, the method of attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and the VA and selected to minimize damage to equipment and surfaces.
- G. Polyethylene sheeting utilized for personnel decontamination facility shall be opaque white or black in color, 6 mil fire retardant poly.

- H. Installation and plumbing hardware, showers, hoses, drain pans, sump pumps and waste water filtration system shall be provided by the Contractor.
- I. An adequate number of HEPA vacuums, scrapers, sprayers, nylon brushes, brooms, disposable mops, rags, sponges, staple guns, shovels, ladders and scaffolding of suitable height and length as well as meeting OSHA requirements shall be provided. Fall protection devices, water hose to reach all areas in the regulated area, airless spray equipment, and any other tools, materials or equipment required to conduct the abatement project shall also be provided. All electrically operated hand tools, equipment, electric cords shall be equipped with GFCI protection.
- J. Special protection for objects in the regulated area shall be detailed (e.g., plywood over carpeting or hardwood floors to prevent damage from scaffolds, water, and falling material).
- K. Disposal bags - 2 layers of 6 mil, for asbestos waste shall be pre-printed with labels, markings and address as required by OSHA, EPA and DOT regulations.
- L. The VA shall be provided a copy of the MSDS as required for all hazardous chemicals under OSHA 29 CFR 1910.1200 - Hazard Communication. Chlorinated compounds shall not be used with any spray adhesive or other product. Appropriate encapsulant(s) shall be provided.
- M. OSHA DANGER demarcation signs, as many and as required by OSHA 29 CFR 1926.1101(k)(7) shall be provided and placed by the Competent Person. All other posters and notices required by Federal and State regulations shall be posted in the Clean Room.
- N. Adequate and appropriate PPE for the project and number of personnel/shifts shall be provided. All personal protective equipment issued must be based on a hazard assessment conducted under 29 CFR 1910.132(d).

## **2.2 CONTAINMENT BARRIERS AND COVERINGS IN THE REGULATED AREA**

### **2.2.1 GENERAL**

Using critical barriers, seal off the perimeter to the regulated area to completely isolate the regulated area from adjacent spaces. All horizontal surfaces in the regulated area must be covered with 2 layers of 6 mil fire retardant poly to prevent contamination and to facilitate clean-up. Should adjacent areas become contaminated, immediately stop work and clean up the contamination at no additional cost to the Government. Provide firestopping and identify all fire barrier

penetrations due to abatement work as specified in Section 2.2.7;  
FIRESTOPPING.

#### **2.2.2 PREPARATION PRIOR TO SEALING THE REGULATED AREA**

- A. Place all tools, scaffolding, materials and equipment needed for working in the regulated area prior to erecting any plastic sheeting. Remove all uncontaminated removable furniture, equipment and/or supplies from the regulated area before commencing work, or completely cover with 2 layers of 6-mil fire retardant poly sheeting and secure with duct tape. Lock out and tag out any HVAC systems in the regulated area.

#### **2.2.3 CONTROLLING ACCESS TO THE REGULATED AREA**

- A. Access to the regulated area is allowed only through the personnel decontamination facility (PDF), if required. All other means of access shall be eliminated and OSHA Danger demarcation signs posted as required by OSHA. If the regulated area is adjacent to or within view of an occupied area, provide a visual barrier of 6 mil opaque fire retardant poly sheeting to prevent building occupant observation. If the adjacent area is accessible to the public, the barrier must be solid.

#### **2.2.4 CRITICAL BARRIERS**

- A. Completely separate any openings into the regulated area from adjacent areas using fire retardant poly at least 6 mils thick and duct tape. Individually seal with 2 layers of 6 mil poly and duct tape all HVAC openings into the regulated area. Individually seal all lighting fixtures, clocks, doors, windows, convectors, speakers, or any other objects in the regulated area. Heat must be shut off any objects covered with poly.

#### **2.2.5 SECONDARY BARRIERS**

- A. A loose layer of 6 mil fire retardant poly shall be used as a drop cloth to protect the floor/horizontal surfaces from debris generated during the glovebag abatement. This layer shall be replaced as needed during the work.

#### **2.2.6 EXTENSION OF THE REGULATED AREA**

- A. If the enclosure of the regulated area is breached in any way that could allow contamination to occur, the affected area shall be included in the regulated area and constructed as per this section. If the affected area cannot be added to the regulated area, decontamination

measures must be started immediately and continue until air monitoring indicates background levels are met.

#### **2.2.7 FIRESTOPPING**

- A. Through penetrations caused by cables, cable trays, pipes, sleeves must be firestopped with a fire-rated firestop system providing an air tight seal.
- B. Firestop materials that are not equal to the wall or ceiling penetrated shall be brought to the attention of the VA Representative. The Contractor shall list all areas of penetration, the type of sealant used, and whether or not the location is fire rated. Any discovery of penetrations during abatement shall be brought to the attention of the VA Representative immediately. All walls, floors and ceilings are considered fire rated unless otherwise determined by the VA Representative or Fire Marshall.
- C. Any visible openings whether or not caused by a penetration shall be reported by the Contractor to the VA Representative for a sealant system determination. Firestops shall meet ASTM E814 and UL 1479 requirements for the opening size, penetrant, and fire rating needed.

#### **2.3 MONITORING, INSPECTION AND TESTING**

##### **2.3.1 GENERAL**

- A. Perform throughout abatement work monitoring, inspection and testing inside and around the regulated area in accordance with the OSHA requirements and these specifications. The CPIH shall periodically inspect and oversee the performance of the Contractor IH Technician. The IH Technician shall continuously inspect and monitor conditions inside the regulated area to ensure compliance with these specifications. In addition, the CPIH shall personally manage air sample collection, analysis, and evaluation for personnel, regulated area, and adjacent area samples to satisfy OSHA requirements. Additional inspection and testing requirements are also indicated in other parts of this specification.
- B. The VA will employ an independent industrial hygienist (VPIH/CIH) consultant and/or use its own IH to perform various services on behalf of the VA. The VPIH/CIH will perform the necessary monitoring, inspection, testing, and other support services to ensure that VA patients, employees, and visitors will not be adversely affected by the abatement work, and that the abatement work proceeds in accordance with these specifications, that the abated areas or abated buildings have



been successfully decontaminated. The work of the VPIH/CIH consultant in no way relieves the Contractor from their responsibility to perform the work in accordance with contract/specification requirements, to perform continuous inspection, monitoring and testing for the safety of their employees, and to perform other such services as specified. The cost of the VPIH/CIH and their services will be borne by the VA except for any repeat of final inspection and testing that may be required due to unsatisfactory initial results. Any repeated final inspections and/or testing, if required, will be paid for by the Contractor.

- C. If fibers counted by the VPIH/CIH during abatement work, either inside or outside the regulated area, utilizing the NIOSH 7400 air monitoring method, exceed the specified respective limits, the Contractor shall stop work. The Contractor may request confirmation of the results by analysis of the samples by TEM. Request must be in writing and submitted to the VA's representative. Cost for the confirmation of results will be borne by the Contractor for both the collection and analysis of samples and for the time delay that may/does result for this confirmation. Confirmation sampling and analysis will be the responsibility of the CPIH with review and approval of the VPIH/CIH. An agreement between the CPIH and the VPIH/CIH shall be reached on the exact details of the confirmation effort, in writing, including such things as the number of samples, location, collection, quality control on-site, analytical laboratory, interpretation of results and any follow-up actions. This written agreement shall be co-signed by the IH's and delivered to the VA's representative.

#### **2.3.2 SCOPE OF SERVICES OF THE VPIH/CIH CONSULTANT**

- A. The purpose of the work of the VPIH/CIH is to: Assure quality; resolve problems; and prevent the spread of contamination beyond the regulated area. In addition, their work includes performing the final inspection and testing to determine whether the regulated area or building has been adequately decontaminated. All air monitoring is to be done utilizing PCM/TEM. The VPIH/CIH will perform the following tasks:
1. Task 1: Establish background levels before abatement begins by collecting background samples. Retain samples for possible TEM analysis.
  2. Task 2: Perform continuous air monitoring, inspection, and testing outside the regulated area during actual abatement work to detect

- any faults in the regulated area isolation and any adverse impact on the surroundings from regulated area activities.
3. Task 3: Perform unannounced visits to spot check overall compliance of work with contract/specifications. These visits may include any inspection, monitoring, and testing inside and outside the regulated area and all aspects of the operation except personnel monitoring.
  4. Task 4: Provide support to the VA representative such as evaluation of submittals from the Contractor, resolution of unforeseen developments, etc.
  5. Task 5: Perform, in the presence of the VA representative, final inspection and testing of a decontaminated regulated area or building at the conclusion of the abatement and clean-up work to certify compliance with all regulations and the VA requirements/specifications.
  6. Task 6: Issue certificate of decontamination for each regulated area or building and project report.
- B. All data, inspection results and testing results generated by the VPIH/CIH will be available to the Contractor for information and consideration. The Contractor shall cooperate with and support the VPIH/CIH for efficient and smooth performance of their work.
- C. The monitoring and inspection results of the VPIH/CIH will be used by the VA to issue any Stop Removal orders to the Contractor during abatement work and to accept or reject a regulated area or building as decontaminated.

#### **2.3.3 MONITORING, INSPECTION AND TESTING BY ABATEMENT CONTRACTOR CPIH**

The CPIH is responsible for managing all monitoring, inspections, and testing required by these specifications, as well as any and all regulatory requirements adopted by these specifications. The CPIH is responsible for the continuous monitoring of all subsystems and procedures which could affect the health and safety of the Contractor's personnel. Safety and health conditions and the provision of those conditions inside the regulated area for all persons entering the regulated area is the exclusive responsibility of the Contractor /Competent Person. The person performing the personnel and area air monitoring inside the regulated area shall be an IH Technician, who shall be trained and shall have specialized field experience in air sampling and analysis. The IH Technician shall have a NIOSH 582 Course or equivalent and show proof. The IH Technician shall participate in

the AIHA Asbestos Analysis Registry or participate in the Proficiency Analytic Testing program of AIHA for fiber counting quality control assurance. The IH Technician shall also be an accredited EPA/State Contractor/Supervisor and Building Inspector. The IH Technician shall have participated in five abatement projects collecting personal and area samples as well as responsibility for documentation. The analytic laboratory used by the Contractor to analyze the samples shall be AIHA accredited for asbestos PAT. A daily log documenting all OSHA requirements for air monitoring for asbestos in 29 CFR 1926.1101(f), (g) and Appendix A. This log shall be made available to the VA representative and the VPIH/CIH. The log will contain, at a minimum, information on personnel or area sampled, other persons represented by the sample, the date of sample collection, start and stop times for sampling, sample volume, flow rate, and fibers/cc. The CPIH shall collect and analyze samples for each representative job being done in the regulated area, i.e., removal, wetting, clean-up, and load-out. No fewer than two personal samples per shift shall be collected and one area sample per 1,000 square feet of regulated area where abatement is taking place and one sample per shift in the clean room area shall be collected. In addition to the continuous monitoring required, the CPIH will perform inspection and testing at the final stages of abatement for each regulated area as specified in the CPIH responsibilities.

#### **2.4 STANDARD OPERATING PROCEDURES**

The Contractor shall have established Standard Operating Procedures (SOP's) in printed form and loose leaf folder consisting of simplified text, diagrams, sketches, and pictures that establish and explain clearly the ways and procedures to be followed during all phases of the work by the Contractor's personnel. The SOP's must be modified as needed to address specific requirements of the project. The SOP's shall be submitted for review and approval prior to the start of any abatement work. The minimum topics and areas to be covered by the SOP's are:

- A. Minimum Personnel Qualifications
- B. Contingency Plans and Arrangements
- C. Security and Safety Procedures
- D. Respiratory Protection/Personal Protective Equipment Program and Training
- E. Medical Surveillance Program and Recordkeeping
- F. Regulated Area Requirements for Glovebag Abatement

- G. Decontamination Facilities and Entry/Exit Procedures (PDF and W/EDF)
- H. Monitoring, Inspections, and Testing
- I. Removal Procedures For Piping ACM Using the Glovebag Method
- J. Disposal of ACM waste
- K. Regulated Area Decontamination/Clean-up
- L. Regulated Area Visual and Air Clearance
- M. Project Completion/Closeout

## **2.5 SUBMITTALS**

### **2.5.1 PRE-CONSTRUCTION MEETING SUBMITTALS**

Submit to the VA a minimum of 14 days prior to the pre-start meeting the following for review and approval. Meeting this requirement is a prerequisite for the pre-start meeting for this project.

- A. Submit a detailed work schedule for the entire project reflecting contract documents and the phasing/schedule requirements from the CPM chart.
- B. Submit a staff organization chart showing all personnel who will be working on the project and their capacity/function. Provide their qualifications, training, accreditations, and licenses, as appropriate. Provide a copy of the "Certificate of Worker's Acknowledgment" and the "Affidavit of Medical Surveillance and Respiratory Protection" for each person.
- C. Submit Standard Operating Procedures developed specifically for this project, incorporating the requirements of the specifications, prepared, signed and dated by the CPIH.
- D. Submit the specifics of the materials and equipment to be used for this project with brand names, model numbers, performance characteristics, pictures/diagrams, and number available for the following:
  - 1. HEPA vacuums, air monitoring pumps, calibration devices, and emergency power generating system.
  - 2. Waste water filtration system, shower system, critical/floor barriers.
  - 3. Encapsulants, surfactants, hand held sprayers, airless sprayers, glovebags, fire extinguishers.
  - 4. Personal protective equipment.
  - 5. Fire safety equipment to be used in the regulated area.
- E. Submit the name, location, and phone number of the approved landfill; proof/verification the landfill is approved for ACM disposal; the landfill's requirements for ACM waste; the type of vehicle to be used

for transportation; and name, address, and phone number of subcontractor, if used. Proof of asbestos training for transportation personnel shall be provided.

- F. Submit required notifications and arrangements made with regulatory agencies having regulatory jurisdiction and the specific contingency/emergency arrangements made with local health, fire, ambulance, hospital authorities and any other notifications/arrangements.
- G. Submit the name, location and verification of the laboratory and/or personnel to be used for analysis of air and/or bulk samples. Air monitoring must be done in accordance with OSHA 29 CFR 1926.1101(f) and Appendix A.
- H. Submit qualifications verification: Submit the following evidence of qualifications. Make sure that all references are current and verifiable by providing current phone numbers and documentation.
  - 1. Asbestos Abatement Company: Project experience within the past 3 years; listing projects first most similar to this project:  
Project Name; Type of Abatement; Duration; Cost; Reference Name/Phone Number; Final Clearance; Completion Date
  - 2. List of project(s) halted by owner, A/E, IH, regulatory agency in the last 3 years:  
Project Name; Reason; Date; Reference Name/Number; Resolution
  - 3. List asbestos regulatory citations, penalties, damages paid and legal actions taken against the company in the last 3 years. Provide copies and all information needed for verification.
- I. Submit information on personnel: Provide a resume; address each item completely; provide references; phone numbers; copies of certificates, accreditations, and licenses. Submit an affidavit signed by the CPIH stating that all personnel submitted below have medical records in accordance with OSHA 29 CFR 1926.1101(m) and 29 CFR 1910.20 and that the company has implemented a medical surveillance program and maintains recordkeeping in accordance with the above regulations. Submit the phone number and doctor/clinic/hospital used for medical evaluations.
  - 1. CPIH: Name; years of abatement experience; list of projects similar to this one; certificates, licenses, accreditations for proof of AHERA/OSHA specialized asbestos training; professional affiliations;

- number of workers trained; samples of training materials; samples of SOP's developed; medical opinion; current respirator fit test.
2. Competent Person(s)/Supervisor(s): Number; names; social security numbers; years of abatement experience as Competent Person /Supervisor; list of similar projects as Competent Person/Supervisor; as a worker; certificates, licenses, accreditations; proof of AHERA/OSHA specialized asbestos training; maximum number of personnel supervised on a project; medical opinion; current respirator fit test.
  3. Workers: Numbers; names; social security numbers; years of abatement experience; certificates, licenses, accreditations; training courses in asbestos abatement and respiratory protection; medical opinion; current respirator fit test.
- J. Submit copies of State license for asbestos abatement; copy of insurance policy, including exclusions with a letter from agent stating in plain english the coverage provided and the fact that asbestos abatement activities are covered by the policy; copy of SOP's incorporating the requirements of this specification; information on who provides your training, how often; who provides medical surveillance, how often; who does and how is air monitoring conducted; a list of references of independent laboratories/IH's familiar with your air monitoring and standard operating procedures; copies of monitoring results of the five referenced projects listed and analytical method(s) used.
- K. When rental equipment is to be used in regulated areas or used to transport asbestos waste, the contractor shall assure complete decontamination of the rental equipment before return to the rental agency.
1. Submit, before the start of work, the manufacturer's technical data and MSDS for encapsulants used on the project. Provide application instructions also.

#### **2.5.2 SUBMITTALS DURING ABATEMENT**

- A. The Competent Person shall maintain and submit a daily log at the regulated area documenting the dates and times of the following: purpose, attendees and summary of meetings; all personnel entering/exiting the regulated area; document and discuss the resolution of unusual events such as critical barrier breeching, equipment failures, emergencies, and any cause for stopping work;

representative air monitoring and results/TWA's/EL's. Submit this daily log to VA's representative.

- B. The CPIH shall document and maintain the following during abatement and submit as appropriate to the VA's representative.
1. Inspection and approval of the regulated area preparation prior to start of work and daily during work.
  2. Removal of any poly critical/floor barriers.
  3. Visual inspection/testing by the CPIH prior to application of lockdown encapsulation.
  4. Packaging and removal of ACM waste from regulated area.
  5. Disposal of ACM waste materials; copies of Waste Shipment Records/landfill receipts to the VA's representative on a weekly basis.

#### **2.5.3 SUBMITTALS AT COMPLETION OF ABATEMENT**

The CPIH shall submit a project report consisting of the daily log book requirements and documentation of events during the abatement project including Waste Shipment Records signed by the landfill's agent. The report shall include a certificate of completion, signed and dated by the CPIH, in accordance with Attachment #1. The VA Representative will forward the abatement report to the Medical Center after completion of the project.

### **2.6 ENCAPSULANTS**

#### **2.6.1 TYPES OF ENCAPSULANTS**

- A. The following four types of encapsulants must comply with performance requirements as stated in paragraph 2.6.2:
1. Removal encapsulant - used as a wetting agent to remove ACM.
  2. Bridging encapsulant - provides a tough, durable coating on ACM.
  3. Penetrating encapsulant - penetrates/encapsulates ACM at least 13 mm (1/2").
  4. Lockdown encapsulant - seals microscopic fibers on surfaces after ACM removal.

#### **2.6.2 PERFORMANCE REQUIREMENTS**

Encapsulants shall meet the latest requirements of EPA; shall not contain toxic or hazardous substances; or solvents; and shall comply with the following performance requirements:

- A. General Requirements for all Encapsulants:
1. ASTM E84: Flame spread of 25; smoke emission of 50.

2. University of Pittsburgh Protocol: Combustion Toxicity; zero mortality.
  3. ASTM C732: Accelerated Aging Test; Life Expectancy - 20 years.
  4. ASTM E96: Permeability - minimum of 0.4 perms.
- B. Bridging/Penetrating Encapsulants:
1. ASTM E736: Cohesion/Adhesion Test - 24 kPa (50 lbs/ft<sup>2</sup>).
  2. ASTM E119: Fire Resistance - 3 hours (Classified by UL for use on fibrous/cementitious fireproofing).
  3. ASTM D2794: Gardner Impact Test; Impact Resistance - minimum 11.5 kg-mm (43 in/lb).
  4. ASTM D522: Mandrel Bend Test; Flexibility - no rupture or cracking.
- C. Lockdown Encapsulants:
1. ASTM E119: Fire resistance - 3 hours (tested with fireproofing over encapsulant applied directly to steel member).
  2. ASTM E736: Bond Strength - 48 kPa (100 lbs/ft<sup>2</sup>) (test compatibility with cementitious and fibrous fireproofing).
  3. In certain situations, encapsulants may have to be applied to hot pipes/equipment. The encapsulant must be able to withstand high temperatures without cracking or off-gassing any noxious vapors during application.

## **2.7 CERTIFICATES OF COMPLIANCE**

The Contractor shall submit to the VA representative certification from the manufacturer indicating compliance with performance requirements for encapsulants when applied according to manufacturer recommendations.

## **2.8 RECYCLABLE PROTECTIVE CLOTHING**

If recyclable clothing is provided, all requirements of EPA, DOT and OSHA shall be met.

## **PART 3 - EXECUTION**

### **3.1 PRE-ABATEMENT ACTIVITIES**

#### **3.1.1 PRE-ABATEMENT MEETING**

The VA representative, upon receipt, review, and substantial approval of all pre-abatement submittals and verification by the CPIH that all materials and equipment required for the project are on the site, will arrange for a pre-abatement meeting between the Contractor, the CPIH, Competent Person(s), the VA representative(s), and the VPIH/CIH. The purpose of the meeting is to discuss any aspect of the submittals needing clarification or amplification and to discuss any aspect of the



project execution and the sequence of the operation. The Contractor shall be prepared to provide any supplemental information/documentation to the VA's representative regarding any submittals, documentation, materials or equipment. Upon satisfactory resolution of any outstanding issues, the VA's representative will issue a written order to proceed to the Contractor. No abatement work of any kind described in the following provisions shall be initiated prior to the VA written order to proceed.

### **3.1.2 PRE-ABATEMENT INSPECTIONS AND PREPARATIONS**

Before any work begins on the construction of the regulated area, the Contractor will:

- A. Conduct a space-by-space inspection with an authorized VA representative and prepare a written inventory of all existing damage in those spaces where asbestos abatement will occur. Still or video photography may be used to supplement the written damage inventory. Document will be signed and certified as accurate by both parties.
- B. The VA Representative, the Contractor, and the VPIH/CIH must be aware of 10/95 A/E Quality Alert indicating the failure to identify asbestos as applicable to glovebag abatement in the areas listed. Make sure these areas are looked at/reviewed on the project: Lay-in ceilings concealing ACM; ACM behind walls/windows from previous renovations; inside chases/walls; transite piping/ductwork/sheets; behind radiators; below window sills; water/sewer lines; electrical conduit coverings; steam line trench coverings.
- C. Ensure that all furniture, machinery, equipment, curtains, drapes, blinds, and other movable objects which the Contractor is required to remove from the regulated area have been cleaned and removed or properly protected from contamination.
- D. Shut down and seal with a minimum of 2 layers of 6 mil fire retardant poly all HVAC systems serving the regulated area. The regulated area critical barriers shall be completely isolated from any other air in the building. The VA's representative will monitor the isolation provision.
- E. Shut down and lock out in accordance with 29 CFR 1910.147 all electrical circuits which pose a potential hazard. Electrical arrangements will be tailored to the particular regulated area and the systems involved. All electrical circuits affected will be turned off at the circuit box outside the regulated area, not just the wall

switch. The goal is to eliminate the potential for electrical shock which is a major threat to life in the regulated area due to water use and possible energized circuits. Electrical lines used to power equipment in the regulated area shall conform to all electrical safety standards and shall be isolated by the use of a ground fault circuit interrupter (GFCI). All GFCI shall be tested prior to use. The VA's representative will monitor the electrical shutdown.

F. If required, remove and dispose of carpeting from floors in the regulated area.

G. Inspect existing firestopping in the regulated area. Correct as needed.

### **3.1.3 PRE-ABATEMENT CONSTRUCTION AND OPERATIONS**

A. Perform all preparatory work for the first regulated area in accordance with the approved work schedule and with this specification.

B. Upon completion of all preparatory work, the CPIH will inspect the work and systems and will notify the VA's representative when the work is completed in accordance with this specification. The VA's representative may inspect the regulated area and the systems with the VPIH/CIH and may require that upon satisfactory inspection, the Contractor's employees perform all major aspects of the approved SOP's, especially worker protection, respiratory systems, contingency plans, decontamination procedures, and monitoring to demonstrate satisfactory operation.

C. The CPIH shall document the pre-abatement activities described above and deliver a copy to the VA's representative.

D. Upon satisfactory inspection of the installation of and operation of systems the VA's representative will notify the Contractor in writing to proceed with the asbestos abatement work in accordance with this specification.

## **3.2 REGULATED AREA PREPARATIONS**

### **3.2.1 OSHA DANGER SIGNS**

Post OSHA DANGER signs meeting the specifications of OSHA 29 CFR 1926.1101 at any location and approaches to the regulated area where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the regulated area to permit any personnel to read the sign and take the necessary measures to avoid exposure. Additional signs will be posted following construction of the regulated area enclosure.

**3.2.2 SHUT DOWN - LOCK OUT ELECTRICAL**

Shut down and lock out electric power to the regulated area. Provide temporary power and lighting. Insure safe installation including GFCI of temporary power sources and equipment by compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems. Electricity shall be provided by the VA.

**3.2.3 SHUT DOWN - LOCK OUT HVAC**

Shut down and lock out heating, cooling, and air conditioning system (HVAC) components that are in, supply or pass through the regulated area.

Investigate the regulated area and agree on pre-abatement condition with the VA's representative. Seal all intake and exhaust vents in the regulated area with duct tape and 2 layers of 6-mil poly. Also, seal any seams in system components that pass through the regulated area. Remove all contaminated HVAC system filters and place in labeled 6-mil poly disposal bags for disposal as asbestos waste.

**3.2.4 SANITARY FACILITIES**

The Contractor shall provide sanitary facilities for abatement personnel and maintain them in a clean and sanitary condition throughout the abatement project.

**3.2.5 WATER FOR ABATEMENT**

The VA will provide water for abatement purposes. The Contractor shall connect to the existing VA system. The service to the shower(s) shall be supplied with backflow prevention.

**3.2.6 PRE-CLEANING MOVABLE OBJECTS**

Pre-clean all movable objects within the regulated area using a HEPA filtered vacuum and/or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the regulated area and carefully stored in an uncontaminated location.

**3.2.7 PRE-CLEANING FIXED OBJECTS**

Pre-clean all fixed objects in the regulated area using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery behind grills or gratings where access may be difficult but contamination may be significant. Also, pay particular attention to wall, floor and ceiling penetration behind fixed items. After precleaning, enclose fixed objects with 2 layers of 6-mil poly and seal securely in place with duct tape. Objects (e.g., permanent fixtures, shelves, electronic equipment, laboratory tables,

sprinklers, alarm systems, closed circuit TV equipment and computer cables) which must remain in the regulated area and that require special ventilation or enclosure requirements should be designated here along with specified means of protection. Contact the manufacturer for special protection requirements.

### **3.2.8 PRE-CLEANING SURFACES IN THE REGULATED AREA**

Pre-clean all surfaces in the regulated area using HEPA filtered vacuums and/or wet cleaning methods as appropriate. Do not use any methods that would raise dust such as dry sweeping or vacuuming with equipment not equipped with HEPA filters. Do not disturb asbestos-containing materials during this pre-cleaning phase.

## **3.3 CONTAINMENT BARRIERS AND COVERINGS FOR THE REGULATED AREA**

### **3.3.1 GENERAL**

Seal off any openings at the perimeter of the regulated area with critical barriers to completely isolate the regulated area and to contain all airborne asbestos contamination created by the abatement activities. Should the adjacent area past the regulated area become contaminated due to improper work activities, the Contractor shall suspend work inside the regulated area, continue wetting, and clean the adjacent areas in accordance with procedures described in these specifications. Any and all costs associated with the adjacent area cleanup shall not be borne by the VA.

### **3.3.2 PREPARATION PRIOR TO SEALING OFF**

Place all materials, equipment and supplies necessary to isolate the regulated area inside the regulated area. Remove all movable material/equipment as described above and secure all unmovable material/equipment as described above. Properly secured material/equipment shall be considered to be outside the regulated area.

### **3.3.3 CONTROLLING ACCESS TO THE REGULATED AREA**

Access to the regulated area shall be permitted only through the PDF. All other means of access shall be closed off by proper sealing and DANGER signs posted on the clean side of the regulated area where it is adjacent to or within view of any occupiable area. An opaque visual barrier of 6 mil poly shall be provided so that the abatement work is not visible to any building occupants. If the area adjacent to the regulated area is accessible to the public, construct a solid barrier on the public side of the sheeting for protection and isolation of the project. The barrier shall be constructed with nominal 2" x 4" (50mm x

100mm) wood or metal studs 16" (400mm) on centers, securely anchored to prevent movement and covered with a minimum of 1/2" (12.5mm) plywood. Provide an appropriate number of OSHA DANGER signs for each visual and physical barrier. Any alternative method must be given a written approval by the VA's representative.

#### **3.3.4 CRITICAL BARRIERS**

The regulated area must be completely separated from the adjacent areas, and the outside by at least 2 layers of 6 mil fire retardant poly and duct tape/spray adhesive. Individually seal all supply and exhaust ventilation openings, lighting fixtures, clocks, doorways, windows, convectors, speakers, and other openings into the regulated area with 2 layers of 6 mil fire retardant poly, and taped securely in place with duct tape/spray adhesive. Critical barriers must remain in place until all work and clearances have been completed. Light fixtures shall not be operational during abatement. Auxiliary lighting shall be provided. If needed, provide plywood squares 6" x 6" x 3/8" (150mm x 150mm x 18mm) held in place with one 6d smooth masonry/galvanized nail driven through the center of the plywood square and duct tape on the poly so as to clamp the poly to the wall/surface. Locate plywood squares at each end, corner, and 4' (1200mm) maximum on centers.

#### **3.3.5 EXTENSION OF THE REGULATED AREA**

If the regulated area barrier is breached in any manner that could allow the passage of asbestos fibers or debris, the Competent Person shall immediately stop work, continue wetting, and proceed to extend the regulated area to enclose the affected area as per procedures described in this specification. If the affected area cannot be enclosed, decontamination measures and cleanup shall start immediately. All personnel shall be isolated from the affected area until decontamination/cleanup is completed as verified by visual inspection and air monitoring. Air monitoring at completion must indicate background levels.

#### **3.3.6 FLOOR BARRIERS:**

All floors within 10' of glovebag work shall be covered with 2 layers of 6 mil fire retardant poly.

### **3.4 REMOVAL OF PIPING ACM**

#### **3.4.1 WETTING MATERIALS**

- A. Use amended water for the wetting of ACM prior to removal. The Competent Person shall assure the wetting of ACM meets the definition

of "adequately wet" in the EPA NESHAP's regulation and OSHA's "wet methods" for the duration of the project. A removal encapsulant may be used instead of amended water with written approval of the VA's representative.

- B. Amended Water: Provide water to which a surfactant has been added shall be used to wet the ACM and reduce the potential for fiber release during disturbance of ACM. The mixture must be equal to or greater than the wetting provided by water amended by a surfactant consisting one ounce of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with 5 gallons (19L) of water.
- C. Removal Encapsulant: Provide a penetrating encapsulant designed specifically for the removal of ACM. The material must, when used, result in adequate wetting of the ACM and retard fiber release during disturbance equal to or greater than the amended water described above in B.

#### **3.4.2 SECONDARY BARRIER AND WALKWAYS**

- A. Install as a drop cloth a 6 mil poly sheet at the beginning of each work shift where removal is to be done during that shift. Completely floors within 10 feet (3M) of the area where work is to done. Secure the secondary barrier with duct tape to prevent debris from getting behind it. Remove the secondary barrier at the end of the shift or as work in the area is completed. Keep residue on the secondary barrier wetted. When removing, fold inward to prevent spillage and place in a disposal bag.
- B. Install walkways using 6 mil poly between the regulated area and the decontamination facilities (PDF and W/EDF) to protect the floor from contamination and damage. Install the walkways at the beginning of each shift and remove at the end of each shift.

#### **3.4.3 WET REMOVAL OF ACM**

- A. Using acceptable glovebag procedures, adequately and thoroughly wet the ACM to be removed prior to removal to reduce/prevent fiber release to the air. Adequate time must be allowed for the amended water to saturate the ACM. Abatement personnel must not disturb dry ACM. Use a fine spray of amended water or removal encapsulant. Saturate the material sufficiently to wet to the substrate without causing excessive dripping. The material must be sprayed repeatedly/continuously during the removal process in order to maintain adequately wet conditions. Removal encapsulants must be applied in accordance with the

manufacturer's written instructions. Perforate or carefully separate, using wet methods, an outer covering that is painted or jacketed in order to allow penetration and wetting of the material. Where necessary, carefully remove covering while wetting to minimize fiber release. In no event shall dry removal occur except in the case of electrical hazards or a greater safety issue is possible!

### **3.5 GLOVEBAG REMOVAL PROCEDURES**

#### **3.5.1 GENERAL**

All applicable OSHA requirements and glovebag manufacturer's recommendations shall be met during glove bagging operations.

1. Mix the surfactant with water in the garden sprayer, following the manufacturer's directions.
2. Have each employee put on a HEPA filtered respirator approved for asbestos and check the fit using the positive/negative fit check.
3. Have each employee put on a disposable full-body suit. Remember, the hood goes over the respirator straps.
4. Check closely the integrity of the glove bag to be used. Check all seams, gloves, sleeves, and glove openings. OSHA requires the bottom of the bag to be seamless.
5. Check the pipe where the work will be performed. If it is damaged (broken lagging, hanging, etc.), wrap the entire length of the pipe in poly sheeting and "candy stripe" it with duct tape.
6. Attach glovebag with required tools per manufacturer's instructions.
7. Using the smoke tube and aspirator bulb, test 10% of glovebags by placing the tube into the water porthole (two-inch opening to glove bag), and fill the bag with smoke and squeeze it. If leaks are found, they should be taped closed using duct tape and the bag should be retested with smoke.
8. Insert the wand from the water sprayer through the water porthole.
9. Insert the hose end from a HEPA vacuum into the upper portion of the glove bag.
10. Wet and remove the pipe insulation.
11. If the section of pipe is covered with an aluminum jacket, remove it first using the wire cutters to cut any bands and the tin snips to remove the aluminum. It is important to fold the sharp edges in to prevent cutting the bag when placing it in the bottom.

12. When the work is complete, spray the upper portion of the bag and clean-push all residue into the bottom of the bag with the other waste material. Be very thorough. Use adequate water.
13. Put all tools, after washing them off in the bag, in one of the sleeves of glove bag and turn it inside out, drawing it outside of the bag. Twist the sleeve tightly several times to seal it and tape it several tight turns with duct tape. Cut through the middle of the duct tape and remove the sleeve. Put the sleeve in the next glove bag or put it in a bucket of water to decontaminate the tools after cutting the sleeve open.
14. Turn on the HEPA vacuum and collapse the bag completely. Remove the vacuum nozzle, seal the hole with duct tape, twist the bag tightly several times in the middle, and tape it to keep the material in the bottom during removal of the glove bag from the pipe.
15. Slip a disposal bag over the glove bag (still attached to the pipe). Remove the tape securing the ends, and slit open the top of the glove bag and carefully fold it down into the disposal bag. Double bag and gooseneck waste materials.

### **3.5.2 NEGATIVE PRESSURE GLOVEBAG PROCEDURE**

1. In addition to the above requirements, the HEPA vacuum shall be run continuously during the glovebag procedure until completion at which time the glovebag will be collapsed by the HEPA vacuum prior to removal from the pipe/component.
2. The HEPA vacuum shall be attached and operated as needed to prevent collapse of the glovebag during the removal process.

## **3.6 LOCKDOWN ENCAPSULATION**

### **3.6.1 GENERAL**

Lockdown encapsulation is an integral part of the ACM removal. At the conclusion of ACM removal and before removal of the primary barriers, all piping surfaces shall be encapsulated with a bridging encapsulant.

### **3.6.2 SEALING EXPOSED EDGES**

Seal edges of ACM exposed by removal work with two coats of encapsulant. Prior to sealing, permit the exposed edges to dry completely to permit penetration of the encapsulant.

## **3.7 DISPOSAL OF ACM WASTE MATERIALS**

### **3.7.1 GENERAL**

Dispose of waste ACM and debris which is packaged in accordance with these specifications, OSHA, EPA and DOT. The landfill requirements for



packaging must also be met. Disposal shall be done at the approved landfill. Disposal of non-friable ACM shall be done in accordance with applicable regulations.

### **3.7.2 PROCEDURES**

- A. Asbestos waste shall be packaged and moved through the W/EDF into a covered transport container in accordance with procedures in this specification. Waste shall be double-bagged prior to disposal. Wetted waste can be very heavy. Bags shall not be overfilled. Bags shall securely sealed to prevent accidental opening and/or leakage. The top shall be tightly twisted and goosenecked prior to tightly sealing with at least three wraps of duct tape. Ensure that unauthorized persons do not have access to the waste material once it is outside the regulated area. All transport containers must be covered at all times when not in use. NESHAP's signs must be on containers during loading and unloading. Material shall not be transported in open vehicles. If drums are used for packaging, the drums shall be labeled properly and shall not be re-used.
- B. Waste Load Out: Waste load out shall be done in accordance with the procedures in W/EDF Decontamination Procedures. Bags shall be decontaminated on exterior surfaces by wet cleaning and/or HEPA vacuuming before being placed in the second bag.
- C. Asbestos waste with sharp edged components, i.e., nails, screws, lath, strapping, tin sheeting, jacketing, metal mesh, etc., which might tear poly bags shall be wrapped securely in burlap before packaging and, if needed, use a poly lined fiber drum as the second container, prior to disposal.

## **3.8 PROJECT DECONTAMINATION**

### **3.8.1 GENERAL**

- A. The entire work related to project decontamination shall be performed under the close supervision and monitoring of the CPIH.
- B. If the asbestos abatement work is in an area which was contaminated prior to the start of abatement, the decontamination will be done by cleaning the primary barrier poly prior to its removal and cleaning of the regulated area surfaces after the primary barrier removal.
- C. If the asbestos abatement work is in an area which was uncontaminated prior to the start of abatement, the decontamination will be done by cleaning the primary barrier poly prior to its removal, thus preventing contamination of the building when the regulated area critical barriers are removed.

**3.8.2 REGULATED AREA CLEARANCE**

Air testing and other requirements which must be met before release of the Contractor and re-occupancy of the regulated area space are specified in Final Testing Procedures.

**3.8.3 WORK DESCRIPTION**

Decontamination includes the cleaning and clearance of the air in the regulated area and the decontamination and removal of the enclosures/facilities installed prior to the abatement work including primary/critical barriers, PDF and W/EDF facilities.

**3.8.4 PRE-DECONTAMINATION CONDITIONS**

- A. Before decontamination starts, all ACM waste from the regulated area shall be removed, all waste collected and removed, and the secondary barrier of poly removed and disposed of along with any gross debris generated by the work.
- B. At the start of decontamination, the following shall be in place:
  - 1. Critical barriers over all openings consisting of two layers of 6 mil poly which is the sole barrier between the regulated area and the rest of the building or outside.
  - 3. Decontamination facilities, if required for personnel and equipment in operating condition.

**3.8.5 FIRST CLEANING**

Carry out a first cleaning of all surfaces of the regulated area including items of remaining poly sheeting, tools, scaffolding, ladders/staging by wet methods and/or HEPA vacuuming. Do not use dry dusting/sweeping methods. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible residue from abated surfaces or poly or other surfaces. If determined by the CPIH/VPIH/CIH additional cleaning(s) may be needed.

**3.8.6 PRE-CLEARANCE INSPECTION AND TESTING**

The CPIH and VPIH/CIH will perform a thorough and detailed visual inspection after the first cleaning to determine whether there is any visible residue in the regulated area. If the visual inspection is acceptable, the CPIH will perform pre-clearance sampling using aggressive clearance as detailed in 40 CFR 763 Subpart E (AHERA) Appendix A(III)(B)(7)(d). If the sampling results show values below 0.01 f/cc, then the Contractor shall notify the VA's representative of the results with a brief report from the CPIH documenting the

inspection and sampling results and a statement verifying that the regulated area is ready for lockdown encapsulation. The VA reserves the right to utilize their own VPIH/CIH to perform a pre-clearance inspection and testing for verification.

#### **3.8.7 LOCKDOWN ENCAPSULATION OF ABATED SURFACES**

With the express written permission of the VA's representative, perform lockdown encapsulation of all surfaces from which asbestos was abated in accordance with the procedures in this specification.

### **3.9 FINAL VISUAL INSPECTIONS AND AIR CLEARANCE TESTING**

#### **3.9.1 GENERAL**

Notify the VA representative 24 hours in advance for the performance of the final visual inspection and testing. The final visual inspection and testing will be performed by the VPIH/CIH after the final cleaning.

#### **3.9.2 FINAL VISUAL INSPECTION**

Final visual inspection will include the entire regulated area, the PDF, all poly sheeting, seals over HVAC openings, doorways, windows, and any other openings. If any debris, residue, dust or any other suspect material is detected, the final cleaning shall be repeated at no cost to the VA. Dust/material samples may be collected and analyzed at no cost to the VA at the discretion of the VPIH/CIH to confirm visual findings. When the regulated area is visually clean the final testing can be done.

#### **3.9.3 FINAL AIR CLEARANCE TESTING**

- A. After an acceptable final visual inspection by the VPIH/CIH and VA Representative, the VPIH/CIH will perform the final testing. Air samples will be collected and analyzed in accordance with procedures for PCM in this specification. If the release criteria are not met, the Contractor shall repeat the final cleaning and continue decontamination procedures. Additional inspection and testing will be done at the expense of the Contractor.
- B. If the results of the PCM are acceptable, remove the critical barriers. Any small quantities of residue material found upon removal of the poly shall be removed with a HEPA vacuum and localized isolation. If significant quantities are found as determined by the VPIH/CIH, then the entire area affected shall be cleaned as specified in the final cleaning.

- C. When release criteria are met, proceed to perform the abatement closeout and to issue the certificate of completion in accordance with these specifications.

#### **3.9.4 FINAL AIR CLEARANCE PROCEDURES**

- A. Contractor's Release Criteria: Work in a regulated area is complete when the regulated area is visually clean and airborne fiber levels have been reduced to or below 0.01 f/cc as measured with PCM methods.
- B. Air Monitoring and Final Clearance Sampling: To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to the specified level, the VPIH/CIH will secure samples and analyze them according to the following procedures:
1. Fibers Counted: "Fibers" referred to in this section shall be either all fibers regardless of composition as counted in the NIOSH 7400 PCM method.
  2. Aggressive Sampling: All final air testing samples shall be collected using aggressive sampling techniques. Samples will be collected on 0.8 $\mu$  MCE filters for PCM analysis and 0.45 $\mu$  Polycarbonate filters for TEM analysis. Before pumps are started, initiate aggressive sampling as detailed in 40 CFR 763 Subpart E (AHERA) Appendix A (III)(B)(7)(d). Air samples will be collected in areas subject to normal air circulation away from corners, obstructed locations, and locations near windows, doors, or vents. After air sampling pumps have been shut off, circulating fans shall be shut off.

#### **3.9.5 CLEARANCE SAMPLING USING PCM**

The NIOSH 7400 method will be used for clearance sampling with a minimum collection volume of 1200 Liters of air. A minimum of 5 PCM clearance samples will be collected.

#### **3.9.6 LABORATORY TESTING OF PCM SAMPLES**

The services of an AIHA accredited laboratory will be employed by the VA to perform analysis of the air samples. Samples will be sent by the VPIH/CIH so that verbal/faxed reports can be received within 24 hours. A complete record, certified by the laboratory, of all air monitoring tests and results will be furnished to the VA's representative and the Contractor.

**3.10 ABATEMENT CLOSEOUT AND CERTIFICATE OF COMPLIANCE****3.10.1 COMPLETION OF ABATEMENT WORK**

After thorough decontamination, complete asbestos abatement work upon meeting the regulated area clearance criteria and fulfilling the following:

- A. Remove all equipment, materials, and debris from the project area.
- B. Package and dispose of all asbestos waste as required.
- C. Repair or replace all interior finishes damaged during the abatement work.
- D. Fulfill other project closeout requirements as specified elsewhere in this specification.

**3.10.2 CERTIFICATE OF COMPLETION BY CONTRACTOR**

The CPIH shall complete and sign the "Certificate of Completion" in accordance with Attachment 1 at the completion of the abatement and decontamination of the regulated area.

**3.10.3 WORK SHIFTS**

All work shall be done during administrative hours (8:00 AM to 4:30 PM) Monday - Friday excluding Federal Holidays. Any change in the work schedule must be approved in writing by the VA Representative.

**3.10.4 RE-INSULATION**

If required as part of the contract, replace all asbestos containing insulation with suitable non-asbestos material. Provide MSDS's for all replacement materials. Refer to Section 23 07 11, HVAC, PLUMBING, AND BOILER PLANT INSULATION.

**ATTACHMENT #1****CERTIFICATE OF COMPLETION**

DATE:

PROJECT NAME:

VAMC/ADDRESS:

1. I certify that I have personally inspected, monitored and supervised the abatement work of  
(specify regulated area or Building):  
which took place from to.
2. That throughout the work all applicable requirements/regulations and the VA's specifications were met.
3. That any person who entered the regulated area was protected with the appropriate personal protective equipment and respirator and that they followed the proper entry and exit procedures and the proper operating procedures for the duration of the work.
4. That all employees of the Abatement Contractor engaged in this work were trained in respiratory protection, were experienced with abatement work, had proper medical surveillance documentation, were fit-tested for their respirator, and were not exposed at any time during the work to asbestos without the benefit of appropriate respiratory protection.
5. That I performed and supervised all inspection and testing specified and required by applicable regulations and VA specifications.
6. That the conditions inside the regulated area were always maintained in a safe and healthy condition and the maximum fiber count never exceeded 0.5 f/cc, except as described below.
7. That all glovebag work was done in accordance with OSHA requirements and the manufacturer's recommendations.

CPIH Name:

Signature/Date:

Asbestos Abatement Contractor's Name:

Signature/Date:

**ATTACHMENT #2****CERTIFICATE OF WORKER'S ACKNOWLEDGMENT****DATE:**

PROJECT NAME:

PROJECT ADDRESS:

ABATEMENT CONTRACTOR'S NAME:

**WORKING WITH ASBESTOS CAN BE HAZARDOUS TO YOUR HEALTH. INHALING ASBESTOS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCERS. IF YOU SMOKE AND INHALE ASBESTOS FIBERS YOUR CHANCES OF DEVELOPING LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.**

Your employer's contract with the owner for the above project requires that: You must be supplied with the proper personal protective equipment including an adequate respirator and be trained in its use. You must be trained in safe and healthy work practices and in the use of the equipment found at an asbestos abatement project. You must receive/have a current medical examination for working with asbestos. These things shall be provided at no cost to you. By signing this certificate you are indicating to the owner that your employer has met these obligations.

**RESPIRATORY PROTECTION:** I have been trained in the proper use of respirators and have been informed of the type of respirator to be used on the above indicated project. I have a copy of the written Respiratory Protection Program issued by my employer. I have been provided for my exclusive use, at no cost, with a respirator to be used on the above indicated project.

**TRAINING COURSE:** I have been trained by a third party, State/EPA accredited trainer in the requirements for an AHERA/OSHA Asbestos Abatement Worker training course, 32 hours minimum duration. I currently have a valid State accreditation certificate. The topics covered in the course include, as a minimum, the following:

- Physical Characteristics and Background Information on Asbestos
- Potential Health Effects Related to Exposure to Asbestos
- Employee Personal Protective Equipment
- Establishment of a Respiratory Protection Program
- State of the Art Work Practices
- Personal Hygiene
- Additional Safety Hazards
- Medical Monitoring
- Air Monitoring
- Relevant Federal, State and Local Regulatory Requirements, Procedures, and Standards
- Asbestos Waste Disposal

**MEDICAL EXAMINATION:** I have had a medical examination within the past 12 months which was paid for by my employer. This examination included: health history, occupational history, pulmonary function test, and may have included a chest x-ray evaluation. The physician issued a positive written opinion after the examination.

Signature:

Social Security Number:

Printed Name:

Witness:

**ATTACHMENT #3****AFFIDAVIT OF MEDICAL SURVEILLANCE, RESPIRATORY PROTECTION AND  
TRAINING/ACCREDITATION**

VA PROJECT NAME AND NUMBER:

VA MEDICAL FACILITY:

ABATEMENT CONTRACTOR'S NAME AND ADDRESS:

1. I verify that the following individual

Name:

Social Security Number:

who is proposed to be employed in asbestos abatement work associated with the above project by the named Abatement Contractor, is included in a medical surveillance program in accordance with 29 CFR 1926.1101(m), and that complete records of the medical surveillance program as required by 29 CFR 1926.1101(m)(n) and 29 CFR 1910.20 are kept at the offices of the Abatement Contractor at the following address.

Address:

2. I verify that this individual has been trained, fit-tested and instructed in the use of all appropriate respiratory protection systems and that the person is capable of working in safe and healthy manner as expected and required in the expected work environment of this project.
3. I verify that this individual has been trained as required by 29 CFR 1926.1101(k). This individual has also obtained a valid State accreditation certificate. Documentation will be kept on-site.
4. I verify that I meet the minimum qualifications criteria of the VA specifications for a CPIH.

Signature of CPIH:

Date:

Printed Name of CPIH:

Signature of Contractor:

Date:

Printed Name of Contractor:



**ATTACHMENT #4****ABATEMENT CONTRACTOR/COMPETENT PERSON(S) REVIEW AND ACCEPTANCE OF THE  
VA'S ASBESTOS SPECIFICATIONS**

VA Project Location:

VA Project #:

VA Project Description:

This form shall be signed by the Asbestos Abatement Contractor Owner and the Asbestos Abatement Contractor's Competent Person(s) prior to any start of work at the VA related to this Specification. If the Asbestos Abatement Contractor's/Competent Person(s) has not signed this form, they shall not be allowed to work on-site.

I, the undersigned, have read VA's Asbestos Specification regarding the asbestos abatement requirements. I understand the requirements of the VA's Asbestos Specification and agree to follow these requirements as well as all required rules and regulations of OSHA/EPA/DOT and State/Local requirements. I have been given ample opportunity to read the VA's Asbestos Specification and have been given an opportunity to ask any questions regarding the content and have received a response related to those questions. I do not have any further questions regarding the content, intent and requirements of the VA's Asbestos Specification.

At the conclusion of the asbestos abatement, I will certify that all asbestos abatement work was done in accordance with the VA's Asbestos Specification and all ACM was removed properly and no fibrous residue remains on any abated surfaces.

Abatement Contractor Owner's Signature

Date

Abatement Contractor Competent Person(s)

Date

Date

Date

- E N D -

**SECTION 03 30 00  
CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

This section specifies cast-in-place structural concrete and materials and mixes for other concrete.

**1.2 RELATED WORK:**

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

**1.3 TESTING AGENCY FOR CONCRETE MIX DESIGN:**

- A. Testing agency retained and reimbursed by the Contractor and approved by Contracting Officer's Technical Representative(COTR).
- B. Testing agency maintaining active participation in Program of Cement and Concrete Reference Laboratory (CCRL) of National Institute of Standards and Technology.
- C. Testing agency shall furnish equipment and qualified technicians to establish proportions of ingredients for concrete mixes.

**1.4 TOLERANCES:**

- A. Formwork: ACI 117, except the elevation tolerance of formed surfaces before removal of shores is +0 mm (+0 inch) and -20 mm (-3/4 inch).
- B. Reinforcement Fabricating and Placing: ACI 117, except that fabrication tolerance for bar sizes Nos. 10, 13, and 16 (Nos. 3, 4, and 5) (Tolerance Symbol 1 in Fig. 2.1(a), ACI, 117) used as column ties or stirrups is +0 mm (+0 inch) and -13 mm (-1/2 inch) where gross bar length is less than 3600 mm (12 feet), or +0 mm (+0 inch) and -20 mm (-3/4 inch) where gross bar length is 3600 mm (12 feet) or more.
- C. Cross-Sectional Dimension: ACI 117, except tolerance for thickness of slabs 12 inches or less is +20 mm (+3/4 inch) and - 6 mm (-1/4 inch). Tolerance of thickness of beams more than 300 mm (12 inch) but less than 900 mm (3 feet) is +20 mm (+3/4 inch) and -10 mm (-3/8 inch).
- D. Slab Finishes: ACI 117, Section 4.5.6, F-number method in accordance with ASTM E1155, except as follows:
1. Test entire slab surface, including those areas within 600 mm (2 feet) of construction joints and vertical elements that project through slab surface.
  2. Maximum elevation change which may occur within 600 mm (2 feet) of any column or wall element is 6 mm (0.25 inches).

3. Allow sample measurement lines that are perpendicular to construction joints to extend past joint into previous placement no further than 1500 mm (5 feet).

#### **1.5 REGULATORY REQUIREMENTS:**

- A. ACI SP-66 - ACI Detailing Manual.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. ACI 301 - Standard Specifications for Structural Concrete.

#### **1.6 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Shop Drawings: Reinforcing steel: Complete shop drawings
- C. Mill Test Reports:
  1. Reinforcing Steel.
  2. Cement.
- D. Manufacturer's Certificates:
  1. Abrasive aggregate.
  2. Lightweight aggregate for structural concrete.
  3. Air-entraining admixture.
  4. Chemical admixtures, including chloride ion content.
  5. Waterproof paper for curing concrete.
  6. Liquid membrane-forming compounds for curing concrete.
  7. Non-shrinking grout.
  8. Liquid hardener.
  9. Waterstops.
  10. Expansion joint filler.
  11. Adhesive binder.
- E. Testing Agency for Concrete Mix Design: Approval request including qualifications of principals and technicians and evidence of active participation in program of Cement and Concrete Reference Laboratory (CCRL) of National Institute of Standards and Technology.
- F. Test Report for Concrete Mix Designs: Trial mixes including water-cement fly ash ratio curves, concrete mix ingredients, and admixtures.
- F. Shoring and Reshoring Sequence: Submit for approval a shoring and reshoring sequence for flat slab/flat plate portions, prepared by a registered Professional Engineer. As a minimum, include timing of form stripping, reshoring, number of floors to be reshored and timing of reshore removal to serve as an initial outline of procedures subject to modification as construction progresses. Submit revisions to sequence, whether initiated by COTR (see FORMWORK) or Contractor.

**1.7 DELIVERY, STORAGE, AND HANDLING:**

- A. Conform to ACI 304. Store aggregate separately for each kind or grade, to prevent segregation of sizes and avoid inclusion of dirt and other materials.
- B. Deliver cement in original sealed containers bearing name of brand and manufacturer, and marked with net weight of contents. Store in suitable watertight building in which floor is raised at least 300 mm (1 foot) above ground. Store bulk cement and fly ash in separate suitable bins.
- C. Deliver other packaged materials for use in concrete in original sealed containers, plainly marked with manufacturer's name and brand, and protect from damage until used.

**1.8 PRE-CONCRETE CONFERENCE:**

- A. General: At least 15 days prior to submittal of design mixes, conduct a meeting to review proposed methods of concrete construction to achieve the required results.
- B. Agenda: Includes but is not limited to:
  - 1. Submittals.
  - 2. Coordination of work.
  - 3. Availability of material.
  - 4. Concrete mix design including admixtures.
  - 5. Methods of placing, finishing, and curing.
  - 6. Finish criteria required to obtain required flatness and levelness.
  - 7. Timing of floor finish measurements.
  - 8. Material inspection and testing.
- C. Attendees: Include but not limited to representatives of Contractor; subcontractors involved in supplying, conveying, placing, finishing, and curing concrete; lightweight aggregate manufacturer; admixture manufacturers; COTR; Consulting Engineer; Department of Veterans Affairs retained testing laboratories for concrete testing and finish (F-number) verification.
- D. Minutes of the meeting: Contractor shall take minutes and type and distribute the minutes to attendees within five days of the meeting.

**1.9 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Concrete Institute (ACI):
  - 117-06.....Tolerances for Concrete Construction and Materials

- 211.1-02.....Selecting Proportions for Normal, Heavyweight,  
and Mass Concrete
- 211.2-04.....Selecting Proportions for Structural Lightweight  
Concrete
- 214R-02.....Evaluation of Strength Test Results of Concrete
- 301-05.....Structural Concrete
- 304R-2000.....Guide for Measuring, Mixing, Transporting, and  
Placing Concrete
- 305R-06.....Hot Weather Concreting
- 306R-(2002).....Cold Weather Concreting
- 308R-(2001).....Standard Practice for Curing Concrete
- 309R-05.....Guide for Consolidation of Concrete
- 31808.....Building Code Requirements for Reinforced  
Concrete and Commentary
- 347R-04.....Guide to Formwork for Concrete
- SP-66-04.....ACI Detailing Manual
- C. American National Standards Institute and American Hardboard Association  
(ANSI/AHA):
- A135.4-2004.....Basic Hardboard
- D. American Society for Testing and Materials (ASTM):
- A82/A82M-07.....Steel Wire, Plain, for Concrete Reinforcement
- A185/185M-07.....Steel Welded Wire Fabric, Plain, for Concrete  
Reinforcement
- A615/A615M-08.....Deformed and Plain Billet-Steel Bars for  
Concrete Reinforcement
- A653/A653M-07.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-  
Iron Alloy-Coated (Galvannealed) by the Hot-Dip  
Process
- A706/A706M-06.....Low-Alloy Steel Deformed and Plain Bars for  
Concrete Reinforcement
- A767/A767M-05.....Zinc-Coated (Galvanized) Steel Bars for Concrete  
Reinforcement
- A775/A775M-07.....Epoxy-Coated Reinforcing Steel Bars
- A820-06.....Steel Fibers for Fiber-Reinforced Concrete
- A996/A996M-06.....Rail-Steel and Axle-Steel Deformed Bars for  
Concrete Reinforcement
- C31/C31M-08.....Making and Curing Concrete Test Specimens in the  
field
- C33-07.....Concrete Aggregates

C39/C39M-05.....	Compressive Strength of Cylindrical Concrete Specimens
C94/C94M-07.....	Ready-Mixed Concrete
C143/C143M-05.....	Slump of Hydraulic Cement Concrete
C150-07.....	Portland Cement
C171-07.....	Sheet Materials for Curing Concrete
C172-07.....	Sampling Freshly Mixed Concrete
C173-07.....	Air Content of Freshly Mixed Concrete by the Volumetric Method
C192/C192M-07.....	Making and Curing Concrete Test Specimens in the Laboratory
C231-08.....	Air Content of Freshly Mixed Concrete by the Pressure Method
C260-06.....	Air-Entraining Admixtures for Concrete
C309-07.....	Liquid Membrane-Forming Compounds for Curing Concrete
C330-05.....	Lightweight Aggregates for Structural Concrete
C494/C494M-08.....	Chemical Admixtures for Concrete
C496-06.....	Splitting Tensile Strength of Cylindrical Concrete Specimens
C567-05.....	Density of Structural Lightweight Concrete
C618-05.....	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
C666/C666M-03.....	Resistance of Concrete to Rapid Freezing and Thawing
C881/C881M-02.....	Epoxy-Resin-Base Bonding Systems for Concrete
C1107/1107M-07.....	Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
D6-95(R2006).....	Loss on Heating of Oil and Asphaltic Compounds
D297-93(R2006).....	Rubber Products-Chemical Analysis
D1751-04.....	Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
D4397-02.....	Polyethylene Sheeting for Construction, Industrial and Agricultural Applications
E1155-96(R2008).....	Determining $F_F$ Floor Flatness and $F_L$ Floor Levelness Numbers
E. American Welding Society (AWS):	
D1.4-05.....	Structural Welding Code - Reinforcing Steel

- F. Concrete Reinforcing Steel Institute (CRSI):  
Handbook 2008
- G. National Cooperative Highway Research Program (NCHRP):  
Report On.....Concrete Sealers for the Protection of Bridge  
Structures
- H. U. S. Department of Commerce Product Standard (PS):  
PS 1.....Construction and Industrial Plywood  
PS 20.....American Softwood Lumber
- I. U. S. Army Corps of Engineers Handbook for Concrete and Cement:  
CRD C513.....Rubber Waterstops  
CRD C572.....Polyvinyl Chloride Waterstops

## **PART 2 - PRODUCTS:**

### **2.1 MATERIALS:**

- A. Portland Cement: ASTM C150 Type I or II.
- B. Fly Ash: ASTM C618, Class C or F including supplementary optional requirements relating to reactive aggregates and alkalis, and loss on ignition (LOI) not to exceed 5 percent.
- C. Coarse Aggregate: ASTM C33.
  - 1. Size 67 or Size 467 may be used for footings and walls over 300 mm (12 inches) thick.
  - 2. Coarse aggregate for applied topping, encasement of steel columns, and metal pan stair fill shall be Size 7.
  - 3. Maximum size of coarse aggregates not more than one-fifth of narrowest dimension between sides of forms, one-third of depth of slabs, nor three-fourth of minimum clear spacing between reinforcing bars.
- D. Lightweight Aggregates for Structural Concrete: ASTM C330, Table 1.  
Maximum size of aggregate not larger than one-fifth of narrowest dimension between forms, nor three-fourth of minimum clear distance between reinforcing bars. Contractor to furnish certified report to verify that aggregate is sound and durable, and has a durability factor of not less than 80 based on 300 cycles of freezing and thawing when tested in accordance with ASTM C666.
- E. Fine Aggregate: ASTM C33. Fine aggregate for applied concrete floor topping shall pass a 4.75 mm (No. 4) sieve, 10 percent maximum shall pass a 150  $\mu$ m (No. 100) sieve.
- F. Mixing Water: Fresh, clean, and potable.
- G. Admixtures:
  - 1. Water Reducing Admixture: ASTM C494, Type A and not contain more chloride ions than are present in municipal drinking water.

2. Water Reducing, Retarding Admixture: ASTM C494, Type D and not contain more chloride ions than are present in municipal drinking water.
3. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C494, Type F or G, and not contain more chloride ions than are present in municipal drinking water.
4. Non-Corrosive, Non-Chloride Accelerator: ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. Admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory of at least one year duration using an acceptable accelerated corrosion test method such as that using electrical potential measures.
5. Air Entraining Admixture: ASTM C260.
6. Prohibited Admixtures: Calcium chloride, thiocyanate or admixtures containing more than 0.05 percent chloride ions are not permitted.
7. Certification: Written conformance to the requirements above and the chloride ion content of the admixture prior to mix design review.
- H. Reinforcing Steel: ASTM A615, or ASTM A996, deformed, grade as shown.
- I. Welded Wire Fabric: ASTM A185.
- J. Supports, Spacers, and Chairs: Types which will hold reinforcement in position shown in accordance with requirements of ACI 318 except as specified.
- K. Expansion Joint Filler: ASTM D1751.
- L. Sheet Materials for Curing Concrete: ASTM C171.
- M. Liquid Membrane-forming Compounds for Curing Concrete: ASTM C309, Type I, with fugitive dye. Compound shall be compatible with scheduled surface treatment, such as paint and resilient tile, and shall not discolor concrete surface.
- N. Liquid Densifier/Sealer: 100% active colorless aqueous silicate solution.
- O. Penetrating Sealer: For use on parking garage ramps and decks. High penetration silane sealer providing minimum 95 percent screening per National Cooperative Highway Research Program (NCHRP) No. 244 standards for chloride ion penetration resistance. Requires moist (non-membrane) curing of slab.
- P. Adhesive Binder: ASTM C881.
  1. Porous Backfill: Crushed stone or gravel graded from 25 mm to 20 mm (1 inch to 3/4 inch).
  2. Epoxy Joint Filler: Two component, 100 percent solids compound, with a minimum shore D hardness of 50.



**2.2 CONCRETE MIXES:**

A. Mix Designs: Proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318.

1. If trial mixes are used, make a set of at least 6 cylinders in accordance with ASTM C192 for test purposes from each trial mix; test three for compressive strength at 7 days and three at 28 days.
2. Submit a report of results of each test series, include a detailed listing of the proportions of trial mix or mixes, including cement, fly ash, admixtures, weight of fine and coarse aggregate per m<sup>3</sup> (cubic yard) measured dry rodded and damp loose, specific gravity, fineness modulus, percentage of moisture, air content, water-cement -fly ash ratio, and consistency of each cylinder in terms of slump. Include dry unit weight of lightweight structural concrete.
3. Prepare a curve showing relationship between water-cement -fly ash ratio at 7-day and 28-day compressive strengths. Plot each curve using at least three specimens.
4. If the field experience method is used, submit complete standard deviation analysis.

B. Fly Ash Testing: Submit certificate verifying conformance with specifications initially with mix design and for each truck load of fly ash delivered from source. Notify COTR immediately when change in source is anticipated. Prior to beginning trial mixes submit to the COTR the following representative samples of material to be used, properly identified source and project description and number, type of testing (complete chemical and physical), suitably packaged for shipment, and addressed as specified. Allow 60 calendar days for test results after submittal of sample.

1. Fly ash - 2.25 kg (five pounds).
2. Portland cement - 3.5 kg (8 pounds):

Address -Waterways Experiment Station (WES)  
3909 Halls Ferry Road  
Vicksburg, MS 39180-6199  
ATTN: Engineering Materials Group

C. After approval of mixes no substitution in material or change in proportions of approval mixes may be made without additional tests and approval of COTR or as specified. Making and testing of preliminary test cylinders may be carried on pending approval of cement and fly ash, providing Contractor and manufacturer certify that ingredients used in making test cylinders are the same. COTR may allow Contractor to proceed

with depositing concrete for certain portions of work, pending final approval of cement and fly ash and approval of design mix.

- D. Cement Factor: Maintain minimum cement factors in Table I regardless of compressive strength developed above minimums. Fly ash may be substituted for up to 20 percent of the minimum cement factor at option of Contractor, except fly ash may not be used in concrete designated as architectural concrete.

**TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE**

Concrete Strength		Non-Air- Entrained	Air-Entrained	
Min. 28 Day Comp. Str. MPa (psi)	Min. Cement kg/m <sup>3</sup> (lbs/c. yd)	Max. Water Cement Ratio	Min. Cement kg/m <sup>3</sup> (lbs/c. yd)	Max. Water Cement Ratio
35 (5000) <sup>1,3</sup>	375 (630)	0.45	385 (650)	0.40
30 (4000) <sup>1,3</sup>	325 (550)	0.55	340 (570)	0.50
25 (3000) <sup>1,3</sup>	280 (470)	0.65	290 (490)	0.55
25 (3000) <sup>1,2</sup>	300 (500)	*	310 (520)	*

1. If trial mixes are used, the proposed mix design shall achieve a compressive strength 8.3 MPa (1200 psi) in excess of f'c. For concrete strengths above 35 Mpa (5000 psi), the proposed mix design shall achieve a compressive strength 9.7 MPa (1400 psi) in excess of f'c.

2. Lightweight Structural Concrete. Pump mixes may require higher cement values.

3. For concrete exposed to high sulfate content soils maximum water cement ratio is 0.44.

\* Determined by Laboratory in accordance with ACI 211.1 for normal concrete or ACI 211.2 for lightweight structural concrete.

E. Maximum Slump: Maximum slump, as determined by ASTM C143 with tolerances as established by ASTM C94, for concrete to be vibrated shall be as shown in Table II.

**TABLE II - MAXIMUM SLUMP, MM (INCHES)\***

Type of Construction	Normal Weight Concrete	Lightweight Structural Concrete
Reinforced Footings and Substructure Walls	75mm (3 inches)	75 mm (3 inches)
Slabs, Beams, Reinforced Walls, and Building Columns	100 mm (4 inches)	100 mm (4 inches)

\* Slump may be increased by the use of the approved high-range water-reducing admixture (superplasticizer). Tolerances as established by ASTM C94. Concrete containing the high-range-water-reducing admixture may have a maximum slump of 225 mm (9 inches). The concrete shall arrive at the job site at a slump of 50 mm to 75 mm (2 inches to 3 inches), and 75 mm to 100 mm (3 inches to 4 inches) for lightweight concrete. This

should be verified, and then the high-range-water-reducing admixture added to increase the slump to the approved level.

- F. Air-Entrainment: Air-entrainment of normal weight concrete shall conform with Table III. Air-entrainment of lightweight structural concrete shall conform with Table IV. Determine air content by either ASTM C173 or ASTM C231.

**TABLE III - TOTAL AIR CONTENT  
FOR VARIOUS SIZES OF COARSE AGGREGATES (NORMAL CONCRETE)**

Nominal Maximum Size of Total Air Content	Coarse Aggregate, mm (Inches) Percentage by Volume
10 mm (3/8 in).6 to 10	13 mm (1/2 in).5 to 9
20 mm (3/4 in).4 to 8	25 mm (1 in).3-1/2 to 6-1/2
40 mm (1 1/2 in).3 to 6	

**TABLE IV  
AIR CONTENT OF LIGHTWEIGHT STRUCTURAL CONCRETE**

Nominal Maximum size of Total Air Content	Coarse Aggregate, mm's (Inches) Percentage by Volume
Greater than 10 mm (3/8 in) 4 to 8	10 mm (3/8 in) or less 5 to 9

- G. High early strength concrete, made with Type III cement or Type I cement plus non-corrosive accelerator, shall have a 7-day compressive strength equal to specified minimum 28-day compressive strength for concrete type specified made with standard Portland cement.
- H. Lightweight structural concrete shall not weigh more than air-dry unit weight shown. Air-dry unit weight determined on 150 mm by 300 mm (6 inch by 12 inch) test cylinders after seven days standard moist curing followed by 21 days drying at 23 degrees C  $\pm$  1.7 degrees C (73.4  $\pm$  3 degrees Fahrenheit), and 50 (plus or minus 7) percent relative humidity. Use wet unit weight of fresh concrete as basis of control in field.
- I. Concrete slabs placed at air temperatures below 10 degrees C (50 degrees Fahrenheit) use non-corrosive, non-chloride accelerator. Concrete required to be air entrained use approved air entraining admixture. Pumped concrete, synthetic fiber concrete, architectural concrete, concrete required to be watertight, and concrete with a water/cement ratio below 0.50 use high-range water-reducing admixture (superplasticizer).
- J. Durability: Use air entrainment for exterior exposed concrete subjected to freezing and thawing and other concrete shown or specified. Air content as shown in Table III or Table IV.

- K. Enforcing Strength Requirements: Test as specified in Section 01 45 29, TESTING LABORATORY SERVICES, during the progress of the work. Seven-day tests may be used as indicators of 28-day strength. Average of any three 28-day consecutive strength tests of laboratory-cured specimens representing each type of concrete shall be equal to or greater than specified strength. No single test shall be more than 3.5 MPa (500 psi) below specified strength. Interpret field test results in accordance with ACI 214. Should strengths shown by test specimens fall below required values, COTR may require any one or any combination of the following corrective actions, at no additional cost to the Government:
1. Require changes in mix proportions by selecting one of the other appropriate trial mixes or changing proportions, including cement content, of approved trial mix.
  2. Require additional curing and protection.
  3. If five consecutive tests fall below 95 percent of minimum values given in Table I or if test results are so low as to raise a question as to the safety of the structure, COTR may direct Contractor to take cores from portions of the structure. Use results from cores tested by the Contractor retained testing agency to analyze structure.
  4. If strength of core drilled specimens falls below 85 percent of minimum value given in Table I, COTR may order load tests, made by Contractor retained testing agency, on portions of building so affected. Load tests in accordance with ACI 318 and criteria of acceptability of concrete under test as given therein.
  5. Concrete work, judged inadequate by structural analysis, by results of load test, or for any reason, shall be reinforced with additional construction or replaced, if directed by the COTR.

### 2.3 BATCHING AND MIXING:

- A. General: Concrete shall be "Ready-Mixed" and comply with ACI 318 and ASTM C94, except as specified. Batch mixing at the site is permitted. Mixing process and equipment must be approved by COTR. With each batch of concrete, furnish certified delivery tickets listing information in Paragraph 16.1 and 16.2 of ASTM C94. Maximum delivery temperature of concrete is 38°C (100 degrees Fahrenheit). Minimum delivery temperature as follows:

Atmospheric Temperature	Minimum Concrete Temperature
-1. degrees to 4.4 degrees C (30 degrees to 40 degrees F)	15.6 degrees C (60 degrees F.)
-17 degrees C to -1.1 degrees C	21 degrees C (70 degrees F.)

(0 degrees to 30 degrees F.)	
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1. Services of aggregate manufacturer's representative shall be furnished during the design of trial mixes and as requested by the COTR for consultation during batching, mixing, and placing operations of lightweight structural concrete. Services will be required until field controls indicate that concrete of required quality is being furnished. Representative shall be thoroughly familiar with the structural lightweight aggregate, adjustment and control of mixes to produce concrete of required quality. Representative shall assist and advise COTR.

### **PART 3 - EXECUTION**

#### **3.1 PLACING REINFORCEMENT:**

- A. General: Details of concrete reinforcement in accordance with ACI 318 and ACI 315, unless otherwise shown.
- B. Placing: Place reinforcement conforming to CRSI DA4, unless otherwise shown.
  1. Place reinforcing bars accurately and tie securely at intersections and splices with 1.6 mm (16 gauge) black annealed wire. Secure reinforcing bars against displacement during the placing of concrete by spacers, chairs, or other similar supports. Portions of supports, spacers, and chairs in contact with formwork shall be made of plastic in areas that will be exposed when building is occupied. Type, number, and spacing of supports conform to ACI 315. Where concrete slabs are placed on ground, use concrete blocks or other non-corrodible material of proper height, for support of reinforcement. Use of brick or stone supports will not be permitted.
  2. Lap welded wire fabric at least 1 1/2 mesh panels plus end extension of wires not less than 300 mm (12 inches) in structural slabs. Lap welded wire fabric at least 1/2 mesh panels plus end extension of wires not less than 150 mm (6 inches) in slabs on grade.
- C. Bending: Bend bars cold, unless otherwise approved. Do not field bend bars partially embedded in concrete, except when approved by COTR.
- D. Cleaning: Metal reinforcement, at time concrete is placed, shall be free from loose flaky rust, mud, oil, or similar coatings that will reduce bond.
- E. Future Bonding: Protect exposed reinforcement bars intended for bonding with future work by wrapping with felt and coating felt with a bituminous compound unless otherwise shown.

**3.2 EXPANSION JOINTS:**

- A. Clean expansion joint surfaces before installing premolded filler and placing adjacent concrete.

**3.3 PLACING CONCRETE:**

- A. Preparation:

- 1. Remove hardened concrete, wood chips, shavings and other debris from forms.
  - 2. Remove hardened concrete and foreign materials from interior surfaces of mixing and conveying equipment.
  - 3. Have forms and reinforcement inspected and approved by COTR before depositing concrete.
  - 4. Provide runways for wheeling equipment to convey concrete to point of deposit. Keep equipment on runways which are not supported by or bear on reinforcement. Provide similar runways for protection of vapor barrier on coarse fill.

- B. Bonding: Before depositing new concrete on or against concrete which has been set, thoroughly roughen and clean existing surfaces of laitance, foreign matter, and loose particles.

- 1. Preparing surface for applied topping:

- a. Remove laitance, mortar, oil, grease, paint, or other foreign material by sand blasting. Clean with vacuum type equipment to remove sand and other loose material.
    - b. Broom clean and keep base slab wet for at least four hours before topping is applied.
    - c. Use a thin coat of one part Portland cement, 1.5 parts fine sand, bonding admixture; and water at a 50: 50 ratio and mix to achieve the consistency of thick paint. Apply to a damp base slab by scrubbing with a stiff fiber brush. New concrete shall be placed while the bonding grout is still tacky.

- C. Conveying Concrete: Convey concrete from mixer to final place of deposit by a method which will prevent segregation. Method of conveying concrete subject to approval of COTR.

- D. Placing: For special requirements see Paragraphs, HOT WEATHER and COLD WEATHER.

- 1. Do not place concrete when weather conditions prevent proper placement and consolidation, or when concrete has attained its initial set, or has contained its water or cement content more than 1 1/2 hours.

2. Deposit concrete in forms as near as practicable in its final position. Prevent splashing of forms or reinforcement with concrete in advance of placing concrete.
3. Do not drop concrete freely more than 3000 mm (10 feet) for concrete containing the high-range water-reducing admixture (superplasticizer) or 1500 mm (5 feet) for conventional concrete. Where greater drops are required, use a tremie or flexible spout (canvas elephant trunk), attached to a suitable hopper.
4. Discharge contents of tremies or flexible spouts in horizontal layers not exceeding 500 mm (20 inches) in thickness, and space tremies such as to provide a minimum of lateral movement of concrete.
5. Continuously place concrete until an entire unit between construction joints is placed. Rate and method of placing concrete shall be such that no concrete between construction joints will be deposited upon or against partly set concrete, after it's initial set has taken place, or after 45 minutes of elapsed time during concrete placement.
6. On bottom of members with severe congestion of reinforcement, deposit 25 mm (1 inch) layer of flowing concrete containing the specified high-range water-reducing admixture (superplasticizer). Successive concrete lifts may be a continuation of this concrete or concrete with a conventional slump.
7. Concrete on metal deck:
  - a. Concrete on metal deck shall be minimum thickness shown. Allow for deflection of steel beams and metal deck under the weight of wet concrete in calculating concrete quantities for slab.
    - 1) The Contractor shall become familiar with deflection characteristics of structural frame to include proper amount of additional concrete due to beam/deck deflection.
- E. Consolidation: Conform to ACI 309. Immediately after depositing, spade concrete next to forms, work around reinforcement and into angles of forms, tamp lightly by hand, and compact with mechanical vibrator applied directly into concrete at approximately 450 mm (18 inch) intervals. Mechanical vibrator shall be power driven, hand operated type with minimum frequency of 5000 cycles per minute having an intensity sufficient to cause flow or settlement of concrete into place. Vibrate concrete to produce thorough compaction, complete embedment of reinforcement and concrete of uniform and maximum density without segregation of mix. Do not transport concrete in forms by vibration.
  1. Use of form vibration shall be approved only when concrete sections are too thin or too inaccessible for use of internal vibration.



2. Carry on vibration continuously with placing of concrete. Do not insert vibrator into concrete that has begun to set.

### **3.7 HOT WEATHER:**

Follow the recommendations of ACI 305 or as specified to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete. Methods proposed for cooling materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by COTR.

### **3.8 COLD WEATHER:**

Follow the recommendations of ACI 306 or as specified to prevent freezing of concrete and to permit concrete to gain strength properly. Use only the specified non-corrosive, non-chloride accelerator. Do not use calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions. Methods proposed for heating materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by COTR.

### **3.9 PROTECTION AND CURING:**

- A. Conform to ACI 308: Initial curing shall immediately follow the finishing operation. Protect exposed surfaces of concrete from premature drying, wash by rain and running water, wind, mechanical injury, and excessively hot or cold temperatures. Keep concrete not covered with membrane or other curing material continuously wet for at least 7 days after placing, except wet curing period for high-early-strength concrete shall be not less than 3 days. Keep wood forms continuously wet to prevent moisture loss until forms are removed. Cure exposed concrete surfaces as described below. Other curing methods may be used if approved by COTR.
  1. Liquid curing and sealing compounds: Apply by power-driven spray or roller in accordance with the manufacturer's instructions. Apply immediately after finishing. Maximum coverage 10m<sup>2</sup>/L (400 square feet per gallon) on steel troweled surfaces and 7.5m<sup>2</sup>/L (300 square feet per gallon) on floated or broomed surfaces for the curing/sealing compound.
  2. Plastic sheets: Apply as soon as concrete has hardened sufficiently to prevent surface damage. Utilize widest practical width sheet and overlap adjacent sheets 50 mm (2 inches). Tightly seal joints with tape.

3. Paper: Utilize widest practical width paper and overlap adjacent sheets 50 mm (2 inches). Tightly seal joints with sand, wood planks, pressure-sensitive tape, mastic or glue.

### **3.10 CONCRETE FINISHES:**

#### **A. Slab Finishes:**

1. Monitoring and Adjustment: Provide continuous cycle of placement, measurement, evaluation and adjustment of procedures to produce slabs within specified tolerances. Monitor elevations of structural steel in key locations before and after concrete placement to establish typical deflection patterns for the structural steel. Determine elevations of cast-in-place slab soffits prior to removal of shores. Provide information to COTR and floor consultant for evaluation and recommendations for subsequent placements.
2. Set perimeter forms to serve as screed using either optical or laser instruments. For slabs on grade, wet screeds may be used to establish initial grade during strike-off, unless COTR determines that the method is proving insufficient to meet required finish tolerances and directs use of rigid screed guides. Where wet screeds are allowed, they shall be placed using grade stakes set by optical or laser instruments. Use rigid screed guides, as opposed to wet screeds, to control strike-off elevation for all types of elevated (non slab-on-grade) slabs. Divide bays into halves or thirds by hard screeds. Adjust as necessary where monitoring of previous placements indicates unshored structural steel deflections to other than a level profile.
3. Place slabs monolithically. Once slab placement commences, complete finishing operations within same day. Slope finished slab to floor drains where they occur, whether shown or not.
4. Use straightedges specifically made for screeding, such as hollow magnesium straightedges or power strike-offs. Do not use pieces of dimensioned lumber. Strike off and screed slab to a true surface at required elevations. Use optical or laser instruments to check concrete finished surface grade after strike-off. Repeat strike-off as necessary. Complete screeding before any excess moisture or bleeding water is present on surface. Do not sprinkle dry cement on the surface.
5. Immediately following screeding, and before any bleed water appears, use a 3000 mm (10 foot) wide highway straightedge in a cutting and filling operation to achieve surface flatness. Do not use bull floats or darbys, except that darbying may be allowed for narrow slabs and restricted spaces.

6. Wait until water sheen disappears and surface stiffens before proceeding further. Do not perform subsequent operations until concrete will sustain foot pressure with maximum of 6 mm (1/4 inch) indentation.
7. Float Finish: Slabs to receive unbonded toppings, steel trowel finish, fill, mortar setting beds, or a built-up roof, and ramps, stair treads, platforms (interior and exterior), and equipment pads shall be floated to a smooth, dense uniform, sandy textured finish. During floating, while surface is still soft, check surface for flatness using a 3000 mm (10 foot) highway straightedge. Correct high spots by cutting down and correct low spots by filling in with material of same composition as floor finish. Remove any surface projections and re-float to a uniform texture.
8. Steel Trowel Finish: Concrete surfaces to receive resilient floor covering or carpet, monolithic floor slabs to be exposed to view in finished work, future floor roof slabs, applied toppings, and other interior surfaces for which no other finish is indicated. Steel trowel immediately following floating. During final troweling, tilt steel trowel at a slight angle and exert heavy pressure to compact cement paste and form a dense, smooth surface. Finished surface shall be smooth, free of trowel marks, and uniform in texture and appearance.
9. Finished slab flatness (FF) and levelness (FL) values comply with the following minimum requirements:
  - a. Areas covered with carpeting, or not specified otherwise in b. below:

Slab on Grade:	
Specified overall value	F <sub>F</sub> 25/F <sub>L</sub> 20
Minimum local value	F <sub>F</sub> 17/F <sub>L</sub> 15
Level suspended slabs (shored until after testing) and topping slabs:	
Specified overall value	FF 25/FL 20
Minimum local value	FF 17/FL 15
Unshored suspended slabs:	
Specified overall value	FF 25
Minimum local value	FF 17
  - b. Level tolerance such that 80 percent of all points fall within a 20 mm (3/4 inch) envelope +10 mm, -10 mm (+3/8 inch, -3/8 inch) from the design elevation.

- b. Areas that will be exposed, receive thin-set tile or resilient flooring, or roof areas designed as future floors:
- Slab on grade:
- |                         |             |
|-------------------------|-------------|
| Specified overall value | FF 36/FL 20 |
| Minimum local value     | FF 24/FL 15 |
- Level suspended slabs (shored until after testing) and topping slabs
- |                         |             |
|-------------------------|-------------|
| Specified overall value | FF 30/FL 20 |
| Minimum local value     | FF 24/FL 15 |
- Unshored suspended slabs:
- |                         |       |
|-------------------------|-------|
| Specified overall value | FF 30 |
| Minimum local value     | FF 24 |
- Level tolerance such that 80 percent of all points fall within a 20 mm (3/4 inch) envelope +10 mm, -10 mm (+3/8 inch, -3/8 inch) from the design elevation.
- c. "Specified overall value" is based on the composite of all measured values in a placement derived in accordance with ASTM E1155.
- d. "Minimum local value" (MLV) describes the flatness or levelness below which repair or replacement is required. MLV is based on the results of an individual placement and applies to a minimum local area. Minimum local area boundaries may not cross a construction joint or expansion joint. A minimum local area will be bounded by construction and/or control joints, or by column lines and/or half-column lines, whichever is smaller.
10. Measurements
- a. Department of Veterans Affairs retained testing laboratory will take measurements as directed by COTR, to verify compliance with  $F_F$ ,  $F_L$ , and other finish requirements. Measurements will occur within 72 hours after completion of concrete placement (weekends and holidays excluded). Make measurements before shores or forms are removed to insure the "as-built" levelness is accurately assessed. Profile data for above characteristics may be collected using a laser level or any Type II apparatus (ASTM E1155, "profileograph" or "dipstick"). Contractor's surveyor shall establish reference elevations to be used by Department of Veterans Affairs retained testing laboratory.
- b. Contractor not experienced in using  $F_F$  and  $F_L$  criteria is encouraged to retain the services of a floor consultant to assist with recommendations concerning adjustments to slab thicknesses,

finishing techniques, and procedures on measurements of the finish as it progresses in order to achieve the specific flatness and levelness numbers.

11. Acceptance/ Rejection:

- a. If individual slab section measures less than either of specified minimum local  $F_F/F_L$  numbers, that section shall be rejected and remedial measures shall be required. Sectional boundaries may be set at construction and contraction (control) joints, and not smaller than one-half bay.
- b. If composite value of entire slab installation, combination of all local results, measures less than either of specified overall  $F_F/F_L$  numbers, then whole slab shall be rejected and remedial measures shall be required.

12. Remedial Measures for Rejected Slabs: Correct rejected slab areas by grinding, planning, surface repair with underlayment compound or repair topping, retopping, or removal and replacement of entire rejected slab areas, as directed by COTR, until a slab finish constructed within specified tolerances is accepted.

**3.13 SURFACE TREATMENTS:**

- A. Use on exposed concrete floors and concrete floors to receive carpeting except those specified to receive non-slip finish.
- B. Liquid Densifier/Sealer: Apply in accordance with manufacturer's directions just prior to completion of construction.
- C. Non-Slip Finish: Except where safety nosing and tread coverings are shown, apply non-slip abrasive aggregate to treads and platforms of concrete steps and stairs, and to surfaces of exterior concrete ramps and platforms. Broadcast aggregate uniformly over concrete surface at rate of application of 8% per 1/10th  $m^2$  (7.5 percent per square foot) of area. Trowel concrete surface to smooth dense finish. After curing, rub treated surface with abrasive brick and water to slightly expose abrasive aggregate.

**3.14 APPLIED TOPPING:**

- A. Separate concrete topping on floor base slab of thickness and strength shown. Topping mix shall have a maximum slump of 200 mm (8 inches) for concrete containing a high-range water-reducing admixture (superplasticizer) and 100 mm (4 inches) for conventional mix. Neatly bevel or slope at door openings and at slabs adjoining spaces not receiving an applied finish.
- B. Placing: Place continuously until entire section is complete, struck off with straightedge, leveled with a highway straightedge or highway bull

float, floated and troweled by machine to a hard dense finish. Slope to floor drains as required. Do not start floating until free water has disappeared and no water sheen is visible. Allow drying of surface moisture naturally. Do not hasten by "dusting" with cement or sand.

**3.15 RESURFACING FLOORS:**

Remove existing flooring areas to receive resurfacing to expose existing structural slab and extend not less than 25 mm (1 inch) below new finished floor level. Prepare exposed structural slab surface by roughening, broom cleaning, and dampening. Apply specified bonding grout. Place topping while the bonding grout is still tacky.

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**SECTION 05 31 00  
STEEL DECKING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

This section specifies material and services required for installation of steel decking as shown and specified.

**1.2 RELATED WORK:**

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Finish Painting: Section 09 91 00, PAINTING.

**1.3 DESIGN REQUIREMENTS:**

- A. Design steel decking in accordance with AISI publication, "Specification for the Design of Cold-formed Steel Structural Members" except as otherwise shown or specified.
- B. Design all elements with the latest published version of applicable codes.

**1.4 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Shop and erection drawings showing decking unit layout, connections to supporting members, and similar information necessary for completing installation as shown and specified, including supplementary framing, sump pans, ridge and valley plates, cant strips, cut openings, special jointing or other accessories. Show welding, side lap, closure, deck reinforcing and closure reinforcing details. Show openings required for work of other trades, including openings not shown on structural drawings. Indicate where temporary shoring is required to satisfy design criteria.
- C. Manufacturer's Literature and Data: Showing steel decking section properties and specifying structural characteristics.
- D. Certification: For each type and gauge of metal deck supporting concrete slab or fill, furnish certification of the specified fire ratings. Certify that the units supplied are U.L. listed as a "Steel Floor and Form Unit".

**1.5 QUALITY ASSURANCE:**

- A. Underwriters' Label: Provide metal floor deck units listed in Underwriters' Laboratories "Fire Resistance Directory", with each deck unit bearing the UL label and marking for specific system detailed.

**1.6 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only. Refer to the latest edition of all referenced Standards and codes.
- B. American Society for Testing and Materials (ASTM):
- A36/A36M.....Standard Specification for Carbon Structural Steel
  - A611.....Standard Specification for Structural Steel SS), Sheet, Carbon, Cold-Rolled
  - A653/A653M.....Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process
  - C423.....Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- C. American Institute of Steel Construction (AISC):
- 1. Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design (ninth Edition, 1989)
  - 2. Load and Resistance Factor Design Specification for Structural Steel Buildings (Latest Edition)
- D. American Iron and Steel Institute (AISI):
- 1. Specification and Commentary for the Design of Cold-Formed Steel Structural Members
- E. American Welding Society (AWS):
- D1.3.....Structural Welding Code - Sheet Steel
- F. Factory Mutual (FM Global):
- 1. Loss Prevention Data Sheet 1-28: Wind Loads to Roof Systems and Roof Deck Securement
  - 2. Factory Mutual Research Approval Guide (Latest Edition)
- G. Military Specifications (Mil. Spec.)
- MIL-P-21035B.....Paint, High Zinc Dust Content, Galvanizing Repair

**PART 2 - PRODUCTS****2.1 MATERIALS:**

- A. Steel Decking: ASTM A653, Structural Quality, Grade C, D, or E.
- B. Galvanizing: ASTM A653, G60.
- C. Galvanizing Repair Paint: Mil. Spec. MIL-P-21035B.
- D. Miscellaneous Steel Shapes: ASTM A36.
- E. Welding Electrode: E60XX minimum.



F. Sheet Metal Accessories: ASTM A653, galvanized, unless noted otherwise. Provide accessories of every kind required to complete the installation of metal decking in the system shown. Finish sheet metal items to match deck including, but not limited to, the following items:

1. Metal Closure Strips: For openings between decking and other construction, of not less than 1.3 mm (18 gauge) sheet steel of the same quality as the deck units. Form to the configuration required to provide tight-fitting closures at open ends of flutes and sides of decking.

## **2.2 REQUIREMENTS:**

- A. Provide steel decking of the type, depth, gauge, and section properties as shown.
- B. Metal Form Deck - Type 1: Single pan fluted units utilized as a permanent form for reinforced concrete slabs. Comply with the depth and gauge requirements as shown on the Contract Documents.
  1. Finish: Galvanized G-60.
- C. Do not use steel deck for hanging supports for any type or kind of building components including suspended ceilings, electrical light fixtures, plumbing, heating, or air conditioning pipes or ducts or electrical conduits.

## **PART 3 - EXECUTION**

### **3.1 ERECTION:**

- A. Do not start installation of metal decking until corresponding steel framework has been plumbed, aligned and completed and until temporary shoring, where required, has been installed. Remove any oil, dirt, paint, ice, water and rust from steel surfaces to which metal decking will be welded.
- B. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- C. Do not use floor deck units for storage or working platforms until permanently secured. Do not overload deck units once placed. Replace any deck units that become damaged after erection and prior to casting concrete at no cost to the Government.
- D. Provide steel decking in sufficient lengths to extend over 3 or more spans, except for interstitial levels.
- E. Place steel decking units at right angles to supporting members. End laps of sheets of roof deck shall be a minimum of 50 mm (2 inches) and shall occur over supports.

F. Fastening Deck Units:

1. Fasten floor deck units to steel supporting members by not less than 16 mm (5/8 inch) diameter puddle welds or elongated welds of equal strength, spaced not more than 305 mm (12 inches) o.c. with a minimum of two welds per unit at each support. Where two units abut, fasten each unit individually to the supporting steel framework.
2. Tack weld or use self-tapping No. 8 or larger machine screws at 915 mm (3 feet) o.c. for fastening end closures. Only use welds to attach longitudinal end closures.
3. Weld side laps of adjacent floor deck units that span more than 1524 mm (5 feet). Fasten at midspan or 915 mm (3 feet) o.c., whichever is smaller.
4. Fasten roof deck units to steel supporting members by not less than 16 mm (5/8 inch) diameter puddle welds or elongated welds of equal strength, spaced not more than 305 mm (12 inches) o.c. at every support, and at closer spacing where required for lateral force resistance by diaphragm action. Attach split or partial panels to the structure in every valley. In addition, secure deck to each supporting member in ribs where side laps occur. Power driven fasteners may be used in lieu of welding for roof deck if strength equivalent to the welding specified above is provided. Submit test data and design calculations verifying equivalent design strength.
5. Mechanically fasten side laps of adjacent roof deck units with spans greater than 1524 mm (5 feet) between supports, at intervals not exceeding 915 mm (3 feet) o.c., or midspan, whichever is closer, using self-tapping No. 8 or larger machine screws.
6. Provide any additional fastening necessary to comply with the requirements of Underwriters Laboratories and/or Factory Mutual to achieve the required ratings.
7. Uplift Loading: Install and anchor roof deck units to resist gross uplift loading of 2.1 kPa (45 psf) at eave overhang and 1.4 kPa (30 psf) for other roof areas.

G. Cutting and Fitting:

1. Cut all metal deck units to proper length in the shop prior to shipping.
2. Field cutting by the metal deck erector is restricted to bevel cuts, notching to fit around columns and similar items, and cutting openings that are located and dimensioned on the Structural Drawings.

3. Other penetrations shown on the approved metal deck shop drawings but not shown on the Structural Drawings are to be located, cut and reinforced by the trade requiring the opening.
4. Make all cuts neat and trim using a metal saw, drill or punchout device; cutting with torches is expressly prohibited.
5. Do not make any cuts in the metal deck that are not shown on the approved metal deck drawings. If an additional opening not shown on the approved shop drawings is required, submit a sketch, to scale, locating the required new opening and any other openings and supports in the immediate area. Do not cut the opening until the sketch has been reviewed and accepted by the Contracting Officer's Technical Representative(COTR). Provide any additional reinforcing or framing required for the opening at no cost to the Government. Failure to comply with these requirements is cause for rejection of the work and removal and replacement of the affected metal deck.
6. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.

### **3.2 WELDING:**

Welds shall be made only by welders and welding operators who have been previously qualified by tests as prescribed in AWS D1.3.

### **3.3 FIELD REPAIR:**

1. Areas scarred during erection.
2. Welds to be thoroughly cleaned and touched-up. Touch-up paint for zinc-coated units shall be zinc rich galvanizing repair paint.

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**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies items and assemblies fabricated from structural steel shapes and other materials as shown and specified.
- B. Items specified.
  - 1. Support for Wall and Ceiling Mounted Items.
  - 2. Miscellaneous Frames.
  - 3. Edge Guard Angles.
  - 4. Loose Lintels.
  - 5. Shelf Angles.
  - 6. Miscellaneous Steel supports.

**1.2 RELATED WORK**

- A. Colors, finishes, and textures: Refer to Drawing Sheet IN-601, FINISH SCHEDULE.
- B. Prime and finish painting: Section 09 91 00, PAINTING.
- C. Stainless steel corner guards: Section 10 26 00, WALL AND DOOR PROTECTION.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES
- B. Shop Drawings:
  - 1. Each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors.
  - 2. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
  - 3. Provide templates and rough-in measurements as required.
- C. Manufacturer's Certificates: Live load designs as specified.
- D. Design Calculations for specified live loads including dead loads.
- E. Furnish setting drawings and instructions for installation of anchors to be preset into concrete work and for the positioning of items having anchors to be built into concrete construction.

**1.4 QUALITY ASSURANCE**

- A. Each manufactured product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly manufacturing items of type specified.

- B. Each product type shall be the same and be made by the same manufacturer.
- C. Assembled product to the greatest extent possible before delivery to the site.
- D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.

#### 1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Mechanical Engineers (ASME):
  - B18.6.1-81(R1997).....Wood Screws
  - B18.2.2-87(R2005).....Square and Hex Nuts
- C. American Society for Testing and Materials (ASTM):
  - A36/A36M-05.....Structural Steel
  - A47-99(R2004).....Malleable Iron Castings
  - A48-03.....Gray Iron Castings
  - A53-06.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated  
Welded and Seamless
  - A123-02.....Zinc (Hot-Dip Galvanized) Coatings on Iron and  
Steel Products
  - A307-07.....Carbon Steel Bolts and Studs, 60,000 PSI Tensile  
Strength
  - A391/A391M-01.....Grade 80 Alloy Steel Chain
  - A653/A653M-07.....Steel Sheet, Zinc Coated (Galvanized) or Zinc-  
Iron Alloy Coated (Galvannealed) by the Hot-Dip  
Process
  - A786/A786M-05.....Rolled Steel Floor Plate
  - B456-03.....Electrodeposited Coatings of Copper Plus Nickel  
Plus Chromium and Nickel Plus Chromium
  - C1107-07.....Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
  - F436-07.....Hardened Steel Washers
  - F468-06.....Nonferrous Bolts, Hex Cap Screws, and Studs for  
General Use
  - F593-02.....Stainless Steel Bolts, Hex Cap Screws, and Studs
  - F1667-05.....Driven Fasteners: Nails, Spikes and Staples
- D. American Welding Society (AWS):
  - D1.1-04.....Structural Welding Code Steel
  - D1.2-03.....Structural Welding Code Aluminum

- D1.3-98.....Structural Welding Code Sheet Steel
- E. National Association of Architectural Metal Manufacturers (NAAMM)
  - AMP521-01.....Pipe Railing Manual
  - AMP 500-505-1988.....Metal Finishes Manual
  - MBG 531-00.....Metal Bar Grating Manual
  - MBG 532-00.....Heavy Duty Metal Bar Grating Manual
- F. Structural Steel Painting Council (SSPC):
  - SP 1-05.....No. 1, Solvent Cleaning
  - SP 2-05.....No. 2, Hand Tool Cleaning
  - SP 3-05.....No. 3, Power Tool Cleaning
- G. Federal Specifications (Fed. Spec):
  - RR-T-650E.....Treads, Metallic and Nonmetallic, Nonskid

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Structural Steel: ASTM A36.
- B. Floor Plate:
  - 1. Steel ASTM A786.
- C. Steel Pipe: ASTM A53.
  - 1. Type S, Grade A, unless specified otherwise.
  - 2. NPS (inside diameter) as shown.
- D. Primer Paint: As specified in Section 09 91 00, PAINTING.
- E. Grout: ASTM C1107, pourable type.

### **2.2 HARDWARE**

- A. Rough Hardware:
  - 1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electro-galvanizing process.
  - 2. Galvanized G-90 where specified.
- B. Fasteners:
  - 1. Bolts with Nuts:
    - a. ASME B18.2.2.
    - b. ASTM A307 for 415 MPa (60,000 psi) tensile strength bolts.
    - c. ASTM F468 for nonferrous bolts.
    - d. ASTM F593 for stainless steel.
  - 2. Screws: ASME B18.6.1.
  - 3. Washers: ASTM F436, type to suit material and anchorage.
  - 4. Nails: ASTM F1667, Type I, style 6 or 14 for finish work.

### **2.3 FABRICATION GENERAL**

- A. Material

1. Use material as specified. Use material of commercial quality and suitable for intended purpose for material that is not named or its standard of quality not specified.
2. Use material free of defects which could affect the appearance or service ability of the finished product.

B. Size:

1. Size and thickness of members as shown.
2. When size and thickness is not specified or shown for an individual part, use size and thickness not less than that used for the same component on similar standard commercial items or in accordance with established shop methods.

C. Connections

1. Except as otherwise specified, connections may be made by welding, riveting or bolting.
2. Field riveting will not be approved.
3. Design size, number and placement of fasteners, to develop a joint strength of not less than the design value.
4. Holes, for rivets and bolts: Accurately punched or drilled and burrs removed.
5. Size and shape welds to develop the full design strength of the parts connected by welds and to transmit imposed stresses without permanent deformation or failure when subject to service loadings.
6. Use Rivets and bolts of material selected to prevent corrosion (electrolysis) at bimetallic contacts. Plated or coated material will not be approved.
7. Use stainless steel connectors for removable members machine screws or bolts.

D. Fasteners and Anchors

1. Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
2. Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
3. Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
4. Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self drilling and tapping screws or bolts.

## E. Workmanship

### 1. General:

- a. Fabricate items to design shown.
- b. Furnish members in longest lengths commercially available within the limits shown and specified.
- c. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane.
- d. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items.
- e. Provide openings, cut-outs, and tapped holes for attachment and clearances required for work of other trades.
- f. Prepare members for the installation and fitting of hardware.
- g. Cut openings in floor plates for the passage of ducts, pipes, conduits and similar items. Provide reinforcement to support cut edges.
- h. Fabricate surfaces and edges free from sharp edges, burrs and projections which may cause injury.

### 2. Welding:

- a. Weld in accordance with AWS.
- b. Welds shall show good fusion, be free from cracks and porosity and accomplish secure and rigid joints in proper alignment.
- c. Where exposed in the finished work, continuous weld for the full length of the members joined and have depressed areas filled and protruding welds finished smooth and flush with adjacent surfaces.
- d. Finish welded joints to match finish of adjacent surface.

### 3. Joining:

- a. Miter or butt members at corners.
- b. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.

### 4. Anchors: Where metal fabrications are shown to be preset in concrete,

weld 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 150 mm (6 inches) long with 25 mm (one inch) hooked end, to back of member at 600 mm (2 feet) on center, unless otherwise shown.

### 5. Cutting and Fitting:

- a. Accurately cut, machine and fit joints, corners, copes, and miters.
- b. Fit removable members to be easily removed.
- c. Design and construct field connections in the most practical place for appearance and ease of installation.
- d. Fit pieces together as required.



- e. Fabricate connections for ease of assembly and disassembly without use of special tools.
  - f. Joints firm when assembled.
  - g. Conceal joining, fitting and welding on exposed work as far as practical.
  - h. Do not show rivets and screws prominently on the exposed face.
  - i. The fit of components and the alignment of holes shall eliminate the need to modify component or to use exceptional force in the assembly of item and eliminate the need to use other than common tools.
- F. Finish:
- 1. Finish exposed surfaces in accordance with NAAMM Metal Finishes Manual.
  - 2. Steel and Iron: NAAMM AMP 504.
    - a. Zinc coated (Galvanized): ASTM A123, G90 unless noted otherwise.
    - b. Surfaces exposed in the finished work:
      - 1) Finish smooth rough surfaces and remove projections.
      - 2) Fill holes, dents and similar voids and depressions with epoxy type patching compound.
    - c. Shop Prime Painting:
      - 1) Surfaces of Ferrous metal:
        - a) Items not specified to have other coatings.
        - b) Galvanized surfaces specified to have prime paint.
        - c) Remove all loose mill scale, rust, and paint, by hand or power tool cleaning as defined in SSPC-SP2 and SP3.
        - d) Clean of oil, grease, soil and other detrimental matter by use of solvents or cleaning compounds as defined in SSPC-SP1.
        - e) After cleaning and finishing apply one coat of primer as specified in Section 09 91 00, PAINTING.
      - 2) Non ferrous metals: Comply with MAAMM-500 series.
- G. Protection:
- 1. Insulate aluminum surfaces that will come in contact with concrete, masonry, or metals other than stainless steel or zinc by giving a coat of heavy-bodied alkali resisting bituminous paint or other approved paint in shop.
  - 2. Spot prime all abraded and damaged areas of zinc coating which expose the bare metal, using zinc rich paint on hot-dip zinc coat items and zinc dust primer on all other zinc coated items.

## **2.4 SUPPORTS**

### **A. General:**

1. Fabricate ASTM A36 structural steel shapes as shown.
2. Use clip angles or make provisions for welding hangers and braces to overhead construction.
3. Field connections may be welded or bolted.

### **B. For Wall Mounted Items:**

1. For items supported by metal stud partitions.
2. Steel strip or hat channel minimum of 1.5 mm (0.0598 inch) thick.
3. Steel strip minimum of 150 mm (6 inches) wide, length extending one stud space beyond end of item supported.
4. Steel hat channels where shown. Flange cut and flattened for anchorage to stud.
5. Structural steel tube or channel for grab bar at water closets floor to structure above with clip angles or end plates formed for anchors.
6. Use steel angles for thru wall counters. Drill angle for fasteners at ends and not over 100 mm (4 inches) on center between ends.

### **C. For Cubical Curtain Track:**

1. Fabricate assembly of steel angle as shown.
2. Drill angle bent ends for anchor screws to acoustical suspension system and angle for hanger wires.
3. Provide pipe sleeve welded to angle.

### **D. Supports at Ceiling for Radiographic (x-ray) Equipment:**

1. Fabricate hangers braces, and track of modular channel units assembly as shown.
2. Fabricate steel plates for anchor to structure above.
3. Drill bent plates for bolting at mid height at concrete beams.

### **E. For Overhead Lights requiring structural supports:**

1. Fabricate as shown to suit equipment furnished.
2. Drill leveling plate for light fixture bolts.

## **2.5 MISCELLANEOUS FRAMES**

### **A. Structural Frames for Lead Lined Doors:**

1. Obtain accurate dimensions and templates from suppliers of lead lined doors, finish hardware, and hollow steel door frames. Coordinate with Section 08 11 13, HOLLOW METAL FRAMES, and Section 13 49 00, RADIATION PROTECTION.
2. Fabricate as shown for use in connection with lead lined frames.
3. Extend angles at jambs from floor to structural slab above. At floors of interstitial spaces, terminate jamb sections and provide anchors as shown.

4. Continuously weld plates and reinforcements to frame members and head members of angle frames between jambs.

## **2.6 GUARDS**

### **A. Edge Guard Angles for Openings in Slabs:**

1. Fabricate from steel angles of sizes and with anchorage shown.
2. Where size of angle is not shown, provide 50 x 50 x 6 mm (2 x 2 x 1/4 inch) steel angle with 32 x 5 mm (1-1/4 x 3/16 inch) strap anchors, welded to back.
3. Miter or butt angles at corners and weld.
4. Use one anchor near end and three feet on centers between end anchors.

## **2.7 LOOSE LINTELS**

- A. Furnish lintels of sizes shown. Where size of lintels is not shown, provide the sizes specified.
- B. Fabricate lintels with not less than 150 mm (6 inch) bearing at each end for nonbearing masonry walls, and 200 mm (8 inch) bearing at each end for bearing walls.
- C. Provide one angle lintel for each 100 mm (4 inches) of masonry thickness as follows except as otherwise specified or shown.
  1. Openings 750 mm to 1800 mm (2-1/2 feet to 6 feet) - 100 x 90 x 8 mm (4 x 3-1/2 x 5/16 inch).
  2. Openings 1800 mm to 3000 mm (6 feet to 10 feet) - 150 x 90 x 9 mm (6 x 3-1/2 x 3/8 inch).
- D. For 150 mm (6 inch) thick masonry openings 750 mm to 3000 mm (2-1/2 feet to 10 feet) use one angle 150 x 90 x 9 mm (6 x 3-1/2 x 3/8 inch).
- E. Provide bearing plates for lintels where shown.
- F. Weld or bolt upstanding legs of double angle lintels together with 19 mm (3/4 inch bolts) spaced at 300 mm (12 inches) on centers.
- G. Insert spreaders at bolt points to separate the angles for insertion of metal windows, louver, and other anchorage.
- H. Where shown or specified, punch upstanding legs of single lintels to suit size and spacing of anchor bolts.

## **2.8 SHELF ANGLES**

- A. Fabricate from steel angles of size shown.
- B. Fabricate angles with horizontal slotted holes for 19 mm (3/4 inch) bolts spaced at not over 900 mm (3 feet) on centers and within 300 mm (12 inches) of ends.
- C. Provide adjustable malleable iron inserts for embedding in concrete framing.

**PART 3 - EXECUTION****3.1 INSTALLATION, GENERAL**

- A. Set work accurately, in alignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Items set into concrete:
  - 1. Provide temporary bracing for such items until concrete is set.
  - 2. Place in accordance with setting drawings and instructions.
- C. Set frames of corner guards and similar items flush with finish floor or wall surface and, where applicable, flush with side of opening.
- D. Field weld in accordance with AWS.
  - 1. Design and finish as specified for shop welding.
  - 2. Use continuous weld unless specified otherwise.
- E. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to building construction as specified. Power actuated drive pins may be used except for removable items and where members would be deformed or substrate damaged by their use.
- F. Spot prime all abraded and damaged areas of zinc coating as specified and all abraded and damaged areas of shop prime coat with same kind of paint used for shop priming.
- G. Isolate aluminum from dissimilar metals and from contact with concrete and masonry materials as required to prevent electrolysis and corrosion.
- H. Secure escutcheon plate with set screw.

**3.2 INSTALLATION OF SUPPORTS**

- A. Anchorage to Structure:
  - 1. Secure angles or channels and clips to overhead structural steel by continuous welding unless bolting is shown.
  - 2. Secure supports to concrete inserts by bolting or continuous welding as shown.
  - 3. Secure supports with expansion bolts to mid height of concrete beams and to slabs when inserts do not exist, unless shown otherwise.
  - 4. Secure steel plate or hat channels to studs as detailed.
- B. Supports for Wall Mounted items:
  - 1. Locate center of support at anchorage point of supported item.
  - 2. Locate support at top and bottom of wall hung cabinets.
  - 3. Locate support at top of floor cabinets and shelving installed against walls.
  - 4. Locate supports where required for items shown.

**3.3 MISCELLANEOUS FRAMES FOR LEAD LINED DOORS**

- A. Secure jamb angle clips and plates, at top and bottom with two, 9 mm (3/8 inch) expansion bolts to concrete.
- B. Secure 150 x 90 x 13 mm (6 x 3-1/2 x 1/2 inch) angle to steel framing for anchorage when expansion bolts to concrete is not possible.
- C. Secure clips by welding to steel.
- D. At interstitial spaces, anchor jamb angles as shown.

**3.4 GUARDS**

- A. Steel Angle Edge Guards:
  - 1. Set into formwork before concrete is placed.
  - 2. Set angles flush with edge of opening and finish floor, or as shown.
  - 3. At existing construction fasten angle and filler piece to adjoining construction with 16 mm (5/8 inch) diameter by 75 mm (3 inch) long expansion bolts 450 mm (18 inches) on center.

**3.5 STEEL LINTELS**

- A. Use lintel sizes and combinations shown or specified.
- B. Install lintels with longest leg upstanding, except for openings in 150 mm (6 inch) masonry walls install lintels with longest leg horizontal.
- C. Install lintels to have not less than 150 mm (6 inch) bearing at each end for nonbearing walls, and 200 mm (8 inch) bearing at each end for bearing walls.

**3.6 SHELF ANGLES**

- A. Anchor shelf angles with 19 mm (3/4 inch) bolts unless shown otherwise in adjustable malleable iron inserts, set level at elevation shown.
- B. Provide expansion space at end of members.

**3.7 CLEAN AND ADJUSTING**

- A. Adjust movable parts including hardware to operate as designed without binding or deformation of the members centered in the opening or frame and, where applicable, contact surfaces fit tight and even without forcing or warping the components.
- B. Clean after installation exposed prefinished and plated items and items fabricated from stainless steel, aluminum and copper alloys, as recommended by the metal manufacture and protected from damage until completion of the project.

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**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. Section specifies wood blocking, furring, nailers, rough hardware, and light wood construction.

**1.2 RELATED WORK:**

- A. Milled woodwork: Section 06 20 00, FINISH CARPENTRY.
- B. Gypsum board: Section 09 29 00, GYPSUM BOARD.

**1.3 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings showing framing connection details, fasteners, connections and dimensions.

**1.4 PRODUCT DELIVERY, STORAGE AND HANDLING:**

- A. Protect lumber and other products from dampness both during and after delivery at site.
- B. Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.
- C. Stack plywood and other board products so as to prevent warping.
- D. Locate stacks on well drained areas, supported at least 150 mm (6 inches) above grade and cover with well ventilated sheds having firmly constructed over hanging roof with sufficient end wall to protect lumber from driving rain.

**1.5 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Society of Mechanical Engineers (ASME):
  - B18.2.1A-96(R2005).....Square and Hex Bolts and Screws
  - B18.2.2-87(R2005).....Square and Hex Nuts
  - B18.6.1-81 (R97).....Wood Screws
  - B18.6.4-98(R2005).....Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws
- C. American Plywood Association (APA):
  - E30-03.....Engineered Wood Construction Guide
- D. American Society for Testing And Materials (ASTM):
  - A47-99(R2004).....Ferritic Malleable Iron Castings
  - A48-03.....Gray Iron Castings

- A653/A653M-07.....Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process
- C954-04.....Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs from 0.033 inch (2.24 mm) to 0.112-inch (2.84 mm) in thickness
- C1002-04.....Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Metal Studs
- F844-07.....Washers, Steel, Plan (Flat) Unhardened for General Use
- F1667-05.....Nails, Spikes, and Staples
- E. Federal Specifications (Fed. Spec.):
- MM-L-736C.....Lumber; Hardwood
- F. Commercial Item Description (CID):
- A-A-55615.....Shield, Expansion (Wood Screw and Lag Bolt Self Threading Anchors)
- G. Military Specification (Mil. Spec.):
- MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated
- H. U.S. Department of Commerce Product Standard (PS)

## **PART 2 - PRODUCTS**

### **2.1 LUMBER:**

- A. Unless otherwise specified, each piece of lumber bear grade mark, stamp, or other identifying marks indicating grades of material, and rules or standards under which produced.
1. Identifying marks in accordance with rule or standard under which material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
  2. Inspection agency for lumber approved by the Board of Review, American Lumber Standards Committee, to grade species used.
- B. Lumber Other Than Structural:
1. Unless otherwise specified, species graded under the grading rules of an inspection agency approved by Board of Review, American Lumber Standards Committee.
  2. Furring, blocking, nailers and similar items 100 mm (4 inches) and narrower Standard Grade; and, members 150 mm (6 inches) and wider, Number 2 Grade.

**C. Sizes:**

1. Conforming to Prod. Std., PS20.
2. Size references are nominal sizes, unless otherwise specified, actual sizes within manufacturing tolerances allowed by standard under which produced.

**D. Moisture Content:**

1. At time of delivery and maintained at the site.
2. Boards and lumber 50 mm (2 inches) and less in thickness: 19 percent or less.
3. Lumber over 50 mm (2 inches) thick: 25 percent or less.

**E. Fire Retardant Treatment:**

1. Mil Spec. MIL-L-19140 with piece of treated material bearing identification of testing agency and showing performance rating.
2. Treatment and performance inspection, by an independent and qualified testing agency that establishes performance ratings.

**2.2 PLYWOOD**

- A. Comply with Prod. Std., PS 1.
- B. Bear the mark of a recognized association or independent inspection agency that maintains continuing control over quality of plywood which identifies compliance by veneer grade, group number, span rating where applicable, and glue type.
- C. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant treated plywood panels.
  1. APA rated Exposure 1, panel grade C-D Plugged, or better.
  2. Minimum 23.8 mm (15/16 inch) thick, unless otherwise indicated.

**2.3 ROUGH HARDWARE AND ADHESIVES:**

- A. Anchor Bolts:
  1. ASME B18.2.1 and ANSI B18.2.2 galvanized, 13 mm (1/2 inch) unless shown otherwise.
  2. Extend at least 200 mm (8 inches) into masonry or concrete with ends bent 50 mm (2 inches).
- B. Miscellaneous Bolts: Expansion Bolts: C1D, A-A-55615; lag bolt, long enough to extend at least 65 mm (2-1/2 inches) into masonry or concrete. Use 13 mm (1/2 inch) bolt unless shown otherwise.
- C. Washers
  1. ASTM F844.
  2. Use zinc or cadmium coated steel or cast iron for washers exposed to weather.
- D. Screws:
  1. Wood to Wood: ANSI B18.6.1 or ASTM C1002.



2. Wood to Steel: ASTM C954, or ASTM C1002.

E. Nails:

1. Size and type best suited for purpose unless noted otherwise. Use aluminum-alloy nails, plated nails, or zinc-coated nails, for nailing wood work exposed to weather and on roof blocking.
2. ASTM F1667:
  - a. Common: Type I, Style 10.
  - b. Concrete: Type I, Style 11.
  - c. Barbed: Type I, Style 26.
  - d. Underlayment: Type I, Style 25.
  - e. Masonry: Type I, Style 27.

**PART 3 - EXECUTION**

**3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS:**

A. Conform to applicable requirements of the following:

1. APA for installation of plywood.

B. Fasteners:

1. Bolts:

- a. Fit bolt heads and nuts bearing on wood with washers.
- b. Countersink bolt heads flush with the surface of nailers.
- c. Embed in concrete and solid masonry or use expansion bolts. Special bolts or screws designed for anchor to solid masonry or concrete in drilled holes may be used.
- d. Use toggle bolts to hollow masonry or sheet metal.
- e. Use bolts to steel over 2.84 mm (0.112 inch, 11 gage) in thickness. Secure wood nailers to vertical structural steel members with bolts, placed one at ends of nailer and 600 mm (24 inch) intervals between end bolts. Use clips to beam flanges.

2. Drill Screws to steel less than 2.84 mm (0.112 inch) thick.

- a. ASTM C1002 for steel less than 0.84 mm (0.033 inch) thick.
- b. ASTM C 954 for steel over 0.84 mm (0.033 inch) thick.

3. Power actuated drive pins may be used where practical to anchor to solid masonry, concrete, or steel.

4. Do not anchor to wood plugs or nailing blocks in masonry or concrete. Use metal plugs, inserts or similar fastening.

5. Screws to Join Wood:

- a. Where shown or option to nails.
- b. ASTM C1002, sized to provide not less than 25 mm (1 inch) penetration into anchorage member.
- c. Spaced same as nails.

C. Blocking Nailers, and Furring:

1. Install furring, blocking, nailers, and grounds where shown.
2. Use longest lengths practicable.
3. Use fire retardant treated wood blocking where shown at openings and where shown or specified.
4. Layers of Blocking or Plates:
  - a. Stagger end joints between upper and lower pieces.
  - b. Nail at ends and not over 600 mm (24 inches) between ends.
  - c. Stagger nails from side to side of wood member over 125 mm (5 inches) in width.
5. Unless otherwise shown, use wall furring 25 mm by 75 mm (1 inch by 3 inch) continuous wood strips installed plumb on walls, using wood shims where necessary so face of furring forms a true, even plane. Space furring not over 400 mm (16 inches on centers, butt joints over bearings and rigidly secure in place. Anchor furring on 400 mm (16 inches) centers.

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**SECTION 06 20 00  
FINISH CARPENTRY**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies exterior and interior millwork.
- B. Items specified.
  - 1. Counter Shelf
  - 2. Counter or Work Tops
  - 3. Mounting Strips, Shelves, and Rods
  - 4. Base and Wall Cabinets

**1.2 RELATED WORK**

- A. Fabricated Metal brackets, bench supports and countertop legs: Section 05 50 00, METAL FABRICATIONS.
- B. Framing, furring and blocking: Section 06 10 00, ROUGH CARPENTRY.
- C. Wood doors: Section 08 14 00, INTERIOR WOOD DOORS.
- D. Color and texture of finish: Drawing IN-601, INTERIOR FINISH SCHEDULE.
- E. Electrical light fixtures and duplex outlets: Division 26, ELECTRICAL.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
  - 1. Millwork items - Half full size scale for sections and details 1:50 (1/4-inch) for elevations and plans.
  - 2. Show construction and installation.
- C. Samples:
  - 1. Plastic laminate sample showing specified pattern, color, texture, and finish.
  - 2. Quartz sample showing specified pattern, color, texture, and finish.
- D. Certificates:
  - 1. Indicating fire retardant treatment of materials meet the requirements specified.
  - 2. Indicating moisture content of materials meet the requirements specified.
- E. List of acceptable sealers for fire retardant materials.
- F. Manufacturer's literature and data:
  - 1. Finish hardware
  - 2. Sinks with fittings
  - 3. Electrical components

**1.4 DELIVERY, STORAGE AND HANDLING**

- A. Protect lumber and millwork from dampness, maintaining moisture content specified both during and after delivery at site.
- B. Store finishing lumber and millwork in weathertight well ventilated structures or in space in existing buildings designated by Contracting Officer's Technical Representative. Store at a minimum temperature of 21<sup>0</sup>C (70<sup>0</sup>F) for not less than 10 days before installation.
- C. Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.

**1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Testing and Materials (ASTM):
  - A36/A36M-05.....Structural Steel
  - A53-06.....Pipe, Steel, Black and Hot-Dipped Zinc Coated,  
Welded and Seamless
  - A167-99 (R2004).....Stainless and Heat-Resisting Chromium-Nickel  
Steel Plate, Sheet, and Strip
  - B26/B26M-05.....Aluminum-Alloy Sand Castings
  - B221-06.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,  
Wire, Profiles, and Tubes
  - E84-07.....Surface Burning Characteristics of Building  
Materials
  - F436-07.....Hardened Steel Washers
- C. American Hardboard Association (AHA):
  - A135.4-04.....Basic Hardboard
- D. Builders Hardware Manufacturers Association (BHMA):
  - A156.9-03.....Cabinet Hardware
  - A156.11-04.....Cabinet Locks
  - A156.16-02.....Auxiliary Hardware
- E. Hardwood Plywood and Veneer Association (HPVA):
  - HP1-04.....Hardwood and Decorative Plywood
- F. National Particleboard Association (NPA):
  - A208.1-99.....Wood Particleboard
- G. American Society of Mechanical Engineers (ASME):
  - B18.2.1-96(R2005).....Square and Hex Bolts and Screws (Inch Series)
- H. American Wood-Preservers' Association (AWPA):
  - AWPA C1-03.....All Timber Products - Preservative Treatment by  
Pressure Processes

- I. Architectural Woodwork Institute (AWI):
  - AWI-99.....Architectural Woodwork Quality Standards and  
Quality Certification Program
- J. National Electrical Manufacturers Association (NEMA):
  - LD 3-05.....High-Pressure Decorative Laminates
  - LD 3.1-95.....Application, Fabrication and Installation of  
High-Pressure Decorative Laminates
- K. U.S. Department of Commerce, Product Standard (PS):
  - PS1-95.....Construction and Industrial Plywood
  - PS20-05.....American Softwood Lumber Standard
- L. Military Specification (Mil. Spec):
  - MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated
- M. Federal Specifications (Fed. Spec.):
  - A-A-1922A.....Shield Expansion
  - A-A-1936.....Contact Adhesive
  - FF-N-836D.....Nut, Square, Hexagon Cap, Slotted, Castle
  - FF-S-111D(1).....Screw, Wood
  - MM-L-736(C).....Lumber, Hardwood

## **PART 2 - PRODUCTS**

### **2.1 LUMBER**

- A. Grading and Marking:
  - 1. Lumber shall bear the grade mark, stamp, or other identifying marks indicating grades of material.
  - 2. Such identifying marks on a material shall be in accordance with the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
  - 3. The inspection agency for lumber shall be approved by the Board of Review, American Lumber Standards Committee, to grade species used.
- B. Sizes:
  - 1. Lumber Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which product is produced.
  - 2. Millwork, standing and running trim, and rails: Actual size as shown or specified.
- C. Hardwood: MM-L-736, species as specified for each item.
- D. Softwood: PS-20, exposed to view appearance grades:
  - 1. Use C select or D select, vertical grain for transparent finish including stain transparent finish.

2. Use Prime for painted or opaque finish.

## **2.2 PLYWOOD**

### **A. Softwood Plywood:**

1. Prod. Std. PS-1.
2. Grading and Marking:
  - a. Each sheet of plywood shall bear the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood.
  - b. The mark shall identify the plywood by species group or identification index, and shall show glue type, grade, and compliance with PS1.
3. Plywood, 13 mm (1/2 inch) and thicker; not less than five ply construction, except 32 mm (1-1/4 inch) thick plywood not less than seven ply.

### **B. Medium Density Particleboard: ANSI A208.2, Grade MD**

## **2.3 PARTICLEBOARD**

### **A. NPA A208.1**

### **B. Plastic Laminate Particleboard Cores:**

1. Use Type 1, Grade 1-M-3, or Type 2, Grade 2-M-2, unless otherwise specified.
2. Use Type 2, Grade 2-M-2, exterior bond, for tops with sinks.

### **C. General Use: Type 1, Grade 1-M-3 or Type 2, Grade 2-M-2.**

## **2.4 PLASTIC LAMINATE**

### **A. NEMA LD-3.**

### **B. Exposed decorative surfaces including both sides of cabinet doors, and for items having plastic laminate finish. General Purpose, Type HGL.**

### **C. Cabinet Interiors including Shelving: Both of following options to comply with NEMA, CLS as a minimum.**

1. Plastic laminate clad medium density fiberboard.

### **D. Backing sheet on bottom of plastic laminate covered wood tops: Backer, Type HGP.**

## **2.5 QUARTZ SURFACES**

### **A. Material: As indicated on Drawing Sheet IN-601 - FINISH SCHEDULE.**

### **B. Color and finish as indicated on Drawing Sheet IN-601 - FINISH SCHEDULE.**

## **2.6 ADHESIVE**

### **A. For Plastic Laminate: Fed. Spec. A-A-1936.**

### **B. For Interior Millwork: Unextended urea resin, unextended melamine resin, phenol resin, or resorcinol resin.**

### **C. For Quartz Surfaces:**

1. Mounting Adhesive: Provide structural grade "50 year" silicone or epoxy adhesive of a type recommended by manufacturer for application and conditions of use.
2. Surface Adhesive: Provide epoxy or polyester adhesive of a type recommended by manufacturer for application and conditions of use.
  - a. Adhesive which will be visible in finished work shall be tinted to match quartz surface.

## 2.7 HARDWARE

### A. Rough Hardware:

1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electric-galvanizing process. Galvanized where specified.
2. Use galvanized coating on ferrous metal for exterior work unless non-ferrous metals or stainless is used.
3. Fasteners:
  - a. Bolts with Nuts: FF-N-836.
  - b. Expansion Bolts: A-A-1922A.
  - c. Screws: Fed. Spec. FF-S-111.

### B. Finish Hardware

1. Cabinet Hardware: ANSI A156.9.
  - a. Door/Drawer Pulls: B02011. Door in seismic zones: B03182.
  - b. Drawer Slides: B05051 for drawers over 150 mm (6 inches) deep, B05052 for drawers 75 mm to 150 mm 3 to 6 inches) deep, and B05053 for drawers less than 75 mm (3 inches) deep.
  - c. Sliding Door Tracks: B07063.
  - d. Adjustable Shelf Standards: B4061 with shelf rest B04083.
  - e. Concealed Hinges: B1601, minimum 110 degree opening.
  - f. Butt Hinges: B01361, for flush doors, B01381 for inset lipped doors, and B01521 for overlay doors.
  - g. Cabinet Door Catch: B0371 or B03172.
  - h. Vertical Slotted Shelf Standard: B04103 with shelf brackets B04113, sized for shelf depth.
2. Cabinet Locks: ANSI A156.11.
  - a. Drawers and Hinged Door: E07262.
  - b. Sliding Door: E07162.
3. Auxiliary Hardware: ANSI A156.16.
  - a. Shelf Bracket: B04041, japanned or enameled finish.
  - b. Combination Garment rod and Shelf Support: B04051 japanned or enamel finish.

- c. Closet Bar: L03131 chrome finish of required length.
- 4. Counter Brackets: Capable of supporting loads in excess of 1000 lbs, 1/8 inch thick material, 1-1/2 inch wide flange prepunched with 1/4 inch mounting holes, dimensions of bracket as indicated on Drawings. Brackets shall be finished in manufacturer's standard primer for field finish painting.
- 5. Steel Channel Frame and Leg supports for Counter top. Fabricated under Section 05 50 00, METAL FABRICATIONS.
- 6. Thru-Wall Counter Brackets:
  - a. Steel angles drilled for fasteners on 100 mm (4 inches) centers.
  - b. Baked enamel prime coat finish.
- 7. Edge Strips Moldings:
  - a. Driven type "T" shape with serrated retaining stem; vinyl plastic to match plastic laminate color, stainless steel, or 3 mm (1/8 inch) thick extruded aluminum.
  - b. Stainless steel or extruded aluminum channels.
  - c. Stainless steel, number 4 finish; aluminum, mechanical applied medium satin finish, clear anodized 0.1 mm (0.4 mils) thick.
- 8. Rubber or Vinyl Molding
  - a. Rubber or vinyl standard stock and in longest lengths practicable.
  - b. Design for closures at joints with walls and adhesive anchorage.
  - c. Adhesive as recommended by molding manufacturer.
- 9. Primers: Manufacturer's standard primer for steel providing baked enamel finish.

## **2.8 MOISTURE CONTENT**

- A. Moisture content of lumber and millwork at time of delivery to site.
  - 1. Interior finish lumber, trim, and millwork 32 mm (1-1/4 inches) or less in nominal thickness: 12 percent on 85 percent of the pieces and 15 percent on the remainder.
  - 2. Moisture content of other materials shall be in accordance with the standards under which the products are produced.

## **2.9 FIRE RETARDANT TREATMENT**

- A. Where wood members and plywood are specified to be fire retardant treated, the treatment shall be in accordance with Mil. Spec. MIL-L19140.
- B. Treatment and performance inspection shall be by an independent and qualified testing agency that establishes performance ratings.
- C. Each piece of treated material shall bear identification of the testing agency and shall indicate performance in accordance with such rating of flame spread and smoke developed.



D. Treat wood for maximum flame spread of 25 and smoke developed of 25.

E. Fire Resistant Softwood Plywood:

1. Use Grade A, Exterior, plywood for treatment.
2. Meet the following requirements when tested in accordance with ASTM E84.
  - a. Flame spread: 0 to 25.
  - b. Smoke developed: 100 maximum

F. Fire Resistant Hardwood Plywood:

1. Core: Fire retardant treated softwood plywood.
2. Hardwood face and back veneers untreated,
3. Factory seal panel edges, to prevent loss of fire retardant salts.

## **2.10 FABRICATION**

A. General:

1. Except as otherwise specified, use AWI Custom Grade for architectural woodwork and interior millwork.
2. Finish woodwork shall be free from pitch pockets.
3. Except where special profiles are shown, trim shall be standard stock molding and members of the same species.
4. Plywood shall be not less than 13 mm (1/2 inch), unless otherwise shown or specified.
5. Edges of members in contact with concrete or masonry shall have a square corner caulking rebate.
6. Fabricate members less than 4 m (14 feet) in length from one piece of lumber, back channeled and molded as shown.
7. Interior trim and items of millwork to be painted may be fabricated from jointed, built-up, or laminated members, unless otherwise shown on drawings or specified.
8. Plastic Laminate Work:
  - a. Factory glued to either a medium density fiberboard core, thickness as shown or specified.
  - b. Cover exposed edges with plastic laminate, except where aluminum, stainless steel, or plastic molded edge strips are shown or specified. Use plastic molded edge strips on 19 mm (3/4-inch) molded thick or thinner core material.
  - c. Use backing sheet on concealed large panel surface when decorative face does not occur.

B. Mounting Strips, Shelves and Rods:

1. Cut mounting strips from 25 mm by 100 mm (1 by 4 inches) softwood stock, with exposed edge slightly rounded.

2. Cut wood shelf from softwood 1 inch stock, of width shown, exposed edge slightly rounded. Option: Use 19 mm (3/4 inch) thick plywood with 19 mm (3/4 inch) softwood edge nosing on exposed edge, slightly rounded.
3. Plastic laminate covered, 19 mm (3/4 inch) thick plywood or particle board core with edges and ends having plastic molded edge strips. Size, finish and number as shown.
4. Rod or Closet Bar: L03131. Combination Garment and Shelf Support, intermediate support for closet bar: B04051 for rods over 1800 mm (6 feet) long.

C. Pass Thru Transaction Ledge.

1. Fabricate counter as shown.
2. Cut to fit metal frame profile.
3. Fabricate to receive sliding pass window track when shown; specified in Section 08 56 19, PASS WINDOWS.
4. Use angle and fabricated shelf bracket supports.
5. Quartz Surfaces: Fabricate quartz surfaces on 3/4" plywood substrate.
  - a. Fabricator shall be by a certified Fabricator, certified in writing by Manufacturer.
  - b. Layout surface to minimize joints and avoid L-shaped pieces of quartz surfacing. Layout and fabricate with 'hairline' joints.
  - c. Inspection of Materials:
    - 1) Inspect materials for defects prior to fabrication.
  - d. Tools: Cut and polish with water cooled powered tools.
  - e. Cutouts:
    - 1) Cutouts shall have a minimum of 3/8 inch (10mm) radius.
    - 2) Where edges of cutouts will be exposed in finished work; polish edges.
  - f. Laminations: Laminate layers of quartz surfacing as required to create built up edges following procedures recommended by the manufacturer.

D. Counter or Work Tops:

1. Quartz Surfaces: Fabricate quartz surfaces on 3/4" plywood substrate.
  - a. Fabricator shall be a certified fabricator, certified in writing by Manufacturer.
  - b. Layout surface to minimize joints and avoid L-shaped pieces of quartz surfacing. Layout and fabricate with 'hairline' joints.
  - c. Inspection of Materials: Inspect materials for defects prior to fabrication.
  - d. Tools: Cut and polish with water cooled powered tools.

- e. Cutouts:
    - 1) Cutouts shall have a minimum of 3/8 inch (10mm) radius.
    - 2) Where edges of cutouts will be exposed in finished work, polish edges.
  - f. Laminations: Laminate layers of quartz surfacing as required to create built up edges following procedures recommended by the manufacturer.
- E. Plastic Laminate Surfaced Cabinet Work:
- 1. General: Laminate clad millwork refers to custom design plastic laminate surfaced cabinet work.
  - 2. Quality Standard: Comply with AWI Section 400 requirements for laminate-clad cabinets, Premium Grade Construction.
  - 3. Design of Cabinets: As detailed on Drawings.
  - 4. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
    - a. Horizontal Surfaces Other than Tops: GP-50, 0.050-inch nominal thickness.
    - b. Vertical Surfaces: GP-28, 0.028-inch nominal thickness.
    - c. Materials for Semi-exposed Surfaces: Melamine interiors, including drawers. Exposed face of drawers shall match cabinet doors.
    - d. Color, Pattern, and Finish: As indicated on Drawing sheet IN-601 FINISH SCHEDULE.
  - 5. Core Material for Cabinetwork: Medium density particleboard.
  - 6. Extruded PVC Edgebanding: Minimum 3 mm thick extruded PVC material, color to match plastic laminate color. Edgebanding shall be primed and applied, under pressure, using hotmelt adhesive. Application and workmanship of edgebanding must be accepted before final fabrication begins. Accepted materials will be used as the quality of standard for the cabinetwork.

### **PART 3 - EXECUTION**

#### **3.1 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain work areas and storage areas to a minimum temperature of 21<sup>0</sup>C (70<sup>0</sup>F) for not less than 10 days before and during installation of interior millwork.
- B. Do not install finish lumber or millwork in any room or space where wet process systems such as concrete, masonry, or plaster work is not complete and dry.

#### **3.2 INSTALLATION**

- A. General:

1. Millwork receiving transparent finish shall be primed and back-painted on concealed surfaces. Set no millwork until primed and back-painted.
2. Secure trim with fine finishing nails, screws, or glue as required.
3. Set nails for putty stopping. Use washers under bolt heads where no other bearing plate occurs.
4. Seal cut edges of preservative and fire retardant treated wood materials with a certified acceptable sealer.
5. Coordinate with plumbing and electrical work for installation of fixtures and service connections in millwork items.
6. Plumb and level items unless shown otherwise.
7. Nail finish at each blocking, lookout, or other nailer and intermediate points; toggle or expansion bolt in place where nails are not suitable.

B. Shelves:

1. Install mounting strip at back wall and end wall for shelves in closets where shown secured with toggle bolts at each end and not over 600 mm (24 inch) centers between ends.
  - a. Nail Shelf to mounting strip at ends and to back wall strip at not over 900 mm (36 inches) on center.
  - b. Install metal bracket, ANSI A156.16, B04041, not over 1200 mm (4 feet) centers when shelves exceed 1800 mm (6 feet) in length.
  - c. Install metal bracket, ANSI A156.16, B04051, not over 1200 mm (4 feet) on centers where shelf length exceeds 1800 mm (6 feet) in length with metal rods, clothes hanger bars ANSI A156.16, L03131, of required length, full length of shelf.
2. Install vertical slotted shelf standards, ANSI A156.9, B04103 to studs with toggle bolts through each fastener opening. Double slotted shelf standards may be used where adjacent shelves terminate.
  - a. Install brackets ANSI A156.9, B04113, providing supports for shelf not over 900 mm (36 inches) on center and within 13 mm (1/2 inch) of shelf end unless shown otherwise.
  - b. Install shelves on brackets so front edge is restrained by bracket.

C. Install with butt joints in straight runs and miter at corners.

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**SECTION 07 81 00  
APPLIED FIREPROOFING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies mineral fiber and cementitious coverings to provide fire resistance to interior structural steel members shown.

**1.2 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Manufacturer's complete and detailed application instructions and specifications.
  - 2. Manufacturer's repair and patching instructions.
- C. Certificates:
  - 1. Certificate from testing laboratory attesting fireproofing material and application method meet the specified fire ratings.
    - a. List thickness and density of material required to meet fire ratings.
    - b. Accompanied by complete test report and test record.
  - 2. Manufacturer's certificate indicating sprayed-on fireproofing material supplied under the Contract is same within manufacturing tolerance as fireproofing material tested.
- D. Miscellaneous:
  - 1. Manufacturer's written approval of surfaces to receive sprayed-on fireproofing.
  - 2. Manufacturer's written approval of completed installation.
  - 3. Manufacturer's written approval of the applicators of fireproofing material.

**1.3 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver to job-site in sealed containers marked and labeled to show manufacturer's name and brand and certification of compliance with the specified requirements.
- B. Remove damaged containers from the site.
- C. Store the materials off the ground, under cover, away from damp surfaces.
- D. Keep dry until ready for use.
- E. Remove materials that have been exposed to water before installation from the site.

**1.4 QUALITY CONTROL**

- A. Test for fire endurance in accordance with ASTM E119, for fire rating specified, in a nationally recognized laboratory.
- B. Manufacturer's inspection and approval of surfaces to receive fireproofing as specified under paragraph Examination.
- C. Manufacturer's approval of fireproofing applications.
- D. Manufacturer's approval of completed installation.
- E. Manufacturer's representative shall observe and advise at the commencement of application, and shall visit the site as required thereafter for the purpose of ascertaining proper application.
- F. Pre-Application Test Area.
  - 1. Apply a test area consisting of a typical overhead fireproofing installation, including not less than 4.5 m (15 feet) of beam and deck.
    - a. Apply to one column.
    - b. Apply for the hourly ratings used.
  - 2. Install in location selected by the Contracting Officer's Technical Representative (COTR), for approval by the representative of the fireproofing material manufacturer and by the Government.
  - 3. Perform Bond test on painted steel in accordance with ASTM E736.
  - 4. Do not proceed in other areas until installation of test area has been completed and approved.
  - 5. Keep approved installation area open for observation as criteria for sprayed-on fireproofing.

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - C841-03.....Installation of Interior Lathing and Furring
  - C847-06.....Metal Lath
  - E84-08.....Surface Burning Characteristics of Building  
Materials
  - E119-08.....Fire Tests of Building Construction and  
Materials
  - E605-93 (R2006).....Thickness and Density of Sprayed Fire-Resistive  
Materials Applied to Structural Members

- E736-00.....Cohesion/Adhesion of Sprayed Fire-Resistive  
Materials Applied to Structural Members
- E759-92 (R2005).....The Effect of Deflection on Sprayed Fire-  
Resistive Material Applied to Structural  
Members
- E760-92 (R2005).....Impact on Bonding of Sprayed Fire-Resistive  
Material Applied to Structural Members
- E761-92 (R2005).....Compressive Strength of Fire-Resistive Material  
Applied to Structural Members
- E859-93 (R2006).....Air Erosion of Sprayed Fire-Resistive Materials  
Applied to Structural Members
- E937-93 (R2005).....Corrosion of Steel by Sprayed Fire-Resistive  
Material Applied to Structural Members
- E1042-02.....Acoustically, Absorptive Materials Applied by  
Trowel or Spray.
- G21-96 (R2002).....Determining Resistance of Synthetic Polymeric  
Materials to Fungi
- C. Underwriters Laboratories, Inc. (UL):  
Fire Resistance Directory...Latest Edition including Supplements
- D. Warnock Hersey (WH):  
Certification Listings..Latest Edition
- E. Factory Mutual System (FM):  
Approval Guide.....Latest Edition including Supplements

## **PART 2 - PRODUCTS**

### **2.1 SPRAYED-ON FIREPROOFING**

- A. ASTM E1042, Class (a), Category A.
1. Type I, factory mixed cementitious materials with approved aggregate for exposed locations.
  2. Type II, factory mixed mineral fiber with integral inorganic binders minimum 240 kg/m<sup>3</sup> (15 lb/ft<sup>3</sup>) density per ASTM E605 test unless specified otherwise for concealed locations. Use in areas that are completely encased.
- B. Materials containing asbestos are not permitted.
- C. Fireproofing characteristics when applied in the thickness and density required to achieve the fire-rating specified.

	Characteristic	Test	Results
1.	Deflection	ASTM E759	No cracking, spalling, or delamination when backing to

			which it is applied has a deflection up to 1/120 in 3m (10 ft.)
2.	Corrosion-Resistance	ASTM E937	No promotion of corrosion of steel.
3.	Bond Impact	ASTM E760	No cracking, spalling, or delamination.
4.	Cohesion/Adhesion (Bond Strength)	ASTM E736	Minimum cohesive/adhesive strength of 9.57 kPa (200 lbf/ft <sup>2</sup> ) for protected areas. 19.15 kPa (400 lbf/ft <sup>2</sup> ) for exposed areas.
5.	Air Erosion	ASTM E859	Maximum gain weight of the collecting filter 0.27gm/m <sup>2</sup> (0.025 gm/ft <sup>2</sup> ).
6.	Compressive Strength	ASTM E761	Minimum compressive strength 36 kPa (5 lbf/in <sup>2</sup> ).
7.	Surface Burning Characteristics with adhesive and sealer to be used	ASTM E84	Flame spread 25 or less smoke developed 50 or less
8.	Fungi Resistance	ASTM G21	Resistance to mold growth when inoculated with aspergillus niger (28 days for general application)

## 2.2 ADHESIVE

- A. Bonding adhesive for Type II (fibrous) materials as recommended and supplied by the fireproofing material manufacturer.
- B. Adhesive may be an integral part of the material or applied separately to surface receiving fireproofing material.

## 2.3 SEALER

- A. Sealer for Type II (fibrous) material as recommended and supplied by the fireproofing material manufacturer.
- B. Surface burning characteristics as specified for fireproofing material.
- C. Fungus resistant.
- D. Sealer may be an integral part of the material or applied separately to the exposed surface. When applied separately use contrasting color pigmented sealer, white preferred.

## 2.4 WATER

- A. Clean, fresh, and free from organic and mineral impurities.
- B. pH of 6.9 to 7.1.



**2.5 MECHANICAL BOND MATERIAL**

- A. Expanded Metal Lath: ASTM C847, minimum weight of 0.92 kg/m<sup>2</sup> (1.7 pounds per square yard).
- B. Fasteners: ASTM C841.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Verify surfaces to receive fireproofing are clean and free of dust, soot, oil, grease, water soluble materials or any foreign substance which would prevent adhesion of the fireproofing material.
- B. Verify hangers, inserts and clips are installed before the application of fireproofing material.
- C. Verify ductwork, piping, and other obstructing material and equipment is not installed that will interfere with fireproofing installation.
- D. Verify concrete work on steel decking and concrete encased steel is completed.
- E. Verify temperature and enclosure conditions are required by fireproofing material manufacturer.

**3.2 APPLICATION**

- A. Do not start application until written approval has been obtained from manufacturer of fireproofing materials that surfaces have been inspected by the manufacturer or his representative, and are suitable to receive sprayed-on fireproofing.
- B. Coordinate application of fireproofing material with other trades.
- C. Application of Metal Lath:
  - 1. Apply to beam and columns having painted surfaces which fail ASTM E736 Bond Test requirements in pre-application test area.
  - 2. Apply to beam flanges 300 mm (12-inches) or more in width.
  - 3. Apply to column flanges 400 mm (16-inches) or more in width.
  - 4. Apply to beam or column web 400 mm (16-inches) or more in depth.
  - 5. Tack weld or mechanically fasten on maximum of 300 mm (12-inch) center.
  - 6. See design criteria section of the approved assemblies used.
  - 7. Lap and tie lath member in accordance with ASTM C841.
- D. Mix and apply in accordance with manufacturer's instructions.
  - 1. Mechanically control material and water ratios.
  - 2. Apply adhesive and sealer, when not an integral part of the materials, in accordance with the manufacturer's instructions.

3. Apply to density and thickness indicated in UL Fire Resistance Directory, FM Approval Guide, or WH Certification Listings unless specified otherwise. Test in accordance with ASTM E119.
4. Minimum applied dry density per cubic meter (cubic foot) for the underside of the walk on deck (interstitial) hung purl in or beam and steel deck, columns in interstitial spaces and mechanical equipment rooms shall be as follows:
  - a. Type I - 240 kg/m<sup>3</sup> (15 lb/ft<sup>3</sup>).
  - b. Type II - 350 kg/m<sup>3</sup> (22 lb/ft<sup>3</sup>).
- E. Application shall be completed in one area, inspected and approved by COTR before removal of application equipment and proceeding with further work.
- F. Apply fireproofing material in interior structural steel members and on underside of interior steel floor and roof decks, except on following surfaces:
  1. Areas used as air handling plenums.
  2. Steel to be encased in concrete or designated to receive other type of fireproofing.

### 3.3 FIELD TESTS

- A. Tests of applied material will be performed by VA retained Testing Laboratory. See Section 01 45 29, TESTING LABORATORY SERVICES.
- B. COTR will select area to be tested in specific bays on each floor using a geometric grid pattern.
- C. Test for thickness and density in accordance with ASTM E605. Areas showing thickness less than that required as a result of fire endurance test will be rejected.
- D. Areas showing less than required fireproofing characteristics will be rejected on the following field tests.
  1. Test for cohesion/adhesion: ASTM E736.
  2. Test for bond impact strength: ASTM E760.

### 3.4 PATCHING AND REPAIRING

- A. Inspect after mechanical, electrical and other trades have completed work in contact with fireproofing material, but before sprayed material is covered by subsequent construction.
- B. Perform corrective measures in accordance with fireproofing material Manufacturer's recommendations.
  1. Respray areas requiring additional fireproofing material to provide the required thickness, and replace dislodged or removed material.

2. Spray material for patching by machine directly on point to be patched, or into a container and then hand apply.
3. Hand mixing of material is not permitted.

C. Repair:

1. Respray all test and rejected areas.
2. Patch fireproofing material which is removed or disturbed after approval.

D. Perform final inspection of sprayed areas after patching and repair.

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**SECTION 07 84 00  
FIRESTOPPING**

**PART 1 GENERAL**

**1.1 DESCRIPTION**

- A. Closures of openings in walls, floors, and structural decks against penetration of flame, heat, and smoke or gases in fire resistant rated construction.
- B. Closure of openings in walls against penetration of gases or smoke in smoke partitions.

**1.2 RELATED WORK**

- A. Spray applied fireproofing: Section 07 81 00, APPLIED FIREPROOFING
- B. Sealants and application: Section 07 92 00, JOINT SEALANTS.
- C. Fire and smoke damper assemblies in ductwork: Section 23 31 00, HVAC DUCTS AND CASINGS, and Section 23 37 00, AIR OUTLETS AND INLETS.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturers literature, data, and installation instructions for types of firestopping and smoke stopping used.
- C. List of FM, UL, or WH classification number of systems installed.
- D. Certified laboratory test reports for ASTM E814 tests for systems not listed by FM, UL, or WH proposed for use.

**1.4 DELIVERY AND STORAGE**

- A. Deliver materials in their original unopened containers with manufacturer's name and product identification.
- B. Store in a location providing protection from damage and exposure to the elements.

**1.5 WARRANTY**

- A. Firestopping work subject to the terms of the Article "Warranty of Construction", FAR clause 52.246-21, except extend the warranty period to five years.

**1.6 QUALITY ASSURANCE**

- A. FM, UL, or WH or other approved laboratory tested products will be acceptable.

**1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

## B. American Society for Testing and Materials (ASTM):

E84-07.....Surface Burning Characteristics of Building  
Materials

E814-06.....Fire Tests of Through-Penetration Fire Stops

## C. Factory Mutual Engineering and Research Corporation (FM):

Annual Issue Approval Guide Building Materials

## D. Underwriters Laboratories, Inc. (UL):

Annual Issue Building Materials Directory

Annual Issue Fire Resistance Directory

1479-03.....Fire Tests of Through-Penetration Firestops

## E. Warnock Hersey (WH):

Annual Issue Certification Listings

**PART 2 - PRODUCTS****2.1 FIRESTOP SYSTEMS**

- A. Use either factory built (Firestop Devices) or field erected (through-Penetration Firestop Systems) to form a specific building system maintaining required integrity of the fire barrier and stop the passage of gases or smoke.
- B. Through-penetration firestop systems and firestop devices tested in accordance with ASTM E814 or UL 1479 using the "F" or "T" rating to maintain the same rating and integrity as the fire barrier being sealed. "T" ratings are not required for penetrations smaller than or equal to 100 mm (4 in) nominal pipe or 0.01 m<sup>2</sup> (16 sq. in.) in overall cross sectional area.
- C. Products requiring heat activation to seal an opening by its intumescence shall exhibit a demonstrated ability to function as designed to maintain the fire barrier.
- D. Firestop sealants used for firestopping or smoke sealing shall have following properties:
  - 1. Contain no flammable or toxic solvents.
  - 2. Have no dangerous or flammable out gassing during the drying or curing of products.
  - 3. Water-resistant after drying or curing and unaffected by high humidity, condensation or transient water exposure.
  - 4. When used in exposed areas, shall be capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.

- E. Firestopping system or devices used for penetrations by glass pipe, plastic pipe or conduits, unenclosed cables, or other non-metallic materials shall have following properties:
  - 1. Classified for use with the particular type of penetrating material used.
  - 2. Penetrations containing loose electrical cables, computer data cables, and communications cables protected using firestopping systems that allow unrestricted cable changes without damage to the seal.
  - 3. Intumescent products which would expand to seal the opening and act as fire, smoke, toxic fumes, and, water sealant.
- F. Maximum flame spread of 25 and smoke development of 50 when tested in accordance with ASTM E84.
- G. FM, UL, or WH rated or tested by an approved laboratory in accordance with ASTM E814.
- H. Materials to be asbestos free.

## **2.2 SMOKE STOPPING IN SMOKE PARTITIONS**

- A. Use silicone sealant in smoke partitions as specified in Section 07 92 00, JOINT SEALANTS.
- B. Use mineral fiber filler and bond breaker behind sealant.
- C. Sealants shall have a maximum flame spread of 25 and smoke developed of 50 when tested in accordance with E84.
- D. When used in exposed areas capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Submit product data and installation instructions, as required by article, submittals, after an on site examination of areas to receive firestopping.

### **3.2 PREPARATION**

- A. Remove dirt, grease, oil, loose materials, or other substances that prevent adherence and bonding or application of the firestopping or smoke stopping materials.
- B. Remove insulation on insulated pipe for a distance of 150 mm (six inches) on either side of the fire rated assembly prior to applying the firestopping materials unless the firestopping materials are tested and approved for use on insulated pipes.

**3.3 INSTALLATION**

- A. Do not begin work until the specified material data and installation instructions of the proposed firestopping systems have been submitted and approved.
- B. Install firestopping systems with smoke stopping in accordance with FM, UL, WH, or other approved system details and installation instructions.
- C. Install smoke stopping seals in smoke partitions.

**3.4 CLEAN-UP AND ACCEPTANCE OF WORK**

- A. As work on each floor is completed, remove materials, litter, and debris.
- B. Do not move materials and equipment to the next-scheduled work area until completed work is inspected and accepted by the Contracting Officer's Technical Representative.
- C. Clean up spills of liquid type materials.

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**SECTION 07 92 00****JOINT SEALANTS****PART 1 - GENERAL****1.1 DESCRIPTION:**

- A. Section covers all sealant and caulking materials and their application, wherever required for complete installation of building materials or systems.
- B. Include acoustical sealants at sound rated gypsum board partitions.

**1.2 RELATED WORK:**

- A. Firestopping penetrations: Section 07 84 00, FIRESTOPPING.
- B. Glazing: Section 08 80 00, GLAZING.
- C. Sound rated gypsum partitions: Section 09 29 00, GYPSUM BOARD.
- D. Mechanical Work: Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING; Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

**1.3 QUALITY CONTROL:**

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Product Testing: Obtain test results from a qualified testing agency based on testing current sealant formulations within a 12-month period.
  - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021.
  - 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920, and where applicable, to other standard test methods.
  - 3. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.
  - 4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
- D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates in accordance with sealant manufacturer's recommendations:



1. Locate test joints as directed by Contracting Officer's Technical Representative.
  2. Conduct field tests for each application indicated below:
    - a. Each type of elastomeric sealant and joint substrate indicated.
    - b. Each type of non-elastomeric sealant and joint substrate indicated.
  3. Notify Contracting Officer's Technical Representative seven days in advance of dates and times when test joints will be erected.
- E. VOC: Acrylic latex and Silicon sealants shall have less than 50g/l VOC content.
- F. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:
1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this section.

**1.4 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's installation instructions for each product used.
- C. Cured samples of exposed sealants for each color where required to match adjacent material.
- D. Manufacturer's Literature and Data:
  1. Caulking compound
  2. Primers
  3. Sealing compound, each type, including compatibility when different sealants are in contact with each other.

**1.5 PROJECT CONDITIONS:**

- A. Environmental Limitations:
  1. Do not proceed with installation of joint sealants under following conditions:
    - a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 °C (40 °F).
    - b. When joint substrates are wet.
- B. Joint-Width Conditions:

1. Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions:

1. Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

**1.6 DELIVERY, HANDLING, AND STORAGE:**

- A. Deliver materials in manufacturers' original unopened containers, with brand names, date of manufacture, shelf life, and material designation clearly marked thereon.
- B. Carefully handle and store to prevent inclusion of foreign materials.
- C. Do not subject to sustained temperatures exceeding 5° C (40° F) or less than 32° C (90° F).

**1.7 DEFINITIONS:**

- A. Definitions of terms in accordance with ASTM C717 and as specified.
- B. Back-up Rod: A type of sealant backing.
- C. Bond Breakers: A type of sealant backing.
- D. Filler: A sealant backing used behind a back-up rod.

**1.8 WARRANTY:**

- A. Warranty exterior sealing against leaks, adhesion, and cohesive failure, and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be extended to two years.
- B. General Warranty: Special warranty specified in this Article shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

**1.9 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - C509-06.....Elastomeric Cellular Preformed Gasket and Sealing Material.
  - C612-04.....Mineral Fiber Block and Board Thermal Insulation.

C717-07.....Standard Terminology of Building Seals and Sealants.  
C834-05.....Latex Sealants.  
C919-02.....Use of Sealants in Acoustical Applications.  
C920-05.....Elastomeric Joint Sealants.  
C1021-08.....Laboratories Engaged in Testing of Building Sealants.  
C1193-05.....Standard Guide for Use of Joint Sealants.  
C1330-02 (R2007).....Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.  
D1056-07.....Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.  
E84-08.....Surface Burning Characteristics of Building Materials.

C. Sealant, Waterproofing and Restoration Institute (SWRI).  
The Professionals' Guide

## **PART 2 - PRODUCTS**

### **2.1 SEALANTS:**

- A. S-4:
1. ASTM C920 polyurethane or polysulfide.
  2. Type S.
  3. Class 25.
  4. Grade NS.
  5. Shore A hardness of 25-40.
- B. S-7:
1. ASTM C920, silicone, neutral cure.
  2. Type S.
  3. Class 25.
  4. Grade NS.
  5. Shore A hardness of 25-30.
  6. Structural glazing application.
- C. S-8:
1. ASTM C920, silicone, acetoxycure.
  2. Type S.
  3. Class 25.
  4. Grade NS.
  5. Shore A hardness of 25-30.
  6. Structural glazing application.

## D. S-9:

1. ASTM C920 silicone.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-30.
6. Non-yellowing, mildew resistant.

**2.2 CAULKING COMPOUND:**

- A. C-1: ASTM C834, acrylic latex.
- B. C-2: One component acoustical caulking, non drying, non hardening, synthetic rubber.

**2.3 COLOR:**

- A. Sealants used with unpainted concrete shall match color of adjacent concrete.
- B. Color of sealants for other locations shall be light gray or aluminum, unless specified otherwise.
- C. Caulking shall be light gray or white, unless specified otherwise.

**2.4 JOINT SEALANT BACKING:**

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
  1. Type C: Closed-cell material with a surface skin.
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 32° C (minus 26° F). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

**2.5 FILLER:**

- A. Mineral fiber board: ASTM C612, Class 1.
- B. Thickness same as joint width.
- C. Depth to fill void completely behind back-up rod.

**2.6 PRIMER:**

- A. As recommended by manufacturer of caulking or sealant material.
- B. Stain free type.

**2.7 CLEANERS-NON POUROUS SURFACES:**

- A. Chemical cleaners acceptable to manufacturer of sealants and sealant backing material, free of oily residues and other substances capable of staining or harming joint substrates and adjacent non-porous surfaces and formulated to promote adhesion of sealant and substrates.

**PART 3 - EXECUTION****3.1 INSPECTION:**

- A. Inspect substrate surface for bond breaker contamination and unsound materials at adherent faces of sealant.
- B. Coordinate for repair and resolution of unsound substrate materials.
- C. Inspect for uniform joint widths and that dimensions are within tolerance established by sealant manufacturer.

**3.2 PREPARATIONS:**

- A. Prepare joints in accordance with manufacturer's instructions and SWRI.
- B. Clean surfaces of joint to receive caulking or sealants leaving joint dry to the touch, free from frost, moisture, grease, oil, wax, lacquer paint, or other foreign matter that would tend to destroy or impair adhesion.
  - 1. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.
  - 2. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
  - 3. Remove laitance and form-release agents from concrete.

4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
  - a. Metal.
  - b. Glass.
  - c. Glazed surfaces of ceramic tile.
- C. Do not cut or damage joint edges.
- D. Apply masking tape to face of surfaces adjacent to joints before applying primers, caulking, or sealing compounds.
  1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Apply primer to sides of joints wherever required by compound manufacturer's printed instructions.
  1. Apply primer prior to installation of back-up rod or bond breaker tape.
  2. Use brush or other approved means that will reach all parts of joints.
- F. Take all necessary steps to prevent three sided adhesion of sealants.

### **3.3 BACKING INSTALLATION:**

- A. Install back-up material, to form joints enclosed on three sides as required for specified depth of sealant.
- B. Where deep joints occur, install filler to fill space behind the back-up rod and position the rod at proper depth.
- C. Cut fillers installed by others to proper depth for installation of back-up rod and sealants.
- D. Install back-up rod, without puncturing the material, to a uniform depth, within plus or minus 3 mm (1/8 inch) for sealant depths specified.
- E. Where space for back-up rod does not exist, install bond breaker tape strip at bottom (or back) of joint so sealant bonds only to two opposing surfaces.
- F. Take all necessary steps to prevent three sided adhesion of sealants.

### **3.4 SEALANT DEPTHS AND GEOMETRY:**

- A. At widths up to 6 mm (1/4 inch), sealant depth equal to width.

- B. At widths over 6 mm (1/4 inch), sealant depth 1/2 of width up to 13 mm (1/2 inch) maximum depth at center of joint with sealant thickness at center of joint approximately 1/2 of depth at adhesion surface.

### 3.5 INSTALLATION:

A. General:

1. Apply sealants and caulking only when ambient temperature is between 5° C and 38° C (40° and 100° F).
  2. Do not use polysulfide base sealants where sealant may be exposed to fumes from bituminous materials, or where water vapor in continuous contact with cementitious materials may be present.
  3. Do not use sealant type listed by manufacture as not suitable for use in locations specified.
  4. Apply caulking and sealing compound in accordance with manufacturer's printed instructions.
  5. Avoid dropping or smearing compound on adjacent surfaces.
  6. Fill joints solidly with compound and finish compound smooth.
  7. Tool joints to concave surface unless shown or specified otherwise.
  8. Finish paving or floor joints flush unless joint is otherwise detailed.
  9. Apply compounds with nozzle size to fit joint width.
  10. Test sealants for compatibility with each other and substrate. Use only compatible sealant.
- B. For application of sealants, follow requirements of ASTM C1193 unless specified otherwise.
- C. Where gypsum board partitions are of sound rated, fire rated, or smoke barrier construction, follow requirements of ASTM C919 only to seal all cut-outs and intersections with the adjoining construction unless specified otherwise.
1. Apply a 6 mm (1/4 inch) minimum bead of sealant each side of runners (tracks), including those used at partition intersections with dissimilar wall construction.
  2. Coordinate with application of gypsum board to install sealant immediately prior to application of gypsum board.
  3. Partition intersections: Seal edges of face layer of gypsum board abutting intersecting partitions, before taping and finishing or application of veneer plaster-joint reinforcing.

4. Openings: Apply a 6 mm (1/4 inch) bead of sealant around all cut-outs to seal openings of electrical boxes, ducts, pipes and similar penetrations. To seal electrical boxes, seal sides and backs.
5. Control Joints: Before control joints are installed, apply sealant in back of control joint to reduce flanking path for sound through control joint.

### **3.6 FIELD QUALITY CONTROL:**

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as recommended by sealant manufacturer:
  1. Extent of Testing: Test completed elastomeric sealant joints as follows:
    - a. Perform 10 tests for first 300 m (1000 feet) of joint length for each type of elastomeric sealant and joint substrate.
    - b. Perform one test for each 300 m (1000 feet) of joint length thereafter or one test per each floor per elevation.
- B. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
- C. Inspect tested joints and report on following:
  1. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
  2. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
  3. Whether sealants filled joint cavities and are free from voids.
  4. Whether sealant dimensions and configurations comply with specified requirements.
- D. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
- E. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.
- F. Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated



requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

### **3.7 CLEANING:**

- A. Fresh compound accidentally smeared on adjoining surfaces: Scrape off immediately and rub clean with a solvent as recommended by the caulking or sealant manufacturer.
- B. After filling and finishing joints, remove masking tape.
- C. Leave adjacent surfaces in a clean and unstained condition.

### **3.8 LOCATIONS:**

- A. Sanitary Joints:
  - 1. Walls to Plumbing Fixtures: Type S-9
  - 2. Counter Tops to Walls: Type S-9
  - 3. Pipe Penetrations: Type S-9
- B. High Temperature Joints over 204 degrees C (400 degrees F):
  - 1. Exhaust Pipes, Flues, Breech Stacks: Type S-7 or S-8
- C. Interior Caulking:
  - 1. Typical Narrow Joint 6 mm, (1/4 inch) or less at Walls and Adjacent Components: Types C-1 and C-2.
  - 2. Perimeter of Doors, Windows, Access Panels which Adjoin Concrete or Masonry Surfaces: Types C-1 and C-2.
  - 3. Perimeter of Lead Faced Control Windows and Gypsum Board Walls: Types C-1 and C-2.
  - 4. Exposed Isolation Joints at Top of Full Height Walls: Types C-1 and C-2.
  - 5. Exposed Acoustical Joint at Sound Rated Partitions: Type C-2.
  - 6. Concealed Acoustical Sealant: Type S-4, C-1, and C-2.

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**SECTION 08 11 13  
HOLLOW METAL FRAMES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies steel frames and related components.
- B. Terms relating to steel frames as defined in ANSI A123.1 and as specified.

**1.2 RELATED WORK**

- A. Door Hardware: Section 08 71 00, DOOR HARDWARE.
- B. Glazing: Section 08 80 00, GLAZING.

**1.3 TESTING**

- A. An independent testing laboratory shall perform testing.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturers Literature and Data:
  - 1. Fire rated doors and frames, showing conformance with NFPA 80 and Underwriters Laboratory, Inc., or Intertek Testing Services or Factory Mutual fire rating requirements and temperature rise rating for stairwell doors. Submit proof of temperature rating.

**1.5 SHIPMENT**

- A. Prior to shipment label each frame to show location, size, door swing and other pertinent information.
- B. Fasten temporary steel spreaders across the bottom of each door frame.

**1.6 STORAGE AND HANDLING**

- A. Store doors and frames at the site under cover.
- B. Protect from rust and damage during storage and erection until completion.

**1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. Door and Hardware Institute (DHI):
  - A115 Series.....Steel Door and Frame Preparation for Hardware, Series A115.1 through A115.17 (Dates Vary)
- C. Steel Door Institute (SDI):
  - 113-01.....Thermal Transmittance of Steel Door and Frame Assemblies

- 128-1997.....Acoustical Performance for Steel Door and Frame Assemblies
- A250.8-03.....Standard Steel Doors and Frames
- D. American Society for Testing and Materials (ASTM):
- A167-99(R2004).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
- A568/568-M-07.....Steel, Sheet, Carbon, and High-Strength, Low-alloy, Hot-Rolled and Cold-Rolled
- A1008-08.....Steel, sheet, Cold-Rolled, Carbon, Structural, High Strength Low Alloy and High Strength Low Alloy with Improved Formability
- B209/209M-07.....Aluminum and Aluminum-Alloy Sheet and Plate
- B221/221M-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes
- D1621-04.....Compressive Properties of Rigid Cellular Plastics
- D3656-07.....Insect Screening and Louver Cloth Woven from Vinyl Coated Glass Yarns
- E90-04.....Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
- E. The National Association Architectural Metal Manufacturers (NAAMM):
- Metal Finishes Manual (1988 Edition)
- F. National Fire Protection Association (NFPA):
- 80-09.....Fire Doors and Fire Windows
- G. Underwriters Laboratories, Inc. (UL):
- Fire Resistance Directory
- H. Intertek Testing Services (ITS):
- Certifications Listings...Latest Edition
- I. Factory Mutual System (FM):
- Approval Guide

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Sheet Steel: ASTM A1008, cold-rolled for panels (face sheets) of doors.
- B. Anchors, Fastenings and Accessories: Fastenings anchors, clips connecting members and sleeves from zinc coated steel.
- C. Prime Paint: Paint that meets or exceeds the requirements of A250.8.

### **2.2 METAL FRAMES**

- A. General:

1. SDI A250.8, 1.3 mm (0.053 inch) thick sheet steel, types and styles as shown or scheduled.
  2. Frames for labeled fire rated doors and windows.
    - a. Comply with NFPA 80. Test by Underwriters Laboratories, Inc., Inchcape Testing Services, or Factory Mutual.
    - b. Fire rated labels of approving laboratory permanently attached to frames as evidence of conformance with these requirements. Provide labels of metal or engraved stamp, with raised or incised markings.
  3. Frames for lead-lined doors:
    - a. Frames for doors 900 mm (3 feet) or less in width and having lead lining of 1 mm or less in thickness, and not shown to have structural steel supports: Minimum 1.7 mm (0.067 inch) thick.
    - b. Frames for doors over 900 mm (3 feet) in width or having lead-lining more than 1 mm in thickness shown to be supported by and attached to structural steel subframes: Minimum 1.3 mm (0.053 inch) thick.
    - c. Lead-lining and its application are specified in Section 13 49 00, RADIATION PROTECTION.
  4. Frames for doors specified to have automatic door operators: minimum 1.7 mm (0.067 inch) thick.
  5. Knocked-down frames are not acceptable.
- B. Reinforcement and Covers:
1. SDI A250.8 for, minimum thickness of steel reinforcement welded to back of frames.
  2. Provide mortar guards securely fastened to back of hardware reinforcements except on lead-lined frames.
  3. Where concealed door closers are installed within the head of the door frames, prepare frames for closers and provide 1 mm (0.042 inch) thick steel removable stop sections for access to concealed face plates and control valves, except when cover plates are furnished with closer.
- C. Terminated Stops: SDI A250.8.
- D. Glazed Openings:
1. Integral stop on exterior, corridor, or secure side of door.
  2. Design rabbet width and depth to receive glazing material or panel shown or specified.

E. Frame Anchors:

1. Floor anchors:

- a. Where floor fills occur, provide extension type floor anchors to compensate for depth of fill.
- b. At bottom of jamb use 1.3 mm (0.053 inch) thick steel clip angles welded to jamb and drilled to receive two 6 mm (1/4 inch) floor bolts. Use 50 mm x 50 mm (2 inch by 2 inch) 9 mm by (3/8 inch) clip angle for lead lined frames, drilled for 9 mm (3/8 inch) floor bolts.
- c. Where mullions occur, provide 2.3 mm (0.093 inch) thick steel channel anchors, drilled for two 6 mm (1/4 inch) floor bolts and frame anchor screws.
- d. Where sill sections occur, provide continuous 1 mm (0.042 inch) thick steel rough bucks drilled for 6 mm (1/4 inch) floor bolts and frame anchor screws. Space floor bolts at 50 mm (24 inches) on center.

2. Jamb anchors:

- a. Locate anchors on jambs near top and bottom of each frame, and at intermediate points not over 600 mm (24 inches) apart, except for fire rated frames space anchors as required by labeling authority.
- b. Form jamb anchors of not less than 1 mm (0.042 inch) thick steel unless otherwise specified.
- c. Anchors set in masonry: Use adjustable anchors designed for friction fit against the frame and for extension into the masonry not less than 250 mm (10 inches). Use one of following type:
  - 1) Wire loop type of 5 mm (3/16 inch) diameter wire.
  - 2) T-shape or strap and stirrup type of corrugated or perforated sheet steel.
- d. Anchors for stud partitions: Either weld to frame or use lock-in snap-in type. Provide tabs for securing anchor to the sides of the studs.
- e. Anchors for frames set in prepared openings:
  - 1) Steel pipe spacers with 6 mm (1/4 inch) inside diameter welded to plate reinforcing at jamb stops or hat shaped formed strap spacers, 50 mm (2 inches) wide, welded to jamb near stop.
  - 2) Drill jamb stop and strap spacers for 6 mm (1/4 inch) flat head bolts to pass thru frame and spacers.

- 3) Two piece frames: Subframe or rough buck drilled for 6 mm (1/4 inch) bolts.

f. Modify frame anchors to fit special frame and wall construction and provide special anchors where shown or required.

## **2.3 SHOP PAINTING**

A. SDI A250.8.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

A. Plumb, align and brace frames securely until permanent anchors are set.

1. Use triangular bracing near each corner on both sides of frames with temporary wood spreaders at midpoint.
2. Use wood spreaders at bottom of frame if the shipping spreader is removed.
3. Protect frame from accidental abuse.
4. Where construction will permit concealment, leave the shipping spreaders in place after installation, otherwise remove the spreaders after the frames are set and anchored.
5. Remove wood spreaders and braces only after the walls are built and jamb anchors are secured.

B. Floor Anchors:

1. Anchor the bottom of door frames to floor with two 6 mm (1/4 inch) diameter expansion bolts. Use 9 mm (3/8 inch) bolts on lead lined frames.
2. Power actuated drive pins may be used to secure frame anchors to concrete floors.

C. Jamb Anchors:

1. Anchors in masonry walls: Embed anchors in mortar. Fill space between frame and masonry wall with grout or mortar as walls are built.
2. Coat frame back with a bituminous coating prior to lining of grout filling in masonry walls.
3. Secure anchors to sides of studs with two fasteners through anchor tabs. Use steel drill screws to steel studs.
4. Frames set in prepared openings of masonry or concrete: Expansion bolt to wall with 6 mm (1/4 inch) expansion bolts through spacers. Where subframes or rough bucks are used, 6 mm (1/4 inch) expansion bolts on 600 mm (24 inch) centers or power activated drive pins 600

mm (24 inches) on centers. Secure two piece frames to subframe or rough buck with machine screws on both faces.

D. Install anchors for labeled fire rated doors to provide rating as required.

E. Overhead Bracing (Lead Lined Frames): Where jamb extensions extend to structure above, anchor clip angles with not less than two, 9 mm (3/8 inch) expansion bolts or power actuated drive pins to concrete slab. Weld to steel overhead members.

### **3.2 APPLICATION OF HARDWARE**

A. Install doors and hardware as specified in Section 08 14 00, INTERIOR WOOD DOORS and Section 08 71 00, DOOR HARDWARE.

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**SECTION 08 14 00  
INTERIOR WOOD DOORS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies interior flush doors with prefinish, prefit option.
- B. Section includes fire rated doors and smoke doors.

**1.2 RELATED WORK**

- A. Metal door frames: Section 08 11 13, HOLLOW METAL FRAMES.
- B. Door hardware including hardware location (height): Section 08 71 00, DOOR HARDWARE.
- C. Installation of hollow metal frames and hardware: Section 08 11 13, HOLLOW METAL FRAMES; Section 08 71 00, DOOR HARDWARE.
- D. Glazing: Section 08 80 00, GLAZING.
- E. Finish: Drawing IN-601, INTERIOR FINISH SCHEDULE.
- F. Lead lined wood door: Section 13 49 00, RADIATION PROTECTION.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. Corner section of flush veneered door 300 mm (12 inches) square, showing details of construction, labeled to show grade and type number and conformance to specified standard.
  - 2. Veneer sample 200 mm (8 inch) by 275 mm (11 inch) by 6 mm (1/4 inch) showing specified wood species sanded to receive a transparent finish. Factory finish veneer sample where the prefinished option is accepted.
- C. Shop Drawings:
  - 1. Show every door in project and schedule location in building.
  - 2. Indicate type, grade, finish and size; include detail of glazing, sound gasketing, and pertinent details.
  - 3. Provide information concerning specific requirements not included in the manufacturer's literature and data submittal.
- D. Manufacturer's Literature and Data:
  - 1. Labeled fire rated doors showing conformance with NFPA 80.
- E. Laboratory Test Reports:
  - 1. Screw holding capacity test report in accordance with WDMA T.M.10.
  - 2. Split resistance test report in accordance with WDMA T.M.5.



3. Cycle/Slam test report in accordance with WDMA T.M.7.
4. Hinge-Loading test report in accordance with WDMA T.M.8.

#### **1.4 WARRANTY**

- A. Doors are subject to terms of Article titled "Warranty of Construction", FAR clause 52.246-21, except that warranty shall be as follows:
  1. For interior doors, manufacturer's warranty for lifetime of original installation.

#### **1.5 DELIVERY AND STORAGE**

- A. Factory seal doors and accessories in minimum of 6 mill polyethylene bags or cardboard packages which shall remain unbroken during delivery and storage.
- B. Store in accordance with WDMA I.S.1-A, J-1 Job Site Information.
- C. Label package for door opening where used.

#### **1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. Window and Door Manufacturers Association (WDMA):
  - I.S.1-A-04.....Architectural Wood Flush Doors
  - I.S.4-07A.....Water-Repellent Preservative Non-Pressure Treatment for Millwork
  - I.S.6A-01.....Architectural Wood Stile and Rail Doors
  - T.M.5-90.....Split Resistance Test Method
  - T.M.6-08.....Adhesive (Glue Bond) Durability Test Method
  - T.M.7-08.....Cycle-Slam Test Method
  - T.M.8-08.....Hinge Loading Test Method
  - T.M.10-08.....Screwholding Test Method
- C. National Fire Protection Association (NFPA):
  - 80-07.....Protection of Buildings from Exterior Fire
  - 252-08.....Fire Tests of Door Assemblies
- D. ASTM International (ASTM):
  - E90-04.....Laboratory Measurements of Airborne Sound Transmission Loss

## **PART 2 - PRODUCTS**

### **2.1 FLUSH DOORS**

- A. General:

1. Meet requirements of WDMA I.S.1-A, Extra Heavy Duty.
  2. Adhesive: Type II
  3. Thickness: 45 mm (1-3/4 inches) unless otherwise shown or specified.
- B. Face Veneer:
1. In accordance with WDMA I.S.1-A.
  2. One species throughout the project unless scheduled or otherwise shown.
  3. Specie for Transparent Finish: Refer to Drawing Sheet IN-601 for specie, cut, and finish.
    - a. Grade and Veneer Specie: "AA" grade face veneer, book match veneers, balance match face assembly. Match pairs/sets of doors.
    - b. Match face veneers for doors for uniform effect of color and grain at joints.
    - c. Door edges shall be same species as door face veneer.
    - d. On doors required to have transparent finish on one side and paint finish on other side, use veneers as required for transparent finish on both sides.
  4. Factory sand doors for finishing.
- C. Wood Stops for Glazed Openings:
1. Solid Wood of same species as face veneer.
  2. Glazing On Non-Labeled Doors: Use applied wood stops nailed tight on room side and attached on opposite side with flathead, countersunk wood screws, spaced approximately 125 mm (5 inches) on centers.
- D. Stiles and Rails:
1. Option for Wood Stiles and Rails: Composite material having screw withdrawal force greater than minimum performance level value when tested in accordance with WDMA T.M.10.
- E. Fire Rated Wood Doors:
1. Fire Performance Rating: As indicated on Drawing Sheet AE-611, DOOR AND FRAME SCHEDULE AND DETAILS.
  2. Labels:
    - a. Doors shall conform to the requirements of ASTM E2074, or NFPA 252, and, carry an identifying label from a qualified testing and inspection agency for class of door or opening shown designating fire performance rating.
    - b. Metal labels with raised or incised markings.

3. Performance Criteria for Stiles of doors utilizing standard mortise leaf hinges:
  - a. Hinge Loading: WDMA T.M.8. Average of 10 test samples for Extra Heavy Duty doors.
  - b. Direct screw withdrawal: WDMA T.M.10 for Extra Heavy Duty doors. Average of 10 test samples using a steel, fully threaded #12 wood screw.
  - c. Cycle Slam: 1,000,000 cycles with no loose hinge screws or other visible signs of failure when tested in accordance with WDMA T.M.7.
4. Additional Hardware Reinforcement:
  - a. Provide fire rated doors with hardware reinforcement blocking.
  - b. Size of lock blocks as required to secure hardware specified.
  - c. Top, bottom and intermediate rail blocks shall measure not less than 125 mm (five inches) minimum by full core width.
  - d. Reinforcement blocking in compliance with manufacturer's labeling requirements.
  - e. Mineral material similar to core is not acceptable.
5. Other Core Components: Manufacturer's standard as allowed by the labeling requirements.
6. Provide steel frame approved for use in labeled doors for vision panels.
7. Provide steel astragal on pair of doors.

F. Smoke Barrier Doors:

1. For glazed openings use steel frames approved for use in labeled doors.
2. Provide a steel astragal on one leaf of pairs of doors, including double egress doors.

**2.2 PREFINISH, PREFIT OPTION**

- A. Flush doors may be factory machined to receive hardware, bevels, undercuts, cutouts, accessories and fitting for frame.
- B. Factory fitting to conform to specification for shop and field fitting, including factory application of sealer to edge and routings.
- C. Flush doors to receive transparent finish (in addition to being prefit) shall be factory finished as follows:
  1. WDMA I.S.1-A Section F-3 specification for System TR-4, Conversion Varnish or System TR-5, Catalyzed Vinyl.

2. Use stain when required to produce the finish specified in Drawing Sheet IN-601, INTERIOR FINISH SCHEDULE.

### **2.3 IDENTIFICATION MARK:**

- A. On top edge of door.
- B. Either a stamp, brand or other indelible mark, giving manufacturer's name, door's trade name, construction of door, code date of manufacture and quality.
- C. Accompanied by either of the following additional requirements:
  1. An identification mark or a separate certification including name of inspection organization.
  2. Identification of standards for door, including glue type.
  3. Identification of veneer and quality certification.

### **2.4 SEALING:**

- A. Give top and bottom edge of doors two coats of catalyzed polyurethane or water resistant sealer before sealing in shipping containers.

## **PART 3 - EXECUTION**

### **3.1 DOOR PREPARATION**

- A. Field, shop or factory preparation: Do not violate the qualified testing and inspection agency label requirements for fire rated doors.
- B. Clearances between Doors and Frames and Floors:
  1. Maximum 3 mm (1/8 inch) clearance at the jambs, heads, and meeting stiles, and a 19 mm (3/4 inch) clearance at bottom, except as otherwise specified.
  2. Maximum clearance at bottom of sound rated doors, light-proofed doors, doors to operating rooms, and doors designated to be fitted with mechanical seal: 10 mm (3/8 inch).
- C. Provide cutouts for special details required and specified.
- D. Rout doors for hardware using templates and location heights specified in Section, 08 71 00 DOOR HARDWARE.
- E. Fit doors to frame, bevel lock edge of doors 3 mm (1/8 inch) for each 50 mm (two inches) of door thickness undercut where shown.
- F. Immediately after fitting and cutting of doors for hardware, seal cut edges of doors with two coats of water resistant sealer.
- G. Finish surfaces, including both faces, top and bottom and edges of the doors smooth to touch.
- H. Apply a steel astragal on the opposite side of active door on pairs of fire rated doors.

- I. Apply a steel astragal to meeting style of active leaf of pair of doors or double egress smoke doors.

### **3.2 INSTALLATION OF DOORS AND APPLICATION OF HARDWARE**

- A. Install doors to comply with manufacturer's written instructions and referenced quality standard and as detailed on Drawings.
- B. Refer to Section 087100, DOORS HARDWARE for installation of door hardware.

### **3.3 DOOR PROTECTION**

- A. As door installation is completed, place polyethylene bag or cardboard shipping container over door and tape in place.
- B. Provide protective covering over knobs and handles in addition to covering door.
- C. Maintain covering in good condition until removal is approved by Contracting Officer's Technical Representative.

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**SECTION 08 31 13  
ACCESS DOORS AND FRAMES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. Section specifies access doors or panels.

**1.2 RELATED WORK:**

- A. Lock Cylinders: Section 08 71 00, DOOR HARDWARE.
- B. Access doors in acoustical ceilings: Section 09 51 00, ACOUSTICAL CEILINGS.
- C. Locations of access doors for duct work cleanouts: Section 23 31 00, HVAC DUCTS AND CASINGS; Section 23 37 00, AIR OUTLETS AND INLETS.

**1.3 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Access doors, each type, showing construction, location and installation details.
- C. Manufacturer's Literature and Data: Access doors, each type.

**1.4 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A167-99(R-2004).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
  - A1008-07.....Steel Sheet, Cold-Rolled, Carbon, Structural, High Strength Low-Alloy
- C. American Welding Society (AWS):
  - D1.3-98.....Structural Welding Code Sheet Steel
- D. National Fire Protection Association (NFPA):
  - 80-06.....Fire Doors and Windows
- E. The National Association of Architectural Metal Manufacturers (NAAMM):
  - AMP 500 Series.....Metal Finishes Manual
- F. Underwriters Laboratories, Inc. (UL):
  - Fire Resistance Directory

**PART 2 - PRODUCTS**

**2.1 FABRICATION, GENERAL**

- A. Fabricate components to be straight, square, flat and in same plane where required.

1. Slightly round exposed edges and without burrs, snags and sharp edges.
  2. Exposed welds continuous and ground smooth.
  3. Weld in accordance with AWS D1.3.
- B. Number of locks and non-continuous hinges as required to maintain alignment of panel with frame. For fire rated doors, use hinges and locks as required by fire test.
- C. Provide anchors or make provisions in frame for anchoring to adjacent construction. Provide size, number and location of anchors on four sides to secure access door in opening. Provide anchors as required by fire test.

## **2.2 ACCESS DOORS, FIRE RATED:**

- A. Shall meet requirements for "B" label 1-1/2 hours with maximum temperature rise of 120 degree C (250 degrees F).
- B. Comply with NFPA 80 and have Underwriters Laboratories Inc., or other nationally recognized laboratory label for Class B opening.
- C. Door Panel: Form of 0.9 mm (0.0359 inch) thick steel or stainless steel sheet, insulated sandwich type construction.
- D. Frame: Form of 1.5 mm (0.0598 inch) thick steel sheet of depth and configuration to suit material and type of construction where installed. Provide frame flange at perimeter where installed in concrete masonry or gypsum board openings.
1. Weld exposed joints in flange and grind smooth.
  2. Provide frame flange at perimeter where installed in concrete masonry or gypsum board.
- E. Automatic Closing Device: Provide automatic closing device for door.
- F. Hinge: Continuous steel hinge with stainless steel pin.
- G. Lock:
1. Self-latching, with provision for fitting flush a standard screw-in type lock cylinder. Lock cylinder specified in Section 08 71 00, DOOR HARDWARE.
  2. Provide latch release device operable from inside of door. Mortise case in door.

## **2.3 ACCESS DOORS, FLUSH PANEL:**

- A. Door Panel:
1. Form of 1.9 mm (0.0747 inch) thick steel or 1.5 mm (0.0598 inch) thick stainless steel sheet.
  2. Reinforce to maintain flat surface.

**B. Frame:**

1. Form of 1.5 mm (0.0598 inch) thick steel or stainless steel sheet of depth and configuration to suit material and type of construction where installed.
2. Provide surface mounted units having frame flange at perimeter where installed in concrete, masonry, or gypsum board construction.
3. Weld exposed joints in flange and grind smooth.

**C. Hinge:**

1. Concealed spring hinge to allow panel to open 175 degrees.
2. Provide removable hinge pin to allow removal of panel from frame.

**D. Lock:**

1. Flush, screwdriver operated cam lock.

**2.4 FINISH:**

- A. Provide in accordance with NAAMM AMP 500 series on exposed surfaces.
- B. Steel Surfaces: Baked-on prime coat over a protective phosphate coating.
- C. Stainless Steel: No. 4 for exposed surfaces.

**2.5 SIZE:**

- A. Minimum 600 mm (24 inches) square door unless otherwise shown or required to suit opening in suspension system of ceiling.

**PART 3 - EXECUTION****3.1 LOCATION:**

- A. Provide access panels or doors wherever any valves, traps, dampers, cleanouts, and other control items of mechanical, electrical and conveyor work are concealed in wall or partition, or are above ceiling of gypsum board or plaster.
- B. Use fire rated doors in fire rated partitions and ceilings.
- C. Use flush panels in partitions and gypsum board or plaster ceilings, except lay-in acoustical panel ceilings or upward access acoustical tile ceilings.
- D. Use stainless steel access doors or panels in wet areas or ceramic tile surfaces.

**3.2 INSTALLATION, GENERAL:**

- A. Install access doors in openings to have sides vertical in wall installations, and parallel to ceiling suspension grid or side walls when installed in ceiling.
- B. Set frames so that edge of frames without flanges will finish flush with surrounding finish surfaces.



- C. Set frames with flanges to overlap opening and so that face will be uniformly spaced from the finish surface.
- D. Set recessed panel access doors recessed so that face of surrounding materials will finish on the same plane, when finish in door is installed.

### **3.3 ANCHORAGE:**

- A. Secure frames to adjacent construction using anchors attached to frames or by use of bolts or screws through the frame members.
- B. Type, size and number of anchoring device suitable for the material surrounding the opening, maintain alignment, and resist displacement during normal use of access door.
- C. Anchors for fire rated access doors shall meet requirements of applicable fire test.

### **3.4 ADJUSTMENT:**

- A. Adjust hardware so that door panel will open freely.
- B. Adjust door when closed so door panel is centered in the frame.

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**SECTION 08 33 13  
COILING COUNTER DOORS**

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Section specifies overhead roll up coiling shutters over counter in walls, including frame.
- B. Manual crank up operation.

**1.2 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Shutter.
  - 2. Installation procedures and instructions.
- C. Shop Drawings:
  - 1. Shutter showing details of construction and installation.

**1.3 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A47-99(R2004).....Malleable Iron Castings
  - A48-03.....Gray Iron Castings
  - A53-06.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated  
Welded and Seamless
  - A167-99(R2004).....Stainless and Heat-Resisting Chromium-Nickel  
Steel Plate, Sheet and Strip
  - A653-07.....Steel Sheet Zinc-Coated (Galvanized) or Zinc-  
Iron Alloy Coated (Galvannealed) by the Hot Dip  
Process
  - B209-06.....Aluminum and Aluminum-Alloy Sheet and Plate
  - B221-06.....Aluminum and Aluminum-Alloy Extruded Bars,  
Rods, Wire, Shapes, and Tubes
  - F468-06.....Nonferrous Bolts, Hex Cap Screws, and Studs for  
General Use
  - F593-02.....Stainless Steel Bolts, Hex Cap Screws, and  
Studs
- C. American Welding Society (AWS):

- D1.1-04.....Structural Welding Code Steel
- D1.2-03.....Structural Welding Code Aluminum
- D1.3-98.....Structural Welding Code Sheet Steel
- D. National Association of Architectural Metal Manufacturers (NAAMM)  
AMP 500 Series-1988.....Metal Finishes Manual
- E. American Architectural Manufacturers Association (AAMA):  
2605-05.....Voluntary Specification for High Performance  
Organic Coatings on Architectural Extrusions  
and Panels
- F. Federal Specifications (Fed. Spec):  
TT-P-645B.....Primer, Paint, Zinc-Molybdates, Alkyd Type
- G. National Fire Protection Association (NFPA):  
80-06.....Fire Doors and Fire Windows

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Curtain:
  - 1. Slats: No.1F, interlocked flat-faced slats, 1-1/2 inches (38mm) high by 1/2 inch (13mm) deep, 22 gauge ASTM A 653, Commercial Quality, galvanized steel with plain steel bottom bar and vinyl astragal.
  - 2. Fabricate continuous interlocking slat sections with high strength galvanized steel endlocks riveted to slats per UL requirements.
  - 3. Slat Finish: Manufacturer's standard finish, color to be selected from standard color selection.
  - 4. Bottom Bar Finish: Steel, ASTM A 123, Grade 85 zinc coating, hot-dip galvanized.
- B. Guides:
  - 1. Steel: 12 gauge formed shapes.
  - 2. Finish: Steel, ASTM A 123, Grade 85 zinc coating, hot-dip galvanized.
- C. Counterbalance Shaft Assembly:
  - 1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width.
  - 2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.

- D. Brackets: Fabricate from reinforced steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
  - 1. Finish: Steel, ASTM A 123, Grade 85 zinc coating, hot-dip galvanized.
- E. Hood and mechanism covers: 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.
  - 1. Finish: Manufacturer's standard finish, color to be selected from standard color selection.
- F. Smoke Seals:
  - 1. Bottom Bar: UL Tested PVC double bulb seal.
  - 2. Guides and Head: Replaceable, UL Listed, nylon pile smoke seals sealing against fascia side of curtain.

## **2.2 ACCESSORIES**

- A. Ionization Smoke Detector: UL listed.
- B. Fire Emergency Annunciator: Provide ADA compliant horn/strobe fire emergency annunciator to give advanced warning that the fire door is about to close. Warning signal to activate upon alarm signal.

## **2.3 OPERATION**

- A. Manual Crank Hoist: Provide combination crank / controlled closing system operator including removable hand crank, geared reduction unit and a wall mounted Push To Close station. Integral to the unit is a locking mechanism to hold the door at any position of travel during normal door operation mode and a governor to control automatic closing speed.
- B. Automatic closure shall be activated by a local smoke/fire detector by means of a fail-safe releasing device. Doors shall maintain an average closing speed of not more than 9" (229 mm) per second during normal and automatic closing. Resetting of spring tension or mechanical dropouts shall not be required.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with approved shop drawings and manufacturer's instructions.
- B. Locate anchors and inserts for guides, brackets, supports, hardware, and other accessories and components accurately.

C. Securely attach guides to adjoining construction with not less than 10 mm (3/8-inch) diameter bolts, spaced near each end and not over 600 mm (24 inches) apart.

1. Use fasteners conforming to ASTM F468 and F593.
2. Use stainless steel bolts with aluminum or stainless steel.
3. Use toggle bolts to frame walls or hollow masonry.
4. Use expansion bolts in solid masonry or concrete.

### **3.2 REPAIR**

A. Repair damaged zinc-coated surfaces by applying galvanized repair compound in accordance with the manufacturer's directions.

### **3.3 PROTECTION**

- A. Isolate aluminum in contact with or fastened to dissimilar metal other than stainless steel, white bronze or other metals compatible with aluminum by painting the dissimilar or aluminum with a coat of TT-P-645 primer, or by placing an approved caulking compound, or a non-absorptive tape, or gasket between the aluminum and dissimilar metal.
- B. Paint aluminum in contact with masonry or concrete with a coat of TT-P-645.

### **3.4 ADJUSTING AND CLEANING**

- A. Lubricate properly, adjust and demonstrate, to operate freely and as specified.
- B. Clean upon completion.

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**SECTION 08 56 19**  
**PASS WINDOWS**

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This section specifies custom sliding glass counter mounted pass windows.

**1.2 RELATED WORK**

- A. Pass window opening: Section 08 33 13, COILING COUNTER DOORS.  
B. Glass and Glazing: Section 08 80 00, GLAZING.

**1.3 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extend referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):  
B221/221M-06.....Aluminum and Aluminum- Alloy Extruded Bars,  
Rods, Wire, Shapes and Tubes (Metric)  
C509-06.....Elastomeric Cellular Preformed Gasket and  
Sealing Material
- C. American Society of Mechanical Engineers (ASME):  
B18.6.4-98(R2005).....Thread Forming and Thread Cutting Tapping  
Screws and Metallic Drive Screws
- D. Master Painters Institute (MPI):  
MPI #18.....Organic Zinc Rich Coating
- E. National Association of Architectural Metal Manufacturers (NAAMM):  
AMP 500 Series.....Metal Finishes Manual  
AMP 500.....Introduction to Metal Finishing  
AMP 501.....Finishes for Aluminum

**PART 2 - PRODUCTS****2.1 MATERIAL**

- A. Aluminum Extrusions:
1. ASTM B 221 M.
  2. Alloy and temper recommended by window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 150 MPa (22,000 psi) ultimate tensile strength, and yield of 110 MPa (16,000 psi).
  3. Aluminum alloy used for clear anodic coating as required.
- B. Glazing Gaskets: ASTM C 509.

**2.2 SLIDING GLASS PASS WINDOWS, COUNTER MOUNTED**

- A. Fabricate sliding glass sash and frames of extruded aluminum with corners mitered.
- B. Fabricate sash to receive 6 mm (1/4 inch) thick glass.
- C. Fabricate sliding sash of "H" channel molding at bottom edges including concealed nylon rollers at bottom set on track and guides at top set into track.
- D. Provide sash with pin tumbler lock and two keys.
- E. Provide sash with finger slot on vertical edge.
- F. Fabricate frame with channel sash slot, bottom roller track, and top guides.
- G. Sash may be factory or field glazed using glazing gaskets.
- H. Use concealed screws in assembly.
- I. Finish:
  - 1. Comply with NAAMM AMP 500 Series.
  - 2. Clear anodic coating, Class II Architectural 0.4 mills thick, AA-C22A41.

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Install in pass window opening level and plumb.
- B. Secure with screws to opening; ASME B18.6.4.
  - 1. Screw within 100 mm (4 inches) of ends.
  - 2. Space screws not over 600 mm (24 inches) between end screws.
- C. Coat aluminum in contact with steel with one coat of MPI No. 18.
- D. Clean unit of dust and markings.

**3.2 OPERATION**

- A. Adjust to roll smoothly and stay in position where stopped.
- B. Demonstrate to Contracting Officer's Technical Representative operation and locking.
- C. Turn keys with key tags over to Contracting Officer's Technical Representative.

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**SECTION 08 71 00  
DOOR HARDWARE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Door hardware and related items necessary for complete installation and operation of doors.

**1.2 RELATED WORK**

- A. Caulking: Section 07 92 00 JOINT SEALANTS.
- B. Application of Hardware: also see Section 08 11 13, HOLLOW METAL FRAMES, Section 08 14 00, INTERIOR WOOD DOORS.
- C. Door Schedule: Refer to Drawing sheet AE-611, DOOR FRAME SCHEDULE AND DETAILS
- C. Finishes: Refer to Drawing Sheet IN-601, FINISH SCHEDULE.
- D. Painting: Section 09 91 00, PAINTING.
- E. Card Readers: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS.

**1.3 GENERAL**

- A. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards) unless specified otherwise.
- B. Hardware for Labeled Fire Doors and Exit Doors: Conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Provide hardware listed by UL, except where heavier materials, large size, or better grades are specified herein under paragraph HARDWARE SETS. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements.
- C. Deadlocks specified for psychiatric area doors are not required to have "UL" label.
- D. Hardware for application on metal and wood doors and frames shall be made to standard templates. Furnish templates to the fabricator of these items in sufficient time so as not to delay the construction.
- E. The following items shall be of the same manufacturer, if possible, except as otherwise specified:
  - 1. Mortise locksets.
  - 2. Hinges for wood doors.
  - 3. Surface applied overhead door closers.
  - 4. Exit devices.
  - 5. Floor closers.



**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Hardware Schedule: Prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHMA Finish Designation

- C. Samples and Manufacturers' Literature:
1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.
  2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.
- D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

**1.5 DELIVERY AND MARKING**

- A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to Contracting Officer's Technical Representative for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in Contracting Officer's Technical Representative's office until all other similar items have been installed in project, at which time the

Contracting Officer's Technical Representative will deliver items on file to Contractor for installation in predetermined locations on the project.

#### 1.6 INSTRUCTIONS

- A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters "HW" followed by a number. Each number designates a set of hardware items applicable to a door type.
- B. Manufacturers' Catalog Number References: Where manufacturers' products are specified herein, products of other manufacturers which are considered equivalent to those specified may be used. Manufacturers whose products are specified are identified by abbreviations as follows:

CR	Corbin Russwin	Berlin, CT
MC	McKinney Hinge	Berlin, CT
NO	Norton Door Controls	Monroe, NC
PE	Pemko	Memphis, TN
RO	Rockwood Manufacturing	Rockwood, PA
RX	Rixson Specialty Door Controls	Carol Stream, IL
SN	Securitron MagnaLock Corp.	Phoenix, AZ

- C. Keying: All cylinders shall be keyed into existing Corbin Russwin HO Keyway Great Grand Master Key System. Provide removable core cylinders that are removable only with a special key or tool without disassembly of knob or lockset Cylinders shall be 6 pin type. Keying information shall be furnished at a later date by the Contracting Officer's Technical Representative.
1. Keying information will be furnished to the Contractor by the Contracting Officer's Technical Representative.
  2. Supply information regarding key control of cylinder locks to manufacturers of equipment having cylinder type locks. Notify Contracting Officer's Technical Representative immediately when and to whom keys or keying information is supplied. Return all such keys to the Contracting Officer's Technical Representative.

**1.7 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.
- B. American Society for Testing and Materials (ASTM):  
F883-04.....Padlocks
- C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):  
A156.1-00.....Butts and Hinges  
A156.2-03.....Bored and Pre-assembled Locks and Latches  
A156.3-01.....Exit Devices  
A156.4-00.....Door Controls (Closers)  
A156.5-01.....Auxiliary Locks and Associated Products  
A156.6-05.....Architectural Door Trim  
A156.8-05.....Door Controls-Overhead Stops and Holders  
A156.13-05.....Mortise Locks and Latches Series 1000  
A156.15-06.....Release Devices-Closer Holder, Electromagnetic  
and Electromechanical  
A156.16-02.....American National Standard for Auxiliary  
Hardware  
A156.18-00.....Materials and Finishes  
A156.21-06.....Thresholds  
A156.22-05.....Door Gasketing and Edge Seal Systems  
A156.23-04.....Electromagnetic Locks  
A156.24-03.....Delayed Egress Locking Systems  
A156.26-00.....Continuous Hinges  
A156.31 .....American National Standard for Electric Strikes  
and Frame Mounted Actuators  
A250.8-03.....Standard Steel Doors and Frames
- D. National Fire Protection Association (NFPA):  
80-06.....Fire Doors and Fire Windows  
101-05.....Life Safety Code
- E. Underwriters Laboratories, Inc. (UL):  
Building Materials Directory (2007)

**PART 2 - PRODUCTS**

## 2.1 BUTT HINGES

- A. ANSI A156.1. The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:
1. Exterior Doors: Type A2112 for doors 900 mm (3 feet) wide or less and Type A2111 for doors over 900 mm (3 feet) wide. Hinges for exterior doors shall have non-removable pins.
  2. Interior Doors: Type 8112 for doors 900 mm (3 feet) wide or less and Type A8111 for doors over 900 mm (3 feet) wide.
  3. Automatic doors hung on butts, provide Type A2111 for exterior doors and aluminum doors, and Type A8111 for other doors.
  4. Any door installed in structural steel frames: Type A2412, A8412, A2411 or A8411 as applicable, except where otherwise specified. Such hinges shall be of same quality and weight as other hinges listed above for applicable door sizes.
  5. Labeled Wood Fire Doors: Type 8411 or Type 8412; these hinges shall be thru bolted to door with hex nuts and bolts.
- B. See Articles "MISCELLANEOUS HARDWARE" and "HARDWARE SETS" for pivots and hinges other than butts specified above and continuous hinges specified below.

## 2.2 CONTINUOUS HINGES

- A. ANSI/BHMA A156.26, Grade 1-150.
1. Listed under Category N in BHMA's "Certified Product Directory."
- B. General: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete:
1. Fire Pins: Steel pins to hold labeled fire doors in place if required by tested listing.
- C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a pin that extends entire length of hinge.
1. Base Metal for Exterior Hinges: Stainless steel.
  2. Base Metal for Interior Hinges: Aluminum.
  3. Base Metal for Hinges for Fire-Rated Assemblies: Steel
- D. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves; joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

**2.3 DOOR CLOSING DEVICES**

- A. Closing devices shall be products of one manufacturer for each type specified.

**2.4 OVERHEAD CLOSERS**

- A. Conform to ANSI A156.4, Grade 1.
- B. Closers shall conform to the following:
  - 1. The closer shall have 50 percent adjustable closing force over minimum value for that closer and have adjustable hydraulic back check effective between 60 degrees and 85 degrees of door opening.
  - 2. Where specified, closer shall have hold-open feature.
  - 3. Size Requirements: Size closers in accordance with manufacturer's recommendations or provide multi-size closers, sizes 1 through 6.
  - 4. Material of closer shall be forged or cast aluminum.
  - 5. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
  - 6. Closers shall have full size cover.
  - 7. Closers shall have adjustable hydraulic back-check and separate valves for closing and latching speed.

**2.5 FLOOR CLOSERS AND FLOOR PIVOT SETS**

- A. Comply with ANSI A156.4. Provide stainless steel floor plates for floor closers and floor pivots, except where metal thresholds occur. Provide cement cast for all floor closers. Floor closers specified for fire doors shall comply with Underwriters Laboratories, Inc., requirements for concealed type floor closers for classes of fire doors indicated on drawings. Hold-open mechanism, where required, shall engage when door is opened 105 degrees, except when door swing is limited by building construction or equipment, the hold-open feature shall engage when door is opened approximately 90 degrees. Floor closers shall have adjustable hydraulic back-check. Single acting floor closers shall also have built in dead stop. Pivots for non-labeled doors shall be cast, forged or extruded brass or bronze.
- B. Where floor closer appears in hardware set provide the following as applicable.
  - 1. Double Acting Floor Closers: Type C06012.
  - 2. Single Acting Floor Closer: Type C06021 (center pivoted).  
(Intermediate pivot is not required).
  - 3. Single Acting Floor Closers: Type C06041 (offset pivoted).

4. Single Acting Floor Closer for Labeled Fire Doors: Type C06051 (offset pivoted).
5. Single Acting Floor Closer For Lead Lined Doors: Type C06061 (center pivoted). (Intermediate pivot is not required).
6. Single Acting Floor Closers For Lead Lined Doors: Type C06071 (offset pivoted).

## **2.6 COMBINATION CLOSER - HOLDER**

- A. Conform to ANSI A156.15; combination closer-holder with built-in electronic release.
- B. Combination closer-holder shall have the following features:
  1. Control door closing and latching sequence by hydraulic action.
  2. Wiring for 24V DC current. Current draw shall not exceed 0.16 amperes.
  3. Double level arm closing action, and adjustable hydraulic back-check.
  4. Spring power for closing force shall conform to ANSI A156.4 and have 50% spring power adjustment.
  5. Closer Size Requirements:
    - a. Doors, 900 mm (3 feet) and less in width: Size III closer.
    - b. Doors over 900 mm (3 feet) and less than 1050 mm (3 feet 6 inches) in width: Size IV closer.
    - c. Doors 1050 mm (3 feet 6 inches) and over in width: Size V closer.
  6. Hold open mechanism shall hold door open between 85 degrees and 180 degrees depending on wall and frame conditions. Mount device to provide maximum door opening permitted by building construction or equipment.
  7. Electronic release shall release door when signaled by smoke detector. Smoke detectors shall not be incorporated as an integral part of door holders. Smoke detectors are specified in the Section 28 31 00 FIRE ALARM SYSTEMS.
  8. All closers to have full covers.
  9. All closers shall have a 1 ½" piston and an adjustable back check position valve.

## **2.7 DOOR STOPS**

- A. Conform to ANSI A156.16.
- B. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of

building construction. For concrete, masonry or quarry tile construction, use lead expansion shields for mounting door stops.

- C. Where cylindrical locks with turn pieces or pushbuttons occur, equip wall bumpers Type L02251 (rubber pads having concave face) to receive turn piece or button.
- D. Substitute floor stops Type L02141 or L02161 as appropriate, when wall bumpers would not provide an effective door stop.
- E. Where drywall partitions occur, use floor stops, Type L02141 or L02161.
- F. Provide stop Type L02011 or L02181, as applicable for exterior doors.
- G. Omit stops where floor mounted door holders are required and where automatic operated doors occur.
- H. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.
- I. Provide appropriate door mounted stop on doors in individual toilets where floor or wall mounted stops cannot be used.
- J. Provide overhead surface applied stop Type C02541, ANSI A156.8 on patient toilet doors in bedrooms where toilet door could come in contact with the bedroom door.
- K. Provide door stops on doors where combination closer magnetic holders are specified.

## **2.8 OVERHEAD DOOR HOLDERS**

- A. Conform to ANSI Standard A156.8. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door. Set overhead holders for 110 degree opening, unless limited by building construction or equipment.

## **2.9 FLOOR DOOR HOLDERS**

- A. Conform to ANSI Standard A156.16. Provide extension strikes for Types L01301 and L01311 holders where necessary.

## **2.10 LOCKS AND LATCHES**

- A. Conform to ANSI A156.2. Locks and latches for doors 45 mm (1-3/4 inch) thick or over shall have beveled fronts. Lock cylinders shall have not less than six pins. Cylinders for all locksets shall be removable core type. Cylinder shall be removable by special key or tool. Construct all cores so that they will be interchangeable into the core housings of all mortise locks, rim locks, cylindrical locks, and any other type lock included in the Great Grand Master Key System. Disassembly of lever or lockset shall not be required to remove core from lockset. All

locksets or latches on double doors with fire label shall have latch bolt with 19 mm (3/4 inch) throw. Provide temporary keying device or construction core of allow opening and closing during construction and prior to the installation of final cores.

- B. In addition to above requirements, locks and latches shall comply with following requirements:
1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13. Mortise locksets shall be series 1000, minimum Grade 2. All locksets and latchsets, except on designated doors in Psychiatric (Mental Health) areas, shall have lever handles similar to Falcon S-lever Design. Lever handle shall be fabricated from wrought stainless steel. No substitute lever design or material shall be accepted. All locks and latchsets shall be furnished with curved lip strike and wrought box. Lock function F02 shall be furnished with key plates similar to Russwin's No. A70. All lock cases installed on lead lined doors shall be lead lined before applying final hardware finish. Furnish armored fronts for all mortise locks.
  2. Cylindrical Lock and Latch Sets: levers shall meet ADA (Americans with Disabilities Act) requirements. Cylindrical locksets shall be series 4000 Grade I. Knobs for series 4000 lock and latch sets shall have 57 mm (2-1/4 inch) diameters. Where two turn pieces are specified for lock F76, turn piece on inside knob shall lock and unlock inside knob, and turn piece on outside knob shall unlock outside knob when inside knob is in the locked position. (This function is intended to allow emergency entry into these rooms without an emergency key or any special tool.)
  3. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.5.

#### **2.11 PUSH-BUTTON COMBINATION LOCKS**

- A. ANSI/BHMA A156.5, Grade 1. Mechanical or electrically operated as indicated.
- B. Construction: Heavy duty cylindrical lock housing conforming to ANSI/BHMA A156.2, Grade 1. Lever handles and operating components in compliance with the UFAS and the ADA Accessibility Guidelines.
- C. Special Features: Key override to permit a master keyed security system and a key activated passage feature to allow access without using the entry code.



**2.12 ELECTROMAGNETIC LOCKS**

A. ANSI/BHMA A156.23; electrically powered, of strength and configuration indicated; with electromagnet attached to frame and armature plate attached to door. Listed under Category E in BHMA's "Certified Product Directory."

1. Type: Full exterior or full interior, as required by application indicated.
2. Strength Ranking: 1500 lbf (6672 N).
3. Inductive Kickback Peak Voltage: Not more than 53 OV.
4. Residual Magnetism: Not more than 4 lbf (18 N) to separate door from magnet.

B. Delayed-Egress Locks: BHMA A156.24. Listed under Category G in BHMA's "Certified Product Directory".

1. Means of Egress Doors: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds, as required by NFPA 101.
2. Security Grade: Activated from secure side of door by initiating device.
3. Movement Grade: Activated by door movement as initiating device.

**2.13 ELECTRIC STRIKES**

A. ANSI/ BHMA A156.31 Grade 1.

B. General: Use fail-secure electric strikes with fire-rated devices.

**2.14 KEYS**

A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

Locks/Keys	Quantity
Cylinder locks	2 keys each
Cylinder lock change key blanks	100 each different key way
Master-keyed sets	6 keys each
Grand Master sets	6 keys each
Great Grand Master set	5 keys
Control key	1 key

**2.15 ARMOR PLATES, COMBINATION KICK-MOP PLATES AND DOOR EDGING**

A. Conform to ANSI Standard A156.6.

B. Provide protective plates as specified below:

1. Kick-mop plates and armor plates plastic or metal, Type J100 series, color as required.
2. Provide kick-mop plates for both sides of each door, except where noted as not required. Kick-mop plates shall be 200 mm (8 inches) high. On push side of doors where jamb stop extends to floor, make combination kick-mop plates 38 mm (1-1/2 inches) less than width of door, except pairs of metal doors which shall have plates 25 mm (1 inch) less than width of each door. Extend all other combination kick-mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.
3. Kick-mop plates are not required on following door sides:
  - a) Armor plate side of doors;
  - b) Exterior side of exterior doors;
  - c) Closet side of closet doors;
  - d) Storage side of doors to or from storage spaces; and
  - e) Both sides of aluminum entrance doors.
4. Armor plates for doors are listed under Article "Hardware Sets". Armor plates shall be 875 mm (35 inches) high and 38 mm (1-1/2 inches) less than width of doors, except on pairs of metal doors. Plates on pairs of metal doors shall be 25 mm (1 inch) less than width of each door. Where top of intermediate rail of door is less than 875 mm (35 inches) from door bottom, extend armor plates to within 13 mm (1/2 inch) of top rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt cross bar.
5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick-mop plate in place of armor plate. Size of stretcher plate and kick-mop plate shall be 200 mm (8 inches) high.

#### **2.16 EXIT DEVICES**

- A. Conform to ANSI Standard A156.3. Exit devices shall be Grade 1; type and function are specified in hardware sets. Provide flush with finished floor strikes for vertical rod exit devices in interior of building. Trim shall have lever handles similar to locksets, unless otherwise specified.
- B. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

**2.17 FLUSH BOLTS (LEVER EXTENSION)**

- A. Conform to ANSI A156.16. Flush bolts shall be Type L24081 unless otherwise specified. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors. Modify flush bolts to fit stiles of aluminum doors on double-acting doors.
- B. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2-1/2 inches).
- C. Friction-fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.

**2.18 FLUSH BOLTS (AUTOMATIC)**

- A. Conform to ANSI A156.16. Dimension of flush bolts shall conform to ANSI A115. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware. Flush bolts shall automatically latch and unlatch. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flushbolt. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1-1/2 by 3-1/2 inches).

**2.19 DOOR PULLS**

- A. Conform to ANSI A156.6. Pull plate 90 mm by 350 mm (3-1/2 inches by 14 inches), unless otherwise specified. Cut plates of door pulls for cylinders, or turn pieces where required.

**2.20 PUSH PLATES**

- A. Conform to ANSI A156.6. Plastic, Type J302, 200 mm (8 inches) wide by 350 mm (14 inches) high. Provide plastic Type J300 plates 100 mm (4 inches wide by 350 mm (14 inches) high) where push plates are specified for doors with stiles less than 200 mm (8 inches) wide. Color shall be selected from manufacturer's standards. Cut plates for cylinders, and turn pieces where required.

**2.21 COMBINATION PUSH AND PULL PLATES**

- A. Conform to ANSI 156.6. Type J303, stainless steel 3 mm (1/8 inch) thick, 80 mm (3-1/3 inches) wide by 800 mm (16 inches) high), top and bottom edges shall be rounded. Secure plates to wood doors with 38 mm (1-1/2 inch) long No. 12 wood screws. Cut plates for turn pieces, and cylinders where required. Pull shall be mounted down.

**2.22 COORDINATORS**

- A. Conform to ANSI A156.16. Coordinators, when specified for fire doors, shall comply with Underwriters Laboratories, Inc., requirements for fire door hardware. Coordinator may be omitted on exterior pairs of doors where either door will close independently regardless of the

position of the other door. Coordinator may be omitted on interior pairs of non-labeled open where open back strike is used. Open back strike shall not be used on labeled doors. Paint coordinators to match door frames, unless coordinators are plated.

### **2.23 THRESHOLDS**

- A. Conform to ANSI A156.21, mill finish extruded aluminum, except as otherwise specified. In existing construction, thresholds shall be installed in a bed of sealant with machine screws and expansion shields. In new construction, embed aluminum anchors coated with epoxy in concrete to secure thresholds. Furnish thresholds for the full width of the openings.

### **2.24 AUTOMATIC DOOR BOTTOM SEAL AND RUBBER GASKET FOR LIGHT PROOF DOORS**

- A. Conform to ANSI A156.22.

### **2.25 WEATHERSTRIPS (FOR EXTERIOR DOORS)**

- A. Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length ( $0.000774\text{m}^3/\text{s/m}$ ).

### **2.26 MISCELLANEOUS HARDWARE**

- A. Access Doors (including Sheet Metal, Screen and Woven Wire Mesh Types): Except for fire-rated doors and doors to Temperature Control Cabinets, equip each single or double metal access door with Lock Type E76213, conforming to ANSI A156.5. Key locks as directed. Ship lock prepaid to the door manufacturer. Hinges shall be provided by door manufacturer.
- B. Cylinders for Various Partitions and Doors: Key cylinders same as entrance doors of area in which partitions and door occur, except as otherwise specified. Provide cylinders to operate locking devices where specified for following partitions and doors:
  - 1. Folding doors and partitions.
  - 2. Wicket door (in roll-up door assemblies).
  - 3. Slide-up doors.
  - 4. Swing-up doors.
  - 5. Fire-rated access doors-Engineer's key set.
  - 6. Doors from corridor to electromagnetic shielded room.
  - 7. Day gate on vault door.
- C. Mutes: Conform to ANSI A156.16. Provide door mutes or door silencers Type L03011, of white or light gray color, on each steel door frame, except lead-lined frames and frames for sound-resistant, lightproof and electromagnetically shielded doors. Furnish 3 mutes for single doors and 2 mutes for each pair of doors, except double-acting doors. Provide

4 mutes or silencers for frames for each Dutch type door. Provide 2 mutes for each edge of sliding door which would contact door frame.

## **2.27 PADLOCKS FOR VARIOUS DOORS, GATES AND HATCHES**

- A. ASTM E883, size 50 mm (2 inch) wide chain; furnish extended shackles as required by job conditions. Provide padlocks, with key cylinders, for each door in following areas as noted.

## **2.28 FINISHES**

- A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds, etc., shall be as specified below under "Miscellaneous Finishes." For field painting (final coat) of ferrous hardware, see Section 09 91 00, PAINTING.
- B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.
- C. Miscellaneous Finishes:
1. Hinges-Interior Doors: 652.
  3. Pivots: Match door trim.
  4. Door Closers: Factory applied paint finish. Dull or Satin Aluminum color.
  5. Thresholds: Mill finish aluminum.
  6. Cover plates for floor hinges and pivots: 630.
  7. Other primed steel hardware: 652.
- D. Hardware Finishes for Existing Buildings: U.S. Standard finishes shall match finishes of hardware in (similar) existing spaces except where otherwise specified.
- E. Color of Plastic Items: Where colors other than chocolate brown or black are specified, color of core material may be different than color of face.
- F. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze) finish on door closers shall closely match doors.

## **2.29 BASE METALS**

- A. Apply specified U.S. Standard finishes on different base metals as following:

<b>Finish</b>	<b>Base Metal</b>
652	Steel
626	Brass or bronze

630

Stainless steel

**PART 3 - EXECUTION****3.1 HARDWARE HEIGHTS**

- A. For existing buildings locate hardware on doors at heights to match existing hardware. The Contractor shall visit the site, verify location of existing hardware and submit locations to Contracting Officer's Technical Representative for approval.
- B. Hardware Heights from Finished Floor:
1. Exit devices centerline of strike (where applicable) 1000 mm (40-5/16 inches).
  2. Locksets and latch sets centerline of strike 1000 mm (40-5/16 inches).
  3. Deadlocks centerline of strike 1200 mm (48 inches).
  4. Hospital arm pull 1170 mm (46 inches) to centerline of bottom supporting bracket.
  5. Centerline of door pulls to be 1000 mm (40 inches).
  6. Push plates and push-pull shall be 1250 mm (50 inches) to top of plate.
  7. Push-pull latch to be 1000 mm (40-5/16 inches) to centerline of strike.
  8. Centerline of deadlock strike to be 840 mm (33 inches) when used with push-pull latch.
  9. Locate other hardware at standard commercial heights. Locate push and pull plates to prevent conflict with other hardware.

**3.2 INSTALLATION**

- A. Closer devices, including those with hold-open features, shall be equipped and mounted to provide maximum door opening permitted by building construction or equipment. Closers shall be mounted regular arm. Where closers are mounted on doors they shall be mounted with sex nuts and bolts; foot shall be fastened to frame with machine screws.
- B. Substitute parallel arm or top jamb mounting for regular arm mounting where the following conditions occur:
1. Where door swing, in full open position, would be limited to less than 90 degrees due to partition construction and closer location.
  2. Where door to room opens outward into corridor, except security bedroom, bathroom and anteroom doors which shall have closer installed parallel arm on exterior side of doors.

3. Where exterior doors open outward.
4. On doors equipped with roller latch.

C. Hinge Size Requirements:

Door Thickness	Door Width	Hinge Height
45 mm (1-3/4 inch)	900 mm (3 feet) and less	113 mm (4-1/2 inches)
45 mm (1-3/4 inch)	Over 900 mm (3 feet) but not more than 1200 mm (4 feet)	125 mm (5 inches)
35 mm (1-3/8 inch) (hollow core wood doors)	Not over 1200 mm (4 feet)	113 mm (4-1/2 inches)

- D. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim.
- E. Where new hinges are specified for new doors in existing frames or existing doors in new frames, sizes of new hinges shall match sizes of existing hinges; or, contractor may reuse existing hinges provided hinges are restored to satisfactory operating condition as approved by Contracting Officer's Technical Representative. Existing hinges shall not be reused on door openings having new doors and new frames. Coordinate preparation for hinge cut-outs and screw-hole locations on doors and frames.

F. Hinges Required Per Door:

Doors 1500 mm (5 ft) or less in height	2 butts
Doors over 1500 mm (5 ft) high and not over 2280 mm (7 ft 6 in) high	3 butts
Doors over 2280 mm (7 feet 6 inches) high	4 butts
Doors with spring hinges 1370 mm (4 feet 6 inches) high or less	2 butts
Doors with spring hinges over 1370 mm (4 feet 6 inches)	3 butts

- G. Fastenings: Suitable size and type and shall harmonize with hardware as to material and finish. Provide machine screws and lead expansion shields to secure hardware to concrete, ceramic or quarry floor tile, or solid masonry. Fiber or rawl plugs and adhesives are not permitted. All fastenings exposed to weather shall be of nonferrous metal.

H. After locks have been installed; show in presence of Contracting Officer's Technical Representative that keys operate their respective locks in accordance with keying requirements. (All keys, Master Key level and above shall be sent Registered Mail to the Medical Center Director along with the bitting list. Also a copy of the invoice shall be sent to the Contracting Officer's Technical Representative for his records.) Installation of locks which do not meet specified keying requirements shall be considered sufficient justification for rejection and replacement of all locks installed on project.

### **3.3 HARDWARE SETS**

A. Following sets of hardware correspond to hardware symbols shown on drawings. Where hardware set for a single door is specified for a pair of doors; equip each leaf of such pair of doors with set noted. Only those hardware sets that are shown on drawings will be required. Disregard hardware sets listed in specifications but not shown on drawings.



## HW SET: 01

## DOOR NUMBER:

BB494	BB495	BB497A	BB503	BB505	BB512
BB514B	BB527	BB552	BB553	BB567	BB588
BB613	BB615	BB616	BB617	BB618	BB620
BB491					

## EACH TO HAVE:

2	EA	HINGE	TA2714 4 1/2 X 4 1/2 (ANSI/BHMA A8112)	26D	MC
1	EA	ELECTRIC HINGE	TA2714 4 1/2 X 4 1/2 QC8 (ANSI/BHMA A8112)	26D	MC
1	EA	ELECTRIFIED LOCKSET	ML20930 LSA (ANSI/BHMA F07)	630	CR
1	EA	CLOSER REG	7500 (ANSI/BHMA CO2021)	689	NO
1	EA	PROTECTION PLATES	K1050 10" X 34" 4BE CSK (ANSI/BHMA J101)	US32D	RO
1	EA	WALL BUMPER	407 (ANSI/BHMA LO2101)	US32D	RO
1	SET	SMOKE SEALS	S88 BL 17'		PE
1	EA	POWER SUPPLY	BPS-24-1		CR

NOTE: ACCESS CONTROL, CARD READERS, CARDS, ETC. TO BE SUPPLIED BY OTHERS.

## HW SET: 02

## DOOR NUMBER:

BB547	BB560C	BB560D	BB560E	BB590B	BB545
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## EACH TO HAVE:

2	EA	HINGE	TA2714 4 1/2 X 4 1/2 NRP (ANSI/BHMA A8112)	26D	MC
1	EA	ELECTRIC HINGE	TA2714 4 1/2 X 4 1/2 QC8 NRP (ANSI/BHMA A8112)	26D	MC
1	EA	ELECTRIFIED LOCKSET	ML20930 LSA (ANSI/BHMA F07)	630	CR
1	EA	CLOSER PA 180	7500 (ANSI/BHMA CO2021)	689	NO
1	EA	PROTECTION PLATES	K1050 10" X 34" 4BE CSK (ANSI/BHMA J101)	US32D	RO
1	EA	WALL BUMPER	407 (ANSI/BHMA LO 2101)	US32D	RO
1	SET	SMOKE SEALS	S88 BL 17'		PE
1	EA	POWER SUPPLY	BPS-24-1		CR

NOTE: ACCESS CONTROL, CARD READERS, CARDS, ETC. TO BE SUPPLIED BY OTHERS.

## HW SET: 03

## DOOR NUMBER:

BB453	BB561	BB563	BB565	BB569	BB630B
BB493					

## EACH TO HAVE:

2	EA	HINGE	TA2714 4 1/2 X 4 1/2 (ANSI/BHMA A8112)	26D	MC
1	EA	ELECTRIC HINGE	TA2714 4 1/2 X 4 1/2 QC8 (ANSI/BHMA A8112)	26D	MC
1	EA	ELECTRIFIED LOCKSET	ML20930 LSA (ANSI/BHMA F07)	630	CR
1	EA	CLOSER REG	7500 (ANSI/BHMA CO2021)	689	NO
1	EA	CON OH STOP	1-336 (ANSI/BHMA CO 2511)	689	RX
1	EA	PROTECTION PLATES	K1050 10" X 34" 4BE CSK (ANSI/BHMA J101)	US32D	RO
1	SET	SMOKE SEALS	S88 BL 17'		PE
1	EA	POWER SUPPLY	BPS-24-1		CR

NOTE: ACCESS CONTROL, CARD READERS, CARDS, ETC. TO BE SUPPLIED BY OTHERS.

## HW SET: 04

## DOOR NUMBER:

BB497B      BB551      BB611      BB570

## EACH TO HAVE:

2	EA	HINGE	TA2714 4 1/2 X 4 1/2 NRP (ANSI/BHMA A8112)	26D	MC
1	EA	ELECTRIC HINGE	TA2714 4 1/2 X 4 1/2 QC8 NRP (ANSI/BHMA A8112)	26D	MC
1	EA	ELECTRIFIED LOCKSET	ML20930 LSA (ANSI/BHMA F07)	630	CR
1	EA	CLOSER PA 180	7500 (ANSI/BHMA CO2021)	689	NO
1	EA	PROTECTION PLATES	K1050 10" X 34" 4BE CSK (ANSI/BHMA J101)	US32D	RO
1	EA	WALL BUMPER	407 (ANSI/BHMA LO 2101)	US32D	RO
1	EA	POWER SUPPLY	BPS-24-1		CR

NOTE: ACCESS CONTROL, CARD READERS, CARDS, ETC. TO BE SUPPLIED BY OTHERS.

## HW SET: 05

## DOOR NUMBER:

BB524A      BB526A      BB581C      BB582C      BB523A      BB528A  
BB581D

## EACH TO HAVE:

2	EA	HVY HINGE	TA3386 4 1/2 X 4 1/2 (ANSI/BHMA A2111)	26D	MC
1	EA	ELECTRIC HINGE	TA3386 4 1/2 X 4 1/2 QC8 (ANSI/BHMA A8111)	26D	MC
1	EA	ELECTRIFIED LOCKSET	ML20930 LSA (ANSI/BHMA F07)	630	CR
1	EA	CLOSER REG	7500 (ANSI/BHMA CO 2021)	689	NO
1	EA	PROTECTION PLATES	K1050 10" X 34" 4BE CSK (ANSI/BHMA J101)	US32D	RO
1	EA	WALL BUMPER	407 (ANSI/BHMA LO 2101)	US32D	RO
1	EA	POWER SUPPLY	BPS-24-1		CR

NOTE: ACCESS CONTROL, CARD READERS, CARDS, ETC. TO BE SUPPLIED BY OTHERS.

## HW SET: 06

## DOOR NUMBER:

BB560B      BB531C      BB560A

## EACH TO HAVE:

2	EA	HVY HINGE	TA3386 4 1/2 X 4 1/2 (ANSI/BHMA A2111)	26D	MC
1	EA	ELECTRIC HINGE	TA3386 4 1/2 X 4 1/2 QC8 (ANSI/BHMA A8111)	26D	MC
1	EA	ELECTRIFIED LOCKSET	ML20930 LSA (ANSI/BHMA F07)	630	CR
1	EA	CLOSER REG	7500 (ANSI/BHMA CO 2021)	689	NO
1	EA	PROTECTION PLATES	K1050 10" X 34" 4BE CSK (ANSI/BHMA J101)	US32D	RO
1	EA	WALL BUMPER	407 (ANSI/BHMA LO 2101)	US32D	RO
1	EA	POWER SUPPLY	BPS-24-1		CR
1	SET	SMOKE SEALS	S88 BL 17'		PE

NOTE: ACCESS CONTROL, CARD READERS, CARDS, ETC. TO BE SUPPLIED BY OTHERS.

## HW SET: 07

## DOOR NUMBER:

BB533C      BB511      BB604

## EACH TO HAVE:

2	EA	HVY HINGE	TA3386 4 1/2 X 4 1/2 (ANSI/BHMA A2111)	26D	MC
1	EA	ELECTRIC HINGE	TA3386 4 1/2 X 4 1/2 QC8 (ANSI/BHMA A8111)	26D	MC
1	EA	ELECTRIFIED LOCKSET	ML20930 LSA (ANSI/BHMA F07)	630	CR
1	EA	CLOSER REG	7500 (ANSI/BHMA CO 2021)	689	NO
1	EA	CON OH STOP	1-336 (ANSI/BHMA CO 2511)	689	RX
1	EA	PROTECTION PLATES	K1050 10" X 34" 4BE CSK (ANSI/BHMA J101)	US32D	RO
1	SET	SMOKE SEALS	S88 BL 17'		PE
1	EA	POWER SUPPLY	BPS-24-1		CR

NOTE: ACCESS CONTROL, CARD READERS, CARDS, ETC. TO BE SUPPLIED BY OTHERS.

## HW SET: 08

## DOOR NUMBER:

BB533B      BB535B      BB537      BB602      BB612      BB614  
BB531B

## EACH TO HAVE:

3	EA	HINGE	TA2714 4 1/2 X 4 1/2 (ANSI/BHMA A8112)	26D	MC
1	EA	PRIVACY SET	ML2030 LSA (ANSI/BHMA F19)	630	CR
1	EA	CLOSER REG/PA	7500 (ANSI/BHMA CO 2021)	689	NO
1	EA	PROTECTION PLATE	K1050 10" X 34" 4BE CSK (ANSI/BHMA J 101)	US32D	RO
1	EA	WALL BUMPER	409 (ANSI/BHMA LO 2251)	US32D	RO
1	SET	SMOKE SEALS	S88 BL 17'		PE

## HW SET: 09

## DOOR NUMBER:

BB453B      BB526B      BB528B      BB532B

## EACH TO HAVE:

3	EA	HINGE	TA2714 4 1/2 X 4 1/2 (ANSI/BHMA A8112)	26D	MC
1	EA	PRIVACY SET	ML2030 LSA (ANSI/BHMA F19)	630	CR
1	EA	PROTECTION PLATE	K1050 10" X 34" 4BE CSK (ANSI/BHMA J 101)	US32D	RO
1	EA	WALL BUMPER	409 (ANSI/BHMA LO 2251)	US32D	RO

## HW SET: 10

## DOOR NUMBER:

BB587      BB524B

## EACH TO HAVE:

3	EA	HINGE	TA2714 4 1/2 X 4 1/2 (ANSI/BHMA A8112)	26D	MC
1	EA	PRIVACY SET	ML2030 LSA (ANSI/BHMA F19)	630	CR
1	EA	OVERHEAD STOP	10-336 (ANSI/BHMA CO 5442)	630	RX
1	EA	PROTECTION PLATE	K1050 10" X 34" 4BE CSK (ANSI/BHMA J 101)	US32D	RO

HW SET: 11

DOOR NUMBER:

490T

EACH TO HAVE:

2	EA	HINGE	TA2714 4 1/2 X 4 1/2 NRP (ANSI/BHMA A8112)	26D	MC
1	EA	ELECTRIC HINGE	TA2714 4 1/2 X 4 1/2 QC8 (ANSI/BHMA A8112)	26D	MC
1	EA	FIRE EXIT DEVICE	ED5200A X N9905 (ANSI/BHMA F09)	630	CR
1	EA	CLOSER REG/PA	7500 (ANSI/BHMA CO2021)	689	NO
1	EA	PROTECTION PLATE	K1050 10" X 34" 4BE CSK (ANSI/BHMA J 101)	US32D	RO
1	EA	WALL BUMPER	407 (ANSI/BHMA LO 2101)	US32D	RO
1	EA	POWER SUPPLY	BPS-24-1		CR

NOTE: ACCESS CONTROL, CARD READERS, CARDS, ETC. TO BE SUPPLIED BY OTHERS.

HW SET: 12 – BI-PARTING BREAKAWAY

DOOR NUMBER:

BB600

NOTE: ALL HARDWARE SUPPLIED BY THE DOOR MANUFACTURER.

HW SET: 13

DOOR NUMBER:

BB582A BB583A BB601A BB605A BB581A

EACH TO HAVE:

2	EA	BOTTOM PIVOT	L147 3/4" OFFSET	626	RX
2	EA	TOP PIVOT	L180	626	RX
1	EA	ELECTRIFIED PIVOT	CSEM19 12-WIRE QC-12	626	RX
1	EA	SIDE PIVOT	M19	626	RX
2	EA	FLUSH BOLTS	555 (ANSI/BHMA LO 4251)	US26D	RO
1	EA	ELECTRIFIED LOCKSET	ML20930 LSA (ANSI/BHMA F07)	630	CR
1	EA	OVERHEAD STOP	10-436 (ANSI/BHMA CO5442)	689	RX
1	EA	PROTECTION PLATE	K1050 10" X 10" 4BE CSK (ANSI/BHMA J101)	US32D	RO
1	EA	POWER SUPPLY	BPS-24-1		CR
1	EA	DUST PROOF STRIKE	570 (ANSI/BHMA L 4021)	US26D	RO

NOTE: ACCESS CONTROL, CARD READERS, CARDS, ETC. TO BE SUPPLIED BY OTHERS.

HW SET: 14

DOOR NUMBER:

BB490 BB530

EACH TO HAVE:

6	EA	HVY HINGE	TA3786 4 1/2 X 4 1/2 (ANSI/BHMA A8111)	26D	MC
2	EA	FIRE DEVICE	ED5400A M55 (ANSI/BHMA A156.3, TYPE 2,01)	630	CR
2	EA	MAGNETIC HOLDER	998 (ANSI/BHMA CO0011)	689	RX
2	EA	CLOSER REG/PA	7500 (ANSI/BHMA CO 2021)	689	NO
2	EA	PROTECTION PLATE	K1050 10" X 34" 4BE CSK (ANSI/BHMA J 101)	US32D	RO
2	EA	WALL BUMPER	407 (ANSI/BHMA LO 2101)	US32D	RO

2	EA	ASTRAGAL	357 C 84"	PE
1	SET	SMOKE SEALS	S88 BL 25'	PE

HW SET: 15

DOOR NUMBER:

BB540

EACH TO HAVE:

6	EA	HVY HINGE	TA3786 4 1/2 X 4 1/2 (ANSI/BHMA A8111)	26D	MC
2	EA	FIRE DEVICE	ED5400A M55 (ANSI/BHMA A156.3, TYPE 2,01)	630	CR
2	EA	CLOSER REG/PA	7500 (ANSI/BHMA CO 2021)	689	NO
2	EA	PROTECTION PLATE	K1050 10" X 34" 4BE CSK (ANSI/BHMA J 101)	US32D	RO
2	EA	WALL BUMPER	407 (ANSI/BHMA LO 2101)	US32D	RO
2	EA	ASTRAGAL	357 C 84"		PE
1	SET	SMOKE SEALS	S88 BL 25'		PE

HW SET: 16

DOOR NUMBER:

BB510            BB580

EACH TO HAVE:

4	EA	HVY HINGE	TA37864 4 1/2 X 4 1/2 (ANSI/BHMA A8111)	26D	MC
2	EA	ELECTRIC HINGE	TA37864 4 1/2 X 4 1/2 QC8 (ANSI/BHMA A8111)	26D	MC
2	EA	EL EXIT DEVICE	ED5400A X N955 M55 M94 (ANSI/BHMA A156.3)	630	CR
2	EA	POWER OPERATOR	5900 X-IN POWER OPERATOR	689	NO
2	EA	PROTECTION PLATE	K1050 10" X 46" 4BE CSK (ANSI/BHMA J101)	US32D	RO
2	EA	WALL BUMPER	407 (ANSI/BHMA LO 2101)	US32D	RO
1	EA	POWER SUPPLY	BPS-24-2		CR
2	EA	DOOR SWITCH	661		NO
1	EA	EXIT MOTION SENSOR	XMS		SN
1	SET	SMOKE SEALS	S88 BL 25'		PE
2	EA	WEATHERSTRIP	18041 CNB 84"		PE

HW SET: 17 – BI-PASS

DOOR NUMBER:

BB582D            BB601B            BB605B

EACH TO HAVE:

6	EA	FLUSH PULL	94	US32D	RO
1	EA	BI-PASS DOOR SET	HPB280A TRACK X HANGERS X FLOOR GUIDE		PE

HW SET: 18

DOOR NUMBER:

BB531A            BB533A            BB535A            BB541A            BB543A            BB543B  
BB514A

EACH TO HAVE:

1	EA	BOTTOM PIVOT	L147 3/4" OFFSET	626	RX
1	EA	TOP PIVOT	L180	626	RX
1	EA	ELECTRIFIED PIVOT	CSEM19 12-WIRE QC-12	626	RX

DOOR HARDWARE

08 71 00-22

1	EA	ELECTRIFIED LOCKSET	ML20930 LSA (ANSI/BHMA F07)	630	CR
1	EA	CLOSER REG/PA	7500 (ANSI/BHMA CO 2021)	689	NO
1	EA	PROTECTION PLATE	K1050 10" X 34" 4BE CSK (ANSI/BHMA J 101)	US32D	RO
1	EA	WALL BUMPER	409 (ANSI/BHMA LO 2251)	US32D	RO
1	EA	POWER SUPPLY	BPS-24-1		CR
1	SET	SMOKE SEALS	S88 BL 17'		PE

HW SET: 19

DOOR NUMBER:

BB531D	BB533D	BB535C	BB582B	BB583B	BB581B
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EACH TO HAVE:

1	EA	BOTTOM PIVOT	L147 3/4" OFFSET	626	RX
1	EA	TOP PIVOT	L180	626	RX
1	EA	SIDE PIVOT	M19	626	RX
1	EA	PASSAGE SET	ML2010 NSA (ANSI/BHMA CO 2021)	630	CR
1	EA	CLOSER REG/PA	7500 (ANSI/BHMA CO 2021)	689	NO
1	EA	PROTECTION PLATE	K1050 10" X 34" 4BE CSK (ANSI/BHMA J 101)	US32D	RO
1	EA	WALL BUMPER	409 (ANSI/BHMA LO 2251)	US32D	RO

HW SET: 20

DOOR NUMBER:

BB603A	BB521
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EACH TO HAVE:

3	EA	HINGE	TA2714 4 1/2 X 4 1/2 (ANSI/BHMA A8112)	26D	MC
1	EA	PASSAGE SET	ML2010 NSA (ANSI/BHMA F01)	630	CR
1	EA	CLOSER REG/PA	7500 (ANSI/BHMA CO 2021)	689	NO
1	EA	CON OH STOP	1-336 (ANSI/BHMA CO 2511)	689	RX
1	EA	PROTECTION PLATE	K1050 10" X 34" 4BE CSK (ANSI/BHMA J 101)	US32D	RO

HW SET: 21

DOOR NUMBER:

BB583C

EACH TO HAVE:

6	EA	HINGE	TA2714 4 1/2 X 4 1/2 (ANSI/BHMA A8112)	26D	MC
2	EA	SURFACE DUMMY	ML 2050 LSA	630	CR
2	EA	ROLLER CATCH	590 (ANSI/BHMA A156.16)	26D	RO
2	EA	OVERHEAD STOP	10-336 (ANSI/BHMA CO 5442)	630	RX
2	EA	PROTECTION PLATE	K1050 10" X 2" LTDW 4BE CSK	US32D	RO

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**SECTION 08 71 13  
AUTOMATIC DOOR OPERATORS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies equipment, controls and accessories for automatic operation of interior, bi-parting doors, with break-away feature.
- B. Flush wood doors shall be furnished and prepared under separate section; installed under this Section.

**1.2 RELATED WORK**

- A. Flush wood doors; Section 08 14 00, INTERIOR WOOD DOORS.
- B. Door hardware; Section 08 71 00, DOOR HARDWARE.
- C. Electric general wiring, connections and equipment requirements; Division 26, ELECTRICAL.
- D. Section 28 31 00, FIRE ALARM SYSTEMS.

**1.3 QUALITY ASSURANCE**

- A. Automatic door operators, controls and other equipment shall be products of a manufacturer regularly engaged in manufacturing such equipment for a minimum of three years.
- B. One type of automatic door equipment shall be used throughout the project.
- C. Equipment installer shall have specialized experience and shall be approved by the manufacturer.

**1.4 WARRANTY**

- A. Automatic door operators shall be subject to the terms of the "Warranty of Construction", FAR clause 52.246-21, except that the Warranty period shall be two years in lieu of one year.

**1.5 MAINTENANCE MANUALS**

- A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on automatic door operators.

**1.6 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's literature and data describing operators, power units, controls, door hardware and safety devices.

C. Shop Drawings:

1. Showing location of controls and safety devices in relationship to each automatically operated door.
2. Showing layout, profiles, product components, including anchorage, accessories, as applicable.
3. Submit templates, wiring diagrams, fabrication details and other information to coordinate the proper installation of the automatic door operators.

D. Submit in writing to Contracting Officer's Technical Representative that items listed in Article 1.3 are in compliance.

**1.7 DESIGN CRITERIA**

- A. As a minimum automatic door equipment shall comply with the requirements of BHMA 156.10. Except as otherwise noted on drawings, provide operators which will move the doors from the fully closed to fully opened position in five seconds maximum time interval, when speed adjustment is at maximum setting.
- B. Equipment: Conforming to UL 325. Provide key operated power disconnect wall switch for each door installation.
- C. Electrical Wiring, Connections and Equipment: Provide all motor, starter, controls, associated devices, and interconnecting wiring required for the installation. Equipment and wiring shall be as specified in Division 26, ELECTRICAL.

**1.8 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Builders Hardware Manufacturers Association, Inc. (BHMA):  
A156.10-05.....Power Operated Pedestrian Doors (BHMA 1601)
- C. National Fire Protection Association (NFPA):  
101-05.....Life Safety Code
- D. Underwriters Laboratory (UL):  
325-02.....Door, Drapery, Gate, Louver, and Window  
Operators and Systems

**1.9 DELIVERY AND STORAGE**

- A. Delivery shall be in factory's original, unopened, undamaged container with identification labels attached.



**PART 2 - PRODUCTS****2.1 SLIDING DOOR OPERATORS**

- A. General: Sliding doors shall have electric operators, conforming to BHMA A156.10 and the following requirements as applicable. Assembly shall be bi-parting sliding doors as shown on drawings.
- B. Door Operation: Doors shall be opened by electric motor pulling door from closed to open position and shall stop door by electrically reducing voltage and stalling door against mechanical stop. System shall permit manual control of door in event of power failure. Opening and closing speeds shall be adjustable. In compliance with NFPA-101, all door panels shall allow "breakout" to the full open position to provide instant egress at any point in the door's movement.
- C. Operators: Completely assembled and sealed electromechanical operating unit, all located in cast aluminum housing and filled with special lubricant for extreme conditions. Attached to transmission system shall be a minimum 1/8 Hp "DC" shunt-wound permanent magnet motor with sealed ball bearings. Complete unit shall be rubber mounted with provisions for easy maintenance and replacement. Operators shall have adjustable opening and closing cycle. Housing shall be minimum 6063T-5 alloy aluminum not less than .005 mm (125 inch) minimum thickness, 150 mm by 200 mm (6 inch wide by 8 inch high).
- D. Sliding Door Hardware Guide Rollers, Door Carrier: Top door carriers shall ride on steel or delrin rollers incorporating sealed bearings with each door having two support rollers and one anti-rise roller. Each roller shall have a minimum of 9 mm (3/8-inch) of vertical adjustment with positive mechanical locks. Each door shall also include two urethane covered oil impregnated bearing bottom rollers attached with 5 mm (3/16-inch) thick formed steel guide brackets. Each door carrier supporting a door leaf shall include a vertical steel reinforcing member to prevent sagging when door is swung under breakaway conditions. All carbon steel brackets and fittings shall be plated for corrosion resistance.

**2.2 POWER UNITS**

- A. Each power unit shall be self-contained, electric operated and independent of the door operator. Capacity and size of power circuits shall be in accordance with automatic door operator manufacturer's specifications and Division 26 - ELECTRICAL.

### **2.3 DOOR CONTROLS**

- A. Opening and closing actions of doors shall be actuated by controls and safety devices specified, and conform to ANSI 156.10. Controls shall cause doors to open instantly when control device is actuated; hold doors in open positions; then, cause doors to close, unless safety device or reactivated control interrupts operation.
- B. Push Plate Wall Switch: Recess type, stainless steel push plate, minimum 100 mm by 100 mm (four-inch by four-inch), with 13 mm (1/2-inch) high letters "To Operate Door--Push" engraved on face of plate.
- C. Motion Detector: The motion detector may be surface mounted on each side of door header, to provide a signal to actuate the door operator, and monitor the immediate zone, to detect intrusion by persons, carts or similar objects. The zone which the detector monitors shall be 1500 mm (five feet) deep and 1500 mm (five feet) across, plus or minus 150 mm (six inches) on all dimensions. The maximum response time shall be no less than 25 milliseconds. Unit shall be designed to operate on 24 volts AC. The control shall not be affected by cleaning material, solvents, dust, dirt and outdoor weather conditions.

### **2.4 SAFETY DEVICES**

- A. General: Area over which doors swing shall be a safety section and anyone standing in path of door's movement shall be protected by a safety device, except where push controls are shown.
- B. At sliding doors, provide two photoelectric beams mounted at heights of 600 mm (24 inches) and 1200 mm (48 inches) in the door frame. Beams shall parallel door openings to prevent doors from closing when anyone is in the center of the door or doors. When beams are activated, doors shall recycle to full open position. Actuation shall include a motion detector mounted on each side of the door for detection of traffic in each direction.
- C. Time delay switches shall be adjustable between 3 to 60 seconds and shall control closing cycle of doors.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Coordinate installation of equipment with other related work. Manual controls and power disconnect switches shall be recessed or semi-flush mounted in partitions. Secure operator components to adjacent construction with suitable fastenings. Conceal conduits, piping, and electric equipment, in finish work.

- B. Install power units in locations shown. All equipment, including time delay switches, shall be accessible for maintenance and adjustment.
- C. Operators shall be adjusted and must function properly for the type of traffic (pedestrians, carts, stretchers and wheelchairs) expected to pass through doors. Each door leaf of pairs of doors shall open and close in synchronization. On pairs of doors, operators shall allow either door to be opened manually without the other door opening.
- D. Install controls at positions shown and make them convenient for particular traffic expected to pass through openings. Maximum height of push plate wall switches from finished floors shall be 40 inches unless otherwise approved by the Contracting Officer's Technical Representative.

### 3.2 INSTRUCTIONS

- A. Following the installation and final adjustments of the door operators, the installer shall fully instruct VA personnel for 2 hours on the operating, servicing and safety requirements for the swing and sliding automatic door operators.
- B. Coordinate instruction to VA personnel with Contracting Officer's Technical Representative.

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**SECTION 08 80 00  
GLAZING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies glass, related glazing materials and accessories. Glazing products specified apply to factory or field glazed items.

**1.2 RELATED WORK**

- A. Factory glazed by manufacturer in following units:
1. Metal framed mirrors: Section 10 28 00, TOILET ACCESSORIES.
  2. Lead glass(Glass Type GL-3): Section 13 49 00, RADIATION PROTECTION.

**1.3 LABELS**

- A. Temporary labels:
1. Provide temporary label on each light of glass identifying manufacturer or brand and glass type, quality and nominal thickness.
  2. Label in accordance with NFRC (National Fenestration Rating Council) label requirements.
  3. Temporary labels shall remain intact until glass is approved by COTR.
- B. Permanent labels:
1. Locate in corner for each pane.
  2. Label in accordance with ANSI Z97.1 and SGCC (Safety Glass Certification Council) label requirements.
    - a. Tempered glass.
    - b. Fire resistance glass.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Glass Thickness:
1. Select thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with applicable code.
  2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
  3. Test in accordance with ASTM E 330.
  4. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.

**1.5 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

**B. Manufacturer's Certificates:**

1. Certificates stating that tempered glass meets requirements for safety glazing material as specified in ANSI Z97.1.
2. Certificate test reports confirming compliance's with specified fire resistive rating.

**C. Warranty:** Submit written guaranty, conforming to General Condition requirements, and to "Warranty of Construction" Article in this Section.**D. Manufacturer's Literature and Data:**

1. Glass, each kind required.
2. Elastic compound for metal sash glazing.
3. Glazing cushion.
4. Sealing compound.

**E. Samples:**

1. Size: 150 mm by 150 mm (6 inches by 6 inches).

**1.6 DELIVERY, STORAGE AND HANDLING**

- A. Delivery: Schedule delivery to coincide with glazing schedules so minimum handling of crates is required. Do not open crates except as required for inspection for shipping damage.
- B. Storage: Store cases according to printed instructions on case, in areas least subject to traffic or falling objects. Keep storage area clean and dry.
- C. Handling: Unpack cases following printed instructions on case. Stack individual windows on edge leaned slightly against upright supports with separators between each.

**1.7 PROJECT CONDITIONS**

- A. Field Measurements: Field measure openings before ordering tempered glass products. Be responsible for proper fit of field measured products.

**1.8 WARRANTY**

- A. Warranty: Conform to terms of "Warranty of Construction", FAR clause 52.246-21, except extend warranty period for the following:
1. Bullet resistive plastic material to remain visibly clear without discoloration for 10 years.
  2. Insulating glass units to remain sealed for 10 years.
  3. Laminated glass units to remain laminated for 5 years.
  4. Polycarbonate to remain clear and ultraviolet light stabilized for 5 years.

5. Insulating plastic to not have more than 6 percent decrease in light transmission and be ultraviolet light stabilized for 10 years.

#### **1.9 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
- Z97.1-04.....Safety Glazing Material Used in Building -  
                                Safety Performance Specifications and Methods  
                                of Test.
- C. American Society for Testing and Materials (ASTM):
- C542-05.....Lock-Strip Gaskets.
- C716-06.....Installing Lock-Strip Gaskets and Infill  
                                Glazing Materials.
- C864-05.....Dense Elastomeric Compression Seal Gaskets,  
                                Setting Blocks, and Spacers.
- C920-05.....Elastomeric Joint Sealants.
- C1036-06.....Flat Glass.
- C1048-04.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated  
                                and Uncoated Glass.
- E84-08.....Surface Burning Characteristics of Building  
                                Materials.
- D. Code of Federal Regulations (CFR):
- 16 CFR 1201 - Safety Standard for Architectural Glazing Materials;  
    1977, with 1984 Revision.
- E. National Fire Protection Association (NFPA):
- 80-08.....Fire Doors and Windows.
- F. Safety Glazing Certification Council (SGCC):
- Certified Products Directory (Issued Semi-Annually).
- G. Underwriters Laboratories, Inc. (UL):
- 752-06.....Bullet-Resisting Equipment.

#### **PART 2 - PRODUCT**

##### **2.1 HEAT-TREATED GLASS**

- A. Clear Tempered Glass - Indicated as GL-1 on Drawings.
1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.
2. Thickness, 6 mm (1/4 inch).

##### **2.2 FIRE RESISTANT GLASS - Indicated as GL-2 on Drawings:**

- A. Fire resistant glass or glass assembly classified by UL in Building Materials Directory or other approved testing laboratory bearing permanent mark of classification.
- B. Firelite.
  - 1. UL listing R13377-1, 4.8 mm (3/16 inch) thick, unpolished.
  - 2. Distributed by Technical Glass Products; Kirkland, WA 98033.
- C. Pyrovue Commercial.
  - 1. UL listing R10178(N), 41 mm (1-5/8 inch) thick.
  - 2. Represented by Advanced Glass Systems Corporation, Trumbauersville, PA 18970-0051

### **2.3 GLAZING ACCESSORIES**

- A. As required to supplement the accessories provided with the items to be glazed and to provide a complete installation. Ferrous metal accessories exposed in the finished work shall have a finish that will not corrode or stain while in service.
- B. Setting Blocks: ASTM C864:
  - 1. Channel shape; having 6 mm (1/4 inch) internal depth.
  - 2. Shore a hardness of 80 to 90 Durometer.
  - 3. Block lengths: 50 mm (two inches) except 100 to 150 mm (four to six inches) for insulating glass.
  - 4. Block width: Approximately 1.6 mm (1/16 inch) less than the full width of the rabbet.
  - 5. Block thickness: Minimum 4.8 mm (3/16 inch). Thickness sized for rabbet depth as required.
- C. Spacers: ASTM C864:
  - 1. Channel shape having a 6 mm (1/4 inch) internal depth.
  - 2. Flanges not less 2.4 mm (3/32 inch) thick and web 3 mm (1/8 inch) thick.
  - 3. Lengths: One to 25 to 76 mm (one to three inches).
  - 4. Shore a hardness of 40 to 50 Durometer.
- D. Sealing Tapes:
  - 1. Semi-solid polymeric based material exhibiting pressure-sensitive adhesion and withstanding exposure to sunlight, moisture, heat, cold, and aging.
  - 2. Shape, size and degree of softness and strength suitable for use in glazing application to prevent water infiltration.
- E. Glazing Sealants: ASTM C920, silicone neutral cure:
  - 1. Type S.

2. Class 25
  3. Grade NS.
  4. Shore A hardness of 25 to 30 Durometer.
- F. Neoprene, EPDM, or Vinyl Glazing Gasket: ASTM C864.
1. Channel shape; flanges may terminate above the glazing channel or flush with the top of the channel.
  2. Designed for dry glazing.
- G. Color:
1. Color of glazing compounds, gaskets, and sealants used for aluminum color frames shall match color of the finished aluminum and be nonstaining.
  2. Color of other glazing compounds, gaskets, and sealants which will be exposed in the finished work and unpainted shall be black, gray, or neutral color.
- H. Smoke Removal Unit Targets: Adhesive targets affixed to glass to identify glass units intended for removal for smoke control. Comply with requirements of local Fire Department.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Verification of Conditions:
1. Examine openings for glass and glazing units; determine they are proper size; plumb; square; and level before installation is started.
  2. Verify that glazing openings conform with details, dimensions and tolerances indicated on manufacturer's approved shop drawings.
- B. Advise Contractor of conditions which may adversely affect glass and glazing unit installation, prior to commencement of installation: Do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Verify that wash down of adjacent masonry is completed prior to erection of glass and glazing units to prevent damage to glass and glazing units by cleaning materials.

#### **3.2 PREPARATION**

- A. For sealant glazing, prepare glazing surfaces in accordance with GANA-02 Sealant Manual.
- B. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.



- C. Shop fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.
- D. Verify that components used are compatible.
- E. Clean and dry glazing surfaces.
- F. Prime surfaces scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

### **3.3 INSTALLATION - GENERAL**

- A. Install in accordance with GANA-01 Glazing Manual and GANA-02 Sealant Manual unless specified otherwise.
- B. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet the Performance Test Requirements specified in other applicable sections of specifications.
- C. Set glazing without bending, twisting, or forcing of units.
- D. Do not allow glass to rest on or contact any framing member.
- E. Glaze doors and operable sash, in a securely fixed or closed and locked position, until sealant or glazing compound has thoroughly set.
- F. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.
- G. Fire Resistant Glass: Glaze in accordance with UL design requirements.

### **3.4 INSTALLATION - WET METHOD (SEALANT AND SEALANT)**

- A. Place setting blocks at 1/4 points and install glazing pane or unit.
- B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.
- C. Fill gaps between glazing and stops with Type S sealant to depth of bite on glazing, but not more than 9 mm (3/8 inch) below sight line to ensure full contact with glazing and continue the air and vapor seal.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### **3.5 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)**

- A. Cut glazing tape to length and install against permanent stops, projecting 1.6 mm (1/16 inch) above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 150 mm (6 inches) from corners.
- C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

- D. Install removable stops, spacer shims inserted between glazing and applied stops at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.
- E. Fill gaps between pane and applied stop with Type S sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

### **3.6 REPLACEMENT AND CLEANING**

- A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by COTR.
- B. Replace cracked, broken, and imperfect glass, or glass which has been installed improperly.
- C. Leave glass, putty, and other setting material in clean, whole, and acceptable condition.

### **3.7 PROTECTION**

- A. Protect finished surfaces from damage during erection, and after completion of work. Strippable plastic coatings on colored anodized finish are not acceptable.

### **3.8 GLAZING INSTALLATION**

- A. Fire Resistant Glass: Install fire resistant glass in interior fire rated or labeled doors and windows.
- B. Tempered Glass:
  - 1. Install in full and half glazed doors unless indicated otherwise.
  - 2. Install in door sidelights adjacent to doors.
  - 3. Use clear tempered glass on interior side lights and doors.
- C. Clear Glass:
  - 1. Interior observation windows not specified otherwise.
  - 2. Interior pane of dual glazed windows not receiving tempered glass or other special glass indicated or specified.

- - - E N D - - -

**SECTION 09 22 16  
NON-STRUCTURAL METAL FRAMING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies steel studs wall systems, ceiling or soffit suspended or furred framing, wall furring, fasteners, and accessories for the screw attachment of gypsum board.

**1.2 RELATED WORK**

- A. Support for wall mounted items: Section 05 50 00, METAL FABRICATIONS.
- B. Ceiling suspension systems for acoustical tile or panels and lay in gypsum board panels: Section 09 51 00, ACOUSTICAL CEILINGS, Section 09 29 00, GYPSUM BOARD.

**1.3 TERMINOLOGY**

- A. Description of terms shall be in accordance with ASTM C754, ASTM C11, ASTM C841 and as specified.
- B. Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead shall be the underside of the floor or roof construction supported by beams, trusses, or bar joists. In interstitial spaces with walk-on floors the underside of the walk-on floor is the underside of structure overhead.
- C. Thickness of steel specified is the minimum bare (uncoated) steel thickness.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Studs, runners and accessories.
  - 2. Hanger inserts.
  - 3. Channels (Rolled steel).
  - 4. Furring channels.
  - 5. Screws, clips and other fasteners.
- C. Shop Drawings:
  - 1. Typical ceiling suspension system.
  - 2. Typical metal stud and furring construction system including details around openings and corner details.
  - 3. Typical fire rated assembly and column fireproofing showing details of construction same as that used in fire rating test.
- D. Test Results: Fire rating test designation, each fire rating required for each assembly.

**1.5 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE**

A. In accordance with the requirements of ASTM C754.

**1.6 APPLICABLE PUBLICATIONS**

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

B. American Society For Testing And Materials (ASTM)

A123-02.....Zinc (Hot-dip Galvanized) Coatings on Iron and Steel Products

A653/A653M-07.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

A641-03.....Zinc-Coated (Galvanized) Carbon Steel Wire

C11-07.....Terminology Relating to Gypsum and Related Building Materials and Systems

C635-04.....Manufacture, Performance, and Testing of Metal Suspension System for Acoustical Tile and Lay-in Panel Ceilings

C636-06.....Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels

C645-07.....Non-Structural Steel Framing Members

C754-04.....Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products

C841-03.....Installation of Interior Lathing and Furring

C954-04.....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

C1002-04.....Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs

E580-06.....Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint.

**PART 2 - PRODUCTS****2.1 PROTECTIVE COATING**

A. Galvanize steel studs, runners (track), rigid (hat section) furring channels, "Z" shaped furring channels, and resilient furring channels, with coating designation of G-60 minimum, per ASTM 123.

**2.2 STEEL STUDS AND RUNNERS (TRACK)**

- A. ASTM C645, modified for thickness specified and sizes as shown.
  - 1. Use ASTM A525 steel, 0.8 mm (0.0329-inch) thick bare metal (33 mil).
  - 2. Runners same thickness as studs.
- B. Provide not less than two cutouts in web of each stud, approximately 300 mm (12 inches) from each end, and intermediate cutouts on approximately 600 mm (24-inch) centers.
- C. Doubled studs for openings and studs for supporting concrete backer-board.
- D. Studs 3600 mm (12 feet) or less in length shall be in one piece.

**2.3 FURRING CHANNELS**

- A. Rigid furring channels (hat shape): ASTM C645.
- B. Resilient furring channels:
  - 1. Not less than 0.45 mm (0.0179-inch) thick bare metal.
  - 2. Semi-hat shape, only one flange for anchorage with channel web leg slotted on anchorage side, channel web leg on other side stiffens fastener surface but shall not contact anchorage surface other channel leg is attached to.
- C. "Z" Furring Channels:
  - 1. Not less than 0.45 mm (0.0179-inch)-thick bare metal, with 32 mm (1-1/4 inch) and 19 mm (3/4-inch) flanges.
  - 2. Web furring depth to suit thickness of insulation with slotted perforations.
- D. Rolled Steel Channels: ASTM C754, cold rolled; or, ASTM C841, cold rolled.

**2.4 FASTENERS, CLIPS, AND OTHER METAL ACCESSORIES**

- A. ASTM C754, except as otherwise specified.
- B. For fire rated construction: Type and size same as used in fire rating test.
- C. Fasteners for steel studs thicker than 0.84 mm (0.033-inch) thick. Use ASTM C954 steel drill screws of size and type recommended by the manufacturer of the material being fastened.
- D. Clips: ASTM C841 (paragraph 6.11), manufacturer's standard items. Clips used in lieu of tie wire shall have holding power equivalent to that provided by the tie wire for the specific application.
- E. Concrete ceiling hanger inserts (anchorage for hanger wire and hanger straps): Steel, zinc-coated (galvanized), manufacturers standard items, designed to support twice the hanger loads imposed and the type of hanger used.
- F. Tie Wire and Hanger Wire:

1. ASTM A641, soft temper, Class 1 coating.
  2. Gage (diameter) as specified in ASTM C754 or ASTM C841.
- G. Attachments for Wall Furring:
1. Manufacturers standard items fabricated from zinc-coated (galvanized) steel sheet.
  2. For concrete or masonry walls: Metal slots with adjustable inserts or adjustable wall furring brackets. Spacers may be fabricated from 1 mm (0.0396-inch) thick galvanized steel with corrugated edges.
- H. Power Actuated Fasteners: Type and size as recommended by the manufacturer of the material being fastened.

## **2.5 SUSPENDED CEILING SYSTEM FOR GYPSUM BOARD (OPTION)**

- A. Conform to ASTM C635, heavy duty, with not less than 35 mm (1-3/8 inch) wide knurled capped flange face designed for screw attachment of gypsum board.
- B. Wall track channel with 35 mm (1-3/8 inch) wide flange.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION CRITERIA**

- A. Where fire rated construction is required for walls, partitions, columns, beams and floor-ceiling assemblies, the construction shall be same as that used in fire rating test.
- B. Construction requirements for fire rated assemblies and materials shall be as shown and specified, the provisions of the Scope paragraph (1.2) of ASTM C754 and ASTM C841 regarding details of construction shall not apply.

### **3.2 INSTALLING STUDS**

- A. Install studs in accordance with ASTM C754, except as otherwise shown or specified.
- B. Space studs not more than 610 mm (24 inches) on center.
- C. Cut studs 6 mm to 9 mm (1/4 to 3/8-inch) less than floor to underside of structure overhead when extended to underside of structure overhead.
- D. Where studs are shown to terminate above suspended ceilings, provide bracing as shown or extend studs to underside of structure overhead.
- E. Extend studs to underside of structure overhead for fire, rated partitions, smoke partitions, shafts, and sound rated.
- F. Openings:
  1. Frame jambs of openings in stud partitions and furring with two studs placed back to back or as shown.
  2. Fasten back to back studs together with 9 mm (3/8-inch) long Type S pan head screws at not less than 600 mm (two feet) on center, staggered along webs.

3. Studs fastened flange to flange shall have splice plates on both sides approximately 50 X 75 mm (2 by 3 inches) screwed to each stud with two screws in each stud. Locate splice plates at 600 mm (24 inches) on center between runner tracks.

G. Fastening Studs:

1. Fasten studs located adjacent to partition intersections, corners and studs at jambs of openings to flange of runner tracks with two screws through each end of each stud and flange of runner.
2. Do not fasten studs to top runner track when studs extend to underside of structure overhead.

H. Chase Wall Partitions:

1. Locate cross braces for chase wall partitions to permit the installation of pipes, conduits, carriers and similar items.
2. Use studs or runners as cross bracing not less than 63 mm (2-1/2 inches wide).

- I. Form building seismic or expansion joints with double studs back to back spaced 75 mm (three inches) apart plus the width of the seismic or expansion joint.

- J. Form control joint, with double studs spaced 13 mm (1/2-inch) apart.

**3.3 INSTALLING WALL FURRING FOR FINISH APPLIED TO ONE SIDE ONLY**

- A. In accordance with ASTM C754, or ASTM C841 except as otherwise specified or shown.

B. Wall furring-Stud System:

1. Framed with 63 mm (2-1/2 inch) or narrower studs, 600 mm (24 inches) on center.
2. Brace as specified in ASTM C754 for Wall Furring-Stud System or brace with sections or runners or studs placed horizontally at not less than three foot vertical intervals on side without finish.
3. Securely fasten braces to each stud with two Type S pan head screws at each bearing.

C. Direct attachment to masonry or concrete; rigid channels or "Z" channels:

1. Install rigid (hat section) furring channels at 600 mm (24 inches) on center, horizontally or vertically.
2. Install "Z" furring channels vertically spaced not more than 600 mm (24 inches) on center.
3. At corners where rigid furring channels are positioned horizontally, provide mitered joints in furring channels.
4. Ends of spliced furring channels shall be nested not less than 200 mm (8 inches).

5. Fasten furring channels to walls with power-actuated drive pins or hardened steel concrete nails. Where channels are spliced, provide two fasteners in each flange.
  6. Locate furring channels at interior and exterior corners in accordance with wall finish material manufacturers printed erection instructions. Locate "Z" channels within 100 mm (4 inches) of corner.
- D. Installing Wall Furring-Bracket System: Space furring channels not more than 400 mm (16 inches) on center.

### **3.4 INSTALLING SUPPORTS REQUIRED BY OTHER TRADES**

- A. Provide for attachment and support of electrical outlets, plumbing, laboratory or heating fixtures, recessed type plumbing fixture accessories, access panel frames, wall bumpers, wood seats, toilet stall partitions, dressing booth partitions, urinal screens, chalkboards, tackboards, wall-hung casework, handrail brackets, recessed fire extinguisher cabinets and other items like auto door buttons and auto door operators supported by stud construction.
- B. Provide additional studs where required. Install metal backing plates, or special metal shapes as required, securely fastened to metal studs.

### **3.5 INSTALLING FURRED AND SUSPENDED CEILINGS OR SOFFITS**

- A. Install furred and suspended ceilings or soffits in accordance with ASTM C754 or ASTM C841 except as otherwise specified or shown for screw attached gypsum board ceilings and soffits.
1. Space framing at 400 mm (16-inch) centers for metal lath anchorage.
  2. Space framing at 600 mm (24-inch) centers for gypsum board anchorage.
- B. New exposed concrete slabs:
1. Use metal inserts required for attachment and support of hangers or hanger wires with tied wire loops for embedding in concrete.
  2. Furnish for installation under Division 3, CONCRETE.
  3. Suspended ceilings under concrete rib construction shall have runner channels at right angles to ribs and be supported from ribs with hangers at ends and at 1200 mm (48-inch) maximum intervals along channels. Stagger hangers at alternate channels.
- C. Concrete slabs on steel decking composite construction:
1. Use pull down tabs when available.
  2. Use power activated fasteners when direct attachment to structural framing can not be accomplished.
- D. Where bar joists or beams are more than 1200 mm (48 inches) apart, provide intermediate hangers so that spacing between supports does not exceed 1200 mm (48 inches). Use clips, bolts, or wire ties for direct attachment to steel framing.



- E. Existing concrete construction exposed or concrete on steel decking:
  - 1. Use power actuated fasteners either eye pin, threaded studs or drive pins for type of hanger attachment required.
  - 2. Install fasteners at approximate mid height of concrete beams or joists. Do not install in bottom of beams or joists.
- F. Steel decking without concrete topping:
  - 1. Do not fasten to steel decking 0.76 mm (0.0299-inch) or thinner.
  - 2. Toggle bolt to decking 0.9 mm (0.0359-inch) or thicker only where anchorage to steel framing is not possible.
- G. Installing suspended ceiling system for gypsum board (ASTM C635 Option):
  - 1. Install only for ceilings to receive screw attached gypsum board.
  - 2. Install in accordance with ASTM C636.
    - a. Install main runners spaced 1200 mm (48 inches) on center.
    - b. Install 1200 mm (four foot) tees not over 600 mm (24 inches) on center; locate for edge support of gypsum board.
    - c. Install wall track channel at perimeter.
- H. Installing Ceiling Bracing System:
  - 1. Construct bracing of 38 mm (1-1/2 inch) channels for lengths up to 2400 mm (8 feet) and 50 mm (2 inch) channels for lengths over 2400 mm (8 feet) with ends bent to form surfaces for anchorage to carrying channels and over head construction. Lap channels not less than 600 mm (2 feet) at midpoint back to back. Screw or bolt lap together with two fasteners.
  - 2. Install bracing at an approximate 45 degree angle to carrying channels and structure overhead; secure as specified to structure overhead with two fasteners and to carrying channels with two fasteners or wire ties.

### 3.6 TOLERANCES

- A. Fastening surface for application of subsequent materials shall not vary more than 3 mm (1/8-inch) from the layout line.
- B. Plumb and align vertical members within 3 mm (1/8-inch.)
- C. Level or align ceilings within 3 mm (1/8-inch.)

- - - E N D - - -

**SECTION 09 29 00  
GYPSUM BOARD**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies furnishing, installing, and finishing of gypsum board for partitions, walls, ceilings, and soffits.
- B. Include acoustical sound insulation for walls and partitions.

**1.2 RELATED WORK**

- A. Installation of steel framing members for walls, partitions, furring, soffits, and ceilings: Section 05 40 00, COLD-FORMED METAL FRAMING, and Section 09 22 16, NON-STRUCTURAL METAL FRAMING.
- B. Acoustical Sealants: Section 07 92 00, JOINT SEALANTS.
- C. Lead lined wallboard: Section 13 49 00, RADIATION PROTECTION.
- D. Lay in gypsum board ceiling panels: Section 09 51 00, ACOUSTICAL CEILING.

**1.3 TERMINOLOGY**

- A. Definitions and description of terms shall be in accordance with ASTM C11, C840, and as specified.
- B. Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead shall be the underside of the floor or roof construction supported by the trusses or bar joists.
- C. "Yoked": Gypsum board cut out for opening with no joint at the opening (along door jamb or above the door).

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Cornerbead and edge trim.
  - 2. Finishing materials.
  - 3. Laminating adhesive.
  - 4. Gypsum board, each type.
  - 5. Batt insulation.
- C. Shop Drawings:
  - 1. Typical gypsum board installation, showing corner details, edge trim details, details at door frames, and details at ceilings and soffits.
  - 2. Typical sound rated assembly, showing treatment at perimeter of partitions and penetrations at gypsum board.

3. Typical fire rated assembly and column fireproofing, indicating details of construction same as that used in fire rating test.

D. Samples:

1. Cornerbead.
2. Edge trim.
3. Control joints.

E. Test Results:

1. Fire rating test, each fire rating required for each assembly.
2. Sound rating test.

#### 1.5 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE

- A. In accordance with the requirements of ASTM C840.

#### 1.6 ENVIRONMENTAL CONDITIONS

- A. In accordance with the requirements of ASTM C840.

#### 1.7 APPLICABLE PUBLICATIONS

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

B. American Society for Testing And Materials (ASTM):

C11-08.....Terminology Relating to Gypsum and Related  
Building Materials and Systems

C475-02.....Joint Compound and Joint Tape for Finishing  
Gypsum Board

C840-08.....Application and Finishing of Gypsum Board

C919-08.....Sealants in Acoustical Applications

C954-07.....Steel Drill Screws for the Application of Gypsum  
Board or Metal Plaster Bases to Steel Stud from  
0.033 in. (0.84mm) to 0.112 in. (2.84mm) in  
thickness

C1002-07.....Steel Self-Piercing Tapping Screws for the  
Application of Gypsum Panel Products or Metal  
Plaster Bases to Wood Studs or Steel Studs

C1047-05.....Accessories for Gypsum Wallboard and Gypsum  
Veneer Base

C1396-06.....Gypsum Board

E84-08.....Surface Burning Characteristics of Building  
Materials

C. Underwriters Laboratories Inc. (UL):

Latest Edition.....Fire Resistance Directory

D. Inchcape Testing Services (ITS):

Latest Editions.....Certification Listings

**PART 2 - PRODUCTS****2.1 GYPSUM BOARD**

- A. Gypsum Board: ASTM C1396, Type X, 16 mm (5/8 inch) thick unless shown otherwise. Gypsum board shall contain a minimum of 20 percent recycled gypsum.
- B. Mold and Moisture Resistant Gypsum Board (Water Resistant Gypsum Board): ASTM C1396, Type X, 16 mm (5/8 inch) thick.
- C. Impact-Resistant Gypsum Board: ASTM C1396, manufactured to produce greater resistance to surface indentations and thru-penetration (impact resistance) than the regular gypsum board.
- D. Ceiling Gypsum Board: ASTM C1396, sag resistant, thickness as detailed on Drawings.
- E. Gypsum cores shall contain a minimum of 95 percent post industrial recycled gypsum content. Paper facings shall contain 100 percent post-consumer recycled paper content.

**2.2 ACCESSORIES**

- A. Metal Trim: ASTM C1047, except formed of 0.39 mm (0.015 inch) thick zinc coated steel sheet or rigid PVC plastic.
  - 1. Flanges not less than 22 mm (7/8 inch) wide with punchouts or deformations as required to provide compound bond.
  - 2. Include for cornerbeads and control joints; shape as applicable to locations.
- B. Reveals:
  - 1. Material: Extruded aluminum sections, 1.27 mm (0.050 inch) nominal wall thickness, profile and dimensions as indicated on Drawings.
  - 2. Finish: Manufacturer's standard finish as applicable for field finishing.

**2.3 FASTENERS**

- A. ASTM C1002 and ASTM C840, except as otherwise specified.
- B. ASTM C954, for steel studs thicker than 0.04 mm (0.33 inch).
- C. Select screws of size and type recommended by the manufacturer of the material being fastened.
- D. For fire rated construction, type and size same as used in fire rating test.
- E. Clips: Zinc-coated (galvanized) steel; gypsum board manufacturer's standard items.

## **2.4 ACOUSTICAL INSULATION**

- A. Fiberglass Insulation Batts: ASTM C665, Type 1, unfaced, non-combustible, maximum flame spread of 10, smoke development of 10, when tested in accordance with ASTM E84.
- B. Thickness as shown; of widths and lengths to fit tight against framing.

## **2.5 FINISHING MATERIALS AND LAMINATING ADHESIVE**

- A. General: ASTM C475 and ASTM C840. Free of antifreeze, vinyl adhesives, preservatives, biocides and other VOC. Adhesive shall contain a maximum VOC content of 50 g/l.
- B. Joint Tape for Gypsum Board: Paper.
- C. Joint Compound:
  - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
  - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
  - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.

## **PART 3 - EXECUTION**

### **3.1 GYPSUM BOARD HEIGHTS**

- A. Extend all layers of gypsum board from floor to underside of structure overhead on following partitions and furring:
  - 1. Two sides of partitions:
    - a. Fire rated partitions.
    - b. Smoke partitions.
    - c. Sound rated partitions.
    - d. Full height partitions shown (FHP).
  - 2. One side of partitions or furring:
    - a. Inside of exterior wall furring or stud construction.
    - b. Room side of room without suspended ceilings.
    - c. Furring for pipes and duct shafts, except where fire rated shaft wall construction is shown.
  - 3. Extend all layers of gypsum board construction used for fireproofing of columns from floor to underside of structure overhead, unless shown otherwise.

- B. In locations other than those specified, extend gypsum board from floor to heights as follows:
  - 1. Not less than 100 mm (4 inches) above suspended acoustical ceilings.
  - 2. At ceiling of suspended gypsum board ceilings.
  - 3. At existing ceilings.

### 3.2 INSTALLING GYPSUM BOARD

- A. Coordinate installation of gypsum board with other trades and related work.
- B. Install gypsum board in accordance with ASTM C840, except as otherwise specified.
- C. Use gypsum boards in maximum practical lengths to minimize number of end joints.
- D. Bring gypsum board into contact, but do not force into place.
- E. Ceilings:
  - 1. For single-ply construction, use perpendicular application.
  - 2. For two-ply assemblies:
    - a. Use perpendicular application.
    - b. Apply face ply of gypsum board so that joints of face ply do not occur at joints of base ply with joints over framing members.
- F. Walls:
  - 1. When gypsum board is installed parallel to framing members, space fasteners 300 mm (12 inches) on center in field of the board, and 200 mm (8 inches) on center along edges.
  - 2. When gypsum board is installed perpendicular to framing members, space fasteners 300 mm (12 inches) on center in field and along edges.
  - 3. Stagger screws on abutting edges or ends.
  - 4. For single-ply construction, apply gypsum board with long dimension either parallel or perpendicular to framing members as required to minimize number of joints except gypsum board shall be applied vertically over "Z" furring channels.
  - 5. For two-ply gypsum board assemblies, apply base ply of gypsum board to assure minimum number of joints in face layer. Apply face ply of wallboard to base ply so that joints of face ply do not occur at joints of base ply with joints over framing members.
  - 6. No offset in exposed face of walls and partitions will be permitted because of single-ply and two-ply application requirements.
  - 7. Control Joints ASTM C840 and as follows:
    - a. Locate at both side jambs of openings if gypsum board is not "yoked". Use one system throughout.

- b. Not required for wall lengths less than 9000 mm (30 feet).
  - c. Extend control joints the full height of the wall or length of soffit/ceiling membrane.
- G. Acoustical or Sound Rated Partitions, Fire and Smoke Partitions:
- 1. Cut gypsum board for a space approximately 3 mm to 6 mm (1/8 to 1/4 inch) wide around partition perimeter.
  - 2. Coordinate for application of caulking or sealants to space prior to taping and finishing.
  - 3. For sound rated partitions, use sealing compound (ASTM C919) to fill the annular spaces between all receptacle boxes and the partition finish material through which the boxes protrude to seal all holes and/or openings on the back and sides of the boxes. STC minimum values as shown.
- H. Accessories:
- 1. Set accessories plumb, level and true to line, neatly mitered at corners and intersections, and securely attach to supporting surfaces as specified.
  - 2. Install in one piece, without the limits of the longest commercially available lengths.
  - 3. Corner Beads:
    - a. Install at all vertical and horizontal external corners and where shown.
    - b. Use screws only. Do not use crimping tool.
  - 4. Edge Trim (Casings Beads):
    - a. At both sides of expansion and control joints unless shown otherwise.
    - b. Where gypsum board terminates against dissimilar materials and at perimeter of openings, except where covered by flanges, casings or permanently built-in equipment.
    - c. Where gypsum board surfaces of non-load bearing assemblies abut load bearing members.
    - d. Where shown.

### 3.3 FINISHING OF GYPSUM BOARD

- A. Finish joints, edges, corners, and fastener heads in accordance with ASTM C840. Use Level 5 finish for all finished areas open to public view.
- B. Before proceeding with installation of finishing materials, assure the following:
  - 1. Gypsum board is fastened and held close to framing or furring.
  - 2. Fastening heads in gypsum board are slightly below surface in dimple formed by driving tool.

- C. Finish joints, fasteners, and all openings, including openings around penetrations, on that part of the gypsum board extending above suspended ceilings to seal surface of smoke barrier, and fire rated gypsum board construction.
- D. After the installation of hanger rods, hanger wires, supports, equipment, conduits, piping and similar work, seal remaining openings and maintain the integrity of the smoke barrier, and fire rated construction.
- E. Sanding is not required of non decorated surfaces.

#### **3.4 REPAIRS**

- A. After taping and finishing has been completed, and before decoration, repair all damaged and defective work, including nondecorated surfaces.
- B. Patch holes or openings 13 mm (1/2 inch) or less in diameter, or equivalent size, with a setting type finishing compound or patching plaster.
- C. Repair holes or openings over 13 mm (1/2 inch) diameter, or equivalent size, with 16 mm (5/8 inch) thick gypsum board secured in such a manner as to provide solid substrate equivalent to undamaged surface.
- D. Tape and refinish scratched, abraded or damaged finish surfaces including cracks and joints in non decorated surface to provide smoke tight construction, fire protection equivalent to the fire rated construction and STC equivalent to the sound rated construction.

- - - E N D - - -



**SECTION 09 30 13**  
**CERAMIC/PORCELAIN TILING**

**PART 1 - GENERAL****1.1 DESCRIPTION**

This section specifies ceramic, porcelain tile, waterproofing membranes for thin-set applications, crack isolation membranes, tile backer board.

**1.2 RELATED WORK**

- A. Sealing of joints where specified: Section 07 92 00, JOINT SEALANTS.
- B. Color, texture and pattern of field tile and trim shapes, size of field tile, trim shapes, and color of grout specified: Finish Schedule in Construction documents, sheet IN-601.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. Base tile, each type, each color, each size.
  - 2. Mosaic floor tile panels, 225 mm by 225 mm (9 inches by 9 inches), each type, color, size and pattern.
  - 3. Porcelain tile, each type, color, patterns and size.
  - 4. Wall (or wainscot) tile, each color, size and pattern.
  - 5. Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.
- C. Product Data:
  - 1. Ceramic and porcelain tile, marked to show each type, size, and shape required.
  - 2. Chemical resistant mortar and grout (Epoxy and Furan).
  - 3. Cementitious backer unit.
  - 4. Dry-set Portland cement mortar and grout.
  - 5. Divider strip.
  - 6. Elastomeric membrane and bond coat.
  - 7. Reinforcing tape.
  - 8. Leveling compound.
  - 9. Latex-Portland cement mortar and grout.
  - 10. Commercial Portland cement grout.
  - 11. Slip resistant tile.
  - 12. Waterproofing isolation membrane.
  - 13. Fasteners.
- D. Certification:

1. Master grade, ANSI A137.1.
2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
  - a. Chemical resistant mortar and grout (epoxy and furan).
  - b. Modified epoxy emulsion.
  - c. Commercial Portland cement grout.
  - d. Cementitious backer unit.
  - e. Dry-set Portland cement mortar and grout.
  - f. Elastomeric membrane and bond coat.
  - g. Reinforcing tape.
  - h. Latex-Portland cement mortar and grout.
  - i. Leveling compound.
  - j. Waterproof isolation membrane.
  - k. Factory mounted tile suitability for application in wet area specified under 2.1, A, 3 with list of successful in-service performance locations.

#### **1.4 DELIVERY AND STORAGE**

- A. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- B. Store material to prevent damage or contamination.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
  - A10.20-05.....Safety Requirements for Ceramic Tile, Terrazzo, and Marble Works
  - A108.1A-05.....Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar
  - A108.1B-05.....Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with dry-Set or latex-Portland Cement Mortar
  - A108.1C-05.....Contractors Option; Installation of Ceramic Tile in the Wet-Set method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar
  - A108.5-05.....Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar

- A108.6-05.....Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy
- A108.8-05.....Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout
- A108.10-05.....Installation of Grout in Tilework
- A108.11-05.....Interior Installation of Cementitious Backer Units
- A118.1-05.....Dry-Set Portland Cement Mortar
- A118.3-05.....Chemical Resistant, Water Cleanable Tile-Setting Epoxy and Water Cleanable Tile-Setting and Grouting Epoxy Adhesive
- A118.4-05.....Latex-Portland Cement Mortar
- A118.5-05.....Chemical Resistant Furan Mortars and Grouts for Tile Installation
- A118.6-05.....Standard Cement Grouts for Tile Installation
- A118.9-05.....Cementitious Backer Units
- A118.10-05.....Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation
- A136.1-05.....Organic Adhesives for Installation of Ceramic Tile
- A137.1-88.....Ceramic Tile
- C. American Society For Testing And Materials (ASTM):
  - C109/C109M-07.....Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch. or [50-mm] Cube Specimens)
  - C241-90 (R2005).....Abrasion Resistance of Stone Subjected to Foot Traffic
  - C348-02.....Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
  - C627-93(R2007).....Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester
  - C954-07.....Steel Drill Screws for the Application of Gypsum Board on Metal Plaster Base to Steel Studs from 0.033 in (0.84 mm) to 0.112 in (2.84 mm) in thickness
  - C1002-07.....Steel Self-Piercing Tapping Screws for the Application of Panel Products

- C1028-07.....Determining the Static Coefficient of Friction  
of Ceramic Tile and Other Like Surfaces by the  
Horizontal Dynamometer Pull Meter Method
- C1127-01.....Standard Guide for Use of High Solids Content,  
Cold Liquid-Applied Elastomeric Waterproofing  
Membrane with an Integral Wearing Surface
- C1178/C1178M-06.....Standard Specification for Coated Glass Mat  
Water-Resistant Gypsum Backing Panel
- D4397-02.....Standard Specification for Polyethylene Sheeting  
for Construction, Industrial and Agricultural  
Applications
- D5109-99(R2004).....Standard Test Methods for Copper-Clad  
Thermosetting Laminates for Printed Wiring  
Boards
- D. Marble Institute of America (MIA): Design Manual III-2007
- E. Tile Council of America, Inc. (TCA):  
2007.....Handbook for Ceramic Tile Installation

## **PART 2 - PRODUCTS**

### **2.1 TILE**

- A. Comply with ANSI A137.1, Standard Grade, except as modified:
1. Inspection procedures listed under the Appendix of ANSI A137.1.
  2. Abrasion Resistance Classification:
    - a. Tested in accordance with values listed in Table 1, ASTM C 1027.
    - b. Class V, 12000 revolutions for floors in Corridors
    - c. Class IV, 6000 revolutions for remaining areas.
  3. Slip Resistant Tile for Floors:
    - a. Coefficient of friction, when tested in accordance with ASTM C1028, required for level of performance:
  4. Mosaic tile may be mounted or joined together by a resinous bonding material along tile edges.
  5. Factory Blending: For tile with color variations, within the ranges selected during sample submittals blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
  6. Factory-Applied Temporary Protective Coating:
    - a. Protect exposed face surfaces (top surface) of tile against adherence of mortar and grout by pre-coating with a continuous film of petroleum paraffin wax, applied hot.
    - b. Do not coat unexposed tile surfaces.
    - c. Pre-wax tiles set or grouted with epoxy or latex modified mortars.

- B. Unglazed Ceramic Mosaic Tile: Nominal 6 mm (1/4 inch) thick with cushion edges.
- C. Unglazed Quarry Tile: Nominal 13 mm (1/2 inch) thick, square edges.
- D. Glazed Wall Tile: Cushion edges, glazing, as specified on the finish schedule, Construction documents sheet IN-601.
- E. Custom Glass Mosaic Tile: Nominal 5/16" thick, 1" x 1" tile mesh mounted on 12" x 12" sheet, Factory custom blended, Equal blend with all colors as specified on the finish schedule, Construction documents, sheet IN-601.
- F. Trim Shapes:
  - 1. Conform to applicable requirements of adjoining floor and wall tile.
  - 2. Use trim shapes sizes conforming to size of adjoining field wall tile including existing spaces unless detailed or specified otherwise on the finish schedule, Construction documents sheet IN-601.
  - 3. Internal and External Corners:
    - a. Square internal and external corner joints are not acceptable.
    - b. External corners including edges: Use bullnose shapes.
    - c. Internal corners: Use cove shapes.
    - d. Base to floor internal corners: Use special shapes providing integral cove vertical and horizontal joint.
    - e. Base to floor external corners: Use special shapes providing bullnose vertical edge with integral cove horizontal joint. Use stop at bottom of openings having bullnose return to wall.
    - f. Wall top edge internal corners: Use special shapes providing integral cove vertical joint with bullnose top edge.
    - g. Wall top edge external corners: Use special shapes providing bullnose vertical and horizontal joint edge.
    - h. For unglazed ceramic mosaic and glazed wall tile installed in Portland cement mortar setting bed, use cove and bullnose shapes as applicable. When ceramic mosaic wall and base tile is required, use C Series cove and bullnose shapes.
    - i. For unglazed ceramic mosaic and glazed wall tile installed in dry-set Portland cement mortar, latex-Portland cement mortar, and organic adhesive (thin set methods), use cove and surface bullnose shapes as applicable.

## **2.2 CEMENTITIOUS BACKER UNITS**

- A. Use in wet areas.
- B. ANSI A118.9.
- C. Use Cementitious backer units in maximum available lengths.
- D. Backer unit meet or exceed the following additional physical properties:

<u>Property</u>	<u>Test Method</u>	<u>Value</u>
Water absorption	ASTM C948	Less than 20 percent by weight

### **2.3 JOINT MATERIALS FOR CEMENTITIOUS BACKER UNITS**

- A. Reinforcing Tape: Vinyl coated woven glass fiber mesh tape, open weave, 50 mm (2 inches) wide. Tape with pressure sensitive adhesive backing will not be permitted.
- B. Tape Embedding Material: Latex-Portland cement mortar complying with ANSI A118.4.
- C. Joint material, including reinforcing tape, and tape embedding material, shall be as specifically recommended by the backer unit manufacturer.

### **2.4 FASTENERS**

- A. Screws for Cementitious Backer Units.
  - 1. Standard screws for gypsum board are not acceptable.
  - 2. Minimum 11 mm (7/16 inch) diameter head, corrosion resistant coated, with washers.
  - 3. ASTM C954 for steel 1 mm (0.033 inch) thick.
  - 4. ASTM C1002 for steel framing less than 0.0329 inch thick.
- B. Washers: Galvanized steel, 13 mm (1/2 inch) minimum diameter.

### **2.5 GLASS MAT WATER RESISTANT GYPSUM BACKER BOARD**

Confirm to ASTM C1178/C1178M, Optional System for Cementitious Backer Units.

### **2.6 SETTING MATERIALS OR BOND COATS**

- A. Conform to TCA Handbook for Ceramic Tile Installation.
- B. Portland Cement Mortar: ANSI A108.1.
- C. Latex-Portland Cement Mortar: ANSI A118.4.
  - 1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A118.4.
  - 2. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of Portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
- D. Dry-Set Portland Cement Mortar: ANSI A118.1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A118.4.
- E. Organic Adhesives: ANSI A136.1, Type 1.
- F. Chemical-Resistant Bond Coat:
  - 1. Epoxy Resin Type: ANSI A118.3.
  - 2. Furan Resin Type: ANSI A118.5.
- G. Elastomeric Waterproofing Membrane and Bond Coat:

1. TCA F122-02.
  2. ANSI A118.10.
  3. One component polyurethane, liquid applied material having the following additional physical properties:
    - a. Hardness: Shore "A" between 40-60.
    - b. Elongation: Between 300-600 percent.
    - c. Tensile strength: Between 40-60 psig.
    - d. No volatile compounds.
  4. Coal tar modified urethanes are not acceptable.
- H. Waterproofing Isolation Membrane:
1. Sheet System TCA F122-02.
  2. Optional System to elastomeric waterproof membrane.
  3. Composite sheet consisting of ASTM D5109, Type II, Grade I Chlorinated Polyethylene (CM) sheet reinforced on both sides with a non-woven polyester fiber.
  4. Designed for use in wet areas as an isolation and positive waterproofing membranes for thin-set bonding of sheet to substrate and thin-set bonding of ceramic and porcelain tile or marble to sheet. Suited for both horizontal and vertical applications.
  5. Conform to the following additional physical properties:

Property	Units	Results	Test Method
Hardness Shore A	Points	70-80	ASTM D2240 (10 Second Reading)
Shrinkage	Percent	5 maximum	ASTM D1204
Brittleness		No crack remains flexible at temperature-37 degrees C (-25 degrees F)	ASTM D2497 13 mm (1/2- inch) Mandrel Bend
Retention of Properties after Heat Aging	Percent of original	80 Tensile 80 Breaking 80 Elongation	ASTM D3045, 90 degrees C (194 degrees F) for 168 hours

6. Manufacturer's standard sheet size with prefabricated or preformed inside and outside corners.
7. Sheet manufacturer's solvent welding liquid or xylene and edge sealant.

## 2.7 GROUTING MATERIALS

- A. Coloring Pigments:

1. Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
  2. Add coloring pigments to grout by the manufacturer.
  3. Job colored grout is not acceptable.
  4. Use is required in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.
- B. White Portland Cement Grout:
1. ANSI A118.6.
  2. Use one part white Portland cement to one part white sand passing a number 30 screen.
  3. Color additive not permitted.
- C. Commercial Portland Cement Grout: ANSI A118.6 color as specified.
- D. Dry-Set Grout: ANSI A118.6 color as specified.
- E. Latex-Portland Cement Grout: ANSI A118.6 color as specified.
1. Unsanded grout mixture for joints 3.2 mm (1/8 inch) and narrower.
  2. Sanded grout mixture for joints 3.2 mm (1/8 inch) and wider.
- F. Chemical-Resistant Grout:
1. Epoxy grout, ANSI A118.3.
  2. Furan grout, ANSI A118.5.

## **2.8 PATCHING AND LEVELING COMPOUND**

- A. Portland cement base, polymer-modified, self-leveling compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- B. Shall have minimum following physical properties:
1. Compressive strength - 25 MPa (3500 psig) per ASTM C109/C109M.
  2. Flexural strength - 7 MPa (1000 psig) per ASTM C348 (28 day value).
  3. Tensile strength - 600 psi per ANSI 118.7.
  4. Density - 1.9.
- C. Capable of being applied in layers up to 38 mm (1-1/2 inches) thick without fillers and up to 100 mm (four inches) thick with fillers, being brought to a feather edge, and being trowelled to a smooth finish.
- D. Primers, fillers, and reinforcement as required by manufacturer for application and substrate condition.
- E. Ready for use in 48 hours after application.

## **2.9 WATER**

Clean, potable and free from salts and other injurious elements to mortar and grout materials.



**2.10 CLEANING COMPOUNDS**

- A. Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
- B. Materials containing acid or caustic material not acceptable.

**2.11 FLOOR MORTAR BED REINFORCING**

ASTM A185 welded wire fabric without backing, MW3 x MW3 (2 x 2-W0.5 x W0.5).

**2.12 POLYETHYLENE SHEET**

- A. Polyethylene sheet conforming to ASTM D4397.
- B. Nominal thickness: 0.15 mm (six mils).
- C. Use sheet width to minimize joints.

**PART 3 - EXECUTION****3.1 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain ambient temperature of work areas at not less than 16 degree C (60 degrees F), without interruption, for not less than 24 hours before installation and not less than three days after installation.
- B. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation and ANSI Specifications for installation.
- C. Do not install tile when the temperature is above 38 degrees C (100 degrees F).
- D. Do not install materials when the temperature of the substrate is below 16 degrees C (60 degrees F).
- E. Do not allow temperature to fall below 10 degrees C (50 degrees F) after fourth day of completion of tile work.

**3.2 ALLOWABLE TOLERANCE**

- A. Variation in plane of sub-floor, including concrete fills leveling compounds and mortar beds:
  - 1. Not more than 1 in 500 (1/4 inch in 10 feet) from required elevation where Portland cement mortar setting bed is used.
  - 2. Not more than 1 in 1000 (1/8 inch in 10 feet) where dry-set Portland cement, and latex-Portland cement mortar setting beds and chemical-resistant bond coats are used.
- B. Variation in Plane of Wall Surfaces:
  - 1. Not more than 1 in 400 (1/4 inch in eight feet) from required plane where Portland cement mortar setting bed is used.

2. Not more than 1 in 800 (1/8 inch in eight feet) where dry-set or latex-Portland cement mortar or organic adhesive setting materials is used.

### 3.3 SURFACE PREPARATION

#### A. Cleaning New Concrete or Masonry:

1. Chip out loose material, clean off all oil, grease dirt, adhesives, curing compounds, and other deterrents to bonding by mechanical method, or by using products specifically designed for cleaning concrete and masonry.
2. Use self-contained power blast cleaning systems to remove curing compounds and steel trowel finish from concrete slabs where ceramic tile will be installed directly on concrete surface with thin-set materials.
3. Steam cleaning or the use of acids and solvents for cleaning will not be permitted.

#### B. Patching and Leveling:

1. Mix and apply patching and leveling compound in accordance with manufacturer's instructions.
2. Fill holes and cracks and align concrete floors that are out of required plane with patching and leveling compound.
  - a. Thickness of compound as required to bring finish tile system to elevation shown.
  - b. Float finish except finish smooth for elastomeric waterproofing.
  - c. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
3. Apply patching and leveling compound to concrete and masonry wall surfaces that are out of required plane.
4. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.

#### C. Mortar Bed for Slopes to Drains:

1. Slope compound to drain where drains are shown.
2. Install mortar bed in depressed slab sloped to drains not less than 1 in 200 (1/16 inch per foot).
3. Allow not less than 50 mm (2 inch) depression at edge of depressed slab.
4. Screed for slope to drain and float finish.
5. Cure mortar bed for not less than seven days. Do not use curing compounds or coatings.

- D. Additional preparation of concrete floors for tile set with epoxy, or furan-resin shall be in accordance with the manufacturer's printed instructions.
- E. Cleavage Membrane:
1. Install polythene sheet as cleavage membrane in depressed slab when waterproof membrane is not scheduled or indicated.
  2. Turn up at edge of depressed floor slab to top of floor.
- F. Walls:
1. In showers or other wet areas cover studs with polyethylene sheet.
  2. Apply patching and leveling compound to concrete and masonry surfaces that are out of required plane.
  3. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.
  4. Apply metal lath to framing in accordance with ANSI A108.1:
    - a. Use fasteners specified in paragraph "Fasteners." Use washers when lath opening is larger than screw head.
    - b. Apply scratch and leveling coats to metal lath in accordance with ANSI A108.1.C.
    - c. Total thickness of scratch and leveling coats:
      - 1) Apply 9 mm to 16 mm (3/8 inch to 5/8 inch) thick over solid backing.
      - 2) 16 mm to 19 mm (5/8 to 3/4 inch) thick on metal lath over studs.
      - 3) Where wainscots are required to finish flush with wall surface above, adjust thickness required for flush finish.
    - d. Apply scratch and leveling coats more than 19 mm (3/4 inch) thick in two coats.
- G. Existing Floors and Walls:
1. Remove existing composition floor finishes and adhesive. Prepare surface by grinding, chipping, self-contained power blast cleaning or other suitable mechanical methods to completely expose uncontaminated concrete or masonry surfaces. Follow safety requirements of ANSI A10.20.
  2. Remove existing concrete fill or topping to structural slab. Clean and level the substrate for new setting bed and waterproof membrane or cleavage membrane.
  3. Where new tile bases are required to finish flush with plaster above or where they are extensions of similar bases in conjunction with existing floor tiles cut channel in floor slab and expose rough wall

construction sufficiently to accommodate new tile base and setting material.

### **3.4 CEMENTITIOUS BACKER UNITS**

- A. Remove polyethylene wrapping from cementitious backer units and separate to allow for air circulation. Allow moisture content of backer units to dry down to a maximum of 35 percent before applying joint treatment and tile.
- B. Install in accordance with ANSI A108.11 except as specified otherwise.
- C. Install units horizontally or vertically to minimize joints with end joints over framing members. Units with rounded edges; face rounded edge away from studs to form a V joint for joint treatment.
- D. Secure cementitious backer units to each framing member with screws spaced not more than 200 mm (eight inches) on center and not closer than 13 mm (1/2 inch) from the edge of the backer unit or as recommended by backer unit manufacturer. Install screws so that the screw heads are flush with the surface of the backer unit.
- E. Where backer unit joins shower pans or waterproofing, lap backer unit over turned up waterproof system. Install fasteners only through top one-inch of turned up waterproof systems.
- F. Do not install joint treatment for seven days after installation of cementitious backer unit.
- G. Joint Treatment:
  - 1. Fill horizontal and vertical joints and corners with latex-Portland cement mortar. Apply fiberglass tape over joints and corners and embed with same mortar.
  - 2. Leave 6 mm (1/4 inch) space for sealant at lips of tubs, sinks, or other plumbing receptors.

### **3.5 GLASS MAT WATER-RESISTANT GYPSUM BACKER BOARD**

- A. Install in accordance with manufacturer's instructions. TCA Systems W245-01.
- B. Treat joints with tape and latex-Portland cement mortar or adhesive.

### **3.6 CERAMIC TILE - GENERAL**

- A. Comply with ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" applicable to methods of installation.
- B. Comply with TCA Installation Guidelines:
- C. Installing Mortar Beds for Floors:
  - 1. Install mortar bed to not damage cleavage or waterproof membrane; 32 mm (1-1/2 inch) minimum thickness.
  - 2. Install floor mortar bed reinforcing centered in mortar fill.

3. Screed finish to level plane or slope to drains where shown, float finish.
4. For thin set systems cure mortar bed not less than seven days. Do not use curing compounds or coatings.
5. For tile set with Portland cement paste over plastic mortar bed coordinate to set tile before mortar bed sets.

D. Setting Beds or Bond Coats:

1. Set wall tile installed over concrete or masonry in dry-set Portland cement mortar, or latex-Portland cement mortar, ANSI 108.1B. and TCA System W211-02, W221-02 or W222-02.
2. Set wall tile installed over concrete backer board in latex-Portland cement mortar, ANSI A108.1B.
3. Set wall tile installed over Portland cement mortar bed on metal lath base in Portland cement paste over plastic mortar bed, or dry-set Portland cement mortar or latex-Portland cement mortar over a cured mortar bed, ANSI A108.1C, TCA System W231-02, W241-02.
4. Set tile installed over gypsum board and gypsum plaster in organic adhesive, ANSI A108.4, TCA System W242-02.
5. Set trim shapes in same material specified for setting adjoining tile.

E. Workmanship:

1. Lay out tile work so that no tile less than one-half full size is used. Make all cuts on the outer edge of the field. Align new tile work scheduled for existing spaces to the existing tile work unless specified otherwise.
2. Set tile firmly in place with finish surfaces in true planes. Align tile flush with adjacent tile unless shown otherwise.
3. Form intersections and returns accurately.
4. Cut and drill tile neatly without marring surface.
5. Cut edges of tile abutting penetrations, finish, or built-in items:
  - a. Fit tile closely around electrical outlets, piping, fixtures and fittings, so that plates, escutcheons, collars and flanges will overlap cut edge of tile.
  - b. Seal tile joints water tight as specified in Section 07 92 00, JOINT SEALANTS, around electrical outlets, piping fixtures and fittings before cover plates and escutcheons are set in place.
6. Completed work shall be free from hollow sounding areas and loose, cracked or defective tile.
7. Remove and reset tiles that are out of plane or misaligned.
8. Floors:

- a. Extend floor tile beneath casework and equipment, except those units mounted in wall recesses.
  - b. Align finish surface of new tile work flush with other and existing adjoining floor finish where shown.
  - c. In areas where floor drains occur, slope to drains where shown.
  - d. Shove and vibrate tiles over 200 mm (8 inches) square to achieve full support of bond coat.
9. Walls:
- a. Cover walls and partitions, including pilasters, furred areas, and freestanding columns from floor to ceiling, or from floor to nominal wainscot heights shown with tile. Refer to finish drawings for extents of wall tile.
  - b. Finish reveals of openings with tile, except where other finish materials are shown or specified.
  - c. At window openings, provide tile stools and reveals, except where other finish materials are shown or specified.
  - d. Finish wall surfaces behind and at sides of casework and equipment, except those units mounted in wall recesses, with same tile as scheduled for room proper.
10. Joints:
- a. Keep all joints in line, straight, level, perpendicular and of even width unless shown otherwise.
  - b. Make joints 2 mm (1/16 inch) wide for glazed wall tile and mosaic tile work.
11. Back Buttering: For installations indicated below, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
- a. Tile wall installations in wet areas, including showers, tub enclosures, laundries and swimming pools.
  - b. Tile installed with chemical-resistant mortars and grouts.
  - c. Tile wall installations composed of tiles 200 by 200 mm (8 by 8 inches or larger).
  - d. Exterior tile wall installations.

### **3.7 CERAMIC TILE INSTALLED WITH PORTLAND CEMENT MORTAR**

- A. Mortar Mixes for Floor, Wall And Base: ANSI A108.1, except specified otherwise.
- B. Installing Wall and Base Tile: ANSI A108.1, except specified otherwise.
- C. Installing Floor Tile: ANSI A108.1, except as specified otherwise. Slope mortar beds to floor drains a minimum of 1 in 100 (1/8 inch per foot).

**3.8 PORCELAIN TILE INSTALLED WITH LATEX PORTLAND CEMENT BONDING MORTAR**

Due to the denseness of porcelain tile use latex Portland cement bonding mortar that meets the requirements of ANSI A118.4. Bonding mortars shall be mixed in accordance with manufacturer's instructions. Improper liquid ratios and dwell time before placement of bonding mortar and tile shall affect bond.

**3.9 THIN SET CERAMIC AND PORCELAIN TILE INSTALLED WITH DRY-SET PORTLAND CEMENT AND LATEX-PORTLAND CEMENT MORTAR**

- A. Installation of Tile: ANSI A108.5, except as specified otherwise.
- B. Slope tile work to drains not less than 1 in 100 (1/8 inch per foot).

**3.10 THIN SET CERAMIC AND PORCELAIN TILE INSTALLED WITH ORGANIC ADHESIVE**

Installation of Tile: ANSI A108.4.

**3.11 THIN SET CERAMIC AND PORCELAIN TILE INSTALLED WITH CHEMICAL-RESISTANT BOND COAT**

- A. Epoxy Resin Type: Install tile in accordance with Installation of Tile with Epoxy Mortar; ANSI A108.6.
- B. Furan Resin Type: Proportion, mix and place in accordance with the manufacturer's printed instructions. Set tile in accordance with ANSI A108.8.

**3.12 CERAMIC AND PORCELAIN TILE INSTALLED WITH ELASTOMERIC BOND COAT**

- A. Surface Preparation: Prepare surfaces as specified in paragraph 3.3G
- B. Installation of Elastomeric Membrane: ANSI A108.13 and TCA F122-02.
  - 1. Prime surfaces, where required, in accordance with manufacturer's instructions.
  - 2. Install first coat of membrane material in accordance with manufacturer's instructions, in thickness of 0.75 to 1.3 mm (30 to 50 mils).
  - 3. Extend material over flashing rings of drains and turn up vertical surfaces not less than 100 mm (four inches) above finish floor surface.
  - 4. When material has set, recoat areas with a second coat of elastomeric membrane material for a total thickness of 1.3 to 1.9 mm (50 to 75 mils).
  - 5. After curing test for leaks with 25 mm (one inch) of water for 24 hours.
- C. Installation of Tile in Elastomeric Membrane:
  - 1. Spread no more material than can be covered with tile before material starts to set.
  - 2. Apply tile in second coat of elastomeric membrane material in accordance with the coating manufacturer's instructions in lieu at

aggregate surfacing specified in ASTM C1127. Do not install top coat over tile.

### **3.13 GROUTING**

#### **A. Grout Type and Location:**

1. Grout for glazed wall and base tile, paver tile and unglazed mosaic tile, Portland cement grout, latex-Portland cement grout, dry-set grout, or commercial Portland cement grout.

#### **B. Workmanship:**

1. Install and cure grout in accordance with the applicable standard.
2. Portland Cement grout: ANSI A108.10.
3. Epoxy Grout: ANSI A108.6.
4. Furan and Commercial Portland Cement Grout: ANSI A108.8 and in accordance with the manufacturer's printed instructions.
5. Dry-set grout: ANSI A108.5.

### **3.14 MOVEMENT JOINTS**

- #### **A. Prepare tile expansion, isolation, construction and contraction joints for installation of sealant. Refer to Section 07 92 00, JOINT SEALANTS.**

#### **B. TCA details EJ 171-02.**

- #### **C. At expansion joints, rake out joint full depth of tile and setting bed and mortar bed. Do not cut waterproof or isolation membrane.**

- #### **D. Rake out grout at joints between tile, service sink, at toe of base, and where shown not less than 6 mm (1/4 inch) deep.**

### **3.15 CLEANING**

- #### **A. Thoroughly sponge and wash tile. Polish glazed surfaces with clean dry cloths.**

- #### **B. Methods and materials used shall not damage or impair appearance of tile surfaces.**

- #### **C. The use of acid or acid cleaners on glazed tile surfaces is prohibited.**

- #### **D. Clean tile grouted with epoxy, furan and commercial Portland cement grout and tile set in elastomeric bond coat as recommended by the manufacturer of the grout and bond coat.**

### **3.16 PROTECTION**

- #### **A. Keep traffic off tile floor, until grout and setting material is firmly set and cured.**

- #### **B. Where traffic occurs over tile floor, cover tile floor with not less than 9 mm (3/8 inch) thick plywood, wood particle board, or hardboard securely taped in place. Do not remove protective cover until time for final inspection. Clean tile of any tape, adhesive and stains.**



**3.17 TESTING FINISH FLOOR**

- A. Test floors in accordance with ASTM C627 to show compliance with codes 1 through 10.
- B. Test kitchen and storage rooms.

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**SECTION 09 51 00  
ACOUSTICAL CEILINGS**

**PART 1- GENERAL**

**1.1 DESCRIPTION**

- A. Metal ceiling suspension system for acoustical ceilings.
- B. Acoustical units.
- C. Adhesive application.

**1.2 RELATED WORK**

- A. Color, pattern, and location of each type of acoustical unit:  
Finish schedule, Construction documents sheet IN-601.
- B. Access doors in adhesive applied tile: Section 08 31 13, ACCESS DOORS  
AND FRAMES.

**1.3 SUBMITTAL**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA,  
AND SAMPLES.
- B. Samples:
  - 1. Acoustical units, each type, with label indicating conformance to  
specification requirements.
  - 2. Colored markers for units providing access.
- C. Manufacturer's Literature and Data:
  - 1. Ceiling suspension system, each type, showing complete details of  
installation.
  - 2. Acoustical units, each type
- D. Manufacturer's Certificates: Acoustical units, each type, in accordance  
with specification requirements.

**1.4 DEFINITIONS**

- A. Standard definitions as defined in ASTM C634.
- B. Terminology as defined in ASTM E1264.

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent  
referenced. Publications are referenced in the text by basic  
designation only.
- B. American Society for Testing and Materials (ASTM):
  - A641/A641M-03.....Zinc-coated (Galvanized) Carbon Steel Wire
  - A653/A653M-07.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-  
Iron Alloy-coated (Galvannealed) by the Hot-Dip  
Process

C423-07.....	Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
C634-02 (E2007).....	Standard Terminology Relating to Environmental Acoustics
C635-04.....	Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
C636-06.....	Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
E84-07.....	Surface Burning Characteristics of Building Materials
E119-07.....	Fire Tests of Building Construction and Materials
E413-04.....	Classification for Rating Sound Insulation.
E580-06.....	Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint
E1264-(R2005).....	Classification for Acoustical Ceiling Products

## **PART 2- PRODUCTS**

### **2.1 METAL SUSPENSION SYSTEM**

- A. ASTM C635, heavy-duty system, except as otherwise specified.
  - 1. Ceiling suspension system members may be fabricated from either of the following unless specified otherwise.
    - a. Galvanized cold-rolled steel, bonderized.
    - b. Extruded aluminum.
    - c. Fire resistant plastic (glass fiber) having a flame spread and smoke developed rating of not more than 25 when tested in accordance with ASTM E84.
  - 2. Use same construction for cross runners as main runners. Use of lighter-duty sections for cross runners is not acceptable.
- B. Exposed grid suspension system for support of lay-in panels:
  - 1. Exposed grid width not less than 22 mm (7/8 inch) with not less than 8 mm (5/16 inch) panel bearing surface.
  - 2. Fabricate wall molding and other special molding from the same material with same exposed width and finish as the exposed grid members.
  - 3. On exposed metal surfaces apply baked-on enamel flat texture finish in color to match adjacent acoustical units unless specified otherwise on the finish schedule, Construction documents sheet IN-601.

**2.2 PERIMETER SEAL**

- A. Vinyl, polyethylene or polyurethane open cell sponge material having density of 1.3 plus or minus 10 percent, compression set less than 10 percent with pressure sensitive adhesive coating on one side.
- B. Thickness as required to fill voids between back of wall molding and finish wall.
- C. Not less than 9 mm (3/8 inch) wide strip.

**2.3 WIRE**

- A. ASTM A641.
- B. For wire hangers: Minimum diameter 2.68 mm (0.1055 inch).
- C. For bracing wires: Minimum diameter 3.43 mm (0.1350 inch).

**2.4 ANCHORS AND INSERTS**

- A. Use anchors or inserts to support twice the loads imposed by hangers attached thereto.
- B. Hanger Inserts:
  - 1. Fabricate inserts from steel, zinc-coated (galvanized after fabrication).
  - 2. Nailing type option for wood forms:
    - a. Upper portion designed for anchorage in concrete and positioning lower portion below surface of concrete approximately 25 mm (one inch).
    - b. Lower portion provided with not less than 8 mm (5/16 inch) hole to permit attachment of hangers.
  - 3. Flush ceiling insert type:
    - a. Designed to provide a shell covered opening over a wire loop to permit attachment of hangers and keep concrete out of insert recess.
    - b. Insert opening inside shell approximately 16 mm (5/8 inch) wide by 9 mm (3/8 inch) high over top of wire.
    - c. Wire 5 mm (3/16 inch) diameter with length to provide positive hooked anchorage in concrete.
- C. Clips:
  - 1. Galvanized steel.
  - 2. Designed to clamp to steel beam or bar joists, or secure framing member together.
  - 3. Designed to rigidly secure framing members together.
  - 4. Designed to sustain twice the loads imposed by hangers or items supported.
- D. Tile Splines: ASTM C635.

**2.5 CARRYING CHANNELS FOR SECONDARY FRAMING**

- A. Fabricate from cold-rolled or hot-rolled steel, black asphaltic paint finish, free of rust.
- B. Weighing not less than the following, per 300 m (per thousand linear feet):

Size mm	Size Inches	Cold-rolled		Hot-rolled	
		Kg	Pound	Kg	Pound
38	1 1/2	215.4	475	508	1120
50	2	267.6	590	571.5	1260

**2.6 ADHESIVE**

- A. ASTM D1779, having flame spread index of 25 or less when tested in accordance with ASTM E84.
- B. Developing minimum strength of 7 kg/m<sup>2</sup> (one psi) of contact surface 48 hours after installation in temperature of 21 °C (70 °F).

**2.7 ACOUSTICAL UNITS**

- A. General:
1. ASTM E1264, weighing 3.6 kg/m<sup>2</sup> (3/4 psf) minimum for mineral fiber panels or tile.
  2. Class A Flame Spread: ASTM 84
  3. Minimum NRC (Noise Reduction Coefficient): 0.55 unless specified otherwise: ASTM C423.
  4. Minimum CAC (Ceiling Attenuation Class): 40-44 range unless specified otherwise: ASTM E413.
  5. Manufacturers standard finish, minimum Light Reflectance (LR) coefficient of 0.75 on the exposed surfaces, except as specified otherwise on the finish schedule, Construction documents sheet IN-601.
  6. Lay-in panels: Sizes as shown on the finish schedule, Construction documents sheet IN-601.
  7. Tile for concealed grid upward access system: Optional 300 by 300 or 300 by 600 mm (12 by 12 or 12 by 24 inch) size.
    - a. Cross score 300 by 600 mm (12 by 24 inch) tile to simulate 300 by 300 mm (12 by 12 inch) tile edges.
    - b. Provide tile with beveled or square edges and joints as required to suit suspension and access system.
- B. Type III Units - Mineral base with water-based painted finish less than 10 g/l VOC, Form 2 - Water felted, minimum 16 mm (5/8 inch) thick. Mineral base to contain minimum 65 percent recycled content.

- C. Type IV Units - Mineral base with membrane-faced overlay, Form 2 - Water felted, minimum 16 mm (5/8 inch) thick. Apply over the paint coat on the face of the unit a poly (vinyl) chloride overspray having a flame spread index of 25 or less when tested in accordance with ASTM E84.

## **2.8 ACCESS IDENTIFICATION**

### **A. Markers:**

1. Use colored markers with pressure sensitive adhesive on one side.
2. Make colored markers of paper or plastic, 6 to 9 mm (1/4 to 3/8 inch) in diameter.

### **B. Use markers of the same diameter throughout building.**

### **C. Color Code: Use following color markers for service identification:**

Color.....Service

Red.....Sprinkler System: Valves and Controls

Green.....Domestic Water: Valves and Controls

Yellow.....Chilled Water and Heating Water

Orange.....Ductwork: Fire Dampers

Blue.....Ductwork: Dampers and Controls

Black.....Gas: Laboratory, Medical, Air and Vacuum

## **PART 3 EXECUTION**

### **3.1 CEILING TREATMENT**

- A. Treatment of ceilings shall include sides and soffits of ceiling beams, furred work 600 mm (24 inches) wide and over, and vertical surfaces at changes in ceiling heights unless otherwise shown. Install acoustic tiles after wet finishes have been installed and solvents have cured.
- B. Lay out acoustical units symmetrically about center lines of each room or space unless shown otherwise on reflected ceiling plan.
- C. Moldings:
1. Install metal wall molding at perimeter of room, column, or edge at vertical surfaces.
  2. Install special shaped molding at changes in ceiling heights and at other breaks in ceiling construction to support acoustical units and to conceal their edges.
- D. Perimeter Seal:
1. Install perimeter seal between vertical leg of wall molding and finish wall, partition, and other vertical surfaces.
  2. Install perimeter seal to finish flush with exposed faces of horizontal legs of wall molding.

### **3.2 CEILING SUSPENSION SYSTEM INSTALLATION**

#### **A. General:**

1. Install metal suspension system for acoustical tile and lay-in panels in accordance with ASTM C636, except as specified otherwise.
2. Use direct or indirect hung suspension system or combination thereof as defined in ASTM C635.
3. Support a maximum area of  $1.48 \text{ m}^2$  (16 sf) of ceiling per hanger.
4. Prevent deflection in excess of  $1/360$  of span of cross runner and main runner.
5. Provide extra hangers, minimum of one hanger at each corner of each item of mechanical, electrical and miscellaneous equipment supported by ceiling suspension system not having separate support or hangers.
6. Provide not less than 100 mm (4 inch) clearance from the exposed face of the acoustical units to the underside of ducts, pipe, conduit, secondary suspension channels, concrete beams or joists; and steel beam or bar joist unless furred system is shown,
7. Use main runners not less than 1200 mm (48 inches) in length.
8. Install hanger wires vertically. Angled wires are not acceptable except for seismic restraint bracing wires.

B. Anchorage to Structure:

1. Concrete:
  - a. Install hanger inserts and wire loops required for support of hanger and bracing wire in concrete forms before concrete is placed. Install hanger wires with looped ends through steel deck if steel deck does not have attachment device.
  - b. Use eye pins or threaded studs with screw-on eyes in existing or already placed concrete structures to support hanger and bracing wire. Install in sides of concrete beams or joists at mid height.
2. Steel:
  - a. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels for attachment of hanger wires.
    - (1) Size and space carrying channels to insure that the maximum deflection specified will not be exceeded.
    - (2) Attach hangers to steel carrying channels, spaced four feet on center, unless area supported or deflection exceeds the amount specified.
  - b. Attach carrying channels to the bottom flange of steel beams spaced not 1200 mm (4 feet) on center before fire proofing is installed. Weld or use steel clips to attach to beam to develop full strength of carrying channel.

- c. Attach hangers to bottom chord of bar joists or to carrying channels installed between the bar joists when hanger spacing prevents anchorage to joist. Rest carrying channels on top of the bottom chord of the bar joists, and securely wire tie or clip to joist.
- C. Direct Hung Suspension System:
  - 1. As illustrated in ASTM C635.
  - 2. Support main runners by hanger wires attached directly to the structure overhead.
  - 3. Maximum spacing of hangers, 1200 mm (4 feet) on centers unless interference occurs by mechanical systems. Use indirect hung suspension system where not possible to maintain hanger spacing.
- D. Indirect Hung Suspension System:
  - 1. As illustrated in ASTM C635.
  - 2. Space carrying channels for indirect hung suspension system not more than 1200 mm (4 feet) on center. Space hangers for carrying channels not more than 2400 mm (8 feet) on center or for carrying channels less than 1200 mm (4 feet) on center so as to insure that specified requirements are not exceeded.
  - 3. Support main runners by specially designed clips attached to carrying channels.

### 3.3 ACOUSTICAL UNIT INSTALLATION

- A. Cut acoustic units for perimeter borders and penetrations to fit tight against penetration for joint not concealed by molding.
- B. Install lay-in acoustic panels in exposed grid with not less than 6 mm (1/4 inch) bearing at edges on supports.
  - 1. Install tile to lay level and in full contact with exposed grid.
  - 2. Replace cracked, broken, stained, dirty, or tile not cut for minimum bearing.
- C. Tile in concealed grid upward access suspension system:
  - 1. Install acoustical tile with joints close, straight and true to line, and with exposed surfaces level and flush at joints.
  - 2. Make corners and arises full, and without worn or broken places.
  - 3. Locate acoustical units providing access as specified under Article, ACCESS.
- D. Markers:
  - 1. Install markers of color code specified to identify the various concealed piping, mechanical, and plumbing systems.
  - 2. Attach colored markers to exposed grid on opposite sides of the units providing access.



3. Attach marker on exposed ceiling surface of upward access acoustical unit.

**3.4 CLEAN-UP AND COMPLETION**

- A. Replace damaged, discolored, dirty, cracked and broken acoustical units.
- B. Leave finished work free from defects.

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**SECTION 09 65 13  
RESILIENT BASE AND ACCESSORIES**

**PART 1 - GENERAL****1.1 DESCRIPTION**

This section specifies the installation of rubber base and accessories.

**1.2 RELATED WORK**

A. Color and texture: Finish schedule, Construction documents sheet IN-601.

**1.3 SUBMITTALS**

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Description of each product.
2. Base manufacturer's recommendations for adhesives.
3. Application and installation instructions.

C. Samples:

1. Base: 150 mm (6 inches) long, each type and color.
2. Sheet Rubber Flooring: 300 mm (12 inches) square.
3. Adhesive: Literature indicating each type.

**1.4 DELIVERY**

A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.

B. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

**1.5 STORAGE**

A. Store materials in weather tight and dry storage facility.

B. Protect material from damage by handling and construction operations before, during, and after installation.

**1.6 APPLICABLE PUBLICATIONS**

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

B. American Society for Testing and Materials (ASTM):

F1344-04.....Rubber Floor Tile

F1861-02.....Resilient Wall Base

C. Federal Specifications (Fed. Spec.):

RR-T-650E.....Treads, Metallic and Non-Metallic, Nonskid

**PART 2 - PRODUCTS****2.1 GENERAL**

Use only products by the same manufacturer and from the same production run.

**2.2 RESILIENT BASE**

- A. ASTM F1861, 3 mm (1/8 inch) thick, 100 mm (4 inches) high, Type TP Rubber, Thermoplastics, Group 2-layered with molded top. Style B-cove.
- B. Where carpet occurs, use Style A-straight.
- C. Use only one type of base throughout.

**2.3 PRIMER (FOR CONCRETE FLOORS)**

As recommended by the adhesive and tile manufacturer.

**2.4 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

Provide products with latex or polyvinyl acetate resins in the mix.

**2.5 ADHESIVES**

- A. Use products recommended by the material manufacturer for the conditions of use.
- B. Use low-VOC adhesive during installation. Water based adhesive with low VOC is preferred over solvent based adhesive.

**PART 3 - EXECUTION****3.1 PROJECT CONDITIONS**

- A. Maintain temperature of materials above 21° C (70 °F), for 48 hours before installation.
- B. Maintain temperature of rooms where work occurs, between 21° C and 27° C (70°F and 80°F) for at least 48 hours, before, during, and after installation.
- C. Do not install materials until building is permanently enclosed and wet construction is complete, dry, and cured.

**3.2 INSTALLATION REQUIREMENTS**

- A. The respective manufacturer's instructions for application and installation will be considered for use when approved by the COTR.
- B. Submit proposed installation deviation from this specification to the COTR indicating the differences in the method of installation.
- C. The COTR reserves the right to have test portions of material installation removed to check for non-uniform adhesion and spotty adhesive coverage.

**3.3 PREPARATION**

- A. Examine surfaces on which material is to be installed.
- B. Fill cracks, pits, and dents with leveling compound.

- C. Level to 3 mm (1/8 inch) maximum variations.
- D. Do not use adhesive for leveling or filling.
- E. Grind, sand, or cut away protrusions; grind high spots.
- F. Clean substrate area of oil, grease, dust, paint, and deleterious substances.
- G. Substrate area dry and cured. Perform manufacturer's recommended bond and moisture test.
- H. Preparation of existing installation:
  - 1. Remove existing base and stair treads including adhesive.
  - 2. Do not use solvents to remove adhesives.
  - 3. Prepare substrate as specified.

### **3.4 BASE INSTALLATION**

- A. Location:
  - 1. Unless otherwise specified or shown, where base is scheduled, install base over toe space of base of casework, lockers, laboratory, pharmacy furniture island cabinets and where other equipment occurs.
  - 2. Extend base scheduled for room into adjacent closet, alcoves, and around columns.
- B. Application:
  - 1. Apply adhesive uniformly with no bare spots.
  - 2. Set base with joints aligned and butted to touch for entire height.
  - 3. Before starting installation, layout base material to provide the minimum number of joints with no strip less than 600 mm (24 inches) length.
    - a. Short pieces to save material will not be permitted.
    - b. Locate joints as remote from corners as the material lengths or the wall configuration will permit.
- C. Form corners and end stops as follows:
  - 1. Score back of outside corner.
  - 2. Score face of inside corner and notch cove.
- D. Roll base for complete adhesion.

### **3.5 CLEANING AND PROTECTION**

- A. Clean all exposed surfaces of base and adjoining areas of adhesive spatter before it sets.
- B. Keep traffic off resilient material for at least 72 hours after installation.
- C. Clean and polish materials in the following order:
  - 1. After two weeks, scrub resilient base, rubber tile and materials with a minimum amount of water and a mild detergent. Leave surfaces clean

- and free of detergent residue. Polish resilient base to a gloss finish.
2. Do not polish tread and sheet rubber materials.
- D. When construction traffic is anticipated, cover tread materials with reinforced kraft paper and plywood or hardboard properly secured and maintained until removal is directed by the COTR.
- E. Where protective materials are removed and immediately prior to acceptance, replace damaged materials and re-clean resilient materials. Damaged materials are defined as having cuts, gouges, scrapes or tears and not fully adhered.

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**SECTION 09 65 19  
RESILIENT TILE FLOORING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies the installation of solid vinyl tile flooring, vinyl composition tile flooring, rubber tile flooring, and accessories.

**1.2 RELATED WORK**

- A. Color and pattern and location in room finish schedule: Finish schedule, Construction documents sheet IN-601.
- B. Resilient Base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Description of each product.
  - 2. Resilient material manufacturers recommendations for adhesives, underlayment, primers and polish.
  - 3. Application and installation instructions.
- C. Samples:
  - 1. Tile: 300 mm by 300 mm (12 inches by 12 inches) for each type, pattern and color.
  - 2. Edge Strips: 150 mm (6 inches) long, each type.
  - 3. Feature Strips: 150 mm (6 inches) long.
- D. Shop Drawings:
  - 1. Layout of patterns shown on the drawings and on the finish schedule, Construction documents sheet IN-601
  - 2. Edge strip locations showing types and detail cross sections.
- E. Test Reports:
  - 1. Abrasion resistance: Depth of wear for each tile type and color and volume loss of tile, certified by independent laboratory.
  - 2. Tested per ASTM F510.

**1.4 DELIVERY**

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

**1.5 STORAGE**

- A. Store materials in weathertight and dry storage facility.

- B. Protect from damage from handling, water, and temperature.

#### **1.6 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
- D4078-02.....Water Emulsion Floor Finish
  - E662-06.....Specific Optical Density of Smoke Generated by Solid Materials
  - E1155-96 (R2008).....Determining Floor Flatness and Floor Levelness Numbers
  - F510-93 (R 2004).....Resistance to Abrasion of Resilient Floor Coverings Using an Abrader with a Grit Feed Method
  - F710-08.....Preparing Concrete Floors to Receive Resilient Flooring
  - F1344-04.....Rubber Floor Tile
  - F1700-04.....Solid Vinyl Floor Tile
- C. Federal Specifications (Fed. Spec.):
- SS-T-312.....Tile Floor: Asphalt, Rubber, Vinyl and Vinyl Composition

#### **1.7 QUALITY ASSURANCE**

- A. 10 Year Commercial Warranty
- B. Manufactures proposed for use shall submit evidence of ability to meet performance requirements specified not less than 10 days prior to bid date.
- C. Manufacture be capable of providing technical training and field service representation.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. Furnish product type, materials of the same production run and meeting following criteria.
- B. Use adhesives, underlayment, primers and polish recommended by the floor resilient material manufacturer.
- C. Critical Radiant Flux: 0.45 watts per sq. cm or more, Class I, per ASTM E 648.
- D. Smoke density: Less than 450 per ASTM E662.

**2.2 SOLID VINYL-TILE**

- A. ASTM F1700, 305 mm x 609.6 mm (12 by 24 inches) square, 3 mm (0.125 inch) thick, homogenous throughout.
- B. Color and Pattern uniformly distributed throughout thickness.
- C. Where solid vinyl tiles are specified, seek products with recycled content.

**2.3 Vinyl Plank Flooring**

- A. 101.5 mm x 94.5 mm (4" x 36") plank, 2.5 mm (.100 inch) thick.
- B. Urethane Aluminum Oxide Topcoat Cured by UV Process
- C. Where vinyl plank tiles are specified, seek products with recycled content.

**2.4 RUBBER TILE**

- A. ASTM F1344, Class 1, homogenous rubber tile, B, through mottled, 300 mm (12 inches) square, 3 mm (1/8 inch) thick.
- B. Color and pattern uniformly distributed throughout tile.
- C. Molded pattern wearing surface base thickness 3 mm (1/8 inch) thick.
- D. Where rubber tile is used provide tiles with a minimum of 90% post consumer rubber.

**2.5 ADHESIVES**

- A. Comply with applicable regulations regarding toxic and hazardous materials Green Seal (GS-36) for commercial adhesive.
- B. Use low-VOC adhesive during installation. Water based is preferred over solvent based adhesives.

**2.6 PRIMER (FOR CONCRETE SUBFLOORS)**

As recommended by the adhesive and tile manufacturer.

**2.7 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

- A. Provide cementitious products with latex or polyvinyl acetate resins in the mix.
- B. Determine the type of underlayment selected for use by the condition to be corrected.

**2.8 POLISH AND CLEANERS**

- A. Cleaners RFCI CL-1.
- B. Polish: ASTM D4078.

**2.9 EDGE STRIPS**

- A. 28 mm (1-1/8 inch) wide unless shown otherwise.
- B. Bevel from maximum thickness to minimum thickness for flush joint unless shown otherwise.
- C. Extruded aluminum, mill finish, mechanically cleaned:



1. Drill and counter sink edge strip for flat head screws.
  2. Space holes near ends and approximately 225 mm (9 inches) on center between.
- D. Resilient Edge Strip or Reducer Strip: Fed. Specs. SS-T-312, Solid vinyl.

## **2.10 SCREWS**

Stainless steel flat head screw.

## **PART 3 - EXECUTION**

### **3.1 PROJECT CONDITIONS**

- A. Maintain temperature of materials a minimum of 22 °C (70 °F,) for 48 hours before installation.
- B. Maintain temperature of rooms where work occurs between 21 °C and 27 °C (70 °F and 80 °F), for at least 48 hours, before, during and after installation.
- C. Do not install flooring until building is permanently enclosed and wet construction in or near areas to receive tile materials is complete, dry and cured.

### **3.2 SUBFLOOR PREPARATION**

- A. Verify that concrete slabs comply with ASTM F710. At existing slabs, determine levelness by F-number method in accordance with ASTM E1155. Overall value shall not exceed as follows:  
FF30/FL20
- B. Correct conditions which will impair proper installation.
- C. Fill cracks, joints and other irregularities in concrete with leveling compound:
  1. Do not use adhesive for filling or leveling purposes.
  2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.
  3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joints.
- D. Clean floor of oil, paint, dust, and deleterious substances: Leave floor dry and cured free of residue from existing curing or cleaning agents.
- E. Concrete Subfloor Testing:  
Determine Adhesion and dryness of the floor by bond and moisture tests as recommended by RFCI manual MRP.
- F. Concrete substrates: Prepare to ASTM F710
  1. Verify that substrates are dry and free of curing compounds, sealers and hardeners.

2. Remove substrate coatings and other substrates that are incompatible with adhesives and that contain soap, wax, oil or silicone using mechanical methods recommended by manufacture, Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacture. Proceed with installation only after substrates pass testing.
4. Moisture testing: Perform tests recommended by manufacture as follows. Proceed with installation only after substrates pass testing.
  - a. Perform anhydrous calcium chloride test, ASTM 1869. Proceed with installation only after substrates have maximum moisture vapor emission rate of 3 pounds of water per 1,000 square feet in 24 hours.
  - b. Perform relative humidity test using in situ probes, ASTM F2170. Proceed with installation only after substrates have maximum 75% relative humidity.
- G. Perform additional subfloor preparation to obtain satisfactory adherence of flooring if subfloor test patches allows easy removal of tile.
- H. Prime the concrete subfloor if the primer will seal slab conditions that would inhibit bonding, or if priming is recommended by the tile or adhesive manufacturers.
- I. Preparation of existing installation shall include the removal of existing resilient floor and existing adhesive. Do not use solvents to remove adhesives.
- J. Close areas where installation is to occur to traffic during floor tile installation and 48 hours post installation.

### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions for application and installation unless specified otherwise.
- B. Mix tile from at least two containers. An apparent line either of shades or pattern variance will not be accepted.
- C. Tile Layout:
  1. Refer to finish drawings for tile layout.
  2. No tile shall be less than 150 mm (6 inches) and of equal width at walls.
  3. Place tile pattern in the same direction; do not alternate tiles.
- D. Trim tiles to touch for the length of intersections at pipes and vertical projections, seal joints at pipes with waterproof cement.
- E. Application:
  1. Apply adhesive uniformly with no bare spots.

- a. Conform to RFC1-TM-6 for joint tightness and for corner intersection unless layout pattern shows random corner intersection.
  - b. More than 5 percent of the joints not touching will not be accepted.
2. Roll tile floor with a minimum 45 kg (100 pound) roller. No exceptions.
  3. The COTR may have test tiles removed to check for non-uniform adhesion, spotty adhesive coverage, and ease of removal. Install new tile for broken removed tile.
- F. Installation of Edge Strips:
1. Locate edge strips under center line of doors unless otherwise shown.
  2. Set resilient edge strips in adhesive. Anchor metal edge strips with anchors and screws specified.
  3. Where tile edge is exposed, butt edge strip to touch along tile edge.
  4. Where thin set ceramic tile abuts resilient tile, set edge strip against floor file and against the ceramic tile edge.

### 3.4 CLEANING AND PROTECTION

- A. Clean adhesive marks on exposed surfaces during the application of resilient materials before the adhesive sets. Exposed adhesive is not acceptable.
- B. Keep traffic off resilient material for a minimum 72 hours after installation.
- C. Clean and polish materials in the following order:
  1. For the first two weeks sweep and damp mopped only.
  2. After two weeks, scrub resilient materials with a minimum amount of water and a mild detergent. Leave surface clean and free of detergent residue.
  3. Apply polish to the floors in accordance with the polish manufacturer's instructions.
- D. When construction traffic occurs over tile, cover resilient materials with reinforced kraft paper properly secured and maintained until removal is directed by COTR. At entrances and where wheeled vehicles or carts are used, cover tile with plywood, hardboard, or particle board over paper, secured and maintained until removal is directed by COTR.
- E. When protective materials are removed and immediately prior to acceptance, replace any damage tile, re-clean resilient materials, lightly re-apply polish and buff floors.

**3.5 LOCATION**

- A. Unless otherwise specified or shown, install tile flooring, on floor under areas where casework, laboratory and pharmacy furniture and other equipment occurs, except where mounted in wall recesses.
- B. Extend tile flooring for room into adjacent closets and alcoves.

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**SECTION 09 68 00  
CARPETING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

Section specifies carpet, edge strips, adhesives, and other items required for complete installation.

**1.2 RELATED WORK**

- A. Color and texture of carpet and edge strip: Finish schedule, Construction documents sheet IN-601.
- B. Resilient wall base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

**1.3 QUALITY ASSURANCE**

- A. Carpet installed by mechanics certified by the Floor Covering Installation Board.
- B. Certify and label the carpet that it has been tested and meets criteria of CRI IAQ Carpet Testing Program for indoor air quality.
- C. Installer Qualifications: Minimum 3 years documented experience in work for this section.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data:
  - 1. Manufacturer's catalog data and printed documentation stating physical characteristics, durability, resistance to fading and flame resistance characteristics for each type of carpet material and installation accessory.
  - 2. Manufacturer's printed installation instructions for the carpet, including preparation of installation substrate, seaming techniques and recommended adhesives and tapes.
  - 3. Manufacturer's certificate verifying carpet containing recycled materials include percentage of recycled materials as specified.
- C. Samples:
  - 1. Carpet: "Production Quality" samples 300 x 300 mm (12 x 12 inches) of carpets, showing quality, pattern and color specified on the finish schedule, Construction documents sheet IN-601.
  - 2. Floor Edge Strip (Molding): 150 mm (6 inches) long of each color and type specified.
  - 3. Base Edge Strip (Molding): 150 mm (6 inches) long of each color specified.

- D. Shop Drawings: Installers layout plan showing seams and cuts for sheet carpet and carpet module.
- E. Maintenance Data: Carpet manufacturer's maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods and cleaning cycles.

#### **1.5 DELIVERY AND STORAGE**

- A. Deliver carpet in manufacturer's original wrappings and packages clearly labeled with manufacturer's name, brand, name, size, dye lot number and related information.
- B. Deliver adhesives in containers clearly labeled with manufacturer's name, brand name, number, installation instructions, safety instructions and flash points.
- C. Store in a clean, dry, well ventilated area, protected from damage and soiling. Maintain storage space at a temperature above 16 degrees C (60 degrees F) for 2 days prior to installation.

#### **1.6 ENVIRONMENTAL REQUIREMENTS**

Areas in which carpeting is to be installed shall be maintained at a temperature above 16 degrees C (60 degrees F) for 2 days before installation, during installation and for 2 days after installation. A minimum temperature of 13 degrees C (55 degrees F) shall be maintained thereafter for the duration of the contract. Traffic or movement of furniture or equipment in carpeted area shall not be permitted for 24 hours after installation. Other work which would damage the carpet shall be completed prior to installation of carpet.

#### **1.7 WARRANTY**

Carpet and installation subject to terms of "Warranty of Construction" FAR clause 52.246-21, except that warranty period is extended to two years.

#### **1.8 APPLICABLE PUBLICATIONS**

- A. Publication listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):  
ANSI/NSF 140-07.....Sustainable Carpet Assessment Standard
- C. American Association of Textile Chemists and Colorists (AATCC):  
AATCC 16-04.....Colorfastness to Light  
AATCC 129-05.....Colorfastness to Ozone in the Atmosphere under  
High Humidities  
AATCC 134-06.....Electric Static Propensity of Carpets

AATCC 165-99.....Colorfastness to Crocking: Textile Floor  
Conerings-AATCC Crockmeter Method

D. American Society for Testing and Materials (ASTM):

ASTM D1335-05.....Tuft Bind of Pile Yarn Floor Coverings  
ASTM D3278-96 (R2004)...Flash Point of Liquids by Small Scale Closed-Cup  
Apparatus  
ASTM D5116-06.....Determinations of Organic Emissions from Indoor  
Materials/Products  
ASTM D5252-05.....Operation of the Hexapod Tumble Drum Tester  
ASTM D5417-05.....Operation of the Vettermann Drum Tester  
ASTM E648-06.....Critical Radiant Flux of Floor-Covering Systems  
Using a Radiant Heat Energy Source

E. The Carpet and Rug Institute (CRI):

CRI 104-02.....Installation of Commercial Carpet

**PART 2 - PRODUCTS**

**2.1 CARPET**

A. Physical Characteristics:

1. Carpet free of visual blemishes, streaks, poorly dyed areas, fuzzing of pile yarn, spots or stains and other physical and manufacturing defects.
2. Manufacturers standard construction commercial carpet:
  - a. Modular Tile: 660 mm (24 inches) square tile.
3. Provide static control to permanently control static build upto less than 3.0 kV when tested at 20 percent relative humidity and 21 degrees C (70 degrees F) in accordance with AATCC 134.
4. Pile Height: Maximum 2.94 mm (0.116 inch).
5. Pile Fiber: Nylon with recycled content 25 percent minimum branded (federally registered trademark).
6. Pile Type: Pattern Loop.
7. Backing materials: Manufacturer's unitary backing designed for glue-down installation using recovered materials.
8. Appearance Retention Rating (ARR): Carpet shall be tested and have the minimum 3.5-4.0 Severe ARR when tested in accordance with either the ASTM D 5252 (Hexapod) or ASTM D 5417 (Vettermann) test methods using the number of cycles for short and long term tests as specified.
9. Tuft Bind: Minimum force of 40 N (10 lb) required to pull a tuft or loop free from carpet backing. Test per ASTM D1335.

10. Colorfastness to Crocking: Dry and wet crocking and water bleed, comply with AATCC 165 Color Transference Chart for colors, minimum class 4 rating.
11. Colorfastness to Ozone: Comply with AATCC 129, minimum rating of 4 on the AATCC color transfer chart.
12. Delamination Strength: Minimum of 440 N/m (2.5 lb/inch) between secondary backing.
13. Flammability and Critical Radiant Flux Requirements:
  - a. Test Carpet in accordance with ASTM E 648.
  - b. Class I: Not less than 0.45 watts per square centimeter.
  - c. Carpet in corridors, exits and Medical Facilities: Class I.
14. Density: Average Pile Yarn Density (APYD):
  - a. Corridors, lobbies, entrances, common areas or multipurpose rooms, open offices, waiting areas and dining areas: Minimum APYD 6000.
15. VOC Limits: Use carpet and carpet adhesive that comply with the following limits for VOC content when tested according to ASTM D 5116:
  - a. Carpet, Total VOCs: 0.5 mg/sq.m x hr.
  - b. Carpet, 4-PC (4-Phenylcyclohexene): 0.05 mg/sq.m x hr.
  - c. Carpet, Formaldehyde: 0.05 mg/sq.m x hr.
  - d. Carpet, Styrene: 0.4 mg/sq.m x hr.
  - e. Adhesive, Total VOCs: 10.00 mg/sq.m x hr.
  - f. Adhesive, Formaldehyde: 0.05 mg/sq.m x hr.
  - g. Adhesive, 2-Ethyl-1-Hexanol: 3.00 mg/sq.m x hr.
- B. Shall meet platinum level of ANSI/NSF 140.
- C. Color, Texture, and Pattern: As specified on the Finish schedule, Construction documents sheet IN-601.

## **2.2 ADHESIVE AND CONCRETE PRIMER**

- A. Waterproof, resistant to cleaning solutions, steam and water, nonflammable, complies with air-quality standards as specified. Adhesives flashpoint minimum 60 degrees C (140 degrees F), complies with ASTM D 3278.
- B. Seam Adhesives: Waterproof, non-flammable and non-staining.

## **2.3 EDGE STRIPS (MOLDING)**

- A. Metal:
  1. Hammered surface aluminum, pinless, clamp down type designed for the carpet being installed.
  2. Floor flange not less than 38 mm (1-1/2 inches) wide, face not less than 16 mm (5/8 inch) wide.



3. Finish: Clear anodic coating.

B. Vinyl Edge Strip:

1. Beveled floor flange minimum 50 mm (2 inches) wide.
2. Beveled surface to finish flush with carpet for tight joint and other side to floor finish.
3. Color as specified on the finish schedule, Construction documents sheet IN-601.

**2.4 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

- A. Provide Portland cement bases polymer modifier with latex or polyvinyl acetate resin manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- B. Determine the type of underlayment selected for use by condition to be corrected.

**PART 3 - EXECUTION**

**3.1 SURFACE PREPARATION**

- A. Examine surfaces on which carpeting is to be installed.
- B. Clean floor of oil, waxy films, paint, dust and deleterious substances that prevent adhesion, leave floor dry and cured, free of residue from curing or cleaning agents
- C. Correct conditions which will impair proper installation, including trowel marks, pits, dents, protrusions, cracks or joints.
- D. Fill cracks, joints depressions, and other irregularities in concrete with leveling compound.
  1. Do not use adhesive for filling or leveling purposes.
  2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.
  3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joint lines.
- E. Test new concrete subfloor prior to adhesive application for moisture and surface alkalinity per CRI 104 Section 6.3.1 or per ASTM E1907.
- F. Close areas where installation is to occur to traffic during floor tile installation and 48 hours post installation.
- G. Project Conditions: Relative humidity at the time of installation to be between 20% and 65%.

**3.2 CARPET INSTALLTION**

- A. Do not install carpet until work of other trades including painting is complete and dry.
- B. Install in accordance with CRI 104 direct glue down installation.
  1. Relax carpet in accordance with Section 6.4.
  2. Comply with indoor air quality recommendations noted in Section 6.5.

3. Maintain temperature in accordance with Section 15.3.
- C. Secure carpet to subfloor of spaces with adhesive applied as recommended by carpet manufacturer.
- D. Follow carpet manufacturer's recommendations for matching pattern and texture directions.
- E. Cut openings in carpet where required for installing equipment, pipes, outlets, and penetrations.
  1. Bind or seal cut edge of sheet carpet and replace flanges or plates.
  2. Use additional adhesive to secure carpets around pipes and other vertical projections.
- F. Carpet Modules:
  1. Install per CRI 104, Section 13, Adhesive Application.
  2. Lay carpet modules with pile in same direction unless specified otherwise on the Finish schedule, Construction documents sheet IN-601.
  3. Install carpet modules so that cleaning methods and solutions do not cause dislocation of modules.
  4. Lay carpet modules uniformly to provide tight flush joints free from movement when subject to traffic.

### **3.3 EDGE STRIPS INSTALLATION**

- A. Install edge strips over exposed carpet edges adjacent to uncarpeted finish flooring.
- B. Anchor metal strips to floor with suitable fasteners. Apply adhesive to edge strips, insert carpet into lip and press it down over carpet.
- C. Anchor vinyl edge strip to floor with adhesive apply adhesive to edge strip and insert carpet into lip and press lip down over carpet.

### **3.4 PROTECTION AND CLEANING**

- A. Remove waste, fasteners and other cuttings from carpet floors.
- B. Vacuum carpet and provide suitable protection. Do not use polyethylene film.
- C. Do not permit traffic on carpeted surfaces for at least 48 hours after installation. Protect the carpet in accordance with CRI 104.
- D. Do not move furniture or equipment on unprotected carpeted surfaces.
- E. Just before final acceptance of work, remove protection and vacuum carpet clean.

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**SECTION 09 72 16**  
**VINYL-COATED FABRIC WALL COVERINGS**

**PART 1 - GENERAL****1.1 DESCRIPTION**

Section specifies vinyl coated fabric wallcovering and installation.

**1.2 RELATED WORK**

- A. Color, pattern, type, direction of hanging and areas to receive wallcovering: Finish schedule, Construction documents sheet IN-601.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. Each type and pattern as specified on the Finish schedule, Construction documents sheet IN-601..
  - 2. Size: Full width of mill run.
- C. Manufacturer's Certificates:
  - 1. Compliance with CFFA W-101D.
  - 2. Wallcovering manufacturer's approval of adhesive.
- D. Manufacturer's Literature and Data:
  - 1. Primer and adhesive.
  - 2. Installation instructions.
  - 3. Maintenance instructions, including recommended materials and methods for maintaining wallcovering with precautions in use of cleaning material.

**1.4 QUALITY ASSURANCE**

- A. Finish one complete space with each type (color and pattern) of wallcovering showing specified colors and patterns.
- B. Use approved sample spaces as a standard for work throughout the project.
- C. Installer qualifications: Minimum 3 years documented experience in work for this section.

**1.5 DELIVERY, STORAGE AND HANDLING**

- A. Deliver in original unopened containers bearing the manufacturer's name, brand name, and product designation.
- B. Store in accordance with manufacturer's instructions.
- C. Handle to prevent damage to material.

**1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. Chemical Fabrics and Film Association, Inc., (CFFA):  
Document 2575-96.....Vinyl Coated Fabric Wallcovering
- C. American Society for Testing and Materials (ASTM)  
G21-96 (R2002).....Determining Resistance of Synthetic Polymeric  
Materials to Fungi

**PART 2 - PRODUCTS****2.1 VINYL COATED FABRIC WALLCOVERING**

- A. Comply with CFFA-2575.
- B. Fungi Resistance: ASTM G21, rating of 0.
- C. Factory-applied clear delustered polyvinyl-fluoride (PVF) coating:
  - 1. Minimum 0.0125 mm (1/2 mil) thickness.
  - 2. Do not include PVF coating weight in minimum total weight.
  - 3. Fire hazard classification with PVF coating: Class A unless specified otherwise.
- D. Type II (Medium Duty).
- E. Type III (Heavy Duty).

**2.2 ADHESIVE**

- A. Use only water-based adhesive having volatile organic compounds not more than 50 g/l.
- B. Vermin and mildew resistant.

**2.3 EDGE GUARDS OR TRIM**

- A. "J" shape with groove to receive the wallcovering.
- B. Concealed edge feathered, not less than 19 mm (3/4 inch) wide.
- C. Designed for adhesive attachment.
- D. Use rubber.

**PART 3 - EXECUTION****3.1 JOB CONDITIONS**

- A. Temperatures:
  - 1. Do not perform work until surfaces and materials have been maintained at minimum of 60 °F. for three days before work begins.
  - 2. Maintain minimum temperatures of 60 °F. until adhesives are dried or cured.
- B. Lighting:
  - 1. Do not proceed unless a minimum lighting level of 15 candlepower per square foot occurs.

2. Measure light level at mid-height of wall.

C. Ventilation:

1. Provide uniform continuous ventilation in space.

2. Ventilate for a time for not less than complete drying or curing of adhesive.

D. Protect other surfaces from damage which may be caused by this work.

E. Remove waste from building daily.

### **3.2 SURFACE CONDITION**

A. Inspect surfaces to receive wallcoverings to assure that:

1. Patches and repairs are completed.

2. Surface are clean, smooth and prime painted.

B. Do not proceed until discovered defects have been corrected by other trades and surfaces are ready to receive wallcovering.

C. Carefully remove electrical outlet and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings and fastenings, prior to starting work.

D. Carefully store items for reinstallation.

E. Install Edge Guard or Trim:

1. Locate where shown or specified.

2. Run edge guards from top of base to ceiling or wainscot cap in continuous length.

3. Run wainscot cap trim level unless shown otherwise.

4. Install as specified by manufacturer of edge guard or trim, in adhesive.

5. Smooth adhesive edge. Do not leave adhesive exposed to view.

6. Leave ready to receive wallcovering.

### **3.3 APPLICATION OF ADHESIVE**

A. Mix and apply adhesives in accordance with manufacturer's directions.

B. Prevent adhesive from getting on face of wallcovering.

C. Apply adhesive to wallcovering back.

### **3.4 WALLCOVERING INSTALLATION**

A. Use wallcovering of same batch or run in an area. Use fabric rolls in consecutive numerical sequence of manufacture.

B. Install material completely adhered, smooth, clean, without wrinkles, air pockets, gaps or overlaps.

C. Extend wallcovering continuous behind non-built-in casework and other items which are close to but not bolted to or touching the walls.

D. Install wallcovering before installation of resilient base. Extend wallcovering not more than 6 mm (1/4 inch) below top of resilient base.

- E. Install panels consecutively in order in which they are cut from the roll including filling spaces above or below windows, doors, or similar penetrations.
- F. Do not install horizontal seams.
- G. Except on match patterns, hang fabric by reversing alternate strips, except as recommended by the manufacturer.
- H. Cutting:
  - 1. Cut on a work table with a straight edge.
  - 2. Joints or seams that are not cut clean are unacceptable.
  - 3. Trim additional selvage to achieve a color and pattern match at seams. Overlapped seams are not allowed.
  - 4. Do not double cut seams on wall unless specified.
  - 5. If double cutting on the wall is necessary, place a three inch strip of Type I wallcovering under pasted edge.
    - a. Do not cut into wall surface.
    - b. After cutting, remove strip and excess adhesive from seam before proceeding to next seam.
    - c. Smooth down seam in adhesive for tight bond and joint.
- I. Trim strip-matched patterns, which are not factory pre-trimmed.
- J. Inside Corners:
  - 1. Wrap wallcovering around corner.
  - 2. Do not seam within 50 mm (2 inches) of inside corners.
  - 3. Double cut seam.
- K. Outside Corners:
  - 1. Wrap wallcovering around corner.
  - 2. Do not seam within 150 mm (6 inches) of outside corners.
  - 3. Double cut seam.

### **3.5 PATCHING**

- A. Replace surface damaged wallcovering in a space as specified for new work:
  - 1. Replace full height of surface.
  - 2. Replace from break in plane to break in plane when same batch or run is not used. Double cut seams.
  - 3. Adjoining differential colors from separate batches or runs are not acceptable.
- B. Correct loose or raised seams with adhesives to lay flat with tight bonded joint as specified for new work.

### **3.6 CLEANING AND INSTALLING TEMPORARY REMOVED ITEMS**

- A. Remove adhesive from wallcovering as work proceeds.

- B. Remove adhesives where spilled, splashed or splattered on wallcoverings or adjacent surfaces in a manner not to damage surface from which it is removed.
- C. Reinstall previously removed electrical outlet and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings and fastenings.

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**SECTION 09 91 00  
PAINTING**

**PART 1-GENERAL**

**1.1 DESCRIPTION**

- A. Section specifies field painting.
- B. Section specifies prime coats which may be applied in shop under other sections.
- C. Painting includes shellacs, stains, varnishes, coatings specified, and striping or markers and identity markings.

**1.2 RELATED WORK**

- A. Shop prime painting of steel and ferrous metals: Division 05 - METALS, Division 08 - OPENINGS, Division 10 - SPECIALTIES, Division 13 - SPECIAL CONSTRUCTION, Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, Division 27 - COMMUNICATIONS, and Division 28 - ELECTRONIC SAFETY AND SECURITY sections.
- B. Contractor option: Prefinished flush doors with transparent finishes: Section 08 14 00, INTERIOR WOOD DOORS.
- C. Type of Finish, Color, and Gloss Level of Finish Coat: Finish schedule, sheet IN-601 in Construction documents.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:  
Before work is started, or sample panels are prepared, submit manufacturer's literature, the current Master Painters Institute (MPI) "Approved Product List" indicating 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 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 Product List" where applicable is acceptable.
- C. Sample Panels:
  - 1. After painters' materials have been approved and before work is started submit sample panels showing each type of finish and color specified.
  - 2. Panels to show color: Composition board, 100 by 250 by 3 mm (4 inch by 10 inch by 1/8 inch).



3. Panel to show transparent finishes: Wood of same species and grain pattern as wood approved for use, 100 by 250 by 3 mm (4 inch by 10 inch face by 1/4 inch) thick minimum, and where both flat and edge grain will be exposed, 250 mm (10 inches) long by sufficient size, 50 by 50 mm (2 by 2 inch) minimum or actual wood member to show complete finish.
  4. Attach labels to panel stating the following:
    - a. Federal Specification Number or manufacturers name and product number of paints used.
    - b. Specification code number specified on the Finish schedule, sheet IN-601 in Construction documents.
    - c. Product type and color.
    - d. Name of project.
  5. Strips showing not less than 50 mm (2 inch) wide strips of undercoats and 100 mm (4 inch) wide strip of finish coat.
- D. Sample of identity markers if used.
- E. Manufacturers' Certificates indicating compliance with specified requirements:
1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
  2. High temperature aluminum paint.
  3. Epoxy coating.

#### **1.4 DELIVERY AND STORAGE**

- A. Deliver materials to site in manufacturer's sealed container marked to show following:
1. Name of manufacturer.
  2. Product type.
  3. Batch number.
  4. Instructions for use.
  5. Safety precautions.
- B. In addition to manufacturer's label, provide a label legibly printed as following:
1. Federal Specification Number, where applicable, and name of material.
  2. Surface upon which material is to be applied.
  3. If paint or other coating, state coat types; prime, body or finish.
- C. Maintain space for storage, and handling of painting materials and equipment in a neat and orderly condition to prevent spontaneous combustion from occurring or igniting adjacent items.
- D. Store materials at site at least 24 hours before using, at a temperature between 18 and 30 degrees C (65 and 85 degrees F).

**1.5 MOCK-UP PANEL**

- A. Before starting application of water paint mixtures apply paint as specified to an area, not to exceed 9 m<sup>2</sup> (100 ft<sup>2</sup>), selected by COTR.
- B. Finish and texture approved by COTR will be used as a standard of quality for remainder of work.

**1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.
- B. American Conference of Governmental Industrial Hygienists (ACGIH):  
ACGIH TLV-BKLT-2008.....Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)  
ACGIH TLV-DOC-2008.....Documentation of Threshold Limit Values and Biological Exposure Indices, (Seventh Edition)
- C. American National Standards Institute (ANSI):  
A13.1-07.....Scheme for the Identification of Piping Systems
- D. American Society for Testing and Materials (ASTM):  
D260-86.....Boiled Linseed Oil
- E. Commercial Item Description (CID):  
A-A-1555.....Water Paint, Powder (Cementitious, White and Colors) (WPC) (cancelled)
- F. Master Painters Institute (MPI):  
No. 1-07.....Aluminum Paint (AP)  
No. 18-07.....Organic Zinc Rich Primer  
No. 22-07.....Aluminum Paint, High Heat (up to 590° - 1100°F) (HR)  
No. 31-07.....Polyurethane, Moisture Cured, Clear Gloss (PV)  
No. 36-07.....Knot Sealer  
No. 43-07.....Interior Satin Latex, MPI Gloss Level 4  
No. 44-07.....Interior Low Sheen Latex, MPI Gloss Level 2  
No. 45-07.....Interior Primer Sealer  
No. 46-07.....Interior Enamel Undercoat  
No. 47-07.....Interior Alkyd, Semi-Gloss, MPI Gloss Level 5 (AK)  
No. 48-07.....Interior Alkyd, Gloss, MPI Gloss Level 6 (AK)  
No. 49-07.....Interior Alkyd, Flat, MPI Gloss Level 1 (AK)  
No. 50-07.....Interior Latex Primer Sealer  
No. 51-07.....Interior Alkyd, Eggshell, MPI Gloss Level 3  
No. 52-07.....Interior Latex, MPI Gloss Level 3 (LE)  
No. 53-07.....Interior Latex, Flat, MPI Gloss Level 1 (LE)

- No. 54-07.....Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)  
No. 66-07.....Interior Alkyd Fire Retardant, Clear Top-Coat (ULC  
Approved) (FC)  
No. 67-07.....Interior Latex Fire Retardant, Top-Coat (ULC  
Approved) (FR)  
No. 71-07.....Polyurethane, Moisture Cured, Clear, Flat (PV)  
No. 74-07.....Interior Alkyd Varnish, Semi-Gloss  
No. 77-07.....Epoxy Cold Cured, Gloss (EC)  
No. 90-07.....Interior Wood Stain, Semi-Transparent (WS)  
No. 91-07.....Wood Filler Paste  
No. 95-07.....Fast Drying Metal Primer  
No. 101-07.....Epoxy Anti-Corrosive Metal Primer  
No. 114-07.....Interior Latex, Gloss (LE) and (LG)  
No. 119-07.....Exterior Latex, High Gloss (acrylic) (AE)  
No. 135-07.....Non-Cementitious Galvanized Primer  
No. 138-07.....Interior High Performance Latex, MPI Gloss Level 2  
(LF)  
No. 139-07.....Interior High Performance Latex, MPI Gloss Level 3  
(LL)  
No. 140-07.....Interior High Performance Latex, MPI Gloss Level 4  
No. 141-07.....Interior High Performance Latex (SG) MPI Gloss  
Level 5
- G. Steel Structures Painting Council (SSPC):  
SSPC SP 1-04 (R2004)....Solvent Cleaning  
SSPC SP 2-04 (R2004)....Hand Tool Cleaning  
SSPC SP 3-04 (R2004)....Power Tool Cleaning

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Wood Sealer: MPI 31 (gloss) or MPI 71 (flat) thinned with thinner recommended by manufacturer at rate of about one part of thinner to four parts of varnish.
- B. Identity markers options:
1. Pressure sensitive vinyl markers.
  2. Snap-on coil plastic markers.
- C. Aluminum Paint (AP): MPI 1.
- D. Interior/Exterior Latex Block Filler: MPI 4.
- E. Organic Zinc rich Coating (HR): MPI 22.
- F. High Heat Resistant Coating (HR): MPI 22.
- G. Cementitious Galvanized Metal Primer: MPI 26.
- H. Knot Sealer: MPI 36.

- I. Interior Satin Latex: MPI 43.
- J. Interior Low Sheen Latex: MPI 44.
- K. Interior Primer Sealer: MPI 45.
- L. Interior Enamel Undercoat: MPI 47.
- M. Interior Alkyd, Semi-Gloss (AK): MPI 47.
- N. Interior Alkyd, Gloss (AK): MPI 49.
- O. Interior Latex Primer Sealer: MPI 50.
- P. Interior Alkyd, Eggshell: MPI 51
- Q. Interior Latex, MPI Gloss Level 3 (LE): MPI 52.
- R. Interior Latex, Flat, MPI Gloss Level 1 (LE): MPI 53.
- S. Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE): MPI 54.
- T. Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved) (FC): MPI 66.
- U. Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR): MPI 67.
- V. Epoxy Cold Cured, Gloss (EC): MPI 77.
- W. Interior Wood Stain, Semi-Transparent (WS): MPI 90.
- X. Wood Filler Paste: MPI 91.
- Y. Fast Drying Metal Primer: MPI 95.
- Z. Epoxy Anti-Corrosive Metal Primer: MPI 101.
- AA. Interior latex, Gloss (LE) and (LG): MPI 114.
- BB. Exterior Latex, High Gloss (acrylic) (AE): MPI 119.
- CC. Waterborne Galvanized Primer: MPI 134.
- DD. Non-Cementitious Galvanized Primer: MPI 135.

## **2.2 PAINT PROPERTIES**

- A. Use ready-mixed (including colors), except two component epoxies, polyurethanes, polyesters, paints having metallic powders packaged separately and paints requiring specified additives.
- B. Where no requirements are given in the referenced specifications for primers, use primers with pigment and vehicle, compatible with substrate and finish coats specified.

## **2.3 REGULATORY REQUIREMENTS/QUALITY ASSURANCE**

- A. Paint materials shall conform to the restrictions of the local Environmental and Toxic Control jurisdiction.
  - 1. Volatile Organic Compounds (VOC): VOC content of paint materials shall not exceed 50 mg/l for interior latex paints/primers after colorant is added.
  - 2. Lead-Base Paint:
    - a. Comply with Section 410 of the Lead-Based Paint Poisoning Prevention Act, as amended, and with implementing regulations promulgated by Secretary of Housing and Urban Development.

- b. Regulations concerning prohibition against use of lead-based paint in federal and federally assisted construction, or rehabilitation of residential structures are set forth in Subpart F, Title 24, Code of Federal Regulations, Department of Housing and Urban Development.
- 3. Asbestos: Materials shall not contain asbestos.
- 4. Chromate, Cadmium, Mercury, and Silica: Materials shall not contain zinc-chromate, strontium-chromate, Cadmium, mercury or mercury compounds or free crystalline silica.
- 5. Human Carcinogens: Materials shall not contain any of the ACGIH-BKLT and ACGHI-DOC confirmed or suspected human carcinogens.
- 6. Use high performance acrylic paints in place of alkyd paints, where possible.
- 7. VOC content for solvent-based paints shall not exceed 250g/l and shall not be formulated with more than one percent aromatic hydro carbons by weight.
- 8. Volume Solids: Required to be a minimum of 45%.

### **PART 3 - EXECUTION**

#### **3.1 JOB CONDITIONS**

- A. Safety: Observe required safety regulations and manufacturer's warning and instructions for storage, handling and application of painting materials.
  - 1. Take necessary precautions to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion, or other harm.
  - 2. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at end of each days work.
- B. Atmospheric and Surface Conditions:
  - 1. Do not apply coating when air or substrate conditions are:
    - a. Less than 3 degrees C (5 degrees F) above dew point.
    - b. Below 10 degrees C (50 degrees F) or over 35 degrees C (95 degrees F), unless specifically pre-approved by the Contracting Officer and the product manufacturer. Under no circumstances shall application conditions exceed manufacturer recommendations.
  - 2. Maintain interior temperatures until paint dries hard.
  - 3. Do not paint in direct sunlight or on surfaces that the sun will soon warm.
  - 4. Apply only on clean, dry and frost free surfaces except as follows:
    - a. Apply water thinned acrylic and cementitious paints to damp (not wet) surfaces where allowed by manufacturer's printed instructions.

- b. Dampened with a fine mist of water on hot dry days concrete and masonry surfaces to which water thinned acrylic and cementitious paints are applied to prevent excessive suction and to cool surface.
5. Varnishing:
- a. Apply in clean areas and in still air.
  - b. Before varnishing vacuum and dust area.
  - c. Immediately before varnishing wipe down surfaces with a tack rag.

### 3.2 SURFACE PREPARATION

- A. Method of surface preparation is optional, provided results of finish painting produce solid even color and texture specified with no overlays.
- B. General:
- 1. Remove prefinished items not to be painted such as lighting fixtures, escutcheon plates, hardware, trim, and similar items for reinstallation after paint is dried.
  - 2. Remove items for reinstallation and complete painting of such items and adjacent areas when item or adjacent surface is not accessible or finish is different.
  - 3. See other sections of specifications for specified surface conditions and prime coat.
  - 4. Clean surfaces for painting with materials and methods compatible with substrate and specified finish. Remove any residue remaining from cleaning agents used. Do not use solvents, acid, or steam on concrete and masonry.
- C. Wood:
- 1. Sand to a smooth even surface and then dust off.
  - 2. Sand surfaces showing raised grain smooth between each coat.
  - 3. Wipe surface with a tack rag prior to applying finish.
  - 4. Surface painted with an opaque finish:
    - a. Coat knots, sap and pitch streaks with MPI 36 (Knot Sealer) before applying paint.
    - b. Apply two coats of MPI 36 (Knot Sealer) over large knots.
  - 5. After application of prime or first coat of stain, fill cracks, nail and screw holes, depressions and similar defects with wood filler paste. Sand the surface to make smooth and finish flush with adjacent surface.
  - 6. Before applying finish coat, reapply wood filler paste if required, and sand surface to remove surface blemishes. Finish flush with adjacent surfaces.
  - 7. Fill open grained wood such as oak, walnut, ash and mahogany with MPI 91 (Wood Filler Paste), colored to match wood color.

- a. Thin filler in accordance with manufacturer's instructions for application.
  - b. Remove excess filler, wipe as clean as possible, dry, and sand as specified.
- D. Ferrous Metals:
1. Remove oil, grease, soil, drawing and cutting compounds, flux and other detrimental foreign matter in accordance with SSPC-SP 1 (Solvent Cleaning).
  2. Remove loose mill scale, rust, and paint, by hand or power tool cleaning, as defined in SSPC-SP 2 (Hand Tool Cleaning) and SSPC-SP 3 (Power Tool Cleaning). Exception: where high temperature aluminum paint is used, prepare surface in accordance with paint manufacturer's instructions.
  3. Fill dents, holes and similar voids and depressions in flat exposed surfaces of hollow steel doors and frames, access panels, roll-up steel doors and similar items specified to have semi-gloss or gloss finish with TT-F-322D (Filler, Two-Component Type, For Dents, Small Holes and Blow-Holes). Finish flush with adjacent surfaces.
    - a. This includes flat head countersunk screws used for permanent anchors.
    - b. Do not fill screws of item intended for removal such as glazing beads.
  4. Spot prime abraded and damaged areas in shop prime coat which expose bare metal with same type of paint used for prime coat. Feather edge of spot prime to produce smooth finish coat.
  5. Spot prime abraded and damaged areas which expose bare metal of factory finished items with paint as recommended by manufacturer of item.
- E. Aluminum
1. Clean surfaces to remove grease, oil and other deterrents to paint adhesion in accordance with SSPC-SP 1 (Solvent Cleaning).
  2. Spot coat abraded and damaged areas of zinc-coating which expose base metal on hot-dip zinc-coated items with MPI 18 (Organic Zinc Rich Coating). Prime or spot prime with MPI 134 (Waterborne Galvanized Primer) or MPI 135 (Non-Cementitious Galvanized Primer) depending on finish coat compatibility.
- F. Masonry, Concrete, Cement Board, Cement Plaster and Stucco:
1. Clean and remove dust, dirt, oil, grease efflorescence, form release agents, laitance, and other deterrents to paint adhesion.
  2. Use emulsion type cleaning agents to remove oil, grease, paint and similar products. Use of solvents, acid, or steam is not permitted.

3. Remove loose mortar in masonry work.
4. Replace mortar and fill open joints, holes, cracks and depressions with new mortar specified in Section 04 05 13, MASONRY MORTARING Section 04 05 16, MASONRY GROUTING. Do not fill weep holes. Finish to match adjacent surfaces.
5. Repair broken and spalled concrete edges with concrete patching compound to match adjacent surfaces as specified in CONCRETE Sections. Remove projections to level of adjacent surface by grinding or similar methods.

G. Gypsum Plaster and Gypsum Board:

1. Remove efflorescence, loose and chalking plaster or finishing materials.
2. Remove dust, dirt, and other deterrents to paint adhesion.
3. Fill holes, cracks, and other depressions with CID-A-A-1272A [Plaster, Gypsum (Spackling Compound) finished flush with adjacent surface, with texture to match texture of adjacent surface. Patch holes over 25 mm (1-inch) in diameter as specified in Section for plaster or gypsum board.

### 3.3 PAINT PREPARATION

- A. Thoroughly mix painting materials to ensure uniformity of color, complete dispersion of pigment and uniform composition.
- B. Do not thin unless necessary for application and when finish paint is used for body and prime coats. Use materials and quantities for thinning as specified in manufacturer's printed instructions.
- C. Remove paint skins, then strain paint through commercial paint strainer to remove lumps and other particles.
- D. Mix two component and two part paint and those requiring additives in such a manner as to uniformly blend as specified in manufacturer's printed instructions unless specified otherwise.
- E. For tinting required to produce exact shades specified, use color pigment recommended by the paint manufacturer.

### 3.4 APPLICATION

- A. Start of surface preparation or painting will be construed as acceptance of the surface as satisfactory for the application of materials.
- B. Unless otherwise specified, apply paint in three coats; prime, body, and finish. When two coats applied to prime coat are the same, first coat applied over primer is body coat and second coat is finish coat.
- C. Apply each coat evenly and cover substrate completely.



- D. Allow not less than 48 hours between application of succeeding coats, except as allowed by manufacturer's printed instructions, and approved by COTR.
- E. Finish surfaces to show solid even color, free from runs, lumps, brushmarks, laps, holidays, or other defects.
- F. Apply by brush, roller or spray, except as otherwise specified.
- G. Do not spray paint in existing occupied spaces unless approved by COTR, except in spaces sealed from existing occupied spaces.
  - 1. Apply painting materials specifically required by manufacturer to be applied by spraying.
  - 2. In areas, where paint is applied by spray, mask or enclose with polyethylene, or similar air tight material with edges and seams continuously sealed including items specified in WORK NOT PAINTED, motors, controls, telephone, and electrical equipment, fronts of sterilizes and other recessed equipment and similar prefinished items.
- H. Do not paint in closed position operable items such as access doors and panels, window sashes, overhead doors, and similar items except overhead roll-up doors and shutters.

### 3.5 PRIME PAINTING

- A. After surface preparation prime surfaces before application of body and finish coats, except as otherwise specified.
- B. Spot prime and apply body coat to damaged and abraded painted surfaces before applying succeeding coats.
- C. Additional field applied prime coats over shop or factory applied prime coats are not required except for exterior exposed steel apply an additional prime coat.
- D. Prime rebates for stop and face glazing of wood, and for face glazing of steel.
- E. Wood and Wood Particleboard:
  - 1. Use same kind of primer specified for exposed face surface.
    - a. Exterior wood: MPI 7 (Exterior Oil Wood Primer) for new construction and MPI 5 (Exterior Alkyd Wood Primer) for repainting bare wood primer except where MPI 90 (Interior Wood Stain, Semi-Transparent (WS)) is scheduled.
    - b. Interior wood except for transparent finish: MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat), thinned if recommended by manufacturer.
    - c. Transparent finishes as specified under Transparent Finishes on Wood except Floors.

2. Apply two coats of primer MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat) to surfaces of wood doors, including top and bottom edges, which are cut for fitting or for other reason.
  3. Apply one coat of primer MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat) as soon as delivered to site to surfaces of unfinished woodwork, except concealed surfaces of shop fabricated or assembled millwork and surfaces specified to have varnish, stain or natural finish.
  4. Apply MPI 67 (Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR) to wood for fire retardant finish.
- F. Metals except boilers, incinerator stacks, and engine exhaust pipes:
1. Steel and iron: MPI 95 (Fast Drying Metal Primer) //. Use MPI 101 (Cold Curing Epoxy Primer) where MPI 108 (High Build Epoxy Marine Coating (EC)) finish is specified.
  2. Zinc-coated steel and iron: MPI 134 (Waterborne Galvanized Primer) .
  3. Aluminum scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
- G. Gypsum Board:
1. Surfaces scheduled to have or MPI Gloss Level 5 (LE)) MPI 114 (Interior Latex, Gloss (LE) and (LG)) finish: Use or MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)) MPI 114 (Interior Latex, Gloss (LE) and (LG)) respectively.
  2. Primer: MPI 50 (Interior Latex Primer Sealer) except use MPI 45 (Interior Primer Sealer) MPI 46 (Interior Enamel Undercoat) in shower and bathrooms.
  3. Surfaces scheduled to receive vinyl coated fabric wallcovering: Use MPI 45 (Interior Primer Sealer) MPI 46 (Interior Enamel Undercoat).

### 3.6 INTERIOR FINISHES

- A. Apply following finish coats over prime coats in spaces or on surfaces specified on Finish schedule, sheet IN-601 in Construction Documents.
- B. Metal Work:
1. Apply to exposed surfaces.
  2. Omit body and finish coats on surfaces concealed after installation except electrical conduit containing conductors over 600 volts.
  3. Ferrous Metal, Galvanized Metal, and Other Metals Scheduled:
    - a. Apply two coats of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) unless specified otherwise.
    - b. Two coats of MPI 48 (Interior Alkyd Gloss (AK)) MPI 51 (Interior Alkyd, Eggshell (AK)).

- c. One coat of MPI 46 (Interior Enamel Undercoat) plus one coat of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) on exposed interior surfaces of alkyd-amine enamel prime finished windows.

C. Gypsum Board:

1. One coat of MPI 45 (Interior Primer Sealer) MPI 46 (Interior Enamel Undercoat) plus one coat of MPI 139 (Interior High Performance Latex, MPI Gloss level 3 (LL)).
2. Two coats of MPI 138 (Interior High Performance Latex, MPI Gloss Level 2 (LF)).
3. One coat of MPI 45 (Interior Primer Sealer) MPI 46 (Interior Enamel Undercoat) plus one coat of MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)) or MPI 114 (Interior Latex, Gloss (LE) and (LG)).
4. One coat of MPI 45 (Interior Primer Sealer) MPI 46 (Interior Enamel Undercoat) plus one coat of MPI 48 (Interior Alkyd Gloss (AK)).

D. Wood:

1. Sanding:
  - a. Use 220-grit sandpaper.
  - b. Sand sealers and varnish between coats.
  - c. Sand enough to scarify surface to assure good adhesion of subsequent coats, to level roughly applied sealer and varnish, and to knock off "whiskers" of any raised grain as well as dust particles.
2. Sealers:
  - a. Apply sealers specified except sealer may be omitted where pigmented, penetrating, or wiping stains containing resins are used.
  - b. Allow manufacturer's recommended drying time before sanding, but not less than 24 hours or 36 hours in damp or muggy weather.
  - c. Sand as specified.
3. Paint Finish:
  - a. One coat of MPI 45 (Interior Primer Sealer) MPI 46 (Interior Enamel Undercoat) plus one coat of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) (SG).
  - b. One coat MPI 66 (Interior Alkyd Fire retardant, Clear Top-Coat (ULC Approved) (FC) MPI 67 (Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR), intumescent type (FR).
  - c. One coat of MPI 45 Interior Primer Sealer) MPI 46 (Interior Enamel Undercoat) plus one coat of MPI 48 (Interior Alkyd Gloss (AK)).
  - d. Two coats of MPI 51 (Interior Alkyd, Eggshell) (AK)).
4. Transparent Finishes on Wood Except Floors.
  - a. Natural Finish:
    - 1) One coat of sealer as written in 2.1 E.

- 2) Two coats of MPI 71 (Polyurethane, Moisture Cured, Clear Flat (PV)) MPI 31 (Polyurethane, Moisture Cured, Clear Gloss (PV)).

b. Stain Finish:

- 1) One coat of MPI 90 (Interior Wood Stain, Semi-Transparent (WS)).
- 2) Use wood stain of type and color required to achieve finish specified. Do not use varnish type stains.
- 3) One coat of sealer as written in 2.1 E.
- 4) Two coats of MPI 71 (Polyurethane, Moisture Cured, Clear Flat (PV)) MPI 31 (Polyurethane Moisture Cured, Clear Gloss (PV)).

c. Varnish Finish:

- 1) One coat of sealer as written in 2.1 E.
- 2) Two coats of MPI 71 (Polyurethane, Moisture Cured, Clear Flat (PV)) MPI 31 (Polyurethane Moisture Cured, Clear Gloss (PV)).

- d. MPI 66 (Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved) (FC)) Intumescent Type, Fire Retardant Coating (FC) where scheduled:  
Two coats.

### 3.7 REFINISHING EXISTING PAINTED SURFACES

- A. Clean, patch and repair existing surfaces as specified under surface preparation.
- B. Remove and reinstall items as specified under surface preparation.
- C. Remove existing finishes or apply separation coats to prevent non compatible coatings from having contact.
- D. Patched or Replaced Areas in Surfaces and Components: Apply spot prime and body coats as specified for new work to repaired areas or replaced components.
- E. Except where scheduled for complete painting apply finish coat over plane surface to nearest break in plane, such as corner, reveal, or frame.
- F. In existing rooms and areas where alterations occur, clean existing stained and natural finished wood retouch abraded surfaces and then give entire surface one coat of MPI 31 (Polyurethane, Moisture Cured, Clear Gloss) MPI 71 (Polyurethane, Moisture Cured, Clear Flat (PV)).
- G. Refinish areas as specified for new work to match adjoining work unless specified or scheduled otherwise.
- H. Coat knots and pitch streaks showing through old finish with MPI 36 (Knot Sealer) before refinishing.
- I. Sand or dull glossy surfaces prior to painting.
- J. Sand existing coatings to a feather edge so that transition between new and existing finish will not show in finished work.

**3.8 PAINT COLOR**

- A. Color and gloss of finish coats is specified on Finish schedule, sheet IN-601 in Construction Documents.
- B. For additional requirements regarding color see Articles, REFINISHING EXISTING PAINTED SURFACE and MECHANICAL AND ELECTRICAL FIELD PAINTING SCHEDULE.
- C. Coat Colors:
  - 1. Color of priming coat: Lighter than body coat.
  - 2. Color of body coat: Lighter than finish coat.
  - 3. Color prime and body coats to not show through the finish coat and to mask surface imperfections or contrasts.
- D. Painting, Caulking, Closures, and Fillers Adjacent to Casework:
  - 1. Paint to match color of casework where casework has a paint finish.
  - 2. Paint to match color of wall where casework is stainless steel, plastic laminate, or varnished wood.

**3.9 MECHANICAL AND ELECTRICAL WORK FIELD PAINTING SCHEDULE**

- A. Field painting of mechanical and electrical consists of cleaning, touching-up abraded shop prime coats, and applying prime, body and finish coats to materials and equipment if not factory finished in space scheduled to be finished.
- B. In spaces not scheduled to be finish painted on Finish schedule, sheet IN-601 in Construction Documents FINISHES paint as specified under paragraph H, colors.
- C. Paint various systems specified in Division 02 - EXISTING CONDITIONS, Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, Division 27 - COMMUNICATIONS, and Division 28 - ELECTRONIC SAFETY AND SECURITY.
- D. Paint after tests have been completed.
- E. Omit prime coat from factory prime-coated items.
- F. Finish painting of mechanical and electrical equipment is not required when located in interstitial spaces, above suspended ceilings, in concealed areas such as pipe and electric closets, pipe basements, pipe tunnels, trenches, attics, roof spaces, shafts and furred spaces except on electrical conduit containing feeders 600 volts or more.
- G. Omit field painting of items specified in paragraph, Building and Structural WORK NOT PAINTED.
- H. Color:
  - 1. Paint items having no color specified on Finish schedule, sheet IN-601 in Construction Documents to match surrounding surfaces.

2. Paint colors as specified on Finish schedule, sheet IN-601 in Construction Documents except for following:
  - a. White .....Exterior unfinished surfaces of enameled plumbing fixtures. Insulation coverings on breeching and uptake inside boiler house, drums and drum-heads, oil heaters, condensate tanks and condensate piping.
  - b. Gray: .....Heating, ventilating, air conditioning and refrigeration equipment (except as required to match surrounding surfaces), and water and sewage treatment equipment and sewage ejection equipment.
  - c. Aluminum Color: Ferrous metal on outside of boilers and in connection with boiler settings including supporting doors and door frames and fuel oil burning equipment, and steam generation system (bare piping, fittings, hangers, supports, valves, traps and miscellaneous iron work in contact with pipe).
  - d. Federal Safety Red: Exposed fire protection piping hydrants, post indicators, electrical conduits containing fire alarm control wiring, and fire alarm equipment.
  - e. Federal Safety Orange: .Entire lengths of electrical conduits containing feeders 600 volts or more.
  - f. Color to match brickwork sheet metal covering on breeching outside of exterior wall of boiler house.
- I. Apply paint systems on properly prepared and primed surface as follows:
  1. Interior Locations:
    - a. Apply two coats of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) to following items:
      - 1) Metal under 94 degrees C (200 degrees F) of items such as bare piping, fittings, hangers and supports.
      - 2) Equipment and systems such as hinged covers and frames for control cabinets and boxes, cast-iron radiators, electric conduits and panel boards.
      - 3) Heating, ventilating, air conditioning, plumbing equipment, and machinery having shop prime coat and not factory finished.
    - b. Ferrous metal exposed in hydrotherapy equipment room and chlorinator room of water and sewerage treatment plants: One coat of MPI 101 (Cold Curing Epoxy Primer) and one coat of MPI 77 (Epoxy Cold Cured, Gloss (EC) MPI 98 (High Build Epoxy Coating)) MPI 108 (High Build Epoxy Marine coating (EC)).
    - c. Paint electrical conduits containing cables rated 600 volts or more using two coats of MPI 9 (Exterior Alkyd Enamel (EO)) in the Federal

Safety Orange color in exposed and concealed spaces full length of conduit.

2. Other exposed locations:

- a. Metal surfaces, except aluminum, of cooling towers exposed to view, including connected pipes, rails, and ladders: Two coats of MPI 1 (Aluminum Paint (AP)).
- b. Cloth jackets of insulation of ducts and pipes in connection with plumbing, air conditioning, ventilating refrigeration and heating systems: One coat of MPI 50 (Interior Latex Primer Sealer) and one coat of MPI 10 (Exterior Latex, Flat (AE)).

**3.10 BUILDING AND STRUCTURAL WORK FIELD PAINTING**

A. Painting and finishing of interior and exterior work except as specified under paragraph 3.11 B.

1. Painting and finishing of new and existing work including colors and gloss of finish selected is specified on Finish schedule, sheet IN-601 in Construction Documents.
2. Painting of disturbed, damaged and repaired or patched surfaces when entire space is not scheduled for complete repainting or refinishing.
3. Painting of ferrous metal and galvanized metal.
4. Identity painting and safety painting.

B. Building and Structural Work not Painted:

1. Prefinished items:

- a. Casework, doors, elevator entrances and cabs, metal panels, wall covering, and similar items specified factory finished under other sections.
- b. Factory finished equipment and pre-engineered metal building components such as metal roof and wall panels.

2. Finished surfaces:

- a. Hardware except ferrous metal.
- b. Anodized aluminum, stainless steel, chromium plating, copper, and brass, except as otherwise specified.
- c. Signs, fixtures, and other similar items integrally finished.

3. Concealed surfaces:

- a. Inside dumbwaiter, elevator and duct shafts, interstitial spaces, pipe basements, crawl spaces, pipe tunnels, above ceilings, attics, except as otherwise specified.
- b. Inside walls or other spaces behind access doors or panels.
- c. Surfaces concealed behind permanently installed casework and equipment.

4. Labels:

- a. Code required label, such as Underwriters Laboratories Inc., Inchcape Testing Services, Inc., or Factory Mutual Research Corporation.
  - b. Identification plates, instruction plates, performance rating, and nomenclature.
5. Gaskets.
  6. Structural steel encased in concrete, masonry, or other enclosure.
  7. Structural steel to receive sprayed-on fire proofing.
  8. Ceilings, walls, columns in interstitial spaces.

### 3.11 IDENTITY PAINTING SCHEDULE

- A. Identify designated service in accordance with ANSI A13.1, unless specified otherwise, on exposed piping, piping above removable ceilings, piping in accessible pipe spaces, interstitial spaces, and piping behind access panels.
  1. Legend may be identified using 2.1 G options or by stencil applications.
  2. Apply legends adjacent to changes in direction, on branches, where pipes pass through walls or floors, adjacent to operating accessories such as valves, regulators, strainers and cleanouts a minimum of 12 000 mm (40 feet) apart on straight runs of piping. Identification next to plumbing fixtures is not required.
  3. Locate Legends clearly visible from operating position.
  4. Use arrow to indicate direction of flow.
  5. Identify pipe contents with sufficient additional details such as temperature, pressure, and contents to identify possible hazard. Insert working pressure shown on drawings where asterisk appears for High, Medium, and Low Pressure designations as follows:
    - a. High Pressure - 414 kPa (60 psig) and above.
    - b. Medium Pressure - 104 to 413 kPa (15 to 59 psig).
    - c. Low Pressure - 103 kPa (14 psig) and below.
    - d. Add Fuel oil grade numbers.
  6. Legend name in full or in abbreviated form as follows:

	COLOR OF	COLOR OF	COLOR OF	LEGEND
PIPING	EXPOSED PIPING	BACKGROUND	LETTERS	BBREVIATIONS
Blow-off		Yellow	Black	Blow-off
Boiler Feedwater		Yellow	Black	Blr Feed



A/C Condenser Water Supply		Green	White	A/C Cond Wtr Sup
A/C Condenser Water Return		Green	White	A/C Cond Wtr Ret
Chilled Water Supply		Green	White	Ch. Wtr Sup
Chilled Water Return		Green	White	Ch. Wtr Ret
Shop Compressed Air		Yellow	Black	Shop Air
Air-Instrument Controls		Green	White	Air-Inst Cont
Drain Line		Green	White	Drain
Emergency Shower		Green	White	Emg Shower
High Pressure Steam		Yellow	Black	H.P. _____*
High Pressure Condensate Return		Yellow	Black	H.P. Ret _____*
Medium Pressure Steam		Yellow	Black	M. P. Stm _____*
Medium Pressure Condensate Return		Yellow	Black	M.P. Ret _____*
Low Pressure Steam		Yellow	Black	L.P. Stm _____*
Low Pressure Condensate Return		Yellow	Black	L.P. Ret _____*
High Temperature Water Supply		Yellow	Black	H. Temp Wtr Sup
High Temperature Water Return		Yellow	Black	H. Temp Wtr Ret
Hot Water Heating Supply		Yellow	Black	H. W. Htg Sup
Hot Water Heating Return		Yellow	Black	H. W. Htg Ret
Gravity Condensate Return		Yellow	Black	Gravity Cond Ret
Pumped Condensate Return		Yellow	Black	Pumped Cond Ret
Vacuum Condensate Return		Yellow	Black	Vac Cond Ret
Fuel Oil - Grade		Green	White	Fuel Oil-Grade ____*
Boiler Water Sampling		Yellow	Black	Sample
Chemical Feed		Yellow	Black	Chem Feed
Continuous Blow-Down		Yellow	Black	Cont. B D
Pumped Condensate		Black		Pump Cond
Pump Recirculating		Yellow	Black	Pump-Recirc.
Vent Line		Yellow	Black	Vent
Alkali		Yellow	Black	Alk
Bleach		Yellow	Black	Bleach
Detergent		Yellow	Black	Det
Liquid Supply		Yellow	Black	Liq Sup
Reuse Water		Yellow	Black	Reuse Wtr
Cold Water (Domestic)	White	Green	White	C.W. Dom
Hot Water (Domestic)				
Supply	White	Yellow	Black	H.W. Dom
Return	White	Yellow	Black	H.W. Dom Ret
Tempered Water	White	Yellow	Black	Temp. Wtr
Ice Water				

Supply	White	Green	White	Ice Wtr
Return	White	Green	White	Ice Wtr Ret
Reagent Grade Water		Green	White	RG
Reverse Osmosis		Green	White	RO
Sanitary Waste		Green	White	San Waste
Sanitary Vent		Green	White	San Vent
Storm Drainage		Green	White	St Drain
Pump Drainage		Green	White	Pump Disch
Chemical Resistant Pipe				
Waste		Yellow	Black	Acid Waste
Vent		Yellow	Black	Acid Vent
Atmospheric Vent		Green	White	ATV
Silver Recovery		Green	White	Silver Rec
Oral Evacuation		Green	White	Oral Evac
Fuel Gas		Yellow	Black	Gas
Fire Protection Water				
Sprinkler		Red	White	Auto Spr
Standpipe		Red	White	Stand
Sprinkler		Red	White	Drain

7. Electrical Conduits containing feeders over 600 volts, paint legends using 50 mm (2 inch) high black numbers and letters, showing the voltage class rating. Provide legends where conduits pass through walls and floors and at maximum 6100 mm (20 foot) intervals in between. Use labels with yellow background with black border and words Danger High Voltage Class, 5000,15000,25000.

8. See Sections for methods of identification, legends, and abbreviations of the following:

a. Medical Gases and vacuum lines: Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES / Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES.

b. Conduits containing high voltage feeders over 600 volts: Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS / Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS / Section 28 05 33, RACEWAYS AND BOXES FOR ELECTRONIC SAFETY AND SECURITY.

B. Fire and Smoke Partitions:

1. Identify partitions above ceilings on both sides of partitions except within shafts in letters not less than 64 mm (2 1/2 inches) high.

2. Stenciled message: "SMOKE BARRIER" or, "FIRE BARRIER" as applicable.

3. Locate not more than 6100 mm (20 feet) on center on corridor sides of partitions, and with a least one message per room on room side of partition.
  4. Use semigloss paint of color that contrasts with color of substrate.
- C. Identify columns in pipe basements and interstitial space:
1. Apply stenciled number and letters to correspond with grid numbering and lettering shown.
  2. Paint numbers and letters 100 mm (4 inches) high, locate 450 mm (18 inches) below overhead structural slab.
  3. Apply on four sides of interior columns and on inside face only of exterior wall columns.
  4. Color:
    - a. Use black on concrete columns.
    - b. Use white or contrasting color on steel columns.

### 3.12 PROTECTION CLEAN UP, AND TOUCH-UP

- A. Protect work from paint droppings and spattering by use of masking, drop cloths, removal of items or by other approved methods.
- B. Upon completion, clean paint from hardware, glass and other surfaces and items not required to be painted of paint drops or smears.
- C. Before final inspection, touch-up or refinished in a manner to produce solid even color and finish texture, free from defects in work which was damaged or discolored.

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### APPENDIX

Coordinate the following abbreviations used in Section 09 91 00, PAINTING, with other Sections, especially Drawing IN-601, INTERIOR FINISHES and other COATING SECTIONS listed. Use the same abbreviation and terms consistently.

Paint or coating    Abbreviation:

Acrylic Emulsion    AE (MPI 10 - flat/MPI 11 - semigloss/MPI 119 - gloss)

Alkyd Flat    Ak (MPI 49)

Alkyd Gloss Enamel    G (MPI 48)

Alkyd Semigloss Enamel    SG (MPI 47)

Aluminum Paint    AP (MPI 1)

Cementitious Paint    CEP (TT-P-1411)

Exterior Latex    EL??(MPI 10 / 11 / 119)??

Exterior Oil    EO (MPI 9 - gloss/MPI 8 - flat/MPI 94 - semigloss)

Epoxy Coating    EC (MPI 77 - walls, floors/MPI 108 - CMU, concrete)

Fire Retardant Paint    FR (MPI 67)

Fire Retardant Coating (Clear)    FC (MPI 66, intumescent type)

Floor Enamel        FE (MPI 27 - gloss/MPI 59 - eggshell)  
Heat Resistant Paint    HR (MPI 22)  
Latex Emulsion        LE (MPI 53, flat/MPI 52, eggshell/MPI 54, semigloss/MPI  
                         114, gloss Level 6  
Latex Flat    LF (MPI 138)  
Latex Gloss LG (MPI 114)  
Latex Semigloss    SG (MPI 141)  
Latex Low Luster    LL (MPI 139)  
Plastic Floor Coating    PL  
Polyurethane Varnish    PV (MPI 31 - gloss/MPI 71 - flat)  
Rubber Paint        RF (CID-A-A-3120 - Paint for Swimming Pools (RF)).  
Water Paint, Cement        WPC (CID-A-A-1555 - Water Paint, Powder).  
Wood Stain    WS (MPI 90)

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**SECTION 09 96 59  
HIGH-BUILD GLAZED COATINGS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies a special coating (SC) system designed to provide on interior masonry or other surfaces a glazed tile like finish.

**1.2 RELATED WORK**

Location, color and texture (Class): Drawing IN-601, INTERIOR FINISH SCHEDULE.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. Material samples, 150 mm (six inches) square, showing the number of coats of each coating material on each substrate to which the material is to be applied. Apply coating to the samples in a setback procedure, leaving exposed a portion of the substrate and subsequent portions of each coat.
  - 2. Color samples, minimum 75 mm (three inches) by 125 mm (five inches) of each color and texture (Class) specified.
- C. Certificates:
  - 1. Certifying that the coating complies with requirements of this specification, including resistance to abrasion and resistance to perspiration.
  - 2. Certifying that the coating supplied is the same, with manufacturing tolerances, as the coating tested.
- D. Manufacturer's Literature and Data:

Literature and data describing the coating material to be furnished.  
Printed application for instructions for each substrate.
- E. Test Reports: Reports of tests certifying compliance with requirement specified.

**1.4 ENVIRONMENTAL REQUIREMENTS**

Apply coating only when surface and air ambient temperature is above 10°C (50 degrees F) and maintained for a period of not less than 48 hours after applications, except as otherwise required by the coating manufacturer.

**1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. The Master Painters Institute (MPI):  
Approved Product List - 2006

**PART 2 - PRODUCTS****2.1 GLAZED COATING**

- A. Epoxy Cold Cured Gloss: MPI No 77.
- //B. In existing occupied buildings, use Water Based Epoxy, MPI No. 115.//

**PART 3 - EXECUTION****3.1 PREPARATION OF SURFACES**

- A. Patch surfaces as required for receiving glazed coating. Fill masonry block and make surfaces smooth and free of voids and pinholes. Assure surfaces are clean, dry, well cured, sound and free of ridges and depressions.
- //B. Wait for new plaster surfaces to cure for not less than 30 days before starting application of the coating system.//
- //C. Previous Coatings: Remove flaking, scaling or unsound coatings. Sand sound previous coatings to remain, with medium sand paper to eliminate gloss and provide tooth. //
- D. Remove or protect items not requiring coating.

**3.2 APPLICATION**

- A. Finish Film Thickness: Apply materials at not less than the manufacturer's recommended spreading rate.
- B. On previously coated surfaces, apply one base coat and one finish coat.
- C. On bare concrete block and cast in place concrete apply two base coats and one finish coat.
- D. On bare gypsum board //and // plaster // apply one primer coat, one base coat and one finish coat.
- E. In rooms or spaces shown or specified to have glazed coating, apply the glazed coating to surfaces behind casework and equipment, except behind those items built into wall recesses.
- F. Make edges of glazed coatings sharp and clean without overlapping adjoining other materials or colors.
- //G. Apply glazed coating in areas specified under Section 09 06 00, SCHEDULE FOR FINISHES. //
- //H. Apply glazed coating in the following areas:
  - 1. Animal Wards:

2. Toilet Number. \_\_\_\_\_

3. \_\_\_\_\_

### **3.3 CLEANING AND PROTECTION**

- A. During progress of the work and upon completion, promptly clean adjacent surfaces and materials of spills, spatters, drips, and stains from glazed coatings application. Remove glazed coatings by proper methods exercising care to prevent damage to finished surfaces and materials.
- B. Protect work of other trades against damage resulting from glazed coatings work.
- C. Touch up damaged coating surfaces before final acceptance.

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**SECTION 10 21 23  
CUBICLE CURTAIN TRACKS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies cubicle curtain track (C.C.T.).

**1.2 RELATED WORK**

- A. Steel shapes for suspending track assembly: Section 05 50 00, METAL FABRICATIONS and Section 09 51 00, ACOUSTICAL CEILINGS.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
1. One 300 mm (12 inch) long piece of cubicle curtain track with carrier access and end stop.
  2. One clip anchor for fastening track to grid system of acoustical ceilings.
  3. One curtain carrier.
- C. Shop Drawings: Showing layout of tracks and method of anchorage.
- D. Manufacturer's Literature and Data:
1. Cubicle curtain track.

**1.4 DELIVERY, STORAGE AND HANDLING**

- A. Deliver material in original package marked to identify the contents, brand name, and the name of the manufacturer or supplier.
- B. Store in dry and protected location. Store so as to not bend or warp the tracks.
- C. Do not open packages until contents are needed for installation, unless verification inspection is required.

**1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
- B221-06.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- B456-03.....Electrodeposited Coatings for Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
- C. The National Association of Architectural Metal Manufacturers (NAAMM):
- AMP 500 Series.....Metal Finishes Manual



**PART 2 - PRODUCTS****2.1 CUBICLE CURTAIN TRACKS**

- A. Surface mounted:
  - 1. Channel Tracks (Surface Mounted Type): Extruded aluminum, ASTM B221, alloy 6063, temper T5 or T6, channel shaped, with smooth inside raceway for curtain carriers.
- B. Curtain Carriers: Nylon or delrin carriers, with either nylon or delrin wheels on metal, delrin, or nylon axles. Equip each carrier with either stainless steel, chromium plated brass or steel hooks with swivel, or nickel chromium plated brass or stainless steel bead chain and hook assembly, or delrin carriers may have moulded on delrin hooks. Hook for bead chain may be the same material and finish as the bead chain or may be chromium plated steel. Provide 2.2 carriers for every 300 mm (onefoot) of each section of each track length, plus one additional carrier.
- C. End Stop Connectors, Ceiling Flanges and Other Accessories: Fabricate from the same material with the same finish as the tracks or from nylon.
- D. Hangers and Fittings: Fabricate from the same material with the same finish as the tracks. Hangers may be round or square for channel tracks and round for tubular tracks. Design fittings to be compatible with design of tracks and to safely transmit the track load to the hangers.
- E. At end of each section of track, make provision for insertion and removal of carriers. Design to prevent accidental removal of carrier. Any operating mechanism shall be removable with common tools.

**2.2 FASTENERS**

- A. Exposed Fasteners, Screws and Bolts: Stainless steel or chromium/nickel plated brass.
- B. Concealed Fasteners, Screws and Bolts: Hot-dip galvanized (except in high moisture areas use stainless steel).
- C. Metal Clips: Anchor curtain tracks to exposed grid of lay-in acoustical tile ceilings, with concealed metal (butterfly) type or two piece snap locking type ceiling clip of high strength spring steel. When it is not possible to install the metal ceiling clip, the cubicle curtain track may be screwed to the ceiling grid.

**2.3 FINISHES**

- A. Aluminum: Chemically etched medium matte, with clear anodic coating, Class II Architectural, 0.4 mils thick.

**2.4 FABRICATION**

- A. Weld and grind smooth joints of fabricated components.

- B. Form tracks and bends of lengths that will produce the minimum number of joints. Make track sections up to 4800 mm (16 feet) without joints. Form corner bend on a 300 mm (12 inch) radius.
- C. Provide steel anchor plates, supports, and anchors for securing components to building construction.
- D. Form flat surface without distortion.
- E. Shop assemble components and package complete with anchors and fittings.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install tracks after finish painting and ceiling finishing operations are complete.
- B. Install track level and hangers plumb and securely anchor to the ceiling to form a rigid installation.
- C. Anchor surface mounted curtain tracks directly to exposed grid of lay-in acoustical tile ceilings with suitable fasteners, spaced approximately 600 mm (24 inches) on center.
- D. Anchor surface mounted curtain tracks to concrete, plaster and gypsum board ceilings with a minimum of 3 mm (1/8-inch) diameter fastenings or concealed clips spaced not more than 900 mm (three feet) on center.
- E. Install suspended track seven feet, three inches above the finished floor, with hangers spaced no more than four feet on center. At ceiling line, provide flange fittings secured to hangers with set screws. Secure track to walls with flanged fittings and to hangers with special fittings.
- F. Securely fasten end stop caps to prevent their being forced out by the striking weight of carriers.
- G. Remove damaged or defective components and replace with new components or repair to the original condition.

#### **3.2 ACCEPTANCE**

- A. Track shall be installed neat, rigid, plumb, level and true, and securely anchored to the overhead construction.
- B. Carrier units shall operate smoothly and easily over the full range of travel.

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**SECTION 10 26 00  
WALL AND DOOR PROTECTION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies wall guards (crash rails or bumper guards), handrail/wall guard combinations, corner guards and high impact wallcovering.

**1.2 RELATED WORK**

- A. Armor plates and kick plates not specified in this section: Section 08 71 00, DOOR HARDWARE.
- B. Color and texture of aluminum and resilient material: Refer to Drawing Sheet IN-601, FINISH SCHEDULE.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Show design and installation details.
- C. Manufacturer's Literature and Data:
1. Wall Guards (Crash Rails or Bumper Guards)
  2. Corner Guards.
  3. High Impact Wallcovering
  4. Handrails.
- D. Test Report: Showing that resilient material complies with specified fire and safety code requirements.

**1.4 DELIVERY AND STORAGE**

- A. Deliver materials to the site in original sealed packages or containers marked with the name and brand, or trademark of the manufacturer.
- B. Protect from damage from handling and construction operations before, during and after installation.
- C. Store in a dry environment of approximately 21° C (70 degrees F) for at least 48 hours prior to installation.

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
- A167-99(R2004).....Stainless and Heat-Resisting Chromium-Nickel  
Steel Plate, Sheet, and Strip
- B221-07.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,  
Wire, Shapes, and Tubes

- D256-06.....Impact Resistance of Plastics
- D635-06.....Rate of Burning and/or Extent and Time of  
Burning of Self-Supporting Plastics in a  
Horizontal Position
- E84-07.....Surface Burning Characteristics of Building  
Materials
- C. The National Association of Architectural Metal Manufacturers (NAAMM):  
AMP 500 Series.....Metal Finishes Manual
- D. National Fire Protection Association (NFPA):  
80-06.....Standard for Fire Doors and Windows
- E. Society of American Automotive Engineers (SAE):  
J 1545-05.....Instrumental Color Difference Measurement for  
Exterior Finishes.
- F. Underwriters Laboratories Inc. (UL):  
Annual Issue.....Building Materials Directory

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Basis of products is per manufacturer's listed on Drawing Sheet IN-601, FINISH SCHEDULE.
- B. Stainless Steel components shall be fabricated from type 304 stainless steel with a #4 satin finish.
- C. Aluminum Extruded: ASTM B221, Alloy 6063, Temper T5 or T6.
- D. Resilient Materials: Extruded and injection molded acrylic vinyl or extruded polyvinyl chloride meeting following requirements:
1. Minimum impact resistance of 1197 ps (25 ft lbs per sq.ft) when tested in accordance with ASTM D256 (Izod impact, ft.lbs. per inch notch).
  2. Class 1 fire rating when tested in accordance with ASTM E84, having a maximum flame spread of 25 and a smoke developed rating of 450 or less.
  3. Rated self extinguishing when tested in accordance with ASTM D635.
  4. Material shall be labeled and tested by Underwriters Laboratories or other approved independent testing laboratory.
  5. Integral color with all colored components matched in accordance with SAE J 1545 to within plus or minus 1.0 on the CIE-LCH scales.
  6. Same finish on exposed surfaces.
- E. Wood Components: Solid wood members, plain sawn, FAS grade hardwood, kiln dried to a moisture content of 6% to 10%. All wood components shall be factory finished as indicated on Drawing Sheet IN-601, FINISH SCHEDULE.

- F. Fasteners: All fasteners to be no-corrosive and compatible with retainers. All necessary fasteners to be supplied by the manufacturer.

## **2.2 CORNER GUARDS**

- A. Stainless Steel Corner Guards: Fabricated of 1.6 mm (0.0625 inch) thick stainless steel. Form corner guards of dimensions and to contour shown. Attachment hardware shall be appropriate for wall construction.
1. Provide appropriate mounting hardware, cushions and base plates as required.
  2. Provide factory fabricated end closure caps at top and bottom of surface mounted corner guards.

## **2.3 WALL GUARDS AND HANDRAILS**

- A. Resilient Wall Guards and Handrails:
1. Handrail/Wall Guard Combination: Snap-on covers of resilient material, minimum 2 mm (0.078-inch) thick, shall be free-floated on a continuous, extruded aluminum retainer, minimum 1.8 mm (0.072-inch) thick, anchored to wall at maximum 760 mm (30 inches) on center.
  2. Wood Handrail/Wall Guard Combination: Surface mounted assembly of continuous extruded aluminum retainer with removable wood face and handrail.
  3. Wall Guards (Crash Rails): Snap-on covers of resilient material, minimum 2.8 mm (0.110-inch) thick, shall be free-floated over 50 mm (two-inch) wide aluminum retainer clips, minimum 2.3 mm (0.090-inch) thick, anchored to wall at maximum 600 mm (24 inches) on center, supporting a continuous aluminum retainer, minimum 1.6 mm (0.062-inch) thick; or, shall be free-floated over a continuous extruded aluminum retainer, minimum 2.3 (0.090-inch) thick anchored to wall at maximum 600 mm (24 inches) on center.
  4. Provide handrails and wall guards (crash rails) with prefabricated end closure caps, inside and outside corners, concealed splices, cushions, mounting hardware and other accessories as required. End caps and corners shall be field adjustable to assure close alignment with handrails and wall guards (crash rails). Screw or bolt closure caps to aluminum retainer.
- B. Stainless Steel Handrail: Stainless steel tube rails mounted on wall brackets. Handrail assemblies and attachments shall withstand a minimum uniform load of 50 lbf/ft applied vertically down and horizontally, but

## **2.4 HIGH IMPACT WALLCOVERING**

- A. Fabricate from vinyl acrylic or polyvinyl chloride resilient material minimum 6mm (0.20 inch) thick designed specially for interior use.

- B. Coordinate with guard rail protection material and supplier for proper fit, installation and color.
- C. Provide adhesive as recommended by the wall covering manufacturer.

## **2.5 FASTENERS AND ANCHORS**

- A. Provide fasteners and anchors as required for each specific type of installation.
- B. Where type, size, spacing or method of fastening is not shown or specified, submit shop drawings showing proposed installation details.

## **2.6 FINISH**

- A. In accordance with NAAMM AMP 500 series.
- B. Aluminum:
  - 1. Concealed aluminum: Mill finish as fabricated, uniform in color and free from surface blemishes.
- C. Stainless Steel: NAAMM finish Number 4.
- D. Resilient Material: Embossed texture and color in accordance with SAE J 1545 and as specified on Drawing Sheet IN-601, FINISH SCHEDULE.

## **PART 3 - EXECUTION**

### **3.1 RESILIENT CORNER GUARDS**

- A. Install corner guards on walls in accordance with manufacturer's instructions.

### **3.2 STAINLESS STEEL CORNER GUARDS**

- A. Mount guards on external corners of interior walls, partitions and columns as shown.
- B. Where corner guards are installed on gypsum board, clean surface and anchor guards with a neoprene solvent-type contact adhesive specifically manufactured for use on gypsum board construction. Remove excess adhesive from around edge of guard and allow to cure undisturbed for 24 hours.

### **3.3 RESILIENT HANDRAIL WALL GUARD COMBINATIONS AND RESILIENT WALL GUARDS (CRASH RAIL)**

- A. Secure guards to walls with mounting cushions and fasteners in accordance with manufacturer's details and instructions.

### **3.4 STAINLESS STEEL WALL GUARDS**

- A. Space brackets at not more than three feet on centers and anchor to the wall in accordance with manufacturer's installation instructions.

### **3.5 DOOR, DOOR FRAME PROTECTION AND HIGH IMPACT WALL COVERING**

- A. Surfaces to receive protection shall be clean, smooth and free of obstructions.

- B. Install protectors after frames are in place but preceding installation of doors in accordance with approved shop drawings and manufacturers specific instructions.
- C. Apply with adhesive in controlled environment according to manufacturer's recommendations.
- D. Protection installed on fire rated doors and frames shall be installed according to NFPA 80 and installation procedures listed in UL Building Materials Directory; or, equal listing by other approved independent testing laboratory establishing the procedures.

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**SECTION 10 28 00  
TOILET ACCESSORIES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies manufactured items usually used in dressing rooms, toilets, and at sinks in related spaces.
- B. Items Specified:
  - 1. Paper towel dispenser.
  - 2. Toilet tissue dispenser.
  - 3. Grab Bars.
  - 4. Metal framed mirror.
  - 5. Mop racks.
  - 6. Seat cover dispenser.

**1.2 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
  - 1. Each product specified.
  - 2. Paper towel dispenser units.
  - 3. Metal framed mirrors, showing shelf where required, fillers, and design and installation of units when installed on ceramic tile wainscots and offset surfaces.
  - 4. Grab bars, showing design and each different type of anchorage.
  - 5. Show material and finish, size of members, and details of construction, installation and anchorage of mop racks.
- C. Samples:
  - 1. One of each type of accessory specified.
  - 2. After approval, samples may be used in the work.
- D. Manufacturer's Literature and Data:
  - 1. All accessories specified.
  - 2. Show type of material, gages or metal thickness in inches, finishes, and when required, capacity of accessories.
  - 3. Show working operations of spindle for toilet tissue dispensers.
  - 4. Mop racks.
- E. Manufacturer's Certificates:
  - 1. Attesting that soap dispensers are fabricated of material that will not be affected by liquid soap or aseptic detergents, Phisohex and solutions containing hexachlorophene.
  - 2. Anodized finish as specified.



**1.3 QUALITY ASSURANCE**

- A. Each product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
- B. Each accessory type shall be the same and be made by the same manufacturer.
- C. Each accessory shall be assembled to the greatest extent possible before delivery to the site.
- D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.

**1.4 PACKAGING AND DELIVERY**

- A. Pack accessories individually to protect finish.
- B. Deliver accessories to the project only when installation work in rooms is ready to receive them.
- C. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- D. Deliver products to site in sealed packages of containers; labeled for identification with manufacturer's name, brand, and contents.

**1.5 STORAGE**

- A. Store products in weathertight and dry storage facility.
- B. Protect from damage from handling, weather and construction operations before, during and after installation in accordance with manufacturer's instructions.

**1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A167-99(R2004).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
  - A176-99(R2004).....Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip
  - A269-07.....Seamless and Welded Austenitic Stainless Steel Tubing for General Service
  - A312/A312M-06.....Seamless and Welded Austenitic Stainless Steel Pipes
  - A653/A653M-07.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

- B221-06.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,  
Wire, Shapes, and Tubes
- B456-03.....Electrodeposited Coatings of Copper Plus Nickel  
Plus Chromium and Nickel Plus Chromium
- C1036-06.....Flat Glass
- C1048-04.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated  
and Uncoated Glass
- D635-06.....Rate of Burning and/or Extent and Time of  
Burning of Self Supporting Plastics in a  
Horizontal Position
- F446-85 (R2004).....Consumer Safety Specification for Grab Bars and  
Accessories Installed in the Bathing Area.
- A269-07.....Seamless and Welded Austenitic Stainless Steel  
Tubing for General Service
- D3453-01.....Flexible Cellular Materials - Urethane for  
Furniture and Automotive Cushioning, Bedding,  
and Similar Applications
- D3690-02.....Vinyl-Coated and Urethane-Coated Upholstery  
Fabrics
- C. The National Association of Architectural Metal Manufacturers (NAAMM):  
AMP 500 Series.....Metal Finishes Manual  
AMP 500-505-88.....Metal Finishes Manual and Finishes for Stainless  
Steel
- D. American Welding Society (AWS):  
D10.4-86 (R2000).....Welding Austenitic Chromium-Nickel Stainless  
Steel Piping and Tubing
- E. Federal Specifications (Fed. Specs.):  
A-A-3002.....Mirrors, Glass  
FF-S-107C (2).....Screw, Tapping and Drive  
FF-S-107C.....Screw, Tapping and Drive.  
WW-P-541E(1).....Plumbing Fixtures (Accessories, Land Use) Detail  
Specification

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Aluminum: ASTM B221, alloy 6063-T5 and alloy 6463-T5.
- B. Stainless Steel:
1. Plate or sheet: ASTM A167, Type 302, 304, or 304L, except ASTM A176 where Type 430 is specified, 0.0299-inch thick unless otherwise specified.
  2. Tube: ASTM A269, Alloy Type 302, 304, or 304L.

- C. Stainless Steel Tubing: ASTM A269, Grade 304 or 304L, seamless or welded.
- D. Stainless Steel Pipe: ASTM A312; Grade TP 304 or TP 304L.
- E. Steel Sheet: ASTM A653, zinc-coated (galvanized) coating designation G90.
- F. Glass:
  - 1. ASTM C1036, Type 1, Class 1, Quality q2, for mirrors

## **2.2 FASTENERS**

- A. Exposed Fasteners: Stainless steel or chromium plated brass, finish to match adjacent surface.
- B. Concealed Fasteners: Steel, hot-dip galvanized (except in high moisture areas such as showers or bath tubs use stainless steel).
- C. Toggle Bolts: For use in hollow masonry or frame construction.
- D. Hex bolts: For through bolting on thin panels.
- E. Expansion Shields: Lead or plastic as recommended by accessory manufacturer for component and substrate for use in solid masonry or concrete.
- F. Screws:
  - 1. ASME B18.6.4.
  - 2. Fed Spec. FF-S-107, Stainless steel Type A.
- G. Adhesive: As recommended by manufacturer for products to be joined.

## **2.3 FINISH**

- A. In accordance with NAAMM AMP 500 series.
- B. Anodized Aluminum:
  - 1. Chemically etched medium matte, with clear anodic coating, Class I Architectural, 0.7-mil thick.
- C. Mechanical finish, medium satin.
  - 1. Chromium Plating: ASTM B456, satin or bright as specified, Service Condition No. SC2.
  - 2. Stainless Steel: NAAMM AMP 503, finish number 4.
  - 3. Ferrous Metal:
    - a. Shop Prime: Clean, pretreat and apply one coat of primer and bake.
    - b. Finish: Over primer apply two coats of alkyd or phenolic resin enamel, and bake.

## **2.4 FABRICATION - GENERAL**

- A. Welding, AWS D10.4.
- B. Grind dress, and finish welded joints to match finish of adjacent surface.
- C. Form exposed surfaces from one sheet of stock, free of joints.
- D. Provide steel anchors and components required for secure installation.

- E. Form flat surfaces without distortion. Keep exposed surfaces free from scratches and dents. Reinforce doors to prevent warp or twist.
- F. Isolate aluminum from dissimilar metals and from contact with building materials as required to prevent electrolysis and corrosion.
- G. Hot-dip galvanized steel, except stainless steel, anchors and fastening devices.
- H. Shop assemble accessories and package with all components, anchors, fittings, fasteners and keys.
- I. Key items alike.
- J. Provide templates and rough-in measurements as required.
- K. Round and deburr edges of sheets to remove sharp edges.

## **2.5 PAPER TOWEL DISPENSERS**

- A. Surface mounted type with sloping top.
- B. Dispensing capacity for 300 sheets of any type of paper toweling.
- C. Fabricate of stainless steel.
- D. Provide door with continuous hinge at bottom, and either spring tension cam lock or tumbler lock, keyed alike, at top and a refill sight slot in front.

## **2.6 TOILET TISSUE DISPENSERS**

- A. Double roll surface mounted type.
- B. Mount on continuous backplate.
- C. Removable spindle ABS plastic or chrome plated plastic.
- D. Wood rollers are not acceptable.

## **2.7 GRAB BARS**

- A. Fed. Spec WW-P-541/8B, Type IV, bars, surface mounted, Class 2, grab bars and ASTM F446.
- B. Fabricate of either stainless steel or nylon coated steel, except use only one type throughout the project:
  - 1. Stainless steel: Grab bars, flanges, mounting plates, supports, screws, bolts, and exposed nuts and washers.
- C. Concealed mount, except grab bars mounted at floor, swing up and on metal toilet partitions.
- D. Bars:
  - 1. Fabricate from 38 mm (1-1/2 inch) outside diameter tubing.
    - a. Stainless steel, minimum 1.2 mm (0.0478 inch) thick.
    - b. Nylon coated bars, minimum 1.5 mm (0.0598 inch) thick.
  - 2. Fabricate in one continuous piece with ends turned toward walls, except swing up and where grab bars are shown continuous around three sides of showers, bars may be fabricated in two sections, with concealed slip joint between.

3. Continuous weld intermediate support to the grab bar.
  4. Swing up bars manually operated. Designed to prevent bar from falling when in raised position.
- E. Flange for Concealed Mounting:
1. Minimum of 2.65 mm (0.1046 inch) thick, approximately 75 mm (3 inch) diameter by 13 mm (1/2 inch) deep, with provisions for not less than three set screws for securing flange to back plate.
  2. Insert grab bar through center of the flange and continuously weld perimeter of grab bar flush to back side of flange.
- F. Flange for Exposed Mounting:
1. Minimum 5 mm (3/16 inch) thick, approximately 75 mm (3 inch) diameter.
  2. Insert grab bar through flange and continuously weld perimeter of grab bar flush to backside of flange.
  3. Where mounted on metal toilet partitions, provide three equally spaced, countersunk holes, sized to accommodate 5 mm (3/16 inch) diameter bolts.
  4. Where mounted on floor, provide four equally spaced holes, sized to accommodate 5 mm (3/8 inch) diameter bolts, not more than 5 mm (3/8 inch) from edge of flange.
- G. In lieu of providing flange for concealed mounting, and back plate as specified, grab rail may be secured by being welded to a back plate and be covered with flange.
- H. Back Plates:
1. Minimum 2.65 mm (0.1046 inch) thick metal.
  2. Fabricate in one piece, approximately 6 mm (1/4 inch) deep, with diameter sized to fit flange. Provide slotted holes to accommodate anchor bolts.
  3. Furnish spreaders, through bolt fasteners, and cap nuts, where grab bars are mounted on metal partitions.

## **2.8 METAL FRAMED MIRRORS**

- A. Fed. Spec. A-A-3002 metal frame; stainless steel, type 302 or 304.
- B. Mirror Glass:
1. Minimum 6 mm (1/4 inch) thick.
  2. Set mirror in a protective vinyl glazing tape.
  3. Use tempered glass for mirrors in Mental Health and Behavioral Nursing units.
- C. Frames:
1. Channel or angle shaped section with face of frame not less than 9 mm (3/8 inch) wide. Fabricate with square corners.

2. Use either 0.9 mm (0.0359 inch) thick stainless steel, chrome finished steel, or extruded aluminum, with clear anodized finish 0.4 mils thick.
3. Filler:
  - a. Where mirrors are mounted on walls having ceramic tile wainscots not flush with wall above, provide fillers at void between back of mirror and wall surface.
  - b. Fabricate fillers from same material and finish as the mirror frame, contoured to conceal the void behind the mirror at sides and top.
4. Attached Shelf for Mirrors:
  - a. Fabricate shelf of the same material and finish as the mirror frame.
  - b. Make shelf approximately 125 mm (five inches) in depth, and extend full width of the mirror.
  - c. Close the ends and the front edge of the shelf to the same thickness as the mirror frame width.
  - d. Form shelf for aluminum framed mirror as an integral part of the bottom frame member. Form stainless steel shelf with concealed brackets to attach to mirror frame.

D. Back Plate:

1. Fabricate backplate for concealed wall hanging of either zinc-coated, or cadmium plated 0.9 mm (0.036 inch) thick sheet steel, die cut to fit face of mirror frame, and furnish with theft resistant concealed wall fastenings.
2. Use set screw type theft resistant concealed fastening system for mounting mirrors.

E. Mounting Bracket:

1. Designed to support mirror tight to wall.
2. Designed to retain mirror with concealed set screw fastenings.

## 2.9 MOP RACKS

- A. Minimum 1.0M (40 inches) long with five holders.
- B. Clamps:
  1. Minimum of 1.3 mm (0.050-inch) thick stainless steel bracket retaining channel with a hard rubber serrated cam; pivot mounted to channel.
  2. Clamps to hold handles from 13 mm (1/2-inch) minimum to 32 mm (1-1/4 inch) maximum diameter.
- C. Support:

1. Minimum of 1 mm (0.0375 inch) thick stainless steel hat shape channel to hold clamps away from wall as shown.
  2. Drill wall flange for 3 mm (1/8 inch) fasteners above and below clamp locations.
- D. Secure clamps to support with oval head machine screws or rivets into continuous reinforcing back of clamps.
- E. Finish on stainless Steel: AMP 503-No. 4.

#### **2.10 TOILET SEAT COVER DISPENSER**

- A. Type: Surface mounted stainless steel toilet-seat-cover dispenser, all-welded construction, exposed surfaces satin finish.
- B. Dispensr shall have concealed opening in bottom for filling.
- C. Capacity: 250 toilet seat covers, single of half-fold type.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Before starting work notify Contracting Officer's Technical Representative in writing of any conflicts detrimental to installation or operation of units.
- B. Verify with the Contracting Officer's Technical Representative the exact location of accessories.

#### **3.2 INSTALLATION**

- A. Set work accurately, in alignment and where shown. Items shall be plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Toggle bolt to steel anchorage plates in frame partitions or hollow masonry.
- C. Install accessories in accordance with the manufacturer's printed instructions and ASTM F446.
- D. Install accessories plumb and level and securely anchor to substrate.
- E. Install accessories in a manner that will permit the accessory to function as designed and allow for servicing as required without hampering or hindering the performance of other devices.
- F. Position and install dispensers, and other devices in countertops, clear of drawers, permitting ample clearance below countertop between devices, and ready access for maintenance as needed.
- G. Align mirrors, dispensers and other accessories even and level, when installed in battery.
- H. Install accessories to prevent striking by other moving, items or interference with accessibility.

- I. Install wall mirrors in Mental Health and Behavioral Units with tamper resistant screws that are flush mounted so that they will not support a rope or material for hanging.

### 3.3 SCHEDULE OF ACCESSORIES

- A. Hand Soap Dispensers: NIC.
- B. Toilet tissue dispenser: Bobrick Model B-6857.
- C. Surface mounted paper towel dispenser: Bobrick Model B-262.
- D. Toilet seat cover dispenser: Bobrick Model B-221.
- E. Grab bars: Bobrick B-6806 Series, length and configuration as indicated on Drawings.
- F. Metal framed mirrors: Bobrick B-290 Series.

### 3.4 CLEANING

- A. After installation, clean as recommended by the manufacturer and protect from damage until completion of the project.

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**SECTION 10 44 13  
FIRE EXTINGUISHER CABINETS**

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This section covers recessed fire extinguisher cabinets.

**1.2 RELATED WORK**

- A. Acrylic glazing: Section 08 80 00, GLAZING.  
B. Field Painting: Section 09 91 00, PAINTING.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.  
B. Manufacturer's Literature and Data: Fire extinguisher cabinet including installation instruction and rough opening required.

**1.4 APPLICATION PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.  
B. American Society of Testing and Materials (ASTM):  
D4802-02.....Poly (Methyl Methacrylate) Acrylic Plastic Sheet

**PART 2 - PRODUCTS****2.1 FIRE EXTINGUISHER CABINET**

- A. Recessed type with flat trim of size shown.

**2.2 FABRICATION**

- A. Form body of cabinet from 0.9 mm (0.0359 inch) thick sheet steel.  
B. Fabricate door and trim from 1.2 mm (0.0478 inch) thick sheet steel with all face joints fully welded and ground smooth.  
1. Glaze doors with 6 mm (1/4 inch) thick ASTM D4802, clear acrylic sheet, Category B-1, Finish 1.  
2. Design doors to open 180 degrees.  
3. Provide continuous hinge, pull handle, and adjustable roller catch.  
C. Fire-Rated Cabinets: Listed and labeled to meet requirements of ASTM E814 for fire-resistance rating of wall where it is installed.  
Construct fire-rated cabinets with double walls fabricated from 0.0478-inch (1.2-mm) thick, cold-rolled steel sheet lined with minimum 5/8-inch (16-mm) thick, fire-barrier material. Provide factory drilled mounting holes.  
1. Cabinet Metal: Enameled-steel sheet.  
2. Shelf: Same metal and finish as cabinet.

**2.3 FINISH**

- A. Finish interior of cabinet body with baked-on semigloss white enamel.
- B. Finish door, frame with manufacturer's standard baked-on prime coat suitable for field painting.

**PART 3 - EXECUTION**

- A. Install fire extinguisher cabinets in prepared openings and secure in accordance with manufacturer's instructions.
- B. Install cabinet so that bottom of cabinet is 975 mm (39 inches) above finished floor.

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**SECTION 10 51 13****METAL LOCKERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Heavy-duty metal lockers.

**1.2 SUBMITTALS**

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show locker trim and accessories.
  - 2. Include locker identification system and numbering sequence.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For metal lockers, in manufacturer's standard sizes.
- E. Qualification Data: For qualified Installer.
- F. Warranty: Sample of special warranty.
- G. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

**1.3 QUALITY ASSURANCE**

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain metal lockers, and accessories from single source from single manufacturer.
- C. Preinstallation Conference: Conduct conference at Project site.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

**1.5 PROJECT CONDITIONS**

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

**1.6 COORDINATION**

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other

Sections to ensure that metal lockers can be supported and installed as indicated.

#### **1.7 WARRANTY**

- A. Warranty lockers against defects in workmanship and materials subject to terms of "Warranty of Construction" Article in the GENERAL CONDITIONS, except that warranty period shall be two years.
- B. Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures.
    - b. Faulty operation of latches and other door hardware.
  - 2. Damage from deliberate destruction and vandalism is excluded.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
- B. Steel Tube: ASTM A 500, cold rolled.
- C. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- D. Anchors: Material, type, and size required for secure anchorage to each substrate.
  - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
  - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

#### **2.2 HEAVY-DUTY METAL LOCKERS**

- A. Locker Arrangement: As indicated on Drawings.
- B. Material: Cold-rolled steel sheet.
- C. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
  - 1. Tops, Bottoms, and Sides: 0.060-inch (1.52-mm) nominal thickness.
  - 2. Backs: 0.048-inch (1.21-mm) nominal thickness.
  - 3. Shelves: 0.060-inch (1.52-mm) nominal thickness, with double bend at front and single bend at sides and back.

- D. Frames: Channel formed; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.
  - 1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
- E. Doors: One piece; fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
  - 1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches (381 mm) wide; welded to inner face of doors.
  - 2. Door Style:
    - a. Louvered Vents: No fewer than three louver openings at top and bottom for double-tier lockers.
- F. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
  - 1. Continuous Hinges: Manufacturer's standard, steel, full height.
- G. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry and vandal resistant.
  - 1. Single-Point Latching: Nonmoving latch hook with steel padlock loop that projects through recessed cup and is finished to match metal locker body.
    - a. Latch Hook: Equip each door with one latch hook, fabricated from 0.120-inch (3.04-mm) nominal-thickness steel sheet; welded midway up full-height door strike; with resilient silencer.
- H. Equipment: Equip each metal locker with identification plate and the following unless otherwise indicated:
  - 1. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.
- I. Accessories:
  - 1. Legs: 6 inches (152 mm) high; formed by extending vertical frame members, or fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet; welded to bottom of locker.

- a. Closed Front and End Bases: Fabricated from 0.036-inch (0.91-mm) nominal-thickness steel sheet.
- 2. Continuous Sloping Tops: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
  - a. Closures: Vertical-end type.
- 3. Recess Trim: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
- 4. Filler Panels: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
- 5. Boxed End Panels: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.

J. Finish: Refer to Drawing IN-601 for finish information.

### **2.3 FABRICATION**

- A. Fabricate metal lockers square, rigid, and without warp and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
  - 1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
  - 2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.
- C. Knocked-Down Construction: Fabricate metal lockers using nuts, bolts, screws, or rivets for preassembly at plant prior to shipping.
- D. All-Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds flush.
- E. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.
- F. Identification Plates: Manufacturer's standard, etched, embossed, or stamped plastic plates, with numbers and letters at least 3/8 inch (9 mm) high.

- G. Continuous Base: Formed into channel or zee profile for stiffness, and fabricated in lengths as long as practical to enclose base and base ends of metal lockers; finished to match lockers.
- H. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
  - 1. Sloping-top corner fillers, mitered.
- I. Recess Trim: Fabricated with minimum 2-1/2-inch (64-mm) face width and in lengths as long as practical; finished to match lockers.
- J. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.
- K. Boxed End Panels: Fabricated with 1-inch- (25-mm-) wide edge dimension, and designed for concealing fasteners and holes at exposed ends of nonrecessed metal lockers; finished to match lockers.
- L. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
- M. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

## **2.4 STEEL SHEET FINISHES**

- A. Factory finish steel surfaces and accessories except stainless-steel and chrome-plated surfaces.
- B. Baked-Enamel Finish: Immediately after cleaning, pretreating, and phosphatizing, apply manufacturer's standard thermosetting baked-enamel finish. Comply with paint manufacturer's written instructions for application, baking, and minimum dry film thickness.
- C. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard, baked-polymer, thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install level, plumb, and true; shim as required, using concealed shims.
  - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches (910 mm) o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
  - 2. Anchor single rows of metal lockers to walls near top of lockers and to floor.
- B. Knocked-Down Metal Lockers: Assemble with standard fasteners, with no exposed fasteners on door faces or face frames.
- C. All-Welded Metal Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.
- D. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
  - 1. Attach hooks with at least two fasteners.
  - 2. Attach door locks on doors using security-type fasteners.
  - 3. Identification Plates:
    - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
    - b. Attach plates to upper shelf of each open-front metal locker, centered, with at least two aluminum rivets.
  - 4. Attach recess trim to recessed metal lockers with concealed clips.
  - 5. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
  - 6. Attach sloping-top units to metal lockers, with closures at exposed ends.
  - 7. Attach boxed end panels with concealed fasteners to conceal exposed ends of nonrecessed metal lockers.
  - 8. Attach finished end panels with fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.



- E. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Full-size units of the following metal locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:
    - a. Locks.
    - b. Identification plates.
    - c. Hooks.

### 3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding.
- B. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- C. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

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**SECTION 13 49 00  
RADIATION PROTECTION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies lead radiation shielding.
- B. Construction of products and assemblies used for radiation shielding complying with applicable requirements of NCRP Reports 35, 49 and 102.
- C. This section includes the following items:
  - 1. Lead Lined Wood Doors
  - 2. Lead Glass
  - 3. Lead Lined Frames
  - 4. Thresholds
  - 5. Lead Sheet
  - 6. Lead Lined Gypsum Wallboard

**1.2 RELATED WORK**

- A. Structural steel: Section 05 50 00, METAL FABRICATIONS.
- B. Wood Veneer finish for doors: Section 08 14 00, INTERIOR WOOD DOORS and Drawing Sheet IN-601, FINISH SCHEDULE.
- C. Steel door frames: Section 08 11 13, HOLLOW METAL FRAMES.
- D. Hardware for doors: Section 08 71 00, DOOR HARDWARE.
- E. Installation of frames and hardware: Section 08 11 13, HOLLOW METAL FRAMES; Section 08 14 00, INTERIOR WOOD DOORS; Section 08 71 00, DOOR HARDWARE.

**1.3 MANUFACTURERS QUALIFICATIONS**

- A. Approval by Contracting Officer's Technical Representative is required of product or service of proposed manufacturer and suppliers, and will be based upon submission by Contractor of certification that:
  - 1. Manufacturer regularly and presently manufactures lead radiation shielding as specified as one of its principal products.
  - 2. Manufacturer's product submitted has been in satisfactory and efficient operation on three installations similar and equivalent to this project for three years.
  - 3. Manufacturer submits list of installations.

**1.4 TESTS**

- A. Lead radiation shielding will be tested at the expense of the Government after X-ray equipment is installed.
- B. Any additional testing required due to correction and replacement of defective work will be done by the Government at Contractor's expense.

**NOTE:** Lead glass and lead lined gypsum board will not be tested prior to installation.

### 1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Each lead radiation shielding item specified showing thickness of lead, details of construction and installation.
- C. Samples:
  - 1. Lead lined gypsum board.
  - 2. Bottom corner section of lead lined door, 300 mm (12 inches) square showing bottom and side edge strips.
- D. Manufacturers' Literature and Data: Each lead radiation shielding item specified.

### 1.6 WARRANTY

- A. Warranty lead lined doors against defects in workmanship and materials subject to terms of "Warranty of Construction" Article in the GENERAL CONDITIONS, except that warranty period shall be two years.
- B. Warp or twist of lead lined flush veneered doors may not exceed 3 mm (1/8 inch) in any face dimension of door (including full diagonal), measured not less than six months after doors have been hung and finished.

### 1.7 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Federal Specifications (Fed. Spec.):  
QQ-L-201F(2).....Lead Sheet
- C. American Society for Testing and Materials (ASTM):  
A167-99(R2004).....Stainless and Heat Resisting Chromium-Nickel  
Steel Plate, Sheet, and Strip  
C36-03(E2004).....Gypsum Wallboard  
C1002-07.....Steel Drill Screws for the Application of Gypsum  
Board or Metal Plaster Bases  
D1187-97(R2002).....Asphalt-Base Emulsions for Use as Protective  
Coatings for Metal
- D. United States Department of Commerce Product Standard (PS):  
FED PSI 83-84.....Construction and Industrial Plywood
- E. Military Specifications (Mil. Spec.):  
MIL-C-36373.....Cabinet, Cassette Transfer, Wall Mounted
- F. National Council on Radiation Protection and Measurements (NCRP):

Report 35.....Dental X-Ray Protection (1970)  
Report 49.....Structural Shielding Design and Evaluation for  
Medical Use of X-Rays and Gamma Rays of Energies  
up to 10 MeV (1970)  
Report 102.....Medical X-Ray, Electron Beam and Gamma-Ray  
protection for Energies up to 50 MeV (Equipment  
Design, Performance and Use), (1989)

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Lead Sheet: Fed. Spec. QQ-L-201, Grade C, of thickness shown on drawings.
- B. Lead Lined Gypsum Board:
  - 1. ASTM C36, Type X, 16 mm (5/8 inch) thick.
  - 2. Factory bond sheet lead to one side of wallboard.
  - 3. Apply sheet lead in thicknesses shown, unpierced and in one piece.
- C. Stainless Steel: ASTM A167.
- D. Lead Glass: Clear, X-ray proof, of sufficient thickness to provide X-ray protection equivalent to that provided by partition or door in which glass occurs.
- E. Lead Control Windows: Cast lead, rigid, single unit type without joints, with or without voice passage as shown and with lead stop beads and lead glass.
- F. Thresholds:
  - 1. Lead lined stainless steel as detailed.
- G. Fasteners:
  - 1. Cadmium or chromium plated steel screws for securing lead louvers.
  - 2. Standard steel drill screws, ASTM C1002, with lead washers for application of lead lined sheet materials to metal studs and attach washers in accordance with shielding manufacturer's instructions.
  - 3. Nails:
    - a. Use barbed lead head nails for application of lead lined materials to wood furring strips.
    - b. Long enough to penetrate furring strips not less than 25 mm (one inch).
    - c. Cast-lead head sufficiently thick to equal lead shielding of room provided.
- H. Lead Discs: Same thickness as lead lining, diameter 25 mm (1 inch) larger than fastener.

## 2.2 FABRICATION

- A. General: Lead lining of frames, doors and other items occurring in partitions shall provide an X-ray absorption equivalent to that of partitions in which they occur.
- B. Clearance between Doors and Frames and Floors:
  - 1. Jambs and Heads: A maximum 3 mm (1/8 inch) clearance.
  - 2. Bottom of door to finish floor: Maximum 19 mm (3/4 inch) clearance.
- C. Lead Lined Wood Doors:
  - 1. Flush veneered construction.
  - 2. Construct doors of two separate solid wood cores with a single sheet of lead lining through center.
  - 3. Doors shall have filler strips, crossbanding, face veneers and hardwood edge strips, all glued together with unextended urea resin glue applied under heavy pressure.
  - 4. Extend sheet lead lining to all door edges, providing X-ray absorption equal to partition in which door occurs.
  - 5. Fasten wood cores together with either countersunk steel bolts through lead with bolt heads and nuts covered with poured lead, or with poured lead dowels.
  - 6. Bolts or dowels shall be located 38 mm (1-1/2 inches) from door edges, and at not more than 200 mm (8 inches) on center in each direction over door area.
  - 7. Finish face of dowels and lead covering of bolt heads and nuts flush with wood cores.
  - 8. Edge strips:
    - a. Same species of wood as face veneer.
    - b. Minimum thickness of edge strips shall be 38 mm (1-1/2 inches) at top edge and 63 mm (2-1/2 inches) at bottom edge.
    - c. Glue strips to cores before face veneer is applied.
    - d. Extend vertical edge strips full height of door and bevel 3 mm (1/8 inch) for each 50 mm (two inches) of door thickness.
    - e. Give top and bottom edges of doors to receive transparent finish two coats of water resistant sealer before shipment to site.
  - 9. Crossbanding of hardwood:
    - a. Not less than 2 mm (1/12 inch) thick and face veneer not less than 1 mm (1/28 inch) thick, after sanding.
    - b. When straight grain stock such as Basswood, Aspen or Poplar is used for crossbanding, thickness may be 1.6 mm (1/16 inch) in lieu of 2 mm (1/12 inch).

10. Face veneers and finish of wood doors shall be as indicated on Drawing sheet IN-601, FINISH SCHEDULE.
  - a. Refer to Section 08 14 00, INTERIOR WOOD DOORS for veneer species grade and assembly of face veneers.
  - b. Use identical face veneer on both sides of door.
11. Secure glass panels with hardwood stops of same species as face veneer. Glue stops to doors on corridor side and fasten with countersunk ovalhead screws on room side. Finish edge of stop flush with face veneer.

D. Hardware:

1. Hardware for doors is specified in Section 08 71 00, DOOR HARDWARE.
2. Stagger bolts to door pulls on plates which penetrate lead lining relative to opposite plate and recess on side of door opposite pull.
3. Provide lead plugs or discs over recessed nut ends of such bolts, unless otherwise shown.
4. Nut ends of bolts for surface applied hinges, door closures, and automatic door operators shall be countersunk and covered with lead lined 16 gage stainless steel pans.
5. Provide round head screws with dull chromium plated finish to secure stainless steel pans.
6. Make recesses for lock and latch cases at mill and line with lead butted tightly to lead in door.
7. Make total thickness of sheet lead used for lining hardware, equivalent to thickness of sheet lead core of door.
8. Protection and installation of doors and hardware is specified in Section 08 11 13, HOLLOW METAL FRAMES, Sections 08 14 00, INTERIOR WOOD DOORS, Section 08 71 00, DOOR HARDWARE.

E. Lead Lining of Frames:

1. Line or cover steel frames, stops for doors, and corner type control windows with sheet lead.
2. Install sheet lead free of waves, lumps and wrinkles with as few joints as possible.
3. Make joints in sheet lead to obtain X-ray absorption equivalent to adjacent sheet lead. Finish joints smooth and neat.
4. Hollow metal door frames for lead lined doors are specified in Section 08 11 13, HOLLOW METAL FRAMES.

F. Thresholds:

1. Provide stainless steel expansion bolt fasteners as detailed.

**PART 3 - EXECUTION****3.1 LEAD LINED GYPSUM BOARD PANELS**

- A. Apply lead lined gypsum board to metal studs as shown.
- B. Predrill or drill pilot holes for screws as necessary to prevent deformation of the fastener and lead shielding and to prevent distortion of the wallboard.
- C. Apply wallboard vertically with lead linings placed next to supports.
- D. Install sheet lead strips behind joints not less than the thickness used for the wallboard.
  - 1. Lead Strips: 45 mm (1-3/4 inches) wide, except at corner joints, 45 mm by 45 mm (1-3/4 by 1-3/4 inch) lead angles shall be used.
  - 2. Secure the lead strips to supports at outer edges of strips.
- E. Wallboard:
  - 1. Fastened to supports with screws and lead washers or discs at approximately 250 mm (ten inches) on centers.
  - 2. Make provisions for connection with lead lined door frames and for cutouts for vision panels.
  - 3. Joint treatment of lead lined gypsum board panels and fastening depressions shall be as specified for wallboard in Section 09 29 00, GYPSUM BOARD.
- F. Ceiling Installation:
  - 1. All penetrations and joints between lead lined gypsum board panels are to be properly shielded with the same techniques as on wall partitions.
  - 2. Ceiling framing to be 12" on center for support and to prevent sagging.
  - 3. All penetrations must be properly backed with lead of same thickness as in ceiling with proper overlaps. Lead lined access panels to be installed where required to provide continuous radiation protection.

**3.2 SUPPLEMENTAL LEAD SHIELDING**

- A. Line or cover penetrations of wall lead, pipe chases, columns fasteners and elsewhere where shown with sheet lead. Install sheet lead free of waves, lumps and wrinkles and with as few joints as possible. Joints in sheet lead shall provide X-ray absorption equivalent to adjacent sheet lead finished smooth and neat.
- B. Where plaster finish is required over columns or other vertical surfaces covered with sheet lead, drive bolts or other fasteners securing the sheet lead to backing surface half way, and wrap an 18 gage stainless steel tie wire around fasteners. Both ends of each tie wire shall be of sufficient length so that when fastener is fully driven, fastening of

metal lath may be accomplished. Locate fasteners not over 400 mm (16 inches) on centers both ways and cover heads with lead strips or discs if washers are not used.

- C. Provide sufficient lead shielding for spaces around outlet boxes, junction boxes, film illuminators, and pipes, to obtain a net radiation protection at these spaces equaling net radiation protection specified for wall or partition in which they occur.

### 3.3 SIGNS: FURNISH SIGNS AS FOLLOWS:

- A. One for each surface insulated with sheet lead as indicated in the drawings, and lettered as follows:

THIS SURFACE OF THIS ROOM HAS BEEN INSULATED WITH SHEET LEAD OF THE FOLLOWING THICKNESS TO A HEIGHT OF 2100 mm (7 FEET) ABOVE FLOOR SLAB:

	TOTAL LEAD THICKNESS	EQUIVALENT PROTECTION
DOORS AND FRAMES - - - -	_____ mm	_____ mm
PARTITIONS - - - - - - -	_____ mm	_____ mm
FLOORS - - - - - - - - -	_____ mm	_____ mm
CEILINGS - - - - - - - -	_____ mm	_____ mm

- B. One for each lead insulated partition in a room in which not all partitions are insulated, located on partition and lettered as follows:

THIS PARTITION HAS BEEN INSULATED TO HEIGHT OF \_\_\_\_\_ FEET WITH SHEET LEAD OF \_\_\_\_\_ mm THICKNESS, PROVIDING A TOTAL LEAD EQUIVALENT PROTECTION OF \_\_\_\_\_ mm.

- C. One for door to which only the door is insulated, lettered as follows:

THIS DOOR HAS BEEN INSULATED WITH SHEET LEAD OF \_\_\_\_\_ mm THICKNESS, PROVIDING A TOTAL LEAD EQUIVALENT PROTECTION OF \_\_\_\_\_ mm.

- D. Signs:

1. Heavy white paper or cardboard.
2. Height of lettering and number not less than 3 mm (1/8 inch).
3. Fill in blank spaces on signs with mm thickness of lead as installed and total mm thickness of lead equivalent (determined by VA Physicist) and height of such insulation where required.
4. Mount in stainless steel or extruded aluminum frames (with acrylic plastic, 3 mm (1/8 inch) thick over sign) and fasten with suitable screws, one to each corner of each frame.
5. Provide manufacturer's standard stainless steel frame, to hold card size 100 mm by 150 mm (four by six inches).

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