VA PALO ALTO HEATH CARE SYSTEM

RENOVATE BUILDING 7 FOR SPINAL CORD INJURY

1ST FLOOR BUILDING 7

PALO ALTO, CA

DVA PROJECT NO. 640-14-123P
FCA PROJECT NO. 388

100% CONSTRUCTION DOCUMENTS

SPECIFICATIONS
VOLUME 1

Garavaglia Architects/Fong & Chan Architects
November 14th, 2016

DEPARTMENT OF VETERANS AFFAIRS
VHA MASTER SPECIFICATIONS

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SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL INTENTION

A. Contractor shall completely prepare site for building operations, including demolition and removal of portions of existing structures, and furnish labor and materials and perform work for VA Palo Alto Health Care Services Post Traumatic Stress Diagnosis Expansion and Renovation, and Pharmacy, as required by drawings and specifications.

B. Visits to the Site by Bidders: N/A.

C. VA Contacts: Department of Veterans Affairs, Office of Construction and Facilities Management (CFM), Office of Facilities Planning and Development (OFPD).

1. Contracting Officer's Representative (COR).
2. Safety Officer.
3. Safety Specialist/Point of Contact.
4. Green Environment Management Service Coordinator (GEMS).
5. Chief, Engineering Service.
6. Construction Manager: TBD.

D. Before placement and installation of work subject to tests by testing laboratory, the Contractor shall notify the COR in sufficient time to enable VA personnel to be present at the time for adequate oversight of the taking and testing of specimens and field activities. Such prior notice shall be not less than three work days unless otherwise designated by the COR.

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. COR will assign specific routes and times for pathways, corridors and elevators for transportation of personnel, materials and equipment. Contractor shall continually clean up any dust, dirt or debris caused by jobsite ingress/egress.

G. Dust and fume control shall be exercised during all construction operations. Workers shall be careful not to operate any vehicles, gas or diesel engines, or to perform any fume or dust generating process near a building air intake system. Noise shall be held to a minimum at all times. Jack-hammering, core drilling and other noisy or disturbing operations may have to be rescheduled or accomplished after hours to avoid interfering with surgery or patient care services.

H. VHA Directive 2011-36, Safety and Health during Construction, dated 9/22/2011 in its entirety is made a part of this section

1.2 STATEMENT OF BID ITEM(S)

A. ITEM I, GENERAL CONSTRUCTION: Work includes general construction, alterations, and necessary removal of existing structures and construction and certain other items.

1.3 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

A. AFTER AWARD OF CONTRACT, specifications and drawings will be available for download from link provided by COR.

B. The Contractor shall maintain on the job site one (1) printed set of specifications, one (1) printed set of drawings, one (1) printed copy of all RFI's and any documents that modify the original specifications and drawings.

1.4 **ACCIDENT PREVENTION**

A. Refer to 01 35 26 Safety Requirements Section 1.04

1. Avoid interruptions of Government operations and delays in project completion dates;

B. Whenever the Contracting Officer becomes aware of any noncompliance with safety requirements or any condition which poses a serious or imminent danger to the health or safety of personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

C. Contractor shall the above clause with appropriate changes in the designation of the parties in subcontracts.

1.5 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 sub-contractors working on the project and their employees also comply with these regulations.

B. Security Procedures:

1. Contractor and subcontractor employees shall not enter the project site without appropriate badge. They will be subject to inspection of their personal effects when entering or leaving the project site.

2. Contractor shall Employee Daily Log of all personnel working on the site. The Employee Daily Log shall contain the employee's (a) Full Name, (b) Employer/Company Name and (c) Occupation/Trade. The Employee Daily Log shall be submitted with the Contractor's Daily Work Report.

3. Due to noise considerations, work on the project shall be performed between 9:00 am and 4:00 pm Monday through Friday, excluding National Holidays, unless approved in writing by the Contracting Officer. For working outside these hours, the Contractor shall give two weeks' notice to the Contracting Officer's Representative so that oversight, security and escort arrangements can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this specification (see Section 02 41 00 "Demolition").

4. No photography of VA premises is allowed without written permission of the VA Public Affairs Officer. Submit request to COR.

5. VA Police are Federal Police Officers with full authority to make arrests, investigate crimes and issue traffic citations. Citations issued require an appearance in the Federal District Court and/or payment of a fine. Speed limits and other driving and parking codes are strictly enforced. Any vehicle left unattended for more than a few minutes may be cited by the VA Police.

6. Sexual harassment is strictly prohibited. This includes deliberate or unsolicited verbal comments or gestures of a sexual nature, unwelcome sexual advances, requests for sexual favors and/or other unwelcome verbal or physical conduct of a sexual nature.

7. Possession or use of non-prescription drugs or alcohol, including beer and wine, on the Health Care System grounds is strictly prohibited. Possession of firearms, knives with blades over 4", ammunition, explosive devices and any item that may be considered an offensive weapon is strictly prohibited. This includes carrying such items in vehicles.

8. Health Care System does not have equipment, facilities, or personnel trained to handle serious injuries. Call 911 for emergency medical assistance and notify the Contracting Officer's Representative and the VA Police.

9. Vehicle authorization requests shall be required for any vehicle entering the site and such requests 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. Separate permits shall be issued for Contractor and subcontractor employees for parking in designated areas only.

10. 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 or local disaster. The Contractor may return to the site only with the written approval of the COR.

C. Guards: NOT USED

D. Key Control:

1. Contractor shall provide duplicate keys and lock combinations to the COR for the purpose of security inspections of every area of project including tool boxes and parked machines.

2. Contractor shall turn over all permanent lock cylinders to the VA locksmith for permanent installation. See Section 08 71 00, DOOR HARDWARE and coordinate.

E. Document Control:

1. Before starting any work, the General Contractor/Sub Contractors shall submit an electronic security memorandum describing the approach to following goals and maintaining confidentiality of "Sensitive Information".

2. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information. This information shall be shared only with those with a specific need to accomplish the project.

3. Certain documents, sketches, videos or photographs and drawings may be marked "Law Enforcement Sensitive" or "Sensitive Unclassified". Secure such information in separate containers and limit the access to only those who will need it for the project. Return the information to the COR upon request.

4. These security documents shall not be removed or transmitted from the project site without the written approval of COR.

5. All paper waste or electronic media hall be shredded, destroyed or erased in a manner acceptable to the VA.

6. Notify COR and Site Security Officer immediately when there is a loss or compromise of "Sensitive Information".

7. All electronic information shall be stored in specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).

   a. Security, access and maintenance of all project drawings, both scanned and electronic shall be performed and tracked through the EDMS system.

   b. "Sensitive information" including drawings and other documents may be attached to e-mail provided all VA encryption procedures are followed.

F. 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. Separate permits shall be issued for Contractor and its employees for parking in designated areas only.

1.6 FIRE SAFETY

A. Refer to 01 35 26 Safety Requirements Section 1.13.

B. When work requires removal of any ceiling tiles for more than 4 hours in a 24-hour period in areas protected by a fire sprinkler system where the sprinkler heads are made less effective by space above the ceiling exceeding 18 inches, temporary provision shall be made for supplemental heat detectors with annunciation capability to the building/campus fire alarm system. Programmed wireless heat detector sensors (Honeywell #5809 or equal) with associated receiver (Honeywell #5881 or equal) and control panel (Honeywell Vista-20P or equal) are acceptable. Tie-in of the control panel to the building/campus fire alarm system will be made by the VA. Fifteen (15) days advance notice shall be given to the VA for scheduling the tie-in.

C. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Welding, cutting metal or other burning or spark producing operations will require a hot work permit. Welding and/or burning operations are allowed only during normal working hours. Coordinate with COR to obtain permits from Facility Safety Officer at least 24 hours in advance of work. Evidence of training of all personnel assigned to be a fire watch shall be provided before Hot Work Permits will be issued. A fire watch is required for all hot work unless specified differently on the permit. The fire watch shall have fire extinguishing equipment readily available and be trained in its use and be familiar with facilities for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish then otherwise sound the alarm. A fire watch shall be maintained for at least 30 minutes after completion of hot work.

D. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily. Waste and debris shall not be disposed of on station or in VA trash containers or dumpsters. The Contractor shall provide their own bin or dumpster; however, the use and location of such must be approved in writing by the Contracting Officer’s Representative. Construction waste and debris shall not be accumulated in corridors or other building areas where it might cause a fire or safety hazard.

E. Smoke/Fire Barrier Penetrations: Penetrations to smoke or fire barrier walls, ceilings or floor slabs shall be properly sealed immediately with Hilti Fire Stop 601 or 635 for walls and ceilings and Hilti Fire Stop 657 for floor penetrations or approved equal.

1.7 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 COR. 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. Staging area is noted on site plan in this specification.

B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the COR 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 COR, the buildings and utilities may be abandoned and need not be removed.

C. The Contractor shall, as prescribed by the COR, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the COR. 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.

D. Working space and space available for storing materials shall be as determined by the Project Engineer. See site plan attached to this specification section for tentative material storage location. See 'Construction Fence' section within this specification for fence requirements.

E. Workmen are subject to rules of VA Campus applicable to their conduct.

F. Execute work in so as to interfere as little as possible with normal functioning of the VA Campus as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others.

   1. Do not store materials and equipment in other than assigned areas.

   2. Schedule delivery of materials and equipment to immediate construction working areas within buildings in use by VA in quantities sufficient for not more than two work days. Provide unobstructed access to VA Campus areas required to remain in operation.

G. Utilities Services: Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing pipes, electrical wires, conduits, cables, etc., of utility services, or of fire protection systems or communications systems, they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by COR. All such actions shall be coordinated with the Utility Company involved.

H. Construction Fence: Before construction operations begin, Contractor shall provide a chain link construction fence, six-foot minimum height, around the construction area, material storage areas and dumpsters/waste locations. Contractor shall provide and maintain visual screening fabric for all fencing. Contractor shall provide gates as required for access with necessary hardware including hasps and locks. All gates shall be locked when no workers are present. Contractor shall coordinate with the COR to assure VA access at any time. Contractor shall remove the fence when directed by Contracting Officer's Representative.

   1. Contractor shall place all applicable safety signs as required by 29 CFR 1926, securely attached to fence or approved surface. Contractor shall also place construction area signs on the exterior of the construction fence alerting campus and contractor personnel that the fence is enclosing a construction area. Sign shall indicate Construction Area, Authorized Personnel Only, Hard Hats and safety shoes required - Spacing of signs shall not exceed 50' on center, with a minimum of one safety sign on each direction of fence.

I. Work areas will be vacated by Government and turned over to Contractor after date of Notice to Proceed and after all pre-construction activities have been completed and pre-construction submittals have been approved by the Contracting Officer’s Representative.

J. 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 (VA or municipal) whichever will be required to respond to an alarm from Contractor's employee or watchman.

K. Utilities Services: Maintain existing utility services for the VA Campus atall times.

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 Contracting Officer’s Representative. 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 Contracting Officer’s Representative 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 or systems to Contracting Officer’s Representative, in writing, six (6) weeks in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption. Approved outage dates are not guaranteed and are subject to VA operational requirements.

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 the VA. Interruption time approved by Contracting Officer’s Representative may occur at other than Contractor's normal working hours.

4. In case of a contract construction emergency, service will be interrupted on approval of Contracting Officer’s Representative. Such approval will be confirmed in writing as soon as practical.

5. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service connection to the construction project, for such items as water, sewer, electricity or gas, payment of such fee shall be paid by the Contractor unless specifically relieved in writing by the Government.

L. Abandoned Lines: 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. 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 they are completely behind the finished surfaces.

M. To minimize interference of construction activities with flow of VA Campus traffic, comply with the following:

1. Contractor shall not block any road or street, walkway or building egress without requesting approval from the Contracting Officer’s Representative. Submit written request two (2) weeks prior to proposed blockage. 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. Wherever excavation for new work crosses existing roads, at least one lane must be open to traffic at all times.

2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the Contracting Officer’s Representative.

N. Coordinate this contract with other construction operations as directed by Contracting Officer’s Representative. This includes the scheduling of traffic and the use of roadways.

1.8 ALTERATIONS

A. Survey: Before any work is started, the Contractor shall make a thorough survey with the COR of areas of buildings in which alterations occur and areas which are anticipated routes of access, and furnish a signed report to the COR. 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 building.

2. Existence and conditions of items such as plumbing fixtures and electrical fixtures, equipment, signage, etc., 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 COR.

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 COR 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 COR together shall make a thorough re-survey of the areas of buildings involved. They shall furnish a report on conditions 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.

1.9 INFECTION PREVENTION MEASURES

A. Refer to 01 35 26 Safety Requirements Section 1.12 & 1.13.

B. Implement the requirements of VA’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.

C. 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 . Prior to start of work, prepare a plan detailing project-specific dust protection measures, including periodic status reports, and submit to COR and Facility ICRA team for review for compliance with contract requirements.

1.10 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 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 COR.

2. Items not reserved shall become property of the Contractor and be removed by Contractor.

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.

4. Contractor is required to alert VA immediately in the event any known or suspected hazardous materials are disturbed or will need to be disturbed before proceeding with work. Hazardous materials, such as PCB’s, asbestos, lead paint, cleaning solutions and other harmful chemicals shall be disposed of in accordance with federal, state and local laws and regulations. In case of an accidental spill of hazardous materials, the Contractor shall take immediate action to contain the spill and notify the Contracting Officer’s Representative. Washing cement, plaster, paint, oil or grease, solvents, etc. into any drains is strictly prohibited. **REPORT ANY ACCIDENTAL SPILLS THAT MAY RUN INTO STORM DRAINS IMMEDIATELY TO ENGINEERING SERVICE AT EXTENSION 62468.**

5. Contractor shall provide a 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 per SECTION 01 74 19 CONSTRUCTION WASTE MANAGEMENT.

1.11 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS

A. The Contractor shall preserve and protect all structures, equipment, and vegetation on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer’s Representative.

B. The Contractor shall protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the COR may have the necessary work performed and charge the cost to the Contractor.

1.12 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 COR. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the COR 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.

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).

1.13 PHYSICAL DATA

A. Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor. (FAR 52.236-4)

1.14 LAYOUT OF WORK

A. The Contractor shall lay out the work and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at Contractor's own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the COR. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the COR until authorized to remove them. If such marks are destroyed by the Contractor or through Contractor's negligence before their removal is authorized, the COR may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor. (FAR 52.236-17)

1.15 AS-BUILT DRAWINGS

A. The contractor shall maintain one full size set 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 COR's review, as often as requested.

C. Contractor shall deliver electronic CAD files of approved, completed as-built drawings to the COR within 15 calendar days after each completed phase and after the acceptance of the project by the COR.

1.16 USE OF ROADWAYS

A. For hauling, use only established public roads and roads on VA Campus and, when authorized by the Contracting Officer’s Representative, 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 transitions.

1.17 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 COR. If the equipment is not installed and maintained in accordance with the following provisions, the COR 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. Boilers, pumps, feedwater heaters and auxiliary equipment must be operated as a complete system and be fully maintained by operating personnel. Boiler water must be given complete and continuous chemical treatment.

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.

1.18 EXCLUSIVE TEMPORARY USE OF EXISTING ELEVATORS

A. Exclusive use of existing elevators for handling building materials and Contractor's personnel will be permitted subject to following provisions:

1. Contractor shall coordinate all arrangements with the Contracting Officer’s Representative for use of elevators. The Contracting Officer’s Representative will ascertain that elevators are in proper condition. Personnel for operating elevators will not be provided by the Department of Veterans Affairs.

2. 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.

3. Government will accept hoisting ropes of elevator and rope of each speed governor if they are worn under normal operation. However, if these ropes are damaged by action of foreign matter such as sand, lime, grit, stones, etc., during temporary use, they shall be removed and replaced by new hoisting ropes.

4. If brake lining of elevators are excessively worn or damaged during temporary use, they shall be removed and replaced with 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’s Representative.

1.19 TEMPORARY TOILETS

A. Provide where directed, (for use of all Contractor and subcontractor employees) ample temporary sanitary toilet accommodations with suitable sewer and water connections; or, when approved by COR, 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.

1.20 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 COR, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of electricity used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated equipment.

C. Contractor shall install meters at Contractor's expense and furnish the COR a monthly record of the Contractor's usage of electricity as required.

D. 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.

E. Electricity (for Construction and Testing): Furnish all temporary electric services.

1. Obtain electricity by connecting to the VA Campus 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.

F. Water (for Construction and Testing): Furnish temporary water service.

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 COR's discretion) of use of water from Medical Center's system.

G. Fuel: Natural and LP gas and burner fuel oil required for boiler cleaning, normal initial boiler-burner setup and adjusting, and for performing the specified boiler tests will be furnished by the Government. Fuel required for prolonged boiler-burner setup, adjustments, or modifications due to improper design or operation of boiler, burner, or control devices shall be furnished by the Contractor at Contractor's expense.

1.21 NEW TELEPHONE EQUIPMENT

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

1.22 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 COR. 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, 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.

1.23 INSTRUCTIONS

A. Contractor shall furnish Maintenance and Operating manuals (hard copies and electronic) and verbal instructions when required by the various sections of the specifications and as hereinafter specified.

B. Manuals: Maintenance and operating manuals and one compact disc (four hard copies and one electronic copy each) for each separate piece of equipment shall be delivered to the COR 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.

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 COR and shall be considered concluded only when the COR 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 COR, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

1.24 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 COR 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 COR with a written statement as to its condition or shortages.

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

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.

1.25 RELOCATED EQUIPMENT AND ITEMS

A. Contractor shall disconnect, dismantle as necessary, remove and reinstall in new location, all existing equipment and items indicated by symbol "R" or otherwise shown to be relocated by the Contractor.

B. Perform relocation of such equipment or items at such times and in such a manner as directed by the COR.

C. 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.

1.26 CONSTRUCTION SIGN

A. At each project site, provide a Construction Sign where directed by the Contracting Officer’s Representative. All wood members shall be of framing lumber. Cover sign frame with 24 gage galvanized sheet steel nailed securely around edges and on all bearings. Provide three 4 inch by 4 inch posts or equivalent round posts set four feet into ground. Set bottom of sign level at three feet above ground and secure to posts with through bolts. Make posts full height of sign. Brace posts with two by four inch material. Minimum sign size shall be 48”x48”.

B. Paint all surfaces of sign and posts two coats of white gloss paint. Border and letters shall be of black gloss paint, except project title which shall be blue gloss paint.

C. Maintain sign and remove it when directed by the Contracting Officer’s Representative.

D. Detailed drawing of proposed construction sign showing required legend and other characteristics of sign will be available from Contracting Officer’s Representative.

E. Construction sign shall also be posted at each construction site entrance door.

1.27 SAFETY SIGN

A. Provide a Safety Sign where directed by COR. Face of sign shall be 19 mm (3/4 inch) thick exterior grade plywood. Provide two 100 mm by 100 mm (four by four inch) posts extending full height of sign and 900 mm (three feet) into ground. Set bottom of sign level at 1200 mm (four feet) above ground. Safety signs to be installed adjacent to each construction sign location indicated in Article "Construction Sign".

B. Paint all surfaces of Safety Sign and posts with one prime coat and two coats of white gloss paint. Letters and design shall be painted with gloss paint of colors noted.

C. Maintain sign and remove it when directed by COR.

D. Detailed drawing of safety sign showing required legend and other characteristics of sign will be available from Contracting Officer’s Representative.

E. Post the number of accident free days on a daily basis.

1.28 PHOTOGRAPHIC DOCUMENTATION

A. Contractor to provide digital photographic exhibit of existing site and work performed. Digital color photos shall be taken from a digital camera with a minimum of 7.0 megapixels. Photos shall be transmitted to the COR by DVD in jpeg or tiff, and PDF formats. Each photo’s electronic file size shall be a minimum of 300k with a maximum file size of 1.5meg.

B. Photos shall document all phases of construction and shall be updated weekly until the project has been completed. Photos shall be submitted each month along with the project invoice for monthly payment.

1.29 FINAL ELEVATION Digital Images

A. NOT USED

1.30 HISTORIC PRESERVATION

A. Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised of or discover any possible archeological, historical and/or cultural resources, the Contractor shall immediately notify the COR verbally, and then with a written follow up.

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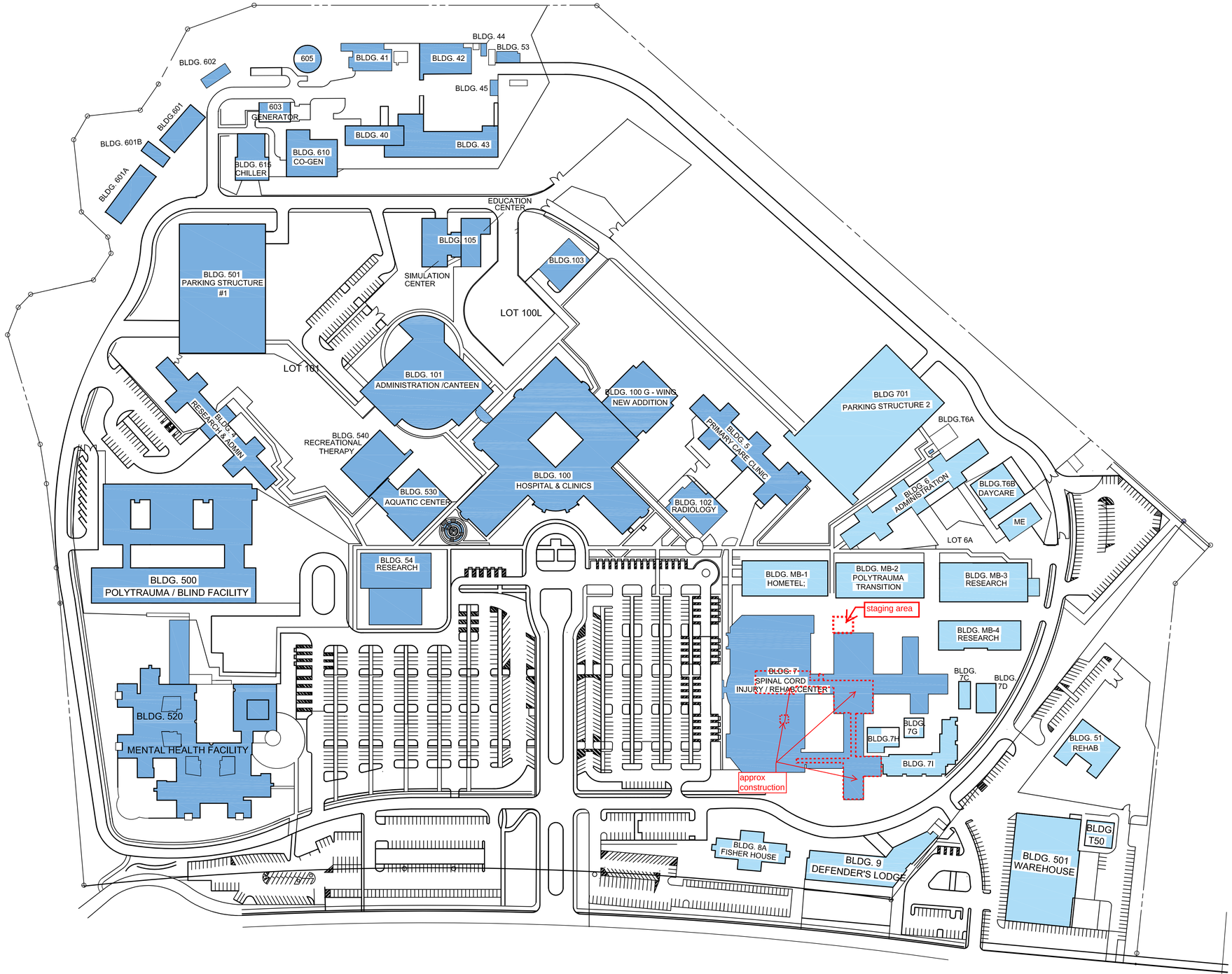
PALO ALTO DIVISION



SITE PLAN - no scale

RENOVATE BUILDING 7 FOR SPINAL CORD INJURY

SECTION 01 00 10

CONTRACTOR QUALITY CONTROL (CQC)

PART 1 - GENERAL

1. REFERENCES

VA Master Specs, subject RFP, and any resultant Contract.

2. PAYMENT

Separate payment will not be made for providing and maintaining an effective Contractor Quality Control (CQC) Program. All costs are included in the contract price.

PART 2 - DELIVERABLES

2. Contractor Quality Control (CQC) Plan, to include VA and Project specific Safety and Infection Control Requirements.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

a. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clauses, Terms, Conditions, Drawings, Technical Specification Sections, and this particular Technical Specification Section. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence.

b. The Site Project Superintendent (SPS) will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The Site Project Superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The Site Project Superintendent (SPS) shall maintain a physical presence at the site, at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

3.2 CQM TRAINING REQUIREMENT

Before project design (Design-Build) or project construction (Design-Bid-Build) begins, the Contractor’s Quality Control Manager is required to have completed any training or attendance as required by this RFP and any resultant contract.

3.3 CONTRACTOR QUALITY CONTROL (CQC) PLAN

The Contractor shall furnish CQC Plan for review and approval by the Government not later than PCC/NTP Issue Date. Plan shall be submitted electronically simultaneously both to the Contracting Officer (CO) and to the Contracting Officer's Technical Representative (COTR). The plan shall identify personnel, procedures, control, instructions, records, and forms to be used in accordance with terms, conditions, technical drawings, and technical specifications.

3.3.1 CONTENT OF CQC PLAN

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and off-site, including work by subcontractors, fabricators, suppliers and purchasing agents:

A. Description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the home office Project Manager (PM). One person may serve both roles. If so, that person shall report directly to Owner/CEO of SDVOSB Prime Contractor. One person may serve both of these roles and functions. If so, this person will report directly to the owner / president of the SDVOSB firm. All of them shall coordinate continuously with SPS to ensure project is completed on time and within budget.

B. The name, qualifications, duties, responsibilities, and authorities of each person assigned a CQC function.

C. Copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.

D. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, consultants, and purchasing agents. These procedures shall be in accordance with terms, clauses, conditions, drawings, and technical specifications of any resultant contract.

E. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test.

F. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

G. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures

shall establish verification that identified deficiencies have been corrected.

H. Procedures for reporting, including proposed reporting formats.

I. List of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the Pre-Construction Conference (PCC).

3.3.2 Additional Requirements for Design Quality Control (DQC) Plan (Design-Build Contracts only)

(Solicitation is not Design – Build, and, therefore, this Paragraph 3.3.2 is not applicable.)

The following additional requirements apply to the Design Quality Control

(DQC) plan:

The Contractor shall provide and maintain a Design Quality Control (DQC) Plan as an effective quality control program which will assure that all services required by this design contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, all documents shall be technically reviewed by competent, independent reviewers identified in the DQC Plan. The same element that produced the product shall not perform the independent technical review (ITR). The Contractor shall correct errors and deficiencies in the design documents prior to submitting them to the Government.

The Contractor shall include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific contract period. This should be at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. The schedule shall include review and correction periods associated with each item. This should be a forward planning as well as a project monitoring tool. The schedule reflects calendar days and not dates for each activity. If the schedule is changed, the Contractor shall submit a revised schedule reflecting the change within 7 calendar days. The Contractor shall include in the DQC Plan the discipline-specific checklists, approved by the Contracting Officer and COTR to be used during the design and quality control of each submittal. These completed checklists shall be submitted at each design phase as part of the project documentation.

The DQC Plan shall be implemented by an Design Quality Control Manager who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated. This individual shall be a person who has verifiable engineering or architectural design

experience and is a registered professional engineer or architect. The Contractor shall notify the Contracting Officer, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

The Contracting Officer will notify the Contractor in writing of the acceptance of the DQC Plan. After acceptance, any changes proposed by the Contractor are subject to the acceptance of the Contracting Officer.

End of DQC 3.3.2 section.

3.3.3 ACCEPTANCE OF CQC PLAN

A. Acceptance of the Contractor’s plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction.

B. The Government reserves the right to require the Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.3.4 NOTIFICATION OF CHANGES

A. Notification of Changes. After acceptance of the CQC plan, the Contractor shall notify the Contracting Officer in writing a minimum of fourteen (14) calendar days prior to any proposed change, including personnel.

B. Proposed changes, including personnel, are subject to review and approval by the Contracting Officer.

3.3.5 COORDINATION MEETING

A. The CQC Plan shall be submitted for review a minimum of 5 calendar days prior to the Pre-Construction Conference (PCC) Meeting. It shall be submitted both to the CO and to the COTR electronically simultaneously.

B. During the PCC meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both on-site and off-site work, and the interrelationship of Contractor’s Management and control with the Government’s Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer as part of the PCC minutes. The minutes shall become a part of the contract file.

C. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures, which may require corrective action by the Contractor.

D. Notice To Proceed (NTP) shall not be issued until plan is approved by CO.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

A. The requirements for the CQC organization are a CQC System Manager, and sufficient number of additional qualified personnel to ensure safety and contract compliance. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer.

B. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

A. This individual is subject to the review and approval of the Contracting Officer.

B. The Contractor shall identify an individual within his organization at the site of the work who shall be responsible for overall management of the CQC and have the authority to act in all CQC matters for the Contractor.

C. The CQC system manager shall be a graduate engineer, graduate architect, or a graduate construction manager, with experience on construction projects similar in size, scope, and complexity to this contract, OR, a construction person with a minimum of three (03) years experience on construction projects similar in size, scope, and complexity to this contract.

D. The CQC System Manager shall be on the site to the extent necessary as determined by the Contracting Officer during construction and shall be employed by the Contractor. The CQC System Manager may also serve as home office Project Manager. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the CQC system manager’s absence. The requirements for the alternate will be the same as for the designated CQC manager.

3.4.3 Additional Requirement

N/A

3.4.4 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the COTR for recommendations and to the Contracting Officer for final review and approval.

3.5 SUBMITTALS AND DELIVERABLES

Submittals shall be made as specified in Section 013323 Shop Drawings, Product Data, and Samples. The CQC organizational elements shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

A. Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract.

B. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of the construction work as follows:

3.6.1 Preparatory Phase

A. This phase shall be performed prior to beginning work on each definable feature of work, after all required documents and materials are reviewed, approved and accepted by the Contracting Officer, and after copies are at the work site. This phase shall include:

B. Review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards, in the English language unless specifically approved otherwise by the Contracting Officer, applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.

C. Review of the contract drawings.

D. Review to ensure that all materials and/or equipment have been tested, submitted, and approved.

E. Review to ensure that provisions have been made to provide required control inspection and testing.

F. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

G. Physical examination of required materials, equipment, and sample work to verify that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

H. Reviews of the appropriate activity hazard analysis to ensure safety requirements are met.

I. Discussion of procedures for constructing the work including repetitive deficiencies, construction tolerances and workmanship standards for that feature of work.

J. Review to ensure that the Contracting Officer has accepted the portion of the plan for the work to be performed.

K. Discussion of the initial control phase.

L. The Government shall be notified at least 24 hours in advance of beginning any of the required action of the preparatory phase. This phase shall include a meeting conducted by the CQC system manager, PM, SPS, and other CQC personnel as applicable for the definable feature.

M. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC system manager and attached to the daily QC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase.

A. This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

B. Review of preliminary work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.

C. Verification of full contract compliance. Verification of required control inspection and testing.

D. Establishment of level of workmanship. Verification that it meets minimum acceptable workmanship standards. Compare with sample panels as appropriate.

E. Resolution of all differences.

F. Review of safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

G. Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC system manager and attached to the daily QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

H. Initial phase should be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase.

Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The checks shall be made a matter of

record in the CQC documentation. Final follow-up checks shall be conducted, and all noted deficiencies corrected, prior to the start of additional features of work that may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases may be required by the Contracting Officer on the same definable features of work if the quality of on-going work is unacceptable; if there are changes in the applicable QC staff or in the on-site production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

A. The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product that conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Costs incidental to the transportation of samples or materials shall be borne by the Contractor.

B. Testing includes operation and/or acceptance tests when specified. A list of tests to be performed shall be furnished as a part of the CQC plan. The list shall give the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

1. Verification that testing procedures comply with contract requirements.

2. Verification that facilities and testing equipment are available and comply with testing standards.

3. Verification that test instrument calibration data meet certified standards.

4. Verification that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

5. Results of all tests taken, both passing and failing tests, shall be recorded on the Quality Control report for the date taken. Specification paragraph/item reference, location where tests were taken, and the sequential control number identifying the test will be given.

6. Actual test reports may be submitted later, if approved by the Contracting Officer, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the COTR.

7. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

A. Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION.

B. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

A. The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner.

B. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

A. The Contractor's Quality Control Manager, the SPS, and the COTR shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those Medical and Engineer leadership and customer groups, may also be in attendance.

B. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least fourteen (14) calendar days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection.

C. Failure of the Contractor to have all contract work acceptably

complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

A. The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

1. Contractor/subcontractor and their area of responsibility.

2. Operating plant/equipment with hours worked, idle, or down for repair.

3. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

4. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

6. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.

7. Offsite surveillance activities, including actions taken.

8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

9. Instructions given/received and conflicts in plans and/or specifications.

10. Contractor's verification statement.

B. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract.

C. The original and one copy of these records in report form shall be furnished to the Government daily within forty-eight (48) hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed, or unless weekly submission was established during the PCC.

D. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract.

E. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

In accordance with VA Master Specs, subject RFP, and any resultant Contract.

3.11 NOTIFICATION OF NON-COMPLIANCE

A. The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements.

B. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

C. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue a suspension of work (See RFP / Contract Clause FAR 52.242-14 -- Suspension of Work (Apr 1984)) halting all or part of the work until satisfactory corrective action has been taken by the Contractor and completed by the Contractor to the complete satisfaction
of the Government.

D. No part of the time lost due to such suspension of work shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement or accepted as a Change Order.

2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

Base Bid: General Construction: Selective renovation of existing building 7 on VA Palo Alto Health Care System campus. Construction of nursing support space, new inpatient and outpatient therapy gym, new upper extremity exam room in clinic, new patient apartment, new private and open offices supporting the spinal cord injury clinic program, and miscellaneous treatment areas. Scope of work is limited to interior renovations and minor hvac and electrical equipment scope as specified in the Drawings and Specifications.

A. Deductive Alternate No. 1: Existing Office Space to Remain. Same as Base Bid, except:

1. Perform no work in room F137

a. Disciplines Affected: Architectural, Mechanical, Plumbing, Electrical, IT, Fire Alarm, Fire Suppression.

b. Reference Drawings: AS-210, AF-210, QH-210, MD-210, MH-210, PP-210, ED-210, EL-210, EP-210, TND-210, TN-210, FAD-210, FA-210, FS-210.

B. Deductive Alternate No. 2: Existing Corridor Spaces to Remain. Same as Base Bid, except:

1. Existing corridors E-C08, C-C01, F-C015, F-C016 as shown to be included will remain. Patch to match existing finish materials damaged by demolition and new construction within and outside the project area.

   a. Disciplines Affected: Architectural, Mechanical, Plumbing, Electrical, IT, Fire Alarm, Fire Suppression.

   b. Reference Drawings: AS-210, AF-210, MD-210, MH-210, ED-210, EL-210, EP-210, TND-210, TN-210, FAD-210, FA-210.

C. Deductive Alternate No. 3: No Architectural Casework for Nurse Station. Same as Base Bid, except:

1. No architectural casework for nurse station D106 as shown included. Contractor to coordinate with VA hospital for plumbing, electrical, telecom, fire alarm, nurse call system and other related engineering works for future nurse station casework

   a. Disciplines Affected: Architectural, Mechanical, Plumbing, Electrical, IT, Fire Alarm, Fire Suppression.

   b. Reference Drawings: AS-240, AF-240, MD-240, MH-240, ED-240, EL-240, EP-240, TND-240, TN-240, FAD-240, FA-240.

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SECTION 01 3119
PROJECT MEETINGS

PART 1 - GENERAL

1.1 PRECONSTRUCTION CONFERENCE

A. Prior to commencement of Work, a preconstruction conference will be conducted by the Contracting Officer’s Representative to discuss procedures which are to be followed during performance of the Work.

B. Location: As designated by the Contracting Officer’s Representative.

C. Attending shall be:

1. Contracting Officer’s Representative.
2. Consultant Architect and his professional consultants.
3. Consultants' Representatives as appropriate.
4. Contractor.
5. Contractor's Superintendent.
6. Subcontractors, as appropriate.
7. Others, as appropriate.

1.2 BILLING MEETING

A. A billing meeting shall be conducted by the Contracting Officer’s Representative each month prior to submittal of the Application For Payment. Updated and accepted Project Record Documents shall be reviewed as conditions of Payment.

B. Location: As designated by the Contracting Officer’s Representative.

C. Attending shall be:

1. Contracting Officer’s Representative.
2. Consultant Architect and his professional consultants.
3. Consultants' Representatives as appropriate.
4. Contractor.
5. Contractor's Superintendent.
6. Subcontractors, as appropriate.
7. Others, as appropriate.

1.3 PROGRESS MEETING

D. During the course of construction, progress meetings will be held to discuss and resolve field problems every two weeks.

E. Location: As designed by the Contracting Officer’s Representative.

F. Attending shall be:

1. Contracting Officer’s Representative.
2. Consultant Architect and his professional consultants.
3. Consultants' Representatives as appropriate.

4. Contractor.
5. Contractor's Superintendent.
6. Subcontractors, as appropriate.
7. Others, as appropriate.

END OF SECTION

SECTION 01 32 16.15 - PROJECT SCHEDULE

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Contractor shall develop a plan and schedule demonstrating fulfillment of the contract requirements (Project Schedule). The Contractor shall keep the Project Schedule up-to-date and shall utilize it for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers).

1.2 CONTRACTOR'S REPRESENTATIVE

A. The Contractor shall designate an authorized representative responsible for the Project Schedule including preparation, review and progress reporting 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 contract.

1.3 SCHEDULES AND UPDATES

A. The contractor shall provide monthly, to the Contracting Officer’s Representative an updated Project Schedule.

B. The contractor shall be responsible for the correctness and timeliness of any updated Project Schedule and payment requests.

1.4 PROJECT SCHEDULE SUBMITTAL

A. Within 10 calendar days after receipt of Notice to Proceed, the Contractor shall submit the Project Schedule for the Contracting Officer’s Representative's review and written approval. The submittal shall include project duration, phase completion dates, activities/events duration and activities/event allocated/loaded cost. Each activity/event on the schedule shall contain a name/number ID, description, duration, allocated cost, early start date, early finish date, late start date, late finish date and total float.

B. The Project Schedule shall reflect the entire contract duration as defined in the contract. Changes/delays shall be entered at the first update after receipt of approval. The Contractor shall provide written requests for time extensions as a result of contract changes/delays.

C. The Project Schedule shall constitute the approved Baseline Schedule until subsequently revised.

D. The Project Schedule shall include all major work.

1.5 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 shall equal the total 90% contract price. The remaining 10% will be held until all requirements of the contract have been completed. The Contractor shall prorate overhead, profit and general conditions on all work activities/events for the entire project length. The contractor shall generate from this information cost curves indicating graphically the total percentage of work activity/event dollar value scheduled versus actual.

The Contractor shall cost load activities/events for all work. Periodic payments shall be approved only for work activities that have been 100% completed and for equipment and material that has been delivered to the work site. IN ANY GIVEN MONTH, NO INVOICED WORK ACTIVITY SHALL EXCEED 25 DAYS FOR THAT MONTH.

1.6 PROJECT SCHEDULE REQUIREMENTS

A. Show on the Project Schedule the sequence of work activities/events required for complete performance of all items of work. The Contractor Shall:

1. Show activities/events such as:
   a. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
   b. Contracting Officer’s Representative's and Architect/Engineer's review and approval of shop drawings, equipment schedules, samples, templates, or similar items.
   c. Interruption of VA Facilities utilities, delivery of Government furnished equipment, and rough-in drawings, project phasing and any other specification requirements.
   d. Test, balance and adjustment of various systems and pieces of equipment, delivery of maintenance and operation manuals, instructions and maintenance tasks.
   e. VA inspection and acceptance with a minimum duration of five work days at the end of each phase and immediately preceding any VA move required by the contract phasing for that phase.
2. Break up the work into activities/events with a duration no longer than one reporting period, except as to non-construction activities/events and any activities/events for which the Contracting Officer’s Representative may approve the showing of a longer duration. The duration for VA approval of any required submittal, shop drawing, or other submittals will not be less than 14 work days.
3. Describe work activities/events clearly, so the work is readily identifiable for assessment of completion.

B. To the extent that the Project Schedule or any revised Project Schedule shows anything not jointly agreed upon, it shall not be deemed to have been approved by the Contracting Officer's Representative. 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 Representative's approval of the Project Schedule.

1.7 PAYMENT TO THE CONTRACTOR:

A. The Contractor shall be entitled to a monthly progress payment upon approval of costs as determined from the currently approved updated Project Schedule. Monthly payment requests/invoices shall include: a listing of all agreed upon project schedule changes and associated data and an updated Project Schedule.

B. Approval of the Contractor's invoice shall be contingent on, among other factors, the submittal of a satisfactory monthly update of the Project Schedule.

1.8 PAYMENT AND PROGRESS REPORTING

A. Monthly schedule update meetings will be held on dates mutually agreed to by the Contracting Officer's Representative and the Contractor. Contractor shall attend all monthly schedule update meetings. The Contractor shall accurately update the Project Schedule and all other data required and provide this information to the Contracting Officer's Representative three work days in advance of the scheduled update meeting.

1.9 RESPONSIBILITY FOR COMPLETION

A. If it becomes apparent from the current revised monthly Project 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's Representative for the proposed schedule changes. If such actions are approved, the representative schedule revisions shall be incorporated by the Contractor into the Project Schedule before the next update.

1.10 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, data and supporting evidence 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 required for 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 Representative's determination as to the total number of days of contract extension will be based upon the current Project Schedule for the time period in question and any other relevant information.

B. Actual delays in activities/events which, according to the schedule, do not affect the extended and predicted contract completion date shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Contracting Officer’s Representative will, within a reasonable time after receipt of a request with justification and supporting information, review the facts and advise the Contractor in writing of the Contracting Officer’s Representative's decision.

C. The Contractor shall submit each request for a change in the contract completion date to the Contracting Officer’s Representative in accordance with the provisions specified under FAR 52.243–4 (Changes) and VAAR 852.236–88 (Changes – Supplemental). The Contractor shall include, as a part of each change request, a sketch showing all schedule logic revisions, duration changes, and cost changes for work in question and its relationship to other activities on the approved Project Schedule.

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SECTION 01 33 23

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.

1-2. For the purposes of this contract, samples (including laboratory samples to be tested) , 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.

1-3 SUBMITTAL SCHEDULE: Within 30 days of execution of construction contract provide SUBMITTAL SCHEDULE for all required items specifically mentioned under the separate sections of the specifications. The SUBMITTAL SCHEDULE shall be fully synchronized with the NETWORK ANALYSIS SCHEDULE 01 32 16.13. List each submittal item. For each item in calendar days and dates list:

a. Date Contractor receives submittal-1 from Material Supplier.

b. 2 weeks for Contractor to review and stamp approval on submittal-1.

c. Date COR/Architect-Engineer receives submittal-1.

d. 2 weeks for COR/Architect-Engineer to review submittal-1 and return to Contractor.

e. If required by comments, 2 weeks from Material Supplier to revise submittal-2.

f. Date Contractor receives submittal-2.

g. 2 weeks for Contractor to review and stamp approval on submittal-2.

h. Date COR/Architect-Engineer receives submittal-2.

i. 2 weeks for COR/Architect-Engineer to review submittal-2 and return to contractor.

j. If required by comments 2 weeks from Material Supplier to revise submittal-3.

k. Date Contractor receives submittal-3.

l. 2 weeks Contractor to review and stamp approval on submittal-3.

m. Date COR/Architect-Engineer receives submittal-3.

n. 2 weeks for COR/Architect-Engineer to review submittal-3 and return to Contractor.

o. Date Contractor order material.

p. Order Processing time and time of manufacture if product is not a stock item.

q. Shipping time from product supplier to construction site.

r. Date product is required on construction site(from NETWORK ANALYSIS SCHEDULE 01 32 16.13).

1-4. 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.

1-5. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract - required items. Delays attributable to untimely and rejected submittals (including any laboratory samples to be tested) will not serve as a basis for extending contract time for completion.

1-6. Submittals will be reviewed for compliance with contract requirements by Architect-Engineer, and action thereon will be taken by Contracting Officer’s Representative on behalf of the Contracting Officer.

1-7. Upon receipt of submittals, Architect-Engineer will assign a file number thereto. Contractor, in any subsequent correspondence, shall refer to this file and identification number to expedite replies relative to previously approved or disapproved submittals.

1-8. 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.

1-9. 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.

1-10. Submittals must be submitted by Contractor only and shipped prepaid. Contracting Officer assumes no responsibility for checking quantities or exact numbers included in such submittals.

A. Submit samples required by Section 09 06 00, SCHEDULE FOR FINISHES, in quadruplicate. Submit other samples in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.

B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail or Email 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 enclosed 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 the applicable requirements specified in preceding Article 1.9, 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 Contracting Officer’s Representative and to Architect-Engineer simultaneously with submission of material to a commercial testing laboratory.
   4. Contractor shall forward a copy of transmittal letter to Contracting Officer’s Representative simultaneously with submission to a commercial testing laboratory .
   5. Laboratory test reports shall be sent directly to Contracting Officer’s Representative 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 Contracting Officer’s Representative 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. For each drawing required, submit one legible photographic paper or vellum reproducible.
2. Reproducible shall be full size.
3. 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.
4. 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.
5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.
6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
7. When work is directly related and involves more than one trade, shop drawings shall be submitted to Architect-Engineer under one cover.

1-11. Samples (except laboratory samples), shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to:

Garavaglia Architecture, Inc.

582 Market Street, Suite 1800

San Francisco, CA 94104

1-12. At the time of transmittal to the Architect-Engineer, the Contractor shall also send a copy of the complete submittal directly to the Contracting Officer’s Representative.

1-13. Samples (except laboratory samples) for approval shall be sent to Architect-Engineer, in care of Contracting Officer’s Representative, VA Medical Center:

Garavaglia Architecture, Inc.

582 Market Street, Suite 1800

San Francisco, CA 94104

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SECTION 01 35 16

ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes special procedures for alteration work.

B. See Section 01 73 00 "Execution" for new work within and attached to existing facilities.

1.2 DEFINITIONS

A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.

B. Consolidate: To strengthen loose or deteriorated materials in place.

C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.

D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

K. Retain: To keep existing items that are not to be removed or dismantled.

L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.3 COORDINATION

A. Alteration Work Subschedule: A construction schedule coordinating the sequencing and scheduling of alteration work for entire Project, including each activity to be performed, and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for alteration work.

1. Schedule construction operations in sequence required to obtain best Work results.

2. Coordinate sequence of alteration work activities to accommodate the following:

a. VA's continuing occupancy of portions of existing building.

b. VA's partial occupancy of completed Work.

c. Other known work in progress.

d. Tests and inspections.

3. Detail sequence of alteration work, with start and end dates.

4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.

5. Use of elevator and stairs.

6. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use in existing structure. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.

B. Pedestrian and Vehicular Circulation: Coordinate alteration work with circulation patterns within Project building(s) and site. Some work is near circulation patterns and adjacent to restricted areas. Circulation patterns cannot be closed off entirely and in places can be only temporarily redirected around small areas of work. Access to restricted areas may not be obstructed. Plan and execute the Work accordingly.

1.4 PROJECT MEETINGS FOR ALTERATION WORK

A. Preliminary Conference for Alteration Work: Before starting alteration work, Architect will conduct conference at Project site.

1. Attendees: In addition to COR, Architect, and Contractor, testing service representative, specialists, and chemical-cleaner manufacturer(s) shall be represented at the meeting.

2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:

a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.

b. Fire-prevention plan.

c. Governing regulations.

d. Areas where existing construction is to remain and the required protection.

e. Hauling routes.

f. Sequence of alteration work operations.

g. Storage, protection, and accounting for salvaged and specially fabricated items.

h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.

i. Qualifications of personnel assigned to alteration work and assigned duties.

j. Requirements for extent and quality of work, tolerances, and required clearances.

k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.

3. Reporting: Architect will record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at weekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to COR, Architect, and Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.

2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.

a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.

b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:

1) Interface requirements of alteration work with other Project Work.

2) Status of submittals for alteration work.

3) Access to alteration work locations.

4) Effectiveness of fire-prevention plan.

5) Quality and work standards of alteration work.

6) Change Orders for alteration work.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.5 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to VA that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain VA's property.

1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to VA where directed at Project site.

1.6 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials:

1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.

2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.

3. Store items in a secure area until delivery to VA.

4. Transport items to VA's storage area on-site.

5. Protect items from damage during transport and storage.

B. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.

2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.

3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.

2. Secure stored materials to protect from theft.

3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F (3 deg C) or more above the dew point.

E. Storage Space:

1. COR will arrange for limited on-site location(s) for free storage of salvaged material. This storage space includes security for stored material.

2. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

1.7 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of preconstruction photographs.

1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."

B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

C. VA's Removals: Before beginning alteration work, verify in correspondence with COR that items not required to be reinstalled in the Work have been removed.

1. All furniture and equipment within buildings shall be removed prior to start of demolition work.

2. All furniture and equipment along south exterior wall of Building 360-H wing prior to start of demolition work.

3. Wall-mounted whiteboards and art work shall be removed prior to the start of demolition work.

D. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

B. Temporary Protection of Materials to Remain:

1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Utility and Communications Services:

1. Notify COR, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.

1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

F. Existing Roofing: Prior to the start of work in an area, install roofing protection as indicated on Drawings.

3.2 PROTECTION FROM FIRE

A. General: Follow fire-prevention plan and the following:

1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties titled "Owner's Responsibility for Fire Protection."

2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.

   a. If combustible material cannot be removed, provide fire blankets to cover such materials.

B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:

1. Use of open-flame equipment is not permitted, except by permission of the COR. Obtain COR's approval for operations involving use of open-flame or welding or other high-heat equipment. Notify Owner at least 72 hours before each occurrence, indicating location of such work.

2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.

3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.

4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.

5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.

6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:

   a. Train each fire watch in the proper operation of fire-control equipment and alarms.

   b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.

   c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.

d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each area to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.

e. Maintain fire-watch personnel at each area of Project site until two hours after conclusion of daily work.

C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.

1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize alkaline and acid wastes and legally dispose of off VA's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.4 GENERAL ALTERATION WORK

A. Have specialty work performed only by qualified specialists.

B. Ensure that supervisory personnel are present when work begins and during its progress.

C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs. Comply with requirements in Section 01 32 33 "Photographic Documentation."

D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.

E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

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SECTION 01 35 26

SAFETY REQUIREMENTS

PART 1 - General

1.1 APPLICABLE PUBLICATIONS

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

B. American Society of Safety Engineers (ASSE):

1. A10.1-2011…....Pre-Project & Pre-Task Safety and Health Planning
2. A10.34-2012…..Protection of the Public on or Adjacent to Construction Sites
3. A10.38-2013…..Basic Elements of an Employer's Program to Provide a Safe and Healthful Work Environment American National Standard Construction and Demolition Operations

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

1. E84-2014……Surface Burning Characteristics of Building Materials

D. The Facilities Guidelines Institute (FGI):

1. FGI Guidelines-2010Guidelines for Design and Construction of Healthcare Facilities

E. National Fire Protection Association (NFPA):

1. 10-2013……..Standard for Portable Fire Extinguishers
2. 30-2012……..Flammable and Combustible Liquids Code
3. 51B-2014……Standard for Fire Prevention During Welding, Cutting and Other Hot Work
4. 70-2014……..National Electrical Code
5. 70B-2013……Recommended Practice for Electrical Equipment Maintenance
6. 70E-2012……Standard for Electrical Safety in the Workplace
7. 99-2012……...Health Care Facilities Code
8. 241-2013…….Standard for Safeguarding Construction, Alteration, and Demolition Operations

F. The Joint Commission (TJC)

1. TJC Manual …..Comprehensive Accreditation and Certification Manual

G. U.S. Nuclear Regulatory Commission

1. 10 CFR 20…….Standards for Protection Against Radiation

H. U.S. Occupational Safety and Health Administration (OSHA):

1. 29 CFR 1904 …Reporting and Recording Injuries & Illnesses
2. 29 CFR 1910 …Safety and Health Regulations for General Industry

3. 29 CFR 1926 …Safety and Health Regulations for Construction Industry

4. CPL 2-0.124…..Multi-Employer Citation Policy

I. VHA Directive 2005-007

1.2 DEFINITIONS

A. OSHA “Competent Person” (CP). One who is capable of identifying existing and predictable hazards in the surroundings and working conditions which are unsanitary, hazardous or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them (see 29 CFR 1926.32(f)).

B. "Qualified Person" means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

C. High Visibility Accident. Any mishap which may generate publicity or high visibility.

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

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

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

2. Days away from work (any time lost after day of injury/illness onset);

3. Restricted work;

4. Transfer to another job;

5. Medical treatment beyond first aid;

6. Loss of consciousness; or

7. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

1.3 REGULATORY REQUIREMENTS

A. In addition to the detailed requirements included in the provisions of this contract, comply with 29 CFR 1926, comply with 29 CFR 1910 as incorporated by reference within 29 CFR 1926, comply with ASSE A10.34, and all applicable federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern except with specific approval and acceptance by the Contracting Officer.

1.4 ACCIDENT PREVENTION PLAN (APP)

A. The APP (aka Construction Safety & Health Plan) shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and ensure it is site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all worksite safety and health of each subcontractor(s). Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.

B. The APP shall be prepared as follows:

1. Written in English by a qualified person who is employed by the Prime Contractor articulating the specific work and hazards pertaining to the contract (model language can be found in ASSE A10.33). Specifically articulating the safety requirements found within these VA contract safety specifications.

2. Address both the Prime Contractors and the subcontractors work operations.

3. State measures to be taken to control hazards associated with materials, services, or equipment provided by suppliers.

4. Address all the elements/sub-elements and in order as follows:

a. **SIGNATURE SHEET.** Title, signature, and phone number of the following:

1) Plan preparer (Qualified Person such as corporate safety staff person or contracted Certified Safety Professional with construction safety experience);

2) Plan approver (company/corporate officers authorized to obligate the company);

3) Plan concurrence (e.g., Chief of Operations, Corporate Chief of Safety, Corporate Industrial Hygienist, project manager or superintendent, project safety professional). Provide concurrence of other applicable corporate and project personnel (Contractor).

b. **BACKGROUND INFORMATION**. List the following:

1) Contractor;

2) Contract number;

3) Project name;

4) Brief project description, description of work to be performed, and location; phases of work anticipated (these will require an AHA).

c. **STATEMENT OF SAFETY AND HEALTH POLICY**. Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor's written safety program goals, objectives, and accident experience goals for this contract should be provided.

d. **RESPONSIBILITIES AND LINES OF AUTHORITIES**. Provide the following:

1) A statement of the employer's ultimate responsibility for the implementation of his SOH program;

2) Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes.

3) The names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA Competent/Qualified Person(s) requirements must be attached;

4) Requirements that no work shall be performed unless a designated competent person is present on the job site;

5) Requirements for pre-task Activity Hazard Analysis (AHAs);

6) Lines of authority;

7) Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified;

e. **SUBCONTRACTORS AND SUPPLIERS.** If applicable, provide procedures for coordinating SOH activities with other employers on the job site:

1) Identification of subcontractors and suppliers (if known);

2) Safety responsibilities of subcontractors and suppliers.

f. **TRAINING.**

1) Site-specific SOH orientation training at the time of initial hire or assignment to the project for every employee before working on the project site is required.

2) Mandatory training and certifications that are applicable to this project (e.g., explosive actuated tools, crane operator, rigger, crane signal person, fall protection, electrical lockout/NFPA 70E, machine/equipment lockout, confined space, etc…) and any requirements for periodic retraining/recertification are required.

3) Procedures for ongoing safety and health training for supervisors and employees shall be established to address changes in site hazards/conditions.

4) OSHA 10-hour training is required for all workers on site and the OSHA 30-hour training is required for Trade Competent Persons (CPs)

g. SAFETY AND HEALTH INSPECTIONS.

1) Specific assignment of responsibilities for a minimum daily job site safety and health inspection during periods of work activity: Who will conduct (e.g., “Site Safety and Health CP”), proof of inspector's training/qualifications, when inspections will be conducted, procedures for documentation, deficiency tracking system, and follow-up procedures.

2) Complete and submit Daily Construction Site Safety Review Checklist included at the end of this Specification.

3) Any external inspections/certifications that may be required (e.g., contracted CSP or CSHT)

h. **ACCIDENT INVESTIGATION & REPORTING.** The Contractor shall conduct mishap investigations of all OSHA Recordable Incidents. The APP shall include accident/incident investigation procedure & identify person(s) responsible to provide the following to the Contracting Officer Representative:

1) Exposure data (man-hours worked);

2) Accident investigations, reports, and logs.

i. **PLANS (PROGRAMS, PROCEDURES) REQUIRED.** Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational risks in site-specific compliance and accident prevention plans. These Plans shall include but are not be limited to procedures for addressing the risks associates with the following:

1) Emergency response ;

2) Contingency for severe weather;

3) Fire Prevention ;

4) Medical Support;

5) Posting of emergency telephone numbers;

6) Prevention of alcohol and drug abuse;

7) Site sanitation(housekeeping, drinking water, toilets);

8) Night operations and lighting ;

9) Hazard communication program;

10) Welding/Cutting “Hot” work ;

11) Electrical Safe Work Practices (Electrical LOTO/NFPA 70E);

12) General Electrical Safety

13) Hazardous energy control (Machine LOTO);

14) Site-Specific Fall Protection & Prevention;

15) Excavation/trenching;

16) Asbestos abatement;

17) Lead abatement;

18) Respiratory protection;

19) Health hazard control program;

20) Abrasive blasting;

21) Heat/Cold Stress Monitoring;

22) Crystalline Silica Monitoring (Assessment);

23) Demolition plan (to include engineering survey);

24) Formwork and shoring erection and removal;

C. Submit the APP to the Contracting Officer Representative for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

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

E. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Project Manager, project overall designated OSHA Competent Person, and Contracting Officer Representative. Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34) and the environment.

1.5 ACTIVITY HAZARD ANALYSES (AHAs)

A. AHAs are also known as Job Hazard Analyses, Job Safety Analyses, and Activity Safety Analyses. Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or sub-contractor is to perform the work, the Contractor(s) performing that work activity shall prepare an AHA (Example electronic AHA forms can be found on the US Army Corps of Engineers web site)

B. AHAs shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.

C. Work shall not begin until the AHA for the work activity has been accepted by the Contracting Officer Representative and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.

1. The names of the Competent/Qualified Person(s) required for a particular activity (for example, excavations, scaffolding, fall protection, other activities as specified by OSHA and/or other State and Local agencies) shall be identified and included in the AHA. Certification of their competency/qualification shall be submitted to the Government Designated Authority (GDA) for acceptance prior to the start of that work activity.
2. The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified person(s).
   a. If more than one Competent/Qualified Person is used on the AHA activity, a list of names shall be submitted as an attachment to the AHA. Those listed must be Competent/Qualified for the type of work involved in the AHA and familiar with current site safety issues.
   b. If a new Competent/Qualified Person (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new person shall acknowledge in writing that he or she has reviewed the AHA and is familiar with current site safety issues.
3. Submit AHAs to the Contracting Officer Representative for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for review at least 15 calendar days prior to the start of each phase. Subsequent AHAs as shall be formatted as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.
4. The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.
5. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. All activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier, or subcontractor and provided to the prime contractor for review and approval and then submitted to Contracting Officer Representative.

1.6 PRECONSTRUCTION CONFERENCE

A. Contractor representatives who have a responsibility or significant role in implementation of the accident prevention program, as required by 29 CFR 1926.20(b)(1), on the project shall attend the preconstruction conference to gain a mutual understanding of its implementation. This includes the project superintendent, subcontractor superintendents, and any other assigned safety and health professionals.

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

C. Deficiencies in the submitted APP will be brought to the attention of the Contractor within 14 days of submittal, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

1.7 "SITE SAFETY AND HEALTH OFFICER" (SSHO) and "COMPETENT PERSON" (CP)

A. The Prime Contractor shall designate a minimum of one SSHO at each project site that will be identified as the SSHO to administer the Contractor's safety program and government-accepted Accident Prevention Plan. Each subcontractor shall designate a minimum of one CP in compliance with 29 CFR 1926.20 (b)(2) that will be identified as a CP to administer their individual safety programs.

B. Further, all specialized Competent Persons for the work crews will be supplied by the respective contractor as required by 29 CFR 1926 (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).

C. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons as well as fill more than one specialized CP role (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).

D. The SSHO or an equally-qualified Designated Representative/alternate will maintain a presence on the site during construction operations in accordance with FAR Clause 52.236-6: *Superintendence by the Contractor*. CPs will maintain presence during their construction activities in accordance with above mentioned clause. A listing of the designated SSHO and all known CPs shall be submitted prior to the start of work as part of the APP with the training documentation and/or AHA as listed in Section 1.8 below.

E. The repeated presence of uncontrolled hazards during a contractor's work operations will result in the designated CP as being deemed incompetent and result in the required removal of the employee in accordance with FAR Clause 52.236-5: Material and Workmanship, Paragraph (c).

1.8 TRAINING

A. The designated Prime Contractor SSHO must meet the requirements of all applicable OSHA standards and be capable (through training, experience, and qualifications) of ensuring that the requirements of 29 CFR 1926.16 and other appropriate Federal, State and local requirements are met for the project. As a minimum the SSHO must have completed the OSHA 30-hour Construction Safety class and have five (5) years of construction industry safety experience or three (3) years if he/she possesses a Certified Safety Professional (CSP) or certified Construction Safety and Health Technician (CSHT) certification or have a safety and health degree from an accredited university or college.

B. All designated CPs shall have completed the OSHA 30-hour Construction Safety course within the past 5 years.

C. In addition to the OSHA 30 Hour Construction Safety Course, all CPs with high hazard work operations such as operations involving asbestos, electrical, cranes, demolition, work at heights/fall protection, fire safety/life safety, ladder, rigging, scaffolds, and trenches/excavations shall have a specialized formal course in the hazard recognition & control associated with those high hazard work operations. Documented “repeat” deficiencies in the execution of safety requirements will require retaking the requisite formal course.

D. All other construction workers shall have the OSHA 10-hour Construction Safety Outreach course and any necessary safety training to be able to identify hazards within their work environment.

E. Submit training records associated with the above training requirements to the Contracting Officer Representative for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance.

F. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the SSHO or his/her designated representative. As a minimum, this briefing shall include information on the site-specific hazards, construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, emergency procedures, accident reporting etc... Documentation shall be provided to the Contracting Officer's Representative that individuals have undergone contractor's safety briefing.

G. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

1.9 INSPECTIONS

A. The SSHO shall conduct frequent and regular safety inspections (daily) of the site and each of the subcontractors CPs shall conduct frequent and regular safety inspections (daily) of the their work operations as required by 29 CFR 1926.20(b)(2). Each week, the SSHO shall conduct a formal documented inspection of the entire construction areas with the subcontractors' “Trade Safety and Health CPs” present in their work areas. Coordinate with, and report findings and corrective actions weekly to Contracting Officer Representative.

B. A Certified Safety Professional (CSP) with specialized knowledge in construction safety or a certified Construction Safety and Health Technician (CSHT) shall randomly conduct a monthly site safety inspection. The CSP or CSHT can be a corporate safety professional or independently contracted. The CSP or CSHT will provide their certificate number on the required report for verification as necessary.

   1. Results of the inspection will be documented with tracking of the identified hazards to abatement.

   2. The Contracting Officer Representative will be notified immediately prior to start of the inspection and invited to accompany the inspection.

   3. Identified hazard and controls will be discussed to come to a mutual understanding to ensure abatement and prevent future reoccurrence.

   4. A report of the inspection findings with status of abatement will be provided to the Contracting Officer Representative within one week of the onsite inspection.

1.10 ACCIDENTS, OSHA 300 LOGS, AND MAN-HOURS

A. Notify the Contracting Officer Representative as soon as practical, but no more than four hours after any accident meeting the definition of OSHA Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than $5,000, or any weight handling equipment accident. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Contracting Officer Representative determine whether a government investigation will be conducted.

B. Conduct an accident investigation for recordable injuries and illnesses, for Medical Treatment defined in paragraph DEFINITIONS, and property damage accidents resulting in at least $20,000 in damages, to establish the root cause(s) of the accident. Complete the VA Form 2162, and provide the report to the Contracting Officer Representative within 5 calendar days of the accident. The Contracting Officer Representative will provide copies of any required or special forms.

C. A summation of all man-hours worked by the contractor and associated sub-contractors for each month will be reported to the Contracting Officer Representative monthly.

D. A summation of all OSHA recordable accidents experienced on site by the contractor and associated sub-contractors for each month will be provided to the Contracting Officer Representative monthly. The contractor and associated sub-contractors' OSHA 300 logs will be made available to the Contracting Officer Representative as requested.

1.11 PERSONAL PROTECTIVE EQUIPMENT (PPE)

A. PPE is governed in all areas by the nature of the work the employee is performing. For example, specific PPE required for performing work on electrical equipment is identified in NFPA 70E, Standard for Electrical Safety in the Workplace.

B. Mandatory PPE includes:

1. Hard Hats - unless written authorization is given by the Contracting Officer Representative in circumstances of work operations that have limited potential for falling object hazards such as during finishing work or minor remodeling. With authorization to relax the requirement of hard hats, if a worker becomes exposed to an overhead falling object hazard, then hard hats would be required in accordance with the OSHA regulations.

2. Safety glasses - unless written authorization is given by the Contracting Officer Representative appropriate safety glasses meeting the ANSI Z.87.1 standard must be worn by each person on site.

3. Appropriate Safety Shoes - based on the hazards present, safety shoes meeting the requirements of ASTM F2413-11 shall be worn by each person on site unless written authorization is given by the Contracting Officer Representative.

4. Hearing protection - Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks.

1.12 INFECTION CONTROL

A. Infection Control is critical in all medical center facilities. Interior construction activities causing disturbance of existing dust, or creating new dust, must be conducted within ventilation-controlled areas that minimize the flow of airborne particles into patient areas.

B. An AHA associated with infection control will be performed by VA personnel in accordance with FGI Guidelines (i.e. Infection Control Risk Assessment (ICRA)). The ICRA procedure found on the American Society for Healthcare Engineering (ASHE) website will be utilized. Risk classifications of Class II or lower will require approval by the Contracting Officer Representative before beginning any construction work. Risk classifications of Class III or higher will require a permit before beginning any construction work. Infection Control permits will be issued by the Contracting Officer's Representative. 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 IV**, however, work outside the primary project scope area may vary. The required infection control precautions with each class are as follows:

1. Class I requirements:

   a. During Construction Work:

      1) Notify the Contracting Officer Representative.

      2) Execute work by methods to minimize raising dust from construction operations.

      3) Ceiling tiles: Immediately replace ceiling tile(s) displaced for visual inspection.

   b. Upon Completion:

      1) Clean work area upon completion of task

      2) Notify the Contracting Officer Representative.

2. Class II requirements:

   a. During Construction Work:

      1) Notify the Contracting Officer Representative.

      2) Provide active means to prevent airborne dust from dispersing into atmosphere such as wet methods or tool mounted dust collectors where possible.

      3) Contain construction waste in covered carts or containers before transport. Follow approved pre-determine route. Sweep/vacuum/wet mop construction transport route every 4 hours or more often if required so construction dust/debris is not along route. Route shall be fully cleaned at the end of each work day.

      4) Water mist work surfaces to control dust while cutting.

      5) Seal unused doors with duct tape.

      6) Block off and seal air vents.

      7) Seal off isolated heating, ventilation and air conditioning (HVAC) systems in areas where work is being performed.

8) Exhaust construction area with exhaust equipment having standard filtration installed to exhaust through existing window units. General Contractor to determine total cfm required exhaust capacity. Capacity to be submitted to COR for review and approval prior to ordering and installing exhaust equipment.

9) Provide plastic vestibule with zipper door installed at all construction areas per 1 35 26 1.12 C 2. Provide and use walk-off mats at all construction entrances. When dirty, replace used mats with new mats in accordance with manufacturer's recommendations.

b. Upon Completion:

1) Wipe work surfaces with cleaner/disinfectant.

2) Contain construction waste before transport in tightly covered containers.

3) Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.

4) Upon completion, restore HVAC system where work was performed

5) Notify the Contracting Officer Representative.

3. Class III requirements:

a. During Construction Work:

1) Obtain permit from the Contracting Officer Representative.

2) Remove or Isolate HVAC system in area where work is being done to prevent contamination of duct system.

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. Install construction barriers and ceiling protection carefully, outside of normal work hours.

4) Maintain negative air pressure, 0.01 inches of water gauge, within work site utilizing HEPA equipped air filtration units and continuously monitored with a digital display, recording and alarm instrument, which must be calibrated on installation, maintained with periodic calibration and monitored by the contractor.

5) Contain construction waste before transport in tightly covered containers.

6) Cover transport receptacles or carts. Tape covering unless solid lid.

b. Upon Completion:

1) Do not remove barriers from work area until completed project is inspected by the Contracting Officer Representative and thoroughly cleaned by the VA Environmental Services Department.

2) Remove construction barriers and ceiling protection carefully to minimize spreading of dirt and debris associated with construction, outside of normal work hours.

3) Vacuum work area with HEPA filtered vacuums.

4) Wet mop area with cleaner/disinfectant.

5) Upon completion, restore HVAC system where work was performed.

6) Return permit to the Contracting Officer Representative.

4. Class IV requirements:

a. During Construction Work:

1) Obtain permit from Contracting Officer Representative or Government Designated Authority.

2) Isolate HVAC system in area where work is being done to prevent contamination of duct system.

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. Install construction barriers and ceiling protection carefully, outside of normal work hours.

4) Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.

5) Seal holes, pipes, conduits, and punctures.

6) 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 work site.

7) All personnel entering work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.

b. Upon Completion:

1) Do not remove barriers from work area until completed project is inspected by the Contracting Officer Representative with thorough cleaning by the VA Environmental Services Dept.

2) Remove construction barriers and ceiling protection carefully to minimize spreading of dirt and debris associated with construction, outside of normal work hours.

3) Contain construction waste before transport in tightly covered containers.

4) Cover transport receptacles or carts. Tape covering unless solid lid.

5) Vacuum work area with HEPA filtered vacuums.

6) Wet mop area with cleaner/disinfectant.

7) Upon completion, restore HVAC system where work was performed.

8) Return permit to the Contracting Officer Representative.

C. Barriers shall be erected as required based upon classification (Class III & IV requires barriers) and shall be constructed as follows:

1. Class III and IV - closed door with masking tape applied over the frame and door is acceptable for projects that can be contained in a single room.

2. Construction, demolition or reconstruction not capable of containment within a single room must have the following barriers erected and made presentable on hospital occupied side:

a. Class III & IV (where dust control is the only hazard, and an agreement is reached with Contracting Officer Representative and Medical Center) - Airtight plastic barrier that extends from the floor to ceiling. Seams must be sealed with duct tape to prevent dust and debris from escaping

b. Class III & IV - Drywall barrier erected with joints covered or sealed to prevent dust and debris from escaping.

c. Class III & IV - Seal all penetrations in existing barrier airtight

d. Class III & IV - Barriers at penetration of ceiling envelopes, chases and ceiling spaces to stop movement air and debris

e. Class IV only - Anteroom or double entrance openings that allow workers to remove protective clothing or vacuum off existing clothing

f. Class III & IV - At elevators shafts or stairways within the field of construction, overlapping flap minimum of two feet wide of polyethylene enclosures for personnel access.

D. Products and Materials:

1. Sheet Plastic: Fire retardant polystyrene, 6-mil thickness meeting local fire codes

2. Barrier Doors: Self Closing One-hour fire-rated solid core wood in steel frame, painted

3. Dust proof one-hour fire-rated.

4. High Efficiency Particulate Air-Equipped filtration machine rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. HEPA filters should have ASHRAE 85 or other prefilter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Maintenance of equipment and replacement of the HEPA filters and other filters will be in accordance with manufacturer's instructions.

5. Exhaust Hoses: Heavy duty, flexible steel reinforced; Ventilation Blower Hose

6. Adhesive Walk-off Mats: Provide minimum size mats of 24 inches x 36 inches
7. Disinfectant: Hospital-approved disinfectant or equivalent product
8. Portable Ceiling Access Module

E. Before any construction on site begins, all contractor personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.

F. A dust control program will be establish and maintained as part of the contractor's infection preventive measures in accordance with the FGI Guidelines for Design and Construction of Healthcare Facilities. Prior to start of work, prepare a plan detailing project-specific dust protection measures with associated product data, including periodic status reports, and submit to Project Engineer and Facility CSC for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

G. Medical center Infection Control personnel will monitor for airborne disease (e.g. aspergillosis) during construction. A baseline of conditions will 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 with safe thresholds established.

H. In general, the following preventive measures shall be adopted during construction to keep down dust and prevent mold.

1. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. HEPA filtration is required where the exhaust dust may reenter the medical center.
2. Exhaust hoses shall be exhausted so that dust is not reintroduced to the medical center.
3. Adhesive Walk-off/Carpet Walk-off Mats 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.
4. 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 it is created. Transport these outside the construction area in containers with tightly fitting lids.
5. The contractor shall not haul debris through patient-care areas without prior approval of the Contracting Officer Representative 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.

6. 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.

7. 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.

I. 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.

1.13 FIRE SAFETY

A. Fire Safety Plan: Establish and maintain a site-specific 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 Contracting Officer Representative for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. This plan may be an element of the Accident Prevention Plan.

1. The Fire Safety Plan shall include the provision of providing temporary wireless fire detection and alarm system and to hook up this system to the buildings closest fire alarm panel OR

2. Modify the existing sprinklers by installing them rigidly close to the ceiling deck via flexible fire sprinkler pipe and modify sprinkler head if needed. Re-use the existing fire/smoke detectors during construction.

B. 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.

C. 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).

D. 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.

2. Install one-hour fire-rated 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.

E. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.

F. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Contracting Officer Representative.

G. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to Contracting Officer Representative.

H. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.

I. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.

J. Sprinklers: Install, test and activate new automatic sprinklers prior to removing existing sprinklers.

K. 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 Contracting Officer Representative. 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 Resident Engineer.

L. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with Contracting Officer Representative.

M. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Contracting Officer Representative to obtain permits from Facility Safety Officer at least twenty four (24) hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.

N. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Contracting Officer Representative.

O. 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.

P. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.

1.14 ELECTRICAL

A. All electrical work shall comply with NFPA 70 (NEC), NFPA 70B, NFPA 70E, 29 CFR Part 1910 Subpart J - General Environmental Controls, 29 CFR Part 1910 Subpart S - Electrical, and 29 CFR 1926 Subpart K in addition to other references required by contract.

B. All qualified persons performing electrical work under this contract shall be licensed journeyman or master electricians. All apprentice electricians performing under this contract shall be deemed unqualified persons unless they are working under the immediate supervision of a licensed electrician or master electrician.

C. All electrical work will be accomplished de-energized and in the Electrically Safe Work Condition (refer to NFPA 70E for Work Involving Electrical Hazards, including Exemptions to Work Permit). Any Contractor, subcontractor or temporary worker who fails to fully comply with this requirement is subject to immediate termination in accordance with FAR clause 52.236-5(c). Only in rare circumstance where achieving an electrically safe work condition prior to beginning work would increase or cause additional hazards, or is infeasible due to equipment design or operational limitations is energized work permitted. The Contracting Officer Representative with approval of the Medical Center Director will make the determination if the circumstances would meet the exception outlined above. An AHA specific to energized work activities will be developed, reviewed, and accepted prior to the start of that work.

   1. Development of a Hazardous Electrical Energy Control Procedure is required prior to de-energization. A single Simple Lockout/Tagout Procedure for multiple work operations can only be used for work involving qualified person(s) de-energizing one set of conductors or circuit part source. Task specific Complex Lockout/Tagout Procedures are required at all other times.

   2. Verification of the absence of voltage after de-energization and lockout/tagout is considered “energized electrical work” (live work) under NFPA 70E, and shall only be performed by qualified persons wearing appropriate shock protective (voltage rated) gloves and arc rate personal protective clothing and equipment, using Underwriters Laboratories (UL) tested and appropriately rated contact electrical testing instruments or equipment appropriate for the environment in which they will be used.

D. Personal Protective Equipment (PPE) and electrical testing instruments will be readily available for inspection by the Contracting Officer Representative.

E. Before beginning any electrical work, an Activity Hazard Analysis (AHA) will be conducted to include Shock Hazard and Arc Flash Hazard analyses (NFPA Tables can be used only as a last alterative and it is strongly suggested a full Arc Flash Hazard Analyses be conducted). Work shall not begin until the AHA for the work activity has been accepted by the Contracting Officer Representative and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.

F. Ground-fault circuit interrupters. All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites shall have approved ground-fault circuit interrupters for personnel protection. “Assured Equipment Grounding Conductor Program” only is not allowed.

1.15 FALL PROTECTION

A. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) for ALL WORK, unless specified differently or the OSHA 29 CFR 1926 requirements are more stringent, to include steel erection activities, systems-engineered activities (prefabricated) metal buildings, residential (wood) construction and scaffolding work.

1. The use of a Safety Monitoring System (SMS) as a fall protection method is prohibited.

2. The use of Controlled Access Zone (CAZ) as a fall protection method is prohibited.

3. Fall protection while using a ladder will be governed by the OSHA requirements.

1.16 SCAFFOLDS AND OTHER WORK PLATFORMS

A. All scaffolds and other work platforms construction activities shall comply with 29 CFR 1926 Subpart L.

B. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) as stated in Section 1.16.

C. The following hierarchy and prohibitions shall be followed in selecting appropriate work platforms.

1. Scaffolds, platforms, or temporary floors shall be provided for all work except that can be performed safely from the ground or similar footing.

2. Ladders less than 20 feet may be used as work platforms only when use of small hand tools or handling of light material is involved.

3. Ladder jacks, lean-to, and prop-scaffolds are prohibited.

4. Emergency descent devices shall not be used as working platforms.

D. Contractors shall use a scaffold tagging system in which all scaffolds are tagged by the Competent Person. Tags shall be color-coded: green indicates the scaffold has been inspected and is safe to use; red indicates the scaffold is unsafe to use. Tags shall be readily visible, made of materials that will withstand the environment in which they are used, be legible and shall include:

1. The Competent Person's name and signature;

2. Dates of initial and last inspections.

1.17 CRANES

A. All crane work shall comply with 29 CFR 1926 Subpart CC.

B. Prior to operating a crane, the operator must be licensed, qualified or certified to operate the crane. Thus, all the provisions contained with Subpart CC are effective and there is no “Phase In” date of November 10, 2014.

C. A detailed lift permit shall be submitted 14 days prior to the scheduled lift complete with route for truck carrying load, crane load analysis, siting of crane and path of swing. The lift will not be allowed without approval of this document.

D. Crane operators shall not carry loads

1. over the general public or VAMC personnel

2. over any occupied building unless

a. the top two floors are vacated

b. or overhead protection with a design live load of 300 psf is provided

1.18 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

A. All installation, maintenance, and servicing of equipment or machinery shall comply with 29 CFR 1910.147 except for specifically referenced operations in 29 CFR 1926 such as concrete & masonry equipment [1926.702(j)], heavy machinery & equipment [1926.600(a)(3)(i)], and process safety management of highly hazardous chemicals (1926.64). Control of hazardous electrical energy during the installation, maintenance, or servicing of electrical equipment shall comply with Section 1.15 to include NFPA 70E and other VA specific requirements discussed in the section.

1.19 WELDING AND CUTTING

1. As specified in section 1.14, Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Contracting Officer Representative and Facility Safety Manager. Obtain permits from Contracting Officer Representative and Facility Safety Manager at least twenty four (24) hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.

1.20 LADDERS

A. All Ladder use shall comply with 29 CFR 1926 Subpart X.

B. All portable ladders shall be of sufficient length and shall be placed so that workers will not stretch or assume a hazardous position.

C. Manufacturer safety labels shall be in place on ladders

D. Step Ladders shall not be used in the closed position

E. Top steps or cap of step ladders shall not be used as a step

F. Portable ladders, used as temporary access, shall extend at least 3 ft (0.9 m) above the upper landing surface.

   1. When a 3 ft (0.9-m) extension is not possible, a grasping device (such as a grab rail) shall be provided to assist workers in mounting and dismounting the ladder.

   2. In no case shall the length of the ladder be such that ladder deflection under a load would, by itself, cause the ladder to slip from its support.

G. Ladders shall be inspected for visible defects on a daily basis and after any occurrence that could affect their safe use. Broken or damaged ladders shall be immediately tagged "DO NOT USE," or with similar wording, and withdrawn from service until restored to a condition meeting their original design.

1.21 FLOOR & WALL OPENINGS

A. All floor and wall openings shall comply with 29 CFR 1926 Subpart M.

B. Floor holes/openings are any that measure over 2 in (51 mm) in any direction of a walking/working surface which persons may trip or fall into or where objects may fall to the level below. See 21.F for covering and labeling requirements.

C. All floor openings or hole into which a person can accidentally walk or fall through shall be guarded either by a railing system with toeboards along all exposed sides or a load-bearing cover. When the cover is not in place, the opening or hole shall be protected by a removable guardrail system or shall be attended when the guarding system has been removed, or other fall protection system.

   1. Covers shall be capable of supporting, without failure, at least twice the weight of the worker, equipment and material combined.

   2. Covers shall be secured when installed, clearly marked with the word “HOLE”, “COVER” or “Danger, Roof Opening-Do Not Remove” or color-coded or equivalent methods (e.g., red or orange “X”). Workers must be made aware of the meaning for color coding and equivalent methods.

- - - E N D - - -

Veteran Affairs Palo Alto Health Care System (VAPAHCS)

Construction Site Safety Review Checklist

Project:_____ Date:_____

Contractor:_____ Certifier Signature:_____ Time:_____

All Contractor personnel and Subcontractor employees are responsible to conduct work activities in a safe and healthful manner for their health and well-being as well VAPAHCS personnel. The purpose of this Site Safety Review is to increase the Contractor/Subcontractors awareness of the need for safe work habits and a positive attitude toward loss prevention and control. Below columns marked with "NC" answers require the Contractor/Subcontractors implementation of corrective action plans. Additional comments/actions will be described on additional pages to supplement this report.

Safety & Health General	OK	NC	N/A	Concrete Operations	OK	NC	N/A
1. Safety Program / Injury Illness Protectn Plan				50. Cement/Silica dust exposures			
2. Orientation/Code of Safe Practices				51. Cutting Sawing/Grinding Controls			
3. Toolbox Meetings/Pre-Job Safety				52. PPE utilized by Crew			
4. Postings (OSHA) (Project Info/POC)				53. Wall or Structure Supported			
5. Emergency Numbers/First Aid				54. Pumps/equipment set-up/ cond.			
6. Toilets/ Hand Wash/Drinking Water				**Ladders**			
Environment				55. Ladder Conditions			
7. Ventilation, incl negative air/HEPA filtration				56. 3' Above Landing			
8. Illumination				57. Braced & Tied			
9. Integrity of Dust Control and containment				58. A-Frame Step Ladder Set Up			
10. Openings Guarded/Covered-Marked				59. Correct Height			
11. Stairs/Walkways Guarded & Accessible				60. Proper Use			
12. Rebars Capped				**Scaffolds/Shoring (Interior/Exterior)**			
13. Equipment/Material Storage				61. Current certified installation doc			
14. Traffic/Public Safety				62. Planks/toe boards			
15. 2 hr. fire separation from Patient Care Areas				63. Railed Properly			
16. Construction Warning Signs Posted				64. Tied to Structure			
17. Housekeeping				65. Ladder Access			
18. Emergency Exits – Clear / Unlocked				66. Daily Inspections			
19. ILSM in place – Exits Blocked/Locked				67. Users trained/Competent person			
Electrical Safety				68. Falling Object Protection			
20. Cords, Plugs Conditions, Surge Protectors				**Excavations/Trench**			
21. GFI Boxes & Grounding				69.Daily Inspections/Competent Person			
22. Overhead Lines protected/marked/spotter				70.Shored/sloped > 5' or soil cond.			
23. Lock out Tag Out				71. Spoil Piles at least 2' from edge			
24. Power/Generator/breaker panels secured				72. Underground Line located/potholed			
Personal Protection (PPE)				73. Barricades/protective measures			
25. Hard Hats				74. Ladder every 25' & after 4' deep			
26. Eye & Face Protection				**Vehicle/Equipment Operations**			
27. Ear Protection				75. Seat Belts by Operators			
28. Gloves/Clothing				76. Back Up Alarms – all Equipment			
29. Footwear				77. Reflective garments/PPE			
30. Respiratory (Dust/Canister Masks)				78. Personal cars in designated areas			
Site Security				79. Forklift operators trained			
31. Fencing				80. Flagmen/Traffic Control			
32. Security				**Scissors/Zoom Booms/Lift Trucks**			
33. Entrance/Exit				81. Controls Operative			
Hand/ Power/Powder Actuated Tools				82. Safety Chains in Place			
34. Guards attached/functional				83. Harness & Lanyards (JLG's)			
35. Grounded Properly				84. Operator Certification			
36. Working Properly				85. Visual Inspection			
37. Trained or Certified Operators/PPE				86. Fluid Levels (Oil, Water)			
Fire Protection				87. Brakes/Lights/Back up Alarm(s)			
38. Fire Extinguishers checked/accessible				88. Gauges – Operative			
39. Alarm/Detection System in Place				89. Scheduled Maintenance			
40. Smoking (No Smoking)				**Welding & Cutting**			
41. Hot Work Permits approved/current				90. Approved Hot Work Permit			
42. Flammable/Combustible Material				91. Cylinders – Use & Segregation			
Fall Protection				92. Torches,Horses,Gauges,PPE,etc			
43. Use of Fall Protection above 6'				93. Weld Cables, Holders & Grounds			
44. Floor openings/holes securely covered				94. Fire Protection (Task Work)			
45. Perimeter/Interior Shaft Guardrails				**Personnel Hoists & Cranes**			
46. Falling material/objects				95. Inspections & Maintenance			
47. Trained on Use – Competent Person				96. Crane Set Up & Swing Protection			
48. Handrails for stairs 4 or more steps				97. Rigging & Loads Secured			
49. Fall Protection Equipmt in place/Inspected.				98. Certified Operator			

Legend: OK = Practice in Compliance; NC = Needs Correction; N/A = Not Applicable

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:

DEPARMENT 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.
http://www.aluminum.org

AABC Associated Air Balance Council
http://www.aabchq.com

AAMA American Architectural Manufacturer's Association
http://www.aamanet.org

AAN American Nursery and Landscape Association
http://www.anla.org

AASHTO American Association of State Highway and Transportation Officials
http://www.aashto.org

AATCC American Association of Textile Chemists and Colorists
http://www.aatcc.org

ACGIH American Conference of Governmental Industrial Hygienists
http://www.acgih.org

ACI American Concrete Institute
http://www.aci-int.net

ACPA American Concrete Pipe Association
http://www.concrete-pipe.org

ACPPA American Concrete Pressure Pipe Association
http://www.acppa.org

ADC Air Diffusion Council
http://flexibleduct.org

AGA American Gas Association
http://www.aga.org

AGC Associated General Contractors of America
http://www.agc.org

AGMA American Gear Manufacturers Association, Inc.
http://www.agma.org

AHAM Association of Home Appliance Manufacturers
http://www.aham.org

AISC American Institute of Steel Construction
http://www.aisc.org

AISI American Iron and Steel Institute
http://www.steel.org

AITC American Institute of Timber Construction
http://www.aitc-glulam.org

AMCA Air Movement and Control Association, Inc.
http://www.amca.org

ANLA American Nursery & Landscape Association
http://www.anla.org

ANSI American National Standards Institute, Inc.
http://www.ansi.org

APA The Engineered Wood Association
http://www.apawood.org

ARI Air-Conditioning and Refrigeration Institute
http://www.ari.org

ASAE American Society of Agricultural Engineers
http://www.asae.org

ASCE American Society of Civil Engineers
http://www.asce.org

ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers
http://www.ashrae.org

ASME American Society of Mechanical Engineers
http://www.asme.org

ASSE American Society of Sanitary Engineering
http://www.asse-plumbing.org

ASTM American Society for Testing and Materials
http://www.astm.org

AWI Architectural Woodwork Institute
http://www.awinet.org

AWS American Welding Society
http://www.aws.org

AWWA American Water Works Association
http://www.awwa.org

BHMA Builders Hardware Manufacturers Association
http://www.buildershardware.com

BIA Brick Institute of America
http://www.bia.org

CAGI Compressed Air and Gas Institute
http://www.cagi.org

CGA Compressed Gas Association, Inc.
http://www.cganet.com

CI The Chlorine Institute, Inc.
http://www.chlorineinstitute.org

CISCA Ceilings and Interior Systems Construction Association
http://www.cisca.org

CISPI Cast Iron Soil Pipe Institute
http://www.cispi.org

CLFMI Chain Link Fence Manufacturers Institute
http://www.chainlinkinfo.org

CPMB Concrete Plant Manufacturers Bureau
http://www.cpmb.org

CRA California Redwood Association
http://www.calredwood.org

CRSI Concrete Reinforcing Steel Institute
http://www.crsi.org

CTI Cooling Technology Institute
http://www.cti.org

DHI Door and Hardware Institute
http://www.dhi.org

EGSA Electrical Generating Systems Association
http://www.egsa.org

EEI Edison Electric Institute
http://www.eei.org

EPA Environmental Protection Agency
http://www.epa.gov

ETL ETL Testing Laboratories, Inc.
http://www.et1.com

FAA Federal Aviation Administration
http://www.faa.gov

FCC Federal Communications Commission
http://www.fcc.gov

FPS The Forest Products Society
http://www.forestprod.org

GANA Glass Association of North America
http://www.cssinfo.com/info/gana.html/

FM Factory Mutual Insurance
http://www.fmglobal.com

GA Gypsum Association
http://www.gypsum.org

GSA General Services Administration
http://www.gsa.gov

HI Hydraulic Institute
http://www.pumps.org

HPVA Hardwood Plywood & Veneer Association
http://www.hpva.org

ICBO International Conference of Building Officials
http://www.icbo.org

ICEA Insulated Cable Engineers Association Inc.
http://www.icea.net

\ICAC Institute of Clean Air Companies
http://www.icac.com

IEEE Institute of Electrical and Electronics Engineers
http://www.ieee.org\

IMSA International Municipal Signal Association
http://www.imsasafety.org

IPCEA Insulated Power Cable Engineers Association

NBMA Metal Buildings Manufacturers Association
http://www.mbma.com

MSS Manufacturers Standardization Society of the Valve and Fittings Industry Inc.
http://www.mss-hq.com

NAAMM National Association of Architectural Metal Manufacturers
http://www.naamm.org

NAPHCC Plumbing-Heating-Cooling Contractors Association
http://www.phccweb.org.org

NBS National Bureau of Standards
See - NIST

NBBPVI National Board of Boiler and Pressure Vessel Inspectors
http://www.nationboard.org

NEC National Electric Code
See - NFPA National Fire Protection Association

NEMA National Electrical Manufacturers Association
http://www.nema.org

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

IGMA Insulating Glass Manufacturers Alliance
http://www.igmaonline.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:

This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained by the Department of Veterans Affairs.

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):

T27-11.....Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates

T96-02 (R2006).....Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

T99-10.....Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop

T104-99 (R2007).....Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

T180-10.....Standard Method of Test for Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop

T191-02(R2006).....Standard Method of Test for Density of Soil In-Place by the Sand-Cone Method

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

A325-10.....Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

A370-12.....Standard Test Methods and Definitions for Mechanical Testing of Steel Products

C31/C31M-10.....Standard Practice for Making and Curing Concrete Test Specimens in the Field

C33/C33M-11a.....Standard Specification for Concrete Aggregates

C39/C39M-12.....Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

C109/C109M-11b.....Standard Test Method for Compressive Strength of Hydraulic Cement Mortars

C136-06.....Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

C138/C138M-10b.....Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

C143/C143M-10a.....Standard Test Method for Slump of Hydraulic Cement Concrete

C172/C172M-10.....Standard Practice for Sampling Freshly Mixed Concrete

C173/C173M-10b.....Standard Test Method for Air Content of freshly Mixed Concrete by the Volumetric Method

C1019-11.....Standard Test Method for Sampling and Testing Grout

C1064/C1064M-11.....Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete

C1077-11c.....Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation

C1314-11a.....Standard Test Method for Compressive Strength of Masonry Prisms

D422-63(2007).....Standard Test Method for Particle-Size Analysis of Soils

D698-07e1.....Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort

D1140-00(2006).....Standard Test Methods for Amount of Material in Soils Finer than No. 200 Sieve

D1143/D1143M-07e1.....Standard Test Methods for Deep Foundations Under Static Axial Compressive Load

D1188-07e1.....Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples

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

D1557-09.....Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft lbf/ft3 (2,700 KNm/m3))

D2166-06.....Standard Test Method for Unconfined Compressive Strength of Cohesive Soil

D2167-08).....Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method

D2216-10.....Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

D2974-07a.....Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

D3740-11.....Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction

D6938-10.....Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

E94-04(2010).....Standard Guide for Radiographic Examination

E164-08.....Standard Practice for Contact Ultrasonic Testing of Weldments

E329-11c.....Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

E543-09.....Standard Specification for Agencies Performing Non-Destructive Testing

E605-93(R2011).....Standard Test Methods for Thickness and Density of Sprayed Fire Resistive Material (SFRM) Applied to Structural Members

E709-08.....Standard Guide for Magnetic Particle Examination

E. American Welding Society (AWS):

D1.D1.1M-10.....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.; E329, C1077, D3666, D3740, A880, E543) 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 Resident Engineer. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall direct attention of Resident Engineer to such failure.

C. Written Reports: Testing laboratory shall submit test reports to Resident Engineer, Contractor, unless other arrangements are agreed to in writing by the Resident Engineer. Submit reports of tests that fail to meet construction contract requirements on colored paper.

D. Verbal Reports: Give verbal notification to Resident Engineer immediately of any irregularity.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 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.

3) 100 percent of tension member fillet welds (i.e., hanger connection plates and other similar connections) 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.

i. Verify that correction of rejected welds are made in accordance with AWS D1.1.

j. 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 Resident Engineer.

3.2 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 Resident Engineer.

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^2 (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^2 (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 Resident Engineer.

3.3 TYPE OF TEST:

Approximate Number of Tests Required

A. Structural Steel:

Ultrasonic Testing of Welds (ASTM E164)	_____
Magnetic Particle Testing of Welds (ASTM E709)	_____
Radiographic Testing of Welds (ASTM E94)	_____

B. Sprayed-On Fireproofing:

Thickness and Density Tests (ASTM E605)	___1__

C. Inspection:

Technical Personnel (Man-days)	_____

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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 Resident Engineer 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 Resident Engineer and the Contracting Officer 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 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 Resident Engineer. 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.
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 Resident Engineer.

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.

2. Control movement of materials and equipment at stream crossings during construction to prevent violation of water pollution control standards of the Federal, State, or local government.

3. Monitor water areas affected by construction.

D. Protection of Fish and Wildlife Resources: Keep construction activities under surveillance, management, and control to minimize interference with, disturbance of, or damage to fish and wildlife. Prior to beginning construction operations, list species that require specific attention along with measures for their protection.

E. 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 California and Bay Area Air Quality Management District 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.

F. 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 Resident Engineer. 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 by approved request. 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	--
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 Resident Engineer noting any problems and the alternatives for mitigating actions.

G. 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.

H. 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 Resident Engineer. 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

DESCRIPTION

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 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.

2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

1.3 REGULATORY COMPLIANCE

A. Buy American Act: Comply with 25.2 - Construction Materials.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Buy American Act: Except as otherwise indicated in Contract Documents, provide products complying with 25.2, Construction Materials.

3. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

4. Government reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
5. Where products are accompanied by the term "as selected," Architect will make selection.
6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.

C. Visual Matching Specification: Where Specifications require "match Architect's sample" or "match existing", provide a product that complies with requirements and matches material indicated. Architect's decision will be final on whether a proposed product matches.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

E. Match Existing Equipment: Where similar products exist in Medical Center and it is in the Government's best interest to provide identical products or products of the same manufacturer, such products are named in the Contract Documents or designated "to match existing equipment". Products so identified shall be considered exceptions to Buy American Act.

PART 3 - EXECUTION (Not Used)

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SECTION 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Installation of the Work.
2. Cutting and patching.
3. Coordination of Government-installed products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.

B. Related Requirements:

1. Section 01 00 00 GENERAL REQUIREMENTS for limits on use of Project site.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 INFORMATIONAL SUBMITTALS

A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
   a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

   a. Primary operational systems and equipment.

   b. Fire separation assemblies.

   c. Air or smoke barriers.

   d. Fire-suppression systems.

   e. Mechanical systems piping and ducts.

   f. Control systems.

   g. Communication systems.

   h. Fire-detection and -alarm systems.

   i. Conveying systems.

   j. Electrical wiring systems.

   k. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

   a. Water, moisture, or vapor barriers.

   b. Membranes and flashings.

   c. Sprayed fire-resistive material.

   d. Equipment supports.

   e. Piping, ductwork, vessels, and equipment.

   f. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.

2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

3. Inform installers of lines and levels to which they must comply.

4. Check the location, level and plumb, of every major element as the Work progresses.

5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.

5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

a. Clean piping, conduit, and similar features before applying paint or other finishing materials.

b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 VA-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for VA's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by VA's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for VA's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify COR if changes to schedule are required due to differences in actual construction progress.

3.7 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in applicable Sections.

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

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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.

C. Lead Paint: Section 02 83 33.13, LEAD BASED PAINT REMOVAL AND DISPOSAL.

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 recycle construction and demolition waste 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.wbdg.org/tools/cwm.php 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 Resident Engineer 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 01 81 13

SUSTAINABLE CONSTRUCTION REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section describes general requirements and procedures to comply with federal mandates and U.S. Department of Veterans Affairs (VA) policies for sustainable construction as summarized in the VA Sustainable Design Manual.

B. The Design Professional has selected materials and utilized integrated design processes that achieve the Government’s objectives. Contractor is responsible to maintain and support these objectives in developing means and methods for performing work and in proposing product substitutions or changes to specified processes. By submitting a change or substitution of materials or processes, contractor must demonstrate its diligence in performing the level of investigation and comparison required under federal mandates and VA policies.

1.2 RELATED WORK

A. Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

B. Section 01 74 19 CONSTRUCTION WASTE MANANGEMENT.

C. Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.

1.3 DEFINITIONS

A. Total Materials Cost: A tally of actual material cost from specification divisions 03 through 10, 31 (applicable to foundations) and 32 (applicable to paving, site improvements, and planting). Alternatively, 45 percent of total construction hard costs in those specification divisions.

B. Recycled Content: Recycled content of materials is defined according to Federal Trade Commission Guides for the Use of Environmental Marketing Claims (16 CFR Part 260). Recycled content value of a material assembly is determined by weight. Recycled fraction of assembly is multiplied by cost of assembly to determine recycled content value.

1. “Post-Consumer” material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
2. “Pre-Consumer” material is defined as material diverted from waste stream during the manufacturing process. Excluded is reutilization

of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

C. Biobased Products: Biobased products are derived from plants and other renewable agricultural, marine, and forestry materials and provide an alternative to conventional petroleum derived products. Biobased products include diverse categories such as lubricants, cleaning products, inks, fertilizers, and bioplastics.

D. Low Pollutant-Emitting Materials: Materials and products which are minimally odorous, irritating, or harmful to comfort and well-being of installers and occupants.

E. Volatile Organic Compounds (VOC): Chemicals that are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects.

1.4 REFERENCE STANDARDS

A. Carpet and Rug Institute Green Label Plus program.

B. U.S. Department of Agriculture BioPreferred program (USDA BioPreferred).

C. U.S. Environmental Protection Agency Comprehensive Procurement Guidelines (CPG).

D. U.S. Environmental Protection Agency WaterSense Program (WaterSense).

E. U.S. Environmental Protection Agency ENERGY STAR Program (ENERGY STAR).

F. U. S. Department of Energy Federal Energy Management Program (FEMP).

G. Green Electronic Council EPEAT Program (EPEAT).

1.5 SUBMITTALS

A. All submittals to be provided by contractor to COR/Resident Engineer and Architect.

B. Sustainability Action Plan:

1. Submit documentation as required by this section; provide additional copies of typical submittals required under technical sections when sustainable construction requires copies of record submittals.
2. Within 30 days after Preconstruction Meeting provide a narrative plan for complying with requirements stipulated within this section.
3. Sustainability Action Plan must:
   a. Make reference to sustainable construction submittals defined by this section.
   b. Address all items listed under PERFORMANCE CRITERIA.

c. Indicate individual(s) responsible for implementing the plan.

C. Project Materials Cost Data Spreadsheet: Within 30 days after the Preconstruction Meeting provide a preliminary Project Materials Cost Data Spreadsheet. The Project Materials Cost Data Spreadsheet must be an electronic file and indicate all materials in Divisions 3 through 10, 31, and 32 used for Project (excluding labor costs and excluding all mechanical, electrical, and plumbing system components), and be organized by specification section. The spreadsheet must include the following:

1. Identify each reused or salvaged material, its cost, and its replacement value.
2. Identify each recycled-content material, its post-consumer and pre-consumer recycled content as a percentage the product’s weight, its cost, its combined recycled content value, defined as the sum of post-consumer recycled content value plus one-half of pre-consumer recycled content value, and total combined recycled content value for all materials as a percentage of total materials costs.
3. Identify each biobased material, its source, its cost, and total value of biobased materials as a percentage of total materials costs.
4. Total cost for Project and total cost of building materials used for Project.

D. Low Pollutant-Emitting Materials Tracking Spreadsheet: Within 30 days after Preconstruction Meeting provide a preliminary Low Pollutant-Emitting Materials Tracking Spreadsheet. The Low Pollutant-Emitting Materials Tracking Spreadsheet must be an electronic file and include all materials on Project in categories described under Low Pollutant-Emitting Materials in 01 81 13.

E. Construction Indoor Air Quality (IAQ) Management Plan:

1. Not more than 30 days after Preconstruction Meeting provide a Construction IAQ Management Plan as an electronic file including descriptions of the following:
   a. Instruction procedures for meeting or exceeding minimum requirements of ANSI/SMACNA 008-2008, Chapter 3, including procedures for HVAC Protection, Source Control, Pathway Interruption, Housekeeping, and Scheduling.

b. Instruction procedures for protecting absorptive materials stored on-site or installed from moisture damage.
c. Schedule of submission of photographs of on-site construction IAQ management measures such as protection of ducts and on-site stored oil installed absorptive materials.
d. Instruction procedures if air handlers must be used during construction, including a description of filtration media to be used at each return air grille.
e. Instruction procedure for replacing all air-filtration media immediately prior to occupancy after completion of construction, including a description of filtration media to be used at each air handling or air supply unit.
f. Instruction procedures and schedule for implementing building flush-out.

F. Product Submittals:
1. Recycled Content: Submit product data from manufacturer indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content (excluding MEP systems equipment and components).
2. Biobased Content: Submittals for products to be installed or used included on the USDA BioPreferred program’s product category lists. Data to include biobased content and source of biobased material; indicating name of manufacturer, cost of each material.
3. Low Pollutant-Emitting Materials: Submit product data confirming compliance with relevant requirements for all materials on Project in categories described under Low Pollutant-Emitting Materials in 01 81 13.
4. For applicable products and equipment, product documentation confirming Energy Star label and EPEAT certification.

G. Sustainable Construction Progress Reports: Concurrent with each Application for Payment, submit a Sustainable Construction Progress Report to confirm adherence with Sustainability Action Plan.
1. Include narratives of revised strategies for bringing work progress into compliance with plan and product submittal data and calculations to demonstrate compliance with thresholds based on materials costs.
2. Include updated and current Project Materials Cost Data Spreadsheet.

3. Include updated and current Low Pollutant-Emitting Materials Tracking Spreadsheet.
4. Include construction waste tracking, in tons or cubic yards, including waste description, whether diverted or landfilled, hauler, and percent diverted for comingled quantities; and excluding land-clearing debris and soil. Provide haul receipts and documentation of diverted percentages for comingled wastes.

H. Closeout Submittals: Within 14 days after Substantial Completion provide the following:
1. Final version of Project Material Cost Data Spreadsheet.
2. Final version of Low Pollutant-Emitting Materials Tracking Spreadsheet.
3. Manufacturer’s cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for filtration media installed at return air grilles during construction if permanently installed air handling units are used during construction.
4. Manufacturer’s cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for final filtration media in air handling units.
5. Minimum 18 construction photographs including six photographs taken on three different occasions during construction of ANSI/SMACNA 008-2008, Chapter 3 approaches employed, along with a brief description of each approach, documenting implementation of IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.
6. Flush-out Documentation:
   a. Product data for filtration media used during flush-out.
   b. Product data for filtration media installed immediately prior to occupancy.
   c. Signed statement describing building air flush-out procedures including dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.

1.6 QUALITY ASSURANCE

A. Preconstruction Meeting: After award of Contract and prior to commencement of Work, schedule and conduct meeting with COR/Resident Engineer and Architect to discuss the Project Sustainable Action Plan content as it applies to submittals, project delivery, required

Construction Indoor Air Quality (IAQ) Management Plan, and other Sustainable Construction Requirements. The purpose of this meeting is to develop a mutual understanding of the Sustainable Construction Requirements and coordination of contractor's management of these requirements with the Contracting Officer and the Construction Quality Manager.

B. Construction Job Conferences: Status of compliance with Sustainable Construction Requirements of these specifications will be an agenda item at regular job meetings conducted during the course of work at the site.

1.7 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. Green Seal Standard GS-11, Paints, 1st Edition, May 20, 1993.

C. Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997.

D. Green Seal Standard GC-36, Commercial Adhesives, October 19, 2000.

E. South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.

F. South Coast Air Quality Management District (SCAQMD) Rule 1168, July 1, 2005 and rule amendment date of January 7, 2005.

G. Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd Edition (ANSI/SMACNA 008-2008), Chapter 3.

H. California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, Emission Testing method for California Specification 01350 (CDPH Standard Method V1.1-2010).

I. Federal Trade Commission Guides for the Use of Environmental Marketing Claims (16 CFR Part 260).

J. ASHRAE Standard 52.2-2007.

PART 2 - PRODUCTS

2.1 PERFORMANCE CRITERIA

A. Construction waste diversion from landfill disposal must comprise at least 50 percent of total construction waste, excluding land clearing debris and soil. Alternative daily cover (ADC) does not qualify as material diverted from disposal.

B. Low Pollutant-Emitting Materials:

1. Adhesives, sealants and sealant primers applied on site within the weatherproofing membrane must comply with VOC limits of SCAQMD Rule 1168:

a. Flooring Adhesives and Sealants:

1) Indoor carpet adhesives: 50 g/L.
2) Wood Flooring Adhesive: 100 g/L.
3) Rubber Floor Adhesives: 60 g/L.
4) Subfloor Adhesives: 50 g/L.
5) Ceramic Tile Adhesives and Grout: 65 g/L.
6) Cove Base Adhesives: 50 g/L.
7) Multipurpose Construction Adhesives: 70 g/L.
8) Porous Material (Except Wood) Substrate: 50 g/L.
9) Wood Substrate: 30 g/L.
10) Architectural Non-Porous Sealant Primer: 250 g/L.
11) Architectural Porous Sealant Primer: 775 g/L.
12) Other Sealant Primer: 750 g/L.
13) Structural Wood Member Adhesive: 140 g/L.
14) Sheet-Applied Rubber Lining Operations: 850 g/L.
15) Top and Trim Adhesive: 250 g/L.
16) Architectural Sealant: 250 g/L.
17) Other Sealant: 420 g/L.

b. Non-Flooring Adhesives and Sealants:

1) Drywall and Panel Adhesives: 50 g/L.
2) Multipurpose Construction Adhesives: 70 g/L.
3) Structural Glazing Adhesives: 100 g/L.
4) Metal-to-Metal Substrate Adhesives: 30 g/L.
5) Plastic Foam Substrate Adhesive: 50 g/L.
6) Porous Material (Except Wood) Substrate Adhesive: 50 g/L.
7) Wood Substrate Adhesive: 30 g/L.
8) Fiberglass Substrate Adhesive: 80 g/L.

9) Architectural Non-Porous Sealant Primer: 250 g/L.
10) Architectural Porous Sealant Primer: 775 g/L.
11) Other Sealant Primer: 750 g/L.
12) PVC Welding Adhesives: 510 g/L.
13) CPVC Welding Adhesives: 490 g/L.
14) ABS Welding Adhesives: 325 g/L.
15) Plastic Cement Welding Adhesives: 250 g/L.
16) Adhesive Primer for Plastic: 550 g/L.
17) Contact Adhesive: 80 g/L.
18) Special Purpose Contact Adhesive: 250 g/L.
19) Structural Wood Member Adhesive: 140 g/L.
20) Sheet Applied Rubber Lining Operations: 850 g/L.
21) Top and Trim Adhesive: 250 g/L.
22) Architectural Sealants: 250 g/L.
23) Other Sealants: 420 g/L.

2. Aerosol adhesives applied on site within the weatherproofing membrane must comply with the following Green Seal GS-36.
   a. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent VOCs by weight.
   b. Aerosol Adhesive, General-Purpose Web Spray: 55 percent VOCs by weight.
   c. Special-Purpose Aerosol Adhesive (All Types): 70 percent VOCs by weight.
3. Paints and coatings applied on site within the weatherproofing membrane must comply with the following criteria:
   a. VOC content limits for paints and coatings established in Green Seal Standard GS-11.
   b. VOC content limit for anti-corrosive and anti-rust paints applied to interior ferrous metal substrates of 250 g/L established in Green Seal GC-03.
   c. Clear wood finishes, floor coatings, stains, primers, sealers, and shellacs applied to interior elements must not exceed VOC content limits established in SCAQMD Rule 1113.
   d. Comply with the following VOC content limits:
      1) Anti-Corrosive/Antirust Paints: 250 g/L.
      2) Clear Wood Finish, Lacquer: 550 g/L.
      3) Clear Wood Finish, Sanding Sealer: 350 g/L.

4) Clear Wood Finish, Varnish: 350 g/L.
5) Floor Coating: 100 g/L.
6) Interior Flat Paint, Coating or Primer: 50 g/L.
7) Interior Non-Flat Paint, Coating or Primer: 150 g/L.
8) Sealers and Undercoaters: 200 g/L.
9) Shellac, Clear: 730 g/L.
10) Shellac, Pigmented: 550 g/L.
11) Stain: 250 g/L.
12) Clear Brushing Lacquer: 680 g/L.
13) Concrete Curing Compounds: 350 g/L.
14) Japans/Faux Finishing Coatings: 350 g/L.
15) Magnesite Cement Coatings: 450 g/L.
16) Pigmented Lacquer: 550 g/L.
17) Waterproofing Sealers: 250 g/L.
18) Wood Preservatives: 350 g/L.
19) Low-Solids Coatings: 120 g/L.

4. Carpet installed in building interior must comply with one of the following:
   a. Meet testing and product requirements of the Carpet and Rug Institute Green Label Plus program.
   b. Maximum VOC concentrations specified in CDPH Standard Method V1.1-2010, using office scenario at the 14 day time point.
5. Each non-carpet flooring element installed in building interior which is not inherently non-emitting (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) must comply with one of the following:
   a. Meet requirements of the FloorScore standard as shown with testing by an independent third-party.
   b. Maximum VOC concentrations specified in CDPH Standard Method V1.1-2010, using office scenario at 14 day time point.
6. Composite wood and agrifiber products used within the weatherproofing membrane must contain no added urea-formaldehyde resins.
7. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies must not contain added urea-formaldehyde.

C. Recycled Content:

1. Any product being installed or used that are listed on EPA Comprehensive Procurement Guidelines designated product list must meet or exceed the EPA's recycled content recommendations. The EPA Comprehensive Procurement Guidelines categories include:
   a. Building insulation.
   b. Cement and concrete.
   c. Consolidated and reprocessed latex paint.
   d. Floor tiles.
   e. Flowable fill.
   f. Laminated paperboard.
   g. Modular threshold ramps.
   h. Nonpressure pipe.
   i. Patio blocks.
   j. Railroad grade crossing surfaces.
   k. Roofing materials.
   l. Shower and restroom dividers/partitions.
   m. Structural fiberboard.
   n. Nylon carpet and nylon carpet backing.
   o. Compost and fertilizer made from recovered organic materials.
   p. Hydraulic mulch.
   q. Lawn and garden edging.
   r. Plastic lumber landscaping timbers and posts.
   s. Park benches and picnic tables.
   t. Plastic fencing.
   u. Playground equipment.
   v. Playground surfaces.
   w. Bike racks.
2. Provide building materials with recycled content such that post-consumer recycled content value plus half the pre-consumer recycled content value constitutes a minimum of [10] [20] percent of cost of materials used for Project, exclusive of mechanical, electrical and plumbing components, specialty items such as elevators, and labor and delivery costs.

D. Biobased Content:

1. Materials and equipment being installed or used that are listed on the USDA BioPreferred program product category list must meet or

exceed USDA's minimum biobased content threshold. Refer to individual specification sections for detailed requirements applicable to that section.

a. USDA BioPreferred program categories include:

1) Adhesive and Mastic Removers.
2) Carpets.
3) Cleaners.
4) Composite Panels.
5) Corrosion Preventatives.
6) Dust Suppressants.
7) Floor Cleaners and Protectors.
8) Floor Coverings (Non-Carpet).
9) Glass Cleaners.
10) Hydraulic Fluids.
11) Industrial Cleaners.
12) Interior Paints and Coatings.
13) Multipurpose Cleaners.
14) Multipurpose Lubricants.
15) Packaging Films.
16) Paint Removers.
17) Plastic Insulating Foam.
18) Pneumatic Equipment Lubricants.
19) Wastewater Systems Coatings.
20) Wood and Concrete Sealers.
21) Wood and Concrete Stains.

E. Materials, products, and equipment being installed which fall into a category covered by the WaterSense program must be WaterSense-labeled or meet or exceed WaterSense program performance requirements, unless disallowed for infection control reasons.

F. Materials, products, and equipment being installed which fall into a category covered by the Energy Star program must be Energy Star-labeled.

1. Energy Star product categories as of 05/19/2015 include:

a. Appliances:

1) Air Purifiers and Cleaners.
2) Clothes Dryers (Residential).
3) Clothes Washers (Residential).

4) Dehumidifiers.
5) Dishwashers (Residential).
6) Refrigerator (Residential).

b. Electronics and Information Technology:
1) Audio/Video Equipment.
2) Computers: Desktops, Workstations, and Thin Clients.
3) Computers: Notebooks and Integrated Computers.
4) Small-Scale Servers.
5) Data Center Storage.
6) Displays.
7) Enterprise Servers.
8) Imaging Equipment.
9) Set-Top and Cable Boxes.
10) Telephones.
11) Televisions.
12) Uninterruptible Power Supplies.

c. Food Service Equipment (Commercial):
1) Dishwashers.
2) Fryers.
3) Griddles.
4) Hot Food Holding Cabinets.
5) Ice Machines, Air-Cooled.
6) Ovens.
7) Refrigerated Beverage Vending Machines.
8) Refrigerators and Freezers.
9) Steam Cookers.

d. Heating and Cooling Equipment:
1) Air-Source Heat Pumps (Residential).
2) Boilers (Residential).
3) Ceiling Fans (Residential).
4) Central Air Conditioners (Residential).
5) Gas Furnaces (Residential).
6) Gas Storage Water Heaters (Residential).
7) Gas Water Heaters (Commercial).
8) Geothermal Heat Pumps (Residential).
9) Heat Pump Water Heaters (Residential).
10) Light Commercial Heating and Cooling Equipment.

11) Room Air Conditioners (Residential).
12) Solar Water Heaters (Residential).
13) Ventilation Fans (Residential).
14) Whole-Home Tankless Water Heaters (Residential).

e. Other:
1) Windows, Doors, and Skylights.

G. Materials, products, and equipment being installed which fall into a category covered by the FEMP program must be FEMP-designated. FEMP-designated product categories as of 05/19/2015 include:
1. Food Service Equipment (Commercial):
a. Ice Machines, Water-Cooled.
2. Heating and Cooling Equipment:
a. Boilers (Commercial).
b. Electric Chillers, Air-Cooled (Commercial).
c. Electric Chillers, Water-Cooled (Commercial).
d. Electric Resistance Water Heaters (Residential).
3. Lighting Equipment:
a. Exterior Lighting.
b. Fluorescent Ballasts.
c. Fluorescent Luminaires.
d. Industrial Lighting (High/Low Bay).
e. Suspended Luminaires.
4. Other Equipment:
a. Pre-Rinse Spray Valves.

H. Electronic products and equipment being installed which fall into a category covered by EPEAT program must be EPEAT registered.
1. Electronic products and equipment covered by EPEAT program as of 05/19/2015 include:
a. Computers: Desktops, Workstations, and Thin Clients.
b. Computers: Notebooks and Integrated Computers.
c. Displays.
d. Imaging Equipment.
e. Televisions.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Irrigation professionals must be certified under a WaterSense labeled certification program.

B. Construction Indoor Air Quality Management:

1. During construction, meet or exceed recommended control measures of ANSI/SMACNA 008-2008, Chapter 3.
2. Protect stored on-site and installed absorptive materials from moisture damage.
3. If permanently installed air handlers are used during construction, filtration media with a minimum efficiency reporting value (MERV) of 8 must be used at each return air grille, as determined by ASHRAE Standard 52.2-1999 (with errata but without addenda). Replace all filtration media immediately prior to occupancy.
4. Perform building flush-out as follows:
   a. After construction ends, prior to occupancy and with interior finishes installed, perform a building flush-out by supplying a total volume of 14000 cu. ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 degrees Fahrenheit and a relative humidity no higher than 60 percent. OR
   b. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. of outdoor air per sq. ft. of floor area to the space. Once a space is occupied, it must be ventilated at a minimum rate of 0.30 cfm per sq. ft. of outside air or design minimum outside air rate determined in Prerequisite EQ 1, whichever is greater. During each day of flush-out period, ventilation must begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions must be maintained until a total of 14000 cu. ft./sq. ft. of outside air has been delivered to the space.
5. Provide construction dust control to comply with SCAQMD Rule 403.

-----END----

SECTION 01 91 00

GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 COMMISSIONING DESCRIPTION

A. This Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS shall form the basis of the construction phase commissioning process and procedures. The Commissioning Agent shall add, modify, and refine the commissioning procedures, as approved by the Department of Veterans Affairs (VA), to suit field conditions and actual manufacturer's equipment, incorporate test data and procedure results, and provide detailed scheduling for all commissioning tasks.

B. Various sections of the project specifications require equipment startup, testing, and adjusting services. Requirements for startup, testing, and adjusting services specified in the Division 7, Division 21, Division 22, Division 23, Division 26, Division 27, Division 28, and Division 31 series sections of these specifications are intended to be provided in coordination with the commissioning services and are not intended to duplicate services. The Contractor shall coordinate the work required by individual specification sections with the commissioning services requirements specified herein.

C. Where individual testing, adjusting, or related services are required in the project specifications and not specifically required by this commissioning requirements specification, the specified services shall be provided and copies of documentation, as required by those specifications shall be submitted to the VA and the Commissioning Agent to be indexed for future reference.

D. Where training or educational services for VA are required and specified in other sections of the specifications, including but not limited to Division 7, Division 8, Division 21, Division 22, Division 23, Division 26, Division 27, Division 28, and Division 31 series sections of the specification, these services are intended to be provided in addition to the training and educational services specified herein.

E. Commissioning is a systematic process of verifying that the building systems perform interactively according to the construction documents and the VA’s operational needs. The commissioning process shall

encompass and coordinate the system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training. Commissioning during the construction and post-occupancy phases is intended to achieve the following specific objectives according to the contract documents:

1. Verify that the applicable equipment and systems are installed in accordance with the contact documents and according to the manufacturer's recommendations.
2. Verify and document proper integrated performance of equipment and systems.
3. Verify that Operations & Maintenance documentation is complete.
4. Verify that all components requiring servicing can be accessed, serviced and removed without disturbing nearby components including ducts, piping, cabling or wiring.
5. Verify that the VA’s operating personnel are adequately trained to enable them to operate, monitor, adjust, maintain, and repair building systems in an effective and energy-efficient manner.
6. Document the successful achievement of the commissioning objectives listed above.

F. The commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functioning product.

1.2 CONTRACTUAL RELATIONSHIPS

A. For this construction project, the Department of Veterans Affairs contracts with a Contractor to provide construction services. The contracts are administered by the VA Contracting Officer and the Resident Engineer as the designated representative of the Contracting Officer. On this project, the authority to modify the contract in any way is strictly limited to the authority of the Contracting Officer.

B. In this project, only two contract parties are recognized and communications on contractual issues are strictly limited to VA Resident Engineer and the Contractor. It is the practice of the VA to require that communications between other parties to the contracts (Subcontractors and Vendors) be conducted through the Resident Engineer and Contractor. It is also the practice of the VA that communications between other parties of the project (Commissioning Agent and Architect/Engineer) be conducted through the Resident Engineer.

C. Whole Building Commissioning is a process that relies upon frequent and direct communications, as well as collaboration between all parties to the construction process. By its nature, a high level of communication and cooperation between the Commissioning Agent and all other parties (Architects, Engineers, Subcontractors, Vendors, third party testing agencies, etc.) is essential to the success of the Commissioning effort.

D. With these fundamental practices in mind, the commissioning process described herein has been developed to recognize that, in the execution of the Commissioning Process, the Commissioning Agent must develop effective methods to communicate with every member of the construction team involved in delivering commissioned systems while simultaneously respecting the exclusive contract authority of the Contracting Officer and Resident Engineer. Thus, the procedures outlined in this specification must be executed within the following limitations:

1. No communications (verbal or written) from the Commissioning Agent shall be deemed to constitute direction that modifies the terms of any contract between the Department of Veterans Affairs and the Contractor.
2. Commissioning Issues identified by the Commissioning Agent will be delivered to the Resident Engineer and copied to the designated Commissioning Representatives for the Contractor and subcontractors on the Commissioning Team for information only in order to expedite the communication process. These issues must be understood as the professional opinion of the Commissioning Agent and as suggestions for resolution.
3. In the event that any Commissioning Issues and suggested resolutions are deemed by the Resident Engineer to require either an official interpretation of the construction documents or require a modification of the contract documents, the Contracting Officer or Resident Engineer will issue an official directive to this effect.
4. All parties to the Commissioning Process shall be individually responsible for alerting the Resident Engineer of any issues that they deem to constitute a potential contract change prior to acting on these issues.
5. Authority for resolution or modification of design and construction issues rests solely with the Contracting Officer or Resident

Engineer, with appropriate technical guidance from the Architect/Engineer and/or Commissioning Agent.

1.3 RELATED WORK

A. Section 01 00 00 GENERAL REQUIREMENTS.
B. Section 01 32 16.01 ARCHITECTURAL AND ENGINEERING CPM SCHEDULES
C. Section 01 32.16 NETWORK ANALYSIS SCHEDULES
D. Section 01 32.16.15 PROJECT SCHEDULES (SMALL PROJECTS – DESIGN/BID/BUILD)
E. Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES
F. Section 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS
G. Section 22 08 00 COMMISSIONING OF PLUMBING SYSTEMS.
H. Section 23 08 00 COMMISSIONING OF HVAC SYSTEMS.
I. Section 27 08 00 COMMISSIONING OF COMMUNICATIONS SYSTEMS.

1.4 SUMMARY

A. This Section includes general requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.
B. The commissioning activities have been developed to support the VA requirements to meet guidelines for Federal Leadership in Environmental, Energy, and Economic Performance.

1.5 ACRONYMS

List of Acronyms	
Acronym	Meaning
A/E	Architect / Engineer Design Team
AHJ	Authority Having Jurisdiction
ASHRAE	Association Society for Heating Air Condition and Refrigeration Engineers
BOD	Basis of Design
BSC	Building Systems Commissioning
CCTV	Closed Circuit Television
CD	Construction Documents
CMMS	Computerized Maintenance Management System
CO	Contracting Officer (VA)
COR	Contracting Officer’s Representative (see also VA-RE)
COBie	Construction Operations Building Information Exchange
CPC	Construction Phase Commissioning

List of Acronyms	
Acronym	Meaning
Cx	Commissioning
CxA	Commissioning Agent
CxM	Commissioning Manager
CxR	Commissioning Representative
DPC	Design Phase Commissioning
FPT	Functional Performance Test
GBI-GG	Green Building Initiative - Green Globes
HVAC	Heating, Ventilation, and Air Conditioning
NC	Department of Veterans Affairs National Cemetery
NCA	Department of Veterans Affairs National Cemetery Administration
NEBB	National Environmental Balancing Bureau
O&M	Operations & Maintenance
OPR	Owner’s Project Requirements
PFC	Pre-Functional Checklist
PFT	Pre-Functional Test
SD	Schematic Design
SO	Site Observation
TAB	Test Adjust and Balance
VA	Department of Veterans Affairs
VAMC	VA Medical Center
VA CFM	VA Office of Construction and Facilities Management
VACO	VA Central Office
VA PM	VA Project Manager
VA-RE	VA Resident Engineer
USGBC	United States Green Building Council

1.6 DEFINITIONS

Acceptance Phase Commissioning: Commissioning tasks executed after most construction has been completed, most Site Observations and Static Tests have been completed and Pre-Functional Testing has been completed and accepted. The main commissioning activities performed during this phase are verification that the installed systems are functional by conducting Systems Functional Performance tests and Owner Training.

Accuracy: The capability of an instrument to indicate the true value of a measured quantity.

Back Check: A back check is a verification that an agreed upon solution to a design comment has been adequately addressed in a subsequent design review

Basis of Design (BOD): The Engineer's Basis of Design is comprised of two components: the Design Criteria and the Design Narrative, these documents record the concepts, calculations, decisions, and product selections used to meet the Owner's Project Requirements (OPR) and to satisfy applicable regulatory requirements, standards, and guidelines.

Benchmarks: Benchmarks are the comparison of a building's energy usage to other similar buildings and to the building itself.. For example, ENERGY STAR Portfolio Manager is a frequently used and nationally recognized building energy benchmarking tool.

Building Information Modeling (BIM): Building Information Modeling is a parametric database which allows a building to be designed and constructed virtually in 3D, and provides reports both in 2D views and as schedules. This electronic information can be extracted and reused for pre-populating facility management CMMS systems. Building Systems Commissioning (BSC): NEBB acronym used to designate its commissioning program.

Calibrate: The act of comparing an instrument of unknown accuracy with a standard of known accuracy to detect, correlate, report, or eliminate by adjustment any variation in the accuracy of the tested instrument.

CCTV: Closed circuit Television. Normally used for security surveillance and alarm detections as part of a special electrical security system.

COBie: Construction Operations Building Information Exchange (COBie) is an electronic industry data format used to transfer information developed during design, construction, and commissioning into the Computer Maintenance Management Systems (CMMS) used to operate facilities. See the Whole Building Design Guide website for further information (http: www.wbdg.org/resources/cobie.php)

Commissionability: Defines a design component or construction process that has the necessary elements that will allow a system or component to be effectively measured, tested, operated and commissioned

Commissioning Agent (CxA): The qualified Commissioning Professional who administers the Cx process by managing the Cx team and overseeing the Commissioning Process. Where CxA is used in this specification it means the Commissioning Agent, members of his staff or appointed members of the commissioning team. Note that LEED uses the term Commissioning Authority in lieu of Commissioning Agent.

Commissioning Checklists: Lists of data or inspections to be verified to ensure proper system or component installation, operation, and function. Verification checklists are developed and used during all phases of the commissioning process to verify that the Owner's Project Requirements (OPR) is being achieved.

Commissioning Design Review: The commissioning design review is a collaborative review of the design professionals design documents for items pertaining to the following: owner's project requirements; basis of design; operability and maintainability (O&M) including documentation; functionality; training; energy efficiency, control systems' sequence of operations including building automation system features; commissioning specifications and the ability to functionally test the systems.

Commissioning Issue: A condition identified by the Commissioning Agent or other member of the Commissioning Team that adversely affects the commissionability, operability, maintainability, or functionality of a system, equipment, or component. A condition that is in conflict with the Contract Documents and/or performance requirements of the installed systems and components. (See also – Commissioning Observation).

Commissioning Manager (CxM): A qualified individual appointed by the Contractor to manage the commissioning process on behalf of the Contractor.

Commissioning Observation: An issue identified by the Commissioning Agent or other member of the Commissioning Team that does not conform to the project OPR, contract documents or standard industry best practices. (See also Commissioning Issue)

Commissioning Plan: A document that outlines the commissioning process, commissioning scope and defines responsibilities, processes, schedules, and the documentation requirements of the Commissioning Process.

Commissioning Process: A quality focused process for enhancing the delivery of a project. The process focuses upon verifying and

documenting that the facility and all of its systems, components, and assemblies are planned, designed, installed, tested, can be operated, and maintained to meet the Owner's Project Requirements.

Commissioning Report: The final commissioning document which presents the commissioning process results for the project. Cx reports include an executive summary, the commissioning plan, issue log, correspondence, and all appropriate check sheets and test forms.

Commissioning Representative (CxR): An individual appointed by a sub-contractor to manage the commissioning process on behalf of the sub-contractor.

Commissioning Specifications: The contract documents that detail the objective, scope and implementation of the commissioning process as developed in the Commissioning Plan.

Commissioning Team: Individual team members whose coordinated actions are responsible for implementing the Commissioning Process.

Construction Phase Commissioning: All commissioning efforts executed during the construction process after the design phase and prior to the Acceptance Phase Commissioning.

Contract Documents (CD): Contract documents include design and construction contracts, price agreements and procedure agreements. Contract Documents also include all final and complete drawings, specifications and all applicable contract modifications or supplements.

Construction Phase Commissioning (CPC): All commissioning efforts executed during the construction process after the design phase and prior to the Acceptance Phase Commissioning.

Coordination Drawings: Drawings showing the work of all trades that are used to illustrate that equipment can be installed in the space allocated without compromising equipment function or access for maintenance and replacement. These drawings graphically illustrate and dimension manufacturers’ recommended maintenance clearances. On mechanical projects, coordination drawings include structural steel, ductwork, major piping and electrical conduit and show the elevations and locations of the above components.

Data Logging: The monitoring and recording of temperature, flow, current, status, pressure, etc. of equipment using stand-alone data recorders.

Deferred System Test: Tests that cannot be completed at the end of the acceptance phase due to ambient conditions, schedule issues or other conditions preventing testing during the normal acceptance testing period.

Deficiency: See "Commissioning Issue".

Design Criteria: A listing of the VA Design Criteria outlining the project design requirements, including its source. These are used during the design process to show the design elements meet the OPR.

Design Intent: The overall term that includes the OPR and the BOD. It is a detailed explanation of the ideas, concepts, and criteria that are defined by the owner to be important. The design intent documents are utilized to provide a written record of these ideas, concepts and criteria.

Design Narrative: A written description of the proposed design solutions that satisfy the requirements of the OPR.

Design Phase Commissioning (DPC): All commissioning tasks executed during the design phase of the project.

Environmental Systems: Systems that use a combination of mechanical equipment, airflow, water flow and electrical energy to provide heating, ventilating, air conditioning, humidification, and dehumidification for the purpose of human comfort or process control of temperature and humidity.

Executive Summary: A section of the Commissioning report that reviews the general outcome of the project. It also includes any unresolved issues, recommendations for the resolution of unresolved issues and all deferred testing requirements.

Functionality: This defines a design component or construction process which will allow a system or component to operate or be constructed in a manner that will produce the required outcome of the OPR.

Functional Test Procedure (FTP): A written protocol that defines methods, steps, personnel, and acceptance criteria for tests conducted on components, equipment, assemblies, systems, and interfaces among systems.

Industry Accepted Best Practice: A design component or construction process that has achieved industry consensus for quality performance and functionality. Refer to the current edition of the NEBB Design Phase Commissioning Handbook for examples.

Installation Verification: Observations or inspections that confirm the system or component has been installed in accordance with the contract documents and to industry accepted best practices.

Integrated System Testing: Integrated Systems Testing procedures entail testing of multiple integrated systems performance to verify proper functional interface between systems. Typical Integrated Systems Testing includes verifying that building systems respond properly to loss of utility, transfer to emergency power sources, re-transfer from emergency power source to normal utility source; interface between HVAC controls and Fire Alarm systems for equipment shutdown, interface between Fire Alarm system and elevator control systems for elevator recall and shutdown; interface between Fire Alarm System and Security Access Control Systems to control access to spaces during fire alarm conditions; and other similar tests as determined for each specific project.

Issues Log: A formal and ongoing record of problems or concerns – and their resolution – that have been raised by members of the Commissioning Team during the course of the Commissioning Process.

Lessons Learned Workshop: A workshop conducted to discuss and document project successes and identify opportunities for improvements for future projects.

Maintainability: A design component or construction process that will allow a system or component to be effectively maintained. This includes adequate room for access to adjust and repair the equipment. Maintainability also includes components that have readily obtainable repair parts or service.

Manual Test: Testing using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the ‘observation’).

Owner’s Project Requirements (OPR): A written document that details the project requirements and the expectations of how the building and its systems will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

Peer Review: A formal in-depth review separate from the commissioning review processes. The level of effort and intensity is much greater than a typical commissioning facilitation or extended commissioning

review. The VA usually hires an independent third-party (called the IDIQ A/E) to conduct peer reviews.

Precision: The ability of an instrument to produce repeatable readings of the same quantity under the same conditions. The precision of an instrument refers to its ability to produce a tightly grouped set of values around the mean value of the measured quantity.

Pre-Design Phase Commissioning: Commissioning tasks performed prior to the commencement of design activities that includes project programming and the development of the commissioning process for the project

Pre-Functional Checklist (PFC): A form used by the contractor to verify that appropriate components are onsite, correctly installed, set up, calibrated, functional and ready for functional testing.

Pre-Functional Test (PFT): An inspection or test that is done before functional testing. PFT's include installation verification and system and component start up tests.

Procedure or Protocol: A defined approach that outlines the execution of a sequence of work or operations. Procedures are used to produce repeatable and defined results.

Range: The upper and lower limits of an instrument's ability to measure the value of a quantity for which the instrument is calibrated.

Resolution: This word has two meanings in the Cx Process. The first refers to the smallest change in a measured variable that an instrument can detect. The second refers to the implementation of actions that correct a tested or observed deficiency.

Site Observation Visit: On-site inspections and observations made by the Commissioning Agent for the purpose of verifying component, equipment, and system installation, to observe contractor testing, equipment start-up procedures, or other purposes.

Site Observation Reports (SO): Reports of site inspections and observations made by the Commissioning Agent. Observation reports are intended to provide early indication of an installation issue which will need correction or analysis.

Special System Inspections: Inspections required by a local code authority prior to occupancy and are not normally a part of the commissioning process.

Static Tests: Tests or inspections that validate a specified static condition such as pressure testing. Static tests may be specification or code initiated.

Start Up Tests: Tests that validate the component or system is ready for automatic operation in accordance with the manufactures requirements.

Systems Manual: A system-focused composite document that includes all information required for the owners operators to operate the systems.

Test Procedure: A written protocol that defines methods, personnel, and expectations for tests conducted on components, equipment, assemblies, systems, and interfaces among systems.

Testing: The use of specialized and calibrated instruments to measure parameters such as: temperature, pressure, vapor flow, air flow, fluid flow, rotational speed, electrical characteristics, velocity, and other data in order to determine performance, operation, or function.

Testing, Adjusting, and Balancing (TAB): A systematic process or service applied to heating, ventilating and air-conditioning (HVAC) systems and other environmental systems to achieve and document air and hydronic flow rates. The standards and procedures for providing these services are referred to as “Testing, Adjusting, and Balancing” and are described in the Procedural Standards for the Testing, Adjusting and Balancing of Environmental Systems, published by NEBB or AABC.

Thermal Scans: Thermographic pictures taken with an Infrared Thermographic Camera. Thermographic pictures show the relative temperatures of objects and surfaces and are used to identify leaks, thermal bridging, thermal intrusion, electrical overload conditions, moisture containment, and insulation failure.

Training Plan: A written document that details, in outline form the expectations of the operator training. Training agendas should include instruction on how to obtain service, operate, startup, shutdown and maintain all systems and components of the project.

Trending: Monitoring over a period of time with the building automation system.

Unresolved Commissioning Issue: Any Commissioning Issue that, at the time that the Final Report or the Amended Final Report is issued that has not been either resolved by the construction team or accepted by

the VA. Validation: The process by which work is verified as complete and operating correctly:

1. First party validation occurs when a firm or individual verifying the task is the same firm or individual performing the task.
2. Second party validation occurs when the firm or individual verifying the task is under the control of the firm performing the task or has other possibilities of financial conflicts of interest in the resolution (Architects, Designers, General Contractors and Third Tier Subcontractors or Vendors).
3. Third party validation occurs when the firm verifying the task is not associated with or under control of the firm performing or designing the task.

Verification: The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems are confirmed to comply with the criteria described in the Owner's Project Requirements.

Warranty Phase Commissioning: Commissioning efforts executed after a project has been completed and accepted by the Owner. Warranty Phase Commissioning includes follow-up on verification of system performance, measurement and verification tasks and assistance in identifying warranty issues and enforcing warranty provisions of the construction contract.

Warranty Visit: A commissioning meeting and site review where all outstanding warranty issues and deferred testing is reviewed and discussed.

Whole Building Commissioning: Commissioning of building systems such as Building Envelope, HVAC, Electrical, Special Electrical (Fire Alarm, Security & Communications), Plumbing and Fire Protection as described in this specification.

1.7 SYSTEMS TO BE COMMISSIONED

A. Commissioning of a system or systems specified for this project is part of the construction process. Documentation and testing of these systems, as well as training of the VA's Operation and Maintenance personnel, is required in cooperation with the VA and the Commissioning Agent.

B. The following systems will be commissioned as part of this project:
   1. All installed lab equipment, including but not limited to:

a. Operating Lights and Booms

b. Satellite Pharmacy Glove Box IV Compounding Cabinet

2. All equipment of heating, ventilating and air conditioning systems both mechanical and plumbing, and direct digital controls.

3. Life safety systems (smoke and fire alarm, fire suppression, fire/smoke dampers, sliding doors)

4. New Domestic water distribution, steam to steam humidifier, new chilled water system and new DI water system on the roof.

5. Emergency Power Systems: including Emergency Lighting

6. All electrical and lighting control systems, including but not limited to electrical distribution system, normal power, emergency power, grounding/bonding, electrical monitoring, substations, lighting control systems.

7. Public Address System

8. Noise and vibration control

9. Data and Communication:

a. TV/cable

b. Ground/bonding

c. Security, Access Control System, Video surveillance

1.8 COMMISSIONING TEAM

A. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project Superintendent and subcontractors, installers, schedulers, suppliers, and specialists deemed appropriate by the Department of Veterans Affairs (VA) and Commissioning Agent.

B. Members Appointed by Contractor:

1. Contractor' Commissioning Manager: The designated person, company, or entity that plans, schedules and coordinates the commissioning activities for the construction team.

2. Contractor's Commissioning Representative(s): Individual(s), each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions.

C. Members Appointed by VA:

1. Commissioning Agent: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to

SECTION 02 41 00
DEMOLITION

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies demolition and removal of portions of buildings, utilities, other structures, debris and lead sheet shielding shown.

1.2 RELATED WORK:

A. Safety Requirements: Section 01 35 26 Safety Requirements Article, ACCIDENT PREVENTION PLAN (APP).

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. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

E. Construction Waste Management: Section 017419 CONSTRUCTION WASTE MANAGEMENT.

F. Infectious Control: Section 01 00 00, GENERAL REQUIREMENTS, Article 1.7, 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 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.
   3. 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.
   4. 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 Resident Engineer. 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 Resident Engineer’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 1.7 INFECTION PREVENTION MEASURES.

1.4 UTILITY SERVICES:

A. Demolish and remove outside utility service lines shown to be removed.

B. Remove abandoned outside 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. Completely demolish and remove structures, including all appurtenances related or connected thereto, as noted below:
   1. As required for installation of new utility service lines.
   2. To full depth within an area defined by hypothetical lines located 1500 mm (5 feet) outside building lines of new structures.

B. Debris, including brick, concrete, stone, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off the Medical Center to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Resident Engineer. Break up concrete slabs below grade that do not require removal from present location into pieces not exceeding 600 mm (24 inches) square to permit drainage. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations.

C. Remove and legally dispose of all materials, other than earth to remain as part of project work. 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. The removal of hazardous material shall be referred to Hazardous Materials specifications.
   1. Lead Sheet Removal: The following provisions will apply for areas of lead sheet removal shown in the drawings.
      a. Lead Control Area Requirements.
         i. Establish a lead control area by completely enclosing with containment screens within the area where lead-sheet removal operations will be performed.
         ii. Contain removal operations by the use of a negative pressure full containment system with at least one change room and with HEPA filtered exhaust.
      b. Lead Sheet material must be recycled in accordance with applicable local, state, and federal laws.
      c. All work related to lead sheet removal shall be performed by experienced personnel.
      d. Disposal Documentation: Submit written evidence that the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead disposal by the EPA and state or local

regulatory agencies. Submit one copy of the completed manifest, signed and dated by the initial transporter in accordance with 40 CFR 262.

D. 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 Resident Engineer. When Utility lines are encountered that are not indicated on the drawings, the Resident Engineer shall be notified prior to further work in that area.

3.2 CLEAN-UP:

On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to Resident Engineer. 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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SECTION 02 83 33.13
LEAD-BASED PAINT REMOVAL AND DISPOSAL

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies abatement and disposal of lead-based paint (LBP) and controls needed to limit occupational and environmental exposure to lead hazards.

1.2 RELATED WORK

A. Section 02 82 11, TRADITIONAL ASBESTOS ABATEMENT.

B. Section 02 41 00, DEMOLITION.

C. Section 09 91 00, PAINTING.

1.3 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 basic designation only.

B. Code of Federal Regulations (CFR):

CFR 29 Part 1910.....Occupational Safety and Health Standards

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

CFR 40 Part 148.....Hazardous Waste Injection Restrictions

CFR 40 Part 260.....Hazardous Waste Management System: General

CFR 40 Part 261.....Identification and Listing of Hazardous Waste

CFR 40 Part 262.....Standards Applicable to Generators of Hazardous Waste

CRF 40 Part 263.....Standards Applicable to Transporters of Hazardous Waste

CFR 40 Part 264.....Standards for Owners and Operations of Hazardous Waste Treatment, Storage, and Disposal Facilities

CFR 40 Part 265.....Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

CFR 40 Part 268.....Land Disposal Restrictions

CFR 49 Part 172.....Hazardous Material Table, Special Provisions, Hazardous Material Communications, Emergency Response Information, and Training Requirements

CFR 49 Part 178.....Specifications for Packaging

C. National Fire Protection Association (NFPA):

NFPA 701-2004.....Methods of Fire Test for Flame-Resistant Textiles and Films

D. National Institute for Occupational Safety And Health (NIOSH)
NIOSH OSHA Booklet 3142. Lead in Construction

E. Underwriters Laboratories (UL)
UL 586-1996 (Rev 2009).. High-Efficiency, Particulate, Air Filter Units

F. American National Standards Institute
Z9.2-2006.....Fundamentals Governing the Design and Operation of Local Exhaust Systems
Z88.6-2006.....Respiratory Protection

1.4 DEFINITIONS

A. Action Level: Employee exposure, without regard to use of respirations, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period. As used in this section, ”30 micrograms per cubic meter of air" refers to the action level.

B. Area Monitoring: Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.

C. Physical Boundary: Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead control area."

D. Certified Industrial Hygienist (CIH): As used in this section, refers to an Industrial Hygienist employed by the Contractor and is certified by the American Board of Industrial Hygiene in comprehensive practice.

E. Change Rooms and Shower Facilities: Rooms within the designated physical boundary around the lead control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross- contamination.

F. Competent Person: A person capable of identifying lead hazards in the work area and is authorized by the contractor to take corrective action.

G. Decontamination Room: Room for removal of contaminated personal protective equipment (PPE).

H. Eight-Hour Time Weighted Average (TWA): Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

I. High Efficiency Particulate Air (HEPA) Filter Equipment: HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency

particulate filter means 99.97 percent efficient against 0.3 micron size particles.

J. Lead: Metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.

K. Lead Control Area: An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-containing paint removal operations. The lead control area is isolated by physical boundaries to prevent unauthorized entry of personnel.

L. Lead Permissible Exposure Limit (PEL): Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1910.1025. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following formula. PEL (micrograms/cubic meter of air) = 400/No. of hrs worked per day

M. Personnel Monitoring: Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1910.1025. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 150 mm to 225 mm (6 to 9 inches) and the center at the nose or mouth of an employee.

1.5 QUALITY ASSURANCE

A. Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by 29 CFR 1926.62 (I) (1) (i) & (ii). The examination shall not be required if adequate records show that employees have been examined as required by 29 CFR 1926.62(I) without the last year.

B. Medical Records: Maintain complete and accurate medical records of employees in accordance with 29 CFR 1910.20.

C. CIH Responsibilities: The Contractor shall employ a certified Industrial Hygienist who will be responsible for the following:

1. Certify Training.
2. Review and approve lead-containing paint removal plan for conformance to the applicable referenced standards.
3. Inspect lead-containing paint removal work for conformance with the approved plan.
4. Direct monitoring.
5. Ensure work is performed in strict accordance with specifications at all times.

6. Ensure hazardous exposure to personnel and to the environment are adequately controlled at all times.

D. Training: Train each employee performing paint removal, disposal, and air sampling operations prior to the time of initial job assignment, in accordance with 29 CFR 1926.62.

E. Training Certification: Submit certificates signed and dated by the CIH and by each employee stating that the employee has received training.

F. Respiratory Protection Program:

1. Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at least every 6 months thereafter as required by 29 CFR 1926.62.
2. Establish and implement a respiratory protection program as required by 29 CFR 1910.134, 29 CFR 1910.1025, and 29 CFR 1926.62.

G. Hazard Communication Program: Establish and implement a Hazard Communication Program as required by 29 CFR 1910.1200.

H. Hazardous Waste Management: The Hazardous Waste Management plan shall comply with applicable requirements of Federal, State, and local hazardous waste regulations and address:

1. Identification of hazardous wastes associated with the work.
2. Estimated quantities of wastes to be generated and disposed of.
3. Names and qualifications of each contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of EPA, state and local hazardous waste permit applications, permits and EPA Identification numbers.
4. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.
5. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.
6. Spill prevention, containment, and cleanup contingency measures to be implemented.
7. Work plan and schedule for waste containment, removal and disposal. Wastes shall be cleaned up and containerized daily.
8. Cost for hazardous waste disposal according to this plan.

I. Safety and Health Compliance:

1. In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding removing, handling, storing,

transporting, and disposing of lead waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1910.1025. Submit matters regarding interpretation of standards to the Contracting Officer for resolution before starting work.

2. Where specification requirements and the referenced documents vary, the most stringent requirements shall apply.

J. Pre-Construction Conference: Along with the CIH, meet with the Contracting Officer to discuss in detail the lead-containing paint removal work plan, including work procedures and precautions for the work plan.

1.6 SUBMITTALS

A. Submit the following in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Catalog Data:
Vacuum filters
Respirators

C. Instructions: Paint removal materials. Include applicable material safety data sheets.

D. Statements Certifications and Statements:

1. Qualifications of CIH: Submit name, address, and telephone number of the CIH selected to perform responsibilities in paragraph entitled "CIH Responsibilities." Provide previous experience of the CIH. Submit proper documentation that the Industrial Hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification.

2. Testing Laboratory: Submit the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne concentrations of lead. Provide proper documentation that persons performing the analysis have been judged proficient by successful participation within the last year in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program. The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/reaccreditation.

3. Lead-Containing Paint Removal Plan:

a. Submit a detailed job-specific plan of the work procedures to be used in the removal of lead-containing paint. The plan shall

include a sketch showing the location, size, and details of lead control areas, location and details of decontamination rooms, change rooms, shower facilities, and mechanical ventilation system.

b. Include in the plan, eating, drinking, smoking and restroom procedures, interface of trades, sequencing of lead related work, collected wastewater and paint debris disposal plan, air sampling plan, respirators, protective equipment, and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of 30 micrograms per cubic meter of air are not exceeded outside of the lead control area.

c. Include air sampling, training and strategy, sampling methodology, frequency, duration of sampling, and qualifications of air monitoring personnel in the air sampling portion on the plan.

4. Field Test Reports: Monitoring Results: Submit monitoring results to the Contracting Officer within 3 working days, signed by the testing laboratory employee performing the air monitoring, the employee that analyzed the sample, and the CIH.

5. Records:

a. Completed and signed hazardous waste manifest from treatment or disposal facility.

b. Certification of Medical Examinations.

c. Employee training certification.

PART 2 PRODUCTS

PAINT REMOVAL PRODUCTS: Submit applicable Material Safety Data Sheets for paint removal products used in paint removal work. Use the least toxic product, suitable for the job and acceptable to the Industrial Hygienist.

PART 3 EXECUTION

3.1 PROTECTION

A. Notification: Notify the Contracting Officer 20 days prior to the start of any paint removal work.

B. Lead Control Area Requirements.

1. Establish a lead control area by completely enclosing with containment screens the area or structure where lead-containing paint removal operations will be performed.

2. Contain removal operations by the use of a negative pressure full containment system with at least one change room and with HEPA filtered exhaust.

C. Protection of Existing Work to Remain: Perform paint removal work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition.

D. Boundary Requirements: Provide physical boundaries around the lead control area by roping off the area [designated on the drawings] or providing curtains, portable partitions or other enclosures to ensure that airborne concentrations of lead will not reach 30 micrograms per cubic meter of air outside of the lead control area.

E. Heating, Ventilating and Air Conditioning (HVAC) Systems: Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead control areas. Seal intake and exhaust vents in the lead control area with 6-mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead control area.

F. Change Room and Shower Facilities: Provide clean change rooms and shower facilities within the physical boundary around the designated lead control area in accordance with requirements of 29 CFR 1926.62.

G. Mechanical Ventilation System:

1. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.57.
2. To the extent feasible, use fixed local exhaust ventilation connected to HEPA filters or other collection systems, approved by the industrial hygienist. Local exhaust ventilation systems shall be designed, constructed, installed, and maintained in accordance with ANSI Z9.2.
3. If air from exhaust ventilation is recirculated into the work place, the system shall have a high efficiency filter with reliable back-up filter and controls to monitor the concentration of lead in the return air and to bypass the recirculation system automatically if it fails. Air may be recirculated only where exhaust to the outside is not feasible.

H. Personnel Protection: Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking is not permitted in the lead control area. No one will be permitted in the lead control area unless they have been given appropriate training and protective equipment.

I. Warning Signs: Provide warning signs at approaches to lead control areas. Locate signs at such a distance that personnel may read the sign

and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

3.2 WORK PROCEDURES

A. Perform removal of lead-containing paint in accordance with approved lead-containing paint removal plan. Use procedures and equipment required to limit occupational and environmental exposure to lead when lead- containing paint is removed in accordance with 29 CFR 1926.62, except as specified herein. Dispose of removed paint chips and associated waste in compliance with Environmental Protection Agency (EPA), federal, state, and local requirements.

B. Personnel Exiting Procedures:

1. Whenever personnel exist the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any clothing or equipment worn during the work day:
   a. Vacuum themselves off.
   b. Remove protective clothing in the decontamination room, and place them in an approved impermeable disposal bag.
   c. Shower.
   d. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.

C. Monitoring: Monitoring of airborne concentrations of lead shall be in accordance with 29 CFR 1910.1025 and as specified herein. Air monitoring, testing, and reporting shall be performed by a CIH or an Industrial Hygiene (IH) Technician who is under the direction of the CIH:

1. The CIH or the IH Technician under the direction of the CIH shall be on the job site directing the monitoring, and inspecting the lead-containing paint removal work to ensure that the requirements of the Contract have been satisfied during the entire lead-containing paint removal operation.
2. Take personal air monitoring samples on employees who are anticipated to have the greatest risk of exposure as determined by the CIH. In addition, take air monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.
3. Submit results of air monitoring samples, signed by the CIH, within 24 hours after the air samples are taken. Notify the Contracting Officer immediately of exposure to lead at or in excess of the action

level of 30 micrograms per cubic meter of air outside of the lead control area.

D. Monitoring During Paint Removal Work:

1. Perform personal and area monitoring during the entire paint removal operation. Sufficient area monitoring shall be conducted at the physical boundary to ensure unprotected personnel are not exposed above 30 micrograms per cubic meter of air at all times. If the outside boundary lead levels are at or exceed 30 micrograms per cubic meter of air, work shall be stopped and the CIH shall immediately correct the condition(s) causing the increased levels and notify the Contracting Officer immediately.
2. The CIH shall review the sampling data collected on that day to determine if condition(s) requires any further change in work methods. Removal work shall resume when approval is given by the CIH. The Contractor shall control the lead level outside of the work boundary to less than 30 micrograms per cubic meter of air at all times. As a minimum, conduct area monitoring daily on each shift in which lead paint removal operations are performed in areas immediately adjacent to the lead control area.
3. For outdoor operations, at least one sample on each shift shall be taken on the downwind side of the lead control area. If adjacent areas are contaminated, clean and visually inspect contaminated areas. The CIH shall certify that the area has been cleaned of lead contamination.

3.3 LEAD-CONTAINING PAINT REMOVAL

A. Remove paint within the areas designated on the drawings in order to completely expose the substrate. Take whatever precautions are necessary to minimize damage to the underlying substrate.

B. Indoor Lead Paint Removal: Select paint removal processes to minimize contamination of work areas with lead-contaminated dust or other lead-contaminated debris/waste. This paint removal process should be described in the lead-containing paint removal plan. Perform manual sanding and scraping to the maximum extent feasible.

C. Mechanical Paint Removal and Blast Cleaning: Perform mechanical paint removal and blast cleaning in lead control areas using negative pressure full containments with HEPA filtered exhaust. Collect paint residue and spent grit (used abrasive) from blasting operations for disposal in accordance with EPA, state and local requirements.

D. Outside Lead Paint Removal: Select removal processes to minimize contamination of work areas with lead-contaminated dust or other lead-contaminated debris/waste. This paint removal process should be described in the lead-containing paint removal plan. Perform manual sanding and scraping to the maximum extent feasible.

3.4 SURFACE PREPARATIONS

Avoid flash rusting or other deterioration of the substrate. Provide surface preparations for painting in accordance with Section 09 91 00, PAINTING.

3.5 CLEANUP AND DISPOSAL

A. Cleanup: Maintain surfaces of the lead control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the paint removal operation has been completed, clean the area of visible lead paint contamination by vacuuming with a HEPA filtered vacuum cleaner and wet mopping the area.

B. Certification: The CIH shall certify in writing that the inside and outside the lead control area air monitoring samples are less than 30 micrograms per cubic meter of air, the respiratory protection for the employees was adequate, the work procedures were performed in accordance with 29 CFR 1926.62, and that there were no visible accumulations of lead-contaminated paint and dust on the worksite. Do not remove the lead control area or roped-off boundary and warning signs prior to the Contracting Officer's receipt of the CIH's certification. Reclean areas showing dust or residual paint chips.

C. Testing of Lead-Containing Paint Residue and Used Abrasive Where indicated or when directed by the Contracting Officer, test lead containing paint residue and used abrasive in accordance with 40 CFR 261 for hazardous waste.

D. Disposal:

1. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and lead-contaminated clothing, which may produce airborne concentrations of lead particles.
2. Store removed paint, lead-contaminated clothing and equipment, and lead-contaminated dust and cleaning debris into U.S. Department of Transportation (49 CFR 178) approved 55-gallon drums. Properly labels each drum to identify the type of waste (49 CFR 172) and the date

lead-contaminated wastes were first put into the drum. Obtain and complete the Uniform Hazardous Waste Manifest forms from Activity Staff Civil Engineer. Comply with land disposal restriction notification requirements as required by 40 CFR 268:

a. At least 14 days prior to delivery, notify the Contracting Officer who will arrange for job site inspection of the drums and manifests by [PWC Hazardous Waste Storage Facility personnel].
b. As necessary, make lot deliveries of hazardous wastes to the PWC Hazardous Waste Storage Facility to ensure that drums do not remain on the jobsite longer than 90 calendar days from the date affixed to each drum.

a. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and lead-contaminated clothing which may produce airborne concentrations of lead particles. Label the containers in accordance with 29 CFR 1926.62. Dispose of lead-contaminated waste material at a EPA or state approved hazardous waste treatment, storage, or disposal facility off Government property.
b. Store waste materials in U.S. Department of Transportation (49 CFR 178) approved 55-gallon drums. Properly label each drum to identify the type of waste (49 CFR 172) and the date the drum was filled. The Contracting Officer or an authorized representative will assign an area for interim storage of waste-containing drums. Do not store hazardous waste drums in interim storage longer than 90 calendar days from the date affixed to each drum.
c. Handle, store, transport, and dispose lead or lead-contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

E. Disposal Documentation Submit written evidence that the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead disposal by the EPA and state or local regulatory agencies. Submit one copy of the completed manifest, signed and dated by the initial transporter in accordance with 40 CFR 262.

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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. Frames
3. Shelf Angles
4. Steel Counter or Bench Top Frame and Leg
5. Modular Channel Units

1.2 RELATED WORK

A. Colors, finishes, and textures: Section 09 06 00, SCHEDULE FOR FINISHES.

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. Manufacturer's Literature and Data: Manufacturer's specifications, load tables, dimensions, diagrams, anchor details, and installation instructions for products to be used in the fabrication of Work, including paint products. C. 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.

D. Manufacturer's Certificates:

1. Anodized finish as specified.
2. Live load designs as specified.

E. Design Calculations for specified live loads including dead loads.

1. Structural Calculations: Submit structural engineering calculations from the substantiating that the design, anchorage and support of metal fabrications and related components/accessories comply with necessary structural and safety requirements of applicable Codes and

Regulations. Calculations shall be stamped and signed by an engineer registered in the State of California.

F. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction.

G. Qualifications: Submit copies of welder, welding operator, and/ or tacker qualifications.

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 presently 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.

E. Welding procedures and operations shall be performed in accordance with referenced AWS Codes and Publications.

F. Welder, Welding Operator, and Tacker Qualifications:

1. All welders, welding operators, and tackers shall be AWS qualified in accordance with referenced AWS Codes and Publications for the welding to be performed.
2. Welders, welding operators, and tackers who have not performed welding for a period of three or more months shall be re-qualified.
3. Welders, welding operators, and tackers whose work fails to pass inspection shall be re-qualified before performing further Work.

G. Welding and Fastener Criteria:

1. All welding and fasteners sizes shown on the Drawings are minimum requirements. Under NO conditions shall welding and fasteners sizes be smaller than the sizes shown on the Drawings, even when a smaller size is proven adequate by calculation.
2. All exposed welded joints shall be ground smooth and made flush with adjacent finish surfaces, unless otherwise noted. Make exposed joints butt tight, flush and hairline.

H. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible; do not delay job progress; allow for trimming and fitting where necessary.

I. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

J. VOC Limits for Field-Applied Primers, Coatings and Paints:

1. Provide paint and coating materials that conform to Federal, State, and Local restrictions for Volatile Organic Compounds (VOC) content.
2. Meet the requirements set forth by Green Seal Standard GS-03, Anti-Corrosive Paints, Second Edition, January 7, 1997, for anti-corrosive and anti-rust paints applied to interior ferrous metal substrates.

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):

B18.6.1-97.....Wood Screws
B18.2.2-87(R2005).....Square and Hex Nuts

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

A36/A36M-08.....Structural Steel
A47-99(R2009).....Malleable Iron Castings
A48-03(R2008).....Gray Iron Castings
A53-10.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A123-09.....Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
A240/A240M.....Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

A269-10.....Seamless and Welded Austenitic Stainless Steel Tubing for General Service
A307-10.....Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
A312/A312M-09.....Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
A391/A391M-07.....Grade 80 Alloy Steel Chain

A653/A653M-10.....Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

A786/A786M-09.....Rolled Steel Floor Plate

B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes

B456-03(R2009).....Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium

B632-08.....Aluminum-Alloy Rolled Tread Plate

C1107-08.....Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

D3656-07.....Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns

F436-10.....Hardened Steel Washers

F468-10.....Nonferrous Bolts, Hex Cap Screws, and Studs for General Use

F593-02(R2008).....Stainless Steel Bolts, Hex Cap Screws, and Studs

F1667-11.....Driven Fasteners: Nails, Spikes and Staples

D. American Welding Society (AWS):

D1.1-10.....Structural Welding Code Steel

D1.2-08.....Structural Welding Code Aluminum

D1.3-08.....Structural Welding Code Sheet Steel

E. National Association of Architectural Metal Manufacturers (NAAMM)

AMP 521-01.....Pipe Railing Manual

AMP 500-06.....Metal Finishes Manual

MBG 531-09.....Metal Bar Grating Manual

MBG 532-09.....Heavy Duty Metal Bar Grating Manual

F. Structural Steel Painting Council (SSPC)/Society of Protective Coatings:

SP 1-04.....No. 1, Solvent Cleaning

SP 2-04.....No. 2, Hand Tool Cleaning

SP 3-04.....No. 3, Power Tool Cleaning

G. Federal Specifications (Fed. Spec):

RR-T-650E.....Treads, Metallic and Nonmetallic, Nonskid

PART 2 – PRODUCTS

2.1 DESIGN CRITERIA

A. In addition to the dead loads, design fabrications to support live loads unless otherwise specified.

2.2 MATERIALS

A. Structural Steel: ASTM A36.

B. Stainless Steel: ASTM A240, Type 302 or 304.

C. Aluminum, Extruded: ASTM B221, Alloy 6063-T5 unless otherwise specified. For structural shapes use alloy 6061-T6 and alloy 6061-T4511.

D. Floor Plate:

1. Steel ASTM A786.
2. Aluminum: ASTM B632.

E. Steel Pipe: ASTM A53.

1. Galvanized for exterior locations.
2. Type S, Grade A unless specified otherwise.
3. NPS (inside diameter) as shown.

F. Cast-Iron: ASTM A48, Class 30, commercial pattern.

G. Malleable Iron Castings: A47.

H. Primer Paint: As specified in Section 09 91 00, PAINTING.

I. Stainless Steel Tubing: ASTM A269, type 302 or 304.

J. Modular Channel Units:

1. Factory fabricated, channel shaped, cold formed sheet steel shapes, complete with fittings bolts and nuts required for assembly.
2. Form channel within turned pyramid shaped clamping ridges on each side.
3. Provide case hardened steel nuts with serrated grooves in the top edges designed to be inserted in the channel at any point and be given a quarter turn so as to engage the channel clamping ridges. Provide each nut with a spring designed to hold the nut in place.
4. Factory finish channels and parts with oven baked primer when exposed to view. Channels fabricated of ASTM A525, G90 galvanized steel may have primer omitted in concealed locations. Finish screws and nuts with zinc coating.
5. Fabricate snap-in closure plates to fit and close exposed channel openings of not more than 0.3 mm (0.0125 inch) thick stainless steel.

K. Grout: ASTM C1107, pourable type.

2.3 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. Galvanized G-90 where specified.

2. Use G90 galvanized coating on ferrous metal for exterior work unless non-ferrous metal or stainless is used.

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.

2.4 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 fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.
5. 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.
6. Use concealed fasteners wherever practicable.
7. Weld permanent connections in ferrous metal items wherever practicable; avoid bolts and screws.

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 gratings and floor plates for the passage of ducts, sumps, 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:
   a. 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.
   b. Where metal fabrications are shown to be built into masonry use 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 250 mm (10 inches) long with 50 mm (2 inch) hooked end, welded 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. Aluminum: NAAMM AMP 501.
   a. Mill finish, AA-M10, as fabricated, use unless specified otherwise.
   b. Clear anodic coating, AA-C22A41, chemically etched medium matte, with Architectural Class 1, 0.7 mils or thicker.
   c. Colored anodic coating, AA-C22A42, chemically etched medium matte with Architectural Class 1, 0.7 mils or thicker.
   d. Painted: AA-C22R10.
3. 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.
4. Stainless Steel: NAAMM AMP-504 Finish No. 4.
5. Chromium Plating: ASTM B456, satin or bright as specified, Service Condition No. SC2.

G. Protection:
1. Insulate aluminum surfaces that will come in contact with concrete, masonry, plaster, or metals other than stainless steel, zinc or white bronze 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.

2.5 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. As shown.
   3. 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 Trapeze Bars:
   1. Construct assembly above ceilings as shown and design to support not less than a 340 kg (750 pound) working load at any point.
   2. Fabricate trapeze supports as shown, with all exposed members, including screws, nuts, bolts and washers, fabricated of stainless steel.
   3. Fabricate concealed components of structural steel shapes unless shown otherwise.
   4. Stainless steel ceiling plate drilled for eye bolt.
   5. Continuously weld connections where welds shown.
   6. Use modular channel where shown with manufacturers bolts and fittings.
      a. Weld ends of steel angle braces to steel plates and secure to modular channel units as shown. Drill plates for anchor bolts.
      b. Fabricate eye bolt, special clamp bolt, and plate closure full length of modular channel at ceiling line and secure to modular channel unit with manufacturers standard fittings.

D. 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.

E. Supports for **Patient Hoists a**nd Items at Various Conditions at Suspended Ceilings:
   1. Fabricate of structural steel shapes as shown.
   2. Drill for anchor bolts of suspended item.

2.6 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 embedded in concrete framing.

2.7 STEEL COUNTER OR BENCH TOP FRAME AND LEGS

A. Fabricate channel or angle frame with mitered and welded corners as shown.

B. Drill top of frame with 6 mm (1/4inch) holes spaced 200 mm (8 inches) on center for securing countertop.

C. Fabricate legs of angle or pipe shapes and continuously weld to frame.

D. Finish frame with backed on enamel prime coat.

2.8 MODULAR CHANNEL UNITS:

A. Modular channel unit frames shown on the Drawings are diagrammatic only. Adjust location of framing members with maximum spacing as shown on Drawings as required by field conditions.

B. Not all Modular channel unit frame members’ sizes, connections, fittings, fasteners and other accessories are shown; these shall be determined by required calculations. Metal Framing System member sizes shown on the Drawings are MINIMUM dimensions.

C. Provide all necessary members, fittings, fasteners, and accessories for a complete installation, whether or not shown on the Drawings.

D. All materials must be protected from corrosion with a factory-applied finish.

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 or masonry.

1. Provide temporary bracing for such items until concrete or masonry is set.
2. Place in accordance with setting drawings and instructions.
3. Build strap anchors, into masonry as work progresses.

C. Set frames of gratings, covers, corner guards, trap doors 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 to mid height of concrete beams when inserts do not exist with expansion bolts and to slabs, with expansion bolts. 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.

C. Supports for Cubicle Curtain Track:
1. Install assembly where shown after ceiling suspension grid is installed.
2. Drill angle for bolt and weld nut to angle prior to installation of tile.

D. Supports for Trapeze Bars:
1. Secure plates to overhead construction with fasteners as shown.
2. Secure angle brace assembly to overhead construction with fasteners as shown and bolt plate to braces.

3. Fit modular channel unit flush with finish ceiling, and secure to plate with modular channel unit manufacturer's standard fittings through steel shims or spreaders as shown.
   a. Install closure plates in channel between eye bolts.
   b. Install eyebolts in channel.

3.3 DOOR FRAMES

A. Secure clip angles at bottom of frames to concrete slab with expansion bolts as shown.
B. Level and plumb frame; brace in position required.
C. At masonry, set frames in walls so anchors are built-in as the work progresses unless shown otherwise.
D. Set frames in formwork for frames cast into concrete.
E. Where frames are set in prepared openings, bolt to wall with spacers and expansion bolts.

3.4 OTHER FRAMES

A. Set frame flush with surface unless shown otherwise.
B. Anchor frames at ends and not over 450 mm (18 inches) on centers unless shown otherwise.
C. Set in formwork before concrete is placed.

3.5 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.

3.6 STEEL COMPONENTS FOR MILLWORK ITEMS

Coordinate and deliver to Millwork fabricator for assembly where millwork items are secured to metal fabrications.

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:

The Work includes, but is not necessarily limited to, the furnishing and installation of rough carpentry, including anchor bolts, as indicated on the Drawings, as specified herein, and as required to complete the Work.

1.2 RELATED WORK:

A. Milled woodwork: Section 06 20 00, FINISH CARPENTRY.

B. Gypsum sheathing: Section 09 29 00, GYPSUM BOARD.

1.3 SUMBITTALS:

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.

C. Procedures: In accordance with SECTION 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS, for Submittals.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Delivery shall be made only when the area of operation is enclosed, all plaster and concrete work is dry, and the area is broom cleaned.

B. Immediately upon delivery to the Site, place materials in a clean storage area, well ventilated and protected from direct sunlight, excessive heat, rain or moisture, in which the relative humidity is between 45 percent and 65 percent at 60 degrees F. to 90 degrees F., and equilibrium moisture content conditions are between 8 percent and 12 percent.

C. Store material flat on level surface, and stack in such fashion as to prevent twisting and warping.

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 Forest and Paper Association (AFPA):
National Design Specification for Wood Construction
NDS-05.....Conventional Wood Frame Construction

C. American Institute of Timber Construction (AITC):
A190.1-07.....Structural Glued Laminated Timber

D. American Society of Mechanical Engineers (ASME):
B18.2.1-96(R2005).....Square and Hex Bolts and Screws
B18.2.2-87.....Square and Hex Nuts
B18.6.1-97.....Wood Screws
B18.6.4-98(R2005).....Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws

E. American Plywood Association (APA):
E30-07.....Engineered Wood Construction Guide

F. American Society for Testing And Materials (ASTM):
A47-99(R2009).....Ferritic Malleable Iron Castings
A48-03(R2008).....Gray Iron Castings
A653/A653M-10.....Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process
C954-10.....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
C1002-07.....Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Metal Studs
D143-09.....Small Clear Specimens of Timber, Method of Testing
D1760-01.....Pressure Treatment of Timber Products
D2559-10.....Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions
D3498-11.....Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems
F844-07.....Washers, Steel, Plan (Flat) Unhardened for General Use
F1667-08.....Nails, Spikes, and Staples

G. Federal Specifications (Fed. Spec.):
MM-L-736C.....Lumber; Hardwood

H. Commercial Item Description (CID):
A-A-55615.....Shield, Expansion (Wood Screw and Lag Bolt Self Threading Anchors)

I. Military Specification (Mil. Spec.):

MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated

J. Truss Plate Institute (TPI):

TPI-85.....Metal Plate Connected Wood Trusses

K. U.S. Department of Commerce Product Standard (PS)

PS 1-95.....Construction and Industrial Plywood

PS 20-05.....American Softwood Lumber Standard

1.6 QUALITY ASSURANCE:

D. Wood Treatment:

1. Treat lumber and plywood to comply with applicable requirements of the American Wood Protection Association (AWPA).
2. Fire-Retardant Treatment: Comply with AWPA standards for pressure impregnation with fire-retardant chemicals to achieve flame spread rating of not more than 25 in accordance with California Code of Regulations, 2007 Edition, Section 202, and with ASTM E84 and D2898, or UL Test 723.
   a. Provide UL label on each piece of lumber or plywood with fire-retardant treatment.
   b. Moisture content of kiln-dried lumber after treatment with fire-retardant shall be no more than that permitted by national grading rules for the wood supplied, or maximum 19 percent.
   c. Moisture content of kiln-dried plywood after treatment with fire-retardant shall be no more than that permitted by national grading rules for the wood supplied, or maximum 15 percent.
   d. Use: All lumber and plywood used in the Work, unless otherwise specified.
3. Preservative Treatment: Comply with AWPA Standard U1 for pressure treating lumber and plywood with water-borne preservatives for above ground use.
   a. Moisture content of kiln-dried lumber after treatment with water borne-preservative shall be no more than that permitted by national grading rules for the wood supplied, or maximum 19 percent.
   b. Moisture content of kiln-dried plywood after treatment with water-borne preservative shall be no more than that permitted by national grading rules for the wood supplied, or maximum 18 percent.
   c. Use: All lumber and plywood used in contact with soil.
4. Complete fabrication of treated items prior to treatment, wherever

possible; if cut after treatment, comply with requirements of AWPA Standard M4 for coating of cut ends.

5. Inspect each piece after drying and discard damaged or defective pieces.

E. VOC Limits:

1. Provide treatment and coating materials that conform to Federal, State, and Local restrictions for Volatile Organic Compounds (VOC) content.
2. All treatment and coating materials used for interior wood applications shall comply with South Coast Air Quality Management District (SCAQMD) Rule # 1113.

F. Meet the requirements set forth in SECTION 01 8113, SUSTAINABLE DESIGN REQUIREMENTS, for Certified Wood Products and for Composite Wood and Agrifiber Products.

1. All wood and wood-based materials and products are to be Forest Stewardship Council (FSC) Certified.

G. Grademark and Trademark:

1. Lumber shall bear grademark/ trademark, or be accompanied by certification of compliance of appropriate grading and inspecting agencies.
2. Lumber shall bear WCLIB, PLIB, or WWPA grade stamp, or shall be marked with the grade stamp of an equivalent lumber grading agency that has been accredited by the American Lumber Standard Committee (ALSC).
3. Plywood shall bear APA grademark/ trademark.
4. Do not place grademark/ trademark on exposed faces.

H. Trade Standards:

1. American Plywood Association (APA), PS 1-07 and PS 2-04.
2. West Coast Lumber Inspection Bureau (WCLIB), Standard Grading Rules No. 17.

1.7 JOB CONDITIONS

I. Environmental Requirements: Maintain uniform moisture content of lumber at specified moisture content before, during, and after installation.

J. Sequencing: Coordinate details with other Work supporting, adjoining, or fastening to rough carpentry Work.

PART 2 - PRODUCTS

2.1 LUMBER:

A. Lumber:

1. Graded in accordance with wclib grading rules, construction grade, douglas fir. Use for blocking, backing, stripping, furring, nailers and as shown on drawings.
2. Each piece of lumber shall be surfaced four sides (s4s).

B. Plywood:

1. Douglas fir, unless otherwise shown or specified.
2. Type:
   A. Exterior type: c-c plugged, exterior grade. Use for substrate where permanently exposed to weather or damp conditions.
   B. Interior type: a-c. Use for interior applications.
   C. Plywood panel boards: c-d plugged, exposure 1, interior type plywood with exterior glue. Use for electrical and communication panel boards.
3. Thickness: minimum 3/4-inch thick and as required for the purpose intended, unless otherwise indicated.

C. Rough hardware: all exterior hardware shall be type 304 stainless steel or hot-dipped galvanized steel per ASTM a123/a123m and/or ASTM a153/a153m.

1. Provide nails, spikes, bolts, screws and framing connectors of standard manufacture required to complete the work.
2. Nails:
   A. Common wire for typical framing, blocking, etc.
   B. Annular ring common wire nails for plywood floor.
   C. Meet requirements of ASTM f 1667.
3. Bolts: hexagonal heads, standard mild steel. Grade a conforming to ASTM a307.
4. Washers: washers for bearing against wood shall be provided under all bolt heads and nuts. Malleable iron or steel plate having an area equal to 16 times the area of bolt or lag screw. Steel washers shall have a thickness not less that 1/10 the length of the washer's longest side. Malleable iron washers shall have a thickness not less than 1/2 the bolt or lag screw diameter and having a bearing surface for the nut or head equal in diameter to not less than the long diameter of the nut or head.
5. Expansion bolts: refer to section 05 5000, METAL FABRICATIONS.

PART 3 - EXECUTION

3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS:

A. Examine areas that are to receive rough carpentry Work and verify the following:
   1. That the installation of building components receiving rough carpentry Work is complete.
   2. That surfaces are satisfactory to receive Work of this Section.
   3. That spacing, direction, and details of supports are correct to accommodate the installation of blocking, stripping, furring, and nailers.

3.2 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS:

A. Conform to applicable requirements of the following:
   1. APA for installation of plywood or structural use panels.
B. Provide blocking, grounds, nailers, stripping, and backing as shown and as required for attachment and anchorage of other Work.
C. Fasteners:
   1. Nails.
      a. Nail in accordance with the Recommended Nailing Schedule as specified in AFPA Manual for House Framing where detailed nailing requirements are not specified in nailing schedule. Select nail

size and nail spacing sufficient to develop adequate strength for the connection without splitting the members.

b. Use special nails with framing connectors.

c. For sheathing and subflooring, select length of nails sufficient to extend 25 mm (1 inch) into supports.

d. Use eight penny or larger nails for nailing through 25 mm (1 inch) thick lumber and for toe nailing 50 mm (2 inch) thick lumber.

e. Use 16 penny or larger nails for nailing through 50 mm (2 inch) thick lumber.

f. Select the size and number of nails in accordance with the Nailing Schedule except for special nails with framing anchors.

2. 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.

3. 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.

4. Power actuated drive pins may be used where practical to anchor to solid masonry, concrete, or steel.

5. Do not anchor to wood plugs or nailing blocks in masonry or concrete. Use metal plugs, inserts or similar fastening.

6. 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.

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SECTION 06 20 00

FINISH CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work includes, but is not necessarily limited to, the furnishing and installing of finish carpentry, including wood panels, and other items as indicated on the drawings and specified herein.

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. Casework: Section 06 41 00, CUSTOM CASEWORK.

D. Wood doors: Section 08 14 00, WOOD DOORS.

E. Color and texture of finish: Section 09 06 00, SCHEDULE FOR FINISHES.

F. Other Countertops: Division 11, EQUIPMENT and Division 12, FURNISHINGS.

G. Electrical light fixtures and duplex outlets: Division 26, ELECTRICAL.

1.3 SUBMITTALS

A. Procedures: In accordance with SECTION 01 33 23 and with SECTION 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for Submittals.

B. Shop Drawings: Submit large-scale drawings for all finish carpentry showing materials, methods of fabrication, and details of installation.

1. Include plans and elevations, details of sections and connections, anchorage, and accessory items.
2. Provide setting drawings, templates, instructions, and directions for the installation of anchorage devices.

C. Samples:

1. Lumber, Solid Stock, and Wood Veneer:
   a. Submit three (3) 12-inch x 12-inch samples of lumber and wood veneer panel in the specified finish with a minimum range of four (4) colors for initial selection.
   b. Resubmit samples for color selection until final acceptance by the Architect.
2. Plexiglass: 6-inch X 6-inch pieces of plexiglass in each specified finish.

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 Resident Engineer. Store at a minimum temperature of 21^{0}C (70^{0}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-08.....Structural Steel

A53-12.....Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless

A167-99 (R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

B26/B26M-09.....Aluminum-Alloy Sand Castings

B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

E84-10.....Surface Burning Characteristics of Building Materials

C. American Hardboard Association (AHA):

A135.4-04.....Basic Hardboard

D. Builders Hardware Manufacturers Association (BHMA):

A156.9-03.....Cabinet Hardware

A156.11-10.....Cabinet Locks

A156.16-08.....Auxiliary Hardware

E. Hardwood Plywood and Veneer Association (HPVA):

HP1-09.....Hardwood and Decorative Plywood

F. National Particleboard Association (NPA):

A208.1-09.....Wood Particleboard

G. American Wood-Preservers' Association (AWPA):

AWPA C1-03.....All Timber Products – Preservative Treatment by Pressure Processes

H. Architectural Woodwork Institute (AWI):

AWI-09.....Architectural Woodwork Quality Standards and Quality Certification Program

I. National Electrical Manufacturers Association (NEMA):
LD 3-05.....High-Pressure Decorative Laminates

J. U.S. Department of Commerce, Product Standard (PS):
PS20-10.....American Softwood Lumber Standard

K. Military Specification (Mil. Spec):
MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated

L. 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

1.6 QUALITY ASSURANCE

A. Meet the requirements set forth in section 01 81 13, sustainable design requirements, for certified wood products and for composite wood and agrifiber products. All wood and wood-based materials and products are to be Forest Stewardship Council (FSC) certified.

D. Wood Paneling Manufacturer Qualifications: Manufacturer shall have a minimum of five (5) years documented successful experience in the fabrication of wood panels of the type specified.

E. Fire-Retardant Treatment:
1. Comply with requirements of SECTION 06 1000, ROUGH CARPENTRY.
2. Treat interior lumber and plywood.

F. Mark each piece of lumber and plywood with type, grade, mill and grading agency identification, except omit marking from surfaces specified to receive transparent finish.

G. Finish carpentry shall conform to the requirements of the “Architectural Woodwork Standards” (AWS) Manual, latest edition, as published by the Woodwork Institute (WI), Architectural Woodwork Institute (AWI), and the Architectural Woodwork Manufacturers Association of Canada (AWMAC).
1. If provisions of the AWS Grade specified herein conflict with or are modified by the Drawings and/ or Specifications, the modifications shall govern.

H. Field Measurements: Take field measurements prior to the preparation of shop drawings and fabrication where possible; do not delay job progress; allow for trimming and fitting where necessary.

I. Meet the requirements set forth in SECTION 01 8113, SUSTAINABLE DESIGN REQUIREMENTS, for Certified Wood Products and for Composite Wood and Agrifiber Products.
   1. All wood and wood-based materials and products are to be Forest Stewardship Council (FSC) Certified.

J. Finishes: Work specified to have transparent finish in this Section shall be identical in color, appearance, and finish with that specified in SECTION 06 4100, CUSTOM CASEWORK. Contractor to coordinate samples required for each of these Sections, and submit them to the Architect at the same time for comparative review.

PART 2 – PRODUCTS.

2.1 **BIO-BASED MATERIAL:**

Bio-based Materials: For products designated by the USDA's Bio-Preferred program, provide products that meet or exceed USDA recommendations for bio-based content, so long as products meet all performance requirements in this specification section. For more information regarding the product categories covered by the Bio-Preferred program, visit http://www.bio-preferred.gov

2.2 MATERIALS

A. All finish carpentry shall comply with Custom Grade as defined in the AWS Manual published by the WI, AWI, and AWMAC, unless otherwise specified or shown on Drawings.

B. Lumber, Solid Stock:
   1. Concealed: Any species containing no defects which materially affect the strength or utility of the piece
   2. Exposed: Quarter-Cut (vertical grain), American Cherry. Color to match approved sample.
   3. Each piece of lumber shall be surfaced four sides (S4S).

C. Quarter-Cut (vertical grain), American Cherry. Minimum 1/50-inch in thickness after sanding or of sufficient thickness as accepted by the Architect so as not to permit show-through of substrate material after sanding and/ or final finishing. Color to match approved sample.

D. Balancing Veneer: Manufacturer's standard.

E. Concealed Plywood: Any species containing no defects which materially affect the strength or utility of the piece.

F. Medium Density Fiberboard (MDF): Conforming to ANSI A208.2 with no added formaldehyde as a fabrication component.

G. Balancing Sheet: Fabricator's standard.

H. Plexiglass: 1/4-inch thick. Polish all edges. Clear finish, unless otherwise noted.

1. Provide etched finish where shown on the Drawings for an even frosted appearance.

D. Solid Polymer Light Fixture Lens: As specified in SECTION 06 61 16, SOLID SURFACING FABRICATIONS.

E. Adhesives: Per manufacturer's requirements.

F. Fasteners: As shown and in accordance with AWS Grade Standards.

1. Panel Clips: Extruded aluminum "Z" shaped clip. Size per manufacturer's calculations to provide adequate support for each panel.

2.2 FABRICATION

A. General:

1. Fabricate and machine all items in conformance with Custom Grade as defined in the AWS Manual published by the WI, AWI, and AWMAC.
2. Fabricate all items with a minimum number of joints, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns and miter at corners to produce tight fitting joints with full surface contact throughout the length of the joint. Provide sealant grooves where abutting wall surfaces.
3. Profile and size as shown on the Drawings.
4. Joinery: Reinforce joints subject to strain, using screws and bolts to ensure they remain tight. At edge-to-edge jointed solid wood, use matched tongues and grooves or plywood splines, reinforced with dowels if necessary.
5. Sanding: Machine and hand sand exposed surfaced. Make sharp arises slightly rounded, but keep external and internal angles true to detail. Completely remove tool marks, raised grain and other causes of unevenness or lack of smoothness.

B. Wood Ceiling Paneling: Wood veneer over 3/4-inch MDF with transparent finish, unless otherwise shown.

1. Furnish manufacturer's standard balancing veneer, including cross-band balancing veneer where applicable.

2. Medium Density Fiberboard
3. All veneer faces shall be glue spliced. Stitched faces will not be acceptable.
4. Matching of adjacent veneer shall be book matched.
5. Matching within each panel shall be center matched.
6. Matching of adjacent panels shall be sequence matched with uniform panel size.
7. Fit exposed edges with matching hardwood vee-shaped edging. Use only one piece for the full length of each edge.
8. Veneer selection shall be reviewed by the Architect prior to layout and installation of the panels.
9. Finish: Transparent, satin sheen finish in accordance with AWS requirements and as specified in SECTION 09 9000, PAINTING.
   a. All items specified or shown as transparent finish shall be shop/ factory finished prior to delivery and installation.
   b. Apply transparent finish to all exposed or semi-exposed surfaces of solid lumber.
   c. Back primer wood veneer paneling with finish system similar to that specified for exposed and semi-exposed surfaces and as recommended by the manufacturer to ensure dimensional stability of wood panels in the finished installation.

C. Wood Base: Wood veneer over 3/4-inch MDF with transparent finish, unless otherwise shown.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS

A. Maintain work areas and storage areas to a minimum temperature of 21^{0}C (70^{0}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 INSPECTION

A. Verify that surfaces and spaces to receive finish carpentry are satisfactory for their installation. If unsatisfactory conditions exist, do not install until such conditions have been corrected.

3.3 PREPARATION

A. Condition wall panels to stable temperature and humidity conditions as specified in Paragraph 1.06.A above in installation areas prior to installing finish carpentry.

3.4 INSTALLATION

A. Install the work straight, plumb, true, and level, with tight joints and no distortions. Shim as required using concealed shims. Maximum variation of 1/8-inch in 8-feet when a straight edge is laid on the surface in any direction with 1/32-inch maximum offset for flush adjoining surfaces and 1/16-inch maximum offset for adjoining surfaces separated by reveals. Scribe and cut Work to fit adjoining Work and refinish or repair damaged surfaces/ finishes at cuts as required.

B. Provide all anchoring and fastening devices required for installation. Provide countersunk screws and/ or nails and fill screw/ nail holes.

C. All butt joints shall be tight and adhered; make no joint width greater than 1/64-inch.

D. Ceiling Panel Installation: Anchor panels to supporting substrate with concealed metal panels clips.

3.5 ADJUSTMENT AND CLEANING

B. Repair damaged and defective finish carpentry Work wherever possible to eliminate defects functionally and visually. Where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.

C. Clean finish carpentry Work on exposed and semi-exposed surfaces. Touch-up shop applied finishes to restore damaged or soiled areas.

D. Protect finish carpentry against damage until the Work is accepted.

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SECTION 06 41 00

CUSTOM CASEWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work includes, but is not necessarily limited to, the furnishing and installing of wood and stainless steel casework, shelves, countertops and accessories as indicated on the Drawings and specified herein.

1.2 RELATED WORK

A. Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS
B. Section 05 50 00, METAL FABRICATIONS
C. Section 06 20 00, FINISH CARPENTRY
D. Section 06 61 16, SOLID SURFACING FABRICATIONS
E. Section 06 66 00, SOLID POLYMER FABRICATIONS
F. Section 07 92 00, JOINT SEALANTS
G. Section 09 06 00, SCHEDULE FOR FINISHES.
H. Section 09 22 16, NON-STRUCTURAL METAL FRAMING
I. Section 09 29 00, GYPSUM BOARD
J. Section 09 30 13, CERAMIC/PORCELAIN TILING
K. Section 09 65 16, RESILIENT SHEET FLOORING
L. Section 09 65 19, RESILIENT TILE FLOOORING
M. Division 22, PLUMBING
N. Division 23, HVAC
O. Division 26, ELECTRICAL

1.3 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 basic designation only.

B. American Society for Testing and Materials (ASTM):
A167-99 (R2009)……. Stainless and Heat-Resisting chromium-Nickel Steel Plate, Sheet and Strip
A1008-10 Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low Alloy
C1036-06 Flat Glass

C. Composite Panel Association (CPA):
A208.1-09 Particleboard

D. U.S. Department of Commerce Product Standards (Prod. Std):
PS1-95 Construction and Industrial Plywood

E. Hardwood, Plywood and Veneer Association (HPVA):
HP-1-09 Hardwood and Decorative Plywood

F. Architectural Woodwork Institute (AWI):
Architectural Woodwork Quality Standards, Guide Specifications Quality Certification Program - 1999

G. American Society of Mechanical Engineers (ASME):
A112.18.1-05 Plumbing Fixture Fittings

H. National Electrical Manufacturers Association (NEMA):
LD3-05 High Pressure Decorative Laminates
LD3.1-95 Performance, Application Fabrication and Installations of High-Pressure Decorative Laminates

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: All casework, countertops, hardware, etc. specified under this Section shall be the product of one manufacturer or supplied under this manufacturer’s direction to eliminate incompatible items.

B. The Drawings and Specifications outline the design intent and the general requirements of casework for the Project. Construction details and specifications for casework are not complete, and casework furnished shall be complete for the intended use.

C. The Drawings and Specification indicate requirements which may differ from manufacturer's standard products. Make all modifications necessary to comply with specified requirements.

D. Casework shall be designed, fabricated and installed to meet the quality standards established in the latest edition of the "Architectural Woodwork Standards" (AWS) Manual, as published by the Woodwork Institute (WI), Architectural Woodwork Institute (AWI), and the Architectural Woodwork Manufacturers Association of Canada (AWMAC).

1. If provisions of the AWS Grade specified herein conflict with or are modified by the Drawings and/ or Specifications, the modifications shall govern.

E. Manufacturer's Qualifications: If the manufacturer of casework is not a WI licensee, the Contractor shall furnish to the Architect, prior to installation, a Certificate of Reinspection by the WI indicating that all casework meets the requirements of the AWS Grade

specified. If the manufacturer of casework is a WI licensee, the Contractor shall issue WI Certified Compliance Certificates by the completion of the job, certifying that the products furnished fully meet the requirements for the AWS Grade specified. Each unit of casework shall bear a WI Certified Compliance Grade Stamp indicating the AWS Grade specified whether or not the manufacturer is a WI licensee.

1. The foregoing shall not be construed to limit the power and authority of the Architect to reject any casework which does not, in the Architect's opinion, meet with any one or more of the Specifications of this Contract.
2. The Manufacturer shall provide a full-time foreman, independent from the job production force, to monitor the quality of Work being accomplished by the manufacturer's crew.

F. Field Measurements: Take field measurements prior to the preparation of shop drawings and fabrication where possible; do not delay job progress; allow for trimming and fitting where necessary.

G. Meet the requirements set forth in SECTION 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for Certified Wood Products and for Composite Wood and Agrifiber Products.

1. All wood and wood-based materials and products are to be Forest Stewardship Council (FSC) Certified.

H. Finishes: Work specified to have transparent finish in this Section shall be identical in color, appearance, and finish with that specified in SECTION 06 2000, FINISH CARPENTRY. Contractor to coordinate samples required for each of these Sections, and submit them to the Architect at the same time for comparative review.

I. Mock-Up Assemblies: Erect mock-up assemblies of a typical Integration Cabinet at the jobsite as indicated on the Drawings. Mock-up assemblies shall consist of base cabinets, upper cabinets, cabinet hardware, countertops, electrical and plumbing fixtures, and all associated framing supports, as applicable. Approved mock-ups shall serve as a standard of workmanship and appearance for casework installation and may remain as part of the Work.

1. Protect mock-up casework assemblies from damage during completion of construction Work.

1.5 SUBMITTALS

A. Procedures: In accordance with SECTION 01 33 23 and with SECTION 01

81 11, SUSTAINABLE DESIGN REQUIREMENTS, for Submittals.

B. Shop Drawings: Submit shop drawings for each item of casework. Include plans, elevations, sections, and details as required to illustrate shop fabrication, field assembly, and installation. Show size and locations of all cutouts. Identify all manufacturer's standard components with catalog numbers, and identify all materials and construction details of custom-fabricated items.
   1. Provide WI Certified Compliance Grade Stamp on all Shop Drawings.

C. Certification: Provide WI Certified Compliance Certificate for the fabrication and installation of all casework.

D. Product Data: Submit manufacturer=s product data on all manufactured items and materials. Include complete descriptions, specifications and installation instructions.

E. Samples: Submit three (3) sets of samples for each of the following, unless otherwise noted:
   1. Hardware: Cabinet hardware, including locks/latches, shelf standards and brackets, door and drawer pulls, drawer slides, grommets and hinges.
   2. Plastic Laminate:
      a. Initial Submittal: Two (2) 6-inch x 6-inch pieces in specified colors and textures for initial selection.
      b. Record Submittal: Three (3) 6-inch x 6-inch pieces in accepted colors and textures for record.
   3. Lumber, Solid Stock, and Wood Veneer:
      a. Transparent Finish: 4-inch X 12-inch samples of lumber and wood veneer in specified finishes with a minimum range of four (4) colors for initial selection.
      b. Opaque Finish: 4-inch X 12-inch samples of lumber and wood veneer in each specified color and finish.
      c. Resubmit samples for color selection until final acceptance by the Architect.
   4. Decorative Stainless Steel: 6-inch X 6-inch pieces of decorative stainless steel in specified finish.
   5. Solid Surfacing: Countertop samples as specified in SECTION 06 61 16, SOLID SURFACING FABRICATIONS.
   6. One (1) full size assembly, which consists of one (1) double-door, plastic laminate base cabinet and one (1) double-door, plastic laminate upper cabinet, showing complete construction details.

Install at project site as directed by Architect for review. Upon completion of review and acceptance by Architect, remaining casework may commence. If not incorporated into the Work, remove sample unit from the premises when directed by Architect.

7. All samples will be retained to ensure that materials delivered to the Project Site conform in every respect to accepted samples.
8. Samples may be used in the Project once conformance to Drawings and Specifications has been confirmed.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Do not deliver casework until all painting, finishing and overhead Work is complete in the spaces to receive casework.

B. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

C. Store casework in a dry location of the building, out of the way of other construction activities.

D. Handle casework with care so as not to damage surfaces or subject the casework to stress.

1.7 JOB CONDITIONS

A. Architect shall visit the casework manufacturer for off-site acceptance of casework fabrication. If the casework manufacturer is located more than 100 miles from the Project Site, Contractor shall reimburse all travel expenses to the Architect, including transportation, room and board, and time spent.

1. If the Architect is required to visit the casework manufacturer more than once, due to Contractor’s fault not to fabricate the casework in accordance with the Contract Documents, the Contractor shall reimburse all travel expenses to the Architect, including transportation, room and board, and time spent.

B. Coordinate with plumbing, mechanical and electrical Work and Owner furnished equipment for proper sizing, location, and sequence of construction.

C. All cutouts and holes for plumbing, mechanical and electrical Work shall be made at the Project Site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: All casework shall comply with Custom Grade, as defined in

the AWS Manual published by the WI, AWI, and AWMAC, unless otherwise specified or shown on the Drawings.

B. Lumber, Solid Stock:
   1. Concealed: Any species containing no defects which materially affect the strength or utility of the piece
   2. Exposed: Quarter-Cut Unfigured Maple, stained to match doors. Color to match approved sample.

C. Wood Veneer: Quarter-Cut Unfigured Maple, stained to match doors. Color to match approved sample. Minimum 1/50-inch in thickness after sanding or of sufficient thickness as accepted by the Architect so as not to permit show-through of substrate material after sanding and/ or final finishing. Color to match approved sample.

D. Concealed Plywood: Any species containing no defects which materially affect the strength or utility of the piece. 5-ply minimum, thickness as shown on Drawings, as specified herein and/ or per AWS Grading rules.

E. Medium Density Fiberboard (MDF): Conforming to ANSI A208.2 with no added formaldehyde as a fabrication component.

F. Plastic Laminate: 0.048-inch thick minimum, high-pressure laminate. Use of Cabinet Liners or Low Pressure Laminates will not be acceptable, except at specific locations identified herein.

G. Balancing Sheet: Fabricator’s standard.

H. Stainless Steel: Type 304, NAAMM No. 4 brushed finish, unless otherwise shown or specified herein.

I. Decorative Stainless Steel: Stainless Steel by Forms + Surfaces, 20 gauge minimum.
   1. Finish: Sandstone Random.
   2. Pattern: No pattern.

J. Solid Surfacing Fabrications: As specified in SECTION 06 61 16, SOLID SURFACING FABRICATIONS.

K. Solid Polymer Fabrications: As specified in SECTION 06 66 00, SOLID POLYMER FABRICATIONS.

L. Hardware: All hardware shall be in accordance with AWS Grade Standards, except as specified below:
   1. Hinges: Concealed, self-closing.
      a. Provide 95° opening hinges for wood cabinet doors adjacent to partitions.
   2. Provide 170° opening hinges for all other wood cabinet doors.

3. Door and Drawer Pulls: 3 5/8-inch long, stainless steel pull with satin chrome finish.
4. Drawer Slides: Full extension slides with minimum 100 pound capacity for drawers sized 19-inches wide or less and/ or 3-inches high or less, and minimum 150 pound capacity for drawers over 19-inches wide and/ or over 3-inches high.
5. Lock: Manufacturer's standard lock. Clear anodized finish.
   a. The name of the manufacturer, or trademark by which manufacturer can readily be identified, legibly marked on each lock.
   b. The key change number marked on the exposed face of lock, and also stamped on each key.
   c. Key change numbers shall provide sufficient information for replacement of the key by the manufacturer.
6. Coat Rod and Bracket: 1 1/4-inch diameter metal rod and extra heavy-duty brackets. Chrome finish.
7. Shelf Standards and Supports:
   a. Shelf Standards and Supports for Cabinets: Recessed-type steel standards for all cabinets.
      1) Shelf Supports: Screw type, zinc plated steel, 3-inch cross piece.
   b. Standards and Brackets for Open Adjustable Shelves: Extra heavy-duty standards and brackets, steel, 7/8-inch wide X 11/16-inch deep with 2-inch slot adjustment. Ano-chrome finish. Length of bracket shall be suitable for the width of specified shelves.
8. Glass Sliding Door Tracks: Extruded aluminum, two-door track assembly.
9. Glass Sliding Door Lock: Steel, keyed adjustable lock with disc tumbler mechanism.
10. Folding Countertop Support: Heavy-duty, 16-inch deep and adjustable folding L-brackets with spring-loaded release lever.

M. Keyboard Tray: Model No. 6G500GMP by Human Scale, or accepted equal.

N. Grille: Aluminum grille.
   1. Finish: Clear anodized.
   2. Size: As shown on the Drawings.

O. Fasteners: As specified in SECTION 05 50 00, METAL FABRICATIONS.

P. Sealant: As specified in SECTION 07 92 00, JOINT SEALANTS. Sealant

to match the color of surfaces adjacent to the joint.

Q. Grommets: 2-inch diameter, unless otherwise shown on the Drawings. Plastic. Colors to be selected by Architect from manufacturer's standard colors.

2.2 FABRICATION OF WOOD VENEER CASEWORK

A. General:

1. Fabricate casework in accordance with AWS Custom Grade, and as shown on Drawings and accepted Shop Drawings.
2. All units shall have easily cleanable, flush interiors.
3. Shop-fabricate casework in whole units or in partial units as most practical for handling and transportation. Assemble partial units in place in such manner that each piece of casework becomes a unified whole visually and structurally. Fabricate fillers and scribe strips of same materials and finishes as cabinets with which they are associated.
4. Fabricate all casework with plywood, unless otherwise noted. Use of particle board for casework will not be acceptable.
5. All cabinets shall be Style A (frameless), consisting of multiple self-supporting units fastened together to form a larger unit, in accordance with AWS Standards, unless otherwise shown.
6. Provide shop-applied back priming for any unfinished and/ or concealed faces of casework adjacent to partition surfaces.
7. Apply plastic laminate to casework surfaces using the largest possible sheet sizes to achieve a minimum number of sections.

B. Base, Wall Hung and Full Height Cabinets:

1. Finish of Exposed Surfaces: All exposed surfaces shall be wood veneer finish with grain running and matching vertically, unless otherwise shown on the Drawings and specified herein. Exposed cabinet surfaces, both exterior and interior, shall be well matched for color and grain of adjacent cabinet surfaces.
   a. All veneer faces shall be glue spliced. Stitched faces will not be acceptable.
   b. Matching of adjacent veneer shall be book matched.
   c. Matching within each panel shall be running matched.
   d. Matching of adjacent panels shall be matched in accordance with the AWS Grade specified.
   e. Provide a transparent, satin sheen finish for all wood veneer

surfaces in accordance with SECTION 09 9000, PAINTING and AWS requirements.

2. Finish of Semi-Exposed Surfaces: All semi-exposed surfaces shall be plastic laminate finish, unless otherwise noted. Pattern and color of plastic laminate finish to be selected by the Architect from manufacturer’s standard colors.
   a. Provide low pressure laminate (melamine) only at semi-exposed surfaces of cabinet panels with exposed wood veneer finish on the opposite side. Color to match plastic laminate finish of other semi-exposed surfaces within the cabinet.
3. Doors and Drawers:
   a. Solid Swinging Doors: AWS Cabinet Door Type "A." 3/4-inch thick, medium density fiberboard core with edge banding on all four (4) sides of same color and grain orientation as wood veneer on the exposed door surface. Interior face of door shall be faced with wood veneer in accordance with AWS Standards.
   b. Drawer Fronts: Same construction as solid swinging doors.
   c. Drawer Boxes: Sides and ends to be solid hardwood or seven (7) or nine (9) ply hardwood plywood with no internal voids. Doweled construction. Drawer bottoms to be hardwood plywood. Factory finish drawer boxes with one coat of sealer and one top coat.
   d. Hinges: As per manufacturer's recommendation, minimum three (3) hinges for solid swinging doors, four (4) hinges for full height doors.
   e. Door Catches: As per manufacturer’s recommendation, minimum one (1) catch per door.
4. Adjustable Shelving: Plastic laminate over plywood core. Apply plastic laminate to all surfaces.
   a. Thickness: Use 3/4-inch thick plywood cores for adjustable shelf widths 30-inches and below, and 1-inch thick plywood cores for adjustable shelf widths above 30-inches.
   b. Screw all shelves to shelf supports. Locations of adjustable shelves to be directed by Owner.
   c. Provide seismic lip on the exposed front edge of all adjustable shelves in cabinets without doors.

2.3 FABRICATION OF STAINLESS STEEL CASEWORK

A. General:

1. All stainless steel casework shall be modern design and shall be constructed in accordance with the best practices of the stainless steel casework industry. High quality of casework shall be established by use of proper machinery, tools, dies, fixtures, and skilled workmen, and shall be evidenced by uniform clearance around doors and drawers.
2. All cabinets shall be stainless steel on both exterior and interior surfaces.
3. Each unit shall have a completely welded shell assembly and shall not require additional parts such as applied panels at ends, backs or bottoms. All units shall be rigid and self-supporting for use interchangeably in a group of caseworks or for use as a single, stand-alone unit.
4. Front surfaces of all panels shall be flush with cabinet front, and shall not overlay case ends or top and bottom rails. At intersections of vertical and horizontal case shell members (such as end panels, top rails, and bottoms), all parts shall be in the same plane without overlap, secured by spot and arc welding. Front corners shall have heavy backup gusset reinforcements. Cracks and crevices are not acceptable.
5. Case openings shall be rabbeted on all four (4) sides for hinged doors, and on two (2) sides for sliding doors, to provide a dust-resistant case.
6. All units shall have easily cleanable, flush interiors.
7. Front width of end panels shall be 3/4-inch and front height of top and bottom members shall be no greater than 1-inch to maintain slim line styling. All members shall be designed, formed, welded, and reinforced for rigid construction.
8. Shop-fabricate casework in whole units or in partial units as most practical for handling and transportation. Assemble partial units in place in such manner that each piece of casework becomes a unified whole visually and structurally.

B. Minimum Gauge Requirements:

1. 20-gauge: Solid door interior panels, scribing strips, filler panels, enclosures and shelves. Add reinforcement or use 18-gauge material for shelves over 36-inch.

2. 18-gauge: Case tops, backs and end panels, bottoms, bases, uprights and vertical posts.
3. 16-gauge: Top front rails, top rear gussets, and reinforcing angles for top rails in cabinets over 36-inch wide.
4. 14-gauge: Front corner reinforcements.
5. 11-gauge: Corner brackets and gussets for leveling screws.

C. Base Cabinets:

1. Base Units: End and back panels shall be formed of a one (1) piece, wrap-around design, with internal reinforcing front and rear posts to provide rigidity and strength. Front posts shall be fully closed, and both front and rear posts shall have shelf adjustment holes.
2. Bottom: All cabinet bottoms shall be one piece construction, fixed, and front flange shall be formed into lower front rail. Holes or capped punch outs for leveling access are not acceptable.
3. Top Rail: Top rails on base cabinets shall interlock with and overlap end panels for strength, but shall be flush at front of unit.
4. Base: Integral toe space on base cabinets shall be 4 1/8-inches high X 3-inches deep. Base corners shall have die formed gussets. Leveling screws for each corner shall be 3/8-inch diameter minimum and have integral bottom flange of minimum 0.56 square inch to provide adequate support and to minimize damage to floor. Adjustment of height to be made through openings in the front of the toe space.
5. Shelves:
   a. All shelves shall be formed from a single sheet of steel with front and back edges turned down and back 3/4-inch.
   b. All movable shelves shall be adjustable on 1 1/2-inch centers and supported by plated clips placed in embossed louvers.
   c. All shelves to be perforated.
   d. Shelves over 36-inches long shall have welded full-width channel reinforcement.
   e. Provide stainless steel seismic lip at all shelves. Ease all sharp edges and corners.

2.4 FABRICATION OF COUNTERTOPS AND OPEN ADJUSTABLE SHELVES

A. General:

1. Fabricate countertops and open adjustable shelves in accordance

with AWS Custom Grade, and as shown on Drawings and accepted Shop Drawings.

2. All countertops shall have a 1-inch overhang at the front and a 1/2-inch overhang on exposed sides, unless otherwise shown.
3. Ends of splashes shall be closed, and the gaps between partitions and splashes and between splash joints shall be sealed with continuous sealant.
4. Use of particleboard and/ or medium density fiberboard substrates for countertops or open adjustable shelves will not be acceptable.
5. Provide plastic grommets for all utility cutouts through countertops and as shown.
6. Apply plastic laminate to casework surfaces using the largest possible sheet sizes to achieve a minimum number of sections.

B. Plastic Laminate Countertop and Splashes:
1. Countertop: Plastic laminate over a 1 1/-8-inch thick plywood core, except as otherwise shown on the Drawings and specified herein.
2. Back Splash: Plastic laminate over a 3/4-inch thick plywood core, except as otherwise shown on the Drawings and specified herein. Back splash shall be coved with edge conditions as shown. Apply plastic laminate to all exposed surfaces.
3. End Splash: Same construction as back splashes, except end splashes shall be deck-mount construction, mechanically fastened to the countertop deck with all edges sealed before assembly.

C. Solid Surfacing Countertops, Lavatories, and Splashes: As specified in SECTION 06 6116, SOLID SURFACING FABRICATIONS.

D. Stainless Steel Countertops and Splashes: 16-gauge, stainless steel countertop over a 1 1/8-inch thick, exterior grade plywood core. Provide a continuous, 14-gauge stainless steel reinforcement channel along the perimeter of the countertop as shown on the Drawings.
1. Fabricate countertop in shop with integral sink, where occurs, to sizes and shapes indicated, in accordance with approved Shop Drawings. Provide a 1 1/8-inch thick hardwood perimeter frame around the sink opening for reinforcement.
2. All seams and corners shall be welded, ground smooth, and polished.

E. Open Adjustable Shelves: Plastic laminate over plywood core. Apply plastic laminate to all surfaces.

1. Thickness: Use 3/4-inch thick plywood cores for adjustable shelf widths 30-inches and below, and 1 1/8-inch thick plywood cores for adjustable shelf widths above 30-inches.
2. Provide seismic lip on the front edge and ends of all open adjustable shelves.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Make all field measurements, and verify all dimensions prior to installation. Accurately fit all casework and components.

B. Verify that surfaces and spaces to receive casework are satisfactory for installation. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected.

C. Prior to installation of casework, examine shop-fabricated work for completion, and complete work as required, including back priming and removal of packing.

D. Condition casework to average prevailing humidity conditions in the building before installation.

3.2 INSTALLATION

A. Casework manufacturer shall provide a full-time foreman supervising the installation of casework as directed by the Contractor.

B. Install casework straight, plumb, level and true with no distortions. Shim as required using concealed shims. Where casework abuts other finished work, scribe and apply filler strips for accurate fit with all fasteners concealed where practicable.

C. Secure base cabinets to floor at toe space with fasteners spaced not more than 24-inches on center and at ends. Bolt contiguous cabinets together. Secure individual cabinets with not less than two (2) fasteners into the floor where they do not adjoin other cabinets.

1. Where required, assemble units into one integral unit with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16-inch.
2. Base Cabinets shall be installed so that any one cabinet within a row can be removed or installed without disturbing adjoining cabinets.
3. Provide holes and cutouts for mechanical and electrical Work as shown or as directed by the Trades involved. Provide stainless steel escutcheons for all utilities through cabinets.

4. Secure all wall hung cabinets to backing plates as shown and scheduled. Anchor, adjust, and align wall hung cabinets as specified for base cabinets.

D. Provide fillers and scribe strips so that cabinet fronts and sides present finished and unbroken surfaces with adjacent cabinet units or partitions. Cut scribe strips so that no gap greater than 1/16-inch exists where casework is fitted against flat or irregular surfaces.

E. At open shelves, install steel standards at three (3) foot on center maximum.

F. Sealant Application: Casework foreman shall field-check each sealant application to ensure a total seal.

3.3 CLEANING, ADJUSTMENT AND PROTECTION

A. Following the completion of installation, clean surfaces of casework, and clean and polish hardware in conformance with manufacturer's recommendations.

B. Repair or remove and replace defective Work as directed upon completion of installation.

C. Clean, lubricate and adjust hardware to ensure proper operation.

D. Protect casework against damage until the Work is accepted.

E. Touch up all Work of other Trades damaged due to the installation of Work of this Section.

- - - E N D - - -

SECTION 06 6116

SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work includes, but is not necessarily limited to, the furnishing and installing of solid acrylic polymer for countertops and homogeneous quartz surfaces for countertops as indicated on the Drawings and specified herein.

1.2 RELATED WORK

A. ROUGH CARPENTRY: SECTION 06 10 00

B. FINISH CARPENTRY: SECTION 06 20 00

C. CUSTOM CASEWORK: SECTION 06 41 00

D. SCHEDULE FOR FINISHES: SECTION 09 06 00

E. NON-STRUCTURAL METAL FRAMING: SECTION 09 22 16

F. GYPSUM BOARD: SECTION 09 29 00

G. CERAMIC/PORCELAIN TILING 09 30 13

H. RESILIENT FLOORING: SECTION 09 65 16

I. ELECTRICAL: DIVISION 26

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Shall be specialized in the manufacture of Products specified with a minimum of five (5) years documented experience.
2. Fabricator/Installer: Fabrications to be performed by a fabricator/ installer certified in writing by the manufacturer.

B. Allowable Tolerances:

1. Variation in component size: 1/8-inch maximum over a 10-foot length with a total aggregate maximum variation of no more than 1/8-inch for each installation and/ or continuous plane.
2. Location of Openings: 1/8-inch maximum from indicated location.
3. Clearance: 1/16-inch minimum to 1/8-inch maximum between partitions and abutting solid surfacing fabrications.

C. Flammability: Product shall be tested per ASTM E84 and/ or UL 723 and shall be classified as a Class A or I product with a flame spread rating of 25 or less and a smoke developed rating of 50 or less, unless otherwise noted.

D. Reference Standards:

1. American National Standards Institute (ANSI).

2. American Society for Testing and Materials (ASTM).
3. National Electrical Manufacturers Association (NEMA).
4. National Sanitation Foundation (NSF) International.
5. Federal Specifications (FS).

E. VOC Limit for Adhesives: Meet the requirements set forth by SCAQMD Rule #1168 with effective date of July 1, 2005.

F. Mock-Up Assemblies: Prior to the fabrication and installation of Work of this Section, erect mock-up assemblies to further verify selections made for colors, to evaluate workmanship, and to represent a quality standard for appearance, materials and construction of completed Work.
   1. Erect a single mock-up assembly of each of the following items:
      a. Full Wall Panel.
      b. Shower Unit, including receptor and interior wall panels.
   2. Location of mock-up assemblies to be determined by the Architect.
   3. Protect mock-up assemblies from damage by construction Work/ activities.
   4. Mock-up assemblies may be used in the Project once conformance to Drawings and Specifications has been confirmed.

1.4 SUBMITTALS

A. Procedures: In accordance with SECTION 01 3300 and with SECTION 01 8113, SUSTAINABLE DESIGN REQUIREMENTS, for Submittals.

B. Product Data: Manufacturer's data sheets, parts list, installation instructions, and maintenance procedures.

C. Samples:
   1. Initial Submittal: Submit two (2) 6-inch x 6-inch samples of each material in each color specified for selection.
   2. Record Submittal: Submit three (3) 6-inch x 6-inch samples of each material in accepted colors for record.

D. Shop Drawings: Submit layout drawings, elevations and details for all solid surfacing fabrications indicating dimensions, component sizes, fabrication details, attachment provisions and coordination requirements with adjacent Work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Do not deliver components to Project Site until areas are ready for installation. Store components indoors prior to installation.

B. Protect materials from damage during handling and storage on site. Provide protective coverings to prevent physical damage to or staining of product following installation for the duration of the Project.

C. Deformations, cracks or other defects will not be accepted.

1.6 GUARANTEE

A. Submit two (2) copies of the written guarantees for solid surfacing Work, agreeing to repair or replace Work which leaks water, deteriorates, or otherwise fails to perform as required within the guarantee period as a result of failure of materials or workmanship at no expense to the Owner.

B. By terms of the guarantee, also agree to remove and replace other Work as required, which has been connected to or superimposed upon the solid surfacing material to be replaced.

C. The guarantee period for the Work shall be ten (10) years after the Date of Final Completion and shall guarantee the entire installation, including the waterproofing membrane assembly, where occurs.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Solid Acrylic Polymer: Nonporous, solid and homogenous acrylic polymer with through body color that is not of coated, laminated or composite construction, and meets ANSI Z124.3 and ANSI Z124.6.

1. Physical and Performance Properties:

a. Tensile Strength (ASTM D638): 6,000 psi.

b. Flexural Strength (ASTM D790): 10,000 psi.

c. Tensile Elongation (ASTM D638): 0.4% min.

d. Hardness (Rockwell “M” Scale, ASTM D785): >85.

e. Hardness (Barcol Impressor, ASTM D2583): 56.

f. Thermal Expansion (ASTM D696): 1.80 X 10^{-5} in./ in./ F.

g. Boiling Water Resistance (NEMA LD 3-2000, Method 3.5): No visible change.

h. High Temperature Resistance (NEMA LD 3-2000, Method 3.6): No change.

i. Stain Resistance (ANSI Z124.3 and ANSI Z124.6): Passes.

j. Fungus and Bacteria Resistance (ASTM G21 and G22): Does not support microbial growth.

k. Water Absorption (ASTM D570): 0.4% (3/4-inch), 0.6% (1/2-inch), and 0.8% (1/4-inch).

B. Homogeneous Quartz Surface: Nonporous, solid and homogenous filled quartz surface with through body color that is not of coated, laminated or composite construction, and meets ANSI Z124.3 and ANSI Z124.6.

1. Physical and Performance Properties:

a. Flexural Strength (ASTM D790): 5,300 psi minimum.

b. Compression Strength (ASTM C170): ~27,000 PSI (Dry), ~24,000 (Wet).
c. Hardness (Moh's Hardness Scale): 7.
d. Thermal Expansion (ASTM D696): 1.45 x 10-5 inches/ inches/ degrees C.
e. Gloss (ANSI Z124, 60 degree Gardner): 45-50.
f. Colorfastness (ANSI Z124.6.5.1): Passes.
g. Wear and Cleanability (ANSI Z124.6.5.3): Passes.
h. Boiling Water Resistance (NEMA LD 3.3.5): None to slight effect.
i. High Temperature Resistance (NEMA LD 3.3.6, 356 degrees F): None to slight effect.
j. Stain Resistance (ANSI Z124.6): Passes.
k. Fungal and Bacterial Resistance (ASTM G21 & G22): No growth.
l. Point Impact (ANSI Z124.6.4.2): Passes.
m. Ball Impact (NEMA LD 3.3.8): 164 inches.
n. Abrasion Resistance (ASTM C501): 139.
o. Water Absorption (ASTM C373): 0.12 percent.
p. Moisture Expansion (ASTM C370): < 0.01 percent on average.

C. Joint Adhesive: Manufacturer=s standard adhesive kit to create inconspicuous, nonporous joints, with a chemical bond. DuPont Surface Joint Adhesive, or accepted equal.

D. Panel Adhesive: Manufacturer's standard neoprene-based panel adhesive meeting ANSI A136.1 OR a flexible, 100 percent silicone-based adhesive product recommended by the manufacturer. Rigid set adhesives will not be acceptable.

E. Sealant: Manufacturer's standard mildew-resistant, FDA and NSF compliant, UL listed silicone sealant in color to match adjacent solid surfacing colors. DuPont Surface Silicone Sealant, or accepted equal.

F. Accessories: As recommended by the manufacturer.

2.2 FABRICATION

A. General:

1. Fabricate units in accordance with manufacturer=s written instructions and approved Shop Drawings.
2. Joints between components shall be formed using manufacturer=s standard joint adhesive. Joints shall be inconspicuous in appearance and without voids.
3. Component edges shall have a smooth, uniform finish. Defective or inaccurate Work shall be repaired and/ or replaced.
4. Provide holes and cutouts as shown and as required for plumbing

fixtures and electrical conduits.

5. Finish: Uniform matte finish.
6. Thickness: As shown on the Drawings.

B. Wall Panels: Shop-fabricate wall panels to sizes and shapes shown in accordance with manufacturer's written instructions and approved Shop Drawings.

C. Shower Units:
1. Fabricate shower receptors in the shop to the greatest extent possible/ practical in sizes and shapes shown.
2. Minimize or eliminate all seams from shower receptors or shower interior panels to the greatest extent possible. Where seaming is absolutely necessary, provide only hard seams in strict accordance with manufacturer's instructions for a monolithic, inconspicuous appearance.

D. Countertop and/ or Lavatory, Backsplash and Endsplash:
1. Shop-fabricate countertop and integral lavatory (where occurs) in one monolithic piece to sizes and shapes shown.
2. Integral lavatory and countertop shall be the same material.
3. Minimize or eliminate all seams from countertop, lavatory, backsplash and endsplash surfaces to the greatest extent possible. Where seaming is absolutely necessary, provide only hard seams in strict accordance with manufacturer's instructions for a monolithic, inconspicuous appearance.
4. Provide only hard seams for all set-top backsplashes and endsplashes in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that surfaces to receive materials are satisfactory for their installation. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected.

3.2 INSTALLATION

A. Clean all substrates receiving solid surfacing materials from dust, dirt, contaminants, and any other materials that would affect the proper adhesion of Work of this Section.

B. Install components plumb, level and rigid in accordance with manufacturer's instructions and approved shop drawings.

C. Fabricate all items using the largest pieces available to the greatest extent possible.

D. Form field joints using manufacturer=s recommended adhesive, with joints inconspicuous in finished Work. Keep components and hands clean when making joints. Remove excess adhesives, sealants and other stains.

E. Exposed joints/ seams will not be acceptable.

F. Make plumbing connections to drains in accordance with DIVISION 22, PLUMBING.

3.3 PROTECTION

A. Protect surfaces from damage. Repair and replace damaged Work to Owner=s satisfaction without increase to Contract Sum.

END OF SECTION

SECTION 07 21 13
THERMAL INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION:

A. The Work includes, but is not necessarily limited to, the furnishing and installing of all building insulation as indicated on the Drawings and specified herein.

1.2 RELATED WORK

A. FIRESTOPPING: SECTION 07 84 00

B. JOINT SEALANTS: SECTION 07 92 00

C. NON-STRUCTURAL METAL FRAMING: SECTION 09 22 16

D. GYPSUM BOARD: SECTION 09 29 00

E. PLUMBING: DIVISION 22

F. HVAC: DIVISION 23

G. ELECTRICAL: DIVISION 26

1.3 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES and Section 01 8113, SUSTAINABLE DESIGN REQUIREMENTS.

B. Manufacturer's Literature and Data:

1. Insulation, each type used
2. Adhesive, each type used.
3. Tape

C. Certificates: Stating the type, thickness and "R" value (thermal resistance) of the insulation to be installed.

1.4 STORAGE AND HANDLING:

A. Store materials indoors in a dry location, protected from moisture, soiling and other sources of damage.

B. Follow the additional instructions of each 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 basic designation only.

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

C553-08.....Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications

Polyisocynurate Thermal Insulation

C612-14.....Mineral Fiber Block and Board Thermal Insulation

C954-15.....Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Base to Steel Studs From 0.033 (0.84 mm) inch to 0.112 inch (2.84 mm) in thickness

C1002-14.....Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs

E84-15b.....Surface Burning Characteristics of Building Materials

F1667-15.....Driven Fasteners: Nails, Spikes and Staples.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source.

B. For Acoustical and Thermal Insulation:

1. Flame Spread Rating: 25 maximum per ASTM E84 or UL 723 as applicable.
2. Smoke Developed Rating: 50 maximum per ASTM E84 or UL 723 as applicable, unless otherwise noted.
3. Minimum 25-percent recycled content.

C. For Fire Safing/ Retardant Insulation:

1. Flame Spread Rating: 25 maximum per ASTM E84.
2. Smoke Developed Rating: 0 per ASTM E84.
3. Minimum 70-percent recycled content.

PART 2 - PRODUCTS

A. Insulation Type 1:

1. Material: 6 1/4-inch thick, R=19, unfaced fiberglass, “Ecobatt Insulation” as manufactured by Knauf Insulation, “Thermal Batt Insulation” as manufactured by Owens Corning, or accepted equal.
2. Use: Thermal insulation at exterior walls.

B. Insulation Type 2:

1. Material: 3 1/2-inch thick, R=11, unfaced fiberglass, “QuietZone Sound Attenuation Batt Insulation” as manufactured by Owens Corning, “QuietTherm Acoustical/ Thermal Batt Insulation” by Knauf Insulation, or accepted equal.

2. Use: Typical Acoustical Insulation.

C. Insulation Type 3:

1. Material: Nominal 4-inch thick, width as required, 4.0 pcf density mineral wool batt insulation. Type "SAF" insulation as manufactured by Thermafiber, Inc., or accepted equal.
2. Use: Fire retardant insulation.

D. Accessories:

1. Stick Clips/ Impaling Pins for Installation: As recommended by the insulation manufacturer for the particular material and installation condition.
2. Adhesive: As recommended by the insulation manufacturer for the insulation type and substrate involved and as specified in SECTION 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS.
3. Insulation Tape: Compatible with insulation in accordance with manufacturer’s requirements.

E. Acoustical Sealant: As specified in SECTION 07 9000, JOINT SEALANTS, and as recommended by the manufacturer.

2.1 INSULATION – GENERAL:

A. Where thermal resistance ("R" value) is specified or shown for insulation, the thickness shown on the drawings is nominal. Use only insulation with actual thickness that is not less than that required to provide the thermal resistance specified.

B. Where "R" value is not specified for insulation, use the thickness shown on the drawings.

C. Where more than one type of insulation is specified, the type of insulation for each use is optional, except use only one type of insulation in any particular area.

D. Insulation Products shall comply with following minimum content standards for recovered materials:

Material Type	Percent by Weight
Rigid Insulation	20 percent pre-consumer recycled material
Batt Insulation	30 percent recovered material
Rock wool material	75 percent recovered material

The minimum-content standards are based on the weight (not the volume) of the material in the insulating core only.

2.2 EXTERIOR FRAMING OR FURRING INSULATION:

A. Batt or Blanket: Optional.

B. Mineral Fiber: ASTM C665, Type II, Class C, Category I where framing is faced with gypsum board.

C. Mineral Fiber: ASTM C665, Type III, Class A where framing is not faced with gypsum board.

2.3 ACOUSTICAL INSULATION:

A. Mineral Fiber boards: ASTM C553, Type II, flexible, or Type III, semirigid (4.5 pound nominal density).

B. Mineral Fiber Batt or Blankets: ASTM C665. Maximum flame spread of 25 and smoke development of 450 when tested in accordance with ASTM E84.

C. Thickness as shown; of widths and lengths to fit tight against framing.

2.4 SOUND DEADENING BOARD:

A. Mineral Fiber Board: ASTM C612, Type IB, 13 mm (1/2 inch thick).

B. Perlite Board: ASTM C728, 13 mm (1/2 inch thick).

2.5 RIGID INSULATION:

A. On the inside face of exterior walls, spandrel beams, floors, bottom of slabs, and where shown.

B. Mineral Fiber Board: ASTM C612, Type IB or 2.

C. Perlite Board: ASTM C728.

D. Cellular Glass Block: ASTM C552, Type I.

2.6 FASTENERS:

A. Staples or Nails: ASTM F1667, zinc-coated, size and type best suited for purpose.

B. Screws: ASTM C954 or C1002, size and length best suited for purpose with washer not less than 50 mm (two inches) in diameter.

C. Impaling Pins: Steel pins with head not less than 50 mm (two inches) in diameter with adhesive for anchorage to substrate. Provide impaling pins of length to extend beyond insulation and retain cap washer when washer is placed on the pin.

2.7 ADHESIVE:

A. As recommended by the manufacturer of the insulation.

B. Asphalt: ASTM D312, Type III or IV.

C. Mortar: ASTM C270, Type 0.

2.8 TAPE:

A. Pressure sensitive adhesive on one face.

B. Perm rating of not more than 0.50.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that surfaces to receive insulation are satisfactory for their installation. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected.

3.2 INSTALLATION - GENERAL

A. Insulation Type 1 and 2:

1. Install snugly and/ or friction fit insulation between framing members, and as shown.
2. Carefully cut and fit insulation around pipes, conduits and other obstructions.
3. Fill all voids to create a continuous thermal and/ or sound-isolated plane.
4. Stagger insulation joints between stud bays and between multiple layers of insulation without leaving voids.
5. Provide supplemental attachment of 18 gauge wire to maintain insulation within stud wall cavities wider than the thickness of insulation.
6. Maintain the integrity of the vapor retarder facing, where occurs. Repair any punctures or tears in the facing as recommended by the manufacturer.

B. Insulation Type 3:

1. Install fire retardant insulation where shown and in accordance with the requirements of referenced UL Listings, leaving no voids. Size of insulation is as shown on the Drawings and is as required to meet the fire-rating appropriate to adjacent construction. Provide safing/ impaling clips as required.

3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

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SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 DESCRIPTION

The Work includes, but is not necessarily limited to, the furnishing and installing of flashing and sheet metal, including coping, flashing, reglets, sheet metal covers and accessories, as indicated on the Drawings and specified herein.

1.2 RELATED WORK

A. Joint Sealants: Section 07 92 00, JOINT SEALANTS.

B. Integral flashing components of manufactured roof specialties and accessories or equipment: Section 07 72 00, ROOF ACCESSORIES, Division 22, PLUMBING sections and Division 23 HVAC sections.

E. Paint materials and application: Section 09 91 00, PAINTING.

1.3 QUALITY ASSURANCE

A. Work shall conform to the standards in the latest edition of the "Architectural Sheet Metal Manual" published by the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).

B. Contractor shall be responsible to furnish and install flashing and sheet metal Work that is permanently watertight, and that withstands wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and/ or fastener disengagement.

C. Reference Standards: The following documents form a part of these Specifications to the extent stated herein. Bring any conflicts between Specifications, Drawings, and the referenced documents to the attention of the Architect in writing, for resolution before taking any related action. Where differences exist between Codes and Standards, the one affording the greatest protection shall apply.

1. Federal Specifications (FS):
   a. QQ-T-201F - “Terneplate, for Roofing and Roofing Products.”
   b. A-A-51145D NOT 1 - “Flux, Soldering, Non-Electronic, Paste and Liquid.”
2. Aluminum Association: “Aluminum Design Manual,” latest edition.
3. American Society for Testing and Materials (ASTM):
   a. A240/ 240M - “Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure

Vessels and for General Applications."

b. A653/ A653M - "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process."

c. B32 - "Standard Specification for Solder Metal."

d. B209 - "Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate."

e. D226 - "Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing."

f. D4586 - "Standard Specification for Asphalt Roof Cement, Asbestos-Free."

4. National Association of Architectural Metal Manufacturers (NAAMM): NAAMM AMP 500, "Metal Finishes Manual."

5. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): SMACNA "Architectural Sheet Metal Manual."

1.4 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. Editions of applicable publications current on date of issue of bidding documents apply unless otherwise indicated.

B. Aluminum Association (AA):

AA-C22A41.....Aluminum Chemically etched medium matte, with clear anodic coating, Class I Architectural, 0.7-mil thick

AA-C22A42.....Chemically etched medium matte, with integrally colored anodic coating, Class I Architectural, 0.7 mils thick

AA-C22A44.....Chemically etched medium matte with electrolytically deposited metallic compound, integrally colored coating Class I Architectural, 0.7-mil thick finish

C. American National Standards Institute/Single-Ply Roofing Institute (ANSI/SPRI):

ANSI/SPRI ES-1-03.....Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems

D. American Architectural Manufacturers Association (AAMA):

AAMA 620.....Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Aluminum

AAMA 621.....Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates

E. ASTM International (ASTM):

A240/A240M-14.....Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications.

A653/A653M-11.....Steel Sheet Zinc-Coated (Galvanized) or Zinc Alloy Coated (Galvanized) by the Hot- Dip Process

B32-08.....Solder Metal

B209-10.....Aluminum and Aluminum-Alloy Sheet and Plate

B370-12.....Copper Sheet and Strip for Building Construction

D173-03(R2011).....Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing

D412-06(R2013).....Vulcanized Rubber and Thermoplastic Elastomers-Tension

D1187-97(R2011).....Asphalt Base Emulsions for Use as Protective Coatings for Metal

D1784-11.....Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

D3656-07.....Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns

D4586-07.....Asphalt Roof Cement, Asbestos Free

F. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual.

G. National Association of Architectural Metal Manufacturers (NAAMM):

AMP 500-06.....Metal Finishes Manual

H. Federal Specification (Fed. Spec):

A-A-1925A.....Shield, Expansion; (Nail Anchors)

UU-B-790A.....Building Paper, Vegetable Fiber

I. International Code Commission (ICC): International Building Code, Current Edition

1.5 PERFORMANCE REQUIREMENTS

A. Wind Uplift Forces: Resist the following forces per FM Approvals 1-49:
   1. Wind Zone 1: 0.48 to 0.96 kPa (10 to 20 lbf/sq. ft.): 1.92-kPa (40-lbf/sq. ft.) perimeter uplift force, 2.87-kPa (60-lbf/sq. ft.) corner uplift force, and 0.96-kPa (20-lbf/sq. ft.) outward force.

B. Wind Design Standard: Fabricate and install copings, roof-edge flashings tested per ANSI/SPRI ES-1 to resist design pressure indicated on Drawings.

1.6 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Shop Drawings: For all specified items, including fully detailed, large-scale drawings of all specially fabricated sheet-metal Work showing joint locations, profiles, dimensions, methods of joining and forming sections, and attachments to adjoining Work:
   1. Flashings
   2. Copings

C. Manufacturer's Literature and Data: For all specified items, including:
   1. Two-piece counterflashing
   3. Expansion joint cover, each type
   4. Nonreinforced, elastomeric sheeting

D. Certificates: Indicating compliance with specified finishing requirements, from applicator and contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

D. Deliver flashing and sheet metal materials and fabrications to the Site undamaged, being careful to protect items during transportation and handling.

E. Unload, store and install flashing and sheet metal materials and fabrications in a manner that prevents bending, warping, twisting, and surface damage.

F. Stack materials on platforms or pallets protected from the weather. Do not store flashing and sheet metal materials in contact with other materials that might cause staining, denting, corrosion, or other

surface damage.

1.8 COORDINATION

Coordinate Work of this Section with interfacing and adjoining Work to ensure proper sequencing of each installation and to provide a watertight, secure and noncorrosive installation.

1.9 WARRANTY

A. Provide a warranty to repair or replace metal flashing Work which fails to resist water penetration or infiltration into the building, deteriorates or sustains damage due to wind, or generates excessive noise from wind.

B. Warranty Period: Five (5) years.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Galvanized Steel: Structural Quality, meeting the requirements of ASTM A653/ A653M with a G90 minimum Coating Designation. Shop primed.

1. Thickness: 20-gauge minimum, unless otherwise specified or shown on the Drawings.

   a. Continuous Cleats/ Clips: 18-gauge minimum.

2. Galvanized Steel to contain a minimum of ~~45~~ **25**-percent recycled content.

B. Aluminum Sheet: ASTM B209/ B209M, 3003-H14 Alloy.

1. Thickness: 0.063-inch thick minimum.
2. All exposed aluminum surfaces shall be free of scratches and other serious surface blemishes.

C. Stainless Steel: Complying with ASTM A240/ A240M, Types 302, 304 and 316. Contractor shall select the Type appropriate for the intended use. 20-gauge minimum thickness.

1. Stainless Steel to contain a minimum of 60-percent recycled content.

D. Lead Sheet: FS QQ-L-201F, Grade B. ASTM B29 and B749.

1. Thickness: Minimum four (4) pounds per square foot, unless otherwise specified or shown on the Drawings.

E. Reglets: Shall provide secure interlocking of separate reglet and counter flashing pieces. 24-gauge minimum, galvanized steel.

F. Fasteners: Same metal as flashing/ sheet metal or other non-corrosive metal as recommended by the sheet metal manufacturer. Match the finish of exposed heads with that of the material being fastened.
   1. Provide rivets, sheet metal screws, machine screws, self-tapping screws, and stove bolts; Contractor shall select type and size of fastener best suited to each condition of use.
G. Solder: ASTM B32, Grade as recommended by the sheet metal manufacturer for the particular metal to which the solder will be applied.
H. Flux: Raw muriatic acid, and other acid as recommended by the sheet metal manufacturer for the particular metal to which the flux will be applied.
I. Welding: As specified in SECTION 05 50 00, METAL FABRICATIONS.
J. Bituminous Coating: SSPC-PS 9.01. Cold-applied asphalt mastic compounded for 15-mil dry film thickness per coat. Provide inert-type, non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
K. Asphalt Primer: ASTM D41.
L. Sealant: As specified in SECTION 07 92 00, JOINT SEALANTS.
M. Primer Coating: Zinc-dust/ zinc-oxide metal primer, and as recommended by the sheet metal manufacturer for the metal to which it will be applied.
N. Paint: As specified in SECTION 09 9000, PAINTING.
O. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and other similar accessories as required for a complete installation. Accessory materials shall be non-corrosive, shall match or be compatible with the materials being installed, and shall be of size and gauge as required for continued system performance.
P. Gaskets: Type suitable for use in conjunction with sheet metal. Gaskets shall be non-staining, non-corrosive, non-shrinking, non-sagging, and ultra-violet (UV) and ozone resistant for exterior concealed applications.

2.2 FABRICATION

A. General Requirements:

1. Fabricate all items in profiles and configurations as shown on the Drawings.
2. Shop-fabricate Work to greatest extent possible.
3. Comply with applicable requirements of the SMACNA "Architectural Sheet Metal Manual," and other recognized industry practices.
4. Fabricate items for continued waterproof and weather-resistant performance with expansion provisions for running lengths of material; items shall be sufficient to permanently prevent leakage, damage or deterioration of the Work.
5. Form Work to fit substrate. Comply with material manufacturer’s instructions and recommendations for forming material. Form exposed sheet metal Work without excessive oil-canning, buckling and tool marks, true to line and levels indicated with exposed edges folded back to form hems.
6. Joints and seams shall be kept to a minimum.
7. Sheet metal in straight continuous runs shall be fabricated from lengths of material no less than eight (8) feet and no greater than twelve (12) feet, unless otherwise shown on the Drawings.

B. Movement Joints:

1. Provide movement joints for thermal expansion and contraction and building movement in completed Work to prevent overstressing materials, breaking connections, or producing wrinkles and distortions in finished surfaces.
2. Space movement joints at a maximum of ten (10) feet with no joints permitted within 24-inches of a corner or intersection, unless otherwise specified or shown on the Drawings.
3. Make movement joints watertight and weather-tight throughout.
4. Where applicable, attach members with clips to permit movement without damage or provide slotted or oversized holes with washers.

C. Seams:

1. General:
   a. Shall be straight and uniform in width and height with no welds or solders showing on exposed faces of material.
   b. Shall be oriented in direction of water flow.
2. Lap Seam: Seam overlap shall not be less than 1-inch wide. Solder

all seams less than 3-inches wide.

3. Flat-Lock Seam: Seam width shall not be less than 3/4-inch.
   a. Use: Typical seam, unless otherwise specified or shown on the Drawings.
4. “S” Cleat Seam: Seam width shall not be less than 3/4-inch.
   a. Use: Flashing seams, unless otherwise shown.
5. Loose-Lock Expansion Seam: Seam width shall not be less than 3-inches wide with a minimum of 1-inch movement within the joint assembly. Completely fill joints with sealant in depth (thickness) of no less than 1/8-inch.
6. Drive Cleat Seam: Width of cover batten shall not be less than 3/4-inch wide.

D. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of Work, form metal to provide for the proper installation of elastomeric sealant in compliance with SMACNA standards.

E. Separations: Provide for separation of metal from non-compatible metal or corrosive substrate by coating concealed surfaces at locations of contact with bituminous coating or proper permanent separation as recommended by manufacturer or fabricator.

F. Soldering:
   1. Clean and flux metal prior to soldering.
   2. Sweat solder completely through seam width.
   3. Make exposed soldering full flowing and smooth with finished surfaces.
   4. Wash acid flux with an appropriate neutralizer solution after soldering, and remove soldering flux from exposed and paint ready surfaces.

G. Reglets and Counter Flashing System: Fabricate upper edge to lock into surface mounted receiver. Fabricate receiver joint sealant pocket on upper edge and lower edge to receive counterflashing, with slotted fastener holes at 400 mm (16 inch) centers between upper and lower edge.

H. Sealant Cover and Flashing Umbrella Assemblies: Custom, stainless steel one- or two- piece assemblies as manufactured by SBC Industries, or accepted equal.

1. Contractor to select the appropriate type of assembly for each condition.
2. Furnish and install flashing collars or clamps around all sealant cover and flashing umbrella assemblies, unless otherwise noted.

I. Galvanized Steel Coping: Galvanized steel in profile and size as shown on the Drawings.
1. Provide miter joints at all corners.

J. Bent/ Formed Aluminum Coping:
1. Coping shall be the maximum length available, and shall be 12-foot long minimum.
2. Profile as shown on the Drawings.
3. Provide concealed splice plate at each joint.
4. All corners to be fully welded.

K. Finishes:
1. Galvanized Steel Coping: All galvanized steel receiving a field finish shall be pretreated and primer coated in the shop; Contractor shall coordinate and verify the compatibility of pretreatment and primer materials with the ultimate finish specified. Galvanized steel receiving finishes that are factory-furnished shall be as specified or shown on the Drawings.
2. Aluminum: Aluminum coping shall be factory finished with a powder coating after assembly. Custom color as selected by the Architect.
3. Field Finish: As specified in SECTION 09 9000, PAINTING, unless otherwise specified or shown. Colors as selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify all roof penetrations, including pipes and/ or sleeves are installed and securely anchored in place.
B. Verify membrane termination and base flashings are in place, sealed and secure.
C. Verify windows, storefront, and exterior wall systems are in place.
D. Ensure substrates are smooth, clean and ready to receive flashing and sheet metal Work.
E. Examine all substrates, areas, and conditions to verify actual locations, dimensions and other conditions affecting performance of Work.

F. Do not begin flashing and sheet metal Work until all unsatisfactory conditions have been addressed and corrected.

3.2 PREPARATION

A. Remove all dirt, dust and foreign materials from the surfaces to receive flashing and sheet metal. Surfaces shall be clean, smooth, even and free from defects, prior to installation.

3.3 INSTALLATION

A. General:

1. Comply with the details and profiles indicated on the Drawings and SMACNA recommendations for installation of the Work.
2. Coordinate the installation of flashing and sheet metal Work specified herein with the Work of other Trades. Work of this Section which interfaces with a specified weatherproofing, waterproofing, and/ or rain drainage system shall be considered an integral component of such system, and shall likewise provide watertight performance.
3. Use concealed fasteners throughout the Work, except as otherwise indicated.
   a. Apply 1-inch diameter spots of mastic over any exposed fasteners. Smooth mastic for a neat appearance.
4. Conceal reinforcement within finished assemblies.
5. Work shall be watertight without waves, warps, buckles, fastening stresses, distortion, tool marks, or "oil canning," and shall be true to line and surface, allowing for expansion and contraction to avoid deformation in service.
6. Separate dissimilar metals and materials with bituminous coating compound or a proper permanent separation as recommended by the manufacturer or fabricator, unless otherwise noted.
7. Form sheet metal on a bending brake. Perform shaping, trimming, and hand seaming in the shop as much as possible. All lines shall be straight and crisp except where the thickness of metal dictates a radius bend, and all exposed edges shall be hemmed 1/2-inch minimum, unless otherwise noted.
8. Lay out metal flashing to minimize transverse joints. Detail transverse joints in all flashing pieces to provide a

watertight connection and to allow for expansion/contraction of the metal.

9. Provide shop-fabricated corner and transition pieces to limit field joinery other than transverse joints. Shop-fabricate inside coping corners, outside coping corners, and horizontal-to-vertical transitions with a minimum 12-inch stub in each linear direction.

B. Install flashing and counter flashing where shown or as required to provide watertight protection.

1. Notch and lap all counter flashing at inside corners and joints, and seam at outside corners.

C. Provide a minimum 1/4-inch per foot slope on all horizontal surfaces to prevent ponding, unless otherwise noted.

3.4 CLEANING AND ADJUSTMENT

A. Leave Work clean and free of stains, scraps, and debris. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Repair and replace any damaged Work.

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SECTION 07 81 00
APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 DESCRIPTION

The Work includes, but is not necessarily limited to, the furnishing and installing of spray-on cementitious fireproofing and intumescent fire resistive coatings for all structural steel members, floor and roof slabs and metal decking as indicated on the Drawings and specified herein. The Work relates to patching and repair displaced fireproofing resulting from other Work in this project.

1.2 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Sustainable Design Submittals, as described below:

1. Volatile organic compounds per volume as specified in PART 2 - PRODUCTS.

C. Manufacturer's Literature and Data:

1. Manufacturer's complete and detailed application instructions and specifications.
2. Manufacturer's repair and patching instructions.
3. Submit schedule indicating material to be used, building elements to be protected, hourly rating and material thickness provided and appropriate references.

D. 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.
      i. Fire-resistance rating of assemblies in accordance with ASTM E119.
      ii. Bond Strength per ASTM E736 and D4541.
      iii. Frame-spread and smoke development rating for materials in accordance with ASTM E84.
      iv. Combustibility per ASTM E1354.
      v. Mold Resistance per ASTM G21.

2. Manufacturer's certificate indicating sprayed-on fireproofing material supplied under the Contract is same within manufacturing tolerance as fireproofing material tested.

E. 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.
4. Code Data: Current ICC Evaluation Report.

1.3 COORDINATION

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

B. Material shall be delivered in original unopened packages, clearly identified with manufacturer's name, brand and UL label.

C. Material shall be stored, intact, off the ground, in a dry location, protected from moisture and contamination. Discard any material that has been exposed to moisture or contamination prior to mixing for use.

D. Follow additional storage requirements of manufacturers.

E. Stock of material is to be rotated and used prior to its expiration date.

1.5 PROJECT CONDITIONS

A. Environmental Requirements:

1. Temperature of substrate and ambient air shall be a minimum of 50-degrees F. for a minimum of twenty-four (24) hours before and after application of fireproofing.
2. Comply with additional requirements of manufacturer.

B. Protection:

1. In the absence of natural ventilation, provide ventilation by mechanical means with minimum total air exchange rate of four (4) times per hour in areas to receive fireproofing, introducing fresh air and exhausting air continuously during and twenty-four (24) hours after application to maintain nontoxic, unpolluted, safe working area.
2. Provide temporary enclosures, as necessary, to prevent spray from contaminating air.
3. Protect adjacent surfaces and equipment from damage by overspray, fall-out and dusting-off of sprayed fireproofing materials.

1.6 QUALITY CONTROL

A. Applicator Qualifications:
   1. Applicator shall be approved by the manufacturer of the fireproofing materials.
   2. Applicator shall have a minimum of five (5) years of successful experience installing fireproofing materials on at least three (3) projects of comparable type and size.
B. Design Criteria: Provide fire-resistive rating per California Code of Regulations, Title 24, Part 2 California Building Code 2001 Edition Table 6-A and as shown on Drawings.
C. In addition to complying with governing code requirements, comply with UL Classification for fire-retardant rating required.
D. Source Quality control: The Testing Laboratory will take samples, perform testing, and report on the following:
   1. Fire-resistance rating of assemblies in accordance with ASTM E119.
   2. Flame-spread and smoke development rating for materials in accordance with ASTM E84.
E. VOC Limits:
   1. Provide paint and coating materials that conform to Federal, State, and Local restrictions for Volatile Organic Compounds (VOC) content.
   2. Meet the requirements set forth by Green Seal Standard GS-11, First Edition May 20, 1993, for paints, coatings and primers.
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 Resident Engineer, 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.

1.7 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):

1. E84 - "Standard Test Method for Surface Burning Characteristic of Building Materials."
2. E119 - "Standard Methods of Fire Tests of Building Construction and Materials."
3. E605 - "Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members."
4. E736 - "Standard Test Method for Cohesion/ Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members."
5. E759 - "Standard Test Method for Effect of Deflection on Sprayed-Fire-Resistive Material Applied to Structural Members."
6. E760 - "Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members."
7. E761 - "Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members.
8. E859 - "Standard Test Method for Air Erosion of Sprayed Fire-Resistive Material Applied to Structural Members."
9. E937 - "Standard Test Method for Corrosion of Steel by Sprayed Fire Resistive Material (SFRM) applied to structural members".
10. E1354 - "Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter."
11. G21 – "Standard Test Method for 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

F. NFPA 101 - Life Safety Code (fire rating requirements).

G. Association of the Wall and Ceiling Industry (AWCI) Technical Manual 12-B, "Standard Practice for the Testing and Inspection of Field Applied Thin Film Intumscent Fire-Resistive Materials; an Annotated Guide," latest edition.

1.8 WARRANTY

A. Contractor, Installer, and Manufacturer agree to repair or replace material which has cracked, flaked, dusted excessively, peeled or fallen from substrate, or otherwise deteriorated to a condition where it would not perform effectively for a fireproofing within guarantee period as a result of failure of materials or workmanship.

B. The warranty period shall be five (5) years for the Work after the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cementitious Fireproofing Systems:

1. Interior: Sprayed on cementitious fireproofing material shall be free of asbestos and mineral wool fiber.
   a. Dry density: Minimum density of 15 pcf, and in accordance with ASTM E605.
   b. Deflection: No cracking, spalling, or delamination from the surface to which it is applied in accordance with ASTM E759.
   c. Bond Impact: No cracking, spalling, or delamination from the surface to which it is applied in accordance with ASTM E760.
   d. Bond Strength: Minimum average bond strength of 200 psf in accordance with ASTM E736.
   e. Corrosion Resistance: Does not contribute to corrosion of steel in accordance with ASTM E937.
   f. Surface Burning Characteristics: Zero (0) flame spread and zero (0) smoke development in accordance with ASTM E84.
   g. Combustibility: The fireproofing shall not deform more than 10% when subjected to compressive forces of 1,200 psf minimum when tested in accordance with ASTM E761.
   h. Compressive Strength: The fireproofing shall not deform more than 10% when subjected to compressive forces of 1,200 psf when tested in accordance with ASTM E761.
   i. Air Erosion: Maximum allowable weight loss of the fireproofing material shall be 0.000 gm/sq. ft. per ASTM E859.
   j. Resistance to Mold: Fireproofing material shall be formulated with a mold inhibitor at time of manufacture and shall show resistance to mold growth for a period of 28 days minimum when tested in accordance with ASTM G21.
2. Exterior: Sprayed on cementitious fireproofing material shall be free of asbestos and mineral wool fiber.
   a. Dry density: Minimum density of 40 pcf, and in accordance with ASTM E605.
   b. Deflection: No cracking, spalling, or delamination from the surface to which it is applied in accordance with ASTM E759.
   c. Bond Impact: No cracking, spalling, or delamination from the surface to which it is applied in accordance with ASTM E760.
   d. Bond Strength: Minimum average bond strength of 10,000 psf in accordance with ASTM E736.

e. Corrosion Resistance: Does not contribute to corrosion of steel in accordance with ASTM E937.

f. Surface Burning Characteristics: Zero (0) flame spread and zero (0) smoke development in accordance with ASTM E84.

g. Combustibility: The fireproofing shall not deform more than 10% when subjected to compressive forces of 1,200 psf minimum when tested in accordance with ASTM E761.

h. Compressive Strength: The fireproofing shall not deform more than 10% when subjected to compressive forces of 500 psi when tested in accordance with ASTM E761.

i. Air Erosion: Maximum allowable weight loss of the fireproofing material shall be 0.000 gm/sq. ft. per ASTM E859.

j. Resistance to Mold: Fireproofing material shall be formulated with a mold inhibitor at time of manufacture and shall show resistance to mold growth for a period of 28 days minimum when tested in accordance with ASTM G21.

B. Intumescent Fire Resistive Coating System:

1. Interior Applications: water based intumescent fireproofing material, free of asbestos and mineral wool fiber. Finish to be white and as smooth as possible.

2. Intumescent fire resistive coating shall conform to the following properties:

a. Durometer Hardness: ASTM D2240, 84 minimum Shore D.

b. Impact Resistance: ASTM D2794, 56 inch-pound intrusion minimum.

c. Abrasion Resistance: ASTM D4060, 0.6505 g/ 1000 cycles (Interior Fireproofing), 0.2300g/1000 cycles (Exterior Fireproofing).

d. Bond Strength: ASTM D4541, 280 psi minimum.

e. Surface Burning Characteristics, Class A, in accordance with ASTM E84:

1) Flame Spread: 10 (Interior Fireproofing), 15 (Exterior Fireproofing).

2) Smoke Development 50 (Interior Fireproofing), 50 (Exterior Fireproofing).

3. Primer: As required by fireproofing manufacturer and compatible with selected system.

C. Finish Coat: As specified in SECTION 09 9000 for Interior Applications.

D. Sealer: Fireproofing manufacturer's recommended standard spray-on type sealer.

E. Water: Potable and free of substances which would adversely affect fireproofing materials.

F. Miscellaneous Materials: As necessary for proper installation in

compliance with fireproofing manufacturer's printed instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that painted or primed surfaces on members to receive sprayed fireproofing and intumescent fire resistive coating are compatible with fireproofing materials and bond requirements.

B. Ensure that clips, hangers, supports, sleeves and other items required penetrating the sprayed fireproofing placed before installing fireproofing.

C. Verify that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until sprayed fireproofing Work is complete.

3.2 PREPARATION

D. Clean substrates of loose mill scale, paint, primer, grease, oil, dirt and other substances which would affect the bond of fireproofing.

E. Sandblast members to receive sprayed fireproofing to remove incompatible materials which affect bond when scraping, brushing, or washing will not remove the materials.

F. Provide masking, drop cloths or other satisfactory coverings so as to prevent overspray of sprayed fireproofing.

G. Close off and seal ductwork in areas where fireproofing is being applied.

3.3 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. Do not apply fireproofing to all lateral support braces, except at connections to the Building vertical load support systems. In such locations, provide fireproofing on brace 1-foot (or per code requirements) beyond the point of attachment. Thickness of fireproofing same as the thickness as required for the vertical support members.

C. Mix and apply fireproofing materials in accordance with the manufacturers' printed instructions and the fire-resistive ratings specified.

D. Do not use fireproofing mix that has partially set, or that contains lumps, or that is frozen or caked.

E. Apply fireproofing over entire substrate with sufficient thickness to obtain the fire-resistive rating required by the governing code for the degree of protection as specified herein.

F. Do not apply fireproofing to the underside of metal decking or to supporting beams and joists until after concrete fill has been placed.
   1. On decks without concrete fill, complete all roofing applications and roof mounted equipment installation prior to application or the fireproofing to the underside of roof decking and/ or supporting beams and joists. Prohibit all roof traffic upon commencement of the fireproofing and until the fireproofing material is dry.
G. Apply protective sealer over Cementitious Fireproofing System as a protective coating in areas where fireproofing is exposed, then apply two (2) coats of clear sealer to fully dried fireproofing systems. Apply in conformance with manufacturer’s recommendations.
H. Apply intumescent fire resistive coating to structural steel members at the appropriate dry film thickness to achieve the fire resistance rating as indicated on Drawings and as required in referenced UL Listings.
   1. Fireproofing exposed to view: Surface shall be tooled smooth to the satisfaction of the Architect.
I. Application shall be completed in one area, inspected and approved by Resident Engineer before removal of application equipment and proceeding with further work.

3.4 FIELD TESTS

A. Tests of applied material will be performed by VA retained Testing Laboratory. See Section 01 45 29, TESTING LABORATORY SERVICES.
   1. Spray-on cementitious fireproofing shall be inspected continuously throughout its installation and in strict accordance with the provisions of ASTM E605 to verify the thickness and density of material-in-place. The volume displacement method described in ASTM E605 shall be used to determine the density of in-place fireproofing.
   2. Verify the bond strength of spray-on cementitious fireproofing in accordance with the provisions of ASTM E736.
   3. Intumescent fire resistive coatings shall be inspected for thickness in accordance with AWCI Technical Manual 12-B before the application of the finish coat.
B. Resident Engineer 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.

3.5 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.

3.6 SCHEDULE

A. Apply fireproofing material in interior structural steel members and on underside of interior steel floor and roof decks, except on following surfaces:
   1. Structural steel and underside of steel decks in elevator or dumbwaiter machine rooms.
   2. Steel members in elevator hoist ways.
   3. Areas used as air handling plenums.
   4. Steel to be encased in concrete or designated to receive other type of fireproofing.

3.7 CLEANING AND PROTECTION

A. Repair damaged fireproofing with new fireproofing materials.

B. Clean up and remove from the jobsite all debris resulting from Work of this Section as the Work progresses.

Protect fireproofing until permanent covering is installed, or until Final Completion where exposed to view in the completed Work.

- - - E N D - - -

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 DESCRIPTION

A. The Work includes, but is not necessarily limited to, the furnishing and installing of firestopping, smokeseals, and associated accessory items, for fire-resistive joint systems and for the protection of penetrations of pipes, ducts, conduit, etc. in smoke and fire rated walls, partitions and floors.

1.2 RELATED WORK

A. Section 07 21 13, THERMAL INSULATION
B. Section 07 81 00, APPLIED FIREPROOFING
C. Section 07 92 00, JOINT SEALANTS.
D. Section 09 29 00, GYPSUM WALLBOARD
E. Division 22, Plumbing
F. Division 23, Mechanical
G. Division 26, Electrical
H. Division 27, Telecommunications

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.
E. Shop Drawings: Submit manufacturer's shop drawings and installation instructions for each type of firestop or smokeseal required by the project. Shop drawings shall indicate the detailing of all necessary anchorages, reinforcements and fastenings required.

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.
C. All firestopping and smokeseal materials shall be installed prior to expiration of shelf life.

1.5 WARRANTY

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.

B. Requirements of Regulatory Agencies: Materials shall have the current approval of the California State Fire Marshal. Firestopping or smokeseal materials shall conform to the requirements for Flame (F) ratings in accordance with ASTM E814, UL 1479, ASTM E1966 and/ or UL 2079 fire tests as applicable and in a configuration that is representative of field conditions, and shall restrict the passage of flame, gas, smoke, and water. When required by Code to conform to Temperature (T) ratings per ASTM E814 or UL 1479 fire tests, the firestopping or smokeseal material shall also control the temperature rise across the penetration.

C. Installer Qualifications: Installer shall be FM and/or UL certified and licensed, or otherwise qualified by the firestopping or smokeseal manufacturer as having been provided the necessary training to install firestop or smokeseal products per specified requirements. A manufacturer’s willingness to sell its firestopping or smokeseal products to a Contractor or to an installer engaged by the Contractor does not in itself confer qualifications on the buyer.

D. Source Limitations: Obtain firestop and smokeseal systems for each type of penetration or joint opening and construction condition indicated from a single manufacturer.

E. All materials used shall be as listed for the specific tested assembly being provided. Equipment used shall be in accordance with firestop or smokeseal manufacturer's written installation 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):

E84-Current Edition.....Surface Burning Characteristics of Building Materials

E814-Current Edition....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-Current Edition....Fire Tests of Through-Penetration Firestops

E. Warnock Hersey (WH):
Annual Issue Certification Listings

1.8 PROJECT CONDITIONS

A. Conform to the manufacturer's printed instructions for installation. Do not install firestopping and smokeseal products when ambient or substrate temperatures are outside the limitations recommended by the manufacturer.

B. When applicable, meet manufacturer’s curing requirements related to temperature and humidity.

C. Conform to all required ventilation and safety requirements.

D. Verify the condition of the substrate before starting Work in accordance with manufacturer’s instructions. Do not install firestopping and smokeseal materials when substrates are wet due to rain, frost, condensation or other causes.

E. Keep flammable materials away from sparks or flame.

F. Provide masking and drop cloths to prevent contamination of adjacent surfaces by firestopping and smokeseal materials.

1.9 SYSTEM DESCRIPTION

A. Provide firestopping and smokeseals at locations indicated on the Drawings, including but not limited to the following areas:

1. All openings in fire or smoke rated floors and walls in both void spaces and those spaces accommodating penetrating items such as cables, conduits, pipes, ducts, etc.
2. Construction gap firestopping occurring within fire rated wall, floor or floor-ceiling (roof) assemblies.
3. Construction gap firestopping occurring at the top of fire rated walls.
4. Construction gap firestopping occurring between fire rated

partitions and windows.

5. Openings in shafts.

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^2 (16 sq. in.) in overall cross sectional area.

C. 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.
5. VOC Content: Firestopping sealants and sealant primers to comply with the following limits for VOC content when calculated according to 40 CFR 59, (EPA Method 24):
   a. Sealants: 250 g/L.
   b. Sealant Primers for Nonporous Substrates: 250 g/L.
   c. Sealant Primers for Porous Substrates: 775 g/L.

D. 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.

E. Maximum flame spread of 25 and smoke development of 50 when tested in accordance with ASTM E84 or UL 723. Material to be an approved firestopping material as listed in UL Fire Resistance Directory or by a nationally recognized testing laboratory.

F. FM, UL, or WH rated or tested by an approved laboratory in accordance with ASTM E814.

G. Materials to be nontoxic and noncarcinogen at all stages of application or during fire conditions and to not contain hazardous chemicals. Provide firestop material that is free from Ethylene Glycol, PCB, MEK, and asbestos.

H. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
2. For floor penetrations with annular spaces exceeding 101 mm (4 in.) or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means acceptable to the firestop manufacturer.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

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.

B. Examine substrates and conditions with installer present for compliance with requirements for opening configuration, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Remove dirt, grease, oil, laitance and form-release agents from concrete, 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 (6 inches) on each 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.

C. Prime substrates where required by joint firestopping system manufacturer using that manufacturer’s recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

D. Masking Tape: Apply masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing seal of firestopping with substrates.

3.3 INSTALLATION:

A. Do not begin firestopping 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:

A. As work on each floor is completed, remove materials, litter, and debris.

B. Clean up spills of liquid type materials.

C. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

D. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to provide firestopping complying with specified requirements.

3.5 INSPECTIONS AND ACCEPTANCE OF WORK:

A. Do not conceal or enclose firestop assemblies until inspection is complete and approved by the Contracting Officer Representative (COR).

B. Furnish service of approved inspector to inspect firestopping in accordance with ASTM E2393 and ASTM E2174 for firestop inspection, and document inspection results. Submit written reports indicating locations of and types of penetrations and type of firestopping used at each location; type is to be recorded by UL listed printed numbers.

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SECTION 07 92 00
JOINT SEALANTS

PART 1 - GENERAL

1.1 DESCRIPTION:

Section covers all sealant materials and their application, wherever required for complete installation of building materials or systems.

A. The Work includes, but is not necessarily limited to the furnishing and installing of all caulking and sealing for both interior and exterior conditions as indicated on the Drawings and specified herein.

B. Sealant types specified herein are not necessarily all applicable for this Project.

1.2 RELATED WORK:

A. Sustainable design requirements: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS

B. Firestopping penetrations: Section 07 84 00, FIRESTOPPING.

C. Glazing: Section 08 80 00, GLAZING.

D. Sound rated gypsum partitions/sound sealants: Section 09 29 00, GYPSUM BOARD.

E. FIRE SUPPRESSION: DIVISION 21

F. PLUMBING: DIVISION 22

G. HVAC: DIVISION 23

H. ELECTRICAL, COMMUNICATIONS, AND SECURITY: DIVISION 26, 27, AND 28

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.

1. Applicator shall have a minimum three (3) years of successful experience installing sealants on Projects of comparable type and size.
2. Applicator shall be an approved applicator of the sealant manufacturer.

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 where indicated or, if not indicated, as directed by Contracting Officer.
   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 Resident Engineer seven days in advance of dates and times when test joints will be erected.
   4. Arrange for tests to take place with joint sealant manufacturer's technical representative present. Manufacturer's Representative: Each sealant manufacturer shall provide a trained, full-time employee available for field testing of sealants to ensure compatibility with each substrate in the Project.

E. VOC Limits: Acrylic latex and Silicon sealants shall have less than 50g/l VOC content. Meet the requirements of South Coast Air Quality Management District Rule #1168 with effective date of July 1, 2005, and rule amendment date of January 7, 2005, for all indoor sealants used in the Project.

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.

G. Before the purchase of each required material, confirm its compatibility with each other material to which it will be applied to in the complete joint system.

1.4 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES and Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS.

B. Product Data: Manufacturer’s complete specifications, recommendations, and installation instructions, including cleaning of joint surfaces, for each type of material required.

C. Cured samples of exposed sealants for each color where required to match adjacent material:

1. Submit two (2) sets of manufacturer's standard color charts for each type of sealant for initial selection, unless otherwise shown on the Drawings or specified herein.
2. Submit three (3) sets of each type of sealant in selected color(s), set between strips of hardboard, or other similar material, with a minimum joint size of 1/2-inch wide X 6-inch long for verification of final color selections.

D. Manufacturer's Literature and Data:

1. Primers
2. Sealing compound, each type, including compatibility when different sealants are in contact with each other.

E. Sealant Compatibility and Adhesion Test Reports: Sealant manufacturer(s) shall submit the following information for each joint sealant condition in the Work, unless otherwise noted:

1. Materials forming joint substrates and joint sealant backings have been tested under laboratory conditions for compatibility and adhesion with joint sealants. Compatibility information shall include stain testing in accordance with ASTM C1248 as applicable.

2. Interpretations of laboratory test results and written recommendations for primers and substrate preparation needed for proper sealant adhesion.
3. Field adhesion test reports confirming specified sealants are compatible with all substrates in the Project.

F. Certification: Submit certification from each sealant manufacturer indicating that the applicator is certified to install Work of this Section.

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.

D. Consult manufacturer when sealant cannot be applied during recommended conditions.

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. Install sealant during manufacturer’s recommended temperature ranges and weather conditions for application and cure. Consult manufacturer when sealant cannot be applied during recommended conditions.

D. Do not use sealants, primers and other accessories after manufacturer's stated shelf life.

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.
C612-10.....Mineral Fiber Block and Board Thermal Insulation.
C717-10.....Standard Terminology of Building Seals and Sealants.
C834-10.....Latex Sealants.
C919-08.....Use of Sealants in Acoustical Applications.
C920-10.....Elastomeric Joint Sealants.
C1021-08.....Laboratories Engaged in Testing of Building Sealants.
C1193-09.....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.

E84-09.....Surface Burning Characteristics of Building Materials.

C. Sealant, Waterproofing and Restoration Institute (SWRI).
The Professionals' Guide

PART 2 - PRODUCTS

2.1 SEALANTS:

A. Sealant Type 1:
   1. Material: ASTM C920, FS TT-S-00227E Type I, Class A, two-component, gun-grade, self-leveling with primer, two-part polyurethane sealant, capable of plus and minus 25-percent movement.
   2. Color: To match adjacent area color.
   3. Use: Exterior, for horizontal joints at paving and paving meeting the building.

B. Sealant Type 2:
   1. Material: ASTM C920, FS TT-S-001543A, Class A, single or multi-component, gun-grade, non-sagging, silicone sealant with movement capability plus or minus 50-percent;
   2. Color: As selected by Architect.
   3. Use: General exterior building sealing, unless otherwise shown or specified.

C. Sealant Type 3:
   1. Material: ASTM C834, Single component, gun-grade, paintable, acrylic-latex, water-based sealant.
   2. Color: As selected by Architect.
   3. Use: All interior building sealing, including sound insulated partitions, except as otherwise specified.

D. Sealant Type 4:
   1. Material: ASTM C920, single component, gun-grade, silicone rubber sealant, mildew-resistant, with movement capability plus or minus 25-percent.
   2. Color: White.

3. Use: Interior wet areas and sanitary sealant.

E. Sealant Type 5:

1. Material: ASTM C920, FS TT-S-001543A, one-part formulation cures to a durable, fire-resistant, flexible and ultra-low modulus silicone rubber joint seal. Joint movement capability: Extension +100% and compression -50%.
2. Color: As selected by Architect.
3. Use: Masonry Joints, unless otherwise shown or specified.

F. Sealant Type 6:

1. Material: ASTM C920, FS TT-S-001543A, single component, gun-grade, silicone sealant, with movement capability plus or minus 25-percent.
2. Color: To match adjacent surfaces.
3. Use: Countertops.

G. Sealant Type 7:

1. Material: Acrylic-impregnated expanding foam sealant with movement capability plus or minus 25-percent.
2. Color: Manufacturer’s standard.
3. Use: Secondary support sealant.

H. Sealant Type 8:

1. Material: ASTM C920, FS TT-S-00230C, Single component, non-sag, tamper resistant elastomeric silyl-terminated polyurethane (STPU) paintable sealant with movement capability plus or minus 12.5% minimum.
2. Color: Manufacturer’s standard.
3. Use: Security sealant.

I. Sealant Type 10:

1. Material: Acrylic latex, water-based and 77% solids spray-applied sealant.
2. Color: Manufacturer’s standard.
3. Use: Acoustical sealant.

J. Sealant Type 11:

1. Material: Acrylic latex, water-based sealant.
2. Color: Manufacturer’s standard – White.
3. Use: Acoustical sealant.

K. Sealant Type 12: Glazing Sealant: As specified in SECTION 08 8000, GLAZING.

2.2 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 Joint Backing: Closed cell or bi-cellular neoprene, polyethylene or polyolefin, compatible with sealant material of sizes and shapes as recommended by the joint sealant manufacturer.

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.

A. Bond-Breaker Tape:

1. 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. Extruded Silicone Tape: A preformed, ultra-low modulus silicone extrusion, meeting the requirements of ASTM C1523 and D412.

2.4 FILLER:

A. Mineral fiber board: ASTM C612, Class 1.

B. Expansion Joint Filler: Asphalt impregnated felt, compatible with sealant material and as recommended by the joint sealant manufacturer.

C. Thickness same as joint width.

D. Depth to fill void completely behind back-up rod.

2.5 PRIMER:

A. As recommended by manufacturer of sealant material.
B. Stain free type.

2.6 PRIMERS, SOLVENTS AND CLEANING MATERIALS

A. Non-staining and non-injurious to exposed surfaces of types as recommended by the joint sealant manufacturer.
B. Cleaner type non porous surfaces: 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. Verify that surfaces to receive joint sealant materials are satisfactory for their application. If unsatisfactory conditions exist, do not commence application until such conditions have been corrected.
B. Inspect substrate surface for bond breaker contamination and unsound materials at adherent faces of sealant.
C. Coordinate for repair and resolution of unsound substrate materials.
D. 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. Prepare surfaces and apply materials in accordance with recommendations in ASTM C1193, manufacturer's instructions, and as specified herein.
B. Clean surfaces of joint to receive 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. Porcelain enamel.
   d. 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, or sealing compounds. Mask areas adjacent to joints as necessary to obtain a neat sealant line and to prevent staining of or damage to adjacent surfaces.
   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. unless otherwise shown or as recommended by the manufacturer.

3.5 INSTALLATION:

A. General:
1. Apply sealants only when ambient temperature is between 5° C and 38° C (40° and 100° F). Observe temperature control in accordance with sealant manufacturer's recommendations.
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 sealing compound in accordance with manufacturer's printed instructions, except where more stringent requirements are indicated on the Drawings or specified herein. Apply material with hand gun, powered gun, or trowel to completely fill voids and joints, free of wrinkles and skips, uniformly smooth with full adhesion.
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.

D. Apply sealant to form an airtight seal at all penetrations and perimeters of sound rated partitions, floors, and ceilings.

E. Extruded silicone tape shall be completely bedded into sealant as shown on the Drawings, and shall overlap joint edges and material intersections no less than that recommended by the manufacturer and as required to maintain a watertight barrier.

3.6 FIELD QUALITY CONTROL:

A. Field-Adhesion Testing: Manufacturer's Representative shall perform adhesion tests in the field in accordance with ASTM C1193, Method A, "Field-Applied Sealant Joint Hand-Pull Tab," unless otherwise noted and 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.
   5. For sealants applied between dissimilar substrates, verify sealant adhesion to each substrate separately.
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 sealant manufacturer.
B. After filling and finishing joints, remove masking tape.
C. Leave adjacent surfaces in a clean and unstained condition.
D. Protect joint sealants during and after the curing period from contact with contaminating substances and from damage resulting from construction operations. Remove and replace any sealant conditions which exhibit contamination or damage to the satisfaction of the Architect.
E. Work shall be left in a clean and neat condition.

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SECTION 07 95 13
EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section specifies floor, wall and ceiling seismic and building expansion joint assemblies.

B. Types of assemblies:
Metal Plate Cover

1.2 RELATED WORK

A. Sheet Metal Expansion Joint Seals: Section 07 60 00, FLASHING AND SHEET METAL.

C. Color of Elastomer Inserts, Filler Strips, Exterior Wall Seals and Metal Finishes: Section 09 06 00, SCHEDULE FOR FINISHES

D. Steel Plate Expansion Joint Covers: Section 05 50 00, METAL FABRICATIONS.

1.3 QUALITY ASSURANCE

A. Project Conditions:

1. Check actual locations of walls and other construction, to which work must fit, by accurate field measurements before fabrication.
2. Show recorded measurements on final shop drawings.

B. Fire tests performed by Factory Mutual, Underwriters Laboratories, Inc., Warnock Hersey or other approved independent testing laboratory.

1.4 DELIVERY STORAGE AND HANDLING

A. Take care in handling of materials so as not to injure finished surface and components.

B. Store materials under cover in a dry and clean location off the ground.

C. Remove materials which are damaged or otherwise not suitable for installation from job site and replace with acceptable materials.

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Submit copies of manufacturer's current literature and data for each item specified.
2. Clearly indicate movement capability of cover assemblies

C. Certificates: Material test reports from approved independent testing laboratory indicating and interpreting test results relative to

compliance of fire-rated expansion joint assemblies with requirements specified.

D. Shop Drawings:

1. Showing full extent of expansion joint cover assemblies; include large-scale details indicating profiles of each type of expansion joint cover assembly, splice joints between sections, joiners with other type assemblies, special end conditions, anchorages, fasteners, and relationship to adjoining work and finishes.
2. Include description of materials and finishes and installation instructions.

E. Samples:

1. Samples of each type and color of metal finish on metal of same thickness and alloy used in work.

1.6 APPLICABLE PUBLICATIONS

A. Publications listed form part of this specification to extent referenced. Publications are referred to in text by basic designation only.

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

A36/A36M-08.....Structural Steel

A240/A240M-14.....Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications.

A283/A283M-07.....Low and Intermediate Tensile Strength Carbon Steel Plates

A786/A786M-05(R2009)....Rolled Steel Floor Plates

B36/B36M-08.....Brass, Plate, Sheet, Strip, and Rolled Bar

B121-01(R2006).....Leaded Brass Plate, Sheet, Strip and Rolled Bar

B209M-07.....Aluminum and Aluminum-Alloy Sheet and Plate (Metric)

B221M-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes (Metric)

B455-10.....Copper-Zinc Lead Alloy (Leaded Brass) Extruded Shapes

C864-05.....Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

C920-11.....Elastomeric Joint Sealants

E119-10.....Fire Tests of Building Construction and Materials

E814-11.....Fire Tests of Through-Penetration Fire Stops

C. Federal Specifications (Fed. Spec):

TT-P-645B.....Primer, Paint, Zinc-Molybdate, Alkyd Type

D. The National Association of Architectural Metal Manufacturers (NAAMM):

AMP 500 Series.....Metal Finishes Manual.

E. National Fire Protection Association (NFPA):

251-06.....Tests of Fire Endurance of Building Construction and Materials

F. Underwriters Laboratories Inc. (UL):

263-11.....Fire Tests of Building Construction and Materials

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A240, Type 302 or 304.

B. Structural Steel Shapes: ASTM A36.

C. Steel Plate: ASTM A283, Grade C.

D. Rolled Steel Floor Plate: ASTM A786.

E. Aluminum:

1. Extruded: ASTM B221, alloy 6063-T5.
2. Plate and Sheet: ASTM B209, alloy 6061-T6.

F. Bronze:

1. Extruded: ASTM B455.
2. Plate: ASTM B121.

G. Brass: ASTM B36.

H. Elastomeric Sealant:

1. ASTM C920, polyurethane.
2. Type:// S (Single-Component) // M (Multiple-Component) //
3. Class 25.
4. Grade P or NS.
5. Shore A hardness 25, unless specified otherwise.

I. Thermoplastic Rubber:

1. ASTM C864.
2. Dense Neoprene or other material standard with expansion joint manufacturers having the same physical properties.

J. Vinyl Invertor Sealant Waterstops: Manufacturers' standard shapes and grade.

K. Fire Barrier:

1. Designed for indicated or required dynamic structural movement without material degradation or fatigue.
2. Tested in maximum joint width condition as a component of an expansion joint cover assembly in accordance with UL 263 NFPA 251, or ASTM E119 and E814, including hose steam test at full-rated period.

L. Zinc-Molybdate Primer: Fed. Spec. TT-P-645.

M. Accessories:

1. Manufacturer's standard anchors, fasteners, set screws, spaces, flexible secondary water stops or seals and filler materials, drain tubes, adhesive and other accessories as indicated or required for complete installations.
2. Compatible with materials in contact.
3. Water stops.

2.2 FABRICATION

A. General:

1. Use ceiling and wall expansion joint cover assemblies of same design as floor to wall and floor to floor expansion joint cover assemblies. Unless shown otherwise.
2. Provide expansion joint cover assemblies of design, basic profile, materials and operation indicated required to accommodate joint size variations in adjacent surfaces, and as required for anticipated structural movement.
3. Deliver to job site ready for use and fabricated in as large sections and assemblies as practical. Assemblies identical to submitted and reviewed shop drawings, samples and certificates.
4. Furnish units in longest practicable lengths to minimize number of end joints. Provide mitered corners where joint changes directions or abuts other materials.
5. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections and other assemblies.
6. Fire Performance Characteristics:
   a. Provide expansion joint cover assemblies identical to those of assemblies whose fire resistance has been determined per ASTM

E119 and E814, NFPA 251, or UL 263 including hose stream test at full-rated period.

b. Fire rating: Not less than rating of adjacent floor or wall construction.

7. Fire Barrier Systems:
   a. Material to carry label of approved independent testing laboratory, and be subject to follow-up system for quality assurance.
   b. Include thermal insulation where necessary, in accordance with above tests, with factory cut miters and transitions.
   c. For joint widths up to and including 150 mm (six inches), supply barrier in lengths up to 15000 mm (50 feet) to eliminate field splicing.
   d. For joint widths of seven inches and wider, supply barrier 3000 mm (10-foot) modules with overlapping ends for field splicing.
   e. For joints within enclosed spaces such as chase walls, include 1 mm (0.032-inch) thick galvanized steel cover where conventional expansion joint cover is not used.
8. Seal Strip: Factory-formed and bonded to metal frames and anchor members.
9. Compression Seals: Prefabricate from thermoplastic rubber or dense neoprene to sizes and approximate profiles shown.

B. Floor-to-Floor Metal Plate Joints:
1. Frames on each side of joint designed to support cover plate of design shown.
   a. Continuous frame designed to finish flush with adjacent floor of profile indicated with seating surface and raised floor rim to accommodate flooring.
   b. Provide concealed bolt and steel anchors for embedment in concrete.
   c. Designed for filler materials between raised rim of frame and edge of cover plate where shown.
   d. Frame and cover plates of some metal where exposed.
      1) Design cover plates to support 180 Kg (400 lbs) per 0.3 square meters (1-square foot).
      2) Cover plates free of rattle due to traffic.

3) No gaps or budges occur on filler material during design movement of joint.
4) Provide manufacturer's continuous standard flexible vinyl water stop under floor joint cover assemblies.

C. Floor-to-Wall Metal Plate Joints:
1. Provide one frame on floor side of joint only. Provide wall side frame where required by manufacturer's design.
2. Angle Cover Plates: Provide angle cover plates for joints to wall with countersunk flat-head exposed fasteners for securing to wall unless shown otherwise.
3. Space fasteners as recommended by manufacturer.
4. Match cover of adjacent floor to floor cover.

D. Interior Wall Joint Cover Assemblies:
1. Surface Mounted Metal Cover Plates:
a. Concealed frame for fastening to wall on one sides of joint.
b. Extend cover to lap each side of joint and to permit free movement on one side.
c. Provide concealed attachment of cover to frame when cover is in close contact with adjacent wall surface finish.
d. Use angle cover plates at intersection of walls.
e. Use smooth surface cover plates matching floor plates.
f. Use expansion fire inserts in fire rated walls, rated same as hourly rating of wall.

E. Ceiling and Soffit Assemblies:
1. Variable movement vinyl insert in metal frame on both sides of joint.
2. Designed for flush mounting with no exposed fasteners.
3. Vinyl insert locked into metal frame.
4. Vinyl and metal finish as specified in section 09 06 00, SCHEDULE FOR FINISHES.
5. Vinyl insert semi rigid either flush face or accordion shape as showed to span joint width without sagging.

2.3 METAL FINISHES

A. General:
1. Apply finishes in factory after products are fabricated.

2. Protect finishes on exposed surfaces with protective covering before shipment.

B. Aluminum Finishes:

1. Finish letters and numbers for anodized aluminum are in accordance with the NAAMM AMP 501, Aluminum Association's Designation System).
   a. Clear anodized finish: AA-C22A41 Chemically etched medium matte, clear anodic coating, Class I Architectural, 0.7 - mil thick.

   b. Color anodized finish: // AA-C22A42, // Chemically etched medium matte, integrally colored anodic coating, Class I Architectural, 0.7-mil thick //; or // AA-C22A44 // Chemically etched medium matte, electrolytically deposited metallic compound, Class I Architectural, 0.7-mil thick finish. Dyes not accepted.
2. Fluorocarbon Finish: NAAMM AMP 503 AAMA 605.2, high performance organic coating.
3. Factory-Primed Concealed Surface: NAAMM AMP 505 Protect concealed aluminum surfaces that will be in contact with plaster, concrete or masonry surfaces when installed by applying a shop coat of zinc-molybdate primer to contact surfaces. Provide minimum dry film thickness of 2.0 mils.

C. Bronze Finish: NAAMM-AMP 502-M32, mechanical finish, directional textured, natural medium satin.

D. Stainless Steel: NAAMM AMP 503, finish No. 2B.

E. Carbon Steel: NAAMM AMP 504, Galvanized 690.

PART 3 EXECUTION

3.1 EXAMINATION

A. Manufacturer’s representative shall make a thorough examination of surfaces receiving work of this section.

B. Before starting installation, notify prime contractor of defects which would affect satisfactory completion of work.

3.2 PREPARATION

A. Verify measurements and dimensions at job site and cooperate in coordination and scheduling of work with work of related trades.

B. Give particular attention to installation of items embedded in concrete and masonry so as not to delay job progress.

C. Provide templates to related trade for location of support and anchorage items.

3.3 INSTALLATION

A. Install in accordance with manufacturers installation instructions unless specified otherwise.

B. Provide anchorage devices and fasteners for securing expansion joint assemblies to in-place construction including threaded fasteners with drilled-in fasteners for masonry and concrete where anchoring members are not embedded in concrete. Provide metal fasteners of type and size to suit type of construction indicated and provide for secure attachment of expansion joint cover assemblies.

C. Perform cutting, drilling and fitting required for installation of expansion joint cover assemblies.

D. Install joint cover assemblies in true alignment and proper relationship to expansion joint opening and adjoining finished surfaces measured from established lines and levels.

E. Allow for thermal expansion and contraction of metal to avoid buckling.

F. Set floor covers at elevations flush with adjacent finished floor materials unless shown otherwise.

G. Material and method of grouting floor frames set in prepared recesses in accordance with manufacturer’s instructions.

H. Locate wall, ceiling and soffit covers in continuous contact with adjacent surfaces. Securely attach in place with required accessories.

I. Locate anchors at interval recommended by manufacturer, but not less than 75 mm (3-inches) from each ends, and, not more than 600 mm (24-inches) on centers.

J. Maintain continuity of expansion joint cover assemblies with end joints held to a minimum and metal members aligned mechanically using splice joints.

K. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames or plates.

L. Flush Metal Cover Plates:

1. Secure flexible filler between frames so that it will compress and expand.
2. Adhere flexible filler materials to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

M. Waterstops:

1. Install in conjunction with floor joints and where shown, run continuously to prevent water damage to finish spaces.
2. Provide seal with frame to prevent water leakage.
3. Provide outlet tubes from waterstops to drain to prevent damage to finish spaces.

N. Fire Barriers:

1. Install in compliance with tested assembly.
2. Install in floors and in fire rated walls.
3. Use fire barrier sealant or caulk supplied with system.

O. Sealants:

Install to prevent water and air infiltration.

3.4 PROTECTION

A. Take proper precautions to protect the expansion joint covers from damage after they are in place.

B. Cover floor joints with plywood where wheel traffic occurs.

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SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work includes, but is not necessarily limited to the furnishing and installing of steel doors, door frames, and interior glazed frames, as indicated on the Drawings and specified herein.

B. Terms relating to steel doors and frames as defined in ANSI A123.1 and as specified.

1.2 RELATED WORK

A. Section 05 50 00, METAL FABRICATIONS.

B. Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.

C. Section 08 33 00, COILING DOORS AND GRILLES.

D. Section 08 71 00, DOOR HARDWARE.

E. Section 08 80 00, GLAZING.

F. Section 09 90 00, PAINTING

G. Section 11 17 36, PACKAGE TRANSFER UNITS.

H. Section 13 49 00, RADIATION PROTECTION.

I. Section 28 13 00, ACCESS CONTROL.

1.3 TESTING

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 —.
2. Sound rated doors, including test report from Testing Laboratory.

C. Shop Drawings: Submit for fabrication and installation of steel doors, door frames, and glazed steel frames. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

D. Color Samples: Three (3) sets of 8-inch x 8-inch samples in each specified door color and finish.

E. Certification:

1. Submit certifications signed by the Contractor and an authorized representative of the approved hollow steel manufacturing company, indicating compliance with fabrication methods specified herein and with referenced standards and UL requirements, where applicable.
2. Submit a copy of the testing report issued by an independent testing laboratory stating that sound retardant door assemblies comply with STC requirements specified herein.

1.5 STORAGE AND HANDLING

A. Mark each door, doorframe and interior glazing frame, on a surface which will be hidden after installation, with designation of opening for which it is furnished. Mark opening designation also on exterior packaging for each door, doorframe and interior glazing frame.

B. Fasten temporary steel spreaders across the bottom of each door frame.

C. Store materials indoors in a dry location, in a vertical position, and in such manner that will prevent twisting or bending.

D. Provide alignment plates or angle spreaders to maintain frame alignment during delivery, handling and installation.

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. Federal Specifications (Fed. Spec.):

L-S-125B.....Screening, Insect, Nonmetallic

C. Door and Hardware Institute (DHI):

A115 Series.....Steel Door and Frame Preparation for Hardware, Series A115.1 through A115.17 (Dates Vary)

D. Steel Door Institute (SDI):

113-01 (R2006).....Thermal Transmittance of Steel Door and Frame Assemblies

128-09.....Acoustical Performance for Steel Door and Frame Assemblies

E. American National Standard Institute:

A250.8-2003 (R2008).....Specifications for Standard Steel Doors and Frames

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

A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

A568/568-M-11.....Steel, Sheet, Carbon, and High-Strength, Low-alloy, Hot-Rolled and Cold-Rolled

A1008-10.....Steel, sheet, Cold-Rolled, Carbon, Structural, High Strength Low Alloy and High Strength Low Alloy with Improved Formability

B209/209M-10.....Aluminum and Aluminum-Alloy Sheet and Plate

B221/221M-12.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes

D1621-10.....Compressive Properties of Rigid Cellular Plastics

D3656-07.....Insect Screening and Louver Cloth Woven from Vinyl Coated Glass Yarns

E90-09.....Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions

G. The National Association Architectural Metal Manufactures (NAAMM):

Metal Finishes Manual (AMP 500-06)

H. National Fire Protection Association (NFPA):

80-13.....Fire Doors and Fire Windows

I. Underwriters Laboratories, Inc. (UL):

Fire Resistance Directory

J. Intertek Testing Services (ITS):

Certifications Listings…Latest Edition

K. Factory Mutual System (FM):

Approval Guide

1.7 QUALITY ASSURANCE

A. Steel doors and frames shall comply with the Steel Door Institute's (SDI) "Recommended Specifications for Standard Steel Doors and Frames" (ANSI A250.8/—SDI 100) and other requirements as specified herein.

B. Manufacturers' Qualifications: All steel doors, door frames, and interior glazed steel frames shall be manufactured by one (1) company listed in Underwriters' Laboratories, Inc. "Building Materials

Directory" and/ or Intertek's "WH & OPL Mark Product Directory."

C. Installer Qualifications: An employer of workers trained and approved by the manufacturer.

D. Fire-rated Door Assemblies: Wherever a fire-resistance classification is indicated, provide fire-rated doors investigated and tested as part of a fire-door assembly, complete with type of fire-door hardware used.
   1. Construct and install fire-rated door assemblies to comply with NFPA 80, and as specified herein.
   2. All fire-rated door assemblies shall be tested for compliance with NFPA 252 or UL 10C without the hose stream test.
   3. All fire-rated doors shall be protected by tight fitting smoke- and draft-control assemblies tested in accordance with UL 1784.
   4. Identify each fire-rated door and frame with UL or WHI Labels, indicating applicable fire rating followed by a letter "S" for the smoke- and draft-control rating.

E. Fire-rated Window Assemblies:
   1. Construct and install assemblies to comply with NFPA 80, and as specified herein.
   2. All fire-rated window assemblies shall be tested in accordance with and shall meet the acceptance criteria of NFPA 257.
   3. All steel window frames in fire-rated walls shall bear UL or WHI Labels for the fire resistance period as shown on the Drawings.

F. Sound Retardant Door Assemblies: Assemblies to consist of door frames with acoustical insulation and sound retardant doors with continuous factory-furnished seals and gasketing. Locations of sound retardant door assemblies are as shown on the Drawings.
   1. All sound retardant door assemblies shall have a minimum Sound Transmission Class (STC) of 35 when tested in accordance with ASTM E90 and ASTM E413.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel: Shall contain a minimum of 25-percent recycled content.
   1. Cold-Rolled Sheets: Commercial quality carbon steel complying with ASTM A1008/ A1008M and ASTM A568/ A568M.
   2. Hot-Rolled Sheets: Commercial Steel (CS), Type B, complying with

ASTM A1011/ A1011M and ASTM A568/ A568M.

3. Hot-Dipped Galvanized Sheets: Commercial Steel (CS), Type B, complying with ASTM A123/ A123M, Coating Designation G90 minimum.
4. Metallic-Coated Sheets: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with minimum A40 (ZF180) zinc-iron-alloy (galvannealed) coating designation.

B. Sound Retardant (Acoustical) Insulation:
1. Frames: As specified in SECTION 07 2000, BUILDING INSULATION.
2. Doors: Manufacturer’s standard.

C. Shop Paint: Rust-inhibitive primer, compatible with finish painting system specified in SECTION 09 9000, PAINTING.

D. Glazing: As indicated on the Drawings and as specified in SECTION 08 8000, GLAZING.

E. Hardware: Furnish as specified in SECTION 08 7100, FINISH HARDWARE.

F. Grout: Comply with ASTM C476, with a slump of 4-inches for standard steel door frames built into concrete or masonry, as measured according to ASTM C143/ C143M.

G. Inserts, Bolts, and Fasteners: Manufacturer's standard units, complying with ASTM A153/ A153M, Class C and D as applicable.

2.2 FABRICATION

A. General:
1. Verify partition or wall dimensions, door and frame sizes, glazed metal sizes, designs, fire-resistive ratings and special requirements of each opening. Review door frame details, templates and the hardware schedule for compliance with referenced standards.
2. Fabricate all steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Wherever practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment to ensure proper assembly at Project Site.
3. Clearance:
   a. Provide a maximum 1/8-inch clearance between door and frame head and jambs.
   b. Provide a maximum 1/8-inch clearance between meeting edges of

pairs of doors.

c. Doors in sound rated partition and wall assemblies shall have a maximum 3/8-inch clearance at the door bottom, and as required to accommodate hardware specified in SECTION 08 7100, FINISH HARDWARE.

d. All other doors shall have a maximum 3/4-inch clearance at the door bottom except as otherwise shown and/ or required by Codes, Regulations and Reference Standards.

4. Welding procedures and operations shall be performed in accordance with AWS Codes and Publications, referenced in SECTION 05 5000, METAL FABRICATIONS.

B. Door and Interior Glazed Frames:

1. Frames shall be one-piece with all joints continuously welded and ground smooth, 16-gauge minimum construction with integral stops, jambs and trim, manufactured in profiles as shown on the Drawings.

a. All interior frames are to be sanitary stop type as shown on the Drawings, unless otherwise noted.

2. Jamb & Head Anchors: Provide minimum of three (3) welded anchors per jamb and (2) welded anchors at head, of type as required for adjacent wall construction. Anchors for labeled door shall conform to requirements of labeling authority.

3. Floor Anchors: One (1) per jamb, with two (2) holes for anchorage.

4. Punch interior steel frames for installation of resilient door silencers. Provide minimum of three (3) silencers in strike stop of each single leaf frame, and four (4) silencers in the head of each double leaf door frame. Punch and install silencers only at door frames without smoke seal per hardware schedule.

5. Lead Lined Frames: As specified under SECTION 13 4900, RADIATION PROTECTION.

C. Steel Doors:

1. Doors shall be full flush type with flush top and bottom and shall conform to the designs, configurations and sizes shown in the Drawings.

2. Overall Thickness: 1 3/4-inch typical, unless otherwise specified on the Drawings.

3. All doors shall meet the requirements for an “Extra Heavy Duty”

performance classification in accordance with ANSI/ SDI A250.8 and A250.4. Doors shall have face sheets formed from a single sheet of steel, the thickness of which shall be 16-gauge minimum in accordance with referenced standards. Galvanize all exterior doors.

a.

b. Interior Doors: Face sheets fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior door requirements.

4. Core: Interlocking stiffeners of minimum 0.0299-inch thick or 22-gauge steel channels or Z-shapes extending vertically, the full height of the door, spaced not more than 6-inch on center, and spot welded to the face sheets.
   a. Non-Rated Doors: For sound deadening, fill areas between stiffeners with sound insulation to eliminate metallic sound incident to normal door operation.
   b. Fire-Rated Doors: As required to provide fire-protection ratings indicated.
   c. Sound Retardant Doors: Provide manufacturer’s standard sound retardant core materials between stiffeners to comply with STC requirements specified herein.
5. Reinforcement for finish hardware: Reinforcement for locks, latches, hinges, closers and holders shall be in accordance with ANSI/ DHI A115.
6. Edges:
   a. Vertical Edges for Single-Acting Doors: Beveled edge, unless square edge is indicated. Beveled Edge: 1/8-inch in 2-inches.
   b. Vertical Edges for Double-Acting Doors: Round vertical edges with 2 1/8-inch radius.
   c. Top and Bottom Edges: Closed with flush or inverted 0.042-inch thick end closures or channels of same material as face sheets.
7. Vision Panels:
   a. Steel Frames: Frames shall be door manufacturer's standard, sheet metal, beveled with corners and intersections mitered, welded and ground smooth. Minimum 18 gauge cold rolled sheet steel. Size, profile and location as shown on the Drawings.
   b. Sealant: As recommended by door manufacturer.

c. Finish: Paint vision panel frame as specified under SECTION 09 9000, PAINTING. Color to match door color.
d. Provide UL labels for fire-rated vision panel installations.
e. Vision panels shall be installed at the factory with fasteners exposed on the room side only where concealed fasteners cannot be used.
f. Provide lead lined vision panels where required to match the radiation protection rating of the door as indicated on the Drawings.

D. Provisions for Hardware:
1. Use templates for factory preparation of doors and frames to receive hardware. Locate cutouts and mortises for hardware at heights as shown on the Drawings and as specified in SECTION 08 7100, DOOR HARDWARE.
a. All frames shall be cut, reinforced, drilled and tapped at the factory for the installation of hardware, unless otherwise noted. Fitting and installation of gaskets and seals for sound rated doors shall also be performed at the factory.
b. Drilling and tapping for the installation of surface-mounted hardware may be done in the field.
2. Neatly mortise, drill and tap to template requirements.
3. Provide plaster guards or mortar boxes behind cutouts in frames.

E. Finishes:
1. Grind rough edges, welds and rough spots smooth.
2. Fill joints with mineral filler and finish surfaces smooth and flush.
3. Thoroughly clean all surfaces, chemically etch, and apply one coat of rust-inhibitive primer.
4. Finish surface: Smooth, free from irregularities and rough spots.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions, SDI’s "Recommended Erection Instructions for Steel Frames" (ANSI A250.11/ SDI 105), requirements of other referenced standards/ documents, and reviewed shop drawings.

B. Labeled Frames: Conform to the requirements of the labeling authority.

C. Frames for Sound Rated Partitions: Line frames for doors in all sound rated partition or wall assemblies with acoustical insulation as shown on the Drawings.

D. Install door frames plumb, level, rigid and square.

E. 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.

F. 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.

G. Jamb Anchors:
   1. Coat frame back with a bituminous coating prior to lining of grout filling in masonry walls.
   2. Secure anchors to sides of studs with two fasteners through anchor tabs. Use steel drill screws to steel studs.

H. Install anchors for labeled fire rated doors to provide rating as required.

I. Frames for Sound Rated Doors: Coordinate to line frames for sound rated doors with insulation.

J. 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 INSTALLATION OF DOORS AND APPLICATION OF HARDWARE

A. Install doors and hardware as specified in Sections – Section 08 11 13, HOLLOW METAL DOORS AND FRAMES – Section 08 14 00, WOOD DOORS – Section 08 71 00, DOOR HARDWARE –.

B. Hardware:

1. Install in accordance with manufacturer's instructions, requirements of regulatory agencies, and industry standards, taking care not to damage hardware, doors and frames or their finishes.
2. Coordinate acoustical gasketing with other hardware to provide a continuous perimeter seal.
3. Adjust acoustical gasketing to form an airtight seal with latching and closure forces in compliance with accessibility requirements of California Building Code.
4. Adjust and lubricate, as required, for proper operation.
5. Upon completion of installation, door and finish hardware shall operate smoothly.

3.2 ADJUST AND CLEAN

A. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

B. Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operation.

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SECTION 08 14 00

INTERIOR WOOD DOORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work includes, but is not necessarily limited to the furnishing and installing of thermally fused wood doors faced with low pressure decorative laminate as indicated on the Drawings and specified herein.

B. Section includes fire rated doors, sound retardant doors, and smoke doors.

1.2 RELATED WORK

A. Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS

B. Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.

C. Section 08 71 00, DOOR HARDWARE.

D. Section 08 80 00, GLAZING.

E. Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. National Fire Protection Association (NFPA).
2. Underwriters’ Laboratories, Inc. (UL).
3. Warnock Hersey International (WHI), Intertek Testing Services.
4. Window and Door Manufacturers Association (WDMA).

B. Door Standards: Flush doors shall meet specified duty level performance standards and aesthetic standards in accordance with ANSI/ WDMA International Standard I.S.1A, latest Edition, “Architectural Wood Flush Doors.”

C. Manufacturers' Qualifications: Obtain doors from a single manufacturer for each type to ensure uniformity in quality of construction and appearance, unless otherwise indicated.

D. Fire-rated Door Assemblies: Wherever a fire-resistance classification is indicated, provide fire-rated doors investigated and tested as part of a fire-door assembly, complete with type of fire-door hardware used.
   1. Construct and install fire-rated door assemblies to comply with NFPA 80, and as specified herein.
   2. All fire-rated door assemblies shall be tested for compliance with NFPA 252 or UL 10C without the hose stream test.
   3. All fire-rated doors shall be protected by tight fitting smoke- and draft-control assemblies tested in accordance with UL 1784.
   4. Identify each fire-rated door and frame with UL or WHI Labels, indicating applicable fire rating followed by a letter AS@ for the smoke- and draft-control rating.

E. Meet the requirements set forth in SECTION 01 8113, SUSTAINABLE DESIGN REQUIREMENTS, for Certified Wood Products and for Composite Wood and Agrifiber Products.

F. Sound Retardant Door Assemblies: Assemblies to consist of door frames with acoustical insulation as specified in SECTION 08 1000, STEEL DOORS AND FRAMES, and sound retardant doors. Locations of sound retardant door assemblies are as shown on the Drawings.
   1. All sound retardant door assemblies shall have a minimum Sound Transmission Class (STC) of 35 when tested in accordance with ASTM E90 and ASTM E413.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

G. Product Data: Manufacturer's descriptive literature for doors specified.

H. Color Samples:
   1. Submit two (2) sets of manufacturer’s standard color selection charts for initial selection.
   2. Submit three (3) sets of 8-inch x 8-inch samples in each selected door color and finish.

I. Installation Instructions: Submit manufacturer’s instructions for installation of door assemblies. Include installation requirements for achieving fire-rated labels. Maintain copies of installation instructions on-site for review by building officials.

J. Certification: Submit a copy of the testing report issued by an independent testing laboratory stating that sound retardant door assemblies comply with STC requirements specified herein.

K. Performance Standard Reports:

1. “Cycle Slam” testing results in accordance with WDMA TM-7.
2. “Hinge-Loading” testing results in accordance with WDMA TM-8.
3. “Door Finishes” testing results in accordance with ASTM test methods specified in Section F-7 of WDMA International Standard I.S.1A.
4. “Screwholding” capacity testing results in accordance with WDMA TM-10.

1.5 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.
2. Specified STC RATING for sound retardant rated door assembly in place.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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, Job Site Information.

C. Protect wood doors during transit, storage and handling to prevent damage, soiling and deterioration.

D. Store doors covered and flat on a level surface in a dry, well-ventilated building. Seal edges if doors will be stored at the site for more than one (1) week.

E. Mark each door on a surface which will be hidden after installation with the designation of the opening for which it is furnished.

F. Do not subject doors to extremely high or low temperatures or humidity.

G. Label package for door opening where used.

1.7 APPLICABLE PUBLICATIONS

Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

A. Window and Door Manufacturers Association (WDMA):

I.S.1A-13.....Architectural Wood Flush Doors

I.S.4-09.....Water-Repellent Preservative Non-Pressure Treatment for Millwork

I.S.6A-13.....Architectural Wood Stile and Rail Doors

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

B. National Fire Protection Association (NFPA):

80-16.....Protection of Buildings from Exterior Fire

252-12.....Fire Tests of Door Assemblies

C. ASTM International (ASTM):

E90-09.....Laboratory Measurements of Airborne Sound Transmission Loss

D. UL LLC (UL):

10C-09 - Positive Pressure Fire Tests of Door Assemblies.

E. Window and Door Manufacturers Association (WDMA):

TM 7-14 - Cycle-Slam Test.

TM 8-14 - Hinge Loading Test.

TM 10-14 - Screw Holding Capacity.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 – PRODUCTS

2.1 MATERIALS

A. All materials for wood doors shall comply with Extra Heavy Duty Grade and Premium Aesthetic Grade as defined in WDMA International Standard I.S.1A, unless otherwise specified or shown on the Drawings.

B. Facings:

1. Typical Wood Veneer with Clear Finish: FSC certified Maple, quarter sawn, WI premium grade. Clear Finish as specified in SECTION 09 90 00, PAINTING. f. In existing buildings, where doors are required to have transparent finish, use wood species and grade of face veneers to match adjacent existing doors, except as noted in Section 09 06 00, SCHEDULE FOR FINISHES.
2. Wood Veneer with Clear Finish where shown on drawings: Natural Cherry, rift cut, WI premium grade. Clear Finish as specified in SECTION 09900, PAINTING.

C. Edge Bands: Impact-resistant non-PVC polymer edging, minimum 0.04-inch thick, applied to all four edges. Colors to be selected by Architect.

D. Core:

1. Non-Rated Doors and 20-Minute Fire-Rated Doors: Particleboard, complying with ANSI A208.1, Grade M-2, with no added formaldehyde as a fabrication component.
2. Fire-Rated Doors with Ratings Greater than 20-Minutes: Solid Mineral Core. Manufacturer's standard core as required to provide fire-resistance rating indicated.
3. Bi-Folding Doors: Same as that specified for Non-Rated Doors.
4. Sound Retardant Doors: Manufacturer’s standard sound retardant core.
5. Lead Lined Doors: As specified under SECTION 13 4900, RADIATION PROTECTION.

E. Glazing: As indicated on the Drawings and as specified in SECTION 08 8000, GLAZING.

F. Adhesives: Type 1, Exterior Glue.

2.2 FABRICATION

A. General:

1. Conform to requirements of applicable Codes, Regulations and Reference Standards.
2. Fabrication of wood doors shall comply with Extra Heavy Duty Grade

and Premium Aesthetic Grade as defined in WDMA International Standard I.S.1A, unless otherwise specified or shown on Drawings.

3. Clearance Between Doors and Frames and Floor: Doors shall have a maximum 1/8-inch clearance at jambs and heads, and a maximum 3/4-inch clearance at bottom except as otherwise required by Codes, Regulations and Reference Standards and except as otherwise noted on the Drawings and specified herein.
   a. Provide a 1/2-inch undercut at the bottom of all single occupant toilet rooms.
   b. Provide a 3/4-inch undercut at the bottom of all anteroom and toilet room doors in isolation rooms.
4. Pre-machine wood doors in the factory. Take accurate field measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with machining in the factory.

B. Flush Wood Doors:
1. All doors shall be 1 3/4-inch thick, except as otherwise shown on the Drawings.
2. Solid Core Construction:
   a. Non-Rated Doors and 20-Minute Fire-Rated Doors: Particleboard Core, hardwood stile width of 1-inch minimum and hardwood rail width of 2 1/4-inch minimum, or as required to meet the ANSI/ WDMA duty level grade specified. Stiles, rails and cross bands bonded to core in one rigid piece.
   b. Fire-Rated Doors with Ratings Greater than 20-Minutes: Solid mineral core, hardwood stile width of 1-inch minimum and hardwood rail width of 2 1/4-inch minimum, or as required to meet the ANSI/ WDMA duty level grade specified. Stiles, rails, and cross bands bonded to core in one rigid piece. Provide hardwood blocking for hardware in locations as follows:
      1) Top Rail: 5-inch minimum.
      2) Bottom Rail: 5-inch minimum in doors specified with kick or mop plates, or automatic door bottoms.
      3) Mid-Rail: 5-inch minimum in doors specified with exit devices and armor plates.
   c. Sound Retardant Doors: Manufacturer’s standard construction as required to comply with STC requirements specified herein.

3. Edge Construction: Provide manufacturer's standard laminated-edge construction for improved screw-holding capability and split resistance and with outer stile matching polymer edging.
4. Vision Panels: All vision panels are steel frames, unless otherwise noted on the Drawings.
   a. Wood Frames: Solid wood stock or non-combustible bead and wood veneer, as appropriate for the fire-rating requirements of the door. Size, profile and location as shown on the Drawings.
      1) Glazing Stop: Two-part metal glazing stop by wood vision panel frame manufacturer.
   b. Steel Frames: Frames shall be door manufacturer's standard, sheet metal, beveled with corners and intersections mitered, welded and ground smooth. Minimum 18 gauge cold rolled sheet steel. Size, profile and location as shown on the Drawings.
      1) Cover: Provide vision panel frame with cover where shown on the Drawings. Refer to SECTION 13 4900, RADIATION PROTECTION, where vision panel assembly is shown with lead glass.
   c. Sealant: As recommended by door manufacturer.
   d. Finish: Paint vision panel frame as specified under SECTION 09 9000, PAINTING. Color to match door color.
   e. Provide UL labels for fire-rated vision panel installations.
   f. Vision panels shall be installed at the factory with fasteners exposed on the room side only where concealed fasteners cannot be used.
   g. Provide lead lined vision panels where required to match the radiation protection rating of the door as indicated on the Drawings.

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.

4. Identification of preservative treatment for stile and rail doors.

2.4 SEALING:

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 INSPECTION

A. Prior to installation of doors, examine door frames and verify that frames are correct type and have been installed as required for proper hanging of corresponding doors. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wood door in accordance with manufacturer's instructions and review shop drawings.

B. Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.

C. Install sound-retardant doors at all sound rated partitions.

D. Hardware:

1. Install in accordance with manufacturer's instructions, requirements of regulatory agencies, and industry standards, taking care not to damage hardware, doors, frames and their finishes.
2. Mount closers with through sex bolts only.
3. Adjust and lubricate, as required, for proper operation.
4. Upon completion of application, door and finish hardware shall operate smoothly.

3.3 ADJUSTMENT

A. Replace or rehang doors which are hinge bound and do not swing or operate freely.

B. Refinish or replace doors damaged during installation.

3.4 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 Resident Engineer.

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SECTION 08 17 10
INTEGRATED DOOR ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Integrated door assemblies including metal door frame, door, and hardware, unless specified in another Section, installed at cross-corridor locations.

B. Smoke and draft control seals, unless specified in another Section.

1.2 RELATED REQUIREMENTS

A. Non-Flooring Adhesives and Sealants and Paints and Coatings VOC Limits: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. Lock Cylinders: Section 08 71 00, DOOR HARDWARE.

C. Automatic Door Operators: Section 08 71 13.11, LOW ENERGY POWER ASSIST DOOR OPERATORS.

D. Door and Frame Color: Section 09 06 00, SCHEDULE FOR FINISHES.

E. Electrical Power: DIVISION 26, ELECTRICAL.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. Builders Hardware Manufacturers Association (BHMA):
   1. A156.3-14 - Exit Devices.
   2. A156.26-06 - Continuous Hinges.
   3. A156.32-14 - Integrated Door Opening Assemblies.

C. ASTM International (ASTM):
   1. A1011/A1011M-14 - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
   2. E2180-07(2012) - Determining the Activity of Incorporated Antimicrobial Agents in Polymeric or Hydrophobic Materials.

D. Door and Hardware Institute (DHI):
   1. Recommended Locations for Architectural Hardware for Standard Doors & Frames (2004).
   2. Recommended Locations for Builders' Hardware Custom Steel Doors & Frames (1996).

E. National Fire Protection Association (NFPA):
   1. 105-16 - Smoke Door Assemblies and Other Opening Protectives.

2. 252-12 - Fire Tests of Door Assemblies.

F. Steel Door Institute (SDI):

1. A250.3-11 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames.
2. A250.8-14 - Specifications for Standard Steel Doors and Frames.
3. A250.10-11 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

G. UL LLC (UL):

1. 10C-09 - Positive Pressure Fire Tests of Door Assemblies.
2. 1784-15 - Air Leakage Tests of Door Assemblies and Other Opening Protectives.

1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.

1. Required Participants:
   a. Contracting Officer's Representative.
   b. Contractor.
   c. Installer.
   d. Other installers responsible for adjacent and intersecting work, including electrical.
2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
   a. Installation schedule.
   b. Installation sequence.
   c. Preparatory work.
   d. Protection before, during, and after installation.
   e. Installation.
   f. Transitions and connections to other work.
   g. Other items affecting successful completion.
3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

1. Show size, configuration, and fabrication and installation details.

2. For each opening, list finish hardware items included in assembly, finish, degree of opening, and electrical rough-in requirements according to Door Schedule.
3. Submit templates to door and frame manufacturers to ensure proper size and location of hardware.

C. Manufacturer's Literature and Data:
1. Description of each product.
2. Installation instructions.

D. Sustainable Construction Submittals:
1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
2. Low Pollutant-Emitting Materials:
a. Show volatile organic compound types and quantities.

E. Certificates: Indicate integrated door assemblies comply with specifications.
1. Show fire rated integrated door assembly is UL Listed for specified application.

F. Qualifications: Substantiate qualifications comply with specifications.
1. Installer.

G. Operation and Maintenance Data:
1. Care instructions for each exposed finish product.
2. Maintenance and adjustment instructions for integrated door assemblies.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
1. Regularly installs specified products.
2. Installed specified products with satisfactory service on five similar installations for minimum five years.
a. Provide contact names and addresses for completed projects when requested by Contracting Officer's Representative.

1.7 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.
B. Mark packaging, legibly. Indicate manufacturer's name.
C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.8 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight facility.

B. Protect products from damage during handling and construction operations.

1.9 FIELD CONDITIONS

A. Field Measurements: Verify field conditions affecting integrated door assembly fabrication and installation. Show field measurements on Submittal Drawings.

1. Coordinate field measurement and fabrication schedule to avoid delay.
2. Coordinate electrical work for electrified hardware installation.

1.10 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant door closers and hinges against material and manufacturing defects.

1. Warranty Periods:
   a. Door Closers: 10 years.
   b. Steel Pinned Continuous Hinges: 10 years.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Design integrated door assemblies complying with specified performance:

1. BHMA A156.32: Grade 1: 1,000,000 cycles.

B. Fire Rated Doors:

1. Fire Resistance Rating: As shown in Door Schedule.
2. Label: Comply with NFPA 252, UL 10C, and labeled by qualified testing and inspection agency showing fire resistance rating.

C. Smoke Rated Doors:

1. Smoke Resistance Rating: As shown in Door Schedule.
2. Label: Comply with NFPA 105, UL 1784, and labeled by qualified testing and inspection agency showing smoke resistance rating.

2.2 PRODUCTS - GENERAL

A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.

B. Provide each integrated door assembly from one manufacturer.

C. Sustainable Construction Requirements:

1. Steel Recycled Content: 30 percent total recycled content, minimum.
2. Low Pollutant-Emitting Materials: Comply with VOC limits specified in Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS for the following products:
   a. Non-flooring adhesives and sealants.
   b. Paints and coatings.

2.3 INTEGRATED DOOR ASSEMBLY

A. Metal Doors: SDI A250.8; Level 2 and Physical Performance Level B, heavy duty; Model 2 seamless.
   1. Face: ASTM A1011/A1011M; cold rolled steel, 1.0 mm (0.04 inches) thick, minimum.
      a. Factory Pre-Finished.
   2. Core: Kraft paper honeycomb or polystyrene.
   3. Thickness: 44 mm (1-3/4 inch).
   4. Reinforce door for hardware installation.

B. Metal Frames: SDI A250.8 Level 2.
   1. Metal: ASTM A1011/A1011M; cold rolled steel, 1.3 mm (0.05 inches) thick, minimum.
   2. Construction: Continuously welded.
   3. Reinforce frame for hardware.
      a. Continuous Hinges: 2.3 mm (0.09 inches) thick.
      b. Other Hardware: Comply with SDI A250.8.
   4. Frame Anchors: Provide adjustable type anchors coordinated with wall construction, minimum 4 per jamb.

C. Integrated Hardware:
   1. Exit Device: BHMA A156.3; Grade 1, passage function, inset in door face, clean and unobtrusive in design.
      a. Push Bar End Caps: Metal, plated satin nickel (BHMA 619) finish.
      b. Exit Device Trim: Lever matching door hardware specified in Section 08 71 00, DOOR HARDWARE.
   2. Continuous Hinges: BHMA A156.26.
      a. Plastic Laminate Clad Doors: Wrap-around style hinge guards and provide stainless steel wrap-around edge guards at strike edge of door.
   3. Other Hardware: As scheduled in this section.

2.4 FINISHES

A. Hardware Finish Symbols:

Table 1 Hardware Finish Symbols

US	BHMA 156.18	Description
USP	600	Primed for field painting
US15	619	Dull Nickel Plated
US26D	626/652	Satin Chrome Plated
US28	628	Satin Aluminum
US32	629	Bright Stainless
US32D	630	Satin Stainless
N/A	689	Aluminum Painted

B. Finish Requirements:
   1. Door Faces: Factory Pre-Finished, SDI A250.3Plastic Laminate.
   2. Frames: Prime painted, SDI A250.10.
   3. Door Hardware:
      a. Continuous Hinges: BHMA 630.
      b. Push Bar: BHMA 630 clad with BHMA 619 end caps.
      c. Exit Device Trim: BHMA 630.
      d. Push/Pull Trim: BHMA 626.
      e. Door Closers: BHMA 689.
      f. Miscellaneous: To match other finishes.
   4. Anti-Microbial Coating: ASTM E2180; ionic silver coating.
   5. Apply coating to hand-operated hardware including levers, pulls, push bars, push plates, and paddles.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.
B. Protect existing construction and completed work from damage.

3.2 INSTALLATION - INTEGRATED DOOR ASSEMBLIES

A. Install products according to manufacturer's instructions and approved submittal drawings.
B. Install door hardware at locations indicated in DHI Recommended Locations for Architectural Hardware for Standard Steel Doors & Frames and DHI Recommended Locations for Builders' Hardware Custom Steel Doors

& Frames, unless otherwise indicated, or to comply with requirements of governing regulations, or if otherwise directed by Contracting Officer's Representative.

C. Install door hardware in compliance with manufacturers' instructions, and templates. Comply with specified degree of opening for doors with automatic operators and overhead door closers. Securely fasten hardware. Confirm operating parts move freely and smoothly without binding, sticking, and excessive clearance.

D. Coordinate installation and interface wiring with fire alarm and smoke detection systems. Provide auxiliary contacts, relays, and interface for fire alarm and security systems.

E. Remove or protect door hardware, before painting and finishing performed after integrated door assembly installation.

F. Adjust and check door assembly and each operating hardware item to ensure correct operation and function. Replace products which cannot be adjusted to operate as intended.

G. Final Adjustment: Perform final hardware check and adjustment maximum one month before building acceptance or partial building occupancy.

3.3 CLEANING

A. Clean exposed surfaces, including hardware. Do not use cleaners that will harm finishes.

3.4 PROTECTION

A. Protect integrated door assemblies from construction operations.

3.5 SCHEDULES

A. The following is a general listing of the Integrated Door Assembly requirements and is not intended for use as a final door submittal. Provide hardware items required by established standards and practices, and to meet IBC and NFPA 101 whether specified or not in the following listed groups.

Each [ADO] Integrated Door to Have:
POWER TRANSFER SHARED BY ELECTRIC PANIC AND RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
LOCK CYLINDER BY SECTION 08 71 00, DOOR HARDWARE.
AUTO DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.

POWER, WIRING, CONDUIT, AND FIRE ALARM CONNECTION BY DIVISION 26.

HW-12A	
Each [MHO] Pair Integrated Doors to Have:	RATED
1 Steel Frame	
1 Integrated Pair Doors w/Exit Devices and Pull Trim	Q2231 x TYPE 8 EXIT DEVICES (F01/ACTIVE FLUSH PULL PASSAGE TRIM)
2 Continuous Hinges	A51031B
1 Self-Adhesive Astragal	R0Y_14
2 Closers	C02011/C02021 (PT4D, PT4H)
2 Magnetic Holders	C00011 TRI-VOLTAGE
1 Set Self-Adhesive Seals	R0E154

POWER, WIRING, CONDUIT, AND FIRE ALARM CONNECTION BY DIVISION 26.

W-12C	
Each [ADO] Pair Integrated Double Egress Doors to Have:	RATED
1 Steel Frame	
1 Integrated Pair Doors w/Exit DEVICES	Q2331 x TYPE 8 EXIT DEVICES (F01)
2 Continuous Hinges	A51031B
1 Overlapping Astragal with Self-Adhesive Seal	R5Y634 x R0E154 x THRU-BOLTS
2 Closers	C02011/C02021 (PT4D, PT4H)
2 Magnetic Holders	C00011 TRI-VOLTAGE
1 Set Self-Adhesive Seals	R0E154

POWER, WIRING, CONDUIT, AND FIRE ALARM CONNECTION BY DIVISION 26.

HW-SH-4	
Each [AC, EL, REX, DPS]Integrated Door to Have:	RATED
1 Steel Frame	
1 Integrated Door w/Elec. Exit Device	Q2131 x TYPE 8 ELECTRIC DEVICE (E01, E05/E06-VERIFY)x F13 LEVER
1 Continuous Transfer Hinge	A51031B x 4-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Closer	C02021 (PT4D, PT4F, PT4H)
1 Armor Plate	J101 x 1.275 mm (0.050 inch) THICKNESS
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0E154
1 Alarm Contact	

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

CARD READER BY DIVISION 28.

LOCK CYLINDER BY SECTION 08 71 00, DOOR HARDWARE.

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SECTION 08 31 13

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 DESCRIPTION:

The Work includes, but is not necessarily limited to the furnishing and installing of access doors including all hardware and accessories for a complete installation, as indicated on the Drawings and specified herein.

1.2 RELATED WORK:

A. SECTION 05 50 00, METAL FABRICATIONS

B. SECTION 08 71 00, DOOR HARDWARE

C. SECTION 09 22 16, NON-STRUCTURAL METAL FRAMING

D. SECTION 09 29 00, GYPSUM WALLBOARD

E. SECTION 09 51 00, ACOUSTICAL CEILINGS

F. SECTION 09 90 00, PAINTING

G. DIVISION 22, PLUMBING

H. DIVISION 23, MECHANICAL

I. DIVISION 26, ELECTRICAL

J. DIVISION 27, TELECOMMUNICATIONS

1.3 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Product Data: Manufacturer’s specifications, installation instructions, and documented compliance with reference standards, where applicable.

C. Shop Drawings: Indicate profiles, accessories, locations and dimensions of all access doors required, whether or not shown on the Drawings.

1.4 APPLICABLE PUBLICATIONS

A. ASTM International (ASTM):

1. A653/A653M-15 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Sip Process.
2. A1008/A1008M-15 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Baked Hardenable.
3. A666-15 - Annealed or Cold-Worked Austenitic Stainless Steel sheet, Strip, Plate, and Flat Bar.
4. E119-15 - Fire Test of Building Construction and Materials.

B. National Fire Protection Association (NFPA):
   1. 80-16 - Fire Doors and Other Opening Protectives.
   2. 251-12 - Fire Tests of Door Assemblies.
C. National Association of Architectural Metal Manufacturers (NAAMM):
   1. AMP 500-06 - Metal Finishes Manual.
D. UL LLC (UL):
   1. Listed - Online Certifications Directory.
   2. 10B-08 - Standard for Fire Tests of Door Assemblies.
   3. 263-11 - Fire Tests of Building Construction and Materials.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturers must have a minimum of five (5) years experience in the production of the specified type of access door.
B. Single Source Responsibility: Provide each access door as a complete unit produced by one (1) manufacturer, including frame, brackets, guides, tracks, and all accessories.
C. When access doors are required to be installed in fire-rated assemblies, the access doors shall be in conformance with fire rating requirements shown, and bear appropriate UL or WHI Labels.
D. Reference Standards:
   1. American Standards of Testing and Materials (ASTM) E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
   2. National Fire Protection Association (NFPA):
      a. NFPA 80 - Standard for Fire Doors and Windows.
      b. NFPA 251 - Standard Methods of Tests of Fire Resistance of Building Construction and Materials.
      c. NFPA 288 - Standard Methods of Fire Tests of Floor Fire Door Assemblies Installed Horizontally in Fire Resistance-Rated Floor Systems.

1.6 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.
B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, production run number, and manufacture date.
C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

D. Store products indoors in dry, weathertight facility.

E. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

1 Field Measurements: Verify field conditions affecting access door fabrication and installation. Show field measurements on Submittal Drawings.

PART 2 – PRODUCTS

2.1 MATERIALS AND FABRICATION

A. Materials:
   1. Steel Sheet: ASTM A1008/A1008M.
   2. Galvanized Steel: ASTM A 653/A 653M.
   3. Stainless Steel: ASTM A666; Type 302 or Type 304.

B. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.

C. **Provide each product from one manufacturer.**

D. **Sustainable Construction Requirements:**
   1. Steel Access Doors Recycled Content: 30 percent total recycled content, minimum.
   2. Stainless Steel Access Doors Recycled Content: 70 percent total recycled content, minimum.

E. Ceiling and Partition Access Doors:
   1. Type 1 Access Doors: For Non-Rated Ceilings and Partitions: Flush Type. 16-gauge steel, taping bead frame and 14-gauge steel door.
      a. Size: As required for access or by regulatory agencies, and as shown on the Drawings. 24-inch x 24-inch minimum for ceiling access, unless otherwise noted.
      b. Hinges: Concealed continuous piano hinges. Opens to 135-degrees minimum.
      c. Lock: Screwdriver-operated cam latch in ceilings, and key-operated cylinder for partitions.
      d. Finish: Factory applied, rust inhibitive baked-enamel prime coat. Paint to match adjacent area color in accordance with SECTION 09 9000, PAINTING.
   2. Type 2 Access Doors: For Fire-Rated Ceilings and Partitions: UL Label for a 1 1/2-hour rating in partitions. 16-gauge steel, taping bead frame and 20-gauge steel door filled with 2-inch thick fire-

rated mineral fiber insulation. Door shall be self-closing and self-latching.

a. Size: As required for access or by regulatory agencies, and as shown on the Drawings. 24-inch x 24-inch minimum.

b. Hinges: Continuous piano hinges. Opens to 175-degrees.

c. Lock: Key-operated cylinder.

d. Finish: Factory-applied, rust inhibitive baked-enamel prime coat. Paint to match adjacent area color in accordance with SECTION 09 9000, PAINTING.

3. Type 3 Access Doors: Operating Rooms: Fully gasketed, flush type access door with taping bead frame and 16-gauge steel door.

a. Size: 24-inch x 24-inch minimum.

b. Acoustic Insulation: Provide 3/4-inch thick polystyrene insulation with an R-value of 4.0, matching the size of the door panel and lining its inside face.

c. Hinges: Concealed, continuous piano hinges. Opens to 135-degrees.

d. Lock: Screwdriver-operated cam latch.

e. Finish: Factory applied, rust inhibitive baked-enamel prime coat. Paint to match adjacent area color in accordance with SECTION 09 9000, PAINTING.

B. Keying for Cylinder Type Lock: Key all locks for Types 1, 2 and 3 Access Doors to master and grandmaster key systems as directed by the Owner.

C. Gasket: Neoprene gasket, unless otherwise noted.

D. Accessories: As recommended by the manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION:

Coordinate with the work of other trades to verify that correct opening dimensions are provided, to ensure clearances with adjacent construction are maintained, to verify required utility connections have been installed where applicable, and to reconfirm the exact locations of access doors and frames.

3.2 INSTALLATION:

A. Installation of access doors shall be in strict conformance with manufacturer's instructions and the requirements of applicable Reference Standards.

B. Coordinate with other trades to verify correct sizes and locations of access doors.

C. Frames shall be installed plumb and level in each opening. Secure rigidly in place.

D. Paint all ceiling and partition access doors, unless otherwise noted. Color to match adjacent ceiling or partition color.

3.3 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.

3.4 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.

3.5 ADJUSTMENT:

A. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

B. Adjust hardware and access doors after installation for proper operation.

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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:

1. Section 08 14 00, WOOD DOORS
2. Section 08 11 13, HOLLOW METAL DOORS AND FRAMES
3. Section 08 71 13.11, LOW ENERGY DOOR OPERATORS

C. Finishes: Section 09 06 00, SCHEDULE FOR FINISHES.

D. Painting: Section 09 91 00, PAINTING.

F. Electrical: Division 26, ELECTRICAL.

G. Fire Detection: Section 28 31 00, FIRE DETECTION AND ALARM.

1.3 GENERAL

A. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards) unless specified otherwise.

B. Provide rated door hardware assemblies where required by most current version of the International Building Code (IBC).

C. 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.

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, except as otherwise specified:

1. Mortise locksets.
2. Hinges for hollow metal and wood doors.
3. Surface applied overhead door closers.

4. Exit devices.
5. Floor closers.

1.4 WARRANTY

A. Automatic door operators shall be subject to the terms of FAR Clause 52.246-21, except that the Warranty period shall be two years in lieu of one year for all items except as noted below:
   1. Locks, latchsets, and panic hardware: 5 years.
   2. Door closers and continuous hinges: 10 years.

1.5 MAINTENANCE MANUALS

A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on all door hardware. Provide installation instructions with the submittal documentation.

1.6 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Submit 6 copies of the schedule per Section 01 33 23. Submit 2 final copies of the final approved schedules to VAMC Locksmith as record copies (VISN Locksmith if the VAMC does not have a locksmith).

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.

1.7 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 Resident Engineer for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in Resident Engineer's office until all other similar items have been installed in project, at which time the Resident Engineer will deliver items on file to Contractor for installation in predetermined locations on the project.

1.8 PREINSTALLATION MEETING

A. Convene a preinstallation meeting not less than 30 days before start of installation of door hardware. Require attendance of parties directly affecting work of this section, including Contractor and Installer, Architect, Project Engineer and VA Locksmith, Hardware Consultant, and Hardware Manufacturer’s Representative. Review the following:

1. Inspection of door hardware.
2. Job and surface readiness.
3. Coordination with other work.
4. Protection of hardware surfaces.
5. Substrate surface protection.
6. Installation.
7. Adjusting.
8. Repair.
9. Field quality control.
10. Cleaning.

1.9 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 (e.g., "HW") followed by a number. Each number designates a set of hardware items applicable to a door type.

//B. Keying: All cylinders shall be keyed into existing _____ // 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 // 7 // pin type. Keying information shall be furnished at a later date by the Resident Engineer.//

1.10 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

E2180-07.....Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials

C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):

A156.1-06.....Butts and Hinges

A156.2-03.....Bored and Pre-assembled Locks and Latches

A156.3-08.....Exit Devices, Coordinators, and Auto Flush Bolts

A156.4-08.....Door Controls (Closers)

A156.5-14.....Cylinders and Input Devices for Locks.

A156.6-05.....Architectural Door Trim

A156.8-05.....Door Controls-Overhead Stops and Holders

A156.11-14.....Cabinet Locks

A156.12-05 .....Interconnected Locks and Latches

A156.13-05.....Mortise Locks and Latches Series 1000
A156.14-07 .....Sliding and Folding Door Hardware
A156.15-06.....Release Devices-Closer Holder, Electromagnetic and Electromechanical
A156.16-08.....Auxiliary Hardware
A156.17-04 .....Self-Closing Hinges and Pivots
A156.18-06.....Materials and Finishes
A156.20-06 .....Strap and Tee Hinges, and Hasps
A156.21-09.....Thresholds
A156.22-05.....Door Gasketing and Edge Seal Systems
A156.23-04.....Electromagnetic Locks
A156.24-03.....Delayed Egress Locking Systems
A156.25-07 .....Electrified Locking Devices
A156.26-06.....Continuous Hinges
A156.28-07 .....Master Keying Systems
A156.29-07 .....Exit Locks and Alarms
A156.30-03 .....High Security Cylinders
A156.31-07 .....Electric Strikes and Frame Mounted Actuators
A156.36-10.....Auxiliary Locks
A250.8-03.....Standard Steel Doors and Frames

D. National Fire Protection Association (NFPA):
80-10.....Fire Doors and Other Opening Protectives
101-09.....Life Safety Code

E. Underwriters Laboratories, Inc. (UL):
Building Materials Directory (2008)

PART 2 - PRODUCTS

2.1 BUTT HINGES

A. ANSI A156.1. Provide only three-knuckle hinges, except five-knuckle where the required hinge type is not available in a three-knuckle version (e.g., some types of swing-clear hinges). The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:

1. Exterior Doors: Type A2112/A5112 for doors 900 mm (3 feet) wide or less and Type A2111/A5111 for doors over 900 mm (3 feet) wide. Hinges for exterior outswing doors shall have non-removable pins.

Hinges for exterior fire-rated doors shall be of stainless steel material.

2. Interior Doors: Type A8112/A5112 for doors 900 mm (3 feet) wide or less and Type A8111/A5111 for doors over 900 mm (3 feet) wide. Hinges for doors exposed to high humidity areas (shower rooms, toilet rooms, kitchens, janitor rooms, etc. shall be of stainless steel material.

B. Provide quantity and size of hinges per door leaf as follows:

1. Doors up to 1210 mm (4 feet) high: 2 hinges.
2. Doors 1210 mm (4 feet) to 2260 mm (7 feet 5 inches) high: 3 hinges minimum.
3. Doors greater than 2260 mm (7 feet 5 inches) high: 4 hinges.
4. Doors up to 900 mm (3 feet) wide, standard weight: 114 mm x 114 mm (4-1/2 inches x 4-1/2 inches) hinges.
5. Doors over 900 mm (3 feet) to 1065 mm (3 feet 6 inches) wide, standard weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
6. Doors over 1065 mm (3 feet 6 inches) to 1210 mm (4 feet), heavy weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
7. Provide heavy-weight hinges where specified.
8. At doors weighing 330 kg (150 lbs.) or more, furnish 127 mm (5 inch) high hinges.

C. 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 1-600.

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

C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a Teflon-coated 6.35mm (0.25-inch) minimum diameter pin that extends entire length of hinge.

1. Base Metal for Exterior Hinges: Stainless steel.
2. Base Metal for Interior Hinges: Stainless steel.
3. Base Metal for Hinges for Fire-Rated Assemblies: Stainless steel.

4. Provide with non-removable pin (hospital tip option) at lockable outswing doors.
5. Where required to clear adjacent casing, trim, and wall conditions and allow full door swing, provide wide throw hinges of minimum width required.
6. Provide with manufacturer's cut-outs for separate mortised power transfers and/or mortised automatic door bottoms where they occur.
7. Where thru-wire power transfers are integral to the hinge, provide hinge with easily removable portion to allow easy access to wiring connections.
8. Where models are specified that provide an integral wrap-around edge guard for the hinge edge of the door, provide manufacturer's adjustable threaded stud and machine screw mechanism to allow the door to be adjusted within the wrap-around edge guard.

2.3 DOOR CLOSING DEVICES

A. Closing devices shall be products of one manufacturer.

2.4 OVERHEAD CLOSERS

A. Conform to ANSI A156.4, Grade 1.

B. Closers shall conform to the following:

1. The closer shall have minimum 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: Provide multi-size closers, sizes 1 through 6, except where multi-size closer is not available for the required application.
4. Material of closer body shall be forged or cast.
5. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
6. Where closers are exposed to the exterior or are mounted in rooms that experience high humidity, provide closer body and arm assembly of stainless steel material.
7. Closers shall have full size metal cover; plastic covers will not be accepted.

8. Closers shall have adjustable hydraulic back-check, separate valves for closing and latching speed, adjustable back-check positioning valve, and adjustable delayed action valve.
9. Provide closers with any accessories required for the mounting application, including (but not limited to) drop plates, special soffit plates, spacers for heavy-duty parallel arm fifth screws, bull-nose or other regular arm brackets, longer or shorter arm assemblies, and special factory templating. Provide special arms, drop plates, and templating as needed to allow mounting at doors with overhead stops and/or holders.
10. Closer arms or backcheck valve shall not be used to stop the door from overswing, except in applications where a separate wall, floor, or overhead stop cannot be used.
11. Provide parallel arm closers with heavy duty rigid arm.
12. Where closers are to be installed on the push side of the door, provide parallel arm type except where conditions require use of top jamb arm.
13. Provide all surface closers with the same body attachment screw pattern for ease of replacement and maintenance.
14. All closers shall have a 1 ½″ (38mm) minimum piston diameter.

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 case 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. The hold-open mechanism shall be selectable on/off by turning a screw through the floor plate. Floor closers shall have adjustable hydraulic back-check, adjustable close speed, and adjustable latch speed. Provide closers with delayed action where a hold-open mechanism is not required. Floor closers shall be multi-sized. Single acting floor closers shall also have built in dead stop. Where required, provide closers with special cement cases

appropriate for shallow deck installation or where concrete joint lines run through the floor blockout. At offset-hung doors installed in deep reveals, provide special closer arm and spindle to allow for installation. Where stone or terrazzo is applied over the floor closer case, provide closer without floor plate and with extended spindle (length as required) and special cover pan (depth as required) to allow closer to be accessed without damaging the material applied over the closer. 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 Closers For Lead Lined Doors: Type C06071 (offset pivoted).

2.6 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. Provide floor stops (Type L02141 or L02161 in office areas; Type L02121 x 3 screws into floor elsewhere. Wall bumpers, where used, must be installed to impact the trim or the door within the leading half of its width. Floor stops, where used, must be installed within 4-inches of the wall face and impact the door within the leading half of its width.

E. Where drywall partitions occur, use floor stops, Type L02141 or L02161 in office areas, Type L02121 elsewhere.

F. Provide stop Type L02011, as applicable for exterior doors. At outswing doors where stop can be installed in concrete, provide stop mated to concrete anchor set in 76mm (3-inch) core-drilled hole and filled with quick-setting cement.

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, except where wall stops cannot be used or where floor stops cannot be installed within 4-inches of the wall.

L. Where the specified wall or floor stop cannot be used, provide concealed overhead stops (surface-mounted where concealed cannot be used).

2.7 OVERHEAD DOOR STOPS AND 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. Provide Grade 1 overhead concealed slide type: stop-only at rated doors and security doors, hold-open type with exposed hold-open on/off control at all other doors requiring overhead door stops.

2.8 FLOOR DOOR HOLDERS

A. Conform to ANSI Standard A156.16. Provide extension strikes for Types L01301 and L01311 holders where necessary.

2.9 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 // seven pins //. Cylinders for all locksets shall be removable core type. Cylinders shall be furnished with construction removable cores and construction master keys. 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, unless shorter throw allowed by the door manufacturer's fire label. Provide temporary keying device or construction core to 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 fabricated from cast stainless steel. Provide sectional (lever x rose) lever design matching [_____]. No substitute lever material shall be accepted. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Lock function F02 shall be furnished with emergency tools/keys for emergency entrance. All lock cases installed on lead lined doors shall be lead lined before applying final hardware finish. Furnish armored fronts for all mortise locks. Where mortise locks are installed in high-humidity locations or where exposed to the exterior on both sides of the opening, provide non-ferrous mortise lock case.
2. Cylindrical Lock and Latch Sets: levers shall meet ADA (Americans with Disabilities Act) requirements. Cylindrical locksets shall be series 4000 Grade I. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Provide lever design to match design selected by Architect or to match existing lever design. 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 A156.36.
4. Privacy locks in non-mental-health patient rooms shall have an inside thumbturn for privacy and an outside thumbturn for emergency entrance. Single occupancy patient privacy doors shall typically swing out; where such doors cannot swing out, provide center-pivoted doors with rescue hardware (see HW-2B).

2.10 PUSH-BUTTON COMBINATION LOCKS

A. ANSI/BHMA A156.5, Grade 1. Battery operated pushbutton entry.
B. Construction: Heavy duty mortise lock housing conforming to ANSI/BHMA A156.13, Grade 1. Lever handles and operating components in compliance with the UFAS and the ADA Accessibility Guidelines. Match lever handles of locks and latchsets on adjacent doors.
C. Special Features: Key override to permit a master keyed security system and a pushbutton security code activated passage feature to allow access without using the entry code.

2.11 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: 500 lbf (2224 N).
   3. Inductive Kickback Peak Voltage: Not more than 0 V.
   4. Residual Magnetism: Not more than 0 lbf (0 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.
4. The lock housing shall not project more than 4-inches (101mm) from the underside of the frame head stop.

2.12 ELECTRIC STRIKES

A. ANSI/ BHMA A156.31 Grade 1.

B. General: Use fail-secure electric strikes at fire-rated doors.

2.13 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	2 keys

B. Psychiatric keys shall be cut so that first two bittings closest to the key shoulder are shallow to provide greater strength at point of greatest torque.

2.14 ARMOR PLATES, KICK PLATES, MOP PLATES AND DOOR EDGING

A. Conform to ANSI Standard A156.6.

B. Provide protective plates and door edging as specified below:

1. Kick plates, mop plates and armor plates of metal, Type J100 series.
2. Provide kick plates and mop plates where specified. Kick plates shall be 254 mm (10 inches) or 305 mm (12 inches) high. Mop plates shall be 152 mm (6 inches) high. Both kick and mop plates shall be minimum 1.27 mm (0.050 inches) thick. Provide kick and mop plates beveled on all 4 edges (B4E). On push side of doors where jamb stop extends to floor, make kick 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 kick and mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick

and mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.

3. Kick plates and/or 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. Both sides of aluminum entrance doors.
4. Armor plates for doors are listed under Article "Hardware Sets". Armor plates shall be thickness as noted in the hardware set, 875 mm (35 inches) high and 38 mm (1-1/2 inches) less than width of doors, except on pairs of metal doors. Provide armor plates beveled on all 4 edges (B4E). 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 of intermediate rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt push bar.
5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick plate in place of armor plate. Size of stretcher plate and kick plate shall be 254 mm (10 inches) high.
6. Provide stainless steel edge guards where so specified at wood doors. Provide mortised type instead of surface type except where door construction and/or ratings will not allow. Provide edge guards of bevel and thickness to match wood door. Provide edge guards with factory cut-outs for door hardware that must be installed through or extend through the edge guard. Provide full-height edge guards except where door rating does not allow; in such cases, provide edge guards to height of bottom of typical lockset armor front. Forward edge guards to wood door manufacturer for factory installation on doors.

2.15 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 cast satin stainless steel lever handles of design similar to locksets, unless otherwise specified. Provide key

cylinders for keyed operating trim and, where specified, cylinder dogging.

B. Surface vertical rod panics shall only be provided less bottom rod; provide fire pins as required by exit device and door fire labels. Do not provide surface vertical rod panics at exterior doors.

C. Concealed vertical rod panics shall be provided less bottom rod at interior doors, unless lockable or otherwise specified; provide fire pins as required by exit device and door fire labels. Where concealed vertical rod panics are specified at exterior doors, provide with both top and bottom rods.

D. Where removable mullions are specified at pairs with rim panic devices, provide mullion with key-removable feature.

E. At non-rated openings with panic hardware, provide panic hardware with key cylinder dogging feature.

F. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

2.16 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.

B. Lever extension manual flush bolts shall only be used at non-fire-rated pairs for rooms only accessed by maintenance personnel.

C. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2-1/2 inches).

D. Friction-fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.

E. Provide extension rods for top bolt where door height exceeds 2184 mm (7 feet 2 inches).

2.17 FLUSH BOLTS (AUTOMATIC)

A. Conform to ANSI A156.3. 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).

B. At interior doors, provide auto flush bolts less bottom bolt, unless otherwise specified, except at wood pairs with fire-rating greater than 20 minutes; provide fire pins as required by auto flush bolt and door fire labels.

2.18 DOOR PULLS WITH PLATES

A. Conform to ANSI A156.6. Pull Type J401, 152 mm CTC (6 inches CTC) length by 19 mm (3/4 inches) diameter minimum with plate Type J302, 90 mm by 381 mm (3-1/2 inches by 15 inches), unless otherwise specified. Provide pull with projection of 57.2 mm (2 1/4 inches) minimum and a clearance of 38.1 mm (1 1/2 inches) minimum. Cut plates of door pull plate for cylinders, or turn pieces where required.

2.19 PUSH PLATES

A. Conform to ANSI A156.6. Metal, Type J302, 203 mm (8 inches) wide by 406.4 mm (16 inches) high. Provide metal Type J302 plates 102 mm (4 inches) wide by 406.4 mm (16 inches) high where push plates are specified for doors with stiles less than 203 mm (8 inches) wide. Cut plates for cylinders, and turn pieces where required.

2.20 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.

2.21 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. Provide bar type coordinators, except where gravity coordinators are required at acoustic pairs. For bar type coordinators, provide filler bars for full width and, as required, brackets for push-side surface mounted closers, overhead stops, and vertical rod panic strikes.

2.22 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 ¼-20 stainless steel 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.

B. For thresholds at elevators entrances see other sections of specifications.

C. At exterior doors and any interior doors exposed to moisture, provide threshold with non-slip abrasive finish.

D. Provide with miter returns where threshold extends more than 12 mm (0.5 inch) beyond face of frame.

2.23 AUTOMATIC DOOR BOTTOM SEAL AND RUBBER GASKET FOR LIGHT PROOF OR SOUND CONTROL DOORS

A. Conform to ANSI A156.22. Provide mortise or under-door type, except where not practical. For mortise automatic door bottoms, provide type specific for door construction (wood or metal).

2.24 WEATHERSTRIPS (FOR EXTERIOR DOORS)

A. Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length (0.000774m^3/s/m).

2.25 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 E07213, conforming to ANSI A156.11. 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 or L03021, depending on frame material, of white or light gray color, on each steel or wood door frame, except at fire-rated frames, 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.

2.28 THERMOSTATIC TEMPERATURE CONTROL VALVE CABINETS

A. Where lock is shown, equip each cabinet door (metal) with lock Type E06213, conforming to ANSI A156.36. Key locks in Key Sets approved by Contracting Officer. See mechanical drawings and specifications for location of cabinets.

B. Cabinet manufacturer shall supply the hinges, bolts and pulls. Ship locks to cabinet manufacturer for installation.

2.30 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 --exterior doors: 626 or 630.
2. Hinges --interior doors: 652 or 630.
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: 600.

D. Hardware Finishes for Existing Buildings: U.S. Standard finishes shall match finishes of hardware in (similar) existing spaces except where otherwise specified.

E. 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.

F. Anti-microbial Coating: All hand-operated hardware (levers, pulls, push bars, push plates, paddles, and panic bars) shall be provided with an anti-microbial/anti-fungal coating that has passed ASTM E2180 tests. Coating to consist of ionic silver (Ag+). Silver ions surround bacterial cells, inhibiting growth of bacteria, mold, and mildew by blockading food and respiration supplies.

2.31 BASE METALS

A. Apply specified U.S. Standard finishes on different base metals as following:

Finish	**Base Metal**
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 VA Resident Engineer for approval.

B. Hardware Heights from Finished Floor:

1. Exit devices centerline of strike (where applicable) 1024 mm (40-5/16 inches).
2. Locksets and latch sets centerline of strike 1024 mm (40-5/16 inches).
3. Deadlocks centerline of strike 1219 mm (48 inches).
4. Hospital arm pull 1168 mm (46 inches) to centerline of bottom supporting bracket.
5. Centerline of door pulls to be 1016 mm (40 inches).
6. Push plates and push-pull shall be 1270 mm (50 inches) to top of plate.

7. Push-pull latch to be 1024 mm (40-5/16 inches) to centerline of strike.
8. 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 on side of door inside rooms, inside stairs, and away from corridors. At exterior doors, closers shall be mounted on interior side. 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. 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)

C. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim and surrounding conditions.

D. 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 Resident Engineer. 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.

E. 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
Dutch type doors	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

F. 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.

G. After locks have been installed; show in presence of Resident Engineer 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 Resident Engineer 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 FINAL INSPECTION

A. Installer to provide letter to VA Resident/Project Engineer that upon completion, installer has visited the Project and has accomplished the following:
   1. Re-adjust hardware.
   2. Evaluate maintenance procedures and recommend changes or additions, and instruct VA personnel.
   3. Identify items that have deteriorated or failed.
   4. Submit written report identifying problems.

3.4 DEMONSTRATION

A. Demonstrate efficacy of mechanical hardware and electrical, and electronic hardware systems, including adjustment and maintenance procedures, to satisfaction of Resident/Project Engineer and VA Locksmith.

3.5 HARDWARE SETS

A. Following sets of hardware correspond to hardware symbols shown on drawings. Only those hardware sets that are shown on drawings will be

required. Disregard hardware sets listed in specifications but not shown on drawings.

B. Hardware Consultant working on a project will be responsible for providing additional information regarding these hardware sets. The numbers shown in the following sets come from BHMA standards.

ELECTRIC HARDWARE ABBREVIATIONS LEGEND:
ADO = Automatic Door Operator
EMCH = Electro-Mechanical Closer-Holder
MHO = Magnetic Hold-Open (wall- or floor-mounted)

INTERIOR SINGLE DOORS

HW-1

Each Door to Have: NON-RATED

1	Continuous Hinge	
1	Door Pull w/ Plate	J401 x J302
1	Push Plate	J302
1	Kick Plate	J102
1	Mop Plate (@ Inswing Doors)	J103
1	Closer	C02011/C02021
1	Floor Stop	L02121 x 3 FASTENERS
3	Silencers	L03011

HW-2

Each Door to Have: RATED/NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Keyed Privacy Indicator Lock	F13 x OCCUPANCY INDICATOR
1	Closer	C02011/C02021
1	Kick Plate	J102
1	Mop Plate (@ Inswing Doors)	J103
1	Floor Stop	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

HW-3

Each Door to Have: RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Office Lock	F04
1	Closer	C02011/C02021
1	Kick Plate	J102
1	Floor Stop	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

HW-4

Each Door to Have: NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Classroom Lock	F08
1	Closer	C02011/C02021
1	Overhead Stop	C04541
3	Silencers	L03011

HW-5

Each Door to Have: RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Storeroom Lock	F07
1	Closer	C02011/C02021
1	Kick Plate	J102 (@ STORAGE, EVM, & HAC ROOMS ONLY)
1	Floor Stop	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

INTERIOR PAIRS OF DOORS

HW-10

Each Pair to Have:		RATED
2	Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1	Classroom Lock	F08
1	Coordinator	TYPE 21A
1	Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2	Closers	C02011/C02021
2	Heavy-Duty Armor Plates	J101 x 3.175 MM (0.125 INCH) THICKNESS
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2	Floor Stops	L02121 x 3 FASTENERS
1	Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
2	Auto Door Bottoms	R0Y346 – HEAVY DUTY
2	Set Self-Adhesive Seals	R0Y154

INSTALL LOCK TRIM PROTECTOR BAR ON PUSH SIDE OF ACTIVE LEAF TO PROTECT LEVER TRIM.

HW-12A

Each [MHO] Pair Integrated Doors to Have: RATED

ALL HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

HW-12C

Each [MHO] Pair Integrated Double Egress Doors to Have: RATED

ALL HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

HW-13

Each Bi-Folding Pair to Have:	NON-RATED
1 Bi-Folding Closet Hardware Set	111FD by Johnson Hardware

RESIDENTIAL UNIT SINGLE DOORS

HW-R2

Each Door to Have: NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Latchset	F75
1	Base Stop	L02031 x 3 FASTENERS
3	Silencers	L03011

HW-R3

Each Door to Have: NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Privacy	F76B
1	Base Stop	L02031 x 3 FASTENERS
1	Coat Hook	L03121
3	Silencers	L03011

SECURITY HARDWARE ABBREVIATIONS LEGEND:

AC = Access Control Device (Card reader, biometric reader, keypad, etc.)
ADO = Automatic Door Operator
DEML = Delayed Egress Magnetic Lock
DEPH = Delayed Egress Panic Exit Device
DPS = Door Position Switch (Door or Alarm Contact)
EL = Electric Lock or Electric Lever Exit Device
PB = Push-button Combination Lock (stand-alone)
RR = Remote Release Button
ELR = Electric Latch Retraction Exit Device
REX = Request-to-Exit Switch in Latching Device Inside Trim

EXTERIOR SINGLE SECURITY DOORS

HW-SH-4

Each [AC, EL, REX, DPS] Integrated Door to Have:		RATED
1	Entry Lock	F11
1	Latch Protector (outswing dr)	
1	Kick Plate	J102
1	Threshold (outswing door)	J32120 x SILICONE GASKET
1	Door Sweep	R0Y416
1	Set Frame Seals	R0Y164
1	Drip	R0Y976

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

- - - E N D - - -

SECTION 08 71 13.11
LOW ENERGY POWER ASSIST DOOR OPERATORS

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies low energy power assisted automatic operation of swing doors. The door operator system shall be complete including operator, controls, door arm and operator enclosure (header and cover).

1.2 RELATED WORK

A. Sealants; Section 07 92 00, JOINT SEALANTS.

B. Steel doors; Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.

C. Wood doors; Section 08 14 00, INTERIOR WOOD DOORS.

D. Aluminum frames entrance work; Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.

E. Door hardware; Section 08 71 00, DOOR HARDWARE.

F. Glass and glazing of doors and frames; Section 08 80 00, GLAZING.

G. Finish Color, Section 09 06 00, SCHEDULE FOR FINISHES.

H. Smoke detectors for control of fire/smoke doors to be wired per Section 28 31 00, FIRE DETECTION AND ALARM.

I. Electric general wiring, connections and equipment requirements; Division 26, ELECTRICAL.

1.3 MANUFACTURER'S QUALIFICATIONS

A. Power assisted 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 manufacturer of automatic door equipment shall be used throughout the building ——project —.

1.4 WARRANTY

Power assisted door operators, controls and other related equipment 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

In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS," furnish copies of 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:
Showing location of controls and safety devices in relationship to each automatically operated door. This includes templates, wiring diagrams, fabrication details, anchorage and other information to providers of related work to coordinate the proper installation of the door operators.

1.7 DESIGN CRITERIA

A. Power assisted automatic door equipment shall accommodate normal traffic as well as the weight of the doors.

B. Equipment: UL approved and comply with applicable codes. Motors shall be rated minimum one-quarter horsepower and shall be single phase and 115 volts.

C. Electrical Wiring; Provide wiring so that only a single power supply is required. 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. American National Standards Institute (ANSI):
ICC/ANSI A117.1-03.....Guideline for Accessible and Usable Buildings and Facilities-Providing Accessibility and Usability for Physically Handicapped People

C. Builders Hardware Manufacturers Association, Inc. (BHMA):
156.19-07.....Power Assist and Low Energy Power Operated Doors

PART 2 - PRODUCTS

2.1 OPERATORS

A. Automatic door operators shall be for commercial doors and shall be electromechanical and surface mounted above the door to the header or

transom bar. The opening force shall be generated by a permanent magnet DC motor driving a combination spiral bevel/spur gear reducer and transmitted to the door through an arm linkage. Opening speed shall be adjustable and feature dual backcheck control allowing adjustment of backcheck speed and position. Closing shall be by spring force generated by a metal compression spring. The spring shall reduce manual opening force to not more than 67 N (15 lbf). The minimum diameter of spring wire shall be .007mm (172 in.). Under the specified design load of the door, the spring shall be capable of performing 2,000,000 cycles before fracture. Adjustable closing speed and fixed latch speed shall control the door in the closing cycle. The doors shall be operated manually at any time without damage to the operator or components.

B. All operators shall have checking mechanism providing cushioning action at last part of door travel, in both opening and closing cycle. Operators shall recycle doors instantaneously to full open position from any point in closing cycle when control switch is reactivated.

C. Operator shall be swinging type enclosed in housing. Operator shall open door by energizing motor and shall stop by electrically reducing voltage and stalling motor against mechanical stop. Door shall close by means of spring energy, and close force shall be controlled by gear system and motor being used as dynamic break without power. System shall operate as manual door control in event of power failure. Opening and closing speeds shall be adjustable:

1. Swing Operator Housing: Housing shall be 140 mm (5-1/2 inches) wide by 150 mm (6 inches) high aluminum extrusions with enclosed end caps for application to 100 mm (4 inch) and larger frame systems. All structural sections shall have a minimum thickness of 3.7 mm (0.146 inch) and be fabricated of 6063-T5 aluminum alloy.
2. Swing Power Operator: Completely assembled and sealed unit which shall include helical gear drive transmission, mechanical spring and bearings, all located in cast aluminum case and filled with special lubricant for extreme temperature conditions. A "DC" shunt-wound permanent magnet motor with sealed ball bearings shall be attached to transmission system. Complete unit shall be rubber mounted with provisions for easy maintenance and replacement, without removing door from pivots or frame.

3. Connecting hardware for swing overhead concealed type power operator shall have drive arm attached to door with a pin linkage rotating in a self-lubricating bearing and adjustable slide block, traveling in an interconnected track and top pivot assembly. Top track and pivot assembly shall be fabricated of steel. Door shall not pivot on shaft of operator.
4. Electrical Control: Operator shall have a self contained electrical control unit, including necessary transformers, relays, rectifiers, and other electronic components for proper operation and switching of power operator. Relays shall be plug-in type for individual replacement and all connecting harnesses shall have interlocking plugs. Control shall also include time delay for normal cycle. Swing door control shall include safe-swing circuit with optional switching which automatically limits power and slows door when approached from the doors swing area.
5. On pairs of doors, operators shall allow either door to be opened manually without the other door opening.

2.2 MICROPROCESSOR CONTROLS

A. The system shall include a multi-function microprocessor control providing adjustable hold open time (1 – 30 sec.), LED indications for actual position unknown, system status, open obstruction shutdown, activation signal, safety mat/sensor signal, Stop-and-Hold signal, and mode selector switches providing a means for easy field selection of the following functions: push-to-operate, latch assist and stack pressure. Control shall be capable of receiving activation signals from any device with normally open dry contact output.
   1. With push-to-operate function enabled, the control shall provide a means of initiating a self-start activation circuit by slightly pushing the door open at any point in the door swing.
   2. Latch Assist shall provide a two second impulse in the close direction to overcome restrictions with locking devices of pressure differentials, allowing the unit to operate in standard time delay mode, and permitting the door to close from the full open position after the hold time is satisfied. All activation modes shall provide fully adjustable opening speed.

B. The door shall be held open by low voltage applied to the continuous duty motor. The control shall include an adjustable safety circuit that

monitors door operation and shuts the motor off if an open obstruction is sensed. The control shall include a recycle feature the reopens the door if an obstruction is sensed at any point during its closing cycle. The control shall include a standard three position toggle switch with functions for ON, OFF, and HOLD OPEN.

2.3 ENCLOSURE

Operator shall be completely self-contained within an extruded aluminum housing (alloy 6063-T6) to conceal operator mechanism and mounting brackets and with removable access cover with an overall maximum size of 140 mm (5-1/2 inches) wide by 150 mm (6 inches) deep. Header color shall be integral color anodized/painted to match adjacent storefront/frame finish.

2.4 ACTIVATION DEVICES

A. Automatic: Opening cycle shall be activated by pressing switches with international symbol of accessibility and "PRESS TO OPERATE DOOR" engraved on the faceplate. Switches shall be installed in a standard 2-gang electrical wall box and placed in a location in compliance with ANSI A117.1. Switches may be wall mounted or mounted on a free standing post or guard rail.

B. Manual: Push-to-operate; manually pushing the door shall activate the automatic opening cycle. Door shall automatically close after timer delay expires.

C. Opening and closing force, measured 25 mm (1 inch) out from the lock stile of the door, shall not exceed 67 N (15 lbf) to stop the door when operating in either direction or cycle.

D. Opening Time: Doors shall be field adjusted so that opening time to back check or 80 degrees, whichever occurs first, shall be 3 seconds or longer as required in Table 1. Backcheck shall not occur before 60 degrees opening.

   Total opening time to fully open shall be as in Table II.

E. Closing Time:

   Doors shall be field adjusted to close from 90 degrees to 10 degrees in 3 seconds or longer as required in Table 1.

   1. Doors shall be field adjusted to close from 10 degrees to fully close position in not less than 1.5 seconds.
   2. Doors shall be field adjusted to remain fully open for not less than 5 seconds.

3. Table 1 provides speed settings for various widths and weights of doors for obtaining results complying with this paragraph.

F. Cycle Tests:

1. Low Energy Power Operated, Low Energy Power Open and Power Assist Operators shall be cycle tested for 300,000 cycles.
2. Use the widest and heaviest door specified as a test specimen. Narrower or lighter doors of the same configurations shall then be considered to meet the cycle test requirements.

Table 1

Minimum Opening Time to Backcheck or 80 degrees, which ever occurs first and the Minimum Closing Time from 90 degrees to Latch Check or 10 degrees.

"D" Door Leaf Width- mm (inches)	"W" Door Weight in kg (pounds) Matrix Values are in seconds				
	(100) 45.4	(56.7) 125	(68.0) 150	(79.4) 175	(90.7) 200
(762) 30	3.0	3.0	3.0	3.0	3.5
(914) 36	3.0	3.5	3.5	4.0	4.0
(1067) 42	3.5	4.0	4.0	4.5	4.5

Doors of other weights and widths can be calculated using the formula;

T = DvW/133 in US units T = DvW/2260 in SI (metric) units

Where: T= Time, seconds

D= Door width, mm (inches)

W= Door weight, kg (lbs)

The values for "T" time have been rounded up to the nearest half second. These values are based on a kinetic energy of (1.25 lbf-ft).

Table II

Total Opening Time to Full Open Position

Backcheck at 60 degrees	Backcheck at 70 degrees	Backcheck at 80 degrees
Table 1 plus 2 seconds	Table 1 plus 1.5 seconds	Table 1 plus 1 second

Note: To determine maximum times from close to full open, the operator shall be adjusted as shown in the chart. Backcheck occurring at a point

between positions in Table II shall use the lowest setting. For example, if the backcheck occurs at 75 degrees, the full open shall be the time shown in Table 1 plus 1.5 seconds.

2.5 POWER UNITS

Provide separate self-contained electric circuits for automatic operators located on each floor of the building. Interruption or failure of power circuits for operators located on one floor of the building shall not interfere with continuous performance of automatic operated doors located on other floors. Capacity and size of power circuits shall be in accordance with automatic operator manufacturer's specifications.

2.6 SAFETY DEVICES

A. Time delay switches shall be adjustable between 5 to 60 seconds and shall control closing cycle of doors.

B. Decals with sign "In" or "Do Not Enter" shall be installed on both faces of each door where shown and shall conform to the requirements of ANSI/BHMA A156.19.

C. Each swing door shall have installed a motion sensor to detect any person standing in the door swing path and prevent the door from opening.

D. Motion sensors shall consist of detection modules, factory prepared to be attached to each side of the lock/strike stile, an armored flex link power cable and bracket assembly, factory prepared for attachment to the pivot stile; a logic board and a position encoder which shall mount to the operator. The detection modules shall contain transmitting and receiving diodes and sense multidimensional zones for detection of people and/or objects in the door area. Detection modules shall be high impact, shock resistant zinc castings with tinted lenses. The swing door sensor system shall provide complete operate and safety zone coverage. These zones shall be fully adjusted to meet specific jobsite conditions (sidewalls, adjacent panels, etc.) The system shall not be affected by ultrasonic, ambient light or radios frequencies within the vicinity of the swing door.

E. Each swing door shall have installed a re-activation sensor mounted on the push-side door face near the top detect any person standing in the door swing path and prevent the door from closing. Wiring for the re-activation sensor between the door and frame shall be concealed in a

power transfer device, hinge or pivot provided under Section 08 71 00; wire chase in door provided under door section.

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. Where units are to be mounted on walls, provide metal supports or shelves for the units. 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 o£ traffic (pedestrians) 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 — Resident Engineer.

---- END ----

SECTION 08 80 00
GLAZING

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work includes, but is not necessarily limited to, the furnishing and installing of all glass, glazing materials and accessories, as indicated on the Drawings and specified herein.

1.2 RELATED WORK

A. Factory glazed by manufacturer in following units:
   1. Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.
   2. Section 08 11 13, HOLLOW METAL DOORS AND FRAMES
   3. Section 08 14 00, WOOD DOORS.
   4. Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.

1.3 LABELS

A. Temporary labels:
   1. Provide temporary label on each light of glass – and plastic material – 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 – and plastic material – is approved by Resident Engineer.

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. Laminated glass or have certificate for panes without permanent label.
      c. Organic coated glass.
   2. Test in accordance with ASTM E 1300.
   3. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.

1.4 SUBMITTALS

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Certificates:
Submit certification from each glazing sealant manufacturer indicating that the proposed sealant is approved for each application in which it was installed.

C. Warranty: Submit written guaranty, conforming to General Condition requirements, and to “Warranty of Construction” Article in this Section.

D. Product Data:
Manufacturer's information on glass and glazing materials, and installation instructions.

E. Samples:
1. Two (2) 12-inch x 12-inch samples of each glass type, unless otherwise specified in other sections. Samples to include polished and ground edge on glass types where edge will be exposed.
2. Two (2) 12-inch long samples of Glazing Sealants, Gaskets, Spacers, Blocks used on each type of glazing.

F. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer’s test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

1.5 DELIVERY, STORAGE AND HANDLING

C. 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. Deliver glass with manufacturer's label indicating type, quality, and thickness on each piece.

D. Storage: Store cases according to printed instructions on case, in areas least subject to traffic or falling objects. Keep

storage area clean and dry. Store materials in the manufacturer's original, unopened, packaging.

E. Handling: Unpack cases following printed instructions on case. Stack individual windows on edge leaned slightly against upright supports with separators between each. Handle glass in a manner to prevent damage to face and edges.

F. Protect laminated security glazing units against face and edge damage during entire sequence of fabrication, handling, and delivery to installation location. Provide protective covering on exposed faces of glazing plastics, and mark inside as "INTERIOR FACE" or "PROTECTED FACE":

1. Treat security glazing as fragile merchandise, and packaged and shipped in export wood cases with width end in upright position and blocked together in a mass. Storage and handling shall comply with Manufacturer's directions and as required to prevent edge damage or other damage to glazing resulting from effects of moisture, condensation, temperature changes, direct exposure to sun, other environmental conditions, and contact with chemical solvents.
2. Temporary protections: The glass front and polycarbonate back of glazing shall be temporarily protected with compatible, peelable, heat-resistant film which will be peeled for inspections and re-applied and finally removed after doors and windows are installed at destination. Since many adhesives will attack polycarbonate, the film used on exposed polycarbonate surfaces shall be approved and applied by manufacturer.
3. Edge protection: To cushion and protect glass clad, polycarbonate, and Noviflex edges from contamination or foreign matter, the four edges shall be sealed the depth of glazing with continuous standard-thickness Santoprene tape. Alternatively, continuous channel shaped extrusion of Santoprene shall be used, with flanges extending into face sides of glazing.

4. Protect "Constant Temperature" units including every unit where glass sheet is directly laminated to or directly sealed with metal-tube type spacer bar to polycarbonate sheet, from exposures to ambient temperatures outside the range of 16 to 24 C, during the fabricating, handling, shipping, storing, installation, and subsequent protection of glazing.

1.6 PROJECT CONDITIONS

A. Field Measurements: Field measure openings before ordering tempered glass products. Be responsible for proper fit of field measured products.

B. Environmental Requirements: Perform glazing Work on dry surfaces only, and when temperature in installation area is above 40-degrees F.

1.7 WARRANTY

A. Warranty: Conform to terms of "Warranty of Construction", FAR clause 52.246-21

1.8 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):

Z97.1-09 .....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.

C794-10 .....Adhesion-in-Peel of Elastomeric Joint Sealants

C864-05 .....Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

C920-11 .....Elastomeric Joint Sealants

C964-07 .....Standard Guide for Lock-Strip Gasket Glazing

C1036-06 .....Flat Glass

C1048-12 .....Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.

C1376-10 .....Pyrolytic and Vacuum Deposition Coatings on Flat Glass

D635-10 .....Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastic in a Horizontal Position

D4802-10 .....Poly (Methyl Methacrylate) Acrylic Plastic Sheet

E84-10 .....Surface Burning Characteristics of Building Materials

E119-10 .....Standard Test Methods for Fire Test of Building Construction and Material

E2190-10 .....Insulating Glass Unit

D. Commercial Item Description (CID):

A-A-59502 .....Plastic Sheet, Polycarbonate

E. Code of Federal Regulations (CFR):

16 CFR 1201 - Safety Standard for Architectural Glazing Materials; 2010

F. National Fire Protection Association (NFPA):

80-13 .....Fire Doors and Windows.

252-12 .....Standard Method of Fire Test of Door Assemblies

257-12 .....Standard on Fire Test for Window and Glass Block Assemblies

G. National Fenestration Rating Council (NFRC)

H. Safety Glazing Certification Council (SGCC) 2012:

Certified Products Directory (Issued Semi-Annually).

I. Underwriters Laboratories, Inc. (UL):

752-11 .....Bullet-Resisting Equipment.

J. Unified Facilities Criteria (UFC):

4-010-01-2012 .....DOD Minimum Antiterrorism Standards for Buildings

K. Glass Association of North America (GANA):
Glazing Manual (Latest Edition)
Sealant Manual (2009)

L. American Society of Civil Engineers (ASCE):
ASCE 7-10 .....Wind Load Provisions

PART 2 – PRODUCT

2.1 MATERIALS:

A. General:

1. Glass Thickness: Use thickness stated unless specified otherwise in assemblies.
2. Kind of Glazing: Provide float, tempered, heat-strengthened, or laminated glass as indicated on the Drawings or specified herein. Where kind is not indicated, provide glazing as required to comply with the California Building Code.
3. Float Glass: Glazing Select quality (Q3), clear float glass, conforming to ASTM C1036, Type I, Class 1.
4. Tempered Glass: Glazing Select quality (Q3), clear float glass, fully tempered, conforming to ASTM C1048, Kind FT, Condition A, Type I, Class 1.
5. Heat Strengthened Glass: Select glazing quality, clear float glass, heat strengthened, conforming to ASTM C1048, Kind HS, Type I, Class 1.
6. Laminated Glass: Float glass of color and heat treating process as specified, laminated together with a polyvinyl butyral (PVB) interlayer, conforming to ASTM C1172. Silk screen patterns, where specified, shall be applied to glass surfaces, not to the PVB interlayer.
7. Fire Rated Glass: Rated as indicated for the assembly in which the glazing material is installed.
   a. Label: Each piece of fire-rated glazing shall be labeled with a permanent label including the name of the product, manufacturer, approved testing and inspecting agency, fire rating period, applicable safety glazing standards, and date of manufacture.

b. Fire-protective glass products used to protect against smoke and flames only shall be rated for [20] [45] minutes as required by local building code and shall be tested in accordance with NFPA 252 (Standard Methods of Fire Tests of Door Assemblies) and NFPA 257 (Standard on Fire Test for Window and Glass Block Assemblies)

c. Fire-resistive products used to protect against smoke, flame, and the transmission of radiant heat shall be rated for [60] [90] [120] minutes and shall be tested in accordance with NFPA 252, NFPA 257, and ASTM E119 (Standard Test Methods for Fire Tests of Building Construction and Materials).

d. Fire-rated glass or glass assembly shall be classified by Underwriters Laboratory (UL), Intertek Testing Services-Warnock Hersey (ITS-WHI) or any other OSHA certified testing laboratory. All glass shall bear a permanent mark of classification in accordance with local building code.

e. Maximum size is per the manufacturer’s test agency listing for doors, transoms, side lights, borrowed lights, and windows.

f. Where safety glazing is required by local building code, fire-rated glass shall be tested in accordance with CPSC 16 CFR 1201 Category I or II and bear a permanent mark of classification.

g. Category I products are limited to 0.84 m2 – 9 ft2 and tested to no less than 203 Nm-150 ft-lbs impact loading.

h. Category II products are greater than 0.84 m2 – 9 ft2 and tested to no less than 542 Nm-400 ft-lbs impact loading. Category II products can be used in lieu of Category I products.

8. Ballistics Resistant Glass: Glass shall meet National Institute of Justice (NIJ) Standard 0108.01 and UL Standard 752. Provide protection listed by UL ABPMED as bullet resisting, with a

power rating of Super-Power Small Arms ballistic level in accordance with UL 752.

B. Glass Types as scheduled on the Drawings:
   1. Type G-1, Flat Tempered Glass: Clear; 1/4-inch thick, fully tempered.
   2. Type G-4, Mirror, See Section 10 28 00 TOILET, BATH, AND LAUNDRY ACCESSORIES
   3. Type G-5, Fire-Rated Laminated Glass: Nominal thickness 5/16-inch thick, laminated, fire-rated, safety-rated ceramic glass with fire resistance to meet fire-rating classification; identify each piece of fire rated glass with UL Label, indicating appropriate fire rating. FireLite Plus by Technical Glass Products, or accepted equal.

C. Glazing Materials:
   1. Comply with recommendations of sealant and glass manufacturer for selection of glazing materials with performance characteristics suitable for applications indicated and conditions at time of installation.
   2. Select sealants with proven compatibility with other materials with which they will come into contact; including glass products and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field service.
   3. Glazing Compound and Sealant:
      a. General: Non-staining type.
      b. Color:
         1) Interior: Clear color, unless otherwise specified.
      c. Interior Glazing:
         1) Non-rated Glazing: FS-TT-S-001543A, single component, non-sag, silicone sealant, with movement capability plus or minus 50-percent; Dow Corning 795 Silicone Building Sealant, or accepted equal.
            a) Polycarbonate Glazing: As recommended by the manufacturer for compatibility.
         2) Fire-rated Glazing: As recommended by manufacturer of fire-rated glass.
   4. Glazing Blocks and Spacers:
      a. Interior Glazing:
         1) Non-rated Glazing: Neoprene, of hardness as recommended by glass manufacturer, unless otherwise indicated on the Drawings.
            a) Polycarbonate Glazing: As recommended by the manufacturer for compatibility.
         2) Fire-rated Glazing: As recommended by manufacturer of fire-

rated glass.

5. Miscellaneous Glazing Accessories: As recommended by frame and glass manufacturers.

2.2 FABRICATION

A. Fabricate glass to sizes required for glazing openings indicated on the Drawings, with edge clearances and tolerances complying with recommendation of the glass manufacturer.
B. Cut all glass to size prior to delivery.
C. Grind edges of glass that will be installed with sealant at a butt joint.
D. Grind smooth and polish edges of glass that will be exposed.
E. Apply edge sealant at edges of laminated glass that will be exposed and installed with silicone sealant at a butt joint to prevent inclusions in PVB layer.
F. In addition to cutting, perform all drilling, edging, and other methods of fabrication of tempered glass in the factory before tempering.
G. Tong marks of tempered glass shall not be visible after glass is installed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of materials, inspect surfaces to see that they are free of burrs, irregularities, dirt, debris and liquids.
B. Inspect glass for face imperfections and damage.
C. Do not commence installation until conditions are satisfactory.
D. 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.

3.2 PREPARATION

A. Clean glazing channel or other framing members to receive glass immediately before glazing. Remove coatings which are not firmly bonded to substrates.
B. Inspect each piece of glass immediately before installation, and eliminate any units which have observable edge damage or face imperfections.
C. Apply primers to joint surfaces where required for adhesion of sealants and where recommended by sealant manufacturer.

3.3 INSTALLATION - GENERAL

A. Install materials in conformance with manufacturer's instructions, reviewed shop drawings, applicable reference standards and applicable

requirements of regulatory agencies.

B. Comply with GANA "Glazing Manual" instructions, except as specified otherwise, and except as specifically recommended otherwise by manufacturer of glass, glazing materials, and framing.

C. Glass shall be clean and dry at time of installation.

D. Install setting blocks and spacers.

E. Center glass in openings vertically and horizontally.

F. Do not cut, nip, or abrade tempered glass.

G. Lines and waves in glass shall run horizontally.

H. Unify appearance of glazing by setting each unit to match others as nearly as possible.

I. Sealant Glazing:

1. Provide back-up material, as recommended by sealant and glass manufacturer, to prevent sealant from extruding into glass channel weep systems and to control depth of sealant.
2. Apply sealant with sufficient force to eliminate voids.
3. Apply sealant to uniform and level line, flush with sightline; tool sealant surface smooth and even with a beveled wash away from glass.

J. Gasket Glazing:

1. Cut gasket with mitered corner to length of channel without stretching.
2. Seal gasket corners and butt joints with sealant recommended by gasket manufacturer.
3. Where wedge-shaped gaskets are driven into one side of the channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.

3.4 REPLACEMENT AND CLEANING

A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by Resident Engineer.

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.

3.5 PROTECTION

A. Following installation of glass in movable frames, fix frames so that they cannot be operated until glazing compounds and sealant have set.

B. Protect glass from damage from welding operations, alkaline materials, and other sources of damage.

C. Attach crossed streamers away from glass face. Do not apply markers to

glass surface.

D. Do not apply identification or caution markers to mirror surface. Protect against damage and accumulation of surface contaminants until final acceptance.

3.6 GLAZING SCHEDULE

Refer to drawings for glazing type locations.

- - - E N D - - -

SECTION 09 05 16
SUBSURFACE PREPARATION FOR FLOOR FINISHES

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies subsurface preparation requirements for areas to receive the installation of applied and resinous flooring. This section includes removal of existing floor coverings, testing concrete for moisture and pH, remedial floor coating for concrete floor slabs having unsatisfactory moisture or pH conditions, floor leveling and repair as required.

1.2 RELATED WORK

A. Section 07 92 00, JOINT SEALANTS.

B. Section 09 65 16, RESILIENT SHEET FLOORING

C. Section 09 65 19, RESILIENT TILE FLOORING

D. Section 09 68 00, CARPETING

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA and TEST DATA.

B. Written approval confirming product compatibility with subfloor material manufacturer and the flooring manufacturer

C. Product Data:

1. Moisture remediation system
2. Underlayment Primer
3. Cementitious Self-Leveling Underlayment
4. Cementitious Trowel-Applied Underlayment (Not suitable for resinous floor finishes)

D. Test Data:

1. Moisture test and pH results performed by a qualified independent testing agency or warranty holding manufacturer’s technical representative.

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 Society for Testing and Materials (ASTM):

D638-*10* *(2010)*	Test Method for Tensile Properties of Plastics
D4259-*88* *(2012)*	Standard Practice for Abrading Concrete to alter the surface profile of the concrete and to remove foreign materials and weak surface laitance.
C109/C109M *-12* *(2012)*	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens) Modified Air Cure Only
D7234-*12* *(2012)*	Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
E96/E96M - 12 ***(2012)***	Standard Test Methods for Water Vapor Transmission of Materials
F710-*11* *(2011)*	Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
F1869-*11* ***(2011)***	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
F2170-*11* ***(2011)***	Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
C348-08 ***(2008)***	Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
C191-13 ***(2013)***	Standard Test Method for Time of Setting of Hydraulic Cement by Vicat Needle

PART 2 - PRODUCTS

2.1 MOISTURE REMEDIATION COATING

A. System Descriptions:

1. High-solids, epoxy system designed to suppress excess moisture in concrete prior to an overlayment. For use under resinous products, VCT, tile and carpet where issues caused by moisture vapor are a concern.

B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up.

C. System Components: Verify specific requirements as systems vary by manufacturer. Verify build up layers and installation method. Verify

compatibility with substrate. Use manufacturer's standard components, compatible with each other and as follows:

1. Liquid applied coating:
   a. Resin: epoxy.
   b. Formulation Description: Multiple component high solids.
   c. Application: Per manufacturer's written installation requirements.
   d. Thickness: minimum 10 mils

D. Material Vapor Permeance: Application shall achieve a permeance rating of less than 0.1 perm in accordance with ASTM E96/E96M.

E. Maximum RH requirement: 100% testing in accordance with ASTM F2170.

Property	Test	Value
Tensile Strength	ASTM D638	4,400 psi
Volatile Organic Compound Limits (V.O.C.)	SCAMD Rule 1113	25 grams per liter
Permeance	ASTM E96	0.1 perms
Tensile Modulus	ASTM D638	$1.9X10^5$ psi
Percent Elongation	ASTM D638	12%
Cure Rate	Per manufacture's Data	4 hours Tack free with 24hr recoat window
Bond Strength	ASTM D7234	100% bond to concrete failure

2.2 CEMENTITIOUS SELF-LEVELING UNDERLAYMENT

A. System Descriptions:
   1. High performance self-leveling underlayment resurfacer. Single component, self-leveling, cementitious material designed for easy application as an underlayment for all types of flooring materials. It is used for substrate repair and leveling.

B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up. Gypsum-based products are unacceptable.

C. System Characteristics:
   1. Wearing Surface: smooth
   2. Thickness: Per architectural drawings, ranging from feathered edge to 1", per application. Applications greater than 1" require additional 3/8" aggregate to mix or as recommended by manufacturer.

D. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.

E. Compressive Strength: Minimum 4100 psi in 28 days in accordance with ASTM C109/C109M.

F. Flexural Strength: Minimum 1000 psi in 28 days in accordance with ASTM C348

G. Dry Time: Underlayment shall receive the application of moisture insensitive tile in 6 hours, floor coverings in 16 hours, and resinous flooring in 3-7 days.

H. Primer: compatible and as recommended by manufacturer for use over intended substrate

I. System Components: Manufacturer's standard components that are compatible with each other and as follows:

1. Primer:
   a. Resin: copolymer
   b. Formulation Description: single component ready to use.
   c. Application Method: Squeegee and medium nap roller. All puddles shall be removed, and material shall be allowed to dry, 1-2 hours at 70F/21C.
   d. Number of Coats: (1) one.
2. Grout Resurfacing Base:
   a. Formulation Description: Single component, cementitious self-leveling high-early and high-ultimate strength grout.
   b. Application Method: colloidal mix pump, cam rake, spike roll.
      1) Thickness of Coats: Per architectural scope, 1” lifts.
      2) Number of Coats: More than one if needed.
   c. Aggregates: for applications greater than 1inch, require additional 3/8” aggregate to mix.

Property	Test	Value
Compressive Strength	ASTM C109/C109M	2,200 psi @ 24 hrs 3,000 psi @ 7 days
Initial set time Final Set time	ASTM C191	30-45 min. 1 to 1.5 hours
Bond Strength	ASTM D7234	100% bond to concrete failure

2.3 CEMENTITIOUS TROWEL-APPLIED UNDERLAYMENT(NOT SUITABLE FOR RESINOUS FLOOR FINISHES)

A. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.

B. Compressive Strength: Minimum 4000 psi in 28 days

C. Trowel-applied underlayment shall not contain silica quartz (sand).

D. Dry Time: Underlayment shall receive the application of floor covering in 15-20 minutes.

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 testing and not less than three days after testing.

B. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation.

C. Do not install materials when the temperatures of the substrate or materials are not within 60-85 degrees F/ 16-30 degrees C.

3.2 SURFACE PREPARATION

A. Existing concrete slabs with existing floor coverings:

1. Conduct visual observation of existing floor covering for adhesion, water damage, alkaline deposits, and other defects.
2. Remove existing floor covering and adhesives. Comply with local, state and federal regulations and the RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to the floor covering being removed.

B. Concrete shall meet the requirements of ASTM F710 and be sound, solid, clean, and free of all oil, grease, dirt, curing compounds, and any substance that might act as a bond-breaker before application. As required prepare slab by mechanical methods. No chemicals or solvents shall be used.

C. General: Prepare and clean substrates according to flooring manufacturer's written instructions for substrate indicated.

D. Prepare concrete substrates per ASTM D4259 as follows:

1. Dry abrasive blasting.
2. Wet abrasive blasting.
3. Vacuum-assisted abrasive blasting.
4. Centrifugal-shot abrasive blasting.
5. Comply with manufacturer's written instructions.

E. Repair damaged and deteriorated concrete according to flooring manufacturer's written recommendations.

F. Verify that concrete substrates are dry.

G. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of per flooring manufactures formal and project specific written recommendation.

H. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity per flooring manufacture’s formal and project specific written recommendation.

I. Provide a written report showing test placement and results.

J. Prepare joints in accordance with Section 07 92 00, JOINT SEALANTS and material manufacturer’s instructions.

K. Alkalinity: Measure surface pH in accordance with procedures provided in ASTM F710 or as outlined by qualified testing agency or flooring manufacturer’s technical representative.

L. Tolerances: Subsurface shall meet the flatness and levelness tolerance specified on drawings or recommended by the floor finish manufacturer. Tolerance shall also not to exceed 1/4” deviation in 10’. As required, install underlayment to achieve required tolerance.

M. Other Subsurface: For all other subsurface conditions, such as wood or metal, contact the floor finish or underlayment manufacturer, as appropriate, for proper preparation practices.

3.3 MOISTURE REMEDIATION COATING:

A. Where results of relative humidity testing (ASTM F2170) exceed the requirements of the specified flooring manufacturer, apply remedial coating as specified to correct excessive moisture condition.

B. Prior to remedial floor coating installation mechanically prepare the concrete surface to provide a concrete surface profile in accordance with ASTM D4259.

C. Mix and apply moisture remediation coating in accordance with manufacturer’s instructions.

3.4 CEMENTITOUS UNDERLAYMENT:

A. Install cementitious self-leveling underlayment as required to correct surface defects, floor flatness or levelness corrections to meet the tolerance requirements as or detailed on drawings, address non-moving cracks or joints, provide a smooth surface for the installation of floor covering, or meet elevation requirements detailed on drawings.

B. Mix and apply in accordance with manufacturer's instructions.

3.5 PROTECTION

A. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, tempered hardwood, or other suitable protection course

3.6 FIELD QUALITY CONTROL

A. Where specified, field sampling of products shall be conducted by a qualified, independent testing facility.

- - - E N D - - -

SECTION 09 06 00
SCHEDULE FOR FINISHES

SECTION 09 06 00-SCHEDULE FOR FINISHES

VAMC: VA Palo Alto Health Care System

Location: 3801 Miranda Avenue, Palo Alto, CA 94304

Project no. and Name: 641-14-123P – Renovate Building 7 for Spinal Cord Injury

Submission: 100% Construction Documents

Date: SEPTEMBER 2016

SECTION 09 06 00
SCHEDULE FOR FINISHES

PART I – GENERAL

1.1 DESCRIPTION

This section contains a coordinated system in which requirements for materials specified in other sections shown are identified by abbreviated material names and finish codes in the room finish schedule or shown for other locations.

1.2 MANUFACTURERS

Manufacturer’s trade names and numbers used herein are only to identify colors, finishes, textures and patterns. Products of other manufacturer’s equivalent to colors, finishes, textures and patterns of manufacturers listed that meet requirements of technical specifications will be acceptable upon approval in writing by contracting officer for finish requirements.

1.3 SUBMITALS

Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES—provide quadruplicate samples for color approval of materials and finishes specified in this section.

1.4 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. MASTER PAINTING INSTITUTE: (MPI)

2001.....Architectural Painting Specification Manual

PART 2- PRODUCTS

2.1 DIGITAL COLOR PHOTOS

A. Size 24 x 35 mm.

B. Labeled for:

1. Building name and Number.

2. Room Name and Number.

2.5 DIVISION 05 – METALS

A. SECTION 05 50 00, METAL FABRICATION

Item	Finish
Modular Channel Units	Galvanized Steel

2.7 DIVISION 07 - THERMAL AND MOISTURE PROTECTION

B. SECTION 07 95 13, EXPANSION JOINT COVER ASSEMBLIES

	Material	Finish	Manufacturer	Mfg. Color Name/No.
Floor Component Cover Plate Frame Casket or Sealant (interior only)	Stainless Steel	Mill Finish	Construction Specialties	
Wall Component Cover Plate Frame Casket or Sealant (interior only)	Stainless Steel	Mill Finish	Construction Specialties	
Ceiling Component Cover Plate, Gasket or Sealant (interior only)	Stainless Steel	Mill Finish	Construction Specialties	

D. SECTION 07 60 00, FLASHING AND SHEET METAL

Item	Material	Finish
	Galvanized	Painted – Match Existing

Copings, Flashing, Counter-flashing	Stainless steel	2B or 2D – Match Existing

E. SECTION 07 71 00 / 07 72 00, ROOF SPECIALITIES AND ACCESSORIES

Item	Material	Finish	Manufacturer	Manufacturer/Color Name/Number.
Equipment Support	Galv. Steel	Paint	n/a	Match Color of Existing Supports

F. SECTION 07 92 00, JOINT SEALANTS

Color	Manufacturer	Manufacturer Color
Match Adjacent Paint Color	Tremco	Submit for Architects Selection

2.8 DIVISION 08 - OPENINGS

A. SECTION 08 11 13, HOLLOW METAL DOORS AND FRAMES

Paint both sides of door and frames same color including ferrous metal louvers, and hardware attached to door	
Component	Color of Paint Type and Gloss
Door	P-1/GL5
Frame	P-1/GL5
Window frame	P-1/GL5

B. SECTION 08 14 00, WOOD DOORS

Component	Finish/Color
Doors – Except as noted below	Wood Veneer to Match Existing Facility Standard/ Maple Qtr Unfigured

C. SECTION 08 31 13, ACCESS DOORS AND FRAMES

Material	Finish/Color
Steel	Paint to Match Ceiling
Stainless steel	Mill Finish

E. SECTION 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

Material	Finish	Manufacturer	Manufacturer Color Name/No.
Aluminum	Powder Coated Finish	Horton	Kelly Moore/Pristine Linen OW-228
Glass		Horton	Clear Tempered

F. SECTION 08 51 23, STEEL WINDOW

Component	Finish	Manufacturer	Mfg. Color Name/No.
Window	Paint	CECO, Curries	Match Door Frame

H. SECTION 08 71 00, BUILDERS HARDWARE

Item	Material	Finish
Hinges		Match Existing Facility Standard
Door Closers		Match Existing Facility Standard
Floor Closers		Match Existing Facility Standard
Floor Pivot Sets		Match Existing Facility Standard

Closer/ Holder		Match Existing Facility Standard
Floor Stops		Match Existing Facility Standard
Door Holders		Match Existing Facility Standard
Lock/ Latches		Match Existing Facility Standard
Key Cabinet	Steel	Match Existing Facility Standard
Armor Plates	Vinyl Sheet	Construction Specialties- Oyster Grey/929
Kick Mop Plates	Vinyl Sheet	Construction Specialties- Oyster Grey/929
Door Edging		Match Existing Facility Standard
Exit Device		Match Existing Facility Standard
Flush Bolts		Match Existing Facility Standard
Door Pulls		Match Existing Facility Standard
Push Plates		Match Existing Facility Standard
Combination Push Pull Plate		Match Existing Facility Standard
Coordinators		Match Existing Facility Standard
Light Proof Seals		Match Existing Facility Standard
Weather Strip		Match Existing Facility Standard
Threshold		Match Existing Facility Standard

I. SECTION 08 80 00, GLAZING

Glazing Type	Manufacturer	Mfg. Color Name/No.
G-1	Oldcastle Building Envelope	Clear Tempered
G-4		Mirror
G-5	Technical Glass Products (TGP)	Fire-Lite Plus

2.9 DIVISION 09 - FINISHES

A. SECTION 09 30 13, CERAMIC AND GLASS TILING

1. SECTION 09 30 13, CERAMIC AND GLASS TILING

Finish code	Manufacturer	Mfg. Color Name/No
CT-1	DalTile	Biscuit/K775
CT-2	DalTile	Warm Field/ SK56

2. SECTION 09 30 13, PORCELAIN PAVER TILE (PPT)

Finish Code	Size	Shape	Pattern	Manufacturer	Mfg. Color Name/No.
PT-1	12″x12″	Square	Bluestone	Crossville	Colorado Bluff UPS/AV201
PT-2	12″x12″	Square	Bluestone	Crossville	Arizona Brown UPS/AV202

3. SECTION 09 30 13, PORCELAIN PAVER TILE GROUT

Finish Code	Manufacturer	Mfg. Color Name/No.
	Laticrete	Spectralock – Submit options to Architect for Review

4. SECTION 09 30 13, METAL DIVIDER STRIPS

Size	Material	Manufacturer
As needed	Satin Anodized Aluminum	Schluter

B. SECTION 09 51 00, ACOUSTICAL CEILINGS

Finish Code	Component	Size	Manufacturer	Mfg Name/No.
	Exposed Suspension System	15/16″ Exposed Tee System	Armstrong	Clean Room/Steel/White
	Exposed Suspension System	15/16″ Exposed Tee System	Armstrong	Prelude/Steel/White
AT-1	Ceiling Tile	24x24, 24x48	Armstrong	Optima/ 3150PB & 3151PB
AT-2	Ceiling Tile	24x24, 24x48	Armstrong	Optima Healthzone/3114 & 3115

C. SECTION 09 65 19, RESILIENT TILE FLOORING

Finish Code	Size	Material/Component	Manufacturer	Mfg Name/No.
LVT-1	6″x36″	Luxury Vinyl Tile	Centiva	CP-3306-C Canadian Maple
LVT-2	6″x36″	Luxury Vinyl Tile	Centiva	CAN-0351-RG Pacific Boathouse
RF-1	24″x24″	Rubber Tile	Nora	2950 Agave
RF-2	24″x24″	Rubber Tile	Nora	2949 Sage
RF-3	24″x24″	Rubber Tile	Nora	2953 Agave
RF-4	24″x24″	Rubber Tile	Nora	2948 Veiled Dusk
VCT-1	12″x12″	Vinyl Composition Tile	Armstrong	T3155 Quartz White

D. SECTION 09 65 16, RESILIENT SHEET FLOORING (VSF)

Finish Code	Pattern name	Manufacturer	Mfg. Color Name/No.
RSF-1	Realities	Mannington	Maple/5621

LN-1	LINOLEUM	FLOORING GROUP	MOCHA/FGAL0745

1. SECTION 09 65 16, WELDING RODS (WSF)

Finish code	Manufacturer	Mfg. Color Name/No.
n/a	Mannington	Submit Options for Architectural Review and Selection
n/a	Nora	Submit Options for Architectural Review and Selection

2. SECTION 09 65 16, CAP STRIPS (WSF)

Finish Code	Manufacturer	Mfg. Color Name/No.
n/a	Nora	Brushed Aluminum

E. SECTION 09 65 13, RESILIENT BASE

Finish Code	Item	Height	Manufacturer	Mfg Name/No.
	Rubber Base (RB)			
RB-1	Rubber Base	6″	Johnsonite	Silk/129
RB-2	Rubber Base	6″	Johnsonite	Desert Camel/19
RB-3	Rubber Base	6″	Johnsonite	Grizzly/281
RB-4	Rubber Base	6″	Johnsonite	Wetlands/150
RB-5	Rubber Base	6″	Johnsonite	Moon Rock/29
RB-6	Rubber Base	6″	Johnsonite	Jade/289

F. SECTION 09 68 00, CARPET MODULES (CFT)

Finish Code	Size	Pattern direction	Manufacturer	Mfg. Color Name/No.
CP-1		Core	Shaw Contract Group	Balsa/5A178
CPT-1	1	Cool Rain Modular	Patcraft	Luscious/00731/I0283

G. SECTION 09 96 59, HIGH-BUILD GLASED COATING (SC)

Finish code	Manufacturer	Mfg. Color Name/No.
P-1	Kelly Moore	Pristine Linen

H. SECTION 09 91 00, PAINT AND COATINGS

1. MPI Gloss and Sheen Standards

		Gloss @60	Sheen @85
Gloss Level 1	a traditional matte finish-flat	max 5 units, and	max 10 units
Gloss Level 2	a high side sheen flat-“a velvet-like” finish	max 10 units, and	10-35 units
Gloss Level 3	a traditional “egg-shell like” finish	10-25 units, and	10-35 units
Gloss Level 4	a “satin-like” finish	20-35 units, and	min. 35 units
Gloss Level 5	a traditional semi-gloss	35-70 units	
Gloss Level 6	a traditional gloss	70-85 units	
Gloss level 7	a high gloss	more than 85 units	

2. Paint code	Gloss	Manufacturer	Mfg. Color Name/No.
P-1	4,6,2	Kelly Moore	Pristine Linen/ow228-1
P-2	4	Kelly Moore	Taravel/ow236-1
P-4	4	Kelly Moore	Lily White/kmw6-1
P-5	4	Kelly Moore	Golden Fleece/km5236-1

P-6	4	Kelly Moore	Daddy-O/hls4260-3
P-7	4	Kelly Moore	Medicine Wheel/km4803-3
p-8	4	Kelly Moore	Cavern Moss/km4825-2
P-9	4	Kelly Moore	Steamboat Geyser/km4745-1
P-10	4	Kelly Moore	Pearly White/kmw44-1
P-11	4	Kelly Moore	Zincluster/kma70-5
P-12	4	Kelly Moore	Blue Mountain/km5014-2
3. Stain Code (S)	Gloss and Transparency	Manufacturer	Mfg. Color Name/No.
	Semi		
S			
S	Opaque		
S			
4. Clear coatings Code(CC)	Gloss	Manufacturer	Mfg. Color Name/No.
CC			

I. SECTION 09 72 16, VINYL COATED FABRIC WALLCOVERING (W)

~~Finish Code~~	~~Manufacturer~~	~~Mfg. Color Name/No.~~
~~W-1~~	~~Carnegie~~	~~STRIE/6423-805~~
~~W-2~~	~~Carnegie~~	~~STRIE/6423-819~~

2.10 DIVISION 10 - SPECIALTIES

A. SECTION 10 11 13 / 10 11 23, CHALKBOARDS / TACKBOARDS

Component	Material	Manufacturer	Mfg. Color Name/No.
Frame	Aluminum	Peter Pepper Products	Satin Anondized Aluminum

Panel	Porcelain Enamel/Steel Sheet	Peter Pepper Products	LCS Liquid Chalk Writing Surface White
Tackable Fabric	Fabric	Peter Pepper Products	Sprite Style 2671: 040 Snow

B. SECTION 10 21 13, TOILET COMPARTMENTS

Component	Manufacturer	Mfg. Color Name/No.
Panels (Women's)	American Specialties – Accurate	Gray Mist/3450C
Panels (Men's)	American Specialties – Accurate	Hazelnut /4450C

C. SECTION 10 21 23, HOSPITAL CUBILCE CURTAINS

Finish Code	Manufacturer	Mfg. Color Name/No.
	TRI KES	Wheatland/TWL-02 Dusk

E. SECTION 10 26 00, WALL GUARDS AND CORNER GUARDS

Item	Material	Manufacturer	Mfg. Color Name/No.
Corner Guards	Vinyl	Construction Specialties	FS-20N - White/949
Wall Guard	Vinyl Sheet	Construction Specialties	SR-50N White/949
Wall Sheet Protection	Vinyl Sheet	Construction Specialties	4000 - White/949

G. SECTION 10 13 00 / 10 14 00, INTERIOR SIGNS

Sign Type	Component	Manufacturer	Mfg. Color Name/No.
Awaiting Direction from VAPAHCS on New Signage			

Standard			

H. SECTION 10 44 13, FIRE EXTNGUISHER CABINETS

Component	Material	Finish
Fire Extinguisher Cabinet	Powder Coated Steel	White

I. SECTION 10 28 00, TOILET AND BATH ACCESSORIES

Item	Material	Manufacturer	Mfg. Color Name/No.
Grab Bar	Stainless Steel	Bobrick	Brushed Stainless Steel
Shower Curtain Rod	Stainless Steel	Bobrick	Chrome Finish
Towel Bar	Stainless Steel	Bobrick	Chrome Finish
Mop Rack	Stainless Steel	Bobrick	Brushed Stainless Steel
Robe Hook	Stainless Steel	Bobrick	Chrome Finish
Metal Framed Mirror	Stainless Steel	Bobrick	Chrome Finish

J. SECTION 10 25 13, PATIENT BED SERVICE WALLS

Component	Material	Finish	Manufacturer	Mfg. Color/Name
Cabinet Frame	Extruded Aluminum	Powder Coated Paint	Amico	White
Face Panel	Plastic Laminate	n/a	Wilsonart	White to Match Cabinet Frame

2.12 DIVISION 12- FURNISHINGS

B. SECTION 12 32 00, WOOD CASEWORK

Item Type	Location	Finish/Color
Casework	Vertical Surfaces – Laminate at Nurse’s Station	Formica – Natural Cane 6930-NT

	Backlit Acrylic Panel – Observation Desk	
High Pressure Decorative Laminate	Vertical Surfaces – Laminate at Apartment	Wilsonart – Coffee Bean/ D495K-18
High Pressure Decorative Laminate	Vertical Surfaces – Laminate at Staff Lounge	Wilsonart – Tan Echo/ 7941K-18

C. SECTION 12 36 00, COUNTERTOPS AND ACCESSORIES

Type	Finish/Color
Quartz Surface Material	Cambria - Torquay
Quartz Surface Material	Cambria - Templeton
Quartz Surface Material	Cambria - Berwyn
Solid Surface Material	LG Hausys – T001/Venus
Solid Surface Material	LG Hausys – S28/Alpine White

D. SECTION 12 22 16, DRAPERY HARDWARE

Material	Finish
Aluminum	Powder Coated White Finish

E. SECTION 12 24 00, WINDOW SHADES

Component	Material	Manufacturer	Mfg. Color Name/No.
Shade Cloth	Ecoveil	MechoShade	Ecoveil 5% Open – Silver Birch
Support Hardware	Equinox Blackout	MechoShade	Winter/0118

2.15 DIVISION 22 - PLUMBING

A. SECTION 22 40 00, PLUMBING FIXTURES AND TRIM

Item	Color

Water Closet	Porcelain White
Urinal	Porcelain White
Lavatories	Porcelain White
Corner Service Sink	White Terrazzo with Gray and Off-white Marble Chips
Clinic Service Sink	Porcelain White

2.16 DIVISON 26 - ELECTRICAL

A. SECTION 26 27 26, WIRING DEVICES

Item	Color
Switches	White
Non-emergency Power Receptacles	White
Data and Telephone Outlets	White
Faceplates	White
Emergency Power Receptacles and Faceplates	Red

PART III EXECUTION

3.1 FINISH SCHEDULES & MISCELLANEOUS ABBREVIATIONS

FINISH SCHEDULE & MISCELLANEOUS ABBREVIATIONS	
Term	Abbreviation
Access Flooring	AF
Accordion Folding Partition	AFP
Acoustical Ceiling	AT
Acoustical Ceiling, Special Faced	AT (SP)
Acoustical Metal Pan	AMP
Ceiling	
Acoustical Wall Panel	AWP
Acoustical Wall Treatment	AWT
Acoustical Wallcovering	AWF
Anodized Aluminum Colored	AAC
Anodized Aluminum Natural Finish	AA
Baked On Enamel	BE
Brick Face	BR
Brick Flooring	BF

Brick Paving	BP
Carpet	CP
Carpet Athletic Flooring	CAF
Carpet Module Tile	CPT
Ceramic Glazed Facing Brick	CGFB
Ceramic Mosaic Tile	FTCT
Concrete	C
Concrete Masonry Unit	CMU
Divider Strips Marble	DS MB
Epoxy Coating	EC
Epoxy Resin Flooring	ERF
Existing	E
Exposed Divider Strips	EXP
Exterior	EXT
Exterior Finish System	EFS
Exterior Paint	EXT-P
Exterior Stain	EXT-ST
Fabric Wallcovering	WF
Facing Tile	SCT
Feature Strips	FS
Floor Mats & Frames	FM
Floor Tile, Mosaic	FT
Fluorocarbon	FC
Folding Panel Partition	FP
Foot Grille	FG
Glass Masonry Unit	GUMU
Glazed Face CMU	GCMU
Glazed Structural Facing Tile	SFTU
Granite	GT
Gypsum Wallboard	GWB
High Glazed Coating	SC
Latex Mastic Flooring	LM
Linear Metal Ceiling	LMC
Linear Wood Ceiling	LWC
Marble	MB
Material	MAT

Mortar	M
Multi-Color Coating	MC
Natural Finish	NF
Paint	P
Paver Tile	PVT
Perforated Metal Facing (Tile or Panels)	PMF
Plaster	PL
Plaster High Strength	HSPL
Plaster Keene Cement	KC
Plastic Laminate	HPDL
Polypropylene Fabric Wallcovering	PFW
Porcelain Paver Tile	PPT
Quarry Tile	QT
Radiant Ceiling Panel System	RCP
Resilient Stair Tread	RST
Rubber Base	RB
Rubber Tile Flooring	RT
Spandrel Glass	SLG
Stain	ST
Stone Flooring	SF
Structural Clay	SC
Suspension Decorative Grids Grids	SDG
Terrazzo Portland Cement	PCT
Terrazzo Tile	TT
Terrazzo, Thin Set	
Textured Gypsum Ceiling Panel	TGC
Textured Metal Ceiling Panel	TMC
Thin set Terrazzo	TST
Veneer Plaster	VP
Vinyl Base	VB
Vinyl Coated Fabric Wallcovering	W

Vinyl Composition Tile	VCT
Vinyl Sheet Flooring	VSF
Vinyl Sheet Flooring (Welded Seams)	WSF

Wall Border	WB
Wood	WD

3.2 FINSIH SCHEDULE SYMBOLS

Symbol	Definition
**	Same finish as adjoining walls
-	No color required
E	Existing
XX	To match existing
EFTR	Existing finish to remain
RM	Remove

3.3 ROOM FINISH SCHEDULE

A. Match adjoining or existing similar surfaces colors, textures or patterns where disturbed or damaged by alterations or new work when not scheduled.

B. ROOM FINISH SCHEDULE – As Shown on Drawings

--- E N D---

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 DESCRIPTION

The work includes, but is not necessarily limited to, the furnishing and installing of metal studs and furring channel-framing of vertical and horizontal surfaces, as indicated on the drawings and specified herein.

1.2 RELATED WORK

A. METAL FABRICATIONS: SECTION 05 50 00

B. THERMAL INSULATION: SECTION 07 21 13

C. FIRESTOPPING: SECTION 07 84 00

D. JOINT SEALANTS: SECTION 07 90 00

E. HOLLOW METAL DOORS AND FRAMES: SECTION 08 11 13

F. GYPSUM WALLBOARD: SECTION 09 29 00

G. ACOUSTICAL CEILINGS: SECTION 09 51 00

1.3 TERMINOLOGY

A. Description of terms shall be in accordance with ASTM C754, ASTM C11, ASTM C841 and as specified.

1.4 QUALITY ASSURANCE

A. Allowable Tolerances:

1. Wall and Partitions: Limit tolerances for bow and alignment to 1/8-inch in 10-feet at both vertical and horizontal directions. Not to exceed a maximum of L/240 of span.
2. Suspended Ceilings:
   a. Deflection: Not to exceed a maximum of L/360 of span.
   b. Level: Finished suspended ceilings shall not deviate from level in excess of 1/8-inch in 12-feet.
   c. Ceiling shall be designed and detailed to comply with lateral design requirements of 2013 California Building Code, ASCE 7-10, AISI S100-07/S2-10 and ASTM C754-11.
   d. Seismic Requirements: Comply with State and local code requirements for seismic bracing of ceiling suspension system, including Uniform Building Code Standard No. 25-2.

B. Testing:

1. Testing Laboratory: Refer to Specifications SECTION 05 5000, METAL FABRICATIONS, Paragraph 1.05 for General requirements.

a. The Testing Laboratory will perform the following tests for drilled-in anchors:
b. 10-percent of all vertical ceiling wire anchors.
c. 50-percent of all seismic bracing anchors.

2. Vertical Test Loads:
a. 200-pounds in tension for hanger wire anchors.
b. 440-pounds in tension for seismic bracing wire anchors.

3. Load tests shall be performed at the Project site and in the presence of the Project Inspector.
4. If any anchors fail the tension testing requirements, the enforcement agency shall determine the additional testing requirements.

C. Comply with fire-resistance rating as indicated and as required by governing authorities and codes.

D. Reference Standards: Published specifications, standards, tests, or recommended methods of trade, industry, or government organizations apply to Work of this Section where cited by abbreviations noted below.
1. Federal Specifications (FS).
2. Steel Stud Manufacturer’s Association (SSMA) Product Technical Catalog.
3. American Society for Testing and Materials (ASTM).
4. American Welding Society (AWS).
5. International Code Council (ICC) evaluation report “Acceptance Criteria for Steel Studs and Joists” and ICC ER 4943P.
6. American Iron and Steel Institute (A.I.S.I.).

E. Steel stud Specifications shall comply with Section CBC Chapters 22 and 22A, Divisions VII and VIII.

F. Each stud shall have a label or stamp, at maximum 48-inch on center, indicating the manufacturer's name, logo or initials, ICC Evaluation Service, Inc. evaluation report number, material thickness and yield strength.

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES and Section 01 81 11 SUSTAINABLE DESIGN REQUIREMENTS.

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.

6. Pre-Engineered Header and Sill System

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 shaft wall assembly
4. Typical fire rated assembly and column fireproofing showing details of construction same as that used in fire rating test.
5. All header and sill conditions framed with Pre-engineered Header and Sill System.

D. Calculations:
1. Provide calculations prepared, signed and stamped by a California registered structural engineer for a pre-engineered header and sill system of all proposed conditions utilizing this system.

1.6 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE

A. In accordance with the requirements of ASTM C754.

B. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

C. Store materials indoors in a dry area, off the floor, protected from weather, direct sunlight, surface contamination, corrosion, and construction traffic and stacked flat to prevent sagging. Do not overload floor system.

D. Remove items delivered in broken, damaged, rusted, or unlabeled condition from Project Site immediately.

E. Additionally store and handle materials in accordance with the “Code of Standard Practice for Cold-Formed Steel Structural Framing,” as published by the AISI.

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)

A641-09.....Zinc-Coated (Galvanized) Carbon Steel Wire

A653/653M-11.....Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.

C11-10.....Terminology Relating to Gypsum and Related Building Materials and Systems

C635-13.....Manufacture, Performance, and Testing of Metal Suspension System for Acoustical Tile and Lay-in Panel Ceilings

C636-08.....Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels

C645-13.....Non-Structural Steel Framing Members

C754-11.....Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products

C841-03(2013).....Installation of Interior Lathing and Furring

C954-11.....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

E580-14.....Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint.

1.8 JOB CONDITIONS

A. Work which will be concealed by suspended ceilings shall be complete, tested if required, and inspected and approved prior to commencement of installation of materials specified herein.

B. Examine supporting structure and conditions under which metal support system will be installed. Notify the Architect in writing, of any conditions detrimental to the proper and timely completion of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall be supplied by one (1) manufacturer unless otherwise noted.

B. The design standard of quality for materials is based on products supplied by Dietrich Metal Framing, FireTrak Corp., U.S. Gypsum Co., and The Steel Network, Inc. Materials provided should match or exceed in performance the physical and structural properties of the design standard and shall comply with the requirements of ICC ER 4943P.

C. Metal Supports shall meet the yield strengths as described below:

1. 18-gauge and lighter: 33ksi yield strength
2. 16-gauge and heavier: 50ksi yield strength

D. Metal Supports to contain a minimum of 25-percent recycled content.

E. Floor Tracks:

1. Cold-formed galvanized steel.

2. 16-gauge minimum or be heavier than stud used.
3. Unpunched, deep leg track, 1 1/2-inch leg minimum.

F. Head of Wall Track Assemblies:
1. General:
a. Cold-formed galvanized steel.
b. 16-gauge minimum or be heavier than stud used.
2. Slotted Tracks: 2 1/2-inch deep slotted flange ceiling track with 4 1/4-inch long horizontal web slots spaced at 4-inches on center, staggered.
3. Deep Leg Tracks: 3-inch leg minimum.
4. Slip Assembly: Clip and track assembly accommodating vertical deflection and lateral drift.

G. Curved Partition tracks:
1. 20 gauge minimum.
2. Location: Curved soffits & partitions.

H. Header and Sill Assemblies:
1. Option 1: Pre-engineered one or two piece steel header or sill assembly. 16-gauge minimum.
a. Contractor to provide all calculations for selected pre-engineered system.
2. Option 2: Built-up system composed of light gauge framing materials as shown on the Drawings.
3. Curved Conditions: Pre-engineered steel headers and sill assemblies and metal stud curves shall be provided by professionally stretch-forming process to achieve curves as shown on drawings. Cutting of assembly to form curve is prohibited.

I. Shaft Wall Ceiling Deflection Track: Cold-formed galvanized steel. 20 gauge minimum.

J. Shaft Wall Tracks: Cold-formed galvanized steel, J runners. 20-gauge minimum and as shown on Drawings.

K. Metal Studs: Minimum 1 3/8-inch wide flange.
1. Cold-formed galvanized steel.
2. Thickness: 16-gauge minimum, and as shown, non-bearing, with punched webs except where used for built-up header or sills.
3. Size: As shown and/or specified herein.

L. Wide Flange Studs: Minimum 1 5/8-inch wide flange.
1. Cold-formed galvanized steel.
2. Thickness: 16-gauge minimum, with punched webs except where used for built-up header or sills.

3. Size: 4-inch wide and as shown.

M. Jamb Studs: Cold-formed galvanized steel, 16 gauge minimum with a minimum flange width of 3-inches with integral flange returns. Sizes as shown on Drawings or as required.

N. Shaft Wall Stud: Cold-formed galvanized steel, 20 gauge minimum. Size as shown on Drawings or as required.

O. Horizontal Stiffeners: 16-gauge steel, 3/4-inch, cold-formed galvanized steel channels.

P. Furring Channels: 16-gauge steel, 1 1/2-inch, cold-formed steel U-shaped channels.

Q. Metal Furring Channels: Cold-formed 25-gauge galvanized steel, hat-shaped channels, 2 5/8-inch wide and 7/8-inch deep with 1/2-inch flange.

R. "Z" Furring Channels: 20-gauge hot dip galvanized steel and as shown.

S. Backing Plates: Steel sheet, plate, and studs of gauge or thickness as required or scheduled, galvanized or painted with rust inhibitive primer.

T. Clips:

1. 16-gauge steel, of sizes and shapes shown.
2. Ceiling Clips for Seismic Bracing: 12-gauge steel of sizes and shapes shown.
3. Ceiling Clip Assemblies for Hanger Wires: 12-gauge steel of sizes and shapes shown.

U. Fasteners: To suit stud, track or channel gauge, unless otherwise noted on the Drawings.

1. Sheet Metal Screws:
   a. #6-20 X 3/8-inch Type S pan head for fastening 25-gauge material.
   b. #10-16 X 1/2-inch Phillips Pan Head for connecting 20-gauge to 20-gauge metal.
   c. #10-16 X 5/8-inch Phillips Pan Head for connecting 16-gauge to 16-gauge metal.
   d. 1/2-inch Type A-12 pan head fastening 25-gauge material to door frame clips.
   e. 1/2-inch Type S-16 pan head mechanical zinc or polymer plated, for fastening wide flange studs to door frame clips, and similar 16-gauge materials.
2. Powder Driven Anchors for Floor and Ceiling Tracks: 0.157 -inch diameter pins.
3. Drill-in Expansion Anchors for Floor and Ceiling Tracks: 3/8-inch diameter with 2-inch concrete penetration.

4. Expansion Anchors: As specified in SECTION 05 5000, METAL FABRICATIONS.
5. Concrete Nails: Case hardened stub nails 3/4-inch long.

V. Wire: Conform with ASTM 641 (Class 1 Coating) with 70 KSI minimum tensile strength.
1. 16-gauge soft annealed galvanized steel tie wire.
2. 12-gauge soft annealed galvanized steel hanger wire.
3. 8-gauge soft annealed galvanized steel hanger wire.

W. Welding Electrodes: AWS low hydrogen type, as required.

X. Miscellaneous Accessories: Manufacturer's standard, suitable for the use intended.

2.2 PROTECTIVE COATING

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.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install Work in accordance with the applicable requirements of SSMA and AWS.

B. Framing and furring Work shall be plumb, straight, true and rigid. Fire rated partitions shall conform to requirements of regulatory agencies for minimum fire resistance rating indicated.

C. Stud sizes and spacing as shown on the Drawings are minimum requirements. In no case shall stud sizes be less or stud spacing be increased even if proven adequate by calculations.

D. Splicing of framing members is prohibited unless span exceeds available material, noted on the Drawings, or specified herein.

E. Exterior Wall: In accordance with Specifications, Paragraph 3.1.D. of this Section, except as follows:
1. Use 6-inch, 16-gauge wide flange steel studs for all exterior walls, except as otherwise shown on Drawings.
2. Frame top and floor tracks, as shown.
3. See Structural Drawings for additional requirements.

F. Interior Partition and Furring Framing:
1. Use gauges and stud types as follows:
a. Use 16-gauge minimum pre-engineered header and sill assemblies at the head and sill of all partition openings, and as shown on the Drawings.

b. Use 16-gauge minimum jamb studs at jambs of door and window frames, and as shown on the Drawings.
c. Use 16-gauge wide flange studs at all partitions supporting casework, backing plates, electrical panels, fire-extinguisher cabinets and as shown.
d. Use 16-gauge metal studs for all other interior partitions, except as otherwise shown on Drawings or specified herein.
e. Weld all double studs together with 1/16-inch, 1-1/2 inches long fillet weld at 16-inches on center, unless otherwise noted.
f. Use slotted ceiling track assemblies at all partitions, furring and as shown.

2. Partitions Height: Frame all partitions full height, from concrete slab floor to underside of concrete slab above, unless otherwise shown.
3. Partition Bridging: Bridging as shown on Drawings.
4. Furring Bracing: Brace furring framing as shown on Drawings.
5. Fasten ceiling and floor tracks to concrete as shown on Drawings. Secure vertical studs in floor tracks with sheet metal screws to suit stud gauge. Provide welded, bolted or screwed connections as shown or required. Align floor and ceiling tracks.
6. Frame around all duct penetrations and other obstructions as shown in the Drawings and specified herein.
7. Deflection Relief:
   a. Install slotted ceiling track assembly as shown on Drawings.
   b. Cut vertical studs short, do not abut vertical studs to slotted ceiling track assembly.
   c. Secure vertical studs to slotted ceiling track with fasteners at center of slot.
8. Do not abut end studs to concrete wall.
9. Provide backing plates as scheduled and detailed of length to fasten each end to metal framing. Provide backing plate support for each point of fastening of any item to be anchored to partition.

G. Interior Gypsum Wallboard Ceiling and Soffit Framing:
1. Install as shown on Drawings and as specified.
2. Space furring channels (main runners) at 4-foot on center maximum, unless otherwise shown. Saddle-tie to hanger wire with two (2) loops secured with no less than four (3) turns in 3-inch maximum.
   a. Locate one (1) furring channel within 6-inch of parallel partition where metal furring is not continuous through partition.

b. Ceiling grid members shall be attached to two (2) adjacent walls. Main runners and furring channel shall be at least 1 inch clear of other wall and furring shall be at least 3/4-inch clear of other wall. If walls run diagonal to the ceiling grid system runners, one end
Of main runner and furring should be free with standard clearances.
c. The width of the perimeter supporting closure angle shall be not less than two (2) inches.
d. Locate additional furring channels around all edges at openings more than 3-foot 6-inch in any direction.
e. Support furring channel with hanger wire within 6-inch or at 1/4 length of end span maximum from end of channel whichever is less.
f. Splice furring channels by lapping and interlocking flanges 12-inch minimum. Provide (2) #8 S.M.S. at each end of overlap, (4) total.

3. Space metal furring (hat-shaped channels) at 2-foot centers maximum, unless otherwise noted. Saddle-tie with 16-gauge tie wire to furring channels with two (2) loops of tie wire and with no less than four (4) turns.
   a. Splice metal furring by lapping and interlocking 12-inches minimum. Provide (2) #8 S.M.S. at each end of overlap, (4) total.
   b. Space saddle-ties at each intersection of furring channel and main runner.
4. Hanger Wires:
   a. Provide 8-gauge hanger wires. Space hanger wires at 4-foot centers maximum.
   b. Splices will not be permitted in any hanger and/or bracing wires.
   c. Maintain 6-inch minimum clearance between all wires and unbraced ducts, pipes and conduit, etc., unless otherwise shown.
   d. Provide trapeze or other supplementary support members at obstructions to maintain hanger spacing. Provide additional hangers or braces as required at all ceiling breaks, soffits or discontinuous areas. Hanger wires shall not be attached to or bend around interfering material or equipment.
   e. Provide counterbrace wires where hanger wires are more than one horizontal in six vertical out of plumb.
   f. Attach hanger wire to main runner channels with wrap-around loop. Make four (3) tight turns minimum within 3-inch maximum at

connections.

g. Attach wires to structure per details as shown on Drawings.

h. Bracing wires shall be completely taut to resist movement and shaking of partitions and door jambs.

i. Hanger wire loops shall be tightly wrapped and sharply bent to prevent any vertical movement or rotation of the member within the loops.

j. Hanger or bracing wire anchored to the structure should be installed in such a manner that the direction of the anchor aligns as closely as possible with the direction of the wire.

5. Frame vertical ceiling sections as shown and as required to complete the Work.

6. Provide diagonal bracing at soffit support regardless of whether or not these braces are shown on Drawings. Diagonal bracing shall be as shown on the Drawings.

7. Seismic Bracing Assemblies:

a. General: Seismic bracing assemblies consist of a compression strut and four (4) 12-gauge splayed bracing wires, splayed at 45-degrees maximum from horizontal vertically and spaced at 90-degrees to each other horizontally, unless otherwise noted or specified herein.

1) Attach wires to main runner within 2-inches of compression strut and furring channel. Make four (4) tight turns minimum within 1 1/2-inch maximum distance at connections.

2) Attach wires to structure per details as shown on Drawings.

3) Provide one compression strut at each convergent point of the 4-ways brace wires as detailed on Drawings and as required by code.

b. Seismic Bracing Assemblies Restraints Spacing:

1) Maximum Tributary Area: 96 square feet.

2) Maximum Spacing: 8 feet x 12 feet.

3) Maximum Distance from Walls and Vertical Ceiling Offsets: 4 feet.

c. Suspended ceiling systems with a ceiling area of 144 square feet or less and fire rated suspended ceiling systems with a ceiling area of 96 square feet or less, surrounded by walls which connect directly to the structure above, do not require seismic bracing assemblies when attached to two adjacent walls.

d. All recessed or drop-in light fixtures and ceiling mounted

mechanical air terminals and services, shall be supported directly by main runners or by supplemental framing which is supported by main runners and positively attached with screws or other approved connectors.

e. Surface mounted fixtures shall be attached to a main runner with a positive clamping device made of material with a minimum of 14 gauge. Rotational spring clamps do not comply.

f. All Fixtures weighing less than or equal to 10 pounds shall have one #12 gauge safety wire connected from the fixture housing to the structure above. It is not necessary for these safety wires to be taut.

g. All fixtures weighing greater than 10 lb but less than or equal to 56 lb. Shall have (2) # 12 gauge safety wire connected from fixture housing to structure above. It is not necessary for these safety wires to be taut.

h. All fixtures weighing greater than 56 lb. Shall be supported directly from structure above by approved hangers.

i. Pendent-hung fixtures shall be supported directly from the structure above using no less than # 9 gauge wire or an approved alternate support. The ceiling suspension system shall not provide any direct support.

j. All recessed or drop-in fixtures shall be supported directly from fixture housing to the structure above with a minimum of (2) # 12 gauge wires located at diagonally opposite corners. Leveling or positioning of fixtures may be provided by ceiling grid. Fixture support wires may be slightly loose to allow the fixture to seat in the grid system. Fixtures shall not be supported from main runners or furring channels if the weight of the fixures causes total dead load to exceed the deflection capability of the ceiling suspension system.

H. Install accessories and miscellaneous specialties to plumb, true and level lines, including other materials furnished and located as part of the Work of other SECTIONS.

I. Provide welded, bolted or screwed connections as shown or required.

J. GYPSUM BOARD INSTALLATION SHALL COMPLY WITH ASTM C840-11:

1. Gypsum board shall consist of single-ply 1/2-inch or 5/8-inch thick in accordance with ASTM C11-10a.

2. Gypsum board shall be installed perpendicular to furring with screws at 1’-2” on center maximum, in accordance with ASTM C840-

11.

3. Gypsum board shall be attached to furring/framing with ASTM C1002-07 type s (ASTM A568-11b Grades 1018 to 1022) screws (not less than, #6, with major diameter not less than 0.136 in).

3.2 CLEANING

A. Clean metal support systems of dirt, grease, or adhering foreign materials prior to installation of materials to be installed therein.

- - - E N D - - -

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 DESCRIPTION

The Work includes, but is not necessarily limited to, the furnishing and installing of gypsum board, as indicated on the Drawings and specified herein.

1.2 RELATED WORK

A. Section 07 21 13, THERMAL INSULATION.
B. Section 07 84 00, FIRESTOPPING
C. Section 07 92 00, JOINT SEALANTS
D. Section 08 10 00, HOLLOW METAL DOORS AND FRAMES
E. Section 09 22 16, NON-STRUCTURAL METAL FRAMING.
F. Section 09 30 13, CERAMIC/PORCELAIN TILING
G. Section 09 90 00, PAINTING
H. Section 10 26 00, WALL AND DOOR PROTECTION
I. Section 13 49 00, RADIATION PROTECTION.
J. Section 09 51 00, ACOUSTICAL CEILING.
K. Division 23, MECHANICAL

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.
C. Shop Drawings:

1. Typical gypsum board installation, showing corner details, edge trim details and the like.
2. Typical sound rated assembly, showing treatment at perimeter of partitions and penetrations at gypsum board.
3. Typical shaft wall assembly.
4. 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. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.6 ENVIRONMENTAL CONDITIONS

A. In accordance with the requirements of ASTM C840.
1. Temperature: Maintain minimum 50 degrees F for 48 hours before application and finishing of gypsum wallboard. Maintain temperature continuously until dry. Do not exceed 95 degrees F when using temporary heat sources.
2. Ventilation:
a. Provide ventilation during and following joint treatment applications.
b. Use temporary air circulators in enclosed areas lacking natural ventilation.
c. Under slow drying conditions, allow additional drying time between coats of joint treatment.
d. Protect installed materials from drafts during hot, dry weather.

B. Protection: Protect adjacent surfaces against damage and stains resulting from gypsum board work.

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

C1177-06.....Glass Mat Gypsum Substrate for Use as Sheathing

C1658-06.....Glass Mat Gypsum Panels

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

1.8 QUALITY ASSURANCE

A. Rated gypsum board shall be in conformance with Underwriters' Laboratories, Inc. fire resistance and fire hazard classification.

B. Each type of gypsum board throughout the Project, including accessories and fasteners, shall be the product of a single manufacturer.

C. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

D. Codes and Standards: Work shall comply with the applicable requirements of the latest addition of Gypsum Association Publication GA-216, "Recommended Specifications for the Application and Finishing of Gypsum Board."

E. Expansion Anchor Testing Requirements: Refer to SECTION 09 1000, METAL SUPPORT SYSTEMS.

F. Construction Tolerances:

1. Gypsum board surfaces shall have no measurable variation in any 2-foot direction and a non-accumulative maximum variation of 1/8-inch in 10-foot when a straight edge is laid on the surface in any direction.
2. Shim Work as required to comply with specified tolerances.

G. Gypsum Board Finish Mockups: Before finishing gypsum board assemblies, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and qualities of materials and execution for both Level 4 and 5 Finishes.

1. Install mockups for the following applications:
   a. Area with tape joint.
   b. At a right turn corner.
   c. Surfaces indicated to receive non-textured paint finishes.
   d. Surfaces indicated to receive textured paint finishes.
2. Simulate finished lighting conditions for review of mockups.
3. Approved mockups may become part of the completed Work if protected and undamaged at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Interior gypsum board:

1. Gypsum board: ASTM C1396, Type X, fire-resistive core. Tapered edges.
   a. Use: Typical at all partitions, ceilings and soffits, unless otherwise shown.
   b. Size, unless otherwise shown:
      1) Partitions: 1/2-inch thick and 5/8-inch thick x 4-foot wide.
      2) Ceilings and soffits: 1/2-inch thick x 4-foot wide.
2. High-impact gypsum board: Meets ASTM c1278 C1396, Type X requirements, and ASTM C1396 Level 3, 5/8-inch x 4-foot wide. Tapered edges.
3. Water resistant gypsum board: ASTM c1278, C1396 and d3273, Type X, fire-resistive core. Tapered edges.

a. Size: same as gypsum board, unless otherwise shown.

4. Flexible gypsum board: ASTM c36 and C1396, 1/4-inch thick x 4-foot wide. Tapered edges.
5. Cement board: ASTM c1325, 5/8-inch thick x 4-foot wide. Square edges.
6. Lead lined gypsum board: as specified under section 13 4900, radiation protection.

B. Exterior gypsum sheathing board: ASTM C1177 and C1396, Type X, 5/8-inch thick by 4-foot wide, water-resistant treated core, fiberglass mat facing on both sides and long edges. Square edges.

C. Shaft-wall liner board/ gypsum coreboard: ASTM C1396, 1-inch thick x 2-foot wide. Type SLX, fire resistive core. Double beveled edges and square edges for appropriate applications. Typical at all partitions, unless otherwise shown.

D. Gypsum board accessories:

1. Fasteners for gypsum board: ASTM C840, except as otherwise specified.
   a. For fire rated construction, same type and size as that used in the applicable fire rating test.
   b. Fasteners for steel studs thicker than 0.033-inch thick shall be steel drill screws of size and type recommended by the manufacturer of the material being fastened.
   c. For other applications, type and size as recommended by the gypsum board manufacturer.
2. Reveal molding: Aluminum reveal molding, Non-vented. Sizes as shown on the drawings.
3. Edge trim: aluminum edge trim Sizes as shown on the drawings.
   a. Use: provide for all exposed edges, cut-outs and indentations, and as shown on the drawings.
4. Control joints, corner beads, casing beads, metal trim and other metal accessories: ASTM C840, zinc-coated (galvanized) steel, size to suit board thickness.

E. Joint treatment: joint tape and joint compound for embedding and finishing shall be products of one (1) manufacturer and in conformance with ASTM c475/ c475m.

F. Adhesive: as recommended by the gypsum board manufacturer and in conformance with ASTM c557.

G. Waterproof sealer/ sealant: in accordance with manufacturer’s recommendations.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that all framing, furring and required backing are complete, that framing is accurately spaced and aligned, and that spacing does not exceed maximum allowable for thickness of gypsum board to be used. Correct framing members out of alignment, bowed or warped to provide true, plumb surfaces before applying gypsum board. Obtain acceptance of method of correction prior to start of Work.

B. Verify that door frames are suitable for the thickness of gypsum board to be used.

C. If unsatisfactory conditions exist, do not proceed with gypsum board application until such conditions have been corrected.

3.2INSTALLATION

A. General:

1. Work shall comply with all applicable requirements of GA-216, except where more stringent requirements are specified herein, by Codes, or by installation instructions from the manufacturer of gypsum board.
2. Attach gypsum board to wall framing system with screws in accordance with manufacturer's recommendations.
3. Use gypsum board of maximum lengths to minimize end joints.
4. Control Joints: Install control joints as shown on the Drawings. Space control joints not to exceed 30-feet in either direction.
5. Provide metal trim at all external corners.
6. Seal and/ or treat all edges of exterior gypsum sheathing board with a waterproof sealer/ sealant in accordance with manufacturer’s requirements.

B. Partitions:

1. Install gypsum board vertically with the long dimension parallel to framing members and with all abutting edges over supports. Neatly fit all end joints. Stagger joints to occur on different framing members on opposite sides of partitions. Do not place butt ends against tapered edges. Cut and fit gypsum board neatly around all outlets, switches, and other penetrating items. Space fasteners 8-inches on center along abutting edges, 12-inches on center at midpoints, and 3/8-inches from edges and ends of board.
   a. Modify fastener spacing as recommended by the board manufacturer where adhesive is used and as required to comply with the specified fire-rating.
2. Moisten gypsum board for curved surfaces in accordance with

manufacturer’s instructions and recommendations, and bend to curvature shown in the Drawings.

3. Install gypsum board within 1/4-inch of penetrating ducts, pipes, conduits, outlet boxes, and other penetrating items.
4. Install "L" cut gypsum board at the corners of all door frames. No horizontal and vertical joints at the corners of door frames are permitted.

C. Shaft Partitions: Install Shaft-Wall Liner Board/ Gypsum Coreboard as shown on the Drawings, and in accordance with manufacturer's instructions.

D. Ceiling and Soffit:
1. Attach a single layer of interior gypsum board, unless otherwise shown, to ceiling suspension systems with the long dimension at a right angle to framing. Support ends of interior gypsum board, installed in a single layer, by metal furring or cross-channels.

E. Exterior Walls:
1. Install exterior gypsum sheathing board on the outside face of exterior walls as shown on the Drawings.
   a. Install exterior gypsum sheathing board in accordance with manufacturer’s instructions and applicable instructions in GA-253 and ASTM C1280.

F. Multiple-Layer Application:
1. Apply base layer vertically, offsetting vertical joints at least one stud space between layers.
2. Fasten to supports with screws in accordance with manufacturer’s instructions and spaced at 16-inches on center or less.
3. Precut and fit face layer and attach to base layer by laminating with adhesive and/ or by using mechanical fasteners in accordance with manufacturer’s instructions and referenced standards.
   a. Provide temporary support for face layers by nailing or shoring when adhered only with laminating adhesive to base layers.

G. Accessories:
1. Provide corner beads at all vertical and horizontal external corners.
2. Provide metal trim where gypsum board abuts a wall or ceiling of dissimilar construction or material.

H. Penetrations Through Sound-Rated Partitions:
1. Cut-outs are to be regular and shall not fracture the core or tear the covering of gypsum board.
2. Minimize penetrations through sound-rated partitions and make only

where necessary. All gypsum board penetrations, including those resulting from wiring, cables, and electrical boxes, are to be sealed airtight with sealant, as specified in SECTION 07 9000, JOINT SEALANTS.

3. Recessed panel boards, equipment, boxes, and other such items, with an area of penetration greater than 25 square inches at sound-rated partitions are to be fully enclosed and sealed with 5/8-inch gypsum board construction, and/ or enclosed in construction as shown on the Drawings.

I. Penetrations Through Fire-Rated Partitions: Shall be treated in accordance with referenced standards, requirements of regulatory agencies and as shown in the Drawings.

J. Penetrations Through Lead-Lined Partitions: As specified in SECTION 13 4900, RADIATION PROTECTION.

K. Finishing:

1. Finish all gypsum board partition and ceiling surfaces in accordance with Levels of Gypsum Board Finish of Gypsum Association Publication GA-214 as follows:
   a. Level 1 Finish: Areas concealed from view.
   b. Level 2 Finish: All mechanical, electrical, storage, pneumatic tube rooms, shell spaces and areas specified with water resistant gypsum board and/or cement board used as a substrate for tile, solid acrylic polymer, special wall surfacing, etc.
   c. Level 3 Finish: All custodian and telecom rooms.
   d. Level 4 Finish: All areas, except as otherwise noted or indicated on the Drawings.
   e. Level 5 Finish: Corridors, Conference Rooms, Waiting Areas, Staff Lounge
   f. Gypsum board specified to have a Level 3, 4, or 5 Finish shall receive a full coat of drywall primer prior to the application of final finishes in accordance with GA-214 and ASTM C840.
   g. Gypsum board ceiling surfaces shall have the same level of Finish as shown or specified for adjacent wall surfaces.
   h. In any case, finishing shall be in accordance with reports of fire test assemblies that meet the fire resistive rating as indicated on the Drawings.
2. All screw heads in exterior gypsum sheathing board shall be sealed and/ or treated with a waterproof sealer/ sealant where required by the manufacturer.

3.3 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 —.

3.4 CLEANING AND ADJUSTING

A. Remedy evidence of fastener popping or ridging.

B. Remove waste, rubbish and debris as work progresses.

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SECTION 09 30 13

CERAMIC/PORCELAIN TILING

PART 1 - GENERAL

1.1 DESCRIPTION

The work includes, but is not necessarily limited to, the furnishing and installing of ceramic and porcelain tile, including all related accessories, as indicated on the drawings and specified herein.

1.2 RELATED WORK

A. Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.
B. Section 07 13 00, SHEET WATERPROOFING
C. Section 07 92 00, JOINT SEALANTS
D. Section 09 06 00, SCHEDULE FOR FINISHES
E. Section 09 29 00, GYPSUM BOARD
F. Section 09 65 19, RESILIENT TILE FLOORING
G. Section 09 68 00, CARPETING
H. Section 10 21 13, TOILET COMPARTMENTS
I. Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Samples: Three (3) sets of each type of tile specified.
   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.
   6. Submit full range of manufacturer’s standard colors for selection of grout color.
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. Organic adhesive.
12. Slip resistant tile.
13. Waterproofing isolation membrane.
14. 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. Organic adhesive.
   k. Waterproof isolation membrane.
   l. 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 tile in manufacturer's original containers with grade-seals unbroken and labels intact until time of use.
B. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.
C. Follow manufacturer's additional instructions for storage, handling and delivery.
D. Allow sufficient lead time for specified tiles to be installed on schedule. Submit delivery schedule at commencement of Project assuring on-time delivery of materials.

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):

A108.1A-11.....Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar

A108.1B-11.....Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with dry-Set or latex-Portland Cement Mortar

A108.1C-11.....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

A137.1-12.....Ceramic Tile

C. American Society For Testing And Materials (ASTM):

A185-07.....Steel Welded Wire Fabric, Plain, for Concrete Reinforcing

C109/C109M-11.....Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch. or [50-mm] Cube Specimens)

C241-09.....Abrasion Resistance of Stone Subjected to Foot Traffic

C348-08.....Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars

C627-10.....Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester

C954-11.....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

C979-10.....Pigments for Integrally Colored Concrete

C1002-07.....Steel Self-Piercing Tapping Screws for the Application of Panel Products

C1027-09.....Determining “Visible Abrasion Resistance on Glazed Ceramic Tile”

C1127-09.....Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface

C1178/C1178M-11.....Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel

C1325-08.....Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units

D4397-10.....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):
Current Edition.....Handbook for Ceramic Tile Installation

1.6 QUALITY ASSURANCE

A. Provide materials obtained from one (1) source for each type and color of tile, grout, and setting material.

B. Tile shall be installed in accordance with the Tile Council of North America’s (TCNA) “Handbook for Ceramic Tile Installation,” latest edition.

C. Contractor to employ and pay for an independent testing agency to verify the moisture content in the concrete slabs prior to the installation of tile flooring. The testing procedure shall be in accordance with manufacturer's written instructions and shall be performed in the presence of the Owner’s Inspector.

1.7 PROJECT CONDITIONS

A. Environment: comply with the temperature and humidity requirements of each tile manufacturer for bonding and grouting of materials.

1. If the manufacturer has no recommendations, maintain ambient temperatures at no less than 50 degrees f. During the installation of tile and for at least seven (7) days after the completion of installation.

B. Protection: prior to the commencement of tile installation, provide adequate protection for surfaces adjacent to those receiving tile.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Patterns and Colors: As shown on the Drawings and Section 09 06 00, SCHEDULE FOR FINISHES.

2. Comply with ANSI A137.1, Standard Grade, except as modified:
   a. Inspection procedures listed under the Appendix of ANSI A137.1.
   b. Abrasion Resistance Classification:
      1) Tested in accordance with values listed in Table 1, ASTM C 1027.
      2) Class V, 12000 revolutions for floors in Corridorsc. Class IV, 6000 revolutions for remaining areas.
   c. Slip Resistant Tile for Floors:
      1) Coefficient of friction, when tested in accordance with ANSI A137.1, required for level of performance:
      2) Equal to or greater than 0.42 for interior tile floors when wet.
   d. Tile Having Abrasive Grains:
      1) Unglazed Ceramic Mosaic Tile: Abrasive grains throughout body of the tile.
      2) Quarry Tile: Abrasive grains uniformly embedded in face at rate of approximately 7.5 percent of surface area.
      3) Porcelain Paver Tile: Matte surface finish.

B. Ceramic Tiles:
   1. Floor Tiles: Unglazed floor tiles
      a. Nominal Size: 1-inch X 1-inch X 1/4-inch thick.
   2. Wall Tiles: Glazed wall tiles
      a. Nominal Size: 4-inch X 4-inch X 5/16-inch thick.

C. Porcelain Tiles:
      a. Floor Tiles: Non-porous, single fired, porcelain stone tile.
      b. Nominal Size: 12-inch X 24-inch X 7/16-inch thick.
   2. Wall Tiles: Glazed wall tiles
      a. Nominal Size: 4-inch X 4-inch X 1/4-inch thick.

D. Bases and Trim Shapes:
   1. Coved Base: Same type, size, and color of ceramic and porcelain tiles as specified floor tiles, unless otherwise noted.
      a. Miter ends at outside and inside intersections.
   2. Trim: Provide bullnoses, returns, trimmers, and other shapes, both standard and special, to provide a complete and finished installation whether or not shown on the Drawings.

E. Setting Materials
   1. Latex-Portland Cement Mortar: Thin set bond coat, consisting of latex-cementitious mortar conforming to ANSI A118.4.

2. Organic Adhesive: Thin set bond coat, consisting of waterproof organic adhesive. In conformance with ANSI A136.1 and as recommended by tile manufacturer.
3. Crack Isolation Membrane, Waterproof Membrane and Membrane Bond Coat: In conformance with ANSI A118.10 and A118.12, and as recommended by the tile manufacturer for specified (Tile Council of North America) TCNA installation methods.
4. Water: Clean, potable and free from salts and other injurious Elements.

F. Grouting Materials
1. Epoxy Grout: In conformance with ANSI A108.6 and A118.3, and certified by the tile manufacturer as suitable for the type of tiles specified and the intended use.
   a. Use: For all floor tiles and floor base.
   b. Colors: To be selected by Architect.
2. Latex-Portland Cement Grout: In conformance with ANSI A108.5 and A118.6, and certified by the tile manufacturer as suitable for the type of tiles specified and the intended use.
   a. Use: For all wall tiles.
   b. Colors: To be selected by Architect.

G. Cementitious Backer Units
1. See Section 09 29 00 GYPSUM BOARD.
2. Use in showers or wet areas.
3. ASTM C1325.
4. Use Cementitious backer units in maximum available lengths.
5. Accessories:
   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 A108.1.
   c. Joint material, including reinforcing tape, and tape embedding material, shall be as specifically recommended by the backer unit manufacturer.
   d. Fasteners 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.

5) Washers: Galvanized steel, 13 mm (1/2 inch) minimum diameter.

H. Glass Mat Water Resistant Gypsum Backer Board

1. Confirm to ASTM c1178/c1178m, optional system for cementious backer units.

I. 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.

J. Patching And Leveling Compound

1. Portland cement base, polymer-modified, self-leveling compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
2. Shall have minimum following physical properties:

a. Compressive strength - 25 MPa (3500 psig) per ASTM C109/C109M.
b. Flexural strength - 7 MPa (1000 psig) per ASTM C348 (28 day value).
c. Tensile strength - 600 psi per ANSI 118.7.
d. Density – 1.9.

3. 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.
4. Primers, fillers, and reinforcement as required by manufacturer for application and substrate condition.
5. Ready for use in 48 hours after application.

K. Metal Divider Strips
1. Terrazzo type divider strips.
2. Heavy top type strip with 5 mm (3/16 inch) wide top and 38 mm (1-1/2 inch) long leg.
3. Embedded leg perforated and deformed for keying to mortar.
4. Aluminum or brass as specified in Section 09 06 00, SCHEDULE FOR FINISHES.

L. Water
Clean, potable and free from salts and other injurious elements to mortar and grout materials.

M. Cleaning Compounds
1. 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.
2. Materials containing acid or caustic material not acceptable.

N. Floor Mortar Bed Reinforcing
ASTM A185 welded wire fabric without backing, MW3 x MW3 (2 x 2-W0.5 x W0.5).

O. Polyethylene Sheet
1. Polyethylene sheet conforming to ASTM D4397.
2. Nominal thickness: 0.15 mm (six mils).
3. 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. 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.

B. 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 100 (1/8 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.

C. Additional preparation of concrete floors for tile set with epoxy shall be in accordance with the manufacturer's printed instructions.

D. 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.

E. 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.

F. 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.

3.4 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 A108.1 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.

3.7 METAL DIVIDER STRIPS

A. Install metal divider strips in floor joints between ceramic and quarry tile floors and between tile floors and adjacent flooring of other materials where the finish floors are flush unless shown otherwise.

B. Set divider strip in mortar bed to line and level centered under doors or in openings.

3.8 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. Setting Beds or Bond Coats:

1. Set floor tile in elastomeric bond coat over elastomeric membrane ANSI 108. 13, TCA System F122 and where shown.
2. Set wall tile installed over concrete backer board in latex-Portland cement mortar, ANSI A108.1B.
3. Set tile installed over gypsum board and gypsum plaster in organic adhesive, ANSI A108.1, TCA System W242-02.
4. Set trim shapes in same material specified for setting adjoining tile.

D. 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.
   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.
    d. Make joints in Paver tile, porcelain type; maximum 3 mm (1/8 inch) wide.
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.
    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.

3.9 CERAMIC TILE INSTALLED WITH PORTLAND CEMENT MORTAR

A. Mortar Mixes for Floor, Wall And Base Tile (including Showers,): 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).

3.11 THIN SET CERAMIC AND PORCELAIN TILE INSTALLED WITH DRY-SET PORTLAND CEMENT AND LATEX-PORTLAND CEMENT MORTAR

A. Installation of Tile: ANSI A108.1, except as specified otherwise.
B. Slope tile work to drains not less than 1 in 100 (1/8 inch per foot).

3.13 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 A108.1.

3.14 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 A108.1 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.

3.15 GROUTING

A. Grout Type and Location:

1. Grout for glazed wall and base tile, paver tile and unglazed mosaic tile except for therapeutic pool 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 A108.1.
3. Epoxy Grout: ANSI A108.1.
4. Commercial Portland Cement Grout: ANSI A108.1 and in accordance with the manufacturer's printed instructions.

3.16 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, at toe of base, and where shown not less than 6 mm (1/4 inch) deep.

3.17 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, commercial Portland cement grout and tile set in elastomeric bond coat as recommended by the manufacturer of the grout and bond coat.

3.18 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.

3.19 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. The work includes, but is not necessarily limited to, the furnishing and installing of ceiling suspension systems and ceiling panels as indicated on the drawings and specified herein.

1.2 RELATED WORK

A. Sustainable design requirements: Section 01 81 11.

B. Metal fabrications: Section 05 5000

C. Solid polymer fabrications: Section 06 6600

D. Color, pattern, and location of each type of acoustical unit: Section 09 06 00, schedule for finishes.

E. Metal support systems: Section 09 1000

F. Gypsum board: Section 09 2900

G. HVAC: Division 23

H. Electrical: Division 26

1.3 SUBMITTAL

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES and with SECTION 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for Submittals.

B. Samples:

1. Acoustical units, each type, with label indicating conformance to specification requirements, including units specified to match existing. Three (3) of each ceiling panel and three (3) of each ceiling suspension system component.
2. Colored markers for units providing access.

C. Manufacturer's Literature and Data:

1. Ceiling suspension system, each type, showing complete details of installation , including suspension system specified to match existing and upward access system details for concealed grid systems.
2. Acoustical units, each type

D. Manufacturer's Certificates: Acoustical units, each type, in accordance with specification requirements. Manufacturer’s certifications that products comply with specified tests and standards.

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-09.....Zinc-coated (Galvanized) Carbon Steel Wire

A653/A653M-11.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process

C423-09.....Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

C634-11.....Standard Terminology Relating to Environmental Acoustics

C635-13.....Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

C636-13.....Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels

E84-13.....Surface Burning Characteristics of Building Materials

E119-12.....Fire Tests of Building Construction and Materials

E413-10.....Classification for Rating Sound Insulation.

E580-11.....Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint

E1264-08e1.....Classification for Acoustical Ceiling Products

C. International Organization for Standardization (ISO)

ISO 14644-1.....Classification of Air Cleanliness

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have minimum three (3) years successful experience in project of similar type and scope; acceptable to both manufacturer of acoustical ceiling panels and ceiling suspension systems.

B. Allowable Tolerances:

1. Deflection: Not to exceed a maximum of L/360 of span.
2. Level: Finished suspended ceilings shall not deviate from level in excess of 1/8-inch in 10-foot.

C. Design Criteria: Ceiling shall be designed and detailed to comply with lateral design requirements of Title 24 and California Code of Regulations for seismic bracing of ceiling suspension system.

D. Testing:

1. Testing Laboratory: Refer to Specifications Section 05 5000, METAL FABRICATIONS, Paragraph 1.06 for General requirements.
2. The Testing Laboratory will perform the following tests for drilled-in anchors:
   a. 10-percent of all vertical ceiling wire anchors.
   b. 50-percent of all seismic bracing anchors.
3. Vertical Test Loads:
   a. 200-pounds in tension for hanger wire anchors.
   b. 440-pounds in tension for seismic bracing wire anchors.
4. If any anchors or expansion bolts fail the tension testing requirements, the enforcement agency shall determine the additional testing requirements.
5. Load tests shall be performed at the Project site and in the presence of the Project Inspector.

E. Acoustical ceiling panels shall be tested per ASTM E 84 and shall conform to ASTM E 1264 for Class A products, and shall be classified by UL for a flame spread rating of 25 or less and a smoke developed rating of 50 or less.

F. Coordinate layout and installation of acoustical ceiling panels and ceiling suspension system components with other work supported by or penetrating through ceilings, including electrical systems, HVAC equipment, and partition system.

G. LEED Requirements: Meet the requirements set forth in SECTION 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS for the following credit(s):

1. Recycled Content [MR credit 4.1 and 4.2]
2. Adhesives and Sealants [EQ credit 4.1]
3. Paints, Primers, and Architectural Coatings [EQ credit 4.2]

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Store material indoors, off the ground, and away from moisture and large variations in temperature.

B. Store cartons of ceiling panels open at each end to stabilize moisture content and temperature.

C. Store materials where conditions of temperature and humidity are similar to those expected during building occupancy.

D. Follow additional delivery, storage, and handling requirements of the

manufacturer.

1.8 JOB CONDITIONS

A. Work which will be concealed by suspended acoustical ceiling shall be complete, tested if required, and inspected and approved prior to commencement of installation of materials specified herein.

PART 2- PRODUCTS

2.1 METAL SUSPENSION SYSTEM

A. ASTM C635, heavy-duty system, except as otherwise specified. Main runners and cross tees are double-web steel construction with four-step protective coating and have a 15/16-inch exposed flange design. Cross tees shall have a quick release end detail allowing for easy cross tee removal and remounting.

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 in Section 09 06 00, SCHEDULE FOR FINISHES.

C. Type 1: Grid System for Type 1 Acoustic Ceiling Panels.
   1. Exposed bottom flange shall be continuous with unbroken roll-formed cap, made from steel, running the length of the member.
   2. Main Runner: Web height shall be 1 1/2-inch, heavy duty classification per ASTM C635.
   3. 4-Foot Cross Tee: Web height shall be 1 1/2-inch
   4. 2-Foot Cross Tee: Web height shall be 1-inchl.
   5. End Condition of Cross Runners: Override.

D. Type 2: Grid System for Type 2 Acoustic Ceiling Panels. Clean Room System Compliant with Federal Standard 209E Class 100.
   1. Main runners and cross tees provided factory-applied closed-cell foam gaskets, and have a 1 1/2-inch exposed flange design.
   2. Exposed bottom flange shall be continuous with unbroken roll-formed cap, made from steel, running the length of the member.
   3. Main Runner: Web height shall be 1 1/2-inch, heavy duty classification per ASTM C635.
   4. 4-Foot Cross Tee: Web height shall be 1 1/2-inch.

5. 2-Foot Cross Tee: Web height shall be 1 1/2-inch.
6. End condition of Cross Runners: Override.

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 ROUGH SUSPENSION

A. Wire: Conform with ASTM 641 (Class 1 Coating) with 70 KSI minimum tensile strength.

1. 16-gauge soft annealed galvanized steel tie wire.
2. 12-gauge soft annealed galvanized steel hanger wire.
3. 8-gauge soft annealed galvanized steel hanger wire.

2.4 ANCHORS

A. Use anchors to support twice the loads imposed by hangers attached thereto.

B. Clips:

1. 16-gauge steel, of sizes and shapes shown.
2. Ceiling Clips for Seismic Bracing: 12-gauge steel of sizes and shapes shown.
3. Ceiling Clip Assemblies for Hanger Wires: 12-gauge steel of sizes and shapes shown.
4. Hold-down Clips: Spring-Loaded Steel Clips capable of resisting air pressure related lift.

C. 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 Kg	Cold-rolled Pound	Hot-rolled Kg	Hot-rolled Pound
38	1 1/2	215.4	475	508	1120
50	2	267.6	590	571.5	1260

2.6 ACOUSTICAL UNITS

A. General:

1. Ceiling Tile shall meet minimum 37% bio-based content in accordance with USDA Bio-Preferred Product requirements.
2. ASTM E1264, weighing 3.6 kg/m^2 (3/4 psf) minimum for mineral fiber panels or tile.
3. Class A Flame Spread: ASTM 84
4. Minimum NRC (Noise Reduction Coefficient): 0.55 unless specified otherwise: ASTM C423.
5. Minimum CAC (Ceiling Attenuation Class): 40-44 range unless specified otherwise: ASTM E413.
6. Manufacturers standard finish, minimum Light Reflectance (LR) coefficient of 0.75 on the exposed surfaces, except as specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES
7. Lay-in panels: Sizes as shown, with square edges

B. Type AT-1: Square 24-inch X 24-inch X 1-inch thick or Rectilinear 24-inch x 48-inch x 1-inch, see drawings for size; Noise reduction coefficient of 0.95; Light reflectance of 0.86; 82% recycled content. Durable and cleanable, fiberglass with acoustically transparent membrane and factory-applied latex paint. White color.

C. Type AT-2(SP): 24-inch x 24-inch and 24-inch x 48-inch, see drawings for size; Noise reduction coefficient of 0.95; Ceiling attenuation class of 29; Light reflectance of 0.86; minimum of 51% recycled content. Easily cleanable, vinyl laminated face with sealed back and edges. White Color. AT (SP) Special faced acoustical tile units shall provide anti-microbial coated surfaces suitable for use in Class 5 Clean Rooms per ISO 14644-1. Special faced acoustical tile units shall meet all general requirements stated in this specification. Hold down clips to be provided at all tiles on each edge. Provide 25% additional hold-down clips for the VA’s use in maintenance.

2.7 ACCESS IDENTIFICATION

A. Markers:
1. Use colored markers with pressure sensitive adhesive on one side.
2. Make colored markers of paper of 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.

E. Existing ceiling:

1. Where extension of existing ceilings occur, match existing.
2. Where acoustical units are salvaged and reinstalled or joined, use salvaged units within a space. Do not mix new and salvaged units within a space which results in contrast between old and new acoustic units.
3. Comply with specifications for new acoustical units for new units required to match appearance of existing units.

3.2 CEILING SUSPENSION SYSTEM INSTALLATION

A. General: Install ceiling systems in accordance with manufacturer’s instructions.

B. Ceiling Suspension System:

1. General: Install in accordance with the requirements of ASTM C636.
2. Hanger Wires:
   a. Provide 12-gauge galvanized steel hanger wires at 4-foot centers, maximum, unless otherwise noted.

1) Space hanger wires at 2-foot centers maximum for all specified grid systems with a light or intermediate duty classification, and as required for a heavy duty classification in accordance with ASTM C635.

b. Install additional hangers at ends of each suspension member, at light fixtures, and 6-inches from vertical surfaces.

c. Attach hanger wires to structure as shown on the Drawings.

d. Fasten hanger wires with a minimum of three (3) tight turns minimum within a 1 1/2-inch maximum distance at connections.

e. Splices will not be permitted in any hanger wires.

f. Maintain 6-inch minimum clearance between all wires and unbraced ducts, pipes and conduit, etc., unless otherwise shown.

g. Provide trapeze or other supplementary support members at obstructions to maintain hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas.

h. Provide counterbrace wires where hanger wires are more than one (1) horizontal in six (6) vertical out of plumb.

3. Grid System:

a. Space main grid members at 4-foot centers maximum, unless otherwise noted.

1) Space main grid members at 2-foot centers maximum for all specified grid systems with a light or intermediate duty classification, and as required for a heavy duty classification in accordance with ASTM C635.

b. Install cross grid members at 2-foot centers maximum with positive splices across main grid members to form 2-foot by 4-foot grids, unless otherwise noted.

c. Support main and cross grid members with hanger wire within 8-inches of the support or within 1/4 of the length of the end tee, whichever is least, for the perimeter of the ceiling area.

d. Install wall angle to walls as shown.

e. At rooms attach grid members to wall angles at two (2) adjacent walls. Do not attach to opposing walls. At opposing walls, maintain 1/2-inch minimum clearance between walls and grid, and interconnect grid members with 16-gauge hanger wire.

C. Seismic Bracing Assemblies:

1. General: Seismic bracing assemblies consist of a compression strut and four (4) 12-gauge galvanized steel wires, splayed at 45-degrees

maximum vertically and spaced at 90-degrees to each other horizontally, unless otherwise noted or specified herein.

a. Attach wires to main runner within 2-inches of the compression strut and cross runner. Make four (4) tight turns minimum within 1 1/2-inch maximum distance at connections.
b. Attach wires to structure as shown on the Drawings.
c. Provide one (1) compression strut at each convergent point of the 4-way brace wires as shown on the Drawings and as required by Code.

2. Seismic Bracing Assemblies Restraints Spacing:
   a. Maximum Tributary Area: 96 square feet.
   b. Maximum Spacing: 8-feet x 12-feet.
   c. Maximum Distance from Walls and Vertical Ceiling Offsets:
      1) Non Fire-Rated Ceiling: 6-foot, or 1/2 of the distance between two bracing assembly points, whichever is less.
      2) Fire-Rated Ceiling: 4-foot, or 1/2 of the distance between two bracing assembly points, whichever is less.
3. Suspended acoustical ceiling systems with a ceiling area of 144 square feet or less and fire-rated suspended acoustical ceiling systems with a ceiling area of 96 square feet or less, surrounded by walls which connect directly to the structure above, do not require seismic bracing assemblies when attached to two adjacent walls.
4. Seismic Braces at Rooms and Corridors Under 8-foot in Width:
   a. Provide two (2) 12-gauge galvanized steel wires splayed at 45-degrees vertically, parallel to walls, attached to closure angle at free end.
   b. Attach bracing wires to steel deck per details as shown on Drawings.
5. Ceiling Mounted Fixtures and Air Terminals:
   a. All recessed or drop-in light fixtures and ceiling mounted mechanical air terminals and services, shall be supported directly by main runners or by supplemental framing which is supported by main runners and positively attached with screws or other approved connectors.
   b. Surface mounted fixtures shall be attached to a main runner with a positive clamping device made of material with a minimum of 14 gauge. Rotational spring clamps do not comply.
   c. All Fixtures weighing less than or equal to 10 pounds shall have one #12 gauge safety wire connected from the fixture housing to

the structure above. It is not necessary for these safety wires to be taut.

d. All fixtures weighing greater than 10 lb but less than or equal to 56 lb. Shall have (2) # 12 gauge safety wire connected from fixture housing to structure above. It is not necessary for these safety wires to be taut.

e. All fixtures weighing greater than 56 lb. Shall be supported directly from structure above by approved hangers.

f. Pendent-hung fixtures shall be supported directly from the structure above using no less than # 9 gauge wire or an approved alternate support. The ceiling suspension system shall not provide any direct support.

g. All recessed or drop-in fixtures shall be supported directly from fixture housing to the structure above with a minimum of (2) # 12 gauge wires located at diagonally opposite corners. Leveling or positioning of fixtures may be provided by ceiling grid. Fixture support wires may be slightly loose to allow the fixture to seat in the grid system. Fixtures shall not be supported from main runners or furring channels if the weight of the fixtures causes total dead load to exceed the deflection capability of the ceiling suspension system.

6. Install accessories and miscellaneous specialties to plumb, true and level lines, including other materials furnished and located as part of the Work of other SECTIONS.
7. Provide welded, bolted or screwed connections as shown or required.

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, discolored, damaged, improperly installed tiles or tile not cut for minimum bearing.
3. Install hold-down clips at all special faced acoustical tile unit locations on each tile edge. Place hold-down clips over the cross tees symmetrically at 2-foot on center.
4. Retegularize all non-typical size acoustical ceiling panels at the perimeter of the room or area in the field.
5. Acoustical ceiling panels larger than typical size and under 2-foot

6-inch shall be spliced from two full size panels approximately equal in dimension. Cut the excess out of the center and apply contact adhesive to both edges. Apply pressure to assure a positive adhesive connection. The spliced panels shall leave no visible seam and excess adhesive on the surfaces.

6. Provide touch-up paint for all exposed, cut edges of ceiling panels in accordance with manufacturer's recommendations.

E. 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.

3.5 TRAINING AND MAINTENANCE

A. Provide one field training session for selected VA's staff for removal, reinstallation, cleaning and maintenance of special faced acoustical units and hold-down clips. Coordinate training time with VA's Project Manager.

3.6 EXTRA STOCK

A. Furnish three (3) extra cartons of each pattern of acoustical ceiling panel for maintenance use. Clearly labeled to identify contents and deliver extra stock to Owner as directed.

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SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the installation of vinyl or rubber base.

1.2 RELATED WORK

A. Color and texture: Section 09 06 00, SCHEDULE FOR FINISHES.

B. Integral base with sheet flooring: Section 09 65 16, RESILIENT SHEET FLOORING.

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 and stair material manufacturer's recommendations for adhesives.
3. Application and installation instructions.

C. Samples:

1. Base: 150 mm (6 inches) long, each type and color.
2. 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):

1. F1344-15 - Rubber Floor Tile.
2. F1859-14 - Rubber Sheet Floor Covering without Backing.
3. F1860-14 - Rubber Sheet Floor Covering with Backing.

4. F1861-08(2012)e1 - Resilient Wall Base.
5. D4259-88(2012) - Abrading Concrete.

C. Federal Specifications (Fed. Spec.):
1. RR-T-650E - Treads, Metallic and Non-Metallic, Skid-Resistant.

D. International Concrete Repair Institute (ICRI):
1. 310.2R-13 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

PART 2 - PRODUCTS

2.1 GENERAL

A. Use only products by the same manufacturer and from the same production run.

B. Sustainable Construction Requirements:
1. Sheet Rubber Flooring Recycled Content: 90 percent total recycled content, minimum.
2. Low Pollutant-Emitting Materials: Comply with VOC limits specified in Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS for the following products:
a. Flooring Adhesives and Sealants.

2.2 RESILIENT BASE

A. ASTM F1861, 3 mm (1/8 inch) thick, 150 mm (6 inches) high, Thermoplastics, Group 2-layered. Style B-cove.

2.7 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 Resident Engineer.

B. Submit proposed installation deviation from this specification to the Resident Engineer indicating the differences in the method of installation.

C. The Resident Engineer 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 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.

3.7 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, sheet rubber and treads 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.

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 16
RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies the installation of linoleum sheet flooring, rubber and vinyl sheet flooring with backing and integral cove base.

C. Installation of sheet flooring including following:

1. Heat welded seams.
2. Integral cove base: Installed at intersection of floor and vertical surfaces where indicated.

1.2 RELATED WORK

A. Section 01 81 13 SUSTAINABLE CONSTRUCTION REQUIREMENTS

B. Concrete floors: Section 03 30 00, CAST-IN-PLACE CONCRETE.

C. Color, pattern and texture: Section 09 06 00, SCHEDULE FOR FINISHES.

D. Resilient base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

1.3 QUALITY CONTROL-QUALIFICATIONS:

A. The Contracting Officer shall approve products or service of proposed manufacturer, suppliers, and installers, and the Contractor shall submit certification that:

1. Heat welded seaming is manufacturer's prescribed method of installation.
2. Installer is approved by manufacturer of materials and has technical qualifications, experience, trained personnel, and facilities to install specified items.
3. Manufacturer's product submitted has been in satisfactory operation, on three installations similar and equivalent in size to this project for three years. Submit list of installations.

B. The sheet vinyl floor coverings shall meet fire performance characteristics as determined by testing products, per ASTM test method, indicated below by Underwriters Laboratories, Inc. (UL) or another recognized testing and inspecting agency acceptable to authorities having jurisdiction.

1. Critical Radiant Flux: 0.45 watts per sq. cm or more, Class I, per ASTM E648.
2. Smoke Density: Less than 450 per ASTM E662.

C. The floor covering manufacturer shall certify that products supplied for installation comply with local regulations controlling use of volatile organic compounds (VOC’s).

1.4 SUBMITTALS

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, submit following:

B. Manufacturer's Literature and Data:

1. Description of resilient material and accessories to be provided.
2. Resilient material manufacturer's recommendations for adhesives, weld rods, sealants, and underlayment.
3. Application and installation instructions.

C. Samples:

1. Sheet material, 38 mm by 300 mm (1-1/2 inch by 12 inch), of each color and pattern with a welded seam using proposed welding rod 300 mm (12 inches) square for each type, pattern and color .
2. Cap strip and fillet strip, 300 mm (12 inches) for integral base.
3. Shop Drawings and Certificates: Layout of joints showing patterns where joints are expressed, and type and location of obscure type joints. Indicate orientation of directional patterns.
4. Certificates: Quality Control Certificate Submittals and lists specified in paragraph, QUALIFICATIONS.
5. Edge strips: 150 mm (6 inches) long each type.
6. Adhesive, underlayment and primer: Pint container, each type.

D. Shop Drawings:

1. Provide shop drawings indicating patterns and locations of each floor covering material and color, welding rod color, and flash cove locations.

E. Mock-ups:

1. Provide 2 foot by 2 foot mock-ups of each flooring material indicating welding at joints between materials (each color), transitions strips between different materials, flash cove details, inside and outside corners, and cap strips. Mock-up should be stored onsite will require review and approval by Design Team and VA’s designated team. Mock-up to be provided with adequate time for review and comments to be addressed prior to installation of final flooring.

1.5 PROJECT CONDITIONS

A. Maintain temperature of floor materials and room, where work occurs, above 18 ° C (65 °F) and below 38 °C (100 °F) for 48 hours before, during and for 48 hours after installation. After above period, room temperature shall not fall below 13 °C (55 °F).

B. Construction in or near areas to receive flooring work shall be complete, dry and cured. Do not install resilient flooring over slabs until they have been cured and are sufficiently dry to achieve a bond with adhesive. Follow flooring manufacturer’s recommendations for bond and moisture testing.

C. Building shall be permanently enclosed. Schedule construction so that floor receives no construction traffic when completed.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in original sealed packages or containers; labeled for identification with manufacturer's name and brand.

B. Deliver sheet flooring full width roll, completely enclosed in factory wrap, clearly marked with the manufacturer's number, type and color, production run number and manufacture date.

C. Store materials in weathertight and dry storage facility. Protect from damage due to handling, weather, and construction operations before, during and after installation. Store sheet flooring on end with ambient temperatures maintained as recommended by manufacturer.

D. Store sheet flooring on end.

E. Move sheet floor coverings and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.7 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 Materials (ASTM):

D4259-88(2012) ..... Abrading Concrete.

E648-15e1.....Critical Radiant Flux of Floor-Covering Systems Using a Radiant Energy Source.

E662-15a.....Specific Optical Density of Smoke Generated by Solid Materials.

F710-08.....Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.

F1303-04(2014).....Sheet Vinyl Floor Covering with Backing.

F1860-14.....Rubber Sheet Flooring with Backing

F1913-04(2014).....Sheet Vinyl Flooring without Backing

F2170-11.....Determining Relative Humidity in Concrete Floor Slabs using In-situ Probes

C. Resilient Floor Covering Institute (RFCI):

Recommended Work Practices for Removal of Resilient Floor Coverings.

D. International Concrete Repair Institute (ICRI):
   1. 310.2R-13 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays, and Concrete Repair.
E. SCS Global Services (SCS):
   1. FloorScore.

1.8 SCHEDULING

Interior finish work such as plastering, drywall finishing, concrete, terrazzo, ceiling work, and painting work shall be complete and dry before installation. Mechanical, electrical, and other work above ceiling line shall be completed. Heating, ventilating, and air conditioning systems shall be installed and operating in order to maintain temperature and humidity requirements.

1.9 WARRANTY:

Submit written warranty, in accordance with FAR clause 52.246-21, Warranty of Construction requirements except that warranty period shall be extended to include two (2) years.

PART 2 - PRODUCTS

2.1 SHEET VINYL FLOOR COVERINGS

A. Sheet Vinyl Floor Coverings: Smooth face, minimum thickness nominal 2 mm (0.08 inch). Sheet flooring shall conform to ASTM F1913 and material requirements specified in ASTM F1303, Type II, Grade 1, backing classification not applicable. Foam backed sheet flooring is not acceptable.
B. Size: Provide maximum size sheet vinyl material produced by manufacturer to provide minimum number of joints. Minimum size width acceptable - 1200 mm (48 inches).
C. Each color and pattern of sheet flooring shall be of same production run.
D. Color and pattern as shown on drawings.

2.2 RUBBER SHEET FLOOR COVERINGS

A. Rubber Sheet Floor Coverings: Smooth face, minimum thickness nominal 3 mm (0.12 inch). Sheet flooring shall conform to the material requirements specified in ASTM F1589, Type I, Grade 1, backing classification not applicable. Foam backed sheet flooring is not acceptable.
B. Size: Provide maximum size rubber shhet material produced by manufacturer to provide minimum number of joints. Minimum size width acceptable - 1200 mm (48 inches).

C. Each color and pattern of sheet flooring shall be of same production run.

D. Color and Pattern as shown on drawings.

2.3 LINOLEUM SHEET FLOORING COVERINGS

A. Linoleum Sheet Flooring Coverings: Smooth face, minimum thickness nominal
2.5 mm (0.08 inch). Sheet flooring shall conform to material requirements specified in ASTM F2304, Type I, “Standard Specification for Sheet Linoleum Floor Covering”. The wear surface shall consist of a homogeneous mixture of linoleum cement (linseed oil, natural tree resins, drying oil catalysts) wood flour, cork flour, color pigments and filler calnedred onto a jute fabric back.

B. Size: Provide maximum size linoleum material produced by manufacturer to provide minimum number of joints. Minimum size width acceptable - 2000 mm (78 inches).

C. Color and pattern shall be dispersed throughout the thickness of the wear layer. Each color and pattern of sheet flooring shall be of same production run.

D. Color and pattern as shown on drawings.

2.3 WELDING ROD:

Welding rod to be product of floor covering manufacturer. Welding Rod Color to match that of adjacent floor covering.

2.4 APPLICATION MATERIALS AND ACCESSORIES

A. Floor and Base Adhesive: Type recommended by sheet flooring material manufacturer for conditions of use.

B. Mastic Underlayment (for concrete floors): Provide products with latex or polyvinyl acetate resins in mix. Condition to be corrected shall determine type of underlayment selected for use.

C. Base Accessories:

1. Fillet Strip: 19 mm (3/4 inch) radius fillet strip compatible with resilient sheet material.
2. Cap Strip: Extruded flanged zero edge vinyl reducer strip approximately 25 mm (one inch) exposed height with 13 mm (1/2 inch) flange.

2.6 ADHESIVES

A. Water resistant type recommended by the sheet flooring manufacturer for the conditions of use. VOC not to exceed 50g/L

B. Comply with applicable regulations regarding toxic and hazardous materials Green Seal (GS-36) for commercial adhesive.

C. Use low-VOC adhesive during installation. Water based is preferred over solvent based adhesives.

2.7 CRACK FILLER AS RECOMMENDED BY FLOORING MATERIAL MANUFACTURER.

2.8 BASE CAP STRIP AND COVE STRIP

A. Metal cap strip compatible with the sheet flooring.

B. Cap strip "J" shape with feathered edge flange approximately 25 mm (one inch) wide; top designed to receive sheet flooring with 13 mm (1/2 inch) flange lapping top of flooring

C. Extrude vinyl cove strip 70 mm (2-3/4 inch) radius compatible with sheet flooring.

2.9 LEVELING COMPOUND (FOR CONCRETE FLOORS)

A. Leveling Materials: Pourable portland cement based, cementitious underlayment material.

B. Water: Potable and free from impurities that affect setting of floor leveling material.

2.10 PRIMER (For Concrete Subfloors)

As recommended by the adhesive or sheet flooring manufacturer.

2.11 EDGE STRIPS

A. Extruded aluminum, mill finish, mechanically cleaned.

B. 28 mm (1-l/8 inch) wide, 6 mm (1/4 inch) thick, bevel one edge to 3 mm (1/8 inch) thick.

C. Drill and counter sink edge strips for flat head screws. Space holes near ends and approximately 225 mm (9 inches) on center in between.

2.12 SEALANT

A. As specified in Section 07 92 00, JOINT SEALANTS.

B. Compatible with sheet flooring.

PART 3 - EXECUTION

3.1 PROJECT CONDITIONS

A. Maintain temperature of sheet flooring above 36 °C (65 °F), for 48 hours before installation.

B. Maintain temperature of rooms where sheet flooring work occurs above 36 °C (65 °F), for 48 hours, before installation and during installation.

C. After installation, maintain temperature at or above 36 °C (65 °F.)

D. Building is permanently enclosed.

E. Wet construction in or near areas to receive sheet flooring is complete, dry and cured.

3.2 SUBFLOOR PREPARATION

A. Concrete Subfloors: Verify that concrete slabs comply with ASTM F710.
   1. Installer shall examine surfaces on which resilient sheet flooring is to be installed, and shall advise Contractor, in writing, of areas which are unacceptable for installation of flooring material. Installer shall advise Contractor which methods are to be used to correct conditions that will impair proper installation. Installation shall not proceed until unsatisfactory conditions have been corrected.
   2. Slab substrates dry, free of curing compounds, sealers, hardeners, and other materials which would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by Resilient Floor Covering Institute recommendations in manual RFCI-MRP.

B. Broom or vacuum clean substrates to be covered by sheet vinyl floor coverings immediately before installation. Following cleaning, examine substrates to determine if there is visually any evidence of moisture, alkaline salts, carbonation, or dust.

C. Primer: If recommended by flooring manufacturer, prior to application of adhesive, apply concrete slab primer in accordance with manufacturer’s directions.

D. Correct conditions which will impair proper installation, including trowel marks, pits, dents, protrusions, cracks or joints.

E. 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.

F. Clean floor of oil, paint, dust and deleterious substances. Leave floor dry and cured free of residue from existing curing or cleaning agents.

G. Moisture Testing: Perform moisture and pH test as recommended by the flooring and adhesive manufacturers. Perform test locations starting on the deepest part of the concrete structure. Proceed with installation only after concrete substrates meet or exceed the manufacturer’s requirements. In the absence of specific guidance from the flooring or adhesive manufacturer the following requirements are to be met:
   1. Perform moisture vapor emission tests in accordance with ASTM F1869. Proceed with installation only after substrates have a maximum

moisture-vapor-emission rate of 1.36 kg of water/92.9 sq. m (3lb of water/1000 sq. ft.) in 24 hours.

2. Perform concrete internal relative humidity testing using situ probes in accordance with ASTM F2170. Proceed with installation only after concrete reaches maximum 75 percent relative humidity level measurement.

H. Preparation shall include the removal of existing resilient floor and existing adhesive. Do not use solvents to remove adhesives. Coordinate with Asbestos Abatement Section if asbestos abatement procedures will be involved.

I. Remove existing resilient flooring and adhesive completely in accordance with Resilient Floor Covering Institute recommendations in manual RFCI-WP. Solvents shall not be used .

3.3 INSTALLATION OF FLOORING

A. Install work in strict compliance with manufacturer's instructions and approved layout drawings.

B. Maintain uniformity of sheet vinyl floor covering direction and avoid cross seams.

C. Arrange for a minimum number of seams and place them in inconspicuous and low traffic areas, but in no case less than 150 mm (6 inches) away from parallel joints in flooring substrates.

D. Match edges of resilient floor coverings for color shading and pattern at seams.

E. Where resilient sheet flooring abuts other flooring material floors shall finish level.

F. Extend sheet vinyl floor coverings into toe spaces, door reveals, closets, and similar openings.

G. Inform the Resident Engineer of conflicts between this section and the manufacturer's instructions or recommendations for auxiliary materials, or installation methods, before proceeding.

H. Install sheet in full coverage adhesives.

1. Air pockets or loose edges will not be accepted.
2. Trim sheet materials to touch in the length of intersection at pipes and vertical projections; seal joints at pipe with waterproof cement or sealant.

I. Keep joints to a minimum; avoid small filler pieces or strips.

J. Follow manufacturer’s recommendations for seams at butt joints. Do not leave any open joints that would be readily visible from a standing position.

K. Follow manufacturer's recommendations regarding pattern match, if applicable.

L. Installation of Edge Strips:

1. Locate edge strips under center lines of doors unless otherwise indicated.
2. Set aluminum strips in adhesive, anchor with lead anchors and stainless steel Phillips screws.

M. Integral Cove Base Installation:

1. Set preformed fillet strip to receive base.
2. Install the base with adhesive, terminate expose edge with the cap strip.
3. Form internal and external corners to the geometric shape generated by the cove at either straight or radius corners.
4. Solvent weld joints as specified for the flooring. Seal cap strip to wall with an adhesive type sealant.
5. Unless otherwise specified or shown where sheet flooring is scheduled, provide integral base at intersection of floor and vertical surfaces. Provide sheet flooring and base scheduled for room on floors and walls under and behind areas where casework, laboratory and pharmacy furniture and other equipment occurs, except where mounted in wall recesses.

3.4 INSTALLATION OF INTEGRAL COVED BASE

A. Set preformed cove to receive base. Install base material with adhesive and terminate exposed edge with cap strip. Integral base shall be150 mm (6 inches) high.

B. Internal and external corners shall be formed to geometric shape generated by cove at either square or radius corners.

3.5 WELDING

A. Heat weld all joints of flooring and base using equipment and procedures recommended by flooring manufacturer.

B. Welding shall consist of routing joint, inserting a welding rod into routed space, and terminally fusing into a homogeneous joint.

C. Upon completion of welding, surface across joint shall finish flush, free from voids, and recessed or raised areas.

D. Fusion of Material: Joint shall be fused a minimum of 65 percent through thickness of material, and after welding shall meet specified characteristics for flooring.

3.6 CLEANING

A. Clean small adhesive marks during application of sheet flooring and base before adhesive sets, excessive adhesive smearing will not be accepted.

B. Remove visible adhesive and other surface blemishes using methods and cleaner recommended by floor covering manufacturers.

C. Clean and polish materials per flooring manufacturer’s written recommendations.

D. Vacuum floor thoroughly.

E. Do not wash floor until after period recommended by floor covering manufacturer and then prepare in accordance with manufacturer’s recommendations.

F. Upon completion, Resident Engineer shall inspect floor and base to ascertain that work was done in accordance with manufacturer's printed instructions.

G. Perform initial maintenance according to flooring manufacturer’s written recommendations.

3.7 PROTECTION:

A. Protect installed flooring as recommended by flooring manufacturer against damage from rolling loads, other trades, or placement of fixtures and furnishings.

B. Keep traffic off sheet flooring for 24 hours after installation.

C. Where construction traffic is anticipated, cover sheet flooring with reinforced kraft paper properly secured and maintained until removal is authorized by the Resident Engineer.

D. Where protective materials are removed and immediately prior to acceptance, repair any damage, re-clean sheet flooring, lightly re-apply polish and buff floor.

3.8 REPLACE AND REPAIR

A. Replace and repair all damaged and/ or uneven flooring to the Architect's satisfaction and at no additional cost to the Owner. Any flooring with bubbles or ripples shall not be acceptable.

3.9 EXTRA STOCK

A. Furnish an extra 3% of each pattern and color of resilient flooring, floor base and accessory material for maintenance use. Clearly label extra stock to identify contents and deliver to the Owner as directed by the Owner’s Representative.

3.10LOCATION

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 65 19

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the installation of luxury vinyl tile flooring, and accessories.

1.2 RELATED WORK

A. Section 01 81 11 SUSTAINABLE DESIGN REQUIREMENTS

B. Color and pattern and location in room finish schedule: Section 09 06 00, SCHEDULE FOR FINISHES.

C. 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 manufacturer’s recommendations for adhesives, underlayment, primers and polish.
3. Application and installation instructions.

C. Samples:

1. Tile: 102 mm by 914 mm (4 inches by 6 inches).

D. Shop Drawings:

1. Layout of patterns shown on the drawings and in Section 09 06 00, SCHEDULE FOR FINISHES.

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 (2008).....Water Emulsion Floor Finish

E648-10.....Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source

E662-09.....Specific Optical Density of Smoke Generated by Solid Materials

E1155-96 (R2008).....Determining Floor Flatness and Floor Levelness Numbers

F510-93 (R 2008).....Resistance to Abrasion of Resilient Floor Coverings Using an Abrader with a Grit Feed Method

F710-08.....Preparing Concrete Floors to Receive Resilient Flooring

F1066-04 (R2010).....Vinyl Composition Floor Tile

F1344-10.....Rubber Floor Tile

F1700-04 (R2010).....Solid Vinyl Floor Tile

C. Resilient Floor Covering Institute (RFCI):

IP #2.....Installation Practice for Vinyl Composition Tile (VCT)

D. Federal Specifications (Fed. Spec.):

SS-T-312.....Tile Floor: Asphalt, Rubber, Vinyl and Vinyl Composition

1.7 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: Provide resilient flooring manufactured by a firm with a minimum of ten (10) years experience in the fabrication of resilient flooring of type equivalent to those specified.

B. Installer’s Qualifications: Installer with a minimum of three (3) years of experience who has specialized in the installation of Work similar to that required for this Project and who is acceptable to the resilient flooring manufacturer.

C. Each type of resilient flooring and related accessory, including recommended adhesives, shall be products of a single manufacturer.

D. Flame Spread: Minimum Class C per ASTM E84.

E. Smoke Density/ Developed: 450 maximum per ASTM E662.

F. Radiant Flux: Class 1 per ASTM E648; Critical Radiant Flux of 0.45 watts per sq. cm. or greater.

G. VOC Limits:

1. Provide resilient flooring materials that conform to Federal, State, and Local restrictions for Volatile Organic Compounds (VOC) content.
2. Adhesives: Meet the requirements set forth by SCAQMD Rule #1168 with effective date of July 1, 2005.
3. Flooring: Shall be “GREENGUARD” or “FloorScore” certified, or shall be determined compliant with “GREENGUARD” or “FloorScore” standards by independent third-party testing as permitted by the U.S. Green Building Council.

H. Rubber flooring products shall meet the applicable performance requirements of ASTM F1344, F1859, and/ or F1860.

I. Contractor to employ and pay for an independent testing agency to verify the vapor emissions of the concrete slabs prior to the installation of resilient flooring. The testing procedure shall be in accordance with manufacturer's written instructions, ASTM F1869, F2170 and F710 standards. The testing process shall be in the presence of the Owner’s Inspector.

1.8 JOB CONDITIONS

A. Environment: Seventy-two (72) hours prior to, during, and after installation of materials, keep temperature in spaces to receive materials between 65-degrees F. and 70-degress F. An absolute minimum temperature of 60 degrees F. must be maintained in all spaces receiving resilient flooring materials following the seventy-two (72) hours after installation.

B. In space to receive materials that are exposed to intense or direct sunlight, protect materials during conditioning, installation and curing periods by covering the light source.

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 LUXURY VINYL TILE

A. ASTM F1700, Class III, Type B - embossed, 102 mm (4 inches) x 914 mm (36 inches), 3.2 mm (1/8 inch) thick.

B. Color and pattern uniformly distributed throughout thickness.

2.3 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.

2.4 PRIMER (FOR CONCRETE SUBFLOORS)

As recommended by the adhesive and tile manufacturer.

2.5 LEVELING COMPOUND (FOR CONCRETE FLOORS)

A. Leveling Materials: Pourable portland cement based, cementitious underlayment material.

B. Water: Potable and free from impurities that affect setting of floor leveling material.

2.6 CRACK FILLER

As recommended by flooring material manufacturer.

2.7 POLISH AND CLEANERS

A. Cleaners RFCI CL-1.

B. Polish: ASTM D4078.

2.8 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.

2.9 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. Perform additional subfloor preparation to obtain satisfactory adherence of flooring if subfloor test patches allows easy removal of tile.

G. 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.

H. Preparation of existing installation shall include the removal of existing resilient floor and existing adhesive. Do not use solvents to remove adhesives.

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. If layout is not shown on drawings, lay tile symmetrically about center of room or space with joints aligned.
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 Resident Engineer 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 Resident Engineer. A

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.

F. Immediately prior to acceptance, the floor and base shall be scrubbed hygienically clean.

3.5 REPLACE AND REPAIR

A. Replace and repair all damaged and/ or uneven flooring to the Architect's satisfaction and at no additional cost to the Owner. Any flooring with bubbles or ripples shall not be acceptable.

3.6 EXTRA STOCK

A. Furnish an extra 3% of each pattern and color of resilient flooring, floor base and accessory material for maintenance use. Clearly label extra stock to identify contents and deliver to the Owner as directed by the Owner’s Representative.

3.7 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. Section 01 81 13 SUSTAINABLE CONSTRUCTION REQUIREMENTS
B. Section 09 05 16, SUBSURFACE PREPARATION FOR FLOOR FINISHES
C. Section 09 06 00, SCHEDULE FOR FINISHES.
D. 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.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES and Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS
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" full tile samples of carpets, showing quality, pattern and color specified in Section 09 06 00, SCHEDULE FOR FINISHES.
   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

A. Carpet and installation subject to terms of "Warranty of Construction" FAR clause 52.246-21, except that warranty period is extended to two years.

B. Provide a wear warranty by the manufacturer guaranteeing fiber loss of not more than 10 percent by weight for a period of not less than ten (10) years from the date of acceptance of the carpet installation.

C. Repairs shall take place within ten (10) days of written notification.

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 140-10.....Sustainable Carpet Assessment Standard

C. American Association of Textile Chemists and Colorists (AATCC):

AATCC 16-04.....Colorfastness to Light
AATCC 129-10.....Colorfastness to Ozone in the Atmosphere under High Humidities
AATCC 134-11.....Electric Static Propensity of Carpets
AATCC 165-08.....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 D5116-10.....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 E648-10.....Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

E. The Carpet and Rug Institute (CRI):
CRI 104-11.....Installation of Commercial Carpet

1.9 QUALITY ASSURANCE

A. Provide each type of carpet and accessory as produced by a single manufacturer.
B. Manufacturer: Manufacturer (carpet mill) with not less than five (5) years of production experience with carpet similar to types specified in this Section, and whose published product literature clearly indicates general compliance of products with requirements of this Section.
C. Installer: Shall be acceptable and/or authorized by the carpet manufacturer to install the specified carpet. Installation shall be performed only by skilled, experienced journeyman carpet installers with not less than five (5) years of carpeting experience similar to the Work of this Section.
D. If an unsatisfactory condition should be determined by the Architect, the Contractor will immediately remove and replace the areas affected.
E. General Standard: "Carpet Primer" by the Carpet and Rug Institute (CRI), for definitions of terminology not otherwise defined herein and for general recommendations and information.
F. All carpet of each type shall be from the same dye lot.
G. Overrun: Where carpet is supplied from run at mill, produce and deliver to project at least 10% overrun on calculated yardage (carpet needed for proper installation plus waste and usable scraps).

H. Fire Performance Characteristics:
   1. Passes the US Department of Commerce (DOC) FF 1-70 “Methenamine Pill Test.”
   2. Meets NFPA Class 1 with a minimum Radiant Panel Test Value of 0.45 watts per square centimeter or greater when tested under ASTM E648.
   3. Achieves a value of less than 450 in the “flaming mode” when tested using the National Bureau of Standards (NBS) Smoke Density Chamber under NFPA 258 and ASTM E662
I. Static Propensity: Will generate no more than 3.5 kV at 70 degrees F and 20% relative humidity using the American Association of Textile Chemists and Colorists (AATCC) Test Method No. 134.
J. Dimensional Backing Stability: AACHEN Test DIN-STD-54318 for determining the amount of change (expansion and shrinkage) that modular carpet experiences when exposed to both wet and dry conditions. Percentage change shall not exceed 0.1% change.
K. VOC Limits:
   1. Provide adhesives that conform to Federal, State, and Local restrictions for Volatile Organic Compounds (VOC) content.
   2. Meets the testing and product requirements of the Carpet and Rug Institute’s Green Label and Green Label Plus program.
   3. Meet the requirements set forth by SCAQMD Rule #1168 with effective date of July 1, 2005, for adhesives.
L. Contractor to employ and pay for an independent testing agency to verify the vapor emissions of the concrete slabs prior to the installation of carpeting. The testing procedure shall be in accordance with manufacturer's written instructions and ASTM F1869 standards. The testing process shall be in the presence of the Owner’s Representative.

1.10 JOB CONDITIONS

A. Do not commence carpet installation until painting and finishing Work has been completed and ceiling and other overhead Work has been tested, approved, and completed.
B. Install carpet using sufficient lighting conditions.
C. Install carpet at a temperature of no less than 65 degrees F and no greater than 95 degrees F. Relative humidity shall be no greater than 65 percent.
D. Sequence carpet with other Work to minimize the possibility of damage and soiling of carpet during the remainder of Construction.

1.11 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver carpeting materials in protective wrapping, and store inside,

protected from weather, moisture and debris.

B. Deliver carpet clearly marked with manufacturer's labels indicating type, size, dye lot, and quality.

C. Store carpet and adhesive in a heated room at a minimum temperature of 68 degrees F. with a relative humidity of not more than 65 percent for at least three (3) days prior to installation.

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:
      1). 457 mm (18 inches) x 914 mm (36 inches) tile.
3. Provide static control to permanently control static build upto less than 2.0 kV when tested at 20 percent relative humidity and 21 degrees C (70 degrees F) in accordance with AATCC 134.
4. Pile Height: Maximum 3.25 mm (0.10 inch).
5. Pile Fiber: Nylon with recycled content 25 percent minimum branded (federally registered trademark).
6. Pile Type: Level 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. Class II: Not less than 0.22 watts per square centimeter.
    d. 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.
    b. Other areas: Minimum APYD 4000.
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 in Section 09 06 00, SCHEDULE FOR FINISHES.

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 SEAMING TAPE

A. Permanently resistant to carpet cleaning solutions, steam, and water.

B. Recommended by carpet manufacturer.

2.4 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-/2 inches) wide, face not less than 16 mm (5/8 inch) wide.
    3. Finish: Clear anodic coating unless specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.

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 in Section 09 06 00, SCHEDULE FOR FINISHES.

2.5 LEVELING COMPOUND (FOR CONCRETE FLOORS)

A. Leveling Materials: Pourable portland cement based, cementitious underlayment material.
B. Water: Potable and free from impurities that affect setting of floor leveling material.

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 and existing carpet materials .
C. Correct conditions which will impair proper installation, including trowel marks, pits, dents, protrusions, cracks or joints.
D. Fill and/ or bead blast the subfloor as required to provide a level, hard, dry and consistent subfloor.
E. Fill cracks more than a 1/16-inch wide and depressions with crack filler.
F. Install leveling material on the floor slab to obtain a smooth, hard, dry, and level surface for finished flooring and to comply with carpet manufacturer's recommendations/ requirements for subfloor preparation.
   1. Level the floor with a maximum variation of 1/4-inch in 10-feet, and a total aggregate maximum variation of no more than 1/4-inch for the entire Project Site.
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. Vacuum clean the substrate.

3.2 CARPET INSTALLATION

A. Install carpet strictly in strict accordance with manufacturer's instructions.
B. Symmetrically arrange carpet tiles with the axes of the room, unless otherwise shown.
C. Arrange carpet tiles in the room to ensure that all perimeter tiles will be no less than 9-inches in either direction.

D. Install carpet tile with pile inclination in one direction using the arrows marked by the carpet manufacturer on the back of each tile.
E. Carpet edges shall be butted together with sufficient force to produce the tightest joint possible without distortion. Dimensional gain due to loose joints shall not be greater than 1/8-inch over 11 carpet tile modules.
F. At door openings, make seams under centers of doors.
G. Cut and fit carpet tightly and neatly into breaks and recesses, alcoves, closets, against bases, permanent cabinets and equipment, under open bottom items, and removable flanges and other similar items.
H. Direct glue down installation:
   1. Prime substrate if required by manufacturer.
   2. Spread adhesive in quantity recommended by manufacturer to ensure proper adhesion over full area of installation.
   3. Apply only enough adhesive to permit proper adhesion of carpet before initial set.
I. Install carpet trim at all exposed carpet edges and between different types of carpet.
J. Do not soil adjacent areas with adhesives.
K. Lightly roll carpet with a vinyl roller after application to remove air pockets and ensure proper adhesion and uniform bond.
L. Remove adhesive promptly from face of carpet.
M. Do not bridge building expansion joints with carpet.

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.

F. Remove spots and smears of cement, excess adhesive, and other surface blemishes from the carpet immediately with solvent/ cleaner recommended by the carpet manufacturer.

G. Remove loose and protruding yarns with sharp scissors.

H. Remove rubbish, wrapping paper, salvages, and scraps.

I. Upon completion, vacuum floors with a commercial, top loading vacuum cleaner with face-beating element.

J. After carpet has been installed, protect from soiling and damage.

3.5 REPLACE/ REPAIR

A. Replace and/ or repair all damaged and/ or uneven carpet. Contractor shall replace any flooring with bubbles or ripples to the Architect’s satisfaction.

3.6 EXTRA STOCK

A. Provide ten (10) percent extra stock of each type of carpet for future replacement. Deliver the extra stock to the Owner as directed.

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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 11 - EQUIPMENT, Division 12 - FURNISHINGS, Division 13 – SPECIAL CONSTRUCTION, Division 14 – CONVEYING EQUIPMENT, 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. Prefinished flush doors with transparent finishes: Section 08 14 00, WOOD DOORS.

C. Type of Finish, Color, and Gloss Level of Finish Coat: Section 09 06 00, SCHEDULE FOR FINISHES.

D. Glazed wall surfacing or tile like coatings: Section 09 96 59, HIGH-BUILD GLAZED COATINGS.

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 in Section 09 06 00, SCHEDULE FOR FINISHES.
      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.
   4. Intumescent clear coating or fire retardant paint.
   5. Plastic floor 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^2 (100 ft^2), selected by Resident Engineer.

B. Finish and texture approved by Resident Engineer 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-2012.....Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
ACGIH TLV-DOC-2012.....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)
A-A-3120.....Paint, For Swimming Pools (RF) (cancelled)

F. Federal Specifications (Fed Spec):
TT-P-1411A.....Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)

G. Master Painters Institute (MPI):
No. 1-12.....Aluminum Paint (AP)
No. 4-12.....Interior/ Exterior Latex Block Filler
No. 5-12.....Exterior Alkyd Wood Primer
No. 7-12.....Exterior Oil Wood Primer

No. 8-12.....Exterior Alkyd, Flat MPI Gloss Level 1 (EO)
No. 9-12.....Exterior Alkyd Enamel MPI Gloss Level 6 (EO)
No. 10-12.....Exterior Latex, Flat (AE)
No. 11-12.....Exterior Latex, Semi-Gloss (AE)
No. 18-12.....Organic Zinc Rich Primer
No. 22-12.....Aluminum Paint, High Heat (up to 590% - 1100F) (HR)
No. 26-12.....Cementitious Galvanized Metal Primer
No. 27-12.....Exterior / Interior Alkyd Floor Enamel, Gloss (FE)
No. 31-12.....Polyurethane, Moisture Cured, Clear Gloss (PV)
No. 36-12.....Knot Sealer
No. 43-12.....Interior Satin Latex, MPI Gloss Level 4
No. 44-12.....Interior Low Sheen Latex, MPI Gloss Level 2
No. 45-12.....Interior Primer Sealer
No. 46-12.....Interior Enamel Undercoat
No. 47-12.....Interior Alkyd, Semi-Gloss, MPI Gloss Level 5 (AK)
No. 48-12.....Interior Alkyd, Gloss, MPI Gloss Level 6 (AK)
No. 49-12.....Interior Alkyd, Flat, MPI Gloss Level 1 (AK)
No. 50-12.....Interior Latex Primer Sealer
No. 51-12.....Interior Alkyd, Eggshell, MPI Gloss Level 3
No. 52-12.....Interior Latex, MPI Gloss Level 3 (LE)
No. 53-12.....Interior Latex, Flat, MPI Gloss Level 1 (LE)
No. 54-12.....Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)
No. 59-12.....Interior/Exterior Alkyd Porch & Floor Enamel, Low Gloss (FE)
No. 60-12.....Interior/Exterior Latex Porch & Floor Paint, Low Gloss
No. 66-12.....Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved) (FC)
No. 67-12.....Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR)
No. 68-12.....Interior/ Exterior Latex Porch & Floor Paint, Gloss
No. 71-12.....Polyurethane, Moisture Cured, Clear, Flat (PV)
No. 74-12.....Interior Alkyd Varnish, Semi-Gloss
No. 77-12.....Epoxy Cold Cured, Gloss (EC)
No. 79-12.....Marine Alkyd Metal Primer
No. 90-12.....Interior Wood Stain, Semi-Transparent (WS)
No. 91-12.....Wood Filler Paste

No. 94-12.....Exterior Alkyd, Semi-Gloss (EO)
No. 95-12.....Fast Drying Metal Primer
No. 98-12.....High Build Epoxy Coating
No. 101-12.....Epoxy Anti-Corrosive Metal Primer
No. 108-12.....High Build Epoxy Coating, Low Gloss (EC)
No. 114-12.....Interior Latex, Gloss (LE) and (LG)
No. 119-12.....Exterior Latex, High Gloss (acrylic) (AE)
No. 135-12.....Non-Cementitious Galvanized Primer
No. 138-12.....Interior High Performance Latex, MPI Gloss Level 2 (LF)
No. 139-12.....Interior High Performance Latex, MPI Gloss Level 3 (LL)
No. 140-12.....Interior High Performance Latex, MPI Gloss Level 4
No. 141-12.....Interior High Performance Latex (SG) MPI Gloss Level 5

H. 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. Plastic Tape:
1. Pigmented vinyl plastic film in colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES or specified.
2. Pressure sensitive adhesive back.
3. Widths as shown.

C. Identity markers options:
1. Pressure sensitive vinyl markers.
2. Snap-on coil plastic markers.

D. Aluminum Paint (AP): MPI 1.

E. Interior/Exterior Latex Block Filler: MPI 4.

F. Exterior Alkyd Enamel (EO): MPI 9.

G. Organic Zinc rich Coating (HR): MPI 22.

H. High Heat Resistant Coating (HR): MPI 22.

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.
S. Interior Latex, Flat, MPI Gloss Level 1 (LE): MPI 53.
T. Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE): MPI 54.
U. Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved) (FC): MPI 66.
V. Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR): MPI 67.
W. Interior/ Exterior Latex Porch & Floor Paint, gloss: MPI 68.
X. Epoxy Cold Cured, Gloss (EC): MPI 77.
Y. Marine Alkyd Metal primer: MPI 79.
Z. Interior Wood Stain, Semi-Transparent (WS): MPI 90.
AA. Wood Filler Paste: MPI 91.
BB. Exterior Alkyd, Semi-Gloss (EO): MPI 94.
CC. Fast Drying Metal Primer: MPI 95.
DD. High Build Epoxy Coating: MPI 98.
EE. Epoxy Anti-Corrosive Metal Primer: MPI 101.
FF. High Build Epoxy Marine Coating (EC): MPI 108.
GG. Interior latex, Gloss (LE) and (LG): MPI 114.
HH. Exterior Latex, High Gloss (acrylic) (AE): MPI 119.
II. Waterborne Galvanized Primer: MPI 134.
JJ. Non-Cementitious Galvanized Primer: MPI 135.
KK. Interior High Performance Latex, MPI Gloss Level 2(LF): MPI 138.
LL. Interior High Performance Latex, MPI Gloss Level 3 (LL): MPI 139.
MM. Interior High Performance Latex, MPI Gloss Level 4: MPI 140.
NN. Interior High Performance Latex (SG), MPI Gloss Level 5: MPI 141.

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 10g/l for interior latex paints/primers and 50g/l for exterior latex paints and primers.
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.
   c. For lead-paint removal, see Section 02 83 33.13, LEAD-BASED PAINT REMOVAL AND DISPOSAL.
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.

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 no exterior painting when it is windy and dusty.
4. Do not paint in direct sunlight or on surfaces that the sun will soon warm.
5. 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.
6. 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. Zinc-Coated (Galvanized) Metal, Aluminum, Surfaces Specified Painted:
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. 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 Resident Engineer.
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 Resident Engineer, 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.
I. 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.
      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 7 (Exterior Oil Wood Primer) or MPI 5 (Exterior Alkyd Wood Primer) or sealer 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 7 (Exterior Oil Wood Primer) or MPI 5 (Exterior Alkyd Wood Primer) or sealer 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. Back prime and seal ends of exterior woodwork, and edges of exterior plywood specified to be finished.
5. 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 79 (Marine Alkyd Metal Primer) MPI 95 (Fast Drying Metal Primer) . Use MPI 101 (Cold Curing Epoxy Primer) where MPI 77 (Epoxy Cold Cured, Gloss (EC)) MPI 98 (High Build Epoxy Coating) MPI 108 (High Build Epoxy Marine Coating (EC)) finish is specified.
2. Zinc-coated steel and iron: MPI 134 (Waterborne Galvanized Primer) MPI 135 (Non-Cementitious Galvanized Primer) .
3. Aluminum scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
4. Terne Metal: MPI 79 (Marine Alkyd Metal Primer) MPI 95 (Fast Drying Metal Primer) .
5. Copper and copper alloys scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
6. Machinery not factory finished: MPI 9 (Exterior Alkyd Enamel (EO)).
7. Asphalt coated metal: MPI 1 (Aluminum Paint (AP)).
8. Metal over 94 degrees C. (200 degrees F), Boilers, Incinerator Stacks, and Engine Exhaust Pipes: MPI 22 (High Heat Resistant Coating (HR)).

G. Gypsum Board and Hardboard:
1. Surfaces scheduled to have MPI 10 (Exterior Latex, Flat (AE)) MPI 11 (Exterior Latex, Semi-Gloss (AE)) MPI 119 (Exterior Latex, High Gloss (acrylic) (AE)) or MPI 53 (Interior Latex, Flat) , MPI Gloss Level 1 LE)) MPI 52 (Interior Latex, MPI Gloss Level 3 (LE)) MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)) MPI 114 (Interior Latex, Gloss (LE) and (LG)) finish: Use MPI 10 (Exterior Latex, Flat (AE)) MPI 11 (Exterior Latex, Semi-Gloss (AE)) MPI 119 (Exterior Latex, High Gloss (acrylic)(AE)) or MPI 53 (Interior Latex, MPI Gloss Level 3 (LE)) MPI 52 (Interior Latex, MPI Gloss Level 3

(LE)) 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).
4. Use MPI 101 (Cold Curing Epoxy Primer) for surfaces scheduled to receive MPI 77 (Epoxy Cold Cured, Gloss (EC)) MPI 98 (High Build Epoxy Coating) MPI 108 (High Build Epoxy Marine Coating (EC)) finish.

3.6 EXTERIOR FINISHES

A. Apply following finish coats where specified in Section 09 06 00, SCHEDULE FOR FINISHES.

B. Steel and Ferrous Metal, Including Tern :
   1. Two coats of MPI 8 (Exterior Alkyd, Flat (EO)) MPI 9 (Exterior Alkyd Enamel (EO)) MPI 94 (Exterior Alkyd, Semi-Gloss (EO)) on exposed surfaces, except on surfaces over 94 degrees C (200 degrees F).
   2. One coat of MPI 22 (High Heat Resistant Coating (HR)) on surfaces over 94 degrees K (200 degrees F) and on surfaces of boiler incinerator stacks engine exhaust pipes.

C. Machinery without factory finish except for primer: One coat MPI 8 (Exterior Alkyd, Flat (EO)) MPI 9 (Exterior Alkyd Enamel (EO)) MPI 94 (Exterior Alkyd, Semi-Gloss (EO)) .

3.7 INTERIOR FINISHES

A. Apply following finish coats over prime coats in spaces or on surfaces specified in Section 09 06 00, SCHEDULE FOR FINISHES.

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.
d. Two coats of CID-A-A3120 Type E (RP) on exposed surfaces in battery rooms pool area chlorinator rooms .
e. Machinery: One coat MPI 9 (Exterior Alkyd Enamel (EO)).
f. Asphalt Coated Metal: One coat MPI 1 (Aluminum Paint (AP)).
g. Ferrous Metal over 94 degrees K (200 degrees F): Boilers, Incinerator Stacks, and Engine Exhaust Pipes: One coat MPI 22 (High Heat Resistant Coating (HR).

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), on exposed wood in attics with floors used for mechanical equipment and above ceilings where shown .

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).

E. Miscellaneous:

1. Apply where specified in Section 09 06 00, SCHEDULE FOR FINISHES.

2. MPI 1 (Aluminum Paint): Two coats of aluminum paint.

3. Gold Paint (GP): Two coats of gold paint.

4. Existing acoustical units scheduled to be repainted except acoustical units with a vinyl finish:

a. Clean units free of dust, dirt, grease, and other deterrents to paint adhesion.

b. Mineral fiber units: One coat of MPI 53 (Interior Latex, Flat, MPI Gloss Level 1 (LE)) MPI 52 (Interior Latex, MPI Gloss Level 3 (LE)) MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)) MPI 114 (Interior Latex, Gloss (LE) and (LG)) .

c. Units of organic fiber or other material not having a class A rating: One coat of MPI 66 (Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved) (FC)) MPI 67 (Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR)) fire retardant paint.

3.8 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) or MPI 71 (Polyurethane, Moisture Cured, Clear Flat (PV)) to match original sheen.
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.

3.9 PAINT COLOR

A. Color and gloss of finish coats is specified in Section 09 06 00, SCHEDULE FOR FINISHES.
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.

3.10 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 in Section 09 06 00, SCHEDULE FOR 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 in Section 09 06 00, SCHEDULE FOR FINISHES to match surrounding surfaces.
2. Paint colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES 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 conducts 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. Exterior Locations:

a. Apply two coats of MPI 9 (Exterior Alkyd Enamel (EO)) to the following ferrous metal items:
Vent and exhaust pipes with temperatures under 94 degrees C (200 degrees F), roof drains, fire hydrants, post indicators, yard hydrants, exposed piping and similar items.

b. Apply two coats of MPI 119 (Exterior Latex, High Gloss (acrylic) (AE)) to the following metal items:
Galvanized and zinc-copper alloy metal.

c. Apply one coat of MPI 22 (High Heat Resistant Coating (HR)), 650 degrees C (1200 degrees F) to incinerator stacks, boiler stacks, and engine generator exhaust.

2. 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. Paint electrical conduits containing cables rated 600 volts or more using two coats of MPI 94 (Exterior Alkyd, Semi-gloss (EO)) in the Federal Safety Orange color in exposed and concealed spaces full length of conduit.

3. 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))

3.11 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 in Finish Schedule, Section 09 06 00, SCHEDULE FOR FINISHES.

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. Moving and operating parts:
   a. Shafts, chains, gears, mechanical and electrical operators, linkages, and sprinkler heads, and sensing devices.
   b. Tracks for overhead or coiling doors, shutters, and grilles.
5. 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.
6. Galvanized metal:
   a. Exterior chain link fence and gates, corrugated metal areaways, and gratings.
   b. Gas Storage Racks.
   c. Except where specifically specified to be painted.
7. Metal safety treads and nosings.

8. Gaskets.

9. Concrete curbs, gutters, pavements, retaining walls, exterior exposed foundations walls and interior walls in pipe basements.
10. Face brick.
11. Structural steel encased in concrete, masonry, or other enclosure.
12. Structural steel to receive sprayed-on fire proofing.
13. Ceilings, walls, columns in interstitial spaces.
14. Ceilings, walls, and columns in pipe basements.
15. Wood Shingles.

3.12 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:

PIPING	COLOR OF EXPOSED PIPING	COLOR OF BACKGROUND	COLOR OF LETTERS	LEGEND 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		Brown	White	Fuel Oil-Grade __*
(Diesel Fuel included under Fuel Oil)				
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	Red	White	Auto Spr
Standpipe	Red	Red	White	Stand
Sprinkler	Red	Red	White	Drain

Hot Water Supply Domestic/Solar Water H.W. Sup Dom/SW
Hot Water Return Domestic/Solar Water H.W. Ret Dom/SW

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. Regular compressed air lines: Section 22 15 00, GENERAL SERVICE COMPRESSED-AIR SYSTEMS.
   b. Dental compressed air lines: Section 22 61 13.74, DENTAL COMPRESSED-AIR PIPING / Section 22 61 19.74, DENTAL COMPRESSED-AIR EQUIPMENT.

c. Laboratory gas 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.
d. Oral evacuation lines: Section 22 62 19.74, DENTAL VACUUM AND EVACUATION EQUIPMENT.
e. 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.
f. 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.

3.14 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 Section 09 06 00, SCHEDULE FOR 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)
Verify abbreviations used in the following coating sections:
Section 09 96 59, HIGH-BUILD GLAZED COATINGS GC

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SECTION 10 11 13
MARKERBOARDS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies markerboards and related items.

B. Boards may be either factory or field assembled.

C. Where shown, assemble either markerboards with tackboards into a single unit.

1.2 RELATED WORK

A. Sustainable Design Requirements: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. Manufacturer, Color, and Style of Chalkboards Markerboards and Presentation Boards: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 QUALITY ASSURANCE

Boards shall be the products of one manufacturer.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Shop Drawings: Identifying all parts by name and material and showing design, construction, installation, anchorage and relation to adjacent construction.

C. Manufacturer's Literature and Data:

2. Markerboard

D. Samples:

1. Markerboard writing surface, 300 by 300 mm (six by six inches), each color, mounted on backing.
2. Integrally colored anodized aluminum, 300 mm (six inch) length.
3. Each accessory (after approval, may be used in the work).

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 National Standards (ANSI):

Z97.1-09.....Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test

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

B221/B221M-08.....Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes

C1036-06.....Flat Glass

C1048-04.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass

F104-03(R2009).....Nonmetallic Gasket Materials

D. Composite Panel Association (CPA):

A208.1-09.....Particleboard

A135.4-04.....Basic Hardboard

E. Porcelain Enamel Institute (PEI)

1001-11.....Architectural Porcelain Enamel

PART 2 - PRODUCTS

2.1 MARKERBOARD

Markerboards shall consist of a writing surface, snap on aluminum frame, marker trough, mullions, display rail and accessories, grounds and other items specified and shown. Size as indicated on drawings.

2.2 FABRICATION

A. Materials:

1. Aluminum, extruded: ASTM B221.
2. Backing: Hardboard, AHBA A135.4 or particleboard, CPA A208.1.

B. Components:

1. Writing Surface: Factory assembly consisting of face sheet of 24 gauge sheet steel with porcelain enamel board texture finish conforming to PEI 1001, laminated to a hardboard or particleboard backing, 9 mm to 13 mm (3/8 to 1/2-inch) thick, and a 0.13 mm (0.005-inch) thick aluminum foil back sheet laminated to back-face.
2. Frames (Trim): Extruded aluminum, 1.5 mm (0.060-inch) thick, snap-on type, approximate face width 44 mm (1-3/4 inch), depth and configuration as required to return to wall and engage clips.
3. Trough: Extruded aluminum, 2.34 mm (0.092-inch) thick, not less than 75 mm (3-inch) projection from writing surface with grooved top surface, closed ends and return to wall surface at underside. Design to be snap-on type with concealed fasteners.
4. Accessories: Fabricate from aluminum with holders from spring steel. Design to suit display rail. Furnish accessories as follows:
5. Mullions: Snap-on type, same material and face width as frames, designed to finish flush with frame.

6. Grounds: Continuous zinc-coated (galvanized) steel or extruded aluminum members designed to support the board writing surface and clips for snap-on frames, map rail and chalk tray.
7. Clips: Manufacturer's standard as required to support frame, mullions, display rail, and trough.

C. Boards 3660 mm (12 feet) or less in length shall be in one piece. Larger units shall have one joint at center. Joints shall have metal spline, with faces in same plane and edges shall touch along entire length.

D. Finish exposed aluminum surfaces as follows:
1. AA 45 chemically etched medium matte, with clear anodic coating Class II Architectural, 0.4 mils thick (AA-M12C22A32).
2. AA 45 chemically etched medium matte, with integrally colored anodic coating, Class II Architectural, 0.4 mils thick (AA-M12C22A32, of color to match approved sample).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install units in accordance with the manufacturer's installation instructions, use concealed fasteners.

B. Inspect surfaces and related construction to receive units. Partitions shall have reinforcing to receive fasteners. Verify type and placement of reinforcement.

C. Do not proceed with the installation until reinforcement is in place and surfaces are flat.

D. Assemble units as specified by the manufacturer.

3.2 INSTALLATION OF CHALKBOARD AND MARKERBOARD

A. Mount board with adhesive and blocking pads spaced 16 inches on center each way.

B. Grounds designed to receive clips for snap-on trim shall be continuous and be secured 300 mm (12 inches) on center. Space clips 300 mm (12 inches) on center.

C. Miter trim at corners, conceal fasteners. Modify trim as required to conform to surrounding construction details.

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SECTION 10 11 00
TACKBOARD

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies tackboards (bulletin boards) and glass door bulletin boards and related items.

B. Boards may be either factory or field assembled.

C. Where shown, assemble both chalkboards and tackboards into a single unit.

1.2 RELATED WORK

A. Sustainable Design Requirements: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. Manufacturer, Color, and Style Tackboard: Section 09 06 00, SCHEDULE FOR FINISHES

1.3 QUALITY ASSURANCE

Boards shall be the products of one manufacturer.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Shop Drawings: Identifying all parts by name and material and showing design, construction, installation, anchorage and relation to adjacent construction.

C. Manufacturer's Literature and Data:

1. Bulletin board.
2. Glass door bulletin board.

D. Samples:

1. Tackboard, 300 by 300 mm (six by six inches), each color, mounted on backing.
2. Integrally colored anodized aluminum, 300 mm (six inch) length.
3. Cork filled map rail, 300 mm (six inch) length.
4. Each accessory (after approval, may be used in the work).

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. National Association of Architectural Metal Manufacturers (NAAMM):

AMP 500 Series.....Metal Finishes Manual
AMP 501.....Finishes for Aluminum

C. American National Standards Institute(ANSI):

Z97.1-09.....Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test

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

B221/B221M-08.....Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes

C1036-06.....Flat Glass

C1048-04.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass

F104-03(R2009).....Nonmetallic Gasket Materials

E. Composite Panel Association (CPA):

A208.1-09.....Particleboard

A135.4-04.....Basic Hardboard

PART 2 - PRODUCTS

2.1 BULLETIN BOARD

Bulletin board shall consist of a tackboard, snap on aluminum frame, grounds and other items specified and shown.

2.2 FABRICATION

A. Materials:

1. Aluminum, extruded: ASTM B221.
2. Cork: ASTM F104, Type II, mildew resistant, Class 2.
5. Backing: Hardboard, AHBA A135.4 or particleboard, CPA A208.1.

B. Components:

1. Tackboard:
   a. Cork backing, 6 mm (1/4-inch) thick factory laminated to a hardboard or particleboard backing of thickness required so that the face of the cork will be in the same plane as the face of the markerboard writing surface, 6 mm to 9 mm (1/4 to 3/8-inch) thick.
   b. Fabric: Class A flame retardant rating with stain-resistant treatment.
2. Frames (Trim): Extruded aluminum, 1.5 mm (0.060-inch) thick, snap-on type, approximate face width 44 mm (1-3/4 inch), depth and configuration as required to return to wall and engage clips.
3. Display Rail: Snap-on type, same materials as frames, approximate face width one inch with 6 mm (1/4-inch) thick cork insert.
4. Mullions: Snap-on type, same material and face width as frames, designed to finish flush with frame.

5. Grounds: Continuous zinc-coated (galvanized) steel or extruded aluminum members designed to support the tackboard and clips for snap-on frames, and map rail
6. Clips: Manufacturer's standard as required to support frame, mullions, and display rail,
7. Tubular Frame (For glass door bulletin board): Extruded aluminum, 2.34 mm (0.092 inches) thick; tubular or open back in section, with flanges for concealed attachment, designed to support door hardware and tackboard.

C. Bulletin boards 3660 mm (12 feet) or less in length shall be in one piece. Larger units shall have one joint at center. Joints shall have metal spline, with faces in same plane and edges shall touch along entire length.

D. Finish exposed aluminum surfaces as follows:
1. AA 45 chemically etched medium matte, with clear anodic coating Class II Architectural, 0.4 mils thick (AA-M12C22A32).
2. AA 45 chemically etched medium matte, with integrally colored anodic coating, Class II Architectural, 0.4 mils thick (AA-M12C22A32, of color to match approved sample).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install units in accordance with the manufacturer's installation instructions, use concealed fasteners.

B. Inspect surfaces and related construction to receive units. Partitions shall have reinforcing to receive fasteners. Verify type and placement of reinforcement.

C. Do not proceed with the installation until reinforcement is in place and surfaces are flat.

D. Assemble units as specified by the manufacturer.

3.2 INSTALLATION OF BULLETIN BOARD:

A. (Except glass door bulletin boards):
1. Mount bulletin boards with adhesive and blocking pads spaced 16 inches on center each way.
2. Grounds designed to receive clips for snap-on trim shall be continuous and be secured 300 mm (12 inches) on center. Space clips 300 mm (12 inches) on center.
3. Miter trim at corners, conceal fasteners. Modify trim as required to conform to surrounding construction details.

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SECTION 10 14 00
SIGNAGE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies interior signage for room numbers, directional signs, code required signs, telephone identification signs and temporary interior signs.

B. This section also specifies exterior medical center identification signs, building identification signs, parking and traffic signs.

C. Installation of Government furnished dedication plaque and VA seal.

1.2 RELATED WORK

A. Sustainable Design Requirements: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. Electrical Work: Division 26, ELECTRICAL.

C. Lighted EXIT signs for egress purposes are specified under Division 26, ELECTRICAL.

E. Color and Finish of Interior Signs: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 MANUFACTURER'S QUALIFICATIONS

Sign manufacturer shall provide evidence that they regularly and presently manufactures signs similar to those specified in this section as one of their principal products.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 00, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Samples: Sign panels and frames, with letters and symbols, each type. Submit 2 sets. One set of samples will be retained by Resident Engineer, other returned to Contractor.

1. Sign Panel, as shown with letters.
2. Color samples of each color, 150 mm x 150 mm (6 inches x 6 inches. Show anticipated range of color and texture.
3. Sample of typeface, arrow and symbols in a typical full size layout.

C. Manufacturer's Literature:

1. Showing the methods and procedures proposed for the concealed anchorage of the signage system to each surface type.
2. Manufacturer’s printed specifications, anchorage details, installation and maintenance instructions.

D. Shop Drawings: Sign location plan, showing location, type and total number of signs required. Scaled for manufacture and fabrication of sign types. Identify materials, show joints, welds, anchorage, accessory items, mounting and finishes. Full size layout patterns for dimensional letters.

1.5 DELIVERY AND STORAGE

A. Deliver materials to job in manufacturer's original sealed containers with brand name marked thereon. Protect materials from damage.

B. Package to prevent damage or deterioration during shipment, handling, storage and installation. Maintain protective covering in place and in good repair until removal is necessary.

C. Deliver signs only when the site and mounting services are ready for installation work to proceed.

D. Store products in dry condition inside enclosed facilities.

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):
B209-07.....Aluminum and Aluminum-Alloy Sheet and Plate
B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and tubes.

C. Federal Specifications (Fed Spec):
MIL-PRF-8184F.....Plastic Sheet, Acrylic, Modified.
MIL-P-46144C.....Plastic Sheet, Polycarbonate

1.7 MINIMUM SIGN REQUIREMENTS

A. Applicable References:
1. VA Signage Design Guide – 2012
2. Architectural Barriers Act Accessibility Standard (ABAAS) – 2006
3. American with Disabilities Act (ADA) – 2010
4. National Fire Protection Association (NFPA) 101 – 2012
5. VA Palo Alto Health Care System Exterior and Interior Standards - 2014

A. Permanent Rooms and Spaces:
1. Tactile and Braille Characters, raised minimum 0.793 mm (1/32 in). Characters shall be accompanied by Grade 2 Braille.
2. Type Styles: Characters shall be uppercase, Helvetica Medium, Helvetica Medium Condensed and Helvetica Regular.
3. Character Height: Minimum 16 mm (5/8 in) high, Maximum 50 mm (2 in).

4. Symbols (Pictograms): Equivalent written description shall be placed directly below symbol, outside of symbol's background field. Border dimensions of symbol background shall be minimum 150 mm (6 in) high.
5. Finish and Contrast: Characters and background shall be eggshell, matte or other non-glare finish with adequate contrast with background.
6. Mounting Location and Height: As shown. Mounted on wall adjacent to the latch side of the door and to avoid door swing and protruding objects.

B. Overhead Signs:
1. Type Styles: As shown. Characters shall have a width-to-height ratio between 3:5 and 1:1. Characters shall have a stroke width-to-height ratio of between 1:5 and 1:10.
2. Character Height: minimum 75 mm (3 in) high for overhead signs. As shown, for directional signs.
3. Finish and Contrast: Same as for signs of permanent rooms and spaces.
4. Mounting Location and Height: As shown.

1.8 COLORS AND FINISHES:

Section 09 06 00, SCHEDULE FOR FINSIHES.

PART 2 - PRODUCTS

2.1 GENERAL

A. Signs of type, size and design shown on the drawings and as specified.
B. Signs complete with lettering, framing and related components for a complete installation.
C. Provide graphics items as completed units produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.
D. Do not scale drawings for dimensions. Contractor to verify and be responsible for all dimensions and conditions shown by these drawings. Resident Engineer to be notified of any discrepancy in drawing, in field directions or conditions, and/or of any changes required for all such construction details.
E. The Sign Contractor, by commencing work of this section, assumes overall responsibility, as part of his warranty of work, to assure that assemblies, components and parts shown or required within the work of the section, comply with the Contract Documents. The Contractor shall further warrant: That all components, specified or required to satisfactorily complete the installation are compatible with each other and with conditions of installations.

2.2 PRODUCTS

A. Aluminum:
   1. Sheet and Plate: ASTM B209.
   2. Extrusions and Tubing: ASTM B221.
B. Cast Acrylic Sheet: MIL-PRF-8184F; Type II, class 1, Water white non-glare optically clear. Matt finish water white clear acrylic shall not be acceptable.
C. Polycarbonate: MIL-P-46144C; Type I, class 1.
D. Vinyl: 0.1 mm thick machine cut, having a pressure sensitive adhesive and integral colors.

2.3 SIGN STANDARDS

A. Topography:
   1. Type Style: Helvetica Bold and Helvetica Bold Condensed. Initial caps or all caps as indicated in Sign Message Schedule.
   2. Arrow: See graphic standards in drawings.
   3. Letter spacing: See graphic standards on drawings.
   4. Letter spacing: See graphic standards on drawings.
   5. All text, arrows, and symbols to be provided in size, colors, typefaces and letter spacing shown. Text shall be a true, clean, accurate reproduction of typeface(s) shown. Text shown in drawings are for layout purposes only; final text for signs is listed in Sign Message Schedule.
B. Project Colors and Finishes: See Section 09 06 00, SCHEDULE FOR FINISHES.

2.4 SIGN TYPES

A. General:
   1. The interior sign system is comprised of sign types families that are identified by a letter and number which identify a particular group of signs. An additional number identifies a specific type of sign within that family.
a. IN indicates an interiorcomponent construction based sign.
B. Interchangeable Component System:
   1. Sign Type Families: 03, 04, 05, 06, 07, 08, 09 10, 11 12, 13, 14, 15, 16 and 17.
   2. Interior sign system capable of being arranged in a variety of configurations with a minimum of attachments, devices and connectors.
      a. Interchangeable nature of the system shall allow for changes of graphic components of the installed sign, without changing sign in its entirety.

b. Component Sign System is comprised of the following primary components:
   1) Rail Back utilizing horizontal rails, spaced to allow for uniform, modular sizing of sign types.
   2) Rail Insert mounted to back of Copy Panels to allow for attachment to Rail Back.
   3) Copy Panels, made of a variety of materials to allow for different graphic needs.
   4) End Caps which interlock to Rail Back to enclose and secure changeable Copy Panels.
   5) Joiners and Accent Joiners connect separate Rail Backs together.
   6) Top Accent Bars which provide decorative trim cap that encloses the top of sign or can connect the sign to a Type 03 Room Number Sign.

c. Rail Back, Rail Insert and End Caps in anodized extruded aluminum to allow for tight tolerances and consistent quality of fit and finish.

d. Signs in system shall be convertible in the field to allow for enlargement from one size to another in height and width through use of Joiners or Accent Joiners, which connect Rail Back panels together blindly, providing a butt joint between Copy Panels. Accent Joiners shall connect Rail Backs together with a visible 3 mm (1/8") horizontal rib, flush to the adjacent copy insert surfaces.

e. Sign configurations shall vary in width from 225 mm (9 inches) to 2050 mm (80 inches), and have height dimensions of 50 mm (2 inches), 75 mm (3 inches), 150 mm (6 inches), 225 mm (9 inches) and 300 mm (12 inches). Height shall be increased beyond 300 mm (12 inches), by repeating height module in full or in part.

3. Rail Back functions as internal structural member of sign using 6063T5 extruded aluminum and anodized black.

   a. Shall accept an extruded aluminum or plastic insert on one sign or on both sides, depending upon sign type.

   b. Shall be convertible in field to allow for connection to other Rail Back panels, so that additive changes can be made to sign unit.

   c. Rail shall allow for a variety of mounting devices including wall mounting for screw-on applications, using pressure sensitive tape,

freestanding mount, ceiling mount and other mounting devices as needed.

4. Rail Insert functions as a mounting device for Copy Panels on to the Rail Back. The Rail Insert mounts to the back of the Copy Panel with adhesive suitable for use with the particular copy insert material.
   a. Shall allow Copy Panels to slide or snap into the horizontal Rail Back for ease of changeability.
   b. Shall mount to the back of the Copy Panel with adhesive suitable for use with particular Copy Panel material.
5. Copy Panels shall accept various forms of copy and graphics, and attaches to the Rail Back with the Rail Insert. Copy Panels shall be either ABS plastic with integral color or an acrylic lacquer finish; photo polymer; or, acrylic.
   a. Interchangeable by sliding horizontally from either side of sign, and to other signs in system of equal or greater width or height.
   b. Cleanable without use of special chemicals or cleaning solutions.
   c. Copy Insert Materials.
      1) ABS Inserts - 2.3 mm (.090 inches) extruded ABS plastic core with .07 mm (.003 inches) acrylic cap bonded during extrusion/texturing process. Pressure bonded to extruded Rail Insert using adhesive. Background color is either integral or painted in acrylic lacquer. ABS inserts finished in a chromium industries #HM335RA texture pattern to prevent glare.
      2) Photo polymer Inserts - 3 mm (.125 inches) phenolic photo polymer with raised copy etched to 2.3 mm (.0937 inches), bonded to an ABS plastic or extruded aluminum insert with adhesive. Background color is painted in acrylic enamel.
      3) Changeable Paper/ Insert Holder - Extruded insert holder with integral Rail Insert for connection with structural back panel in 6063T5 aluminum with a black anodized finish. Inserts into holder are paper with a clear 0.7 mm (.030 inches) textured cover. Background color is painted in acrylic lacquer.
      4) Acrylic - 2 mm (.080 inches) non-glare acrylic. Pressure bonded to extruded Rail Insert using adhesive. Background color is painted in acrylic lacquer or acrylic enamel.
      5) Extruded 6063T5 aluminum with a black anodized finish Insert Holder with integral Rail Insert for connection with Structural Back Panel to hold a 0.7 mm (.030 inches) textured polycarbonate insert and a Sliding Tile which mounts in the Inset Holder and slides horizontally.

6) End Caps - Extruded using 6063T5 aluminum with a black anodized. End Caps interlock with Rail Back with clips to form an integral unit, enclosing and securing the changeable Copy Panels, without requiring tools for assembly.
   a) Shall be interchangeable to either end of sign and to other signs in the system of equal height.
   b) Mechanical fasteners can be added to the End Caps that will secure it to Rail Back to make sign tamper resistant.
7) Joiners - Extruded using 6063T5 aluminum with a black anodized finish. Rail Joiners connect Rail Backs together blindly, providing a butt joint between Copy Inserts.
8) Accent Joiners - Extruded using 6063T5 aluminum with a mirror polished finish. Joiner shall connect Rail Backs together with a visible 3 mm (.125 inches) horizontal rib, flush to the adjacent Copy Panel surfaces.
9) Top Accent Rail - Extruded using 6063T5 aluminum with a mirror polished finish. Rail shall provide 3 mm (.125 inches) high decorative trim cap, which butts flush to adjacent Copy Panel and encloses top of Rail Back and Copy Panel.
10) Typography
   a) Vinyl First Surface Copy (non-tactile) - Applied Vinyl copy.
   b) Subsurface Copy Inserts - Textured 1 mm (.030 inches) clear polycarbonate face with subsurface applied Vinyl copy. Face shall be back sprayed with paint and laminated to an extruded aluminum carrier insert.
   c) Integral Tactile Copy Inserts - phenolic photo polymer etched with 2.3 mm (.0937 inches) raised copy.
   d) Silk-screened First Surface Copy (non-tactile) - Injection molded or extruded ABS plastic or aluminum insert with first surface applied enamel silk-screened copy.

C. Sign Type Family 01, 02.01 thru 02.05, 08, 09 and 20:
   1. All text and graphics are to be first surface silk-screened.
   2. IN-01.12 & IN-01.13: Refer to Sign Type 03 specification for tactile and Braille portion of sign.
   3. IN-02.4: All text and graphics are to be first surface vinyl letters.
   4. IN-01.1: Preparation of artwork for reproduction of "fire and emergency evacuation maps" is by manufacturer.
D. Sign Type Families 03:

1. Tactile sign is to be made from a material that provides for letters, numbers and Braille to be integral with sign plaque material such as: photosensitive polyamide resin, etched metal, sandblasted phenolic or embossed material. Do not apply letters, numbers and Braille with adhesive.
2. Numbers, letters and Braille to be raised 0.793 mm (.0312 inches) from the background surface. The draft of the letters, numbers and Braille to be tapered, vertical and clean.
3. Braille dots are to conform with standard dimensions for literary Braille; (a) Dot base diameter: 1.5 mm (.059 inches) (b) Inter-dot spacing: 2.3 mm (.090 inches) (c) Horizontal separation between cells: 6.0 mm (.241 inches) (d) Vertical separation between cells: 10.0 mm (.395 inches)
4. Entire assembly is painted in specified color. After painting, apply white or other specified color to surface of the numbers and letters. Entire sign is to have a protective clear coat sealant applied.
5. Complete sign is to have an eggshell finish (11 to 19 degree on a 60 degree glossmeter).

E. Sign Type Family 04 and 11:
1. All text and graphics are to be first surface applied vinyl letters.
2. IN-04: When a Type IN-04 is to be mounted under a Type IN03, a connecting Accent Joiner is to be used to create a singular integrated sign.

F. Sign Type 05:
1. Text if added to Copy Insert module to be first surface applied vinyl letters.

G. Sign Type Family 06 and 07:
1. A11 text and graphics are to be first surface applied vinyl letters except for under sliding tile.
2. Protect text, which is covered by sliding tile, so tile does not wear away letters.

H. Sign Type Family 10:
1. Pocket depth is to be 0.3 mm (.0150 inches).

I. Sign Type Family 12 and 13:
1. A11 text and graphics are to be first surface applied vinyl letters.
2. IN-12: Provide felt, cork or similar material on bottom of desk mounting bracket to protect counter surfaces.

J. Sign Type Family 14, 15,and 16:
1. A11 text and graphics are to be first surface applied vinyl letters.

2. IN-14.06: When added to top of IN-14.01, IN-14.04, or IN-14.05 a connecting Accent Joiner is to be used to create a singular integrated sign.
3. Ceiling mounted signs required mounting hardware on the sign that allows for sign disconnection, removal and reinstallation and reconnection.

K. Sign Type Family 17:
1. A11 text and graphics are to be first surface applied vinyl letters.
2. IN-17: Directory constructed using elements of the Component System.

L. Sign Type Family 18:
1. A11 text and graphics are to be first surface applied stylus cut vinyl letters.
2. Provide in specified typeface, color and spacing, with each message or message group on a single quick release backing sheet.

M. Sign Type Family 19:
1. Dimensional letters are mill or laser cut acrylic in the size and thickness noted in the drawings.
2. Draft of letters is perpendicular to letters face.
3. All corners such as where a letter stem and bar intersect are to be square so the letter form is accurately reproduced.
4. Paint letters with acrylic polyurethane in specified color and finish.

N. Sign Type Family (See Specialty Signs Section) 21:
1. IN-21.01: 57 mm (2.25 inches) polished aluminum tube mounted to weighted 356 mm (14 inches) diameter polished aluminum base. Sign bracket to hold a 6 mm (.25 inches) sign plaque.
2. IN-21.02: 57 mm (2.25 inches) polished aluminum tube vertical support mounted to a weighted polished 57 mm (2.25 inches) aluminum tubular base. Rail Back mechanically connected to vertical supports with Copy Panel attached to front and back.
3. IN-21.03 & 21.04: IN-21.02: 57 mm (2.25 inches) polished aluminum tube vertical support mounted to a weighted polished 57 mm (2.25 inches) aluminum tubular base. Rail Back mechanically connected to vertical supports with hinged locking glass door. Black felt covered changeable letter board or tan vinyl impregnated cork tack surface as background within case.

O. Sign Type Family 22:
1. IN-22.01: Extruded aluminum clip anodized black containing rollers to pinch and release paper. End caps are black plastic.

2. IN-22.02: Patient Information holder constructed of 18 gauge formed sheet metal painted in specified color. Polished aluminum connecting rods and buttons. Button covers for mounting screws are to permanently attach and securely conceal screws.

P. Temporary Interior Signs:

1. Fabricated from 50 kg (110 pound) matte finished white paper cut to 100 mm (4 inch) wide by 300 mm (12 inch) long. Punched 3 mm (.125 inch) hole with edge of hole spaced 13 mm (.5 inch) in from edge and centered on 100 mm (4 inch) side. Reinforce hole on both sides with suitable material that prevents tie form pulling through hole. Ties are steel wire 0.3 mm (0.120 inch) thick attached to tag with twist leaving 150 mm (6 inch) long free ends.
2. Mark architectural room number on sign, with broad felt marker in clearly legible numbers or letters that identify room, corridor or space as shown on floor plans.
3. Install temporary signs to all rooms that have a room, corridor or space number. Attach to door frame, door knob or door pull.
   a. Doors that do not require signs are: corridor doors in corridor with same number, folding doors or partitions, toilet doors, bathroom doors within and between rooms, closet doors within rooms, communicating doors in partitions between rooms with corridor entrance doors.
   b. Replace and missing damaged or illegible signs.

2.5 FABRICATION

A. Design components to allow for expansion and contraction for a minimum material temperature range of 56 °C (100 °F), without causing buckling, excessive opening of joints or over stressing of adhesives, welds and fasteners.

B. Form work to required shapes and sizes, with true curve lines and angles. Provide necessary rebates, lugs and brackets for assembly of units. Use concealed fasteners whenever and wherever possible.

C. Shop fabricate so far as practicable. Joints fastened flush to conceal reinforcement, or welded where thickness or section permits.

D. Contact surfaces of connected members be true. Assembled so joints will be tight and practically unnoticeable, without use of filling compound.

E. Signs shall have fine, even texture and be flat and sound. Lines and miters sharp, arises unbroken, profiles accurate and ornament true to pattern. Plane surfaces be smooth flat and without oil-canning, free of

rack and twist. Maximum variation from plane of surface plus or minus 0.3 mm (0.015 inches). Restore texture to filed or cut areas.

F. Level or straighten wrought work. Members shall have sharp lines and angles and smooth su1rfaces.

G. Extruded members to be free from extrusion marks. Square turns and corners sharp, curves true.

H. Drill holes for bolts and screws. Conceal fastenings where possible. Exposed ends and edges mill smooth, with corners slightly rounded. Form joints exposed to weather to exclude water.

I. Finish hollow signs with matching material on all faces, tops, bottoms and ends. Edge joints tightly mitered to give appearance of solid material.

J. All painted surfaces properly primed. Finish coating of paint to have complete coverage with no light or thin applications allowing substrate or primer to show. Finished surface smooth, free of scratches, gouges, drips, bubbles, thickness variations, foreign matter and other imperfections.

K. Movable parts, including hardware, are be cleaned and adjusted to operate as designed without binding of deformation of members. Doors and covers centered in opening or frame. All contact surfaces fit tight and even without forcing or warping components.

L. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

M. No signs are to be manufactured until final sign message schedule and location review has been completed by the Resident Engineer & forwarded to contractor.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Protect products against damage during field handling and installation. Protect adjacent existing and newly placed construction, landscaping and finishes as necessary to prevent damage during installation. Paint and touch up any exposed fasteners and connecting hardware to match color and finish of surrounding surface.

B. Mount signs in proper alignment, level and plumb according to the sign location plan and the dimensions given on elevation and sign location drawings. Where otherwise not dimensioned, signs shall be installed where best suited to provide a consistent appearance throughout the

project. When exact position, angle, height or location is in doubt, contact Resident Engineer for clarification.

C. Contractor shall be responsible for all signs that are damaged, lost or stolen while materials are on the job site and up until the completion and final acceptance of the job.

D. Remove or correct signs or installation work Resident Engineer determines as unsafe or as an unsafe condition.

E. At completion of sign installation, clean exposed sign surfaces. Clean and repair any adjoining surfaces and landscaping that became soiled or damaged as a result of installation of signs.

F. Locate signs as shown on the Sign Location Plans.

G. Certain signs may be installed on glass. A blank glass back up is required to be placed on opposite side of glass exactly behind sign being installed. This blank glass back up is to be the same size as sign being installed.

H. Contractor will be responsible for verifying that behind each sign location there are no utility lines that will be affected by installation of signs. Any damage during installation of signs to utilities will be the sole responsibility of the Contractor to correct and repair.

I. Furnish inserts and anchoring devices which must be set in concrete or other material for installation of signs. Provide setting drawings, templates, instructions and directions for installation of anchorage devices which may involve other trades.

- - - END - - -

SECTION 10 21 23
CARRIER-LESS CUBICLE CURTAIN TRACK SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies carrier-less cubicle curtain track (C.C.T.).

1.2 RELATED WORK

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: One 300 mm (12 inch) long piece of cubicle curtain track 3 hangers, and end stop.
One clip anchor for fastening track to grid system of acoustical ceilings. Three curtain carrier.

C. Shop Drawings: Showing layout of tracks and method of anchorage.

D. Manufacturer's Literature and Data:
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 WARRANTY:

A. Construction Warranty: Cubicle curtain tracks are subject to the terms of the Article “Warranty of Construction,” FAR clause 52.246-21.

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. ASTM International (ASTM):
B221-14.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes

B221M-13.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes (Metric)

B456-11.....Electrodeposited Coatings for Copper Plus Nickel Plus Chromium and Nickel Plus Chromium

C. Aluminum Association (AA):

DAF 45-09.....Designation System for Aluminum Finishes

D. American Architectural Manufacturers Association (AAMA):

2603-13.....Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels

E. The National Association of Architectural Metal Manufacturers (NAAMM):

AMP 500 Series.....Metal Finishes Manual

PART 2 - PRODUCTS

2.1 CUBICLE CURTAIN TRACKS

A. Suspended Type

2. Tubular Track (Suspended Type): Seamless drawn aluminum tubing, ASTM B221, alloy 6061 temper T6, 25 mm (one inch) outside diameter, not less than 1.5 mm (0.060 inch) wall thickness.

B. End Wall Plate, Swivel Clip with Drop Ceiling Grid Mounting Plate, Hanger and Tube Connector, Ceiling Flanges and Other Accessories: Fabricate from the same material with the same finish as the tracks or from nylon.

C. Hangers and Track Connectors: Fabricate from the same material with the same finish as the tracks. Design fittings to be compatible with design of tracks and to safely transmit the track load to the hangers. Hangers to be designed to allow side mounting of split ring cubicle curtain

D. Curtain Loading Tools (2): Fabricated of extruded aluminum. Tool to be designed to load split ring cubicle curtain onto suspended track system.

2.3 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. Hangers & Track Connector: Anchor Hangers & Track Connectors using manufacturer’s recommended anchors and attachment devices.

2.4 FINISHES

A. Aluminum: Powder Coated White Finish.

2.5 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 or suspend from above 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 610 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 914 mm (3 feet) on center.

E. Fasten end stop caps to prevent them from being forced out by the striking weight of carriers.

F. Anchor surface mounted intravenous track directly to support system above ceiling.

G. Remove damaged or defective components and replace with new components or repair to the original condition.

H. Install track rigid, plumb, level and true, and securely anchored to the overhead construction.

I. Verify that carrier units operate smoothly and easily over the full range of travel.

3.2 ACCEPTANCE

A. Track shall be installed neat, rigid, plumb, level and true, and securely anchored to the overhead construction.

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SECTION 10 25 13
PATIENT BED SERVICE WALLS

PART 1 – GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation and connection of the patient wall system. Patient wall system are also referred to as headwall units or HWs.

1.2 RELATED WORK

A. Sustainable Design Requirements: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. Section 09 06 00, SCHEDULE FOR FINISHES: Color and finishes of the patient wall units.

C. Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES AND Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES: Requirements for air, oxygen and vacuum outlets in the patient wall units.

D. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that are common to more than one section of Division 26.

E. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Raceways and outlet boxes for wiring.

F. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.

G. Section 26 27 26, WIRING DEVICES: Wiring devices to be installed in the patient wall units.

H. Section 26 24 16, PANELBOARDS: Panelboard requirements for patient wall units with a panelboard.

I. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground currents.

J. Section 26 51 00, INTERIOR LIGHTING: Lighting fixture requirements when installed in or connected to the patient wall units.

K. Section 27 52 23, NURSE CALL/CODE BLUE SYSTEMS: Nurse Call and Code One requirements for installation in the patient wall units.

1.3 SUBMITTALS

A. In accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, submit the following:

B. Shop Drawings:
   1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
   2. Include electrical ratings, dimensions, mounting details, front view, side view, equipment and device arrangement, wiring diagrams, material, and connection diagrams.
   3. Determine final layout of each style of patient wall system at this stage. Provide configuration drawings showing all possible device (nurse call, medical gases, electrical receptacles and switches, etc.) locations to the Resident Engineer. The Resident Engineer will provide by return of submittal the desired configuration of each style of patient wall system. Limit the number and type of devices allowed for each style of unit to the number and type of devices specified for that style below.
C. Manuals: Two weeks prior to the final inspection, deliver four copies of the following to the Resident Engineer.
   1. Complete maintenance and operating manuals including wiring diagrams, technical data sheets, and information for ordering replacement parts:
      a. Include complete "As installed" diagrams which indicate all items of equipment, their interconnecting wiring and interconnecting piping.
      b. Include complete diagrams of the internal wiring for each of the items of equipment, including "As installed" revisions of the diagrams.
      c. Identify terminals on the wiring diagrams to facilitate installation, maintenance and operation.
D. Certifications: Two weeks prior to the final inspection, deliver four copies of the following certifications to the Resident Engineer:
   1. Certification by the manufacturer that the equipment conforms to the requirements of the drawings and specifications.
   2. Certification by the Contractor that the equipment has been properly installed, adjusted, and tested in accordance with the manufacturer’s recommendations.

1.4 APPLICABLE PUBLICATIONS:

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent

referenced. Publications are referenced in text by the basic designation only.

B. National Fire Protection Association (NFPA):
70-11.....National Electrical Code (NEC)
99-12.....Health Care Facilities

C. Underwriters Laboratories, Inc. (UL):
UL listed in product category SECTIONS AND UNITS (QQXX). This standard used to investigate listed products in this category is NFPA 70 (NEC).

PART 2 - PRODUCTS

2.1 PATIENT WALL SYSTEMS

A. Shall be UL listed.

B. Shall consist of a structural framework, removable panels and removable equipment console units, factory assembled to house all permanent bedside services including but not necessarily limited to fixtures, grounding jacks, power outlets, telephone outlet, nurses call patient station, medical gas outlet(s) and other fittings or devices.

C. Shall conform to the following:
1. Applicable requirements in NFPA 70 (NEC) and NFPA 99.
2. Assembly and all components shall be UL listed or labeled.

D. Coordinate the mounting space provisions for the nurse call equipment with Section 27 52 23, NURSE CALL/CODE BLUE SYSTEMS.

E. Compressed Air, Oxygen, Carbon Dioxide and Vacuum System Equipment: Furnish, install and test the equipment in accordance with the drawings and Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES and Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES.
1. Fixed medical gas outlets are permanently installed in one location and may not be moved without special tools and shutting off the gas involved.
2. Movable medical gas outlets:
a. Hose connected to gas manifold type:
1) The hoses connected to gas manifold shall be UL listed and labeled for the purpose.
2) All hoses shall be accessible at all times. Use bars or other restraining devices to control exposed hoses. A panel may cover the hoses provided it can be easily removed with out the use of special tools for hose inspection.

b. Relocatable type:
   1) Relocatable (snap-in) without the use of tools to any one of several different fixed locations.
   2) Appropriate relocatable adapter can be used to access available gases from each fixed location.
   3) Cover all unused locations with a blank (no gas) adapter plate.

F. Electrical receptacles and switches shall comply with the requirements in Section 26 27 26, WIRING DEVICES; grounding in Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS; and internal wiring in Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW).

G. Styles:
   1. Style HW1: A single bed patient horizontal semi-recessed wall unit. Outlet, receptacles, and accessory configurations and quantities are indicated on the drawings.

H. Unit shall have the following features:
   1. Basic structural framework shall be constructed of heavy gage extruded aluminum or minimum 1.9 mm (14 gage) cold-rolled steel, designed to be a self-supporting unit for above-the-floor, for close wall mounting or a freestanding installation.
   2. Drill and tap the side frame members to permit the installation of front panel devices at modular intervals at any elevation between the top and bottom.
   3. Provide removable front panels:
      a. Construct panel of the following materials:
         1) Fire retarding core material surfaced with a high pressure plastic laminated facing sheet.
         2) Vinyl material heat and pressure applied over a minimum of 1.6 mm (0.060 inch) sheet aluminum back braced for rigidity and sound control.
         3) Vinyl material heat and pressure applied over sheet steel minimum 1.6 mm (0.060 inch).
         4) Vinyl material heat and pressure applied over sheet aluminum minimum 2.0 mm (0.080 inch).
      b. Color and texture shall be as specified in the Section 09 06 00, SCHEDULE FOR FINISHES.
      c. Bond the panel edges with an aluminum extrusion or cold-rolled steel trim designed for mounting directly to the structural framework, thus allowing the panels to be easily removed for

access to internal components and for servicing of utility connections or future modifications. Secure panels with hidden screws or other means to offer an overall finished appearance. All exposed metal surfaces or trims greater than 4 mm (1/8 inch) wide shall be of anodized aluminum or stainless steel finished to resist abrasion and affects from hospital cleaning compounds.

5. Mount patient service components in an equipment console made up of a backbox and finish fascia.
   a. Use galvanized steel backbox with outlet gang openings on minimum 60 mm (2.4 inches) uniform centers to provide mounting supports of front panel devices. Provide removable metal barriers to separate voltage sources and to facilitate wiring between segregated devices within the same horizontal module.
   b. Match finish, either anodized aluminum or stainless steel of all fascia and device face plates.
   c. Fascia and/or face plates may be omitted for power and grounding receptacles in the consoles if the receptacles are mounted flush in the PBPU cover panel and facilities (support members, tapped holes, spacing, etc.) are provided behind the panel for future addition or relocation of receptacles.
   d. Provide smooth external surfaces having a finished appearance. Maintain adequate spacing of device plates and similar items to eliminate crevices and facilitate cleaning.
6. Provide patient services as indicated in paragraphs Styles above, the schematic wiring diagram shown on drawings, and as follows:
   a. Electrical components: Factory assembled and prewired to a sectionalized junction box at the top of the unit in accordance with circuiting and switching arrangements shown on the drawings. Factory assembled prewiring may be stranded in sizes AWG #10 and #12. Provide an equipotential ground bus with lugs suitable for connecting AWG #14 to AWG #6 conductors with a minimum of 48 screw-type terminals, unless otherwise shown.
   b. Receptacles: Single Hospital Grade NEMA 5-20R, unless otherwise specified.
   c. Provide medical gas components compatible with those installed elsewhere in the project that are factory assembled, manifolded and pre-piped, using medical grade copper pipe, to single point connections of each service at the top of the units.

d. Provide nurse call services consisting of provisions for adequate space and matching face plates for the equipment and empty conduit to the sectionalized junction box at the top of the unit.
e. Provide internal power and signal wiring in separate EMT, flexible metal conduits or approved raceway. Separate normal power circuits from emergency power circuits. Also, provide adequate supports for conduits and piping within the structural frame.
f. Telephone outlets/jacks: Plug-in type as approved by the VAMC.
g. Except for anodized aluminum and galvanized or stainless steel surfaces, clean and paint all other metal surfaces at the factory with primer and not less than two coats of baked enamel.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Installation shall be in accordance with NFPA 70 (NEC), NFPA 99, and as shown on the drawings.
B. Compressed Air, Oxygen and Vacuum System Equipment:
   1. Install and test the equipment and piping system in accordance with the drawings and Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES and Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES.
   2. Install and make connections as required for a complete and operational patient wall system for each unit.

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SECTION 10 26 00
WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies wall guards (crash rails or bumper guards), corner guards and door/door frame protectors and high impact wall covering.

1.2 RELATED WORK

A. Sustainable Design Requirements: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. Armor plates and kick plates not specified in this section: Section 08 71 00, DOOR HARDWARE.

C. Wall Paneling: Section 06 61 16, SOLID POLYMER FABRICATIONS

D. Color and texture of aluminum and resilient material: Section 09 06 00, SCHEDULE FOR FINISHES.

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. Indicate locations of all splices and terminations.

C. Manufacturer's Literature and Data:

1. Wall Guards.
2. Corner Guards.
3. Door/Door Frame Protectors.
4. High Impact Wall covering

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(R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
B221-08.....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
E84-09.....Surface Burning Characteristics of Building Materials

C. The National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500-06.....Metal Finishes Manual

D. National Fire Protection Association (NFPA):
80-10.....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. Stainless Steel: ASTM A167, Type 302B.

B. Aluminum Extruded: ASTM B221, Alloy 6063, Temper T5 or T6. Aluminum alloy used for colored anodizing coating shall be as required to produce specified color.

C. Resilient Material:
1. Extruded and injection molded acrylic vinyl or extruded polyvinyl chloride meeting following requirements:
   a. 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).
   b. 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.
   c. Rated self extinguishing when tested in accordance with ASTM D635.
   d. Material shall be labeled and tested by Underwriters Laboratories or other approved independent testing laboratory.

e. 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.
f. Same finish on exposed surfaces.

2.2 CORNER GUARDS

A. Resilient, Shock-Absorbing Corner Guards: Flush mounted type of 6 mm (1/4-inch corner) formed to profile shown.
1. Snap-on corner guard formed from resilient material, minimum 2 mm (0.078-inch) thick, free floating on a continuous 1.6 mm (0.063-inch) thick extruded aluminum retainer. Design retainer used for flush mounted type to act as a stop for adjacent wall finish material. 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.
3. Flush mounted corner guards installed on any fire rated wall shall maintain the fire rating of the wall. Provide fire test of proposed corner guard system to verify compliance.
a. Where insulating materials are an integral part of the corner guard system, the insulating materials shall be provided by the manufacturer of the corner guard system.
b. All exposed metal in fire rated assemblies shall have a paintable finish.

2.3 WALL GUARDS

A. Resilient Wall Guards:
1. 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.
2. Provide and wall guards (crash rails) with prefabricated and 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.

2.4 DOOR AND DOOR FRAME PROTECTION

A. Fabricate door and door frame protection items from vinyl acrylic or polyvinyl chloride resilient material, minimum 1.5 mm (0.060-inch) thick, for doors and 0.9 mm (0.035-inch) thick for door frames , as shown.

B. Coordinate door and door frame protection material requirements with door and frame suppliers to insure fit for all components, and color as specified.

C. Provide adhesive as recommended by resilient material manufacturer.

2.5 HIGH IMPACT WALL COVERING

A. Fabricate from vinyl acrylic or polyvinyl chloride resilient material minimum 1.5mm (0.06 inch) thick designed specially for interior use.

B. Coordinate with door guard rail protection material and supplier for proper fit, installation and color.

C. Provide adhesive as recommended by the wall covering manufacturer.

2.6 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.

2.7 FINISH

A. In accordance with NAAMM AMP 500 series.

B. 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 in Section 09 06 00, SCHEDULE FOR FINISHES.

PART 3 - INSTALLATION

3.1 RESILIENT CORNER GUARDS

A. Install corner guards on walls in accordance with manufacturer's instructions.

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.

3.2 RESILIENT WALL GUARDS (CRASH RAIL)

A. Secure guards to walls with brackets and fasteners in accordance with manufacturer's details and instructions.

3.3 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 manufacture’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, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies manufactured items usually used in dressing rooms, toilets, baths, locker rooms and at sinks in related spaces.

B. Items Specified:

1. Paper towel dispenser. VA Furnished/VA Installed
2. Waste receptacles. VA Furnished/VA Installed
3. Toilet tissue dispenser. VA Furnished/VA Installed
4. Grab Bars: (10800-1.DWG).
5. Shower curtain rods: (10800-2.DWG) and (10800-3.DWG).
6. Clothes hooks, robe or coat.
7. Towel bars.
8. Metal framed mirror: (10800-7.DWG).
9. Foot operated soap dispenser.
10. Soap dishes.
11. Mop racks.
12. Stainless steel shelves, Type 45 (10801-1.DWG)
13. Hand Sanitizer Dispensers – VA Furnished/VA Installed
14. Soap Dispenser – VA Furnished/VA Installed

C. This section also specifies custom fabricated items used in toilets and related spaces.

1.2 RELATED WORK

A. Color of finishes: Section 09 06 00, SCHEDULE FOR FINISHES

B. Ceramic toilet and bath accessories: Section 09 30 13, CERAMIC TILING

C. Color of vinyl fabric: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Shop Drawings:

1. Each product specified.
2. Metal framed mirrors, showing shelf where required, fillers, and design and installation of units when installed on ceramic tile wainscots and offset surfaces.
3. Shower Curtain rods, showing required length for each location.
4. Grab bars, showing design and each different type of anchorage.
5. Foot operated soap dispenser, showing anchorage and components.

6. 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.
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.

1.4 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.

1.5 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.

1.6 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):

1. A269/A269M-15 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
2. A312/A312M-15b - Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
3. A653/A653M-15 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. A666-15 - Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
5. A1011/A1011M-14 - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
6. B30-14a - Copper Alloys in Ingot Form.
7. B75/B75M-11 - Seamless Copper Tube.
8. B221-14 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
9. B221M-13 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
10. B456-11e1 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
11. B824-14 - General Requirements for Copper Alloy Castings.
12. C1036-11e1 - Flat Glass.
13. C1048-12e1 - Heat-Strengthened and Fully Tempered Flat Glass.
14. D635-14 - Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
15. F446-85(2009) - Grab Bars and Accessories Installed in the Bathing Area.

C. The National Association of Architectural Metal Manufacturers (NAAMM):

1. AMP 500-06 - Metal Finishes Manual.

D. American Welding Society (AWS):

1. D10.4-86(2000) - Welding Austenitic Chromium-Nickle Stainless Steel Piping and Tubing.

E. Federal Specifications (Fed. Specs.):

1. A-A-3002 - Mirror, Glass.
2. FF-S-107C(2) - Screws, Tapping and Drive.

3. WW-P-541/8B(1) - Plumbing Fixtures (Accessories, Land Use).

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, and for mirror doors in medicine cabinets.
2. ASTM C1036, Type 1 Class 1 Quality q3, for shelves in medicine cabinets.
3. ASTM C1048, Kind FT, Condition A, Type 1, Class 1 (use in Mental Health and Behavior Nursing Unit Psychiatric Patient Areas and Security Examination Rooms where mirrors and glass are specified).

G. Foam Rubber: ASTM D3453, Grade BD, Type 2.

H. Vinyl Covering: ASTM D3690, Vinyl coated fabric, Class A.

I. Plywood: PS1, Grade CD.

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.
4. Nylon Coated Steel: Nylon coating powder formulated for a fluidized bonding process to steel to provide a hard smooth, medium gloss finish, not less than 0.3 mm (0.012-inch) thick, rated as self-extinguishing when tested in accordance with ASTM D635.

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 – VA FURNISHED, VA INSTALLED

2.7 WASTE RECEPTACLES – VA FURNISHED, VA INSTALLED

2.8 TOILET TISSUE DISPENSERS – VA FURNISHED, VA INSTALLED

2.9 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:

1. Stainless steel: Grab bars, flanges, mounting plates, supports, screws, bolts, and exposed nuts and washers.

C. Concealed mount.

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.

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.

2.10 SHOWER CURTAIN RODS

A. Stainless steel tubing, minimum 1.27 mm (0.050 inch) wall thickness, 32 mm (1-1/4 inch) outside diameter.

B. Flanges, stainless steel rings, 66 mm (2.6 inch) minimum outside diameter, with 2 holes opposite each other for 6 mm (1/4 inch) stainless steel fastening bolts. Provide set screw within curvature of each flange for securing rod.

C. Intermediate Support: For rods over 1800 mm (72 inches) long. Provide adjustable ceiling flanges with set screws, tubular hangers and stirrups.

2.11 CLOTHES HOOKS-ROBE OR COAT

A. Fabricate hook units either of chromium plated brass with a satin finish, or stainless steel, using 6 mm (1/4 inch) minimum thick stock, with edges and corners rounded smooth to the thickness of the metal, or 3 mm (1/8 inch) minimum radius.

B. Fabricate each unit as a double hook on a single shaft, integral with or permanently fastened to the wall flange, provided with concealed fastenings.

2.12 TOWEL BARS

A. Fed. Spec. WW-P-541/8B, Type IV, Bar, Surface mounted; Class 1, towel.

B. Stainless steel, or chromium plated copper alloy.

C. Bar Length: 450 and 600 mm (18 and 24 inches) as shown.

D. Finish brackets and supports to match bar.

2.13 METAL FRAMED MIRRORS

A. Fed. Spec. A-A-3002 metal frame; chromium finished steel.

B. Mirror Glass:

1. Minimum 6 mm (1/4 inch) thick.
2. Set mirror in a protective vinyl glazing tape.

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 chrome finished steel.
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.

2.15 FOOT OPERATED SOAP DISPENSER – NOT USED

2.16 SOAP DISHES

A. Fed. Spec. WW-P-541/8B, Type VI, Holder.

B. Class 1, Surface Mounted:

1. One piece with provisions for exposed fasteners.
2. Fabricate from chromium plated brass approximately 115 by 95 mm (4 1/2 by 3-3/4 inches) overall size with drainage openings at bottom.

C. Class 2, Recessed:

1. One piece seamless shell and flange with provisions for concealed fasteners.
2. Fabricate from either chromium plated brass, or 0.8 mm (0.0329 inch) thick stainless steel.
3. Form surface of soap tray with raised ridges or patterned dimples to provide gripping surface for soap bar, or provide flush soap tray with a retaining lip. Plastic soap trays or tray inserts are not acceptable.

2.18 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.

2.19 STAINLESS STEEL SHELVES, TYPES /45

A. Fabricate shelves and brackets to design shown of 1.2 mm (0.0478-inch) thick stainless steel.

B. Round and finish smooth projecting corners of shelves and edge corners of brackets. Drill brackets for 6 mm (1/4-inch) anchor bolts.

C. Screw or weld brackets to shelves.

2.20 HAND SANITIZER DISPENSERS – VA FURNISHED, VA INSTALLED

2.21 SOAP DISPENSER – VA FURNISHED, VA INSTALLED

2.22 TOILET SEAT COVER DISPENSER – VA FURNISHED/VA INSTALLED

PART 3 - EXECUTION

3.1 PREPARATION

A. Before starting work notify Resident Engineer in writing of any conflicts detrimental to installation or operation of units.

B. Verify with the Resident Engineer 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.

3.3 SCHEDULE OF ACCESSORIES

A. Refer to Equipment Plans and Architectural Interior Elevations for accessories locations.

3.4 CLEANING

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

This section covers recessed fire extinguisher cabinets.

1.2 RELATED WORK

A. Section 08 80 00, GLAZING.

B. 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):
D4802-10.....Poly (Methyl Methacrylate) Acrylic Plastic Sheet

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHER CABINET

Recessed type with flat trim of size and design 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.

2.3 FINISH

A. Finish interior and exterior of cabinet body with baked-on semigloss white enamel.

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 (36 inches) above finished floor unless otherwise shown on drawings.

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SECTION 11 73 00
CEILING MOUNTED PATIENT LIFT SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

Ceiling Mounted Patient Lift Systems for the transfer of physically challenged patients are specified in this section. The installation shall include all required mechanical, electrical and plumbing modifications to meet current code and ordinance requirements pertinent to the lift installation. Along with the below but not limited to the described requirements.

1.2 RELATED WORK

A. Section 01 00 00, GENERAL REQUIREMENTS: Requirements for pre-test of equipment.

B. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic requirements for non-structural equipment.

C. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General Electrical Requirements and items, which are common to sections of Division 26.

1.3 QUALITY ASSURANCE

A. Certification for compliance is required for Ceiling Mounted Patient Lift Systems. Certifications shall be provided by an independent third party who will conduct testing to ensure that the ceiling lift and charging system are safe and in compliance with ISO 10535 & UL 60601-1

B. Inspection of equipment after installation is required prior to use for patient movement. Inspection shall be in accordance with manufacturer’s installation checklist and the facilities installation checklist (Patient Safety Alert AL14-07).

1.4 SUBMITTALS

A. Submit in accordance with specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Certificates of Compliance

C. Manufacturer's Literature and Data:

1. Lifting Capacity
2. Lifting Speed
3. Horizontal Displacement Speeds
4. Horizontal Axis Motor
5. Vertical Axis Motor
6. Emergency Brake

7. Emergency Lowering Device
8. Emergency Stopping Device
9. Electronic Soft-Start and Soft-Stop Motor Control
10. Current Limiter for Circuit Protection
11. Low Battery Disconnect System
12. Strap Length
13. All equipment anchors and supports. Submittals shall include weights, dimensions, center of gravity, standard connections, manufacturer's recommendations and behavior problems (e.g., vibration, thermal expansion,) associated with equipment or piping so that the proposed installation can be properly reviewed.

D. Individual Room layouts showing location of lift system installation shall be approved before proceeding with installation of lifts.

E. Completed “Installation or Relocation Checklist for Ceiling Mounted Patient Lifts” included at the end of this specification section.

1.5 APPLICABLE PUBLICATIONS

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

B. International Organization for Standardization (IOS):
10535-06.....Hoist for the Transfer of Disabled Persons-Requirements and Test Methods

C. Underwriters Laboratories (UL):
60601-1(2003).....Medical Electrical Equipment: General Requirements for Safety
94-2013.....UL Standards for Safety Test for Flammability of Plastic Materials for Parts in Devices and Appliances-Fifth Edition

D. International Electromagnetic Commission (IEC):
801-2(1991).....Electromagnetic Compatibility for Industrial-Process Measurement and Control Equipment-Part 2: Electromagnetic Discharge Requirements

E. Patient Safety Alert AL14-07

PART 2 - PRODUCTS

2.1 CEILING TRACK SYSTEM

The Ceiling Track shall be made from high strength extruded aluminum T66081-T5 at a thickness of 3/16” (4.8mm). Provide anchor supports at a

minimum 3 per linear foot at ceiling substrate. The ceiling track shall be finished with baked enamel paint.

2.2 LIFT UNIT

A. The Lift Unit shall be constructed of a steel frame system (2205lbs / 1000kg tested) driven by a gear reduced high torque motor

B. The Lift system shall have the following features.

1. Lifting capacity: 600 lbs (272 kg)
2. Electronic soft-start and soft-stop motor control
3. Emergency lowering device
4. Emergency stopping device
5. Current limiter for circuit protection in case of overload.
6. Safety device that stops the motor to lift when batteries are low.
7. Lifting speed: 2.3in/s (6 cm/s), 1.6in/s (3.5cm) in full capacity
8. Horizontal displacement speed: 5.9in/s (150mm/s)
9. Horizontal axis motor: 24VDC at 62 watts and vertical axis motor at 110 watts
10. Emergency brake (in case of mechanical failure)
11. Strap length up to 90in (2.3m) tested for 2998lbs (1360kg)
12. Cab: VO plastic–fire retardant, UL 94
13. Wireless remote control (optional)

2.3 MOTORS

A. Vertical Movement-DC Motor

1. Type: Class A, fully enclosed, permanent magnet.
2. Rating: 24Vdc, 1.1A, 110W, 4000RPM, 0.3N-m.
3. Mounting: Secured to chassis.

B. Horizontal Movement-DC Motor

1. Type: Fully enclosed, permanent magnet, integral reducer.
2. Rating: 24Vdc, 1.8A, 62W, 260RPM, 1.0N-m.
3. Mounting: Secured to chassis.

2.4 BATTERIES

A. The life cycle (number of charging cycles) for batteries shall be in compliance with IEC 801-2.

B. Provide rechargeable batteries with up to 120 transfers with a load of 200lbs (74kg) and up to 70 transfers with its maximum load of 440lbs (200kg).

2.5 CHARGER

A. Charger Input: 100-240 Vac, 50/60 Hz.

B. Charger Output: 27 Vdc, 1 A max.

C. Supplemental to the charger provide a clip on charging station with indicator lights.

2.6 STRAPS AND SLING

A. The straps shall be made of threaded nylon. The straps shall ensure the patient's safety by preventing the patient from falling out of the sling.

B. The sling shall be made from a polyester/nylon net material that is pliable, breathable and easy to use. The sling shall cradle the body of the patient.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION

A. Perform site survey of the pre-existing conditions and as-built drawings above and below finish ceiling at the installation location to confirm existing structural and ceiling conditions.

B. Obtain structural and related engineering design drawings and calculations for the new lift installation. Design drawings shall be developed for specific lift installation under specific pre-existing conditions of the facility.

C. If the facility is located in a seismic area, as identified in va handbook h-18-8 seismic design requirements, verify that the ceiling mounted patient lift system installation is in compliance with the requirements of VA directive 7512 seismic safety of va buildings and va master design specification 13.05.041 seismic restraint requirements for non-structural components.

D. Verify that the lift is listed by the manufacturer to be installed and operated in the environment that the lift is operating under. (for example, water tight lifts shall be installed and operated in wet, damp or humid locations such as pools or bathrooms.)

E. Verify NFPA 13 compliance for fire sprinkler system (including but not limited to fire sprinkler heads and piping).

F. Verify NFPA 99 and NFPA 70 compliance for proper grounding and bonding

G. Verify NFPA 99 and NFPA 70 compliance for access to electrical and safety systems.

H. Verify required access to mechanical, HVAC, and fire systems components within the lift installation area.

I. Verify minimum clearances for operation are compliant with manufacturer recommendations. (ensure room clearance and that the ceiling height is adequate for lift usage.)

J. JPerform pre-installation walkthrough to confirm full understanding and consensus of design drawing(s) and installation conditions.

3.1 INSTALLATION

A. Install ceiling mounted patient lift system as per manufacturer's instruction and under the supervision of manufacturer's qualified representative and as shown on drawings.
B. If the distance in between the suspended ceiling and anchors is more than 18″ consult with manufacturer to determine if lateral braces will be required.
C. Verify proper connections of the lift's structural system to the building’s structure (including seismic bracing if applicable).
D. Verify proper interface at the ceiling (hard deck or soft tile) and proper installation of all protective features around the support rods and rails/tracks.
E. Verify structural component sizing and physical installation to ensure that the correct structural system is in place and properly installed to support the lift.
F. Verify proper installation of electric motor per manufacturer's instructions to ensure operational rigidity of motor mounting.
G. Verify proper electrical connections per design drawings and manufacturer's instructions.

3.1 POST INSTALLATION

H. Perform walkthrough to ensure compliance of the installation per the design drawing(s) and manufacturer's instructions.
I. Perform operational test to verify lift functionality.

3.2 INSTRUCTION AND PERSONNEL TRAINING

A. Training shall be provided for the required personnel to educate them on proper operation and maintenance for the lift system equipment.
B. Verify that manufacturer or manufacturer’s representative has provided training on the use of patient handling equipment to clinicians and other staff who move and handle patients.
C. Verify that training and competency are documented prior to release for use with patients.
D. Confirm that the manufacturer's operating and maintenance manuals for this lift have been received.

3.3 TEST

A. Conduct performance test, in the presence of the Resident Engineer and a manufacturer's field representative, to show that the patient lift system equipment and control devices operate properly and in accordance with design and specification requirements.
B. Verification of any “soft start” or “soft stop” features and that lifting speed does not exceed 2.5 inches per second with “zero” load.
C. Verification of load testing and deflection testing at the manufacturer's specified maximum rated lift capacity.
D. Verification of any “soft start” and “soft stop” features and that lifting speed does not exceed 1.5 inches per second under maximum rated lift capacity.
E. Verification of any “soft start” and “soft stop” features and that lifting speed does not exceed 1.5 inches per second under maximum rated lift capacity.
F. Verification of function of emergency stop at maximum rated lift capacity.
G. Verification of emergency lowering feature at maximum rated lift capacity.

3.4 INSPECTION

A. Inspection of installed ceiling mounted patient lift systems shall be conducted in accordance with the manufacturer’s installation checklist and the facilities installation checklist (Patient Safety Alert AL14-07) prior to use for patient movement.
B. Inspection of lift unit casing for cracks and alignment.
C. Verification that the lift unit charges properly.
D. Inspection and activation of hand control for full operation (e.g., up, down, left, right) and “return to charge” function if applicable.
E. Confirm any and all lift unit indicator lights are functioning. (e.g., red service warning light, charging state light)
F. Inspection and verification of all emergency functions of the lift unit.
G. Full extension and inspection of lift strap for loose threads or frays.
H. Inspection of spreader bar and clips for cracks and for loose or missing rings or cotter pins.

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SECTION 12 24 00

WINDOW SHADES

PART 1 - GENERAL

1.1 DESCRIPTION

Cloth shades are specified in this section. Window shades shall be furnished complete, including brackets, fittings and hardware.

1.2 RELATED WORK

A. Color of shade cloth (including tapes and cords: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 QUALITY CONTROL

Manufacturer's Qualification: Venetian blind and vertical blind manufacturer shall provide evidence that the manufacture of blinds are a major product, and that the blinds have performed satisfactorily on similar installations.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Samples:

1. Shade cloth, each type, 600 mm (24 inch) square, including cord and ring, showing color, finish and texture.

C. Manufacturer's literature and data; showing details of construction and hardware for:

Cloth and window shades

D. Shop Drawings: Shop Drawings:

1. Interior Elevations at 3/8-inch scale minimum, indicating shade layout, seam/ batten/ idler cable locations and coordination with surrounding conditions.
2. Floor plans or reflected ceiling plans showing overall arrangement and locations of shades, seam/ batten/ idler cable locations where applicable, and control systems.
3. Head, jamb and sill details as necessary to coordinate with surrounding conditions and construction.
4. Shade schedule coordinating room number, window type, opening sizes, quantities and keys to details.
5. Complete wiring and control diagrams including details showing the integration of motor controllers and shade control systems with building systems and connection requirements for all components

supplied by this Section for installation under DIVISION 26, ELECTRICAL.

a. Indicate locations of all junction boxes and coordinate locations with shade motors.

E. Certificate of Compliance: Contractor shall submit a notarized certificate of compliance indicating compliance with the requirements of the Specifications including statement that specified warranty will be provided without restriction. Shade Contractor shall certify that materials proposed for use comply with applicable building code(s).

1.5 APPLICABLE PUBLICATIONS

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

B. Federal Specifications (Fed. Spec.):

AA-V-00200B.....Venetian Blinds, Shade, Roller, Window, Roller, Slat, Cord, and Accessories

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

A167-99(R2009).....Stainless and heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip

B221/B221M-08.....Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes

PART 2 - PRODUCTS

2.1 MATERIALS

A. Shade Cloth: translucent & opaque.

B. Stainless Steel: ASTM A167

C. Extruded Aluminum: ASTM B221/B221M.

2.2 FASTENINGS

Zinc-coated or cadmium plated metal, aluminum or stainless steel fastenings of proper length and type. Except as otherwise specified, fastenings for use with various structural materials shall be as follows:

Type of Fastening	Structural Material
Wood screw	Wood
Tap screw	Metal
Case-hardened, self-tapping screw	Sheet Metal
Screw or bolt in expansion shields	Solid masonry

Toggle bolts	Hollow blocks, wallboard and plaster

2.3 FABRICATION

A. Fabricate cloth shades to fit measurements of finished openings obtained at site.

B. Shade Systems:

1. Manually operated interior single roller shades with Shade Cloth.

C. Shade Cloth:

1. General: Color of each type of shade cloth to be selected from manufacturer's standard colors as indicated per Section 09 06 00, SCHEDULE FOR FINISHES.

D. Hembar: Shall be continuous extruded aluminum for the entire width of the shade band, and shall be heat sealed on all sides so as to be fully concealed, unless otherwise noted.

E. Guide wire: Shall be 1/8-inch braided and coated stainless steel aircraft cable.

F. Shade Band and Shade Roller Attachment:

1. Shade roller tube shall be of extruded aluminum with diameter and wall thickness as required to support shade fabric without excessive deflection.
2. Shade band shall have positive mechanical attachment to shade roller without requiring use of adhesives, adhesive tapes, staples or rivets.
3. Attach shade bands to shade rollers such that removal and replacement of shade bands can be accomplished without removing either the tube from the brackets or without removing shade brackets. Shade bands must be replaceable onsite.

G. Shade Hardware:

1. Shade hardware system shall permit:
   a. Removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
   b. Removal and re-mounting of the shade band without having to remove the shade roller tube, drive or operating support brackets.
   c. Field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position.

d. Operation of multiple shade bands offset by a maximum of 8-45 degrees from the motor axis between shade bands on each side of the radial line, by a single shade motor.

2. Shade hardware shall be constructed of minimum 1/8-inch thick plated steel, or of heavier and thicker steel as required to support 150 percent of the full weight of each shade.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that surfaces and areas that are to receive Work of this Section are satisfactory for the installation of window shades. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Installation of window shades constitutes Installer’s acceptance of substrate conditions and agreement that the conditions meet window shade manufacturer’s requirements.

B. Verify that all blocking and framing necessary to carry each shade assembly is properly and securely installed.

C. Verify that all electrical and control wiring for each window shade is complete prior to starting Work of this Section.

3.2 INSTALLATION

A. Install each unit in compliance with manufacturer’s instructions for the type of mounting and operation required. Provide units plumb, true and securely anchored in place with recommended hardware and accessories.

B. Coordinate with the Work of other Trades for securing shade units to finished surfaces.

C. Provide fascia panels where shades are not to be recessed in construction, as shown in the Drawings.

D. Install shade bands with the following tolerances:

1. Shade bands shall not be located closer than 2 inches to the interior face of glass. Allow additional clearance as necessary for operable window hardware, where occurs.
2. Maximum variation of gap at perimeter of window opening: 1/4-inch per 8-feet of shade height.
3. Maximum offset from level: 1/16-inch per 5-feet of shade width, non accumulative.
4. All shade bands hall be aligned within 1/4-inch.
5. Shade installation methods not specifically described, are subject to approval of Resident Engineer.

3.3 ADJUSTMENT AND PROTECTION

A. Adjust and balance roller shades to operate smoothly, easily, safely and free from binding or malfunction throughout the entire operational range.
B. Adjust shade fabrics to hang flat without buckling or distortion.
C. Protect installed shade units from damage, blemishes or repeated use until the completion of the Project.

3.4 CLEANING AND REPAIR

A. Clean all exposed surfaces using non-abrasive materials and employing methods recommended by the shade fabric manufacturer.
B. Touch up damaged finishes and repair minor damage in field without indication of repair.
C. Remove and replace any Work which cannot be satisfactorily repaired in field or cleaned as determined by the Architect.

3.5 TRAINING

Installer shall instruct and train Owner’s personnel in the proper operation, adjustment and maintenance of window shade systems.

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SECTION 13 05 41
SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS

PART 1 – GENERAL

1.1 DESCRIPTION:

A. Provide seismic restraint in accordance with the requirements of this section in order to maintain the integrity of nonstructural components of the building so that they remain safe and functional in case of seismic event.

B. The design to resist seismic load shall be based on Seismic Design Categories per section 4.0 of the VA Seismic Design Requirements (H-18-8) dated August 2013, http://www.cfm.va.gov/til/etc/seismic.pdf.

C. Definitions: Non-structural building components are components or systems that are not part of the building's structural system whether inside or outside, above or below grade. Non-structural components of buildings include:

1. Architectural Elements: Facades that are not part of the structural system and its shear resistant elements; cornices and other architectural projections and parapets that do not function structurally; glazing; nonbearing partitions; suspended ceilings; stairs isolated from the basic structure; cabinets; bookshelves; medical equipment; and storage racks.
2. Electrical Elements: Power and lighting systems; substations; switchgear and switchboards; auxiliary engine-generator sets; transfer switches; motor control centers; motor generators; selector and controller panels; fire protection and alarm systems; special life support systems; and telephone and communication systems, electrical conduits, cable trays and raceways.
3. Mechanical Elements: Heating, ventilating, and air-conditioning systems; medical gas systems; plumbing systems; sprinkler systems; pneumatic systems, Pipes and Ducts.
4. Transportation Elements: Mechanical, electrical and structural elements for transport systems, i.e., elevators and dumbwaiters, including hoisting equipment and counterweights.

1.2 RELATED WORK:

A. Section No. 05 50 00

1.3 QUALITY CONTROL:

A. Shop-Drawing Preparation:

1. Have seismic-force-restraint shop drawings and calculations prepared by a professional structural engineer experienced in the area of seismic force restraints. The professional structural engineer shall be registered in the state where the project is located.
2. Submit design tables and information used for the design-force levels, stamped and signed by a professional structural engineer registered in the State where project is located.
3. Submit shop drawings, anchorage details and calculations for all non-structural components for review and approval by the Architect and the Structural Engineer of Record with the exception noted below.

Exception: - Calculations are not required for non- structural components that are shown and detailed on the Construction Documents. However, shop drawings need to be prepared and shall be submitted for the review and approval of the Architect and Structural Engineer of Record,

B. Coordination:
1. Do not install seismic restraints until seismic restraint submittals are approved by the Resident Engineer.
2. Coordinate and install trapezes or other multi-pipe hanger systems prior to pipe installation.

C. Seismic Certification:
In structures assigned to IBC Seismic Design Category D, permanent equipment and components are to have Special Seismic Certification in accordance with requirements of section 13.2.2 of ASCE 7 except for equipment that are considered rugged as listed in section 2.2 OSHPD code application notice CAN No. 2-1708A.5, and shall comply with section 13.2.6 of ASCE 7.

1.4 SUBMITTALS:

A. Submit a coordinated set of equipment anchorage drawings prior to installation including:
1. Description, layout, and location of items to be anchored or braced with anchorage or brace points noted and dimensioned.
2. Details of anchorage or bracing at large scale with all members, parts brackets shown, together with all connections, bolts, welds etc. clearly identified and specified.
3. Numerical value of design seismic brace loads.
4. For expansion bolts, include design load and capacity if different from those specified.

B. Submit prior to installation, a coordinated set of bracing drawings for seismic protection of piping, with data identifying the various support-to-structure connections and seismic bracing structural connections, include:
   1. Single-line piping diagrams on a floor-by-floor basis. Show all suspended piping for a given floor on the same plain.
   2. Type of pipe (Copper, steel, cast iron, insulated, non-insulated, etc.).
   3. Pipe contents.
   4. Structural framing.
   5. Location of all gravity load pipe supports and spacing requirements.
   6. Numerical value of gravity load reactions.
   7. Location of all seismic bracing.
   8. Numerical value of applied seismic brace loads.
   9. Type of connection (Vertical support, vertical support with seismic brace etc.).
   10. Seismic brace reaction type (tension or compression): Details illustrating all support and bracing components, methods of connections, and specific anchors to be used.

C. Submit prior to installation, bracing drawings for seismic protection of suspended ductwork and suspended electrical and communication cables, include:
   1. Details illustrating all support and bracing components, methods of connection, and specific anchors to be used.
   2. Numerical value of applied gravity and seismic loads and seismic loads acting on support and bracing components.
   3. Maximum spacing of hangers and bracing.
   4. Seal of registered structural engineer responsible for design.

D. Submit design calculations prepared and sealed by the registered structural engineer specified above in paragraph 1.3A.

E. Submit for concrete anchors, the appropriate ICBC evaluation reports, OSHPD pre-approvals, or lab test reports verifying compliance with OSHPD Interpretation of Regulations 28-6.

1.5 APPLICABLE PUBLICATIONS:

A. The Publications listed below (including amendments, addenda revisions, supplements and errata) form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only.

B. American Concrete Institute (ACI):

355.2-07.....Qualification for Post-Installed Mechanical Anchors in Concrete and Commentary

318-11.....Building Code Requirements for Structural Concrete

C. American Institute of Steel Construction (AISC):
Load and Resistance Factor Design, Volume 1, Second Edition

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

A36/A36M-08.....Standard Specification for Carbon Structural Steel

A53/A53M-10.....Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

A307-10.....Standard Specification for Carbon Steel Bolts and Studs; 60,000 PSI Tensile Strength.

A325-10.....Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

A325M-09.....Standard Specification for High-Strength Bolts for Structural Steel Joints [Metric]

A490-10.....Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength

A490M-10.....Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints [Metric]

A500/A500M-10.....Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

A501-07.....Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing

A615/A615M-09.....Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

A992/A992M-06.....Standard Specification for Steel for Structural Shapes for Use in Building Framing

A996/A996M-09.....Standard Specification for Rail-Steel and Axel-Steel Deformed Bars for Concrete Reinforcement

E488-96(R2003).....Standard Test Method for Strength of Anchors in Concrete and Masonry Element

E. American Society of Civil Engineers (ASCE 7-10)

F. California Building Code (CBC-Latest Edition)

G. VA Seismic Design Requirements, H-18-8, August 2013
H. National Uniform Seismic Installation Guidelines (NUSIG)
I. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Seismic Restraint Manual for Mechanical- OSHPD2009 Edition
J. International Seismic Application Technology (ISAT) – OSHPD OPA No. 0485
K. Unistrut Corp. – OSHPD OPA No. 01210
L. Mason Industries – OSHPD OPA No. 030049
M. Tolco B-Line Corporation – OSHPD OPA No. 300
N. NFPA 13

1.6 REGULATORY REQUIREMENT:

A. CBC Latest Edition.

B. Exceptions: The seismic restraint of the following items may be omitted:
1. Equipment weighing less than 400 pounds, which is supported directly on the floor or roof.
2. Equipment weighing less than 20 pounds, which is suspended from the roof or floor or hung from a wall.
3. Gas and medical piping less than 1″ inches inside diameter.
4. Piping in boiler plants and equipment rooms less than 1 ¼ inches inside diameter.
5. All other piping less than 2 ½ inches inside diameter, except for automatic fire suppression systems.
6. All piping suspended by individual hangers, 12 inches or less in length from the top of pipe to the bottom of the support for the hanger.
7. All electrical conduits, less than 2 ½ inches inside diameter.
8. All rectangular air handling ducts less than six square feet in cross sectional area.
9. All round air handling ducts less than 28 inches in diameter.
10. All ducts suspended by hangers 12 inches or less in length from the top of the duct to the bottom of support for the hanger.

PART 2 – PRODUCTS

2.1 STEEL:

A. Structural Steel: ASTM A36
B. Hollow Structural Sections (HSS): ASTM A500, Grade B.
C. Bolts & Nuts: ASTM A307 and A325

2.2 CAST-IN-PLACE CONCRETE:

A. Concrete: 28-day strength, f’c = 25 MPa (3,000 psi)
B. Reinforcing Steel: ASTM A615/615M Grade 60 deformed bars.

PART 3 – EXECUTION

3.1 CONSTRUCTION, GENERAL:

A. Provide equipment supports and anchoring devices to withstand the seismic design forces, so that when seismic design forces are applied, the equipment cannot displace, overturn, or become inoperable.

B. Provide anchorages in conformance with recommendations of the equipment manufacturer and as shown on approved shop drawings and calculations.

C. Construct seismic restraints and anchorage to allow for thermal expansion.

D. Testing Before Final Inspection:

1. Test 10-percent of anchors in concrete per ASTM E488, and ACI 355.2 to determine that they meet the required load capacity. If any anchor fails to meet the required load, test the next 20 consecutive anchors, which are required to have zero failure, before resuming the 10-percent testing frequency.
2. Before scheduling Final Inspection, submit a report on this testing indicating the number and location of testing, and what anchor-loads were obtained.

3.2 EQUIPMENT RESTRAINT AND BRACING:

A. See drawings for equipment to be restrained or braced.

3.3 MECHANICAL DUCTWORK AND PIPING; ELECTRICAL BUSWAYS, CONDUITS, AND CABLE TRAYS; AND TELECOMMUNICATION WIRES AND CABLE TRAYS

A. Support and brace mechanical ductwork and piping; electrical busways, conduits and cable trays; and telecommunication wires and cable trays to resist directional forces (lateral, longitudinal and vertical).

B. Brace duct and breeching branches with a minimum of 1 brace per branch.

D. Provide supports and anchoring so that, upon application of seismic forces, piping remains fully connected as operable systems which will not displace sufficiently to damage adjacent or connecting equipment, or building members.

E. Seismic Restraint of Piping:

1. Design criteria:
   a. Follow CBC 2013 and ASCE 7-10 requirements.

F. Piping Connections: Provide flexible connections where pipes connect to equipment. Make the connections capable of accommodating relative differential movements between the pipe and equipment under conditions of earthquake shaking.

3.4 PARTITIONS

A. In buildings with flexible structural frames, anchor partitions to only structural element, such as a floor slab, and separate such partition by a physical gap from all other structural elements.

3.5 CEILINGS AND LIGHTING FIXTURES

A. At regular intervals, laterally brace suspended ceilings against lateral and vertical movements, and provide with a physical separation at the walls.

B. Independently support and laterally brace all lighting fixtures. Refer to applicable portion of lighting specification, Section 26 51 00, INTERIOR LIGHTING.

3.6 STORAGE RACKS, CABINETS, AND BOOKCASES

A. Install storage racks to withstand earthquake forces and anchored to the floor or laterally braced from the top to the structural elements.

B. Anchor medical supply cabinets to the floor or walls and equip them with properly engaged, lockable latches.

C. Anchor filing cabinets that are more than 2 drawers high to the floor or walls, and equip all drawers with properly engaged, lockable latches.

D. Anchor bookcases that are more than 30 inches high to the floor or walls, and equip any doors with properly engaged, lockable latches.

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