

# PROJECT MANUAL

for



## **VA SAN DIEGO HEALTHCARE SYSTEM RENOVATE BUILDING 1 FIRST FLOOR FOR VOLUNTEER AND PATIENT SERVICES PHASE 2**

DEPARTMENT OF VETERANS AFFAIRS  
3350 La Jolla Village Drive  
San Diego, CA 92161

VA PROJECT NO. 664-09-103

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**DEPARTMENT OF VETERANS AFFAIRS  
PROJECT SPECIFICATIONS**

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VA SAN DIEGO  
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**SECTION 01 00 00**

**GENERAL REQUIREMENTS**

**1.1 GENERAL INTENTION**

- A. Contractor shall completely prepare site for building operations, including demolition and removal of existing structures, and furnish labor and materials and perform work to RENOVATE ADMINISTRATIVE SPACE FOR SOCIAL WORK AND OEF/OIF TRANSITION CENTER (PHASE 2), as required by drawings and specifications.
- B. Visits to the site by Bidders may be made only by appointment with the Medical Center Engineering Officer.
- C. Offices of GKKWorks Architects, 1775 Hancock Street, Suite 150, San Diego, CA 92110 as Architect-Engineers, will render certain technical services during construction. Such services shall be considered as advisory to the Government and shall not be construed as expressing or implying a contractual act of the Government without affirmations by Contracting Officer or his duly authorized representative.
- D. 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. Two forms of government issued ID's are required. One of which shall be a Photo ID.
- E. Prior to commencing work, general contractor shall provide proof that a OSHA certified "competent person" (CP) (29 CFR 1926.20(b)(2) will maintain a presence at the work site whenever the general or subcontractors are present. (30-hour OSHA certified Construction Safety course)
- F. Training:
  - 1. All employees of general contractor or subcontractors shall have the 10-hour OSHA certified Construction Safety course and or other relevant competency training, as determined by VA CP with input from the ICRA team.
  - 2. Submit training records of all such employees for approval before the start of work.

**1.2 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR**

- A. AFTER AWARD OF CONTRACT, 1 set of specifications and drawings plus a CD-ROM will be furnished.
- B. Additional sets of drawings may be made by the Contractor, at Contractor's expense, from the CD-ROM.

**1.3 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. General Contractor's employees shall not enter the project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
2. For working outside the "regular hours" as defined in the contract, The General Contractor shall give 3 days notice to the Contracting Officer so that security arrangements can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this section.
3. No photography of VA premises is allowed without written permission of the Contracting Officer.
4. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the Contracting Officer.

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 General Contractor and its employees for parking in designated areas only.

**1.4 FIRE SAFETY**

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

1. American Society for Testing and Materials (ASTM):  
E84-2008.....Surface Burning Characteristics of  
Building Materials
2. National Fire Protection Association (NFPA):  
10-2006.....Standard for Portable Fire Extinguishers  
30-2007.....Flammable and Combustible Liquids Code

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

70-2007.....National Electrical Code

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

3. Occupational Safety and Health Administration (OSHA):

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

- B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to Project Engineer and Facility Safety Officer for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the general contractor's competent person per OSHA requirements. This briefing shall include information on the construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, etc. Documentation shall be provided to the Resident Engineer that individuals have undergone contractor's safety briefing.
- C. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.
- D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).
- E. Temporary Construction Partitions:
  - 1. Install and maintain temporary construction partitions to provide smoke-tight separations between construction areas and adjoining areas. Construct partitions of gypsum board on both sides of metal steel studs. Seal joints and penetrations. At door openings, install Class C, ¾ hour fire/smoke rated doors with self-closing devices.
  - 2. Install one-hour 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.



- F. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- G. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Project Engineer and facility Safety Officer.
- H. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to Project Engineer and facility Safety Officer.
- I. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- J. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- K. 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 Project Engineer and facility Safety Officer. 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 Project Engineer and facility Safety Officer.
- M. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Obtain permits from facility Safety Officer at least 24 hours in advance.
- O. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Project Engineer.
- P. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.
- R. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.
- S. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.
- T. Fines for violations of Fire Safety Requirements.
  - 1. 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.

2. Disposed of waste and debris in accordance with NFPA 241. Remove from buildings daily.
3. Tripping, setting off, of fire alarms and /or flow switches, without proper notification is a violation fineable at the minimum of \$2,500 per offense plus expenses.
4. Smoke detectors that were bagged, covered, or any way rendered inoperable during work shift must be made operable at the end of said work shift. This offense is fineable at the minimum of \$2,500 per offense plus expenses.
5. Any false alarms that causes a visit by the fire department is fineable at the minimum of \$2,500 per offense plus expenses.
6. Hot Work: The following offenses are a violation fineable at a minimum of \$2,500 per offense plus expenses: a) Failure to obtain a hot work permit prior to work, b) Failure to maintain Fire Watch, as required during Hot Work, and c) Failure to remove smoke detector cover after said Hot Work is completed at the end of the work shift for the day, whichever is sooner.
7. Fines for Open Fire Doors: Fire doors at all times shall be kept closed, where required. These doors shall not be left open in any manner; they shall not be propped or tied open. Violations are fineable at no less than \$2,500 per violation plus expenses. These fines will be imposed due to contractor's fault, negligence or failure to comply with NFPA codes and VA Policies.

#### **1.5 OPERATIONS AND STORAGE AREAS**

- A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.
- C. The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded

beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

**(FAR 52.236-10)**

- D. Working space and space available for storing materials shall be as determined by the Resident Engineer.
- E. Workers are subject to rules of Medical Center applicable to their conduct.
- F. Execute work so as to interfere as little as possible with normal functioning of Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by Resident Engineer where required by limited working space.
  - 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 Department of Veterans Affairs in quantities sufficient for not more than two work days. Provide unobstructed access to Medical Center areas required to remain in operation.
  - 3. Where access by Medical Center personnel to vacated portions of buildings is not required, storage of Contractor's materials and equipment will be permitted subject to fire and safety requirements.
- G. The Building will be occupied during performance of work; but immediate areas of alterations will be vacated.
- H. When a area is turned over to Contractor, Contractor shall accept entire responsibility therefore.
  - 1. Contractor shall maintain in operating condition existing fire protection and alarm equipment.
- I. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by Resident Engineer.
  - 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 Project Engineer. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without the Medical Center Director's prior knowledge and written approval. Refer to specification Sections 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, 27 05 11 REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS and 28 05 11, REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY INSTALLATIONS for additional requirements.

- a. Interruption of Utilities: A monetary fine, at a minimum of \$2,500 plus expenses, will be levied, if any utility service is interrupted in any area of the facility without proper notification and authorization, i.e., "Utility Shutdown Notice"
2. Contractor shall submit a request to interrupt any such services to Resident Engineer, in writing, 48 hours in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
3. Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of Medical Center. Interruption time approved by Medical Center may occur at other than Contractor's normal working hours at no cost to the government.
4. Major interruptions of any system must be requested, in writing, at least 15 calendar days prior to the desired time and shall be performed as directed by the Resident Engineer.
5. In case of a contract construction emergency, service will be interrupted on approval of Resident Engineer. Such approval will be confirmed in writing as soon as practical.
6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.
- J. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.
- K. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:
  1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and

vehicles. Wherever excavation for new utility lines cross 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 Resident Engineer.
- L. Coordinate the work for this contract with other construction operations as directed by Resident Engineer. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.

#### **1.6 ALTERATIONS**

- A. Survey: Before any work is started, the Contractor shall make a thorough survey with the Project Engineer of areas of the building in which alterations occur and areas which are anticipated routes of access, and furnish a report, signed by both, to the Contracting Officer. This report shall list by rooms and spaces:
  1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout affected areas of building.
  2. Existence and conditions of items such as plumbing fixtures and accessories, electrical fixtures, equipment, venetian blinds, shades, etc., required by drawings to be either reused or relocated, or both.
  3. Shall note any discrepancies between drawings and existing conditions at site.
  4. Shall designate areas for working space, materials storage and routes of access to areas within buildings where alterations occur and which have been agreed upon by Contractor and Resident Engineer.
- B. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and Resident Engineer together shall make a thorough re-survey of the areas of the building. 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.
- C. 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.

#### **1.7 INFECTION PREVENTION MEASURES**

- A. Implement the requirements of VAMC's Infection Control Risk Assessment (ICRA) team. ICRA Group may monitor dust in the vicinity of the construction work and require the Contractor to take corrective action immediately if the safe levels are exceeded.
- B. 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 Project Engineer and Facility ICRA team for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
  1. All personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.
- C. Medical center Infection Control personnel shall monitor for airborne disease (e.g. aspergillosis) as appropriate during construction. A baseline of conditions may be established by the medical center prior to the start of work and periodically during the construction stage to determine impact of construction activities on indoor air quality. In addition:
  1. The Project Engineer and VAMC Infection Control personnel shall review pressure differential monitoring documentation to verify that pressure differentials in the construction zone and in the patient-care rooms are appropriate for their settings. The requirement for negative air pressure in the construction zone shall depend on the location and type of activity. Upon notification, the contractor shall implement corrective measures to restore proper pressure differentials as needed.
  2. In case of any problem, the medical center, along with assistance from the contractor, shall conduct an environmental assessment to find and eliminate the source.
- D. In general, following preventive measures shall be adopted during construction to keep down dust and prevent mold.
  1. Dampen debris to keep down dust and provide temporary construction partitions in existing structures where directed by Resident Engineer. Blank off ducts and diffusers

to prevent circulation of dust into occupied areas during construction.

2. Do not perform dust producing tasks within occupied areas without the approval of the Project Engineer. For construction in any areas that will remain jointly occupied by the medical Center and Contractor's workers, the Contractor shall:
  - a. Provide dust proof one-hour temporary drywall construction barriers to completely separate construction from the operational areas of the hospital in order to contain dirt debris and dust. Barriers shall be sealed and made presentable on hospital occupied side. Install a self-closing rated door in a metal frame, commensurate with the partition, to allow worker access. Maintain negative air at all times. A fire retardant polystyrene, 6-mil thick or greater plastic barrier meeting local fire codes may be used where dust control is the only hazard, and an agreement is reached with the Resident Engineer and Medical Center.
  - b. HEPA filtration is required where the exhaust dust may reenter the breathing zone. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. Install HEPA (High Efficiency Particulate Accumulator) filter vacuum system rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. Ensure continuous negative air pressures occurring within the work area. HEPA filters should have ASHRAE 85 or other prefilter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Exhaust hoses shall be heavy duty, flexible steel reinforced and exhausted so that dust is not reintroduced to the medical center.
  - c. Adhesive Walk-off/Carpet Walk-off Mats, minimum 600mm x 900mm (24" x 36"), shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often as required to maintain clean work areas directly outside construction area at all times.
  - d. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as they are created. Transport these outside the construction area in containers with tightly fitting lids.
  - e. The contractor shall not haul debris through patient-care areas without prior approval of the Resident Engineer and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut

through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools, material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.

- f. Using a HEPA vacuum, clean inside the barrier and vacuum ceiling tile prior to replacement. Any ceiling access panels opened for investigation beyond sealed areas shall be sealed immediately when unattended.
- g. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.
- h. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.

E. 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.

**1.8 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. 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 Project Engineer.
- 2. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.
- 3. Items of portable equipment and furnishings located in rooms and spaces in which work is to be done under this contract shall remain the property of the Government. When rooms and spaces are vacated by the Department of Veterans Affairs during the alteration period, such items which are NOT required by drawings and specifications to be either



relocated or reused will be removed by the Government in advance of work to avoid interfering with Contractor's operation.

**1.9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS**

- A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) 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.
- 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 Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

**(FAR 52.236-9)**

- C. Refer to Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, for additional requirements on protecting vegetation, soils and the environment. Refer to Articles, "Alterations", "Restoration", and "Operations and Storage Areas" for additional instructions concerning repair of damage to structures and site improvements.
- D. Refer to FAR clause 52.236-7, "Permits and Responsibilities," which is included in General Conditions. A National Pollutant Discharge Elimination System (NPDES) permit is required for this project. The Contractor is considered an "operator" under the permit and has extensive responsibility for compliance with permit requirements. VA will make the permit application available at the (appropriate medical center) office. The apparent low bidder, contractor and affected subcontractors shall furnish all information and certifications that are required to comply with the permit process and permit requirements. Many of the permit requirements will be satisfied by completing construction as shown and specified. Some requirements involve the Contractor's method of operations and operations planning and the Contractor is responsible for employing best management practices. The affected activities often include, but are not limited to the following:
  - Designating areas for equipment maintenance and repair;
  - Providing waste receptacles at convenient locations and provide regular collection of wastes;
  - Locating equipment wash down areas on site, and provide appropriate control of wash-waters;

- Providing protected storage areas for chemicals, paints, solvents, fertilizers, and other potentially toxic materials; and
- Providing adequately maintained sanitary facilities.

#### **1.10 RESTORATION**

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of the Resident Engineer. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the Resident Engineer 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) of Section 00 72 00, GENERAL CONDITIONS.

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

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

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

- A. For hauling, use only established public roads and roads on Medical Center property and, when authorized by the Resident Engineer, such temporary roads which are necessary in the performance of contract work. Temporary roads shall be constructed by the Contractor at Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well-constructed bridges.
- B. When new permanent roads are to be a part of this contract, Contractor may construct them immediately for use to facilitate building operations. These roads may be used by all who have business thereon within zone of building operations.
- C. When certain buildings (or parts of certain buildings) are required to be completed in advance of general date of completion, all roads leading thereto must be completed and available for use at time set for completion of such buildings or parts thereof.

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

- A. Use of new installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to compliance with the following provisions:
  - 1. Permission to use each unit or system must be given by Resident Engineer. If the equipment is not installed and maintained in accordance with the following provisions, the Resident Engineer 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.

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

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

- A. Use of a designated existing elevator for handling building materials and Contractor's personnel will be permitted subject to following provisions:
  - 1. Contractor makes all arrangements with the Project Engineer for use of elevators. The Project Engineer will ascertain that elevators are in proper condition. Contractor may use service elevator No. 1 in Building 500 for daily use.
  - 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 by new brake lining.
  - 5. All parts of main controller, starter, relay panel, selector, etc., worn or damaged during temporary use shall be removed and replaced with new parts, if recommended by elevator inspector after elevator is released by Contractor.
  - 6. Place elevator in condition equal, less normal wear, to that existing at time it was placed in service of Contractor as approved by Contracting Officer.

#### **1.15 TEMPORARY TOILETS**

- A. Contractor may have for use of Contractor's workmen, such toilet accommodations as may be assigned to Contractor by Medical Center. Contractor shall keep such places clean and be responsible for any damage done thereto by Contractor's workmen. Failure to maintain

satisfactory condition in toilets will deprive Contractor of the privilege to use such toilets.

#### **1.16 AVAILABILITY AND USE OF UTILITY SERVICES**

- A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The Contractor shall carefully conserve any utilities furnished without charge.

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

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

#### **1.18 TESTS**

- A. Pre-test mechanical and electrical equipment and systems and make corrections required for proper operation of such systems before requesting final tests. Final test will not be conducted unless pre-tested.
- B. Conduct final tests required in various sections of specifications in presence of an authorized representative of the Contracting Officer. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.
- C. Mechanical and electrical systems shall be balanced, controlled and coordinated. A system is defined as the entire complex which must be coordinated to work together during normal operation to produce results for which the system is designed. For example, air conditioning supply air is only one part of entire system which provides comfort conditions for a building. Other related components are return air, exhaust air, steam, chilled water, refrigerant, hot water, controls and electricity, etc. Another example of a complex which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of fuel, combustion air, controls, steam, feedwater, condensate and other related components.
- D. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonably short period of time during which operating and environmental conditions remain reasonably constant.
- E. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components and of the entire system.

#### **1.19 INSTRUCTIONS**

- A. Contractor shall furnish Maintenance and Operating manuals and verbal instructions when required by the various sections of the specifications and as hereinafter specified.
- B. Manuals: Maintenance and operating manuals (four copies each) for each separate piece of equipment shall be delivered to the Resident Engineer 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 Resident Engineer and shall be considered concluded only when the Resident Engineer 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 Resident Engineer, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

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

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

and immediately furnish the Government representative with a written statement as to its condition or shortages.

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

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**SECTION 01 00 11**

**SPECIAL REQUIREMENTS**

- 1.1 PARKING REGULATIONS - Contractor/Vendor parking shall be kept to a minimum and carpooling of workers must be encouraged. Limited contractor parking is available on a first come first serve basis in designated areas on the north service road behind the medical center. Parking permits must be issued by the VA and displayed on the vehicle dashboard before using this area. Limited contractor parking is made available at Building 2, Power Plant, for authorized work in Building 2 only. All other contractor/vendor parking shall utilize the visitor Parking Lot #3 in front of the medical center. Unauthorized parking is subject to a Federal citation. Parking permits are issued in the Engineering Office, Room BB108.
- 1.2 IDENTIFICATION BADGES - All contractor/vendor personnel shall wear some type of identification. Uniforms or clothing identifying the company name or contractor provided identification badges are considered acceptable. Individuals not having their own acceptable identification shall wear a visitor identification badge provided by the VA. These badges are to be signed for each day at the Police Office at the main entrance to the medical center and turned in each day upon leaving. Individuals with long term work can make special arrangements to have the badges assigned for longer time periods.
- 1.3 SMOKING POLICY - Smoking is permitted only in designated areas. No smoking is allowed within the building. The main designated smoking area is outside of Building #1 on the second floor northwest exterior patio deck. Smoking is not allowed on the grounds, in parking lots, or in other buildings.
- 1.4 DRESS CODE - Shoes and shirts must be worn at all times. Contractors are expected to dress appropriately as this is a public health care facility.
- 1.5 LANGUAGE - Contractors are expected to use appropriate language as this is a public health care facility. Obscene language is not permitted and all individuals are expected to be courteous. This requirement includes the interstitial as conversations can be heard by the public below these spaces.
- 1.6 NOISE AND DISRUPTION - Work is being conducted in an occupied health care facility with surgical and medial patients. The contractor is required to continuously consider the impact to the medical center in completing the required work. Any jackhammering, drilling, or operation causing excessive noise or vibration must be planned in advance with the assigned VA contact person. Consideration must be given to occupancies above, below, and adjacent to the contractor's work area. Also movement of equipment, supplies, and waste through occupied areas, corridors, and elevators must be planned and scheduled to minimize interruption to hospital operations.
- 1.7 WORKING OVER PATIENT AREAS - In general the lay in suspended acoustic ceiling is the only barrier between the interstitial space and the use area below. Any work involving the transport or installation of materials over patient areas requires a minimum of 24 hour notice so the space below can be vacated to minimize the risk of objects falling through the ceiling. This includes but is not limited to activities such as installing pipe, conduit, duct, reheat boxes, etc. (Work in fan rooms, on catwalks, and above solid ceilings is excluded from this requirement.)



- 1.8 ISSUANCE OF KEYS - Keys as deemed appropriate will be issued to the contractor for access to construction areas, interstitial, electrical panels, equipment rooms, and elevators. Keys will be issued by Engineering in room BB108.
- 1.9 CONTRACTOR STORAGE - Storage is not allowed on balconies, in corridors, or anywhere where it would block access to equipment or exits. If an area is turned over to a contractor for the duration of a project he may use that area for storage. Other designated storage areas may be assigned if available. Areas on the grounds will be made available where possible for contractor furnished storage containers or dumpsters. All debris, trash, and packaging materials shall be disposed of off station in a timely manner.
- 1.10 DESIGNATED POINT OF CONTACT - Contractor will be given the name of an individual that will be the designated point of contact for coordinating and overseeing the day to day operation of the contractors work performance. The contractor is responsible for checking in each day he on station with that individual so that the VA knows where the contractor is working and what work is being performed.
- 1.11 USE OF FACILITY EQUIPMENT - Contractors/vendors are to provide all tools, labor, equipment, and materials to accomplish their work unless otherwise specified or if specifically authorized by the VA under special circumstances. This includes use of ladders, dumpster, hand tools, drop lights, flatbed carts, dollies, etc.
- 1.12 RECEIPT OF CONTRACTOR MATERIAL - Contractor is allowed to have deliveries made directly to the VA as long as they coordinate the delivery and have a representative on site to receive, off load, and store the shipment. The VA warehouse will refuse receipt of any contractor delivery.
- 1.13 WELDING / CUTTING PERMITS - The contractor shall fill out a VA supplied permit form for any welding, soldering, brazing, and torch cutting and have it approved prior to accomplishing any hot work. Permits are good only for one day and contractor is responsible for adhering to specified requirements stated on the permit.
- 1.14 UTILITY SHUTDOWNS - Shutdown of any utility, alarm, communication, or fire protection system must be coordinated and scheduled in advance. Contractor shall follow OSHA lockout/tagout procedures while systems are shutdown. Contractor shall coordinate reactivation of all systems upon completion of work.
- 1.15 MEDICAL GASES - All brazing, testing, calibration, and work on medical gas systems must be accomplished by certified mechanics.
- 1.16 AFTER HOURS WORK AUTHORIZATIONS - All work accomplished between 4:30 PM and 7:00 AM on weekdays, work on weekends, and work on holidays must be scheduled in advance and a form filed. Forms are available in Room BB108, Engineering, and must include the date, time, area of work, and names of individuals involved. The contractor must check in with the Police at the main entrance prior to beginning after hours work.
- 1.17 SEISMIC BRACING - All installations in the medical center must have lateral bracing installed to meet or exceed the requirements listed in the current edition of the Uniform Building Code.
- 1.18 EMERGENCY PHONE NUMBERS - Contractors/vendors shall furnish the VA with after hours emergency phone numbers. These numbers will be used only in

case of an emergency concerning the work being completed or space occupied by the contractor.

- 1.19 PCB BALLASTS/FLUORESCENT LAMPS - This facility originally was equipped with PCB containing ballasts in fluorescent light fixtures. Most of these ballasts have been removed. The contractor is responsible for checking any ballast prior to disposal. Any ballast not labeled "Non PCB" shall be turned over to the VA for disposal. Contractor is responsible for disposing of all fluorescent lamps in accordance with all local, state, and federal regulations.
- 1.20 MSDS - The contractor is responsible for having material data safety sheets available on site for all chemicals, solvents, cleaners, paints, adhesives, etc. used by the contractor and for following their precautions.
- 1.21 SAFETY EQUIPMENT - The contractor is responsible for wearing all safety equipment and taking all required precautions for fire and safety issues. This includes wearing goggles, face shields, safety shoes, and having fire extinguishers present. Contractor shall minimize the use of extension cords. All electrical cords shall be inspected and maintained to ensure integrity and proper grounding.
- 1.22 INTERSTITIAL WORK - Special care must be taken when working off of the catwalks in the interstitial so that data lines, pneumatic air lines, ducting, piping, and conduit is not damaged or stepped on. Should such damage occur contractor is to immediately notify VA Engineering. Any damage shall be repaired immediately at the contractor's expense. All contractor generated debris shall be cleaned up and removed from the interstitial. All asbestos waste bags shall be marked to show the contract number, the contractor's name, and the date the bag was started. All penetrations through walls and floor slabs shall be fully patched.
- 1.23 CELLULAR PHONES - Cellular phones are prohibited for use in designated areas inside the building.
- 1.24 WALK OFF MATS - The contractor is responsible to provide walk off mats at each entrance or exit from a construction site. Walk off mats shall be 4' X 6' rubber backed, Golden Star 511-3A, or equal. Contractor shall thoroughly clean mat weekly and vacuum intermittently to control construction dust and debris from being tracked through the facility.
- 1.25 INTERIM INSPECTIONS - The contractor shall request for interim formal inspections by the VA prior to closing up walls or installing ceilings.
- 1.26 CORRESPONDENCE - All correspondence shall be original or (legible xerox copies may be accepted on approval). Fax copies shall be accepted only on an interim basis.
- 1.27 LATEX POWDER FREE ENVIRONMENT - The VA Medical Center is a latex powder free facility. Contractors are not to use any powdered latex gloves or other items which contain latex powder as some individuals have allergic reactions from the airborne particles.
- 1.28 CONTRACTOR STORAGE/STAGING - Contractor shall stage supplies and storage within designated construction areas only. No storage is allowed in corridors or on balcony areas of the medical center.

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**SECTION 01 04 50**

**CUTTING AND PATCHING**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES:**

- A. This Section specifies administrative and procedural requirements for cutting, and patching as indicated on the drawings, including the following:
  - 1. Make its several parts fit together properly
  - 2. Uncover portions of the Work to provide for installation of ill-timed work
  - 3. Remove and replace defective work
  - 4. Remove and replace work not conforming to requirements of the Contract Documents
  - 5. Remove samples of installed work as specified for testing
  - 6. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit
  - 7. Patch and repair fireproofing damaged after installation of other Work
  - 8. Remove and finish construction at connections to other structures
  - 9. Patch exploratory holes created prior to this Contract
  - 10. Remove existing roofing where required by new Work (patching shall be identical with the existing roofing system in materials, system and construction)
  - 11. Verify and check all areas to be cut and patched and coordinate the Work of the various trades involved.
- B. Submittals shall be submitted within the timeframes specified and to the firms or agencies requiring them.
  - 1. Three (3) calendar days prior to performing welding, cutting or brazing, the Contractor shall complete and submit a Hot Work Permit to the Owner, including the following information:
    - a. Work to be performed by the Owner or any Separate Contractor
    - b. Structural value or integrity of any element affected by the hot work
    - c. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems
    - d. Efficiency, operational life, maintenance, or safety of operational elements

- e. Visual qualities of sight-exposed elements.
- 2. If inadequate notice is provided by the Contractor, or if the proposed cutting or patching will compromise the Owner's operations, the Owner has the right to refuse the cutting and patching as proposed without claim of delay or change in Contract Sum to the Contract.
- 3. Where approval of specific procedures for cutting and patching is required before proceeding:
  - a. Submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed.
  - b. Include the following information, as applicable, in the proposal:
    - 1) Identification of the Work
    - 2) Describe the extent of cutting and patching required and how it is to be performed indicate why it cannot be avoided
    - 3) Describe expected results in terms of changes to existing construction include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements
    - 4) Scope of cutting, patching, or alteration
    - 5) Trades who will execute the work
    - 6) Products proposed for use
    - 7) Extent of refinishing to be done
    - 8) Effect on work of Owner or any separate contractor
    - 9) Written notification of any separate contractor whose work will be affected
    - 10) Indicate dates and times when cutting and patching is to be performed
    - 11) List utilities that will be distributed or affected, including those that will be relocated and those that will be temporarily out-of-service indicate how long service will be disrupted
    - 12) Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.
  - c. Approval by the Owner to proceed with cutting and patching does not waive the Owner's right to later

require complete removal and replacement of a part of the Work found to be unsatisfactory.

- d. Contractor shall do all cutting, fitting or patching of the work required to make all parts of the Work come together properly.

D. Quality Assurance

1. Requirements for structural Work:

- a. Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio
- b. Obtain required City or State of California approvals and the Architect's approval of the cutting and patching proposal before cutting and patching the following structural elements:

- 1) Foundation construction
- 2) Bearing and retaining walls
- 3) Structural concrete
- 4) Structural steel
- 5) Lintels
- 6) Structural decking
- 7) Stair systems
- 8) Miscellaneous structural metals
- 9) Exterior curtain wall construction
- 10) Equipment supports
- 11) Piping, ductwork, vessels and equipment
- 12) Structural systems of special construction in Division 13.

2. Operational and safety limitations:

- a. Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety
- b. Obtain the Architect's approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:

- 1) Shoring, bracing, and sheeting
- 2) Primary operational systems and equipment
- 3) Air or smoke barriers
- 4) Water, moisture, or vapor barriers
- 5) Membranes and flashings
- 6) Fire protection systems
- 7) Noise and vibration control elements and systems
- 8) Control systems
- 9) Communication systems
- 10) Conveying systems
- 11) Electrical wiring systems
- 12) Special construction specified by Division 13 Sections.

3. Visual requirements:

- a. Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching
- b. Remove and replace Work cut and patched in a visually unsatisfactory manner
- c. If possible retain the original installer or fabricator to cut and patch exposed Work or, if it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.

E. Materials

1. Where materials are not identified and specified, use materials that are identical to existing materials.
  - a. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect.
  - b. Use materials whose installed performance will equal or surpass that of existing materials.
2. Provide new materials for cutting and patching unless otherwise indicated.

F. Inspection

1. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed.
2. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
3. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical sites.
  - a. Review areas of potential interference and conflict.
  - b. Coordinate procedures and resolve potential conflicts before proceeding.

G. Preparation

1. Provide temporary support of Work to be cut.
2. Protection:
  - a. Protect existing construction during cutting and patching to prevent damage.

- b. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
  - 3. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
  - 4. Until provisions have been made to bypass them, take all precautions necessary to avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated.
- H. Performance
  - 1. General:
    - a. Employ skilled workers to perform cutting and patching
    - b. Proceed with cutting and patching at the earliest feasible time and complete without delay
    - c. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
  - 2. Cutting:
    - a. Cut existing construction using methods least likely to damage elements to be retained or to damage adjoining construction.
    - b. Where possible, review proposed procedures with the original installer comply with the original installer's recommendations
    - c. In general:
      - 1) Where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping
      - 2) Cut holes and slots neatly to size required to minimum disturbance of adjacent surfaces
      - 3) Temporarily cover openings when not in use
    - d. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces
    - e. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill
    - f. Comply with requirements of applicable Sections of Division 2 where cutting and patching requires excavating and backfilling
    - g. Where services are shown or required to be removed, relocated, or abandoned, by-pass utility services such as pipes or conduit before cutting

- 1) Cut-off pipe or conduit in walls or partitions to be removed
  - 2) cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after bypassing and cutting.
3. Patch with durable seams that are as invisible as possible:
- a. Comply with specified tolerances
  - b. Where feasible, inspect and test patched areas to demonstrate integrity of the installation
  - c. Restore exposed finishes of patched areas and extend finish restoration into retrained adjoining construction in a manner that will eliminate evidence of patching and refinishing
  - d. Where removal of walls or partitions extends one finished area into another:
    - 1) Patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance
    - 2) Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance
    - 3) Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat
  - e. Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

I. Cleaning

1. Thoroughly clean areas and spaces where cutting and patching is performed or used as access:
  - a. remove completely paint, mortar, oils, putty and items of similar nature
  - b. thoroughly clean piping, conduit and similar features before painting or other finishing is applied
  - c. restore damaged pipe covering to its original condition.

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**SECTION 01 32 16.15**

**PROJECT SCHEDULES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. The Contractor shall develop a Critical Path Method (CPM) plan and schedule demonstrating fulfillment of the contract requirements (Project Schedule), and shall keep the Project Schedule up-to-date in accordance with the requirements of this section and shall utilize the plan for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers). Conventional Critical Path Method (CPM) technique shall be utilized to satisfy both time and cost applications.
- B. Critical Path Method (CPM) schedules shall be compatible with Microsoft Project Window's Version for projected design delivery denoting mile stone dates of meetings and delivery's and construction schedules relating directly to the CSI technical specifications of each project(s). These schedules will reflect the Gantt chart type appearance of each specification section. They will denote: Activity, Day Duration, Projected Start Date, Projected Finish Date, Month/Quarter Calendar. They shall define critical project activities(s) as deemed necessary by the A/E. the VA will provide the A.E with the start date. Media will be in the form of 8.5x11 color hardcopy with electronic file to be provided.

**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 (COTR).
- B. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section.
- C. The Contractor's representative shall have the option of developing the project schedule within their organization or to engage the services of an outside consultant. If an outside scheduling consultant is utilized, Section 1.3 of this specification will apply.

**1.3 COMPUTER PRODUCED SCHEDULES**

- A. The contractor shall provide monthly, to the Department of Veterans Affairs (VA), all computer-produced time/cost schedules and reports generated from monthly project updates. This monthly computer service will include: three copies of up to five different reports (inclusive of all pages) available within the user defined reports of the scheduling software approved by the Contracting Officer; a hard copy listing of all project schedule changes, and associated data, made at the update and an electronic file of this data; and the resulting monthly updated schedule in PDM format. These must be submitted with and substantively

support the contractor's monthly payment request and the signed look ahead report. The COTR shall identify the five different report formats that the contractor shall provide.

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

#### **1.4 PAYMENT TO THE CONTRACTOR:**

- A. Monthly, the contractor shall submit the AIA application and certificate for payment documents G702 & G703 reflecting updated schedule activities and cost data in accordance with the provisions of the following Article, PAYMENT AND PROGRESS REPORTING, as the basis upon which progress payments will be made pursuant to Article, FAR 52.232 - 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.236 - 83 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS). The Contractor shall be entitled to a monthly progress payment upon approval of estimates as determined from the currently approved updated project schedule. Monthly payment requests shall include: a listing of all agreed upon project schedule changes and associated data; and an electronic file (s) of the resulting monthly updated schedule.
- B. Approval of the Contractor's monthly Application for Payment shall be contingent, among other factors, on the submittal of a satisfactory monthly update of the project schedule.

#### **1.5 PAYMENT AND PROGRESS REPORTING**

- A. Monthly schedule update meetings will be held on dates mutually agreed to by the COTR and the Contractor. Contractor and their CPM consultant (if applicable) 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 COTR three work days in advance of the schedule update meeting. Job progress will be reviewed to verify:
  - 1. Actual start and/or finish dates for updated/completed activities/events.
  - 2. Remaining duration for each activity/event started, or scheduled to start, but not completed.
  - 3. Logic, time and cost data for change orders, and supplemental agreements that are to be incorporated into the Project Schedule.
  - 4. Changes in activity/event sequence and/or duration which have been made, pursuant to the provisions of following Article, ADJUSTMENT OF CONTRACT COMPLETION.

5. Completion percentage for all completed and partially completed activities/events.
  6. Logic and duration revisions required by this section of the specifications.
  7. Activity/event duration and percent complete shall be updated independently.
- B. After completion of the joint review, the contractor shall generate an updated computer-produced calendar-dated schedule and supply the Contracting Officer's representative with reports in accordance with the Article, COMPUTER PRODUCED SCHEDULES, specified.
- C. After completing the monthly schedule update, the contractor's representative or scheduling consultant shall rerun all current period contract change(s) against the prior approved monthly project schedule. The analysis shall only include original workday durations and schedule logic agreed upon by the contractor and resident engineer for the contract change(s). When there is a disagreement on logic and/or durations, the Contractor shall use the schedule logic and/or durations provided and approved by the resident engineer. After each rerun update, the resulting electronic project schedule data file shall be appropriately identified and submitted to the VA in accordance to the requirements listed in articles 1.4 and 1.7. This electronic submission is separate from the regular monthly project schedule update requirements and shall be submitted to the resident engineer within fourteen (14) calendar days of completing the regular schedule update. **Before inserting the contract changes durations, care must be taken to ensure that only the original durations will be used for the analysis, not the reported durations after progress. In addition, once the final network diagram is approved, the contractor must recreate all manual progress payment updates on this approved network diagram and associated reruns for contract changes in each of these update periods as outlined above for regular update periods. This will require detailed record keeping for each of the manual progress payment updates.**
- D. Following approval of the CPM schedule, the VA, the General Contractor, its approved CPM Consultant, RE office representatives, and all subcontractors needed, as determined by the SRE, shall meet to discuss the monthly updated schedule. The main emphasis shall be to address work activities to avoid slippage of project schedule and to identify any necessary actions required to maintain project schedule during the reporting period. The Government representatives and the Contractor should conclude the meeting with a clear understanding of those work and administrative actions necessary to maintain project schedule status during the reporting period. This schedule coordination meeting will occur after each monthly project schedule update meeting utilizing the resulting schedule reports from that schedule update. If the project is behind schedule, discussions should include ways to prevent further slippage as well as ways to improve the project schedule status, when appropriate.

## **1.6 RESPONSIBILITY FOR COMPLETION**

- A. If it becomes apparent from the current revised monthly progress 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 COTR 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, at no additional cost to the Government.

## **1.7 CHANGES TO THE SCHEDULE**

- A. Within 30 calendar days after VA acceptance and approval of any updated project schedule, the Contractor shall submit a revised electronic file (s) and a list of any activity/event changes including predecessors and successors for any of the following reasons:
  - 1. Delay in completion of any activity/event or group of activities/events, which may be involved with contract changes, strikes, unusual weather, and other delays will not relieve the Contractor from the requirements specified unless the conditions are shown on the CPM as the direct cause for delaying the project beyond the acceptable limits.
  - 2. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary.
  - 3. The schedule does not represent the actual prosecution and progress of the project.
  - 4. When there is, or has been, a substantial revision to the activity/event costs regardless of the cause for these revisions.
- B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished equipment, vacating of areas by the VA Facility, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, shall be furnished in writing to the Contracting Officer for approval.
- C. Contracting Officer's approval for the revised project schedule and all relevant data is contingent upon compliance with all other

paragraphs of this section and any other previous agreements by the Contracting Officer or the VA representative.

- D. The cost of revisions to the project schedule resulting from contract changes will be included in the proposal for changes in work as specified in FAR 52.243 - 4 (Changes) and VAAR 852.236 - 88 (Changes - Supplemental), and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.
- E. The cost of revisions to the Project Schedule not resulting from contract changes is the responsibility of the Contractor.

#### **1.8 ADJUSTMENT OF CONTRACT COMPLETION**

- A. The contract completion time will be adjusted only for causes specified in this contract. Request for an extension of the contract completion date by the Contractor shall be supported with a justification, CPM data and supporting evidence as the COTR may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof based on revised activity/event logic, durations (in work days) and costs is obligatory to any approvals. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in this request. The Contracting Officer's determination as to the total number of days of contract extension will be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information.
- B. Actual delays in activities/events which, according to the computer- produced calendar-dated schedule, do not affect the extended and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Contracting Officer will within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Contracting Officer's decision.
- C. The Contractor shall submit each request for a change in the contract completion date to the Contracting Officer in accordance with the provisions specified under FAR 52.243 - 4 (Changes) and VAAR 852.236 - 88 (Changes - Supplemental). The Contractor shall include, as a part of each change order proposal, a sketch showing all CPM logic revisions, duration (in work days) changes, and cost changes, for work in question and its relationship to other activities on the approved network diagram.
- D. All delays due to non-work activities/events such as RFI's, WEATHER, STRIKES, and similar non-work activities/events shall be analyzed on a month by month basis.

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**SECTION 01 33 23**

**SAMPLES AND SHOP DRAWINGS**

- 1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in Section, 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. 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.
- 1-4. 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.
- 1-5. Submittals will be reviewed for compliance with contract requirements by Project Manager or A/E, and action thereon will be taken by Project Manager on behalf of the Contracting Officer.
- 1-6. Upon receipt of submittals, Project Manager or A/E will assign a sequential 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.
- 1-7. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are furnished pursuant to request therefore by Contracting Officer, adjustment in contract price and time will be made in accordance with Articles titled CHANGES (FAR 52.243-4) and CHANGES - SUPPLEMENT (VAAR 852.236-88) of the GENERAL CONDITIONS.
- 1-8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and A/E. However, the Contractor shall assume responsibility for

coordinating and verifying schedules. The Contracting Officer and A/E assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.

- 1-9. 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, INTERIOR/EXTERIOR FINISHES, MATERIALS, AND FINISH SCHEDULE, in quadruplicate. 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 FAX 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 Project Manager and to Contracting Officer simultaneously with submission of material to a commercial testing laboratory.
  5. Laboratory test reports shall be sent directly to Project Manager 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 Project Manager 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.
- 1-10. Samples, shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to

CLINICAL LABORATORY RENOVATION  
Veterans of Affairs Healthcare System  
3350 La Jolla Village Drive  
San Diego, Ca 92161

- 1-11. At the time of transmittal to the Project Manager, the Contractor shall also send a copy of the complete submittal directly to the Contracting Officer.

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**SECTION 01 45 29**

**TESTING LABORATORY SERVICES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section covers materials testing and inspection during construction provided by a Testing Laboratory retained and paid for by the Contractor.

**1.2 REQUIREMENTS**

- A. The Testing Laboratory shall inspect the materials and workmanship and perform the tests described herein and additional tests requested by the Project Engineer. When it appears that the materials furnished, or work performed by the Contractor fail to meet the construction contract requirements, the Testing Laboratory shall direct the attention of the Project Engineer to such failure.
- B. Written Reports: Submit all test reports to Project Engineer within 24 hours after each test is completed.
- C. Verbal Reports: Testing Laboratory is to give verbal notification to Project Engineer immediately of any irregularity.
- D. Test Standards: Testing Laboratory shall furnish the Project Engineer one copy of each standard (ASTM, AASHTO, and AWS) referred to or which is pertinent to these specifications.

**PART 2 - EXECUTION**

**2.1 EARTHWORK**

- A. Testing Compaction:
  - 1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used AASHTO T180, "Moisture-Density Relations of Soils using a 10-pound Rammer and 18-inch Drop, Method A".
  - 2. Make field density tests in accordance with AASHTO T191, Density of Soil In-Place by the Sand-Cone Method; AASHTO T205, Density of Soil In-Place by the Rubber-Balloon Method; or, AASHTO T238, Density of Soil and Soil-Aggregate In-Place by Nuclear Methods.
    - a. One test for each 300 cubic yards of fill or backfill.
    - b. One test for each 400 square yards of subgrade.
    - c. One test for each 300 linear feet of curb and gutter, curb, and sidewalk.
    - d. One test along trenches at maximum 100-feet intervals per 4-feet of vertical lift and at changes in required density.

- e. For each isolated parcel less than 300 cubic yards, 400 square yards, 300 linear feet, and 100-foot intervals per 4-foot lift take at least two tests.
- B. Inspection: Provide supervised geotechnical technician to inspect excavation, surface preparation, and backfill for structural fill.

## **2.2 CONCRETE**

- A. Batch Plant Inspection and Materials Testing:
  - 1. Continuous batch plant inspection shall be performed until concrete quality is established to the satisfaction of the Project Engineer with the concurrence of the Contracting Officer and periodic inspections shall be performed thereafter as determined by Project Engineer.
  - 2. Periodically inspect and test batch proportioning equipment for accuracy and report deficiencies to Project Engineer.
  - 3. Samples and test mix ingredients as necessary to ensure compliance with specifications.
  - 4. Sample and test aggregates daily and as necessary for moisture content. Request that adjustments be made in quantities of mixing water and aggregates as necessary to maintain water - cement ratio of approved design mixes.
  - 5. Certify, in duplicate, that ingredients and proportions and amounts of ingredients in concrete conform with approved trial mixes. When concrete is batched or mixed off immediate building site, certify (by signing, initialing or stamping thereon) on delivery slips (duplicate) that ingredients in truck-load mixes conform to proportions of aggregate weight, cement factor, and water-cement ratio of approved trial mixes.
- B. Materials:
  - 1. Provide a technician at site of placement at all times to perform concrete sampling and testing.
  - 2. Take concrete samples in accordance with ASTM C172. Mold and cure compression test cylinders in accordance with ASTM C31. Make at least three cylinders for each 50 cubic yard or less of each concrete type, and at least three cylinders for any one day's pour for each concrete type. Label each cylinder with an identification number. Project Engineer may require additional cylinders to be molded and cured under job conditions.
  - 3. Test slump of concrete periodically and during making of concrete test cylinders. Method of making slump test shall be as described in ASTM C143.
  - 4. Determine air content of air entrained concrete at least twice a day during progress of work and during making of concrete test cylinders. Determine air content by either ASTM C173 or ASTM C231.

5. If slump or air content fall outside specified limits another test shall be made immediately from another portion of same batch.
6. Ensure maintenance of water-cement ratio established by approved trial mix, but notifying Project Engineer to require addition of cement (at the job site) whenever slump exceeds specified maximum.
7. Notify laboratory technician at batch plant of mix irregularities and request materials and proportioning check.
8. Verify that specified mixing has been accomplished.

C. Laboratory Tests of Field Samples:

1. Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test one cylinder at 7 days and one cylinder at 28 days. The remaining cylinder will be used as a spare to be tested at either 7 or 28 day test as required. Laboratory test reports shall be compiled as follows: Compressive strength test shall be the result of one cylinder, except when the one cylinder shows evidence of improper sampling, molding or testing, in which case it shall be discarded and strength of the spare cylinder shall be used.
2. Furnish certified compression test reports (duplicate) to Project Engineer. On test report indicate following information:
  - a. Cylinder identification number and date cast.
  - b. Specific location at which test samples were taken.
  - c. Type of concrete, slump, and percent air.
  - d. Compressive strength of concrete in psi.
  - e. Weather conditions during placing.
  - f. Temperature of concrete in each test cylinder when test cylinder was molded.
  - g. Maximum and minimum ambient temperature during placing.
  - h. Ambient temperature when concrete sample in test cylinder was taken.
  - i. Date delivered to laboratory and date tested.

**2.3 CONCRETE REINFORCEMENT**

- A. Review mill test reports furnished by the Contractor.
- B. Make one tensile and one bend test from each pair of samples obtained.

- C. Written report shall include, in addition to test results, heat number, manufacturer, type and grade of steel, and bar size.

#### **2.4 MASONRY**

When requested by Project Engineer during progress of work, take and test samples of mortar in accordance with ASTM C91 for conformance with specified strength requirements.

#### **2.5 STRUCTURAL STEEL**

- A. Provide all necessary shop and field inspection and testing services to certify that all structural steel work is done in accordance with drawings and specifications.
1. Welding accomplished shall conform with AWS D1.1 Structural Welding Code.
  2. Prefabrication Inspection:
    - a. Review design and shop detail drawings for size, length, type and location of all welds to be made.
    - b. Approve welding procedure qualifications either by prequalification or by witnessing qualifications tests.
    - c. Approve welder qualifications either by certification and/or by retesting.
    - d. Approve procedure for control of distortion and shrinkage stresses.
    - e. Approve procedures for welding in accordance with applicable portions of Section 4, Technique, of AWS D1.1.
  3. Fabrication and Erection:
    - 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 Table 4.2 of AWS D1.1.
    - e. Verify that quality of welds meet the requirements of Paragraph 8.15, Quality of Welds, of AWS D1.1.
    - f. Correction of rejected welds shall be made in accordance with Paragraph 3.7, Corrections, of AWS D1.1.
- B. Inspection reports, record of welders and their certification, and identification, and instances of noncompliance shall be submitted

to the Project Engineer as specified under "WRITTEN REPORTS" and  
"VERBAL REPORTS."

**2.6 TYPE OF TEST**

	Approximate Number of Tests Required
A. EARTHWORK:	
Laboratory Compaction Test, Soils (AASHTO T180)	5
Field Density, Soils (AASHTO T191)	5
B. CONCRETE:	
Making and Curing Concrete Test Cylinders (ASTM C31)	2
Compressive Strength, Test Cylinders (ASTM C39)	2
Concrete Slump Test (ASTM C143)	2
Concrete Air Content Test (ASTM C173 or C321)	2
Unit Weight, Lightweight Concrete (ASTM C567)	2
C. REINFORCING STEEL:	
Tensile Test (ASTM A370)	0
Bend Test (ASTM A370)	0
D. GROUT and MORTAR:	
Making and Curing Test Cubes (ASTM C109)	0
Compressive Strength, Test Cubes (ASTM C91)	0
E. AGGREGATE BASE:	
Laboratory Compaction, Aggregate Base (AASHTO T180)	0
Field Density, Aggregate Base (AASHTO T191)	10
F. TECHNICAL PERSONNEL:	
1. Materials Testing	
a) Laboratory	5 per month
b) Materials Technician	5 per month
2. Shop and Field Inspection:	
a) Inspector, Structural Steel	2 per month
b) Inspector, Concrete	2 per month
3. Technicians to perform test and inspection listed above. The laboratory will be equipped with concrete cylinder storage facilities, compression machine, cube molds, proctor molds, balances, scales, moisture ovens, slump cones, air meter, and all necessary equipment for compaction control.	

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**SECTION 01 51 66**

**TEMPORARY PARTITIONS**

**PART 1 GENERAL**

**1.1 TEMPORARY PARTITIONS**

- A. Furnish and install and maintain temporary construction partitions to provide smoke-tight separations between construction areas, the areas that are described in phasing requirements, and adjoining areas.
  - 1. Construct partitions of gypsum board or treated plywood (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of wood or metal steel studs.
  - 2. Extend the partitions through suspended ceilings to floor slab or roof. Seal joints and penetrations.
  - 3. At door openings, install Class C, 3/4-hour rated fire and smoke rated doors with self-closing devices.
- B. Install one-hour or two-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 exists, smoke barriers, vertical shafts and openings enclosures.
- C. Close openings in smoke barriers and fire-rated construction to maintain fire ratings. Seal penetrations with listed through-penetration firestop materials.
- D. Provide doors with locks or latches, as appropriate, where entry and existing through the partition is required.
- E. When directed by the Architect paint the partition, 2 coats, colors and directed.
- F. Temporary Fire Protection: Within the temporary partitioned space, and until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonable predictable and controllable fire losses. Comply with NFPA 241.

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**SECTION 01 57 19**

**TEMPORARY ENVIRONMENTAL CONTROLS**

**EP-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. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
  - 4. Rubbish: Combustible and noncombustible wastes such as paper, boxes, glass and crockery, metal and lumber scrap, tin cans, and bones.
  - 5. 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.

**EP-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.

**EP-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

**EP-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 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 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.
- C. 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 only between 8:00 a.m. and 6:00 p.m. unless otherwise permitted by local ordinance or the

Resident Engineer. 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:

- D. 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.
- E. 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 02 41 00**

**DEMOLITION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

This section specifies demolition and removal of buildings, portions of buildings, utilities, other structures and debris from trash dumps shown.

**1.2 RELATED WORK:**

- A. Safety Requirements: GENERAL CONDITIONS Article, ACCIDENT PREVENTION.
- B. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.
- C. Reserved items that are to remain the property of the Government: Section 01 00 00, GENERAL REQUIREMENTS.
- D. 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. 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.
- G. The work shall comply with the requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article 1.7 INFECTION PREVENTION MEASURES.

#### **1.4 TEMPORARY PARTITIONS**

- A. furnish and install and maintain temporary construction partitions to provide smoke-tight separations between construction areas, the areas that are described in phasing requirements, and adjoining areas.
1. Construct partitions of type X gypsum board. Provide solid partitions where the fire rating requires them.
  2. Extend the partitions through suspended ceilings to floor slab or roof. Seal joints and firestop penetrations.
  3. At door openings, install steel fire rated and smoke rated doors with self-closing devices in accordance with Steel Door Institute (SDI) requirements.
- B. Install two-hour fire-rated temporary construction partitions as called for on drawings to maintain integrity of existing exit stair enclosures, exit passageways, fire-rated enclosures for hazardous areas, horizontal exists, smoke barriers, vertical shafts and openings enclosures.
- C. Close openings in smoke barriers and fire-rated construction to maintain fire ratings. Seal penetrations with UL listed through-penetration firestop materials.
- D. Provide doors with locks or latches, as appropriate, where entry and exiting through the partition is required.
- E. Paint the partitions 2 coats, colors as selected by the Project Engineer.

#### **1.5 TEMPORARY FIRE PROTECTION**

- A. Within the temporary partitioned space, and until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection equipment of types needed to protect the

Hospital against all reasonable, predictable and controllable fire losses.

- B. Comply with NFPA 241.
- C. Locate fire extinguishers where directed by the Hospital fire safety authority.

**PART 2 - PRODUCTS - INTENTIONALLY NOT USED**

**PART 3 - EXECUTION**

**3.1 DEMOLITION**

- A. Debris materials shall become property of contractor and shall be disposed of by him, off the Project Site. Disposal shall conform to all local, state, and federal laws and regulations.
- B. On completion of work of this section and after removal of all debris, site shall be left in clean conditions satisfactory to project engineer. Clean-up shall include off the Project Site 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 82 13.18**

**GLOVEBAG ASBESTOS ABATEMENT**

**PART 1 - GENERAL**

**1.1 SUMMARY OF THE WORK**

**1.1.1 CONTRACT DOCUMENTS AND RELATED REQUIREMENTS**

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

**1.1.2 TASKS**

The work tasks are summarized briefly as follows:

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

**1.1.3 ABATEMENT CONTRACTOR USE OF PREMISES**

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

shown on drawings shall be secured in writing from the VA representative through the pre-abatement plan of action. The following limitations of use shall apply to existing facilities shown on drawings:

## **1.2 VARIATIONS IN QUANTITY**

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

## **1.3 STOP ASBESTOS REMOVAL**

If the Contracting Officer or their field representative presents a written **Stop Asbestos Removal Order**, the Abatement Contractor/Personnel shall immediately stop all asbestos removal and adequately wet any exposed ACM. The Contractor shall not resume any asbestos removal activity until authorized to do so by the VA. A stop asbestos removal order may be issued at any time the VA determines abatement conditions/activities are not within specification requirements. Work stoppage will continue until conditions have been corrected to the satisfaction of the VA. Standby time and costs for corrective actions will be borne by the Contractor, including the industrial hygienist's time. The occurrence of any of the following events shall be reported immediately by the Contractor in writing to the VA representative and shall require the Contractor to immediately stop asbestos removal activities and initiate fiber reduction activities:

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

## **1.4 DEFINITIONS**

### **1.4.1 GENERAL**

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

#### 1.4.2 GLOSSARY

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

**ACE** - Asbestos contaminated elements.

**ACM** - Asbestos containing material.

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

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

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

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

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

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

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

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

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

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

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

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

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

**Asbestos waste decontamination facility** - A system consisting of drum/bag washing facilities and a temporary storage area for cleaned containers of asbestos waste. Used as the exit for waste and equipment



leaving the regulated area. In an emergency, it may be used to evacuate personnel.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Competent person** - In addition to the definition in 29 CFR 1926.32(f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f); in addition, for Class I and II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PACM. The designation of PACM may be rebutted pursuant to 29 CFR 1926.1101 (k) (5).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Waste/Equipment decontamination facility (W/EDF)** - The area in which equipment is decontaminated before removal from the regulated area.

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

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

#### 1.4.3 REFERENCED STANDARDS ORGANIZATIONS

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

- A. VA Department of Veterans Affairs  
810 Vermont Avenue, NW  
Washington, DC 20420
- B. AIHA American Industrial Hygiene Association  
2700 Prosperity Avenue, Suite 250  
Fairfax, VA 22031  
703-849-8888
- C. ANSI American National Standards Institute  
1430 Broadway  
New York, NY 10018  
212-354-3300
- D. ASTM American Society for Testing and Materials  
1916 Race St.

Philadelphia, PA 19103  
215-299-5400

- E. CFR Code of Federal Regulations  
Government Printing Office  
Washington, DC 20420
- F. CGA Compressed Gas Association  
1235 Jefferson Davis Highway  
Arlington, VA 22202  
703-979-0900
- G. CS Commercial Standard of the National Institute of Standards and  
Technology (NIST)  
U. S. Department of Commerce  
Government Printing Office  
Washington, DC 20420
- H. EPA Environmental Protection Agency  
401 M St., SW  
Washington, DC 20460  
202-382-3949
- I. MIL-STD Military Standards/Standardization Division  
Office of the Assistant Secretary of Defense  
  
Washington, DC 20420
- J. MSHA Mine Safety and Health Administration  
  
Respiratory Protection Division  
Ballston Tower #3  
Department of Labor  
Arlington, VA 22203  
703-235-1452
- K. NIST National Institute for Standards and Technology  
U. S. Department of Commerce  
Gaithersburg, MD 20234  
301-921-1000
- L. NEC National Electrical Code (by NFPA)
- M. NEMA National Electrical Manufacturer's Association  
2101 L Street, NW  
Washington, DC 20037
- N. NFPA National Fire Protection Association  
1 Batterymarch Park  
P.O. Box 9101  
Quincy, MA 02269-9101  
800-344-3555
- O. NIOSH National Institutes for Occupational Safety and Health  
4676 Columbia Parkway  
Cincinnati, OH 45226  
513-533-8236
- P. OSHA Occupational Safety and Health Administration  
U.S. Department of Labor  
Government Printing Office  
Washington, DC 20402

- Q. UL Underwriters Laboratory  
333 Pfingsten Rd.  
Northbrook, IL 60062  
312-272-8800
- R. USA United States Army  
Army Chemical Corps  
Department of Defense  
Washington, DC 20420

## **1.5 APPLICABLE CODES AND REGULATIONS**

### **1.5.1 GENERAL APPLICABILITY OF CODES, REGULATIONS, AND STANDARDS**

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

### **1.5.2 CONTRACTOR RESPONSIBILITY**

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

### **1.5.3 FEDERAL REQUIREMENTS**

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

- A. Occupational Safety and Health Administration (OSHA)
  - 1. Title 29 CFR 1926.1101 - Construction Standard for Asbestos
  - 2. Title 29 CFR 1910.132 - Personal Protective Equipment
  - 3. Title 29 CFR 1910.134 - Respiratory Protection



4. Title 29 CFR 1926 - Construction Industry Standards
  5. Title 29 CFR 1910.20 - Access to Employee Exposure and Medical Records
  6. Title 29 CFR 1910.1200 - Hazard Communication
  7. Title 29 CFR 1910.151 - Medical and First Aid
- B. Environmental Protection Agency (**EPA**)
1. 40 CFR 61 Subpart A and M (Revised Subpart B) - National Emission Standard for Hazardous Air Pollutants - Asbestos.
  2. 40 CFR 763.80 - Asbestos Hazard Emergency Response Act (AHERA)
- C. Department of Transportation (**DOT**)
- Title 49 CFR 100 - 185 - Transportation

#### **1.5.4 STANDARDS**

- A. Standards which govern asbestos abatement activities include, but are not limited to, the following:
1. American National Standards Institute (ANSI) Z9.2-79 - Fundamentals Governing the Design and Operation of Local Exhaust Systems Z88.2 - Practices for Respiratory Protection.
  2. Underwriters Laboratories (UL) 586-90 - UL Standard for Safety of HEPA filter Units, 7th Edition.
- B. Standards which govern encapsulation work include, but are not limited to, the following:
1. American Society for Testing and Materials (ASTM)
- C. Standards which govern the fire and safety concerns in abatement work include, but are not limited to, the following:
1. National Fire Protection Association (NFPA) 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.
  2. NFPA 701 - Standard Methods for Fire Tests for Flame Resistant Textiles and Film.
  3. NFPA 101 - Life Safety Code

#### **1.5.5 EPA GUIDANCE DOCUMENTS**

- A. EPA guidance documents which discuss asbestos abatement work activities are listed below. These documents are made part of this section by reference. EPA publications can be ordered from (800) 424-9065.
- B. Guidance for Controlling ACM in Buildings (Purple Book) EPA 560/5-85-024

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

#### **1.5.6 NOTICES**

- A. State and Local agencies: Send written notification as required by state and local regulations including the local fire department prior to beginning any work on ACM as follows:
- B. Copies of notifications shall be submitted to the VA for the facility's records in the same time frame notification is given to EPA, State, and Local authorities.

#### **1.5.7 PERMITS/LICENSES**

The contractor shall apply for and have all required permits and licenses to perform asbestos abatement work as required by Federal, State, and Local regulations.

#### **1.5.8 POSTING AND FILING OF REGULATIONS**

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

#### **1.5.9 VA RESPONSIBILITIES**

Prior to commencement of work:

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

#### **1.5.10 SITE SECURITY**

- A. Regulated area access is to be restricted only to authorized, trained/accredited and protected personnel. These may include the Contractor's employees, employees of Subcontractors, VA employees and representatives, State and local inspectors, and any other designated individuals. A list of authorized personnel shall be established prior to commencing the project and be posted in the clean room of the decontamination unit.

- B. Entry into the regulated area by unauthorized individuals shall be reported immediately to the Competent Person by anyone observing the entry. The Competent Person shall immediately notify the VA.
- C. A log book shall be maintained in the clean room of the decontamination unit. Anyone who enters the regulated area must record their name, affiliation, time in, and time out for each entry.
- D. Access to the regulated area shall be through a single decontamination unit, if required. All other access (doors, windows, hallways, etc.) shall be sealed or locked to prevent entry to or exit from the regulated area. The only exceptions for this requirement are the waste/equipment load-out area which shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits. Emergency exits shall not be locked from the inside, however, they shall be sealed with poly sheeting and taped until needed.
- E. The Contractor's Competent Person shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel. A 24 hour security system shall be provided at the entrance to the regulated area to assure that all entrants are logged in/out and that only authorized personnel are allowed entrance.
- F. The Abatement Contractor will have the VA's assistance in notifying adjacent personnel of the presence, location and quantity of ACM in the regulated area and enforcement of restricted access by the VA's employees.
- G. The regulated area shall be locked during non-working hours and secured by VA security guards.

#### **1.5.11 EMERGENCY ACTION PLAN AND ARRANGEMENTS**

- A. An Emergency Action Plan shall be developed by the Contractor prior to commencing abatement activities and shall be agreed to by the Contractor and the VA. The Plan shall meet the requirements of 29 CFR 1910.38 (a); (b).
- B. Emergency procedures shall be in written form and prominently posted and available in the regulated area. Everyone, prior to entering the regulated area, must read and sign these procedures to acknowledge understanding of the regulated area layout, location of emergency exits and emergency procedures.
- C. Emergency planning shall include written notification of police, fire, and emergency medical personnel of planned abatement activities; work schedule and layout of regulated area, particularly barriers that may affect response capabilities.
- D. Emergency planning shall include consideration of fire, explosion, hazardous atmospheres, electrical hazards, slips/trips and falls, confined spaces, and heat stress illness. Written procedures for response to emergency situations shall be developed and employee training in procedures shall be provided.
- E. Employees shall be trained in regulated area/site evacuation procedures in the event of workplace emergencies.

1. For non life-threatening situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the regulated area to obtain proper medical treatment.
  2. For life-threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, remove them from the regulated area, and secure proper medical treatment.
- F. Telephone numbers of all emergency response personnel shall be prominently posted in the clean room, along with the location of the nearest telephone.
- G. The Contractor shall provide verification of first aid/CPR training for personnel responsible for providing first aid/CPR. OSHA requires medical assistance within 3 minutes of a life-threatening injury/illness. Bloodborne Pathogen training shall also be verified for those personnel required to provide first aid/CPR.
- H. The Emergency Action Plan shall provide for a Contingency Plan in the event that an incident occurs that may require the modification of the standard operating procedures during abatement. Such incidents include, but are not limited to, fire; accident; and power failure. The Contractor shall detail procedures to be followed in the event of an incident assuring that work is stopped and wetting is continued until correction of the problem.

#### **1.5.12 PRE-CONSTRUCTION MEETING**

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

- A. Proof of Contractor licensing.
- B. Proof the Competent Person is trained and accredited and approved for working in this State. Verification of the experience of the Competent Person shall also be presented.
- C. A list of all workers who will participate in the project, including experience and verification of training and accreditation.
- D. A list of and verification of training for all personnel who have current first-aid/CPR training. A minimum of one person per shift must have adequate training.
- E. Current medical written opinions for all personnel working on-site meeting the requirements of 29 CFR 1926.1101 (m).
- F. Current fit-tests for all personnel wearing respirators on-site meeting the requirements of 29 CFR 1926.1101 (h) and Appendix C.

- G. A copy of the Contractor's Standard Operating Procedures for Class I Glovebag Asbestos Abatement. In these procedures, the following information must be detailed, specific for this project.
  - 1. Regulated area preparation procedures;
  - 2. Notification requirements procedure of Contractor as required in 29 CFR 1926.1101 (d);
  - 3. If required, decontamination area set-up/layout and decontamination procedures for employees;
  - 4. Glovebag abatement methods/procedures and equipment to be used;
  - 5. Personal protective equipment to be used;
- H. At this meeting the Contractor shall provide all submittals as required.
- I. Procedures for handling, packaging and disposal of asbestos waste.
- J. Emergency Action Plan and Contingency Plan Procedures.

#### **1.6 PROJECT COORDINATION**

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

##### **1.6.1 PERSONNEL**

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

2. The Competent Person has four (4) years of abatement experience of which two (2) years were as the Competent Person on the project; meets the OSHA definition of a Competent Person; has been the Competent Person on two (2) projects of similar size and complexity as this project; has completed EPA AHERA/OSHA/State/Local training requirements/accreditation(s) and refreshers; and has all required OSHA documentation related to medical and respiratory protection.
3. The Contractor Professional Industrial Hygienist (CPIH) shall have five (5) years of monitoring experience and supervision of asbestos abatement projects; has participated as senior IH on five (5) abatement projects, three (3) of which are similar in size and complexity as this project; has developed at least one complete standard operating procedure for asbestos abatement; has trained abatement personnel for three (3) years; has specialized EPA AHERA/OSHA training in asbestos abatement management, respiratory protection, waste disposal and asbestos inspection; has completed the NIOSH 582 Course, Contractor/Supervisor course; and has appropriate medical/respiratory protection records/documentation.
4. The Abatement Personnel shall have completed the EPA AHERA/OSHA abatement worker course; have training on the standard operating procedures of the Contractor; has one year of asbestos abatement experience; has applicable medical and respiratory protection documentation; has certificate of training/current refresher and State accreditation/license.

## **1.7 RESPIRATORY PROTECTION**

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

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

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

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

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

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

#### **1.7.4 MINIMUM RESPIRATORY PROTECTION**

Minimum respiratory protection shall be a full face powered air purifying respirator when fiber levels are maintained consistently at or below 0.5 f/cc. A higher level of respiratory protection may be provided or required, depending on fiber levels. Respirator selection shall meet the requirements of 29 CFR 1926.1101 (h); Table 1, except as indicated in this paragraph. Abatement personnel must have a respirator for their exclusive use.

#### **1.7.5 MEDICAL WRITTEN OPINION**

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

#### **1.7.6 RESPIRATOR FIT TEST**

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

#### **1.7.7 RESPIRATOR FIT CHECK**

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

#### **1.7.8 MAINTENANCE AND CARE OF RESPIRATORS**

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

### **1.8 WORKER PROTECTION**

#### **1.8.1 TRAINING OF ABATEMENT PERSONNEL**

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

#### **1.8.2 MEDICAL EXAMINATIONS**

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

### 1.8.3 PERSONAL PROTECTIVE EQUIPMENT

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

### 1.8.4 REGULATED AREA ENTRY PROCEDURE

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

### 1.8.5 DECONTAMINATION PROCEDURE - PAPR

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

- A. When exiting the regulated area, remove disposable coveralls, and ALL other clothes, disposable head coverings, and foot coverings or boots in the equipment room.
- B. Still wearing the respirator and completely naked, proceed to the shower. Showering is MANDATORY. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:
  - 1. Thoroughly wet body including hair and face. If using a PAPR hold blower above head to keep filters dry.
  - 2. With respirator still in place, thoroughly decontaminate body, hair, respirator face piece, and all other parts of the respirator except the blower and battery pack on a PAPR. Pay particular attention to cleaning the seal between the face and respirator facepiece and under the respirator straps.
  - 3. Take a deep breath, hold it and/or exhale slowly, completely wetting hair, face, and respirator. While still holding breath, remove the respirator and hold it away from the face before starting to breathe.
- C. Carefully decontaminate the facepiece of the respirator inside and out. If using a PAPR, shut down using the following sequence: a) first cap inlets to filters; b) turn blower off to keep debris collected on the inlet side of the filter from dislodging and contaminating the outside of the unit; c) thoroughly decontaminate blower and hoses; d) carefully decontaminate battery pack with a wet rag being cautious of getting water in the battery pack thus preventing destruction. **THIS PROCEDURE IS NOT A SUBSTITUTE FOR RESPIRATOR CLEANING!**
- D. Shower and wash body completely with soap and water. Rinse thoroughly.



- E. Rinse shower room walls and floor to drain prior to exiting.
- F. Proceed from shower to clean room; dry off and change into street clothes or into new disposable work clothing.

#### **1.8.6 REGULATED AREA REQUIREMENTS**

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

#### **1.9 DECONTAMINATION FACILITIES**

##### **1.9.1 DESCRIPTION**

Provide each regulated area with separate personnel (PDF) and waste/equipment decontamination facilities (W/EDF). Ensure that the PDF is the only means of ingress and egress to the regulated area and that all equipment, bagged waste, and other material exit the regulated area only through the W/EDF.

##### **1.9.2 GENERAL REQUIREMENTS**

All personnel entering or exiting a regulated area shall follow the requirements at 29 CFR 1926.1101 (j) (1) and these specifications. All equipment and materials must exit the regulated area through the W/EDF and be decontaminated in accordance with these specifications. Walls and ceilings of the PDF and W/EDF must be constructed of a minimum of 3 layers of 6 mil opaque fire retardant polyethylene sheeting and be securely attached to existing building components and/or an adequate temporary framework. A minimum of 3 layers of 6 mil poly shall also be used to cover the floor under the PDF and W/EDF units. Construct doors so that they overlap and secure to adjacent surfaces. Weigh sheets with layers of duct tape so that they close quickly after release. Put arrows on sheets so they show direction of travel and overlap. If the building adjacent area is occupied, construct a solid barrier on the occupied side(s) to protect the sheeting.

##### **1.9.3 TEMPORARY FACILITIES TO THE PDF AND W/EDF**

The Competent Person shall provide temporary water service connections to the PDF and W/EDF. Backflow prevention must be provided at the point of connection to the VA system. Water supply must be of adequate pressure and meet requirements of 29 CFR 1910.141(d) (3). Provide adequate temporary electric power with ground fault protection and overhead wiring in the PDF and W/EDF. Provide a sub-panel for all temporary power in the clean room. Provide adequate lighting to provide a minimum of 50 foot candles in the PDF and W/EDF. Provide temporary heat to maintain 70°F throughout the PDF and W/EDF..

##### **1.9.4 PERSONNEL DECONTAMINATION FACILITY (PDF)**

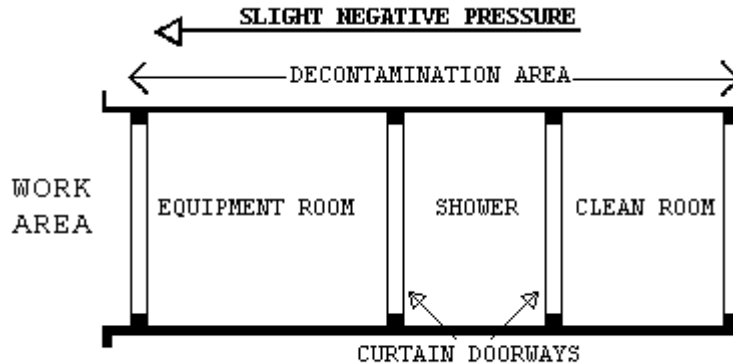
The Competent Person shall provide a PDF consisting of shower room which is contiguous to a clean room and equipment room. The PDF must be sized to accommodate the number of personnel scheduled for the project. The shower room, located in the center of the PDF, shall be fitted with as many portable showers as necessary to ensure all employees can complete the entire decontamination procedure within 15 minutes. The PDF shall be

constructed of opaque poly for privacy. The PDF shall be constructed to eliminate any parallel routes of egress without showering.

1. Clean Room: The clean room must be physically and visually separated from the rest of the building to protect the privacy of personnel changing clothes. The clean room shall be constructed of at least 2 layers of 6 mil fire retardant poly to provide an air tight room. Provide a minimum of 2 - 900 mm (3 foot) wide flapped doorways. One doorway shall be the entry from outside the PDF and the second doorway shall be to the shower room of the PDF. The floor of the clean room shall be maintained in a clean, dry condition. Shower overflow shall not be allowed into the clean room. An adequate supply of disposable towels shall be provided. Provide storage lockers per person. A portable fire extinguisher, Type ABC, shall be provided in accordance with OSHA and NFPA Standard 10. All persons entering the regulated area shall remove all street clothing in the clean room and dress in disposable protective clothing and respiratory protection. Any person entering the clean room does so either from the outside with street clothing on or is coming from the shower room completely naked and thoroughly washed. Females required to enter the regulated area shall be ensured of their privacy throughout the entry/exit process by posting guards at both entry points to the PDF so no male can enter or exit the PDF during her stay in the PDF.
2. Shower Room: The Competent Person shall assure that the shower room is a completely water tight compartment to be used for the movement of all personnel from the clean room to the equipment room and for the showering of all personnel going from the regulated area to the clean room. Each shower shall be constructed so water runs down the walls of the shower and into a drip pan. Install a freely draining smooth floor on top of the shower pan. The shower room shall be separated from the rest of the building and from the clean room and equipment room using air tight walls made from at least 3 layers of 6 mil fire retardant poly. The shower shall be equipped with a shower head and controls, hot and cold water, drainage, soap dish and continuous supply of soap, and shall be maintained in a sanitary condition throughout its use. The controls shall be arranged so an individual can shower without assistance. Provide a flexible hose shower head, hose bibs and all other items shown on Shower Schematic. Waste water will be pumped to a drain after being filtered through a minimum of a 100 micron sock in the shower drain; a 20 micron filter; and a final 5 micron filter. Filters will be changed a minimum of daily or more often as needed. Filter changes must be done in the shower to prevent loss of contaminated water. Hose down all shower surfaces after each shift and clean any debris from the shower pan. Residue is to be disposed of as asbestos waste.
3. Equipment Room: The Competent Person shall provide an equipment room which shall be an air tight compartment for the storage of work equipment, reusable footwear and for use as a change station for personnel exiting the regulated area. The equipment room shall be separated from the regulated area by a minimum 3 foot wide door made of 2 layers of 6 mil fire retardant poly. The equipment room shall be separated from the regulated area, the shower room and the rest of the building by air tight walls and ceiling constructed of a minimum of 3 layers of 6 mil fire retardant poly. Damp wipe all surfaces of the equipment room after each shift change. Provide an additional loose layer of 6 mil fire retardant poly per shift change and remove this layer after each shift.

Provide a temporary electrical sub-panel equipped with GFCI in this room to accommodate any equipment required in the regulated area.

4. The PDF shall consist of the following: Clean room at the entrance followed by a shower room followed by an equipment room leading to the regulated area. Each doorway in the PDF is minimum of 2 layers of 6 mil fire retardant poly.

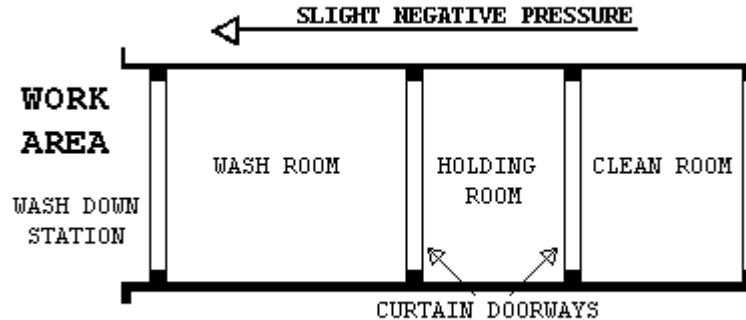


#### 1.9.5 WASTE/EQUIPMENT DECONTAMINATION FACILITY (W/EDF)

The Competent Person shall provide a W/EDF consisting of a wash room, holding room, and clean room for removal of all waste, equipment and contaminated material from the regulated area. Personnel shall not enter or exit the W/EDF except in the event of an emergency. Clean debris and residue in the W/EDF daily. All surfaces in the W/EDF shall be wiped/hosed down after each shift and all debris shall be cleaned from the shower pan. The W/EDF shall consist of the following:

1. Wash Down Station: Provide an enclosed shower unit in the regulated area just outside the Wash Room as an equipment, bag and container cleaning station.
2. Wash Room: Provide a wash room for cleaning of bagged or containerized asbestos containing waste materials passed from the regulated area. Construct the wash room using 50 x 100 mm (2" x 4") wood framing and 3 layers of 6 mil fire retardant poly. Locate the wash room so that packaged materials, after being wiped clean, can be passed to the Holding Room. Doorways in the wash room shall be constructed of 2 layers of 6 mil fire retardant poly.
3. Holding Room: Provide a holding room as a drop location for bagged materials passed from the wash room. Construct the holding room using 50 x 100 mm (2" x 4") wood framing and 3 layers of 6 mil fire retardant poly. The holding room shall be located so that bagged material cannot be passed from the wash room to the clean room unless it goes through the holding room. Doorways in the holding room shall be constructed of 2 layers of 6 mil fire retardant poly.
4. Clean Room: Provide a clean room to isolate the holding room from the building exterior. Construct the clean room using 2 x 4 wood framing and 2 layers of 6 mil fire retardant poly. The clean room shall be located so as to provide access to the holding room from the building exterior. Doorways to the clean room shall be constructed of two layers of 6 mil fire retardant poly.

5. The W/EDF shall be provided as follows: Wash Room leading to a Holding Room followed by a Clean Room leading to outside the regulated area. See diagram.



#### 1.9.6 WASTE/EQUIPMENT DECONTAMINATION PROCEDURES

At washdown station in the regulated area, thoroughly wet clean contaminated equipment and/or sealed polyethylene bags and pass into Wash Room after visual inspection. When passing anything into the Wash Room, close all doorways of the W/EDF, other than the doorway between the washdown station and the Wash Room. Keep all outside personnel clear of the W/EDF. Once inside the Wash Room, wet clean the equipment and/or bags. After cleaning and inspection, pass items into the Holding Room. Close all doorways except the doorway between the Holding Room and the Clean Room. Workers from the Clean Room/Exterior shall enter the Holding Room and remove the decontaminated/cleaned equipment/bags for removal and disposal. These personnel will not be required to wear PPE. At no time shall personnel from the clean side be allowed to enter the Wash Room.

### PART 2 - PRODUCTS, MATERIALS AND EQUIPMENT

#### 2.1 MATERIALS AND EQUIPMENT

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

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

- A. All materials shall be delivered in their original package, container or bundle bearing the name of the manufacturer and the brand name (where applicable).
- B. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Flammable materials cannot be stored inside buildings. Replacement materials shall be stored outside of the regulated/work area until abatement is completed.

- C. The Contractor shall not block or hinder use of buildings by patients, staff, and visitors to the VA in partially occupied buildings by placing materials/equipment in any unauthorized place.
- D. The Competent Person shall inspect for damaged, deteriorating or previously used materials. Such materials shall not be used and shall be removed from the worksite and disposed of properly.
- E. Poly sheeting put under the glovebag regulated area shall be a minimum of 6 mils in thickness.
- F. If required, the method of attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and the VA and selected to minimize damage to equipment and surfaces.
- G. Polyethylene sheeting utilized for personnel decontamination facility shall be opaque white or black in color, 6 mil fire retardant poly.
- H. Installation and plumbing hardware, showers, hoses, drain pans, sump pumps and waste water filtration system shall be provided by the Contractor.
- I. An adequate number of HEPA vacuums, scrapers, sprayers, nylon brushes, brooms, disposable mops, rags, sponges, staple guns, shovels, ladders and scaffolding of suitable height and length as well as meeting OSHA requirements shall be provided. Fall protection devices, water hose to reach all areas in the regulated area, airless spray equipment, and any other tools, materials or equipment required to conduct the abatement project shall also be provided. All electrically operated hand tools, equipment, electric cords shall be equipped with GFCI protection.
- J. Special protection for objects in the regulated area shall be detailed (e.g., plywood over carpeting or hardwood floors to prevent damage from scaffolds, water, and falling material).
- K. Disposal bags - 2 layers of 6 mil, for asbestos waste shall be pre-printed with labels, markings and address as required by OSHA, EPA and DOT regulations.
- L. The VA shall be provided a copy of the MSDS as required for all hazardous chemicals under OSHA 29 CFR 1910.1200 - Hazard Communication. Chlorinated compounds shall not be used with any spray adhesive or other product. Appropriate encapsulant(s) shall be provided.
- M. OSHA DANGER demarcation signs, as many and as required by OSHA 29 CFR 1926.1101(k)(7) shall be provided and placed by the Competent Person. All other posters and notices required by Federal and State regulations shall be posted in the Clean Room.
- N. Adequate and appropriate PPE for the project and number of personnel/shifts shall be provided. All personal protective equipment issued must be based on a hazard assessment conducted under 29 CFR 1910.132(d).

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

### **2.2.1 GENERAL**

Using critical barriers, seal off the perimeter to the regulated area to completely isolate the regulated area from adjacent spaces. All horizontal surfaces in the regulated area must be covered with 2 layers of 6 mil fire retardant poly to prevent contamination and to facilitate clean-up. Should adjacent areas become contaminated, immediately stop work and clean up the contamination at no additional cost to the Government. Provide firestopping and identify all fire barrier penetrations due to abatement work as specified in Section 2.2.8; FIRESTOPPING.

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

- A. Place all tools, scaffolding, materials and equipment needed for working in the regulated area prior to erecting any plastic sheeting. Remove all uncontaminated removable furniture, equipment and/or supplies from the regulated area before commencing work, or completely cover with 2 layers of 6-mil fire retardant poly sheeting and secure with duct tape. Lock out and tag out any HVAC systems in the regulated area.

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

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

### **2.2.4 CRITICAL BARRIERS**

- A. Completely separate any openings into the regulated area from adjacent areas using fire retardant poly at least 6 mils thick and duct tape. Individually seal with 2 layers of 6 mil poly and duct tape all HVAC openings into the regulated area. Individually seal all lighting fixtures, clocks, doors, windows, convectors, speakers, or any other objects in the regulated area. Heat must be shut off any objects covered with poly.

### **2.2.5 SECONDARY BARRIERS**

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

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

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

### **2.2.7 FIRESTOPPING**

- A. Through penetrations caused by cables, cable trays, pipes, sleeves must be firestopped with a fire-rated firestop system providing an air tight seal.
- B. Firestop materials that are not equal to the wall or ceiling penetrated shall be brought to the attention of the VA Representative. The Contractor shall list all areas of penetration, the type of sealant used, and whether or not the location is fire rated. Any discovery of penetrations during abatement shall be brought to the attention of the VA Representative immediately. All walls, floors and ceilings are considered fire rated unless otherwise determined by the VA Representative or Fire Marshall.
- C. Any visible openings whether or not caused by a penetration shall be reported by the Contractor to the VA Representative for a sealant system determination. Firestops shall meet ASTM E814 and UL 1479 requirements for the opening size, penetrant, and fire rating needed.

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

#### **2.3.1 GENERAL**

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

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

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

- A. The purpose of the work of the VPIH/CIH is to: Assure quality; resolve problems; and prevent the spread of contamination beyond the regulated area. In addition, their work includes performing the final inspection and testing to determine whether the regulated area or building has been adequately decontaminated. All air monitoring is to be done utilizing PCM/TEM.
- B. All data, inspection results and testing results generated by the VPIH/CIH will be available to the Contractor for information and consideration. The Contractor shall cooperate with and support the VPIH/CIH for efficient and smooth performance of their work.
- C. The monitoring and inspection results of the VPIH/CIH will be used by the VA to issue any Stop Removal orders to the Contractor during abatement work and to accept or reject a regulated area or building as decontaminated.

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

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



the sample, the date of sample collection, start and stop times for sampling, sample volume, flow rate, and fibers/cc. The CPIH shall collect and analyze samples for each representative job being done in the regulated area, i.e., removal, wetting, clean-up, and load-out. No fewer than two personal samples per shift shall be collected and one area sample per 1,000 square feet of regulated area where abatement is taking place and one sample per shift in the clean room area shall be collected. In addition to the continuous monitoring required, the CPIH will perform inspection and testing at the final stages of abatement for each regulated area as specified in the CPIH responsibilities.

## **2.4 STANDARD OPERATING PROCEDURES**

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

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

## **2.5 SUBMITTALS**

### **2.5.1 PRE-CONSTRUCTION MEETING SUBMITTALS**

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

- A. Submit a detailed work schedule for the entire project reflecting contract documents and the phasing/schedule requirements from the CPM chart.

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

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

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

- A. The Competent Person shall maintain and submit a daily log at the regulated area documenting the dates and times of the following:

purpose, attendees and summary of meetings; all personnel entering/exiting the regulated area; document and discuss the resolution of unusual events such as critical barrier breeching, equipment failures, emergencies, and any cause for stopping work; representative air monitoring and results/TWA's/EL's. Submit this daily log to VA's representative.

- B. The CPIH shall document and maintain the following during abatement and submit as appropriate to the VA's representative.
1. Inspection and approval of the regulated area preparation prior to start of work and daily during work.
  2. Removal of any poly critical/floor barriers.
  3. Visual inspection/testing by the CPIH prior to application of lockdown encapsulation.
  4. Packaging and removal of ACM waste from regulated area.
  5. Disposal of ACM waste materials; copies of Waste Shipment Records/landfill receipts to the VA's representative on a weekly basis.

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

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

## **2.6 ENCAPSULANTS**

### **2.6.1 TYPES OF ENCAPSULANTS**

- A. The following four types of encapsulants must comply with performance requirements as stated in paragraph 2.6.2:
1. Removal encapsulant - used as a wetting agent to remove ACM.
  2. Bridging encapsulant - provides a tough, durable coating on ACM.
  3. Penetrating encapsulant - penetrates/encapsulates ACM at least 13 mm (1/2").
  4. Lockdown encapsulant - seals microscopic fibers on surfaces after ACM removal.

### **2.6.2 PERFORMANCE REQUIREMENTS**

Encapsulants shall meet the latest requirements of EPA; shall not contain toxic or hazardous substances; or solvents; and shall comply with the following performance requirements:

- A. General Requirements for all Encapsulants:
1. ASTM E84: Flame spread of 25; smoke emission of 50.

2. University of Pittsburgh Protocol: Combustion Toxicity; zero mortality.
3. ASTM C732: Accelerated Aging Test; Life Expectancy - 20 years.
4. ASTM E96: Permeability - minimum of 0.4 perms.
- B. Bridging/Penetrating Encapsulants:
  1. ASTM E736: Cohesion/Adhesion Test - 24 kPa (50 lbs/ft<sup>2</sup>).
  2. ASTM E119: Fire Resistance - 3 hours (Classified by UL for use on fibrous/cementitious fireproofing).
  3. ASTM D2794: Gardner Impact Test; Impact Resistance - minimum 11.5 kg-mm (43 in/lb).
  4. ASTM D522: Mandrel Bend Test; Flexibility - no rupture or cracking.
- C. Lockdown Encapsulants:
  1. ASTM E119: Fire resistance - 3 hours (tested with fireproofing over encapsulant applied directly to steel member).
  2. ASTM E736: Bond Strength - 48 kPa (100 lbs/ft<sup>2</sup>) (test compatibility with cementitious and fibrous fireproofing).
  3. In certain situations, encapsulants may have to be applied to hot pipes/equipment. The encapsulant must be able to withstand high temperatures without cracking or off-gassing any noxious vapors during application.

## **2.7 CERTIFICATES OF COMPLIANCE**

The Contractor shall submit to the VA representative certification from the manufacturer indicating compliance with performance requirements for encapsulants when applied according to manufacturer recommendations.

## **2.8 RECYCLABLE PROTECTIVE CLOTHING**

If recyclable clothing is provided, all requirements of EPA, DOT and OSHA shall be met.

## **PART 3 - EXECUTION**

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

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

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

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

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

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

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

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

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

## **3.2 REGULATED AREA PREPARATIONS**

### **3.2.1 OSHA DANGER SIGNS**

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

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

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

### **3.2.3 SHUT DOWN - LOCK OUT HVAC**

Shut down and lock out heating, cooling, and air conditioning system (HVAC) components that are in, supply or pass through the regulated area.

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

### **3.2.4 SANITARY FACILITIES**

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

### **3.2.5 WATER FOR ABATEMENT**

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

### **3.2.6 PRE-CLEANING MOVABLE OBJECTS**

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

### **3.2.7 PRE-CLEANING FIXED OBJECTS**

Pre-clean all fixed objects in the regulated area using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery behind grills or gratings where access may be difficult but contamination may be significant. Also, pay particular attention to wall, floor and ceiling penetration behind fixed items. After precleaning, enclose fixed objects with 2 layers of 6-mil poly and seal securely in place with duct tape. Objects (e.g., permanent fixtures, shelves, electronic equipment, laboratory tables, sprinklers, alarm systems, closed circuit TV equipment and computer cables) which must remain in the regulated area and that require special ventilation or enclosure requirements should be designated here along with specified means of protection. Contact the manufacturer for special protection requirements.

### **3.2.8 PRE-CLEANING SURFACES IN THE REGULATED AREA**

Pre-clean all surfaces in the regulated area using HEPA filtered vacuums and/or wet cleaning methods as appropriate. Do not use any methods that would raise dust such as dry sweeping or vacuuming with equipment not equipped with HEPA filters. Do not disturb asbestos-containing materials during this pre-cleaning phase.

## **3.3 CONTAINMENT BARRIERS AND COVERINGS FOR THE REGULATED AREA**

### **3.3.1 GENERAL**

Seal off any openings at the perimeter of the regulated area with critical barriers to completely isolate the regulated area and to contain all airborne asbestos contamination created by the abatement activities. Should the adjacent area past the regulated area become contaminated due to improper work activities, the Contractor shall suspend work inside the regulated area, continue wetting, and clean the adjacent areas in accordance with procedures described in these specifications. Any and all costs associated with the adjacent area cleanup shall not be borne by the VA.

### **3.3.2 PREPARATION PRIOR TO SEALING OFF**

Place all materials, equipment and supplies necessary to isolate the regulated area inside the regulated area. Remove all movable material/equipment as described above and secure all unmovable



material/equipment as described above. Properly secured material/equipment shall be considered to be outside the regulated area.

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

Access to the regulated area shall be permitted only through the PDF. All other means of access shall be closed off by proper sealing and DANGER signs posted on the clean side of the regulated area where it is adjacent to or within view of any occupiable area. An opaque visual barrier of 6 mil poly shall be provided so that the abatement work is not visible to any building occupants. If the area adjacent to the regulated area is accessible to the public, construct a solid barrier on the public side of the sheeting for protection and isolation of the project. The barrier shall be constructed with nominal 2" x 4" (50mm x 100mm) wood or metal studs 16" (400mm) on centers, securely anchored to prevent movement and covered with a minimum of 1/2" (12.5mm) plywood. Provide an appropriate number of OSHA DANGER signs for each visual and physical barrier. Any alternative method must be given a written approval by the VA's representative.

### **3.3.4 CRITICAL BARRIERS**

The regulated area must be completely separated from the adjacent areas, and the outside by at least 2 layers of 6 mil fire retardant poly and duct tape/spray adhesive. Individually seal all supply and exhaust ventilation openings, lighting fixtures, clocks, doorways, windows, convectors, speakers, and other openings into the regulated area with 2 layers of 6 mil fire retardant poly, and taped securely in place with duct tape/spray adhesive. Critical barriers must remain in place until all work and clearances have been completed. Light fixtures shall not be operational during abatement. Auxiliary lighting shall be provided. If needed, provide plywood squares 6" x 6" x 3/8" (150mm x 150mm x 18mm) held in place with one 6d smooth masonry/galvanized nail driven through the center of the plywood square and duct tape on the poly so as to clamp the poly to the wall/surface. Locate plywood squares at each end, corner, and 4' (1200mm) maximum on centers.

### **3.3.5 EXTENSION OF THE REGULATED AREA**

If the regulated area barrier is breached in any manner that could allow the passage of asbestos fibers or debris, the Competent Person shall immediately stop work, continue wetting, and proceed to extend the regulated area to enclose the affected area as per procedures described in this specification. If the affected area cannot be enclosed, decontamination measures and cleanup shall start immediately. All personnel shall be isolated from the affected area until decontamination/cleanup is completed as verified by visual inspection and air monitoring. Air monitoring at completion must indicate background levels.

### **3.3.6 FLOOR BARRIERS:**

All floors within 10' of glovebag work shall be covered with 2 layers of 6 mil fire retardant poly.

## **3.4 REMOVAL OF PIPING ACM**

### **3.4.1 WETTING MATERIALS**

- A. Use amended water for the wetting of ACM prior to removal. The Competent Person shall assure the wetting of ACM meets the

definition of "adequately wet" in the EPA NESHAP's regulation and OSHA's "wet methods" for the duration of the project. A removal encapsulant may be used instead of amended water with written approval of the VA's representative.

- B. Amended Water: Provide water to which a surfactant has been added shall be used to wet the ACM and reduce the potential for fiber release during disturbance of ACM. The mixture must be equal to or greater than the wetting provided by water amended by a surfactant consisting one ounce of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with 5 gallons (19L) of water.
- C. Removal Encapsulant: Provide a penetrating encapsulant designed specifically for the removal of ACM. The material must, when used, result in adequate wetting of the ACM and retard fiber release during disturbance equal to or greater than the amended water described above in B.

#### **3.4.2 SECONDARY BARRIER AND WALKWAYS**

- A. Install as a drop cloth a 6 mil poly sheet at the beginning of each work shift where removal is to be done during that shift. Completely floors within 10 feet (3M) of the area where work is to be done. Secure the secondary barrier with duct tape to prevent debris from getting behind it. Remove the secondary barrier at the end of the shift or as work in the area is completed. Keep residue on the secondary barrier wetted. When removing, fold inward to prevent spillage and place in a disposal bag.
- B. Install walkways using 6 mil poly between the regulated area and the decontamination facilities (PDF and W/EDF) to protect the floor from contamination and damage. Install the walkways at the beginning of each shift and remove at the end of each shift.

#### **3.4.3 WET REMOVAL OF ACM**

- A. Using acceptable glovebag procedures, adequately and thoroughly wet the ACM to be removed prior to removal to reduce/prevent fiber release to the air. Adequate time must be allowed for the amended water to saturate the ACM. Abatement personnel must not disturb dry ACM. Use a fine spray of amended water or removal encapsulant. Saturate the material sufficiently to wet to the substrate without causing excessive dripping. The material must be sprayed repeatedly/continuously during the removal process in order to maintain adequately wet conditions. Removal encapsulants must be applied in accordance with the manufacturer's written instructions. Perforate or carefully separate, using wet methods, an outer covering that is painted or jacketed in order to allow penetration and wetting of the material. Where necessary, carefully remove covering while wetting to minimize fiber release. In no event shall dry removal occur except in the case of electrical hazards or a greater safety issue is possible!

### **3.5 GLOVEBAG REMOVAL PROCEDURES**

#### **3.5.1 GENERAL**

All applicable OSHA requirements and glovebag manufacturer's recommendations shall be met during glove bagging operations.

1. Mix the surfactant with water in the garden sprayer, following the manufacturer's directions.
2. Have each employee put on a HEPA filtered respirator approved for asbestos and check the fit using the positive/negative fit check.
3. Have each employee put on a disposable full-body suit. Remember, the hood goes over the respirator straps.
4. Check closely the integrity of the glove bag to be used. Check all seams, gloves, sleeves, and glove openings. OSHA requires the bottom of the bag to be seamless.
5. Check the pipe where the work will be performed. If it is damaged (broken lagging, hanging, etc.), wrap the entire length of the pipe in poly sheeting and "candy stripe" it with duct tape.
6. Attach glovebag with required tools per manufacturer's instructions.
7. Using the smoke tube and aspirator bulb, test 10% of glovebags by placing the tube into the water porthole (two-inch opening to glove bag), and fill the bag with smoke and squeeze it. If leaks are found, they should be taped closed using duct tape and the bag should be retested with smoke.
8. Insert the wand from the water sprayer through the water porthole.
9. Insert the hose end from a HEPA vacuum into the upper portion of the glove bag.
10. Wet and remove the pipe insulation.
11. If the section of pipe is covered with an aluminum jacket, remove it first using the wire cutters to cut any bands and the tin snips to remove the aluminum. It is important to fold the sharp edges in to prevent cutting the bag when placing it in the bottom.
12. When the work is complete, spray the upper portion of the bag and clean-push all residue into the bottom of the bag with the other waste material. Be very thorough. Use adequate water.
13. Put all tools, after washing them off in the bag, in one of the sleeves of glove bag and turn it inside out, drawing it outside of the bag. Twist the sleeve tightly several times to seal it and tape it several tight turns with duct tape. Cut through the middle of the duct tape and remove the sleeve. Put the sleeve in the next glove bag or put it in a bucket of water to decontaminate the tools after cutting the sleeve open.
14. Turn on the HEPA vacuum and collapse the bag completely. Remove the vacuum nozzle, seal the hole with duct tape, twist the bag tightly several times in the middle, and tape it to keep the material in the bottom during removal of the glove bag from the pipe.
15. Slip a disposal bag over the glove bag (still attached to the pipe). Remove the tape securing the ends, and slit open the top of the glove bag and carefully fold it down into the disposal bag. Double bag and gooseneck waste materials.

### **3.6 LOCKDOWN ENCAPSULATION**

#### **3.6.1 GENERAL**

Lockdown encapsulation is an integral part of the ACM removal. At the conclusion of ACM removal and before removal of the primary barriers, all piping surfaces shall be encapsulated with a bridging encapsulant.

#### **3.6.2 SEALING EXPOSED EDGES**

Seal edges of ACM exposed by removal work with two coats of encapsulant. Prior to sealing, permit the exposed edges to dry completely to permit penetration of the encapsulant.

### **3.7 DISPOSAL OF ACM WASTE MATERIALS**

#### **3.7.1 GENERAL**

Dispose of waste ACM and debris which is packaged in accordance with these specifications, OSHA, EPA and DOT. The landfill requirements for packaging must also be met. Disposal shall be done at the approved landfill. Disposal of non-friable ACM shall be done in accordance with applicable regulations.

#### **3.7.2 PROCEDURES**

- A. Asbestos waste shall be packaged and moved through the W/EDF into a covered transport container in accordance with procedures in this specification. Waste shall be double-bagged prior to disposal. Wetted waste can be very heavy. Bags shall not be overfilled. Bags shall be securely sealed to prevent accidental opening and/or leakage. The top shall be tightly twisted and goosenecked prior to tightly sealing with at least three wraps of duct tape. Ensure that unauthorized persons do not have access to the waste material once it is outside the regulated area. All transport containers must be covered at all times when not in use. NESHAP's signs must be on containers during loading and unloading. Material shall not be transported in open vehicles. If drums are used for packaging, the drums shall be labeled properly and shall not be re-used.
- B. Waste Load Out: Waste load out shall be done in accordance with the procedures in W/EDF Decontamination Procedures. Bags shall be decontaminated on exterior surfaces by wet cleaning and/or HEPA vacuuming before being placed in the second bag. C. Asbestos waste with sharp edged components, i.e., nails, screws, lath, strapping, tin sheeting, jacketing, metal mesh, etc., which might tear poly bags shall be wrapped securely in burlap before packaging and, if needed, use a poly lined fiber drum as the second container, prior to disposal.

### **3.8 PROJECT DECONTAMINATION**

#### **3.8.1 GENERAL**

- A. The entire work related to project decontamination shall be performed under the close supervision and monitoring of the CPIH.
- B. If the asbestos abatement work is in an area which was contaminated prior to the start of abatement, the decontamination

will be done by cleaning the primary barrier poly prior to its removal and cleaning of the regulated area surfaces after the primary barrier removal.

- C. If the asbestos abatement work is in an area which was uncontaminated prior to the start of abatement, the decontamination will be done by cleaning the primary barrier poly prior to its removal, thus preventing contamination of the building when the regulated area critical barriers are removed.

### **3.8.2 REGULATED AREA CLEARANCE**

Air testing and other requirements which must be met before release of the Contractor and re-occupancy of the regulated area space are specified in Final Testing Procedures.

### **3.8.3 WORK DESCRIPTION**

Decontamination includes the cleaning and clearance of the air in the regulated area and the decontamination and removal of the enclosures/facilities installed prior to the abatement work including primary/critical barriers, PDF and W/EDF facilities.

### **3.8.4 PRE-DECONTAMINATION CONDITIONS**

- A. Before decontamination starts, all ACM waste from the regulated area shall be removed, all waste collected and removed, and the secondary barrier of poly removed and disposed of along with any gross debris generated by the work.
- B. At the start of decontamination, the following shall be in place:
  - 1. Critical barriers over all openings consisting of two layers of 6 mil poly which is the sole barrier between the regulated area and the rest of the building or outside.
  - 3. Decontamination facilities, if required for personnel and equipment in operating condition.

### **3.8.5 FIRST CLEANING**

Carry out a first cleaning of all surfaces of the regulated area including items of remaining poly sheeting, tools, scaffolding, ladders/staging by wet methods and/or HEPA vacuuming. Do not use dry dusting/sweeping methods. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible residue from abated surfaces or poly or other surfaces. If determined by the CPIH/VPIH/CIH additional cleaning(s) may be needed.

### **3.8.6 PRE-CLEARANCE INSPECTION AND TESTING**

The CPIH and VPIH/CIH will perform a thorough and detailed visual inspection after the first cleaning to determine whether there is any visible residue in the regulated area. If the visual inspection is acceptable, the CPIH will perform pre-clearance sampling using aggressive clearance as detailed in 40 CFR 763 Subpart E (ASHERA) Appendix A(III) (B) (7) (d). If the sampling results show values below 0.01 f/cc, then the Contractor shall notify the VA's representative of the results with a brief report from the CPIH documenting the inspection and sampling results and a statement verifying that the regulated area is

ready for lockdown encapsulation. The VA reserves the right to utilize their own VPIH/CIH to perform a pre-clearance inspection and testing for verification.

### **3.8.7 LOCKDOWN ENCAPSULATION OF ABATED SURFACES**

With the express written permission of the VA's representative, perform lockdown encapsulation of all surfaces from which asbestos was abated in accordance with the procedures in this specification.

## **3.9 FINAL VISUAL INSPECTIONS AND AIR CLEARANCE TESTING**

### **3.9.1 GENERAL**

Notify the VA representative 24 hours in advance for the performance of the final visual inspection and testing. The final visual inspection and testing will be performed by the VPIH/CIH after the final cleaning.

### **3.9.2 FINAL VISUAL INSPECTION**

Final visual inspection will include the entire regulated area, the PDF, all poly sheeting, seals over HVAC openings, doorways, windows, and any other openings. If any debris, residue, dust or any other suspect material is detected, the final cleaning shall be repeated at no cost to the VA. Dust/material samples may be collected and analyzed at no cost to the VA at the discretion of the VPIH/CIH to confirm visual findings. When the regulated area is visually clean the final testing can be done.

### **3.9.3 FINAL AIR CLEARANCE TESTING**

- A. After an acceptable final visual inspection by the VPIH/CIH and VA Representative, the VPIH/CIH will perform the final testing. Air samples will be collected and analyzed in accordance with procedures for PCM/TEM in this specification. If the release criteria are not met, the Contractor shall repeat the final cleaning and continue decontamination procedures. Additional inspection and testing will be done at the expense of the Contractor.
- B. If the results of the PCM/TEM are acceptable, remove the critical barriers. Any small quantities of residue material found upon removal of the poly shall be removed with a HEPA vacuum and localized isolation. If significant quantities are found as determined by the VPIH/CIH, then the entire area affected shall be cleaned as specified in the final cleaning.
- C. When release criteria are met, proceed to perform the abatement closeout and to issue the certificate of completion in accordance with these specifications.

### **3.9.4 FINAL AIR CLEARANCE PROCEDURES**

- A. Contractor's Release Criteria: Work in a regulated area is complete when the regulated area is visually clean and airborne fiber levels have been reduced to or below 0.01 f/cc as measured with PCM/TEM methods.
- B. Air Monitoring and Final Clearance Sampling: To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to the specified level, the VPIH/CIH

will secure samples and analyze them according to the following procedures:

1.     Fibers Counted: "Fibers" referred to in this section shall be either all fibers regardless of composition as counted in the NIOSH 7400 PCM method or asbestos fibers counted using the TEM method.
2.     Aggressive Sampling: All final air testing samples shall be collected using aggressive sampling techniques. Samples will be collected on 0.8 $\mu$  MCE filters for PCM analysis and 0.45 $\mu$  Polycarbonate filters for TEM analysis. Before pumps are started, initiate aggressive sampling as detailed in 40 CFR 763 Subpart E (AHERA) Appendix A (III) (B) (7) (d). Air samples will be collected in areas subject to normal air circulation away from corners, obstructed locations, and locations near windows, doors, or vents. After air sampling pumps have been shut off, circulating fans shall be shut off.

#### **3.9.5 CLEARANCE SAMPLING USING PCM**

The NIOSH 7400 method will be used for clearance sampling with a minimum collection volume of 1200 Liters of air. A minimum of 5 PCM clearance samples will be collected.

#### **3.9.6 CLEARANCE SAMPLING USING TEM**

TEM clearance requires a minimum of 13 samples taken and analyzed, including five samples in the regulated area, five samples outside the regulated area and three field blanks using polycarbonate filters.

#### **3.9.7 LABORATORY TESTING OF PCM SAMPLES**

The services of an AIHA accredited laboratory will be employed by the VA to perform analysis of the air samples. Samples will be sent by the VPIH/CIH so that verbal/faxed reports can be received within 24 hours. A complete record, certified by the laboratory, of all air monitoring tests and results will be furnished to the VA's representative and the Contractor.

#### **3.9.8 LABORATORY TESTING OF TEM SAMPLES**

Samples shall be sent by the VPIH/CIH to an accredited laboratory for analysis by TEM. Verbal/faxed results from the laboratory shall be available within 24 hours after receipt of the samples. A complete record, certified by the laboratory, of all TEM results shall be furnished to the VA's representative and the Contractor.

#### **3.10 ABATEMENT CLOSEOUT AND CERTIFICATE OF COMPLIANCE**

##### **3.10.1 COMPLETION OF ABATEMENT WORK**

After thorough decontamination, complete asbestos abatement work upon meeting the regulated area clearance criteria and fulfilling the following:

- A.     Remove all equipment, materials, and debris from the project area.
- B.     Package and dispose of all asbestos waste as required.

- C. Repair or replace all interior finishes damaged during the abatement work.
- D. Fulfill other project closeout requirements as specified elsewhere in this specification.

### **3.10.2 CERTIFICATE OF COMPLETION BY CONTRACTOR**

The CPIH shall complete and sign the "Certificate of Completion" in accordance with Attachment 1 at the completion of the abatement and decontamination of the regulated area.

### **3.10.3 WORK SHIFTS**

All work shall be done during administrative hours (8:00 AM to 4:30 PM) Monday - Friday excluding Federal Holidays. Any change in the work schedule must be approved in writing by the VA Representative.



**ATTACHMENT #1**

**CERTIFICATE OF COMPLETION**

DATE:

PROJECT NAME:

VAMC/ADDRESS:

1. I certify that I have personally inspected, monitored and supervised the abatement work of  
  
(specify regulated area or Building):  
which took place from                      to.
2. That throughout the work all applicable requirements/regulations and the VA's specifications were met.
3. That any person who entered the regulated area was protected with the appropriate personal protective equipment and respirator and that they followed the proper entry and exit procedures and the proper operating procedures for the duration of the work.
4. That all employees of the Abatement Contractor engaged in this work were trained in respiratory protection, were experienced with abatement work, had proper medical surveillance documentation, were fit-tested for their respirator, and were not exposed at any time during the work to asbestos without the benefit of appropriate respiratory protection.
5. That I performed and supervised all inspection and testing specified and required by applicable regulations and VA specifications.
6. That the conditions inside the regulated area were always maintained in a safe and healthy condition and the maximum fiber count never exceeded 0.5 f/cc, except as described below.
7. That all glovebag work was done in accordance with OSHA requirements and the manufacturer's recommendations.

CPIH Name:

Signature/Date:

Asbestos Abatement Contractor's Name:

Signature/Date:

**ATTACHMENT #2**

**CERTIFICATE OF WORKER'S ACKNOWLEDGMENT**

**DATE:**

PROJECT NAME:  
PROJECT ADDRESS:  
ABATEMENT CONTRACTOR'S NAME:

**WORKING WITH ASBESTOS CAN BE HAZARDOUS TO YOUR HEALTH. INHALING ASBESTOS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCERS. IF YOU SMOKE AND INHALE ASBESTOS FIBERS YOUR CHANCES OF DEVELOPING LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.**

Your employer's contract with the owner for the above project requires that: You must be supplied with the proper personal protective equipment including an adequate respirator and be trained in its use. You must be trained in safe and healthy work practices and in the use of the equipment found at an asbestos abatement project. You must receive/have a current medical examination for working with asbestos. These things shall be provided at no cost to you. By signing this certificate you are indicating to the owner that your employer has met these obligations.

**RESPIRATORY PROTECTION:** I have been trained in the proper use of respirators and have been informed of the type of respirator to be used on the above indicated project. I have a copy of the written Respiratory Protection Program issued by my employer. I have been provided for my exclusive use, at no cost, with a respirator to be used on the above indicated project.

**TRAINING COURSE:** I have been trained by a third party, State/EPA accredited trainer in the requirements for an AHERA/OSHA Asbestos Abatement Worker training course, 32 hours minimum duration. I currently have a valid State accreditation certificate. The topics covered in the course include, as a minimum, the following:

- Physical Characteristics and Background Information on Asbestos
- Potential Health Effects Related to Exposure to Asbestos
- Employee Personal Protective Equipment
- Establishment of a Respiratory Protection Program
- State of the Art Work Practices
- Personal Hygiene
- Additional Safety Hazards
- Medical Monitoring
- Air Monitoring
- Relevant Federal, State and Local Regulatory Requirements, Procedures, and Standards
- Asbestos Waste Disposal

**MEDICAL EXAMINATION:** I have had a medical examination within the past 12 months which was paid for by my employer. This examination included: health history, occupational history, pulmonary function test, and may have included a chest x-ray evaluation. The physician issued a positive written opinion after the examination.

Signature:

Social Security Number:

Printed Name:

Witness:

**ATTACHMENT #3**

**AFFIDAVIT OF MEDICAL SURVEILLANCE, RESPIRATORY PROTECTION AND  
TRAINING/ACCREDITATION**

VA PROJECT NAME AND NUMBER:

VA MEDICAL FACILITY:

ABATEMENT CONTRACTOR'S NAME AND ADDRESS:

1. I verify that the following individual

Name:

Social Security Number:

who is proposed to be employed in asbestos abatement work associated with the above project by the named Abatement Contractor, is included in a medical surveillance program in accordance with 29 CFR 1926.1101(m), and that complete records of the medical surveillance program as required by 29 CFR 1926.1101(m) (n) and 29 CFR 1910.20 are kept at the offices of the Abatement Contractor at the following address.

Address:

2. I verify that this individual has been trained, fit-tested and instructed in the use of all appropriate respiratory protection systems and that the person is capable of working in safe and healthy manner as expected and required in the expected work environment of this project.
3. I verify that this individual has been trained as required by 29 CFR 1926.1101(k). This individual has also obtained a valid State accreditation certificate. Documentation will be kept on-site.
4. I verify that I meet the minimum qualifications criteria of the VA specifications for a CPIH.

Signature of CPIH:

Date:

Printed Name of CPIH:

Signature of Contractor:

Date:

Printed Name of Contractor:

**ATTACHMENT #4**

**ABATEMENT CONTRACTOR/COMPETENT PERSON(S) REVIEW AND ACCEPTANCE OF THE  
VA'S ASBESTOS SPECIFICATIONS**

VA Project Location:

VA Project #:

VA Project Description:

This form shall be signed by the Asbestos Abatement Contractor Owner and the Asbestos Abatement Contractor's Competent Person(s) prior to any start of work at the VA related to this Specification. If the Asbestos Abatement Contractor's/Competent Person(s) has not signed this form, they shall not be allowed to work on-site.

I, the undersigned, have read VA's Asbestos Specification regarding the asbestos abatement requirements. I understand the requirements of the VA's Asbestos Specification and agree to follow these requirements as well as all required rules and regulations of OSHA/EPA/DOT and State/Local requirements. I have been given ample opportunity to read the VA's Asbestos Specification and have been given an opportunity to ask any questions regarding the content and have received a response related to those questions. I do not have any further questions regarding the content, intent and requirements of the VA's Asbestos Specification.

At the conclusion of the asbestos abatement, I will certify that all asbestos abatement work was done in accordance with the VA's Asbestos Specification and all ACM was removed properly and no fibrous residue remains on any abated surfaces.

Abatement Contractor Owner's Signature

Date

Abatement Contractor Competent Person(s)

Date

Date

Date

- E N D -

**SECTION 03 30 53**

**CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

This section specifies cast-in-place structural concrete and material and mixes for other concrete.

**1.2 RELATED WORK:**

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Concrete roads, walks, and similar exterior site work: Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS.

**1.3 TOLERANCES:**

- A. ACI 117.
- B. Slab Finishes: ACI 117, F-number method in accordance with ASTM E1155.

**1.4 REGULATORY REQUIREMENTS:**

- A. ACI SP-66 ACI Detailing Manual
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.

**1.5 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Concrete Mix Design.
- C. Shop Drawings: Reinforcing steel: Complete shop drawings.
- D. Manufacturer's Certificates: Air-entraining admixture, chemical admixtures, curing compounds.

**1.6 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Concrete Institute (ACI):
  - 117R-06.....Tolerances for Concrete Construction and Materials
  - 211.1-91 (R2002).....Proportions for Normal, Heavyweight, and Mass Concrete

- 211.2-98 (R2004) .....Proportions for Structural Lightweight  
Concrete
- 301-05.....Specification for Structural Concrete
- 305R-06.....Hot Weather Concreting
- 306R-2002.....Cold Weather Concreting
- SP-66-04 .....ACI Detailing Manual
- 318/318R-05.....Building Code Requirements for Reinforced  
Concrete
- 347R-04.....Guide to Formwork for Concrete
- C. American Society for Testing And Materials (ASTM):
- A185-07.....Steel Welded Wire, Fabric, Plain for  
Concrete Reinforcement
- A615/A615M-08.....Deformed and Plain Billet-Steel Bars for  
Concrete Reinforcement
- A996/A996M-06.....Standard Specification for Rail-Steel and  
Axle-Steel Deformed Bars for Concrete  
Reinforcement
- C31/C31M-08.....Making and Curing Concrete Test Specimens  
in the Field
- C33-07.....Concrete Aggregates
- C39/C39M-05.....Compressive Strength of Cylindrical  
Concrete Specimens
- C94/C94M-07.....Ready-Mixed Concrete
- C143/C143M-05.....Standard Test Method for Slump of  
Hydraulic Cement Concrete
- C150-07.....Portland Cement
- C171-07.....Sheet Material for Curing Concrete
- C172-07.....Sampling Freshly Mixed Concrete
- C173-07.Air Content of Freshly Mixed Concrete by the Volumetric  
Method
- C192/C192M-07.....Making and Curing Concrete Test Specimens  
in the Laboratory
- C231-08.....Air Content of Freshly Mixed Concrete by  
the Pressure Method
- C260-06.....Air-Entraining Admixtures for Concrete
- C330-05.....Lightweight Aggregates for Structural  
Concrete

C494/C494M-08.....Chemical Admixtures for Concrete

C618-08.....Coal Fly Ash and Raw or Calcined Natural  
Pozzolan for Use in Concrete

D1751-04.....Preformed Expansion Joint Fillers for  
Concrete Paving and Structural  
Construction (Non-extruding and Resilient  
Bituminous Types)

D4397-02.....Polyethylene Sheeting for Construction,  
Industrial and Agricultural Applications

E1155-96(2008).....Determining  $F_F$  Floor Flatness and  $F_L$  Floor  
Levelness Numbers

## **PART 2 - PRODUCTS**

### **2.1 FORMS:**

Wood, plywood, metal, or other materials, approved by Resident Engineer, of grade or type suitable to obtain type of finish specified.

### **2.2 MATERIALS:**

- A. Portland Cement: ASTM C150, Type I or II.
- B. Fly Ash: ASTM C618, Class C or F including supplementary optional requirements relating to reactive aggregates and alkalis, and loss on ignition (LOI) not to exceed 5 percent.
- C. Coarse Aggregate: ASTM C33, Size 67. Size 467 may be used for footings and walls over 300 mm (12 inches) thick. Coarse aggregate for applied topping and metal pan stair fill shall be Size 7.
- D. Fine Aggregate: ASTM C33.
- E. Lightweight Aggregate for Structural Concrete: ASTM C330, Table 1
- F. Mixing Water: Fresh, clean, and potable.
- G. Air-Entraining Admixture: ASTM C260.
- H. Chemical Admixtures: ASTM C494.
- I. Vapor Barrier: ASTM D4397, 0.25 mm (10 mil).
- J. Reinforcing Steel: ASTM A615 or ASTM A996, deformed. See structural drawings for grade.
- K. Welded Wire Fabric: ASTM A185.
- L. Expansion Joint Filler: ASTM D1751.
- M. Sheet Materials for Curing Concrete: ASTM C171.
- N. Abrasive Aggregates: Aluminum oxide grains or emery grits.

- O. Liquid Hardener and Dustproofer: Fluosilicate solution or magnesium fluosilicate or zinc fluosilicate. Magnesium and zinc may be used separately or in combination as recommended by manufacturer.
- P. Liquid Densifier/Sealer: 100 percent active colorless aqueous siliconate solution.
- Q. Grout, Non-Shrinking: Premixed ferrous or non-ferrous, mixed and applied in accordance with manufacturer's recommendations. Grout shall show no settlement or vertical drying shrinkage at 3 days or thereafter based on initial measurement made at time of placement, and produce a compressive strength of at least 18mpa (2500 psi) at 3 days and 35mpa (5000 psi) at 28 days.

## 2.3 CONCRETE MIXES:

- A. Design of concrete mixes using materials specified shall be the responsibility of the Contractor as set forth under Option C of ASTM C94.
- B. Compressive strength at 28 days shall be not less than 25 mpa (3000 psi).
- C. Establish strength of concrete by testing prior to beginning concreting operation. Test consists of average of three cylinders made and cured in accordance with ASTM C192 and tested in accordance with ASTM C39.
- D. Maximum slump for vibrated concrete is 100 mm (4 inches) tested in accordance with ASTM C143.
- E. Cement and water factor (See Table I):

**TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE**

Concrete: Strength	Non-Air-Entrained		Air-Entrained	
Min. 28 Day Comp. Str. MPa (psi)	Min. Cement kg/m <sup>3</sup> (lbs/c. yd)	Max. Water Cement Ratio	Min. Cement kg/m <sup>3</sup> (lbs/c. yd)	Max. Water Cement Ratio
35 (5000) <sup>1,3</sup>	375 (630)	0.45	385 (650)	0.40
30 (4000) <sup>1,3</sup>	325 (550)	0.55	340 (570)	0.50
25 (3000) <sup>1,3</sup>	280 (470)	0.65	290 (490)	0.55
25 (3000) <sup>1,2</sup>	300 (500)	*	310 (520)	*

- 1. If trial mixes are used, the proposed mix design shall achieve a compressive strength 8.3 MPa (1200 psi) in excess of f'c. For concrete strengths above 35 Mpa (5000 psi), the proposed mix design shall achieve a compressive strength 9.7 MPa (1400 psi) in excess of f'c.
- 2. Lightweight Structural Concrete. Pump mixes may require higher cement values.
- 3. For concrete exposed to high sulfate content soils maximum water cement ratio is 0.44.
- \* Determined by Laboratory in accordance with ACI 211.1 for normal concrete or ACI 211.2 for lightweight structural concrete.



- F. Air-entrainment is required for all exterior concrete and as required for Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS. Air content shall conform with the following tables:

**TABLE I - TOTAL AIR CONTENT  
FOR VARIOUS SIZES OF COARSE AGGREGATES (NORMAL CONCRETE)**

Nominal Maximum Size of Coarse Aggregate	Total Air Content Percentage by Volume
10 mm (3/8 in)	6 to 10
13 mm (1/2 in)	5 to 9
19 mm (3/4 in)	4 to 8
25 mm (1 in)	3 1/2 to 6 1/2
40 mm (1 1/2 in)	3 to 6

**TABLE II TOTAL AIR CONTENT  
AIR CONTENT OF LIGHTWEIGHT STRUCTURAL CONCRETE**

Nominal Maximum size of Total Air Content	Coarse Aggregate, mm's (Inches) Percentage by Volume
Greater than 10 mm (3/8 in) 4 to 8	10 mm (3/8 in) or less 5 to 9

#### **2.4 BATCHING & MIXING:**

- A. Store, batch, and mix materials as specified in ASTM C94.
1. Job-Mixed: Concrete mixed at job site shall be mixed in a batch mixer in manner specified for stationary mixers in ASTM C94.
  2. Ready-Mixed: Ready-mixed concrete comply with ASTM C94, except use of non-agitating equipment for transporting concrete to the site will not be permitted. With each load of concrete delivered to project, ready-mixed concrete producer shall furnish, in duplicate, certification as required by ASTM C94.
  3. Mixing structural lightweight concrete: Charge mixer with 2/3 of total mixing water and all of the aggregate. Mix ingredients for not less than 30 seconds in a stationary mixer or not less than 10 revolutions at mixing speed in a truck mixer. Add remaining mixing water and other ingredients and continue mixing. Above procedure may be modified as recommended by aggregate producer.

### **PART 3 - EXECUTION**

#### **3.1 FORMWORK:**

- A. Installation conform to ACI 347. Sufficiently tight to hold concrete without leakage, sufficiently braced to withstand vibration of concrete, and to carry, without appreciable deflection, all dead and live loads to which they may be subjected.
- B. Treating and Wetting: Treat or wet contact forms as follows:

1. Coat plywood and board forms with non-staining form sealer. In hot weather cool forms by wetting with cool water just before concrete is placed.
  2. Clean and coat removable metal forms with light form oil before reinforcement is placed. In hot weather cool metal forms by thoroughly wetting with water just before placing concrete.
  3. Use sealer on reused plywood forms as specified for new material.
- C. Inserts, sleeves, and similar items: Flashing reglets, masonry ties, anchors, inserts, wires, hangers, sleeves, boxes for floor hinges and other items specified as furnished under this and other sections of specifications and required to be in their final position at time concrete is placed shall be properly located, accurately positioned and built into construction, and maintained securely in place.
- D. Construction Tolerances:
1. Contractor is responsible for setting and maintaining concrete formwork to assure erection of completed work within tolerances specified to accommodate installation or other rough and finish materials. Remedial work necessary for correcting excessive tolerances is the responsibility of the Contractor. Erected work that exceeds specified tolerance limits shall be remedied or removed and replaced, at no additional cost to the Government.
  2. Permissible surface irregularities for various classes of materials are defined as "finishes" in specification sections covering individual materials. They are to be distinguished from tolerances specified which are applicable to surface irregularities of structural elements.

### **3.2 REINFORCEMENT:**

Details of concrete reinforcement, unless otherwise shown, in accordance with ACI 318 and ACI SP-66. Support and securely tie reinforcing steel to prevent displacement during placing of concrete.

### **3.3 VAPOR BARRIER:**

Except where membrane waterproofing is required, place interior concrete slabs on a continuous vapor barrier.

- A. Place 100 mm (4 inches) of fine granular fill over the vapor barrier to act as a blotter for concrete slab.
- B. Lap joints 150 mm (6 inches) and seal with a compatible pressure-sensitive tape.
- C. Patch punctures and tears.

### **3.4 PLACING CONCRETE:**

- A. Remove water from excavations before concrete is placed. Remove hardened concrete, debris and other foreign materials from

interior of forms, and from inside of mixing and conveying equipment. Obtain approval of Resident Engineer before placing concrete. Provide screeds at required elevations for concrete slabs.

- B. Before placing new concrete on or against concrete which has set, existing surfaces shall be roughened and cleaned free from all laitance, foreign matter, and loose particles.
- C. Convey concrete from mixer to final place of deposit by method which will prevent segregation or loss of ingredients. Do not deposit in work concrete that has attained its initial set or has contained its water or cement more than 1 1/2 hours. Do not allow concrete to drop freely more than 1500 mm (5 feet) in unexposed work nor more than 900 mm (3 feet) in exposed work. Place and consolidate concrete in horizontal layers not exceeding 300 mm (12 inches) in thickness. Consolidate concrete by spading, rodding, and mechanical vibrator. Do not secure vibrator to forms or reinforcement. Vibration shall be carried on continuously with placing of concrete.
- D. Hot weather placing of concrete: Follow recommendations of ACI 305R to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete.
- E. Cold weather placing of concrete: Follow recommendations of ACI 306R, to prevent freezing of thin sections less than 300 mm (12 inches) and to permit concrete to gain strength properly, except that use of calcium chloride shall not be permitted without written approval from Resident Engineer.

### **3.5 PROTECTION AND CURING:**

Protect exposed surfaces of concrete from premature drying, wash by rain or running water, wind, mechanical injury, and excessively hot or cold temperature. Curing method shall be subject to approval by Resident Engineer.

### **3.6 FORM REMOVAL:**

Forms remain in place until concrete has a sufficient strength to carry its own weight and loads supported. Removal of forms at any time is the Contractor's sole responsibility.

### **3.7 SURFACE PREPARATION:**

Immediately after forms have been removed and work has been examined and approved by Resident Engineer, remove loose materials, and patch all stone pockets, surface honeycomb, or similar deficiencies with cement mortar made with 1 part portland cement and 2 to 3 parts sand.

### **3.8 FINISHES:**

- A. Vertical and Overhead Surface Finishes:
  - 1. Unfinished Areas: Vertical and overhead concrete surfaces exposed in unfinished areas, above suspended ceilings in manholes, and other unfinished areas exposed or concealed will not require additional finishing.

2. Interior and Exterior Exposed Areas (to be painted): Fins, burrs and similar projections on surface shall be knocked off flush by mechanical means approved by Resident Engineer and rubbed lightly with a fine abrasive stone or hone. Use an ample amount of water during rubbing without working up a lather of mortar or changing texture of concrete.
3. Interior and Exterior Exposed Areas (finished): Finished areas, unless otherwise shown, shall be given a grout finish of uniform color and shall have a smooth finish treated as follows:
  - a. After concrete has hardened and laitance, fins and burrs have been removed, scrub concrete with wire brushes. Clean stained concrete surfaces by use of a hone or stone.
  - b. Apply grout composed of 1 part portland cement and 1 part clean, fine sand (smaller than 600 micro-m (No. 30) sieve). Work grout into surface of concrete with cork floats or fiber brushes until all pits and honeycomb are filled.
  - c. After grout has hardened, but still plastic, remove surplus grout with a sponge rubber float and by rubbing with clean burlap.
  - d. In hot, dry weather use a fog spray to keep grout wet during setting period. Complete finish for any area in same day. Confine limits of finished areas to natural breaks in wall surface. Do not leave grout on concrete surface overnight.

B. Slab Finishes:

1. Scratch Finish: Slab surfaces to receive a bonded applied cementitious application shall all be thoroughly raked or wire broomed after partial setting (within 2 hours after placing) to roughen surface to ensure a permanent bond between base slab and applied cementitious materials.
2. Floating: Allow water brought to surface by float used for rough finishing to evaporate before surface is again floated or troweled. Do not sprinkle dry cement on surface to absorb water.
3. Float Finish: Ramps, stair treads, and platforms, both interior and exterior, equipment pads, and slabs to receive non-cementitious materials, except as specified, shall be screened and floated to a smooth dense finish. After first floating, while surface is still soft, surfaces shall be checked for alignment using a straightedge or template. Correct high spots by cutting down with a trowel or similar tool and correct low spots by filling in with material of same composition as floor finish. Remove any surface projections on floated finish by rubbing or dry grinding. Refloat the slab to a uniform sandy texture.
4. Steel Trowel Finish: Applied toppings, concrete surfaces to receive resilient floor covering or carpet, future floor

roof and all monolithic concrete floor slabs exposed in finished work and for which no other finish is shown or specified shall be steel troweled. Final steel troweling to secure a smooth, dense surface shall be delayed as long as possible, generally when the surface can no longer be dented with finger. During final troweling, tilt steel trowel at a slight angle and exert heavy pressure on trowel to compact cement paste and form a dense, smooth surface. Finished surface shall be free of trowel marks, uniform in texture and appearance.

5. Broom Finish: Finish all exterior slabs, ramps, and stair treads with a bristle brush moistened with clear water after the surfaces have been floated.
6. Finished slab flatness (FF) and levelness (FL) values comply with the following minimum requirements:

Slab on grade & Shored suspended slabs		Unshored suspended slabs	
Specified overall value	FF 25/FL 20	Specified overall value	FF 25
Minimum local value	FF 17/FL 15	Minimum local value	FF 17

### 3.9 SURFACE TREATMENTS:

- A. Surface treatments shall be mixed and applied in accordance with manufacturer's printed instructions.
- B. Liquid Densifier/Sealer: Use on all exposed concrete floors and concrete floors to receive carpeting except those specified to receive non-slip finish.
- C. Non-Slip Finish: Except where safety nosing and tread coverings are shown, apply non-slip abrasive aggregate to treads and platforms of all concrete steps and stairs, and to surfaces of exterior concrete ramps and platforms. Aggregate shall be broadcast uniformly over concrete surface. Trowel concrete surface to smooth dense finish. After curing, rub the treated surface with abrasive brick and water sufficiently to slightly expose abrasive aggregate.

### 3.10 APPLIED TOPPING:

- A. Separate concrete topping with thickness and strength shown with only enough water to ensure a stiff, workable, plastic mix.
- B. Continuously place applied topping until entire section is complete, struck off with straightedge, compact by rolling or tamping, float and steel trowel to a hard smooth finish.

### 3.11 RESURFACING FLOORS:

Remove existing flooring, in areas to receive resurfacing, to expose existing structural slab and to extend not less than 25 mm (1 inch) below new finished floor level. Prepare exposed structural slab surface by roughening, broom cleaning, wetting, and grouting. Apply topping as specified.

### 3.12 RETAINING WALLS:

- A. Concrete for retaining walls shall be as shown and air-entrained.

- B. Install and construct expansion and contraction joints, waterstops, weep holes, reinforcement and railing sleeves as shown.
- C. Finish exposed surfaces to match adjacent concrete surfaces, new or existing.
- D. Porous backfill shall be placed as shown.

**3.13 PRECAST CONCRETE ITEMS:**

Precast concrete items, not specified elsewhere, shall be cast using 25 MPa (3000 psi) air-entrained concrete to shapes and dimensions shown. Finish surfaces to match corresponding adjacent concrete surfaces. Reinforce with steel as necessary for safe handling and erection.

- - - E N D - - -

**SECTION 03 35 43**

**DIAMOND POLISHED CONCRETE TOPPING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This is the recommended specification for the ARDEX DIAMA-TOP™ Polished Concrete Topping component of the ULTRAFLOR® ARDEX® DIAMATIC® Polished Concrete System, or equal. -Complete installation details are provided in the ARDEX and DIAMATIC Technical Brochures available at [www.ardex.com](http://www.ardex.com) and [www.diamaticusa.com](http://www.diamaticusa.com).
- B. subject to compliance with specified requirements, and review of submittals by the architect, the following companies may also be acceptable:
  - 1. THT Flooring Corp.
  - 2. Green Polishing Solutions.
  - 3. Diamond Polishing Systems.
  - 4. Bomanite Custom Polishing Systems.

**1.2 SECTION INCLUDES**

- A. Products and procedures for the installation of the ARDEX DIAMA-TOP™ Polished Concrete Topping component of the ULTRAFLOR ARDEX DIAMATIC Polished Concrete System using a multi-step dry mechanical process and accessories indicated, specified or required to complete system and achieve specified finish:
  - 1. ARDEX DIAMA-TOP™ Polished Concrete Topping (Gray or White)
  - 2. ARDEX EP 2000™ Substrate Preparation Epoxy
  - 3. DIAMATIC Mechanical Diamond Grinding and Polishing Equipment
  - 4. ULTRAFLOR ARDEX DIAMATIC Concrete Treatment Chemicals
- B. Products and procedures for the initial and long term maintenance of the ULTRAFLOR ARDEX DIAMATIC Polished Concrete System.
- C. All equipment, diamond products, concrete repair and topping materials, crack and joint treatments, and chemicals are specified by DIAMATIC Management Services, DIAMATIC and ARDEX.

**1.3 SUBMITTALS**

- A. Product Data: Submit Manufacturer's technical literature for each product indicated, specified or required. Include manufacturer's

technical data, application instructions, recommendations and MSDS.

- B. Installer Qualifications: Data for company, principal personnel, experience and training. Provide a letter documenting installer's accreditation and certification compliance, as specified under quality assurance.
- C. Test Reports: Provide field quality control sheen gloss reading and static coefficient of friction test results conducted as specified and recorded on floor plan diagram confirming compliance with specified performance criteria.
- D. Warranty: Provide manufacturer's warranty of ULTRAFLO® System materials, contractor workmanship and finish standards.
- E. Maintenance Data: Provide manufacturer's instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under intended use. These instructions should contain precautions against cleaning products and methods that may be detrimental to finishes and performance.

#### **1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: The ULTRAFLO® ARDEX DIAMATIC Polished Concrete System consists of a process and products engineered and manufactured by ARDEX and DIAMATIC. Any substitutions are not permitted and void warranty.
- B. Installer Qualifications:
  - 1. Installer must be experienced and factory-trained in the installation of the ULTRAFLO® ARDEX DIAMATIC Polished Concrete System, including the use of DIAMATIC equipment and diamond abrasives, and ARDEX DIAMATIC concrete preparation, joint treatment, and chemical hardening and finishing materials.
  - 2. Installer must be experienced in performing specified work similar in design, products and scope of this project, with a documented track record of successful, in-service performance and with sufficient production capabilities, facilities and personnel to produce specified work.
  - 3. A factory-trained, competent supervisor must be maintained on site during all times during which specified work is performed.
  - 4. Installer must provide written documentation from the manufacturer confirming the Installer's accreditation and training from both ARDEX and DIAMATIC on installation of the ULTRAFLO® ARDEX DIAMATIC Polished Concrete System and related equipment and processes.
- C. Mock-Up: Before performing the work in this section, an adequate number of on-site mock-ups of the ULTRAFLO® ARDEX DIAMATIC



Polished Concrete System representative of specified process, surface, finish, color and joint design/treatments must be installed for review and approval. These mock-ups should be installed using the same Installer personnel who will perform work. Approved mock-ups may become part of completed work, if undisturbed at time of substantial completion.

- D. Static Coefficient of Friction: A reading of not less than 0.5 for level floor surfaces shall be achieved and documented, as determined by a certified NFSI walkway auditor using the NFSI 101-A quality control test.
- E. Test Reports: Comply with the provisions of the following specifications and standards, except as otherwise noted or specified, or as accepted or directed by the Owner and/or Architect. All test data shall be recorded and submitted upon completion of job.
  - 1. ASTM E430, Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry
  - 2. ASTM G23-81 Standard Test Method for Ultraviolet Light and Water Spray Resistance
  - 3. ACI 302.1R-04 Guide for Concrete Floor and Slab Construction
- F. Pre-Installation Conference: Prior to the installation of the ULTRAFLO ARDEX DIAMATIC Polished Concrete System, an on-site conference shall be conducted to review specification requirements.
  - 1. Required attendees include the Owner, Architect, General Contractor, ULTRAFLO ARDEX DIAMATIC Polished Concrete System Subcontractor, ARDEX Representative and DIAMATIC Representative.
  - 2. The minimum agenda shall include:
  - 3. Tour of work area, inspection and discussion of preparation of substrate and other pre-Installation conditions and issues.
  - 4. Review of System requirements, including drawings, specifications and other contract documents.
  - 5. Review of required submittals and completion status.
  - 6. Review and finalization of installation schedule, and verification of availability of required materials, trained Installer personnel, equipment and facilities to execute specification and avoid delays.
  - 7. Review of required inspection, testing, certification and material usage accounting procedures.

8. Review of methods and procedures for installation, including manufacturer's written instructions.
9. Review of governing regulations and requirements for insurance, certifications, inspection and testing, if applicable.
10. Review of temporary protection requirements during and after installation.
11. Review of cleaning procedures during and after installation.
12. Documentation proceedings, including corrective measures or actions required, and provision of a written copy of record to each participant.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- A. Deliver all materials in original containers, bearing manufacturer's labels indicating brand name and directions for storage, factory numbered and sealed until ready for installation.
- B. Maintain records of product container numbers.
- C. Store all materials in a dry, climate-controlled environment at a minimum of 55°F (13°C) and maximum of 85°F (29°C).

#### **1.6 SITE CONDITIONS**

- A. ARDEX DIAMA-TOP is a cementitious material. Observe the basic rules of concrete work. The ideal temperature at which ARDEX self-leveling leveling products should be installed is 70°F (21°C). Do not install below 50°F (10°C) or above 85°F (29°C) surface temperature. Install quickly if floor is warm (above 70°F/21 °C and up to 85°F/29°C) and follow warm weather precautions available from the ARDEX Technical Service Department (888) 512-7339. Never mix with cement or additives other than ARDEX-approved products.
- B. ARDEX DIAMA-TOP is a Portland cement-based product and, as with any cementitious material, variations in color can occur as a function of job-site conditions.
- C. Close areas to traffic during and after the ARDEX DIAMA-TOP application for a time period recommended by the manufacturer.
- D. Inspect the existing substrate and document unsatisfactory conditions in writing. Verify that surfaces and site conditions are ready to receive work. Correct unacceptable conditions prior to installation of System. Commencement of work constitutes acceptance of substrate conditions.
- E. Existing concrete must be cured for a sufficient time period recommended by DIAMATIC and ARDEX before the application can begin.

- F. Existing concrete must be structural grade, with a minimum compressive strength of 3000 psi and a minimum density of 100 pcf.
- G. Protect the new ARDEX DIAMA-TOP from contamination by petroleum, oil, hydraulic fluid, acid and acidic detergents, paint and other liquid dripping from trades and equipment working over these substrates. If construction equipment must be used on these substrates, diaper all components that may drip fluids.
- H. Prohibit the placement and storage of construction materials over new ARDEX DIAMATOP, to include ferrous metals and steel members.
- I. Prohibit vehicle parking and pipe cutting operations over existing concrete and the new ARDEX DIAMA-TOP Polished Concrete System.
- J. Moisture Vapor and Alkalinity Testing
  - 1. Test existing concrete floors for alkalinity/pH according to method indicated in ASTM F71 0. Acceptable results: pH between 9 and 10.
  - 2. Test existing concrete for moisture vapor transmission according to methods indicated in ASTM F1869. Acceptable results: not more than 5 pounds per 1,000 square feet in 24 hours.
  - 3. Test existing concrete for relative humidity using in situ probes according to ASTM F21 70. Acceptable results: not more than 80%.
  - 4. Correct unacceptable moisture/humidity conditions utilizing the ARDEX MC™ ULTRA MOISTURE CONTROL SYSTEM prior to the installation of ARDEX DIAMA-TOP.

## **1.7 LIST OF MANUFACTURERS**

- A. ARDEX Engineered Cements: [www.ardex.com](http://www.ardex.com); 1-888-512-7339 400 ARDEX Park Drive Aliquippa, PA 15001
- B. DIAMATIC USA; [www.diamaticusa.com](http://www.diamaticusa.com); 1-866-295-5512 5220 Gaines Street, San Diego, CA 92110
- C. No substitutions permitted.
  - 1. Note: In some cases, and only with DIAMATIC's approval, burnishing, grinding and polishing machines may be substituted, provided that the specified DIAMATIC abrasives and blades can still be used.

## **PART 2 - PRODUCTS**

### **2.1 SYSTEM INTEGRITY**

- A. The ULTRAFLOR ARDEX DIAMATIC Polished Concrete System is an engineered and integrated complete installation system requiring

strict adherence to all specified installation processes, equipment, diamond abrasives, concrete preparation, joint treatment and chemicals to achieve the intended result. Any substitutions from the specified products and/or processes will void the system warranty.

## **2.1 MATERIALS**

### **A. ARDEX CONCRETE REPAIR AND TOPPING MATERIALS**

1. The self-leveling concrete repair material shall be ARDEX DIAMA-TOP Polished Concrete Topping.
2. The primer for areas to receive ARDEX DIAMA-TOP will be ARDEX EP 2000 Substrate Preparation Epoxy.
3. For use in pre-leveling or when the material is installed over 2" thick, aggregate shall be well graded, washed gravel (1/8" to 1/4" or larger).
4. Water shall be clean, potable and sufficiently cool (not warmer than 70°F/21 °C).
5. Any pinholes that need to be filled shall be filled with ARDEX DIAMA-FILL™ Filling Compound for Polished Concrete, Concrete Terrazzo and Other Cementitious Wear Surfaces (Medium Gray or White) applied at the appropriate time during the polishing process.
6. For complete installation instructions and required tools, please refer to the individual ARDEX Technical Brochures available for each product.

### **B. DIAMATIC EQUIPMENT**

1. DIAMATIC Micro Polisher - Burnishers: Specific weight and RPM are required to reach temperature of 100°F for application of FLOR-FINISH.
2. DIAMATIC BMG-780 or BMG-735: Planetary Grinder and Polisher, Large Platform: 32" planetary floor polisher. Head pressure of 600 lbs.
3. DIAMATIC BMG580PRO: Planetary Grinder and Polisher Medium Platform: 27" planetary floor polisher for smaller and intermediate areas.
4. DIAMATIC BMG435PRO: Planetary Grinder and Polisher Small Platform: 17" planetary floor polisher for small areas.
5. DIAMATIC 5" Low Speed Grinder: Hand Held Polishing Tool: 5" hand floor polisher for edges with variable speed control range of 500 - 2200 RPM.
6. DIAMATIC 180EC: Walk Behind Edging grinder/polisher.

7. Vacuums: Dust Collection must be designed for filtering of concrete dust. Minimum air speed of 300 CFM for Large and Medium Platform equipment.
8. DIAMATIC BDC1324, BDC317P, BDC3140P, 6-54DC.
9. Crack Chaser: 7" Crack Vac with dolly or hand held 5" grinder with .375" thick/VCut diamond.
10. DIAMATIC Crack Vac or 5" high-speed grinder.
11. DIAMATIC Condor Applicator (densifier and polymer application, also for maintenance).
12. Blastrac/DIAMATIC ride on and walk behind floor scrapers with beveled steel scraper blades of various widths for removal of floor coverings.
13. DIAMATIC BMC335 Shaver: Self-propelled shaver/leveler for slab surface demolition and leveling.
14. Power generator capable of supplying a minimum output of 30kw and up, and 480 Volt three phase power.
15. DIAMATIC Diamond Abrasives and Blades
  - a. Metal Bonded Diamonds - 60/80 Grit of medium and hard bonded metal.
  - b. Transitional Diamonds Ceramic Bonded - #1 Grit.
  - c. Resin Bonded Diamonds - 200, 400, 800, 1500 Grit.
  - d. FLOR-GRIT Diamond Impregnated Pads - 800, 1500, 3000 Grit.
  - e. Metal Bonded Diamond blades 1/8" to 3/4" (3 mm to 18 mm) thick.

C. ULTRAFLOR ARDEX DIAMATIC CONCRETE TREATMENT CHEMICALS

1. ARDEX DIAMATIC FLOR-HARD™ Lithium Impregnating Densifier for ARDEX DIAMA-TOP Concrete Topping and other ARDEX Engineered Cements
2. ARDEX DIAMATIC FLOR-FINISH™ Stain and Wear Protection Treatment (high-gloss)
3. DIAMATIC FLOR Maintainer™ Gloss, Stain and Wear Protection Routine Maintenance Treatment

D. ARDEX CRACK AND JOINT TREATMENT MATERIALS

1. For complete installation instructions and required tools, please refer to the individual ARDEX Technical Brochures available for each product.

2. ARDEX ARDIBOND AP™ Fast-Setting, All-Purpose Repair Epoxy
3. ARDEX ARDISEAL™ RAPID PLUS Semi-Rigid Joint Sealant
4. ARDEX ARDIFIX™ Low Viscosity Rigid Polyurethane Crack and Joint Repair

E. ARDEX MOISTURE CONTROL SYSTEM

1. Where moisture vapor emissions from new or existing concrete exceed the recommendations in Section 1.06 I above, the ARDEX MC™ ULTRA Moisture Control System shall be installed in accordance with the manufacturer's written recommendations prior to the installation of the ARDEX DIAMA-TOP. For complete installation instructions, please refer to the ARDEX MC ULTRA Technical Brochure.

F. DIAMATIC PROTECTION MATERIALS

1. To prevent minor damage from light trade traffic during build out of site, DIAMATIC PRIMO-COVER Protective Floor Covering or DIAMATIC ECONO-COVER Protective Floor Covering for the ULTRAFLOR ARDEX DIAMATIC Polished Concrete System shall be installed.
2. For other traffic considerations, please refer to section 3.09 of this specification.

**2.2 MIX DESIGNS**

- A. Mixing Ratio: The ARDEX DIAMA-TOP shall be mixed in 2-bag batches. Mix each bag of the powder with the specified amount of water in an ARDEX T-10 Mixing Drum using an ARDEX T-1 Mixing Paddle and a 1/2" heavy-duty drill (12 mm, min. 650 rpm). Mix thoroughly for 2-3 minutes to obtain a lump-free mixture. Follow written instructions on the ARDEX product bag label.
- B. Aggregate mix: For pre-leveling and areas to be installed over 2" (5 cm) thick, aggregate may be added to reduce material costs. Mix the powder with water first, and then add from 1 part by volume of aggregate (1/8" to 1/4" [3 to 6 mm] or larger). Do not use sand. The addition of aggregate will diminish the workability of the product and may make it necessary to install a finish layer. Allow the first layer to dry for 12 to 16 hours. Complete aggregate installation instructions are available in the ARDEX DIAMA-TOP Technical Brochure.
- C. For pump installations, the topping shall be mixed using the ARDEX Levelcraft® Automatic Mixing Pump. Start the pump at 150 gallons of water per hour, and then adjust to the minimum water reading that still allows self-leveling properties. DO NOT OVERWATER! Check the consistency of the product on the floor to ensure a uniform distribution of the sand aggregate at both the top surface and bottom of the pour. If settling occurs, reduce the water amount and recheck. Conditions during installation, such as variations in water, powder, substrate, and ambient

temperature, require that the water setting be monitored and adjusted carefully to avoid over watering.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Inspect all concrete substrates and conditions under which the ULTRAFLOAR ARDEX DIAMATIC Polished Concrete System to be installed.
- B. Verify that all surfaces and site conditions are ready to receive work; document and correct conditions detrimental to timely and proper installation of work. Beginning work constitutes acceptance of substrate condition.
- C. Verify that existing concrete has cured a minimum of 28 days before installing ARDEX D IAMA-TOP
- D. **OR** use the ARDEX MC™ ULTRA Moisture Control System for a faster track installation option.
- E. Conduct pre-installation conference, per Section 1.3 F.

#### **3.2 PREPARATION**

- A. All concrete surfaces must be sound, solid, cleaned and primed:
  - 1. All concrete subfloors must be of adequate strength, clean and free of all oil, grease, dirt, curing compounds and any substance that might act as a bond breaker before priming. Mechanically clean if necessary using shot blasting or other.
  - 2. The prepared concrete substrate shall have an ICRI Concrete Surface Profile of 3 (CSP #3). If additional mechanical preparation is necessary to achieve this, the concrete surface must then be swept and vacuumed to remove all loose materials.
  - 3. In all cases, chemical preparation of the substrate is NOT acceptable, including but not limited to acid etching, sweeping compounds, solvents and adhesive removers.
  - 4. All cracks in the subfloor shall be repaired using ARDEX EP 2000 or ARDEX ARDIFIX to minimize telegraphing through the concrete topping. Read and follow the detailed installation instructions as outlined in the Technical Brochures.
  - 5. Suppress dust during demolition with the use of dust collection equipment using HEPA/concrete filtration devices to reduce or eliminate airborne concrete and substrate dust.
- B. Joint Fill

1. Honor all joints up through the ARDEX DIAMA-TOP, including expansion joints, isolation joints and control joints (saw cuts).
2. All joint fill materials shall be installed in accordance with the written recommendations provided in the ARDEX Technical Brochures.
3. All moving joints shall be filled with ARDEX ARDISEAL RAPID PLUS.
4. All non-moving joints shall be filled with ARDEX ARDIBOND AP, ARDEX ARDIFIX or ARDEX ARDISEAL RAPID PLUS.
5. If the joint filling will occur after the polishing process, apply ARDEX DIAMATIC FLOR-HARD, tape or soap to the edge of the ARDEX DIAMA-TOP to keep the joint filler from staining the concrete.
6. Slightly overfill the joint with enough material to shave flush with the concrete. If the level of the joint filler sinks down, immediately add enough product to overfill the joint. Shave the joint filler flush with the concrete using a shaving tool with a sharp blade.
7. Remove all tape and/or soap from the surface around the joint.
8. MicroPolish the surface with appropriate grit DIAMATIC FLOR-GRIT pad.

### **3.3 PRIMING**

- A. If the ARDEX MC ULTRA Moisture Control System is used, no additional priming is needed. The sand-broadcast surface of the ARDEX MC ULTRA is the primer.
- B. If ARDEX MC ULTRA is not used, the concrete shall be primed with ARDEX EP 2000.
- C. Follow the general recommendations for substrate preparation above. Apply the freshly mixed epoxy to the prepared surface using a short-nap paint roller for smoother surfaces or a longer nap for more uneven substrates. ARDEX EP 2000 can also be applied with a paintbrush for hard-to-reach areas and in corners. Primer coverage: Approximately 150-200 sq. ft. (14 to 18.6 m<sup>2</sup>)/unit.
- D. While in a fresh state, broadcast an excess of fine sand ("play sand" that is less than 1/32 of an inch in grain size) consistently over the entire area. Figure about 2/3 lb. of sand per square foot of area (0.32 kg/m<sup>2</sup>). Avoid all traffic over the surface for a minimum of 6 hours.
- E. After 16 hours, broom sweep and vacuum the surface to remove all loose sand. (Otherwise uncontaminated sand can be re-used on the next project.) Install the ARDEX DIAMA-TOP in accordance with written instructions.



### **3.4 ARDEX DIAMA-TOP INSTALLATION**

- A. The minimum installation thickness for ARDEX DIAMA-TOP shall be 3/8" (9 mm). The necessary thickness will vary with jobsite conditions, and must be adequate to achieve the desired finish.
- B. Pour or pump the liquid topping and spread in place with the ARDEX T-4 Spreader. Use the ARDEX T-5 Smoother for feathered edge and touch-up. Wear baseball shoes with non-metallic cleats to avoid leaving marks in the liquid topping. The topping can be walked on in 2-3 hours at 70°F (21°C).
- C. Allow the ARDEX DIAMA-TOP to cure a minimum of 24 to 72 hours before proceeding with the polishing process.

### **3.5 GLOSS ATTAINMENT (ASTM E430)**

- A. Gloss readings are not to be obtained through the use of any microfilming products, sealers, coatings, enhancers or as the result of resin transfer from resin bond abrasives.
- B. Readings shall be taken not less than 10' (3 m) on center in field areas and within 1' (0.3 m) of floor area perimeters. In no case shall a reading be below 2% of specified minimum sheen:
  - 1. Level A Sheen - Low Gloss reading of 30 to 40.
  - 2. Level B Sheen - Medium Gloss reading of 41 to 60.
  - 3. Level C Sheen - High Gloss reading of 61 or higher.
- C. For instructions on achieving gloss levels, refer to the appropriate sub-section of section 3.06 below.

### **3.6 ULTRAFLOR ARDEX DIAMATIC POLISHING PROCESS FOR ARDEX DIAMA-TOP GRAY OR WHITE (NO COLOR ADDED)**

- A. Low Gloss
  - 1. GRIND/POLISH #1: 60/80 Grit Metal Bonded Diamonds.
  - 2. Broom and vacuum the floor to remove all residual dust.
  - 3. If required, apply ARDEX DIAMA-FILL to the ARDEX DIAMA-TOP surface:
    - a. Inspect ARDEX DIAMA-TOP Concrete Topping after the initial metal bond grind to determine if there are superficial pinholes.
    - b. For surfaces with a large number of pinholes, mix and apply a thin fill coat of ARDEX DIAMA-FILL to a properly cleaned surface after the initial metal bond grind.
    - c. Select the ARDEX DIAMA-FILL product from the medium gray or white color options that best match the ARDEX DIAMA-TOP color.

- d. Allow to dry for 60-90 minutes before continuing to the next polishing step.
4. GRIND/POLISH #2: #1 Grit High Performance Transitional Diamonds, Ceramic Bonded.
5. Broom and vacuum floor to remove dust.
6. GRIND/POLISH #3: 200 grit Resin Bonded Diamond.
7. Broom and vacuum to remove dust.
8. Apply ARDEX DIAMATIC FLOR-HARD, per application instructions at a rate of 400 square feet per gallon.
9. Allow ARDEX DIAMATIC FLOR-HARD to dry for 1 hour before continuing onto the next step.
10. GRIND/POLISH #4: 400 grit Resin Bonded Diamond.
11. Broom and vacuum to remove dust.
12. MICROPOLISH/BURNISH #1: FLOR-GRIT 800 Grit Diamond Impregnated Pad.
13. Apply ARDEX DIAMATIC FLOR-FINISH per application instructions at a rate of 1,800 square feet per gallon.
14. Allow to dry a minimum of 15 minutes.
15. MICROPOLISH/BURNISH #2: FLOR-GRIT 1500 Grit Diamond Impregnated Pad.
16. Dry mop the floor clean to remove all debris.
17. Apply ARDEX DIAMATIC FLOR-FINISH per application instructions at a rate of 2,500 square feet per gallon.
18. Allow to dry a minimum of 15 minutes.
19. MICROPOLISH/BURNISH #3: FLOR-GRIT 3000 Grit Diamond Impregnated Pad.
- E. Medium Gloss
  1. GRIND/POLISH #1: 60/80 Grit Metal Bonded Diamonds.
  2. Broom and vacuum the floor to remove all residual dust.
  3. If required, apply ARDEX DIAMA-FILL to the ARDEX DIAMA-TOP surface:
    - a. Inspect ARDEX DIAMA-TOP Concrete Topping after the initial metal bond grind to determine if there are superficial pinholes.

- b. For surfaces with a large number of pinholes, mix and apply a thin fill coat of ARDEX DIAMA-FILL to a properly cleaned surface after the initial metal bond grind.
  - c. Select the ARDEX DIAMA-FILL product from the medium gray or white color options that best match the ARDEX DIAMA-TOP color.
  - d. Allow to dry for 60-90 minutes before continuing to the next polishing step.
- 4. GRIND/POLISH #2: #1 Grit High Performance Transitional Diamonds, Ceramic Bonded.
  - 5. Broom and vacuum floor to remove dust.
  - 6. GRIND/POLISH #3: 200 grit resin bonded diamond.
  - 7. Broom and vacuum to remove dust.
  - 8. Apply ARDEX DIAMATIC FLOR-HARD, per application instructions at a rate of 400 square feet per gallon.
  - 9. Allow ARDEX DIAMATIC FLOR-HARD to dry for 1 hour before continuing onto the next step.
  - 10. GRIND/POLISH #4: 400 grit resin bonded diamond.
  - 11. Broom and vacuum to remove dust.
  - 12. GRIND/POLISH #5: 800 grit resin bonded diamond.
  - 13. Broom and vacuum to remove dust.
  - 14. MICROPOLISH/BURNISH #1: FLOR-GRIT 800 Diamond Impregnated Pad.
  - 15. Dry mop the floor clean to remove all debris.
  - 16. Apply ARDEX DIAMATIC FLOR-FINISH, per application instructions at a rate of 1,800 square feet per gallon.
  - 17. Allow to dry a minimum of 15 minutes.
  - 18. MICROPOLISH/BURNISH #2: FLOR-GRIT 1500 Diamond Impregnated Pad.
  - 19. Dry mop the floor clean to remove all debris.
  - 20. Apply ARDEX DIAMATIC FLOR-FINISH, per application instructions at a rate of 2,500 square feet per gallon.
  - 21. Allow to dry a minimum of 15 minutes.
  - 22. MICROPOLISH/BURNISH #3: FLOR-GRIT 3000 Diamond Impregnated Pad.

F. High Gloss

1. GRIND/POLISH #1: 60/80 Grit Metal Bonded Diamonds.
2. Broom and vacuum the floor to remove all residual dust.
3. If required, apply ARDEX DIAMA-FILL to the ARDEX DIAMA-TOP surface:
  - a. Inspect ARDEX DIAMA-TOP Concrete Topping after the initial metal bond grind to determine if there are superficial pinholes.
  - b. For surfaces with a large number of pinholes, mix and apply a thin fill coat of ARDEX DIAMA-FILL to a properly cleaned surface after the initial metal bond grind.
  - c. Select the ARDEX DIAMA-FILL product from the medium gray or white color options that best match the ARDEX DIAMA-TOP color.
  - d. Allow to dry for 60-90 minutes before continuing to the next polishing step.
4. GRIND/POLISH #2: #1 Grit High Performance Transitional Diamonds, Ceramic Bonded.
5. Broom and vacuum floor to remove dust.
6. GRIND/POLISH #3: 200 grit resin bonded diamond.
7. Broom and vacuum to remove dust.
8. Apply ARDEX DIAMATIC FLOR-HARD, per application instructions at a rate of 400 square feet per gallon.
9. Allow ARDEX DIAMATIC FLOR-HARD to dry for 1 hour before continuing onto the next step.
10. GRIND/POLISH #4: 400 grit resin bonded diamond.
11. Broom and vacuum to remove dust.
12. GRIND/POLISH #5: 800 grit Resin Bonded Diamond
13. Broom and vacuum to remove dust.
14. GRIND/POLISH #6: 1500 grit Resin Bonded Diamond
15. Broom and vacuum to remove dust.
16. MICROPOLISH/BURNISH #1: FLOR-GRIT 1500 Diamond Impregnated Pad
17. Dry mop the floor clean to remove all debris.

18. Apply ARDEX DIAMATIC FLOR-FINISH, per application instructions at a rate of 2,000 square feet per gallon.
19. Allow to dry a minimum of 15 minutes.
20. MICROPOLISH/BURNISH #2: FLOR-GRIT 3000 Diamond Impregnated Pad
21. Dry mop the floor clean to remove all debris.
22. Apply ARDEX DIAMATIC FLOR-FINISH, per application instructions at a rate of 2,500 square feet per gallon.
23. Allow to dry a minimum of 15 minutes.
24. MICROPOLISH/BURNISH #3: FLOR-GRIT 3000 Diamond Impregnated Pad

### 3.7 EDGES

- A. Where desired, polished edge work of ARDEX DIAMA-TOP shall be done with a 5" DIAMATIC Hand Held or Walk Behind polishing tool. The edge polishing process will match the corresponding steps outlined above for the desired gloss level, and each edge polishing step shall be done immediately after the matching main polishing step.
- B. For polishing standard concrete edges, please refer to the main specification.
- C. NOTE: All grinding and polishing completed with grinder/polisher equipment connected to a dust collector.

### 3.8 ACCEPTANCE

- A. Remove all installation materials, and any foreign materials resulting from the installation, from the site.
- B. Clean adjacent surfaces and materials.
- C. Perform post job walk to ensure that the ULTRAFLO ARDEX DIAMA-TOP Concrete System has been completed per the process spec.
- D. Take pictures of final product for documentation and submittal, if requested or required.

### 3.9 PROTECTION

- A. Prevent any spills or stains from coming into contact with the floor. Clean any spills that may occur as quickly as possible.
- B. **Avoid moisture for 72 hours after installation.** Don't permit standing water for this period or place any protective plastic sheeting, rubber matting, rugs or furniture that can prevent proper drying, thereby trapping moisture, which can result in a cloudy effect on the floor.

- C. Light pedestrian use only in the 24 hours after installation. Normal traffic recommended 14 days after completion of the ULTRAFLOAR ARDEX DIAMATIC Concrete Topping System.
- D. Protect the finished ULTRAFLOAR ARDEX DIAMATIC Polished Concrete System from continuing construction and build out as needed by installing the DIAMATIC PRIMO-COVER Protective Floor Covering or DIAMATIC ECONO-COVER Protective Floor Covering.
  - 1. The installation of the DIAMATIC Protective Cover must be approved by the Installer and General Contractor of the ULTRAFLOAR installation.
  - 2. If the DIAMATIC Protective Cover is damaged during use, that section must be cut out and replaced to maintain the integrity of the protective covering.
  - 3. The DIAMATIC Protective Cover can be removed after build out is complete.

### 3.10 ONGOING MAINTENANCE

- A. IMPORTANT NOTICE: Maintaining the ULTRAFLOAR ARDEX DIAMATIC Polished Concrete System and adherence to a recommended cleaning schedule will help the floor hold its mechanically polished gloss longer and greatly reduce the absorption of spilled liquids. The treated concrete floor is easily maintained by regular cleaning with the Maintenance/Post Cleaning procedure, accompanied by Micro-Polishing.
- B. Newly Installed ULTRAFLOAR ARDEX DIAMATIC Polished Concrete System
  - 1. **Restrict water cleaning for 72 hours after installation.** Use only a dry mop to clean. Avoid putting mats or covering treated surface to allow coating to fully cure out.
  - 2. DO NOT USE cleaners that are acidic or that have citrus (de-limonene) or Butyl compounds. Although the ULTRAFLOAR ARDEX DIAMATIC Polished Concrete System is chemical and stain resistant, the application of these high acid cleaners may etch the surface and cause a residual stain. Regular maintenance and cleaning will help prolong surface shine.
- C. Daily Maintenance and Cleaning
  - 1. Once the system is fully cured out (min. 72 hours), routinely sweep, dry mop and wash with neutral pH cleaners or water using a mechanical auto scrubber with vacuum to pick up any residual standing water.
  - 2. DO NOT USE cleaners that are acidic or that have citrus (de-limonene) or Butyl compounds. Although the ULTRAFLOAR ARDEX DIAMATIC Polished Concrete System is chemical and stain resistant, the application of these high acid cleaners may etch the surface and cause a residual stain.

Regular maintenance and cleaning will help prolong surface shine.

- D. Bi-Monthly or Monthly Cleaning (dependent upon floor wear and traffic)
1. Follow the daily maintenance process.
  2. Apply DIAMATIC FLOR-MAINTAINER diluted with 2 parts water using a DIAMATIC CONDOR APPLICATOR or microfiber pad at a coverage rate of 8,000 to 10,000 square feet (743 to 929 m2) gallon.
  3. Burnish/MicroPolish with DIAMATIC FLOR-GRIT 3000 Diamond Impregnated Pad.
  4. Dry mop to remove any debris.
  5. DO NOT USE cleaners that are acidic or that have citrus (de-limonene) or Butyl compounds. Although the ULTRAFLOAR ARDEX DIAMATIC Polished Concrete System is chemical and stain resistant, the application of these high acid cleaners may etch the surface and cause a residual stain. Regular maintenance and cleaning will help prolong surface shine.
- E. ULTRAFLOAR Rejuvenation (recommended application every 1 to 2 years depending upon floor wear and traffic)
1. Follow the daily maintenance process.
  2. Application of ARDEX DIAMATIC FLOR-FINISH applied with Condor applicator or microfiber pads. Follow manufacturer application instructions.
  3. Burnish/MicroPolish with DIAMATIC FLOR-GRIT 3000 Diamond Impregnated Pad.
  4. Dry mop to remove any debris.
  5. DO NOT USE cleaners that are acidic or that have citrus (de-limonene) or Butyl compounds. Although the ULTRAFLOAR ARDEX DIAMATIC Polished Concrete System is chemical and stain resistant, the application of these high acid cleaners may etch the surface and cause a residual stain. Regular maintenance and cleaning will help prolong surface shine.

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**SECTION 03 48 20**

**PRECAST BOLLARDS (ENCASED STEEL POST)**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Furnish and install precast bollards (encased steel post) as indicated on the drawings and specified.

**1.2 SUBMITTALS**

- A. Submit shop drawings showing materials and installation bollards. Indicate locations, dimensions, and profiles. Show reveals and finishes.

**1.3 FIELD MEASUREMENTS**

- A. Make field measurements to ensure that bollards are installed in the proper location, and in correct relationship to the adjacent facilities. Where bollards are designed to protect other construction, check actual dimensions of the other construction to verify the suitability of positioning.

**PART 2 - PRODUCTS**

**2.1 PRECAST BOLLARDS (ENCASED STEEL POST)**

- A. Normal-Weight Concrete Mixtures: Proportion precast concrete at fabricator's option by either laboratory trial batch or field test data methods according to ACI211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 5000 psi (34.5 MPa) minimum.
  - 2. Maximum Water-Cementitious materials Ratio: 0.45.
- B. Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes. Coat contact surfaces of molds with release agent before concrete is placed.
- C. Provide galvanized standard weight steel pipe or heavier, as specified in ASTM A53. Embed or anchor posts in concrete.
- D. Concrete Footings: Provide Class 500-6-2500 concrete prepared as prescribed in Section 201-1 "Concrete, Mortar and Related Materials" of the Standard Specifications for Public Works Construction.
- E. Bollard faces shall be free of joint marks, grain, and other obvious defects. Corners including tops shall be uniform,



straight, and sharp. Finish exposed-face surfaces of precast concrete bollards to match the design reference sample by U.S. Concrete Precast Group "12-MOD."

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

Install bollards in accordance with the approved shop drawings. Anchor After posts have been inserted into holes, fill annular space between post and the cavity wall with nonshrink, nonmetallic grout.

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**SECTION 03 52 00**

**LIGHTWEIGHT CONCRETE ROOF INSULATION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

Section specifies insulating concrete placed on a prepared structural deck as indicated on the drawings.

**1.2 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Description of material.
  - 2. Specifications for mixing, placing, curing and protection of insulating concrete.
  - 3. Interstitial deck: Test specimens reports.
- C. Certificates: Aggregate or foam manufacturer's written certification that applicator has equipment and training to provide a satisfactory installation.

**1.3 DELIVERY, STORAGE AND HANDLING**

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact.
- B. Store in dry and watertight facilities. Do not store materials on ground.

**1.4 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Concrete Institute (ACI):
  - 305R-99.....Hot Weather Concreting
  - 306R-(R97).....Cold Weather Concreting
  - 308-(R97).....Curing Concrete
  - 523-06.....Guide for Cast-in-Place Low-Density Concrete
- C. American Society for Testing and Materials (ASTM):
  - A82-02.....Steel Wire, Plain, for Concrete Reinforcement

A185-97.....Steel Welded Wire Fabric, Plain, for  
Concrete Reinforcement

C150-05.....Portland Cement

C260-06.....Air-Entraining Admixtures for Concrete

C309-06.....Liquid Membrane Forming Compounds for  
Curing Concrete

C332-99.....Lightweight Aggregates for Insulating  
Concrete

C495-91.....Compressive Strength of Lightweight  
Insulating Concrete

C796-04.....Foaming Agents For Use in Producing  
Cellular Concrete Using Preformed Foam

C869-91 (R99).....Foaming Agents Used in Making Preformed  
Foam for Cellular Concrete

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Portland cement: ASTM C150, Type I or Type III.
- B. Lightweight Aggregate: Vermiculite or Perlite conforming to ASTM C332, Group I.
- C. Foaming Agent: ASTM C869.
- D. Air-Entrainment Agent:
  - 1. ASTM C260 type recommended by the aggregate manufacturer.
  - 2. Admixtures with chloride salts or regenerated foam types not acceptable.
- E. Water: Clean and potable, free from impurities detrimental to the concrete.
- F. Insulation and Control Joint Filler:
  - 1. Control Joint Filler: Glass fiber or similar vapor permeable highly compressible material which will compress to one-half its thickness under a load of 172 kPa (25 psi) or less.
  - 2. Insulation: ASTM C665, unfaced for relief vents.
- G. Wire Mesh Reinforcing
  - 1. Hexagonal Mesh: Fabricated of ASTM A82, galvanized steel wire 0.9 mm (0.0359-inch) diameter twisted to form 50 mm (2-inch) hexagons with W0.5 galvanized steel wire woven into mesh spaced 200 mm (18-inches) apart.
  - 2. Welded wire fabric: ASTM A185, 102 x 204 mm (4 by 8-inches) - W1.2/W05 - or 50 x 50 mm (2 by 2-inches) - W05/W0.5.

H. Admixtures:

1. Air Entraining: ASTM C260, Type recommended by the aggregate manufacturer. Admixtures with chloride salts or pregenerated foam types are not acceptable for vermiculite or perlite concrete.
  2. Accelerating, Retarding, and Water Reducing: ASTM C494, Type as recommended by insulating concrete manufacturer.
- I. Concrete Sealer: ASTM C309, Type 2, white, pigmented, curing, sealing, hardening and dustproofing concrete, and compatible with latex paint or acrylic paint, not acting as a bond breaker for the paint.

**2.2 MIXES AND MIXING**

Roof Deck

- A. Mix insulating concrete in accordance with ACI 523.1R or manufacturer's printed specifications where more demanding.
- B. Place in accordance with chapter 5 of ACI 523.1R, or manufacturer's specifications where more demanding.
1. Cold Weather Concreting: ACI 306R and ACI 523.1R. Remove and replace frozen concrete.
  2. Hot Weather Concreting ACI 305R.
  3. Place insulating concrete to not less than 90 mm (3-1/2 inches) over the top of the steel deck crests.
  4. Smooth the placed material to a uniform finish following the screeding operation.
  5. Free surface of loose material, finish smooth to receive sealer.
- C. Design Mix:
1. Compressive strength: Minimum 862 kPa (125 psi) when tested in accordance with ASTM C495 except do not oven dry cellular concrete samples.
  2. Dry density: Maximum 450 Kg/cubic meter (28 pcf).
- D. Vermiculite or Perlite aggregate mix.
1. Mix proportions as recommended by aggregate manufacturer for specified strength and density.
  2. Approximate proportions:
    - a. Ratio of 0.17 cubic meter (6 cubic feet) of aggregate to 42 Kg (94 pounds) of Portland cement.
    - b. Air entraining agent approximately 8 Kg (0.11 pound) per 95 L (25 gallons) of water.

- c. Slump approximately 70 mm (2.7 inches).
- d. Water to assure uniform and consistent mix.
- E. Cellular concrete mix:
  - 1. Mix proportions as recommended by foam manufacture for specified strength and cast density.
  - 2. Preformed foam concentrate diluted at approximately 40 parts water to one part concentrate.

### **PART 3 - EXECUTION**

#### **3.1 INSPECTION**

- A. Clean deck of debris, oil, and other contaminants that will prevent bond.
- B. Do not start until curbs, sleeves, edge venting, or other penetration forms are completed.

#### **3.2 PLACING INSULATING CONCRETE**

- A. Place in accordance with ACI 523.1R or manufacturer's specifications where more demanding.
- B. Cold Weather Concreting: ACI 306R.  
Remove and replace frozen concrete.
- C. Hot Weather Concreting: ACI 305R.
- D. Place reinforcement as required for fire rating and for seismic areas.
  - 1. Lap the edges of the reinforcement 150 mm (6-inches) and the ends 150 mm (6-inches).
  - 2. Locate at midheight of insulating concrete.
  - 3. Place reinforcement without attachment approximately 13mm (1/2 inch) above steel deck crests in insulating concrete.
- E. Place for thickness and profiles shown.
- F. Place concrete not less than 50 mm (2-inches), or more than 200 mm (8-inches) in thickness.
- G. Slope insulating concrete uniformly, 1 in 50 (1/4-inch per foot) minimum, to drains or scuppers.
- H. Depressions that create ponding are not acceptable.
- I. Leave surface free of loose material and finish to receive roofing material specified.
- J. Roof relief Vents for Vermiculite or Perlite Concrete:

1. Under roof relief vents, remove insulating concrete to structural deck and fill with ASTM C665 insulating material.
2. Coordinate with roofing and sheet metal work to space vents minimum 152 mm (6-inches) in diameter, a maximum distance of 9 m (30 feet) from adjacent vent and from vented edge.

K. Control Joints For Perlite Concrete:

1. Install minimum 25 mm (1-inch) wide control joint through thickness of perlite concrete around perimeter of roof deck and at junction of roof penetrations.
2. Fill control joints with control joint filler specified.

**3.3 CURING, PROTECTION AND TESTING**

- A. Roof Deck: Cure in accordance with ACI 308, or manufacturer's specification where more demanding.
- B. Interstitial Deck: Cure in accordance with ACI 523.1R or manufacturer's specification where more demanding.
- C. Interstitial Deck: After curing for not less than 30 days, for vermiculite and perlite concrete, apply on e coat of sealer at approximate rate of 3m<sup>2</sup>/litre (125 square feet per gallon to insulating concrete in accordance with sealer manufacturer's specification.

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**SECTION 03654**

**SELF-LEVELING PORTLAND CEMENT BASED UNDERLAYMENT**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Furnish and install portland cement based self-leveling floor underlayment as indicated on the drawings, where depressions, holes, unevenness or other irregularities exist in the existing floor surface required to receive new finish flooring requiring a smooth and even substrate.

**1.2 SUBMITTALS**

- A. Product Data: Submit descriptive information. Provide physical characteristics, and product limitations.
- B. Manufacturer's Installation Instructions: Indicate mixing, application and, curing instructions.
- C. Manufacturer's Certificate: Certify that the proposed product meets or exceeds specified requirements.

**1.3 QUALIFICATIONS**

- A. Applicator: The applicator shall be an organization specializing in performing the work of this Section with minimum 3 years documented experience and approved by manufacturer.

**1.4 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install underlayment until floor penetrations and peripheral work are complete. Maintain minimum ambient temperatures of 50 degrees F for 24 hours before, during and 72 hours after installation of underlayment. During the curing process, ventilate spaces to remove excess moisture.

**PART 2 PRODUCTS**

**2.1 SELF-LEVELING PORTLAND CEMENT BASED UNDERLAYMENT**

- A. Subject to compliance with specified requirements, self-leveling portland cement based underlayment shall be the product of one of the following (or equal):
  - 1. Ardex, Inc., Ardex K-15.
  - 2. Gyp-Crete Corporation, Level-Right.
  - 3. Quikrete Companies, Normal Set No. 1249-50.
- B. Underlayment: Provide portland cement based mix.
- C. Primer: Provide manufacturer's recommended type.

- D. Joint and Crack Filler: Latex based.
- E. Site mix materials in accordance with manufacturer's instructions. Mix to achieve following characteristics:
  - 1. Density: 115 lb/cu ft minimum dry density.
  - 2. Compressive Strength: 2500 psi at 28 days minimum in accordance with ASTM C472.
  - 3. Fire Hazard Classification: 0/0/0 (Flame/Fuel/Smoke) rating in accordance with ASTM E286.
- F. Mix to consistency to achieve self-leveling.

### **PART 3 EXECUTION**

#### **3.1 PREPARATION**

- A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum by-products, or other compounds detrimental to underlayment material bond to substrate.
- B. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.
- C. Vacuum clean surfaces.

#### **3.2 INSTALLATION**

- A. Install the self-leveling underlayment in accordance with manufacturer's instructions. Place to thickness required to provide a smooth, even substrate suitable for the finish flooring material to be superimposed upon the portland cement based underlayment. The minimum thickness shall not be less than recommended by the manufacturer. Install before partition installation.
- B. Air cure in accordance with manufacturer's instructions.

#### **3.3 APPLICATION TOLERANCE**

- A. Maintain top surface level to 1/8 inch in 10 ft.

#### **3.4 PROTECTION OF FINISHED WORK**

- A. Protect finished Work from damage. Do not permit traffic over unprotected floor surface.

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**SECTION 03 65 40**

**FLOOR PATCHING AND LEVELING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

Furnish and install portland cement based self-leveling floor underlayment as indicated on the drawings, where depressions, holes, unevenness or other irregularities exist in the existing floor surface required to receive new finish flooring requiring a smooth and even substrate.

**1.2 SUBMITTALS**

- A. Product Data: Submit descriptive information. Provide physical characteristics, and product limitations.
- B. Manufacturer's Installation Instructions: Indicate mixing, application and, curing instructions.
- C. Manufacturer's Certificate: Certify that the proposed product meets or exceeds specified requirements.

**1.3 QUALIFICATIONS**

Applicator: The applicator shall be an organization specializing in performing the work of this Section with minimum 3 years documented experience and approved by manufacturer.

**1.4 ENVIRONMENTAL REQUIREMENTS**

Do not install underlayment until floor penetrations and peripheral work are complete. Maintain minimum ambient temperatures of 50 degrees F for 24 hours before, during and 72 hours after installation of underlayment. During the curing process, ventilate spaces to remove excess moisture.

**PART 2 - PRODUCTS**

**2.1 FLOOR PATCHING AND LEVELING MATERIALS**

- A. Subject to compliance with specified requirements, provide self-leveling portland cement based floor patching and leveling materials of one of the following (or equal):
  - 1. Ardex, Inc., Ardex K-15.
  - 2. Gyp-Crete Corporation, Level-Right.
  - 3. Quikrete Companies, Normal Set No. 1249-50.
- B. Underlayment: Provide portland cement based mix.
- C. Primer: Provide manufacturer's recommended type.

- D. Joint and Crack Filler: Latex based.
- E. Site mix materials in accordance with manufacturer's instructions. Mix to achieve following characteristics:
  - 1. Density: 115 lb/cu ft minimum dry density.
  - 2. Compressive Strength: 2500 psi at 28 days minimum in accordance with ASTM C472.
  - 3. Fire Hazard Classification: 0/0/0 (Flame/Fuel/Smoke) rating in accordance with ASTM E286.
- F. Mix to consistency to achieve self-leveling.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum by-products, or other compounds detrimental to underlayment material bond to substrate.
- B. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.
- C. Vacuum clean surfaces.

#### **3.2 INSTALLATION**

- A. Install the self-leveling underlayment in accordance with manufacturer's instructions. Place to thickness required to provide a smooth, even substrate suitable for the finish flooring material to be superimposed upon the portland cement based underlayment. The minimum thickness shall not be less than recommended by the manufacturer. Install before partition installation.
- B. Air cure in accordance with manufacturer's instructions.

#### **3.3 APPLICATION TOLERANCE**

Maintain top surface level to 1/8 inch in 10 ft.

#### **3.4 PROTECTION OF FINISHED WORK**

Protect finished Work from damage. Do not permit traffic over unprotected floor surface.

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**SECTION 05 12 20**

**REINFORCING STRUCTURAL STEEL FRAMING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

This section specifies the reinforcement of structural steel framing as shown and classified by Section 2, Code of Standard Practice for Steel Buildings and Bridges.

**1.2 QUALITY ASSURANCE:**

- A. Fabricator and erector shall maintain a program of quality assurance in conformance with Section 8, Code of Standard Practice for Steel Buildings and Bridges. Work shall be fabricated in an AISC certified Category Conventional Steel Structures or Complex Steel Building Structures fabrication plant.
- B. Before authorizing the commencement of steel erection, the controlling contractor shall ensure that the steel erector is provided with the written notification required by 29 CFR 1926.752. Provide copy of this notification to the Resident Engineer.

**1.3 TOLERANCES:**

Fabrication tolerances for structural steel shall be held within limits established by ASTM A6, by Section 7, Code of Standard Practice for Buildings and Bridges, and by Standard Mill Practice - General Information (AISC ASD Manual, Ninth Edition, Page 1-145 LRFD Manual, Second Edition, Page 1-183.

**1.4 DESIGN:**

- A. Connections: Design and detail all connections for each member size, steel grade and connection type to resist the loads and reactions indicated on the drawings or specified herein. Use details consistent with the details shown on the Drawings, supplementing where necessary. The details shown on the Drawings are conceptual and do not indicate the required weld sizes or number of bolts unless specifically noted. Use rational engineering design and standard practice in detailing, accounting for all loads and eccentricities in both the connection and the members. Promptly notify the Resident Engineer of any location where the connection design criteria is not clearly indicated. The design of all connections is subject to the review and acceptance of the Resident Engineer. Submit structural calculations prepared and sealed by a qualified engineer registered in the state where the project is located. Submit calculations for review before preparation of detail drawings.

**1.5 REGULATORY REQUIREMENTS:**

- A. AISC: Specification for Structural Steel Buildings - Allowable Stress Design, or LRFD Specification for Structural Steel Buildings.

- B. AISC: Code of Standard Practice for Steel Buildings and Bridges.

**1.6 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop and Erection Drawings: Complete
- C. Certificates:
  - 1. Structural steel.
  - 2. Steel for all connections.
  - 3. Welding materials.
  - 4. Shop coat primer paint.
- D. Test Reports:
  - 1. Welders' qualifying tests.
- E. Design Calculations and Drawings:
  - 1. Connection calculations, if required.

**PART 2 - PRODUCTS**

**2.1 MATERIALS:**

- A. Structural Steel: ASTM A36, A242, A283, or A572 as appropriate.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Structural Tubing: ASTM A501.
- D. Steel Pipe: ASTM A53, Grade B.
- E. Bolts, Nuts and Washers:
  - 1. High-strength bolts, including nuts and washers: ASTM A325 or A490.
  - 2. Bolts and nuts, other than high-strength: ASTM A307, Grade A.
  - 3. Plain washers, other than those in contact with high-strength bolt heads and nuts: ANSI Standard B18.22.1.
- F. Zinc Coating: ASTM A123.
- G. Galvanizing Repair Paint: Mil. Spec. MIL-P-21035.

**PART 3 - EXECUTION**

**3.1 CONNECTIONS (SHOP AND FIELD):**

- A. Welding: Welding in accordance with AWS D1.1. Welds shall be made only by welders and welding operators who have been previously

qualified by tests as prescribed in AWS D1.1 to perform type of work required.

- B. High-Strength Bolts: High-strength bolts tightened to a bolt tension not less than proof load given in Specification for Structural Joints Using ASTM A325 or A490 Bolts. Tightening done with properly calibrated wrenches, by turn-of-nut method or by use of direct tension indicators (bolts or washers). Tighten bolts in connections identified as slip-critical using Direct Tension Indicators or the turn-of-the-nut method. Twist-off torque bolts are not an acceptable alternate fastener for slip critical connections.

### **3.2 FABRICATION:**

Fabrication in accordance with Chapter M, Specification for Steel Buildings - Allowable Stress Design and Plastic Design, or Load and Resistance Factor Design.

### **3.3 SHOP PAINTING:**

- A. General: Shop paint steel with primer in accordance with Section 6, Code of Standard Practice for Steel Buildings and Bridges.
- B. Shop paint for steel surfaces is specified in Section 09 91 00, PAINTING.
- C. Do not apply paint to following:
  - 1. Surfaces within 50 mm (2 inches) of joints to be welded in field.
  - 2. Surfaces which will be encased in concrete.
  - 3. Surfaces which will receive sprayed on fireproofing.
  - 4. Top flange of members which will have shear connector studs applied.
- D. Zinc Coated (Hot Dip Galvanized) per ASTM A123 (after fabrication): Touch-up after erection: Clean and wire brush any abraded and other spots worn through zinc coating, including threaded portions of bolts and welds and touch-up with galvanizing repair paint.

### **3.4 ERECTION:**

- A. General: Erection in accordance with Section 7, Code of Standard Practice for Steel Buildings and Bridges.
- B. Temporary Supports: Temporary support of structural steel frames during erection in accordance with Section 7, Code of Standard Practice for Steel Buildings and Bridges.

### **3.5 FIELD PAINTING:**

- A. After erection, touch-up steel surfaces specified to be shop painted. After welding is completed, clean and prime areas not painted due to field welding.

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- B. Finish painting of steel surfaces is specified in Section 09 91  
00, PAINTING.

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**SECTION 05 31 00**

**STEEL DECKING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

This section specifies material and services required for installation of steel decking as shown and specified.

**1.2 DESIGN REQUIREMENTS:**

- A. Design steel decking in accordance with AISI publication, "Specification for the Design of Cold-formed Steel Structural Members" except as otherwise shown or specified.
- B. Design all elements with the latest published version of applicable codes.

**1.3 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Shop and erection drawings showing decking unit layout, connections to supporting members, and similar information necessary for completing installation as shown and specified, including supplementary framing, sump pans, ridge and valley plates, cant strips, cut openings, special jointing or other accessories. Show welding, side lap, closure, deck reinforcing and closure reinforcing details. Show openings required for work of other trades, including openings not shown on structural drawings. Indicate where temporary shoring is required to satisfy design criteria.
- C. Manufacturer's Literature and Data: Showing steel decking section properties and specifying structural characteristics.
- D. Certification: For each type and gauge of metal deck supporting concrete slab or fill, furnish certification of the specified fire ratings. Certify that the units supplied are U.L. listed as a "Steel Floor and Form Unit".
- E. Insurance Certification: Assist the Government in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance.

**1.4 QUALITY ASSURANCE:**

- A. Underwriters' Label: Provide metal floor deck units listed in Underwriters' Laboratories "Fire Resistance Directory", with each deck unit bearing the UL label and marking for specific system detailed.

**1.5 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):
- A36/A36M-08.....Standard Specification for Carbon  
Structural Steel
- A611-97.....Standard Specification for Structural  
Steel (SS), Sheet, Carbon, Cold-Rolled
- A653/A653M-08.....Standard Specification for Steel Sheet,  
Zinc-Coated (Galvanized) or Zinc-Iron  
Alloy-Coated (Galvanized) by the Hot-Dip  
Process
- C423-08.....Standard Test Method for Sound Absorption  
and Sound Absorption Coefficients by the  
Reverberation Room Method
- C. American Institute of Steel Construction (AISC):
1. Specification for Structural Steel Buildings - Allowable  
Stress Design and Plastic Design (ninth Edition, 1989)
  2. Load and Resistance Factor Design Specification for  
Structural Steel Buildings (Latest Edition)
- D. American Iron and Steel Institute (AISI):
1. Specification and Commentary for the Design of Cold-Formed  
Steel Structural Members
- E. American Welding Society (AWS):
- D1.3-08.....Structural Welding Code - Sheet Steel
- F. Factory Mutual (FM Global):
1. Loss Prevention Data Sheet 1-28: Wind Loads to Roof Systems  
and Roof Deck Securement
  2. Factory Mutual Research Approval Guide (2002)
- G. Military Specifications (Mil. Spec.)
- MIL-P-21035B.....Paint, High Zinc Dust Content, Galvanizing  
Repair

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS:**

- A. Steel Decking: ASTM A653, Structural Quality or ASTM A611, Grade  
C, D, or E
- B. Galvanizing: ASTM A653, G60.
- C. Galvanizing Repair Paint: Mil. Spec. MIL-P-21035B.
- D. Primer for Shop Painted Sheets: Manufacturer's standard primer (2  
coats). When finish painting of steel decking is specified in



Section 09 91 00, PAINTING primer coating shall be compatible with specified finish painting.

- E. Miscellaneous Steel Shapes: ASTM A36.
- F. Welding Electrode: E60XX minimum.
- G. Sheet Metal Accessories: ASTM A653, galvanized, unless noted otherwise. Provide accessories of every kind required to complete the installation of metal decking in the system shown. Finish sheet metal items to match deck including, but not limited to, the following items:
  - 1. Metal Cover Plates: For end-abutting deck units, to close gaps at changes in deck direction, columns, walls and openings. Same quality as deck units but not less than 1.3 mm (18 gauge) sheet steel.
  - 2. Continuous Sheet Metal Edging: At openings, concrete slab edges and roof deck edges. Same quality as deck units but not less than 1.3 mm (18 gauge) steel. Side and end closures supporting concrete and their attachment to supporting steel shall be designed by the manufacturer to safely support the wet weight of concrete and construction loads. The deflection of cantilever closures shall be limited to 3 mm (1/8 inch) maximum.
  - 3. Metal Closure Strips: For openings between decking and other construction, of not less than 1.3 mm (18 gauge) sheet steel of the same quality as the deck units. Form to the configuration required to provide tight-fitting closures at open ends of flutes and sides of decking.
  - 4. Ridge and Valley Plates: Provide 1.3 mm (18 gauge), minimum 100 mm (4 inch) wide ridge and valley plates where roof slope exceeds 40 mm per meter (1/2 inch per foot).
  - 5. Cant Strips: Provide bent metal 45 degree leg cant strips where indicated on the Drawings. Fabricate cant strips from 1 mm (20 gauge) metal with a minimum 125 mm (5 inch) face width.
  - 6. Seat Angles for Deck: Provide where a beam does not frame into a column.

## **2.2 REQUIREMENTS:**

- A. Provide steel decking of the type, depth, gauge, and section properties as shown on the drawings.

## **PART 3 - EXECUTION**

### **3.1 ERECTION:**

- A. Do not start installation of metal decking until corresponding steel framework has been plumbed, aligned and completed and until temporary shoring, where required, has been installed. Remove any oil, dirt, paint, ice, water and rust from steel surfaces to which metal decking will be welded.

- B. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- C. Do not use floor deck units for storage or working platforms until permanently secured. Do not overload deck units once placed. Replace any deck units that become damaged after erection and prior to casting concrete at no cost to the Government.
- D. Provide steel decking in sufficient lengths to extend over 3 or more spans, except for interstitial levels.
- E. Place steel decking units at right angles to supporting members. End laps of sheets of roof deck shall be a minimum of 50 mm (2 inches) and shall occur over supports.
- F. Fastening Deck Units:
  - 1. Fasten floor deck units to steel supporting members by not less than 16 mm (5/8 inch) diameter puddle welds or elongated welds of equal strength, spaced not more than 305 mm (12 inches) o.c. with a minimum of two welds per unit at each support. Where two units abut, fasten each unit individually to the supporting steel framework.
  - 2. Tack weld or use self-tapping No. 8 or larger machine screws at 915 mm (3 feet) o.c. for fastening end closures. Only use welds to attach longitudinal end closures.
  - 3. Weld side laps of adjacent floor deck units that span more than 1524 mm (5 feet). Fasten at midspan or 915 mm (3 feet) o.c., whichever is smaller.
  - 4. Fasten roof deck units to steel supporting members by not less than 16 mm (5/8 inch) diameter puddle welds or elongated welds of equal strength, spaced not more than 305 mm (12 inches) o.c. at every support, and at closer spacing where required for lateral force resistance by diaphragm action. Attach split or partial panels to the structure in every valley. In addition, secure deck to each supporting member in ribs where side laps occur. Power driven fasteners may be used in lieu of welding for roof deck if strength equivalent to the welding specified above is provided. Submit test data and design calculations verifying equivalent design strength.
  - 5. Mechanically fasten side laps of adjacent roof deck units with spans greater than 1524 mm (5 feet) between supports, at intervals not exceeding 915 mm (3 feet) o.c., or midspan, whichever is closer, using self-tapping No. 8 or larger machine screws.
  - 6. Provide any additional fastening necessary to comply with the requirements of Underwriters Laboratories and/or Factory Mutual to achieve the required ratings.
- G. Cutting and Fitting:
  - 1. Cut all metal deck units to proper length in the shop prior to shipping.

2. Field cutting by the metal deck erector is restricted to bevel cuts, notching to fit around columns and similar items, and cutting openings that are located and dimensioned on the Structural Drawings.
3. Other penetrations shown on the approved metal deck shop drawings but not shown on the Structural Drawings are to be located, cut and reinforced by the trade requiring the opening.
4. Make all cuts neat and trim using a metal saw, drill or punchout device; cutting with torches is expressly prohibited.
5. Do not make any cuts in the metal deck that are not shown on the approved metal deck drawings. If an additional opening not shown on the approved shop drawings is required, submit a sketch, to scale, locating the required new opening and any other openings and supports in the immediate area. Do not cut the opening until the sketch has been reviewed and accepted by the Resident Engineer. Provide any additional reinforcing or framing required for the opening at no cost to the Government. Failure to comply with these requirements is cause for rejection of the work and removal and replacement of the affected metal deck.
6. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.

### **3.2 WELDING:**

Welds shall be made only by welders and welding operators who have been previously qualified by tests as prescribed in AWS D1.3.

### **3.3 FIELD REPAIR:**

- A. Areas scarred during erection.
- B. Welds to be thoroughly cleaned and touched-up. Touch-up paint for zinc-coated units shall be zinc rich galvanizing repair paint, or Touch-up paint for shop painted units of same type used for shop painting.

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**SECTION 05 40 00**

**COLD-FORMED METAL FRAMING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. This section specifies materials and services required for installation of cold-formed steel, including tracks and required accessories as shown and specified

**1.2 RELATED WORK:**

- A. Structural steel framing: Section 05 12 00, STRUCTURAL STEEL FRAMING.
- B. Gypsum board assemblies: Section 09 29 00, GYPSUM BOARD.

**1.3 DESIGN REQUIREMENTS:**

- A. Design steel in accordance with American Iron and Steel Institute Publication "Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.
- B. Structural Performance: Engineer, fabricate and erect cold-formed metal framing with the minimum physical and structural properties indicated.

**1.4 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Shop and erection drawings showing steel unit layout, connections to supporting members, and information necessary to complete installation as shown and specified.
- C. Manufacturer's Literature and Data: Showing steel component sections and specifying structural characteristics.
- D. For cold-formed metal framing indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for its preparation.

**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 Iron and Steel Institute (AISI):

Specification and Commentary for the Design of Cold-Formed Steel  
Structural Members (1996)

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

A36/A36M (REV. A)-2003...Standard Specifications for Carbon  
Structural Steel

A123/A123M-2002.....Standard Specifications for Zinc (Hot-Dip  
Galvanized) Coatings on Iron and Steel  
Products

A153/A153M-2003.....Standard Specifications for Zinc Coating  
(Hot-Dip) on Iron and Steel Hardware

A307-2002.....Standard Specifications for Carbon Steel  
Bolts and Studs

A653/A653M-2003.....Standard Specifications for Steel Sheet,  
Zinc-Coated (Galvanized) or Zinc-Iron  
Alloy-Coated (Galvannealed) by the Hot-  
Dip Process

C955-2003.....Standard Specifications for Load-Bearing  
(Transverse and Axial) Steel Studs,  
Runners (Tracks), and Bracing or Bridging  
for Screw Application of Gypsum Panel  
Products and Metal Plaster Bases

C1107-2002.....Standard Specifications for Packaged Dry,  
Hydraulic-Cement Grout (Non-shrink)

E488-96 (Reapproved 2003) Standard Test Methods for Strength of  
Anchors in Concrete and Masonry Elements

E1190-95 (Reapproved 2000) Standard Test Methods for Strength of  
Power-Actuated Fasteners Installed in  
Structural Members

D. American Welding Society (AWS):

D1.3-(98).....Structural Welding Code-Sheet Steel

E. Military Specifications (Mil. Spec.):

MIL-P-21035B (Reinst. Notice 2), Paint, High Zinc Dust Content,  
Galvanizing Repair

**PART 2 - PRODUCTS**

**2.1 MATERIALS:**

- A. Sheet Steel for joists, studs and accessories 16 gage and  
heavier: ASTM A653, structural steel, zinc coated // G60 // //  
G90 //, with a yield of 340 MPa (50 ksi) minimum.

- B. Sheet Steel for joists, studs and accessories 18 gage and lighter: ASTM A653, structural steel, zinc coated // G60 // // G90 //, with a yield of 230 MPa (33 ksi) minimum.
- C. Galvanizing Repair Paint: MIL-P-21035B.
- D. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107, with fluid consistency and a 30 minute working time.

## **2.2 WALL FRAMING:**

- A. Steel Studs: Manufacturer's standard C-shaped steel studs of web depth indicated, with lipped flanges, and complying with the requirements indicated on the drawings.
- B. Steel Track: Manufacturer's standard U-shaped steel track, unpunched, of web depths indicated, with straight flanges, and complying with the following:
  - 1. Design Uncoated-Steel Thickness: Matching steel studs.
  - 2. Flange Width: Manufacturer's standard deep flange where indicated, standard flange elsewhere.

## **2.3 FRAMING ACCESSORIES:**

- A. Fabricate steel framing accessories of the same material and finish used for framing members, with a minimum yield strength of 230 MPa (33 ksi).
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
  - 1. Supplementary framing.
  - 2. Bracing, bridging, and solid blocking.
  - 3. Web stiffeners.
  - 4. Gusset plates.
  - 5. Deflection track and vertical slide clips.
  - 6. Stud kickers and girts.
  - 7. Joist hangers and end closures.
  - 8. Reinforcement plates.

## **2.4 ANCHORS, CLIPS, AND FASTENERS:**

- A. Steel Shapes and Clips: ASTM A36, zinc coated by the hot-dip process according to ASTM A123.

- B. Cast-in-Place Anchor Bolts and Studs: ASTM A307, Grade A, zinc coated by the hot-dip process according to ASTM A153.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times the design load, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times the design load, as determined by testing per ASTM E1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws. Low-profile head beneath sheathing, manufacturer's standard elsewhere.

## **2.6 REQUIREMENTS:**

- A. Welding in accordance with AWS D1.3
- B. Furnish members and accessories by one manufacturer only.

## **PART 3 - EXECUTION**

### **3.1 FABRICATION:**

- A. Framing components may be preassembled into panels. Panels shall be square with components attached.
- B. Cut framing components squarely or as required for attachment. Cut framing members by sawing or shearing; do not torch cut.
- C. Hold members in place until fastened.
- D. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
  - 1. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
  - 2. Locate mechanical fasteners and install according to cold-formed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- E. Where required, provide specified insulation in double header members and double jamb studs which will not be accessible after erection.

**3.2 ERECTION:**

- A. Handle and lift prefabricated panels in a manner as to not distort any member.
- B. Securely anchor tracks to supports as shown.
- C. At butt joints, securely anchor two pieces of track to same supporting member or butt-weld or splice together.
- D. Plumb, align, and securely attach studs to flanges or webs of both upper and lower tracks.
- E. All axially loaded members shall be aligned vertically to allow for full transfer of the loads down to the foundation. Vertical alignment shall be maintained at floor/wall intersections.
- F. Install jack studs above and below openings and as required to furnish support. Securely attach jack studs to supporting members.
- G. Install headers in all openings that are larger than the stud spacing in that wall.
- H. Attach bridging for studs in a manner to prevent stud rotation. Space bridging rows as shown.
- I. Studs in one piece for their entire length, splices will not be permitted.
- J. Provide a load distribution member at top track where joist is not located directly over bearing stud.
- K. Provide joist bridging and web stiffeners at reaction points where shown.
- L. Provide end blocking where joist ends are not restrained from rotation.
- M. Provide an additional joist under parallel partitions, unless otherwise shown, when partition length exceeds one-half joist span and when floor and roof openings interrupt one or more spanning members.
- N. Provide temporary bracing and leave in place until framing is permanently stabilized.
- O. Do not bridge building expansion joints with cold-formed metal framing. Independently frame both sides of joints.
- P. Fasten reinforcement plate over web penetrations that exceed size of manufacturer's standard punched openings.



**3.3 TOLERANCES:**

- A. Vertical alignment (plumbness) of studs shall be within 1/960th of the span.
- B. Horizontal alignment (levelness) of walls shall be within 1/960th of their respective lengths.
- C. Spacing of studs shall not be more than 3 mm (1/8 inch) +/- from the designed spacing providing that the cumulative error does not exceed the requirements of the finishing materials.
- D. Prefabricated panels shall be not more than 3 mm (1/8 inch) +/- out of square within the length of that panel.

**3.4 FIELD REPAIR:**

Touch-up damaged galvanizing with galvanizing repair paint.

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**SECTION 05 50 00**

**METAL FABRICATION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section covers items and assemblies fabricated from structural steel shapes and other materials as shown and specified.

**1.2 SUBMITTALS**

In accordance with Section 01 33 23, SAMPLES AND SHOP DRAWINGS, furnish the following:

- A. Shop Drawings: For each item specified in the contract provide shop drawings 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. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.

**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 the basic designation only.

- B. Federal Specifications (Fed. Spec.):

FF-B-588C(1).....Bolt, Toggle; And Expansion Sleeve, Screw

FF-P-395B.....Pin, Drive, Guided And Pin Drive, Power  
Actuated (Fasteners For Powder Actuated  
And Hand Actuated Fastening Tools)

FF-S-325 .....Shield, Expansion; Nail, Expansion; And  
Nail, INT AMD 3 Drive Screw (Devices,  
Anchoring, Masonry)

QQ-A-200/9C(1).....Aluminum Alloy Bar, Rod, Shapes, Tube And  
Wire, Extruded, 6063

QQ-F-461C(1).....Floor, Plate, Steel, Rolled

QQ-S-775E.....Steel, Sheets, Carbon, Zinc-Coated

RR-T-650B.....Treads, Metallic And Non-Metallic, Non-  
Skid

TT-P-641G(1).....Primer Coating, Zinc Dust-zinc Oxide (For  
Galvanized Surfaces)

TT-P-645A.....Primer, Paint Zinc Chromate, Alkyd Type

WW-P-406D.....Pipe, Steel (Seamless And Welded)

- C. Military Specifications (Mil. Spec.):

MIL-P-21035 (SHIPS).....Paint, High Zinc Dust Content, Galvanizing  
Repair

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

A36-81.....Structural Steel

A307.....Low-carbon steel externally and internally  
threaded standard fasteners

E. American Welding Society (AWS):

D1.1-81.....Structural Welding Code

F. Structural Steel Painting Council (SSPC):

SSPC-SP 1-63.....No. 1, Solvent Cleaning

SSPC-SP 2-63.....No. 2, Hand Tool Cleaning

SSPC-SP 3-63.....No. 3, Power Tool Cleaning

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

A. Structural Steel: ASTM A36.

B. Threaded Rods: ASTM A36.

C. Machine Bolts: ASTM A307 Low-carbon steel externally and  
internally threaded standard fasteners.

D. Power Actuated Drive Pins: Fed. Spec. FF-P-395, style to suit  
material.

E. Expansion Bolts (Shields): Fed. Spec. FF-S-325, except lead,  
fiber and plastic shields are not acceptable. Furnish bolts and  
screws required.

F. Toggle Bolts: Fed. Spec. FF-B-588, except wire wings are not  
acceptable.

G. Zinc Chromate Primer: Fed. Spec. TT-P-645, Type II.

H. Zinc Dust Primer: Fed. Spec. TT-P-641, Type II.

I. Zinc Rich Paint: Mil. Spec. MIL-P-21035.

### **2.2 FABRICATION GENERAL**

A. Material: Material shall be as specified. Material required  
which is not named or which is named but for which a standard of  
quality is not specified shall be of good commercial quality,  
suitable in all respects for the intended purpose.

1. Material shall be free of defects which affect the  
appearance of serviceability of the finished product.

- B. Size: Size and thickness of members shall be as shown. When size and thickness is not specified or shown for an individual part, the size and thickness shall be not less than that used for the same component on similar standard commercial items or in accordance with established shop methods.
- C. Connections: Except as otherwise specified, connections may be made by welding, riveting or bolting. Field riveting will not be approved.
  - 1. Holes, for bolts shall be accurately punched or drilled, and shall have the burrs removed. Size, number and placement of rivets and bolts, shall be designed so as to develop a joint strength of not less than the design value.
  - 2. Welding shall be in accordance with AWS D1.1. Welds shall be of sufficient size and shape to develop the full design strength of the parts connected by welds and shall transmit imposed stresses without permanent deformation of failure when subject to service loadings.
  - 3. Bolts shall be of material selected to prevent corrosion (electrolysis) at bimetallic contacts. Plated or coated material will not be approved.
- D. Fasteners and Anchors: Methods for fastening or anchoring metal fabrications to building construction shall be as shown or specified. Where fasteners and anchors are not shown, the type, size, location and spacing shall be designed so as to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and shall suit the sequence of installation. The material and finish of the fasteners shall be compatible with the kinds of materials which are fastened together and their location in the finished work.
  - 1. Fasteners for securing metal fabrication to existing construction or new construction may be by expansion bolts, toggle bolts, power actuated drive pins, welding, self drilling and tapping screws or bolts.
- E. Workmanship:
  - 1. General: Fabricate items to design shown. Furnish members in longest lengths commercially available within the limits shown and specified. All work shall be straight, true, free from warp and twist, and where applicable square and in same plane.
    - a. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items. Provide openings, cut-outs and tapped holes for attachment and clearances required for work of other trades. Prepare members for the installation and fitting of hardware.
    - b. All surfaces and edges shall be free from sharp edges, burrs and projects which may cause injury.
  - 2. Welding: Welding shall be in accordance with the requirements of AWS D1.1. Welds shall show good fusion, be free from cracks and porosity and accomplish secure and

rigid joints in proper alignment. Where exposed in the finished work, welds shall be continuous for the full length of the members joined and have depressed areas filled and all protruding welds finished smooth and flush with adjacent surfaces.

3. Joining: Miter or butt members at corners. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.
4. Cutting and Fitting: All joints, corners, copes, and miters shall be accurately cut, machined and fitted. Removable members shall be fitted so as to be easily removed.
  - a. Design and construct field connections in the most practical place for appearance and ease of installation. All pieces shall fit together as required. Connections shall provide ease of assembly (and disassembly) without use of special tools. Joints shall be firm when assembled.
  - b. Joining, fitting and welding on exposed work shall be concealed as far as practical. Rivets and screws shall not show prominently on the exposed face.
  - c. The fit of components and the alignment of holes shall eliminate the need to modify any component or to use exceptional force in the assembly of any item and shall eliminate the need to use other than common tools.

F. Finish:

1. Steel and Iron:

- a. Shop Prime Painting: All surfaces of steel and iron except surfaces to be welded and zinc coated (galvanized) surfaces shall be cleaned of all oil, grease, soil and other detrimental matter by use of solvents or cleaning compounds as defined in SSPC-SP1. Remove all loose mill scale, rust, and paint, by hand or power tool cleaning as defined in SSPC-SP2 and SP3. Surfaces exposed in the finished work shall have all holes, dents and similar voids and depressions filled with epoxy type patching compound and all projections and rough surfaces finished smooth. After cleaning and finishing, apply one coat of zinc-chromate primer.
- b. Spot prime all abraded and damaged areas of zinc coating which expose the bare metal, using zinc rich paint on hot-dip zinc coated items and zinc dust primer on all other zinc coated items.
- c. Finish painting of exposed surfaces is specified elsewhere.

- G. Protection: Insulate aluminum surfaces that will come in contact with metals other than stainless steel, zinc or white bronze by giving the dissimilar metal a coat of heavy-bodied alkali resisting bituminous paint. Insulate aluminum from plaster,

masonry and concrete by painting the aluminum with zinc-chromate primer.

### **2.3 SUPPORTS**

- A. General: Fabricate of structural steel shapes as shown. Provide clip angles or make provisions for welding hangers and braces to overheads construction. Field connections may be welded or bolted.
- B. Supports for Wall Mounted Items: Where items are supported by metal stud partitions provide supports as follows:
  - 1. 16 gauge steel hat channels.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Installation of metal fabrications shall be by experienced mechanics capable of installing each item in accordance with the drawings and specifications, in consideration of the field conditions, and the shop and erection drawings.
- B. 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.
- C. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and for the positioning of items having anchors to be built into concrete.
- D. 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.
- E. Field welding shall be in accordance with AWS D1.1 and shall be designed and finished as specified for shop welding.
- F. Provide 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.
- G. 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.

### **3.2 CLEANING AND ADJUSTING**

- A. All movable parts including hardware shall be cleaned and adjusted to operate as designed without binding or deformation of the members, to be centered in the opening or frame and, where applicable, to have all contact surfaces fit tight and even without forcing or warping the components.

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