

Paint Exterior of Water Tower at VA Medical Center
Sioux Falls, South Dakota

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CONTRACT LINE ITEM PRICING SCHEDULE

Item no.	Description	Quantity	Unit	Unit Price	Amount
BASIC ITEMS:					
0001	All work complete for mobilization and permits (Section 01 11 00, Paragraph 1.1.3.a.)	Job	LS	xxx	\$ _____
0002	All work complete for removal and disposal of abandoned antenna attachments and cables (Section 01 11 00, Paragraph 1.1.3.b.)	Job	LS	xxx	\$ _____
0003	All work complete for erection of a full containment structure/curtain and removal (Section 01 11 00, Paragraphs 1.1.3. c)	Job	LS	xxx	\$ _____
0004	All work complete for removal of exterior tank coating system (Section 01 11 00, Paragraph 1.1.3.d)	Job	LS	xxx	\$ _____
0005	All work complete for application of a new exterior tank coating system (Section 01 11 00, Paragraph 1.1.3.e and f)	Job	LS	xxx	\$ _____
Sub Total for BASIC BID ITEMS					\$ _____
ALTERNATE DEDUCTION OPTIONS:					
001A	Eliminate 4" Access Concrete work shown on Exhibit "A"	Job	LS	xxx	\$ (_____)_____
002A	Eliminate 8" Access Concrete work shown on Exhibit "A"	Job	LS	xxx	\$ (_____)_____
Sub Total for ADD ALTERNATE OPTIONS					\$ _____
TOTAL AMOUNT BASIC ITEMS 0001 THROUGH 0005					\$ _____
TOTAL AMOUNT ADD ALTERNATE OPTIONS 001A THROUGH 002A					\$ _____
GRAND TOTAL (BASIC BID + ADD ALTERNATE)					\$ _____

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DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 00 73 00

SPECIAL CONTRACT REQUIREMENTS

5/00, Rev 5/03

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SECTION 00 73 00

SPECIAL CONTRACT REQUIREMENTS
5/00, Rev 5/03

PART 1 GENERAL

1.1 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984) The Contractor shall commence work under this contract within ten (10) calendar days after the date of receipt by him of Notice to Proceed, prosecute said work diligently, and complete the entire work except seeding ready for use not later than 365 calendar days after receipt of Notice to Proceed. The time stated for completion shall include final cleanup of the premises. (FAR 52.211-10)

1.1.1 Start Work

Evidence that the Contractor has started procurement of materials, preparation and submission of shop drawings, preparation of subcontracts, and other preparatory work will satisfy the requirement that work commence within ten (10) calendar days after receipt of Notice to Proceed. Therefore, work need not be commenced at the construction site within ten (10) calendar days.

1.1.2 Site Visit

Shall be coordinated through VA Contracting and Engineering.

1.2 LIQUIDATED DAMAGES-CONSTRUCTION (SEPT 2000)

(a) Liquidated damages for this Task Order are \$800 for each calendar day of delay until the work is completed or accepted.

(See the Basic SCPIDT for full text.)

1.3 As-Builts

As-Builts are not required for this project. Section 01 78 39.00 24 As-Builts (from the basic SCPIDT) does not apply to this project.

1.4 State Taxes

Contractors are reminded to review what is required for State Taxes as referenced in the original contract under Section 00 21 00.

1.5 Site Information/Site Restrictions

1.5.1 Site Restrictions

All site activities (Lead Base Paint testing, KTR visits, etc.) at the

Paint Exterior of Water Tower at VA Medical Center, Sioux Falls, SD

Sioux Falls Medical Center are to be coordinated directly through Travis Maas and Todd Mergen.

1.5.2 Antennas

The VA will coordinate and schedule the State Radio Antennas and cables to be removed from the tower 7 days prior to the Contractor's start date. The antenna brackets will remain on the tower. Once the Water Tower coating is completed no welding will be allowed when installing other antennas or equipment as it will damage the effectiveness of the coating.

1.5.3 Containment

See Section 09 97 13.27 for Containment System Requirements and scaffolding.

1.5.4 Safety Lighting

Safety lights, located on the top of the tower, are to remain and stay operational at all times for airline safety.

1.5.5 Date Restrictions

See Section 09 97 13.27 for temperature restrictions for application of paint/coatings.

1.6 GENERAL INTENTION

A. 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.

B. 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.

C. 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 the Contracting Officer.
2. Submit training records of all such employees for approval before the start of work.

1.7 CONSTRUCTION SECURITY REQUIREMENTS

A. Security Plan:

1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
2. The General Contractor is responsible for assuring that all subcontractors working on the project and their employees also comply with these regulations.

B. Security Procedures:

1. General Contractor's employees shall not enter the project site

- without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
2. For working outside the "regular hours" as defined in the contract, The General Contractor shall give 3 days notice to the Contracting 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.

1.8 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.

D. Working space and space available for storing materials shall be as shown on the drawings.

E. Workmen are subject to rules of Medical Center applicable to their conduct.

F. Execute work so as to interfere as little as possible with normal functioning of Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by Project Engineer where required by limited working space.

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

G. Phasing: To insure such executions, Contractor shall furnish the Project

Paint Exterior of Water Tower at VA Medical Center, Sioux Falls, SD

Engineer with a schedule of approximate dates on which the Contractor intends to accomplish work in each specific area of site, building or portion thereof.

H. Construction Fence will be required.

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 Project 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.
2. Contractor shall submit a request to interrupt any such services to Project 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.
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 Project Engineer.
5. In case of a contract construction emergency, service will be interrupted on approval of Project 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. 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.
2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the Project Engineer.

K. Coordinate the work for this contract with other construction operations as directed by Project Engineer.

1.9 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.

B. The Contractor, at Contractor's expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of electricity used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

C. Heat: The Contractor is responsible for providing any heat that may be needed during construction.

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

1. Obtain electricity by connecting to the Medical Center electrical distribution system. The Contractor shall meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Electricity for all other uses is available at no cost to the Contractor.

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

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

1.10 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 (three 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 personnel 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 Project Engineer and shall be considered concluded only when the Project Engineer is satisfied in regard to complete and thorough coverage.

1.11 HISTORIC PRESERVATION

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

PART 2 NOT USED

PART 3 NOT USED

-- End of Section -

SECTION 01 11 00

SUMMARY OF WORK

03/11

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1.1.1 Summary

This contract is specifically intended to rehab facilities as explained herein. A summary description of the project is provided below:

This current Veterans Administration (VA) project shall consist of cleaning/sandblasting and painting of the exterior surfaces of a 100,000 gallon (nominal) Sioux Falls VA Water Tower. Existing coating system is lead-based paint and/or primer requiring appropriate removal and abatement. The interior of this tank was recently rehabilitated under separate contract which included coating removal and replacement. Other work included under that contract included structural repairs and miscellaneous tank revisions to bring it into compliance with OSHA climbing and access and other sanitary improvements to protect water quality and bring it into current State of South Dakota compliance.

The condition of the existing tower (prior to the recent contract mentioned above) is depicted by the photographs contained in Attachment A to this specification section. Numerous abandon communication cable and brackets are on the tower and shall be removed under this contract. Metro Communications has several antennas and association cabling attached to the existing tower. The majority of these components will be removed by others prior to commencement of the field rehabilitation activities. Metro Communication's Existing support structures (larger building, exterior cable rack, and cables) located beneath the tower will remain on-site and need to be protected from all contractor activities. Metro will be constructing a temporary structure around the building and providing outside air for the AC units. The cable rack and cables will not be protected by Metro and shall be protected by the contractor. The contractor shall work with Metro and the supporting emergency agencies to ensure that no emergency communication is lost during this project. Metro has coordinated with the City of Sioux Falls for the installation of an 80' power pole where the tower antennas can be temporary installed (Just south of Fence centered on Tower). Access to these buildings shall be maintained to the owners without requiring personal protective devices or interfering work activities of this contract. See IMAG01_Metro Comm 1.

Additional information regarding the condition of the tower is provided in the most recent inspection report of the tower contained in Attachment C to this specification section. This information contained in that report shall be used for information only purposes by the Contractor.

The existing tower was most recently recoated on the exterior in the 1980's. Recent sampling and analysis for the presence of lead-based primer or paint has been completed and is provided with this solicitation. The results of that sampling indicate the presence of hazardous metals, including lead and chromium among others. Lead abatement will be required as part of these services/construction.

The interior of the tank along with numerous other improvements have been completed in 2011.

Interior Water Tower Project - Summary of work completed in 2011:

"The FY 2011 project included an inspection and evaluation of the structural integrity of the existing 100,000 gallon water tower to ensure it is fit for service and suitable for renovation. An inspection report by MaGuire Iron and John Longnecker, PE, dated 3 May 2011, concluded the tower is structurally sound and "Fit-for Service".

In addition to the fit-for-service evaluation and report, the following renovation work was performed under the FY 2011 project: new inlet/outlet grate over opening at top of drum riser, new 24" diameter pressure-tight manway at base of drum riser, new 30"X30" manway at roof of tank, new 12" fail-safe vent with fan flange (serves as secondary manway also) at roof of tank, new OSHA compliant leg/shell/roof ladders with safety climb devices and ladder gate, new 4" overflow pipe with flap gate, new interior coating system complete, new impressed current cathodic protection (to be installed during FY 2012 exterior project), adjustment of tower X-bracing and riser stay rods, additional weep holes in floor of balcony, misc concrete foundation repairs, new 4" no-freeze drain valve with fire hose connection at base of drum riser, new lightning protection system, and new FAA tower obstruction lighting system."

Other improvements in the immediate area: Concrete Steam Tunnel just north of tower, Watermain valves replaced, Underground Fuel tank and pipeline installation just north and east of tower.

The close proximity of the existing tower to existing facilities will require the use of a containment enclosure/curtain to prevent migration of dust and debris generated by surface preparation and to prevent paint drift during recoating activities. These provisions shall be included as part of the cost for performing the Basic Bid services.

1.1.2 Location

The Sioux Falls VA Water Tower is located on the Veterans Administration Hospital campus in Sioux Falls, South Dakota. The campus is west of South Western Avenue, between West 22nd Street and West 26th Street. The Tower is located at the southwest corner of the campus, east of the Boiler Plant building. A Site Plan is attached as Attachment B to this specification section.

1.1.3 Work Requirements

The work under this contract shall include, but not be limited to:

Basic Bid:

- a. The Contractor shall complete the necessary documents and obtain and pay all applicable fees for all permits and reviews necessary for construction and lead-based paint/primer abatement. All permits for construction shall be requested of and approved by the appropriate regulatory agencies prior to the issuance of the Notice to Proceed with construction activities by the Government.

- b. Fence: Remove all chain link fence, posts, and concrete footings around the water tower site and replace with new per specification (32 31 13 Chain Link Fence and Gates). Concrete post footings shall have forms for the top 12". Grading and shaping shall be incidental to installing new fence and rock. Disturbed area shall be graded for positive drainage. All distributed areas shall be hydroseeded and mulched. All grass inside the water tower fence area shall be removed and replaced with landscaping fabric and 2"-3" typical river bottom landscaping rock. Area under the tower shall be graded to drain. Rock shall extend 18" past the outside of the chain link fence and shall include concrete mower curb edging (no color added). Placed continuously with jointing. Edging shall be approved by COTR 14 days prior to installation.
- c. Gates: Contactor shall install a gate on the south side that allows for a 20' opening (Swing Type). Install a 42" (opening dimension) personnel gate on North side just east of NW water tower leg. Contractor shall verify all gate locations with the COTR.
- d. Erection of a full containment structure/curtain to completely enclose the tank during sanding blasting and painting operations and removal following completion of the work. Containment system shall be suitable for lead abatement activities and to prevent drift of blasting debris and any paint overspray. Requirements for lead abatement services are specified in SECTION 02 83 13.00 20 LEAD IN CONSTRUCTION.
- e. Complete removal of existing exterior tank coating system in accordance with SECTION 09 97 13.27 EXTERIOR COATING OF STEEL STRUCTURES and compliance with lead and other hazardous materials abatement requirements.
- f. Application of a new exterior tank coating system in accordance with SECTION 09 97 13.27 EXTERIOR COATING OF STEEL STRUCTURES. The interior coating shall be refurbished to existing conditions when any exterior welding or construction damages the interior coating.
- g. Exterior painting shall include providing the Veterans Administration logo VA) to match existing size, new font style (see link below), blue color and in locations as currently provided on the existing tower. Proposed logo design and color chip shall be submitted for approval prior to application.
http://vaww.ush.va.gov/excellence/templates/VHA_Style_Guide_508.pdf

Alternate No 1:

- a. Delete the 4" access pavement inside the tower fence area shown on EXHIBIT A.

Alternate No. 2:

- a. Delete the 8" access pavement shown on EXHIBIT A. Replace the concrete curbing with contractor grade plastic edging. Sample shall be submitted to COTR prior to installation for approval.

1.2 NOT USED

1.3 ENVIRONMENTAL RESPONSIBILITIES/PERMIT REQUIREMENTS

The Contractor shall be responsible for obtaining and following all necessary environmental permits for testing, construction, painting, and containment as indicated in Section ENVIRONMENTAL PROTECTION.

The Contractor shall obtain permit approval for the testing, construction, painting, and containment prior to the starting work.

The work anticipated by this contract does not require the submission of professional engineering plans and specifications for approval to the State of South Dakota Department of Environment and Natural Resources. However, the Contractor shall be responsible for submitting any other permit application that may be deemed applicable in performance of this work.

The Department of Veterans Affairs shall also be provided with copies of any reports or documents for their review. The point of contact for submittals documents shall be the following:

Attn: Todd Mergen
Energy Manager
VA Medical Center
2501 W. 22nd Street, Bldg. 17
Sioux Falls, SD 57117
Office: (605) 333-6817
todd.mergen@va.gov

The Contractor shall consider and take appropriate measures during the construction activities period to avoid degradation of the environment due to byproducts or wastes generated as a result of the activities performed. Disposal of wastes or waste streams created by this contract shall be the responsibility of the Contractor.

1.4 PROJECT GUIDANCE AND REGULATIONS

The work shall be conducted in an environmentally-acceptable manner conforming to existing Federal, State, and local regulations, and all other applicable current guidance/regulations. If any conflicts occur between the various guidance and criteria documents, the Contractor shall be responsible for presenting these issues in writing (in a timely manner) to the Contracting Officer for resolution. The Contractor shall also provide written recommendations for resolution of the conflicts.

1.5 SITE VISIT/MEETINGS/PROGRESS COORDINATION

1.5.1 Post Award Site Visits

When necessary, the Contractor shall make site visits during the exercise of this work as required. The Contractor shall contact the Contracting Officer and the Department of Veterans Affairs one week prior to the site visit.

1.5.2 Meetings

Comment Resolution Meetings shall be held in the form of telephone conference calls for the followings requirements:

- a. Quality Control Summary Report review comments
- b. Biweekly Progress Meetings, if necessary

Participants should include the VA-PM and technical staff, the Contractor PM and technical staff. These meetings should also include representatives from the Department of Veterans Affairs if deemed necessary.

1.5.3 Review of Progress and Technical Adequacy

The contract detailed review procedures for developing and submitting all documents shall be in accordance with Section 01 11 00 SUMMARY OF WORK. At appropriate times, representatives of USACE-Omaha may review the progress and technical adequacy of the work requirements. Such review shall not relieve the Contractor from performing all contract requirements, except as may be waived by written instruction from the Contracting Officer.

1.5.4 Progress and Coordination

Meetings, teleconferences or other appropriate communication methods shall be scheduled as deemed necessary or requested to discuss system operation and/or results and Contractor recommendations. The Contractor shall ensure that all necessary personnel engaged in this work are available for this purpose. The Contractor shall be responsible for preparation of agendas and meeting minutes. Meeting minutes shall be furnished to all participant parties within two (2) working days following the meeting.

1.6 SUBMITTAL REQUIREMENTS

All submittal information required for the Water Tower Rehab including, but not limited to; coating systems and any additional equipment information as required by all the sections in this package. Submittal information shall be in accordance with Section SUBMITTAL PROCEDURES.

1.7 SITE SAFETY AND HEALTH PLAN

The Contractor shall prepare and submit a Site Safety and Health plan to be approved by USACE with site-specific details as discussed in the General Health and Safety Scope of Work Requirements, See Section 01 35 26 Government Safety Requirements (See Basic SCPIDT Contract), Section 09 97 13.27, Section 09 97 13.16 and SAFETY AND HEALTH REQUIREMENTS MANUAL EM 385-1-1 dated 15 September 2008. The approved plan shall be made available to all the Contractor's personnel on-site. The Contractor shall ensure that all subcontractors and USACE-Omaha approved visitors follow the requirements specified in the Site Safety and Health plan.

1.8 SPECIAL CONSIDERATIONS

1.8.1 General

All materials gathered and developed in the performance of the work listed in this contract shall be the property of the USACE-Omaha and shall not be used, distributed, or published by the Contractor without specific permission from the Contracting Officer.

1.8.2 Hazardous Substances

The Contractor shall report any spill of oil or hazardous substance to the Contracting Officer within one hour, and shall take every reasonable precaution to prevent the spillage of oil or other hazardous substance. The

Contractor shall also be responsible for taking prompt and prudent action to minimize the impact of any such spill if one were to occur.

1.8.3 Quality Assurance/Quality Control

Quality Assurance/Quality Control shall be conducted in accordance with Section USACE QUALITY CONTROL (See Basic SCPIDT Contract). All Quality Assurance/Quality Control problems in the field or in the laboratory shall be reported to the Contracting Officer as soon as possible. This notification will normally be expected to occur within 48 hours.

1.8.4 Contact with Regulatory Agencies

All contacts with Federal and/or State regulatory agencies or the Department of Veterans Affairs shall be coordinated with the Contracting Officer.

1.8.5 Public Affairs

The Contractor shall not make available to the news media or publicly disclose any data generated in the performance of this work. When approached by the news media, the Contractor shall refer them to the USACE Public Affairs Office for response.

1.9 TECHNICAL REQUIREMENTS

1.9.1 General

Additional specific technical requirements applicable to this work are listed below.

1.10 QUALIFICATIONS

1.10.1 Experience

The entity responsible for the coatings removal and application shall submit as a minimum of ten (10) similar projects over \$100,000 in the last five (5) years. Information submitted shall include: tank size, epoxy materials, surface prep, hazards (Lead if present). Provide points of Contact i.e., names, addresses and phone numbers for (5) five of the above 10 projects that could be used to validate a satisfactory rating concerning time, budget and quality or provide a letter of recommendation from said references.

1.11 CONTRACT CONCEPT DRAWINGS

Photographs, "as-built" drawings, tank inspection report and site plan information is provided in Attachments A, B, C and D of this specification section for the existing Sioux Falls VA Water Tower. These attachments are included for use in developing the proposal as appropriate. Any additional site surveys or fieldwork necessary to validate as-built conditions shall be provided by the Contractor as required for development of this project.

1.12 NOT USED

1.13 LEAD-BASED PAINT/PRIMER ABATEMENT

Sampling conducted by the Government has confirmed the presence of hazardous materials in the existing tank coating systems (exterior). Results of that

testing are provided herein for Contractor reference. It shall be assumed by the Contractor that appropriate lead-based paint/primer abatement is required to execute this work. Requirements for conducting lead abatement services are specified in SECTION 02 83 13.00 20 LEAD IN CONSTRUCTION.

1.14 NOT USED

1.15 NOT USED

1.16 NOT USED

1.17 WORK SCHEDULING

The work hours for this project will be daylight hours Monday through Friday or will abide by local ordinances and regulations, whichever is stricter. Coordination with the VA, county, city, highway department and other effected entities will be the responsibility of the Contractor.

1.18 PROJECT ENVIRONMENTAL GOALS

Contractor shall distribute copies of the Environmental Goals to each subcontractor and the Contracting Officer. The overall goal for construction and operation is to produce a building that meets the functional program needs and incorporates the principles of sustainability. Specifically:

- a. Preserve and restore the site ecosystem and biodiversity; avoid site degradation and erosion. Minimize offsite environmental impact.
- b. Use the minimum amount of energy, water, and materials.
- c. Use environmentally preferable products and decrease toxicity level of materials used.
- d. Use renewable energy and material resources.
- e. Optimize operational performance (through commissioning efforts) in order to ensure energy efficient equipment operates as intended. Consider the durability, maintainability, and flexibility of building systems.
- f. Manage construction site and storage of materials to ensure no negative impact on the indoor environmental quality of the building.
- g. Reduce construction waste through reuse, recycling, and supplier take-back.

1.19 OCCUPANCY OF PREMISES

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

1.20 EXISTING WORK

Paint Exterior of Water Tower at VA Medical Center, Sioux Falls, SD

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

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

1.21 NOT USED

1.22 GOALS AND OBJECTIVES

1.22.1 Codes

All applicable building codes and life safety codes shall be met or exceeded. Applicable codes are listed in each section.

1.22.2 Durability

Materials and equipment will be chosen for their durability and minimum or nonexistent maintenance.

PART 2 PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

2.1.1 Standard Products

All equipment and materials utilized in this project shall be the standard product of a manufacturer regularly engaged in the manufacture of the products and shall essentially duplicate items that have in satisfactory use in 2-years prior to bid opening unless otherwise identified. Painting materials and equipment shall be supported by a service organization that is, in the opinion of the Contracting officer, reasonably convenient to the site. All such materials and equipment shall be of high quality and workmanship, designed and suited for the intended purpose, and shall comply with all applicable construction and work safety standards.

PART 3 EXECUTION

3.1 INSPECTION/PRE-CONSTRUCTION PHASE

The Contractor shall provide all inspection/pre-construction phase services following receipt of a partial notice to proceed from the Government.

3.2 REQUEST TO COMMENCE DRAINING AND ACCESS TO TOWER AND HANDLING OF LIQUID WASTE

The Contractor shall provide a written request to the Government, a minimum of 15 working days prior to commencement of inspection or construction activities that require draining and/or full interior access to the elevated water storage tank. The VA will draw down the contents of the tank to the

extent possible by water use from the tank, with the remainder drained by drain down provisions constructed on the existing tank.

3.3 MINIMIZING IMPACT TO VETERANS ADMINISTRATION, WEATHER CONSIDERATIONS AND COMMUNICATION EQUIPMENT REMOVAL NOTIFICATION

The intent of this work is to minimize disruption of service of the tower to the Veterans Administration and its infrastructure. Therefore the Contractor shall only commence repairs, construction and coating activities during a period of time when weather conditions will allow minimally interrupted execution of this work and provide for suitable working conditions as required by the technical requirements of the coating system specified herein.

3.4 EXISTING COMMUNICATION BUILDINGS

There are two (2) existing small buildings located beneath the footprint of the existing water tower. These two (2) buildings are referred to as "Sharing Partners". Although communication antennas associated with these facilities will be removed prior to rehabilitation activities on the water tower, the Metro Communication building must remain operational. As a result, the Contractor shall coordinate with the users and owners of such building. It shall be the responsibility of the building owner to maintain their structures as they need. The VA shall not be responsible for any disruption to the Sharing Partner's capabilities or have any financial responsibility to protect those facilities.

It has been discussed that the larger building owned and maintained by Metro Communications (Matt Tooley) will remain in place and function with temporary antennas on the VA property adjacent to the water tower. The smaller building under the tower owned and maintained by RACOM (Nick Loney) would be removed before construction begins.

3.5 INSTALLATION

The Contractor shall complete all painting and installations in accordance with the written instructions of the manufacturer, under the direct supervision of the manufacturer's representative and as specified herein under this contract package.

-- End of Section --

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SECTION 02 83 13.00 20

LEAD IN CONSTRUCTION

04/06

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z88.2 (1992) Respiratory Protection

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

29 CFR 1926.103	Respiratory Protection
29 CFR 1926.21	Safety Training and Education
29 CFR 1926.33	Access to Employee Exposure and Medical Records
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Lead
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

40 CFR 268	Land Disposal Restrictions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 178	Specifications for Packagings

UNDERWRITERS LABORATORIES (UL)

UL 586	(2009) Standard for High-Efficiency Particulate, Air Filter Units
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1.2 DEFINITIONS

1.2.1 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8 hour period.

Review analytical information for existing paint systems provided with this solicitation to determine any additional appropriate chemicals requiring establishment of action levels. Existing paint contains a number of metals, including lead and chromium VI.

1.2.2 Area Sampling

Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations but is not collected in the breathing zone of personnel (approximately 5 to 6 feet above the floor).

1.2.3 Competent Person (CP)

As used in this section, refers to a person employed by the Contractor who is trained in the recognition and control of lead hazards in accordance with current federal, State, and local regulations and has the authority to take prompt corrective actions to control the lead hazard. A Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene or a Certified Safety Professional (CSP) certified by the Board of Certified Safety Professionals is the best choice.

1.2.4 Contaminated Room

Refers to a room for removal of contaminated personal protective equipment (PPE).

1.2.5 Decontamination Shower Facility

That facility that encompasses a clean clothing storage room, and a contaminated clothing storage and disposal rooms, with a shower facility in between.

1.2.6 High Efficiency Particulate Arrestor (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated particulate. A high efficiency particulate filter demonstrates at least 99.97 percent efficiency against 0.3 micron or larger size particles.

1.2.7 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps. Excludes other forms of organic lead compounds.

1.2.8 Lead Control Area

A system of control methods to prevent the spread of lead dust, paint chips or debris to adjacent areas that may include temporary containment, floor or ground cover protection, physical boundaries, and warning signs to prevent unauthorized entry of personnel. HEPA filtered local exhaust equipment may be used as engineering controls to further reduce personnel exposures or building/outdoor environmental contamination.

1.2.9 Lead Permissible Exposure Limit (PEL)

Fifty micrograms per cubic meter of air as an 8 hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than eight hours in a work day, the PEL shall be determined by the following formula:

$$\text{PEL (micrograms/cubic meter of air)} = 400/\text{No. hrs worked per day}$$

1.2.10 Material Containing Lead/Paint with Lead (MCL/PWL)

Any material, including paint, which contains lead as determined by the testing laboratory using a valid test method. The requirements of this section does not apply if no detectable levels of lead are found using a quantitative method for analyzing paint or MCL using laboratory instruments with specified limits of detection (usually 0.01%). An X-Ray Fluorescence (XRF) instrument is not considered a valid test method.

1.2.11 Personal Sampling

Sampling of airborne lead concentrations within the breathing zone of an employee to determine the 8 hour time weighted average concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employees' work tasks.

Based on review of analytical information for existing paint systems provided with this solicitation and appropriate health and safety regulations, personal sampling for additional chemicals such as chromium VI, may be appropriate.

1.2.12 Physical Boundary

Area physically roped or partitioned off around lead control area to limit unauthorized entry of personnel.

1.3 DESCRIPTION

1.3.1 Description of Work

Construction activities impacting PWL or material containing lead which are covered by this specification include the removal of material containing lead, chromium and other metals located on the interior and exterior of the water tower tank, on the tank supports, and all appurtenances with painted surfaces.

1.3.2 Coordination with Other Work

The contractor shall coordinate with work being performed in adjacent areas. Coordination procedures shall be explained in the Plan and shall describe how the Contractor will prevent lead exposure to other contractors and/or Government personnel performing work unrelated to lead activities.

1.4 SUBMITTALS

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

SD-01 Preconstruction Submittals

Lead Compliance Plan including CP approval (signature, date, and certification number); G Competent Person qualifications; G Training Certification of workers and supervisors; G lead waste management plan; G written evidence that TSD is approved for lead disposal; G Certification of Medical Examinations; G Copy of current fit test for each worker wearing a respirator; G

SD-06 Test Reports

Occupational and Environmental Assessment Data Report; G

SD-07 Certificates

Testing laboratory qualifications; G
Occupant Notification; G
Clearance Certification; G

SD-11 Closeout Submittals

Completed and signed hazardous waste manifest from treatment or disposal facility; G

1.5 QUALITY ASSURANCE

1.5.1 Qualifications

1.5.1.1 Competent Person (CP)

Submit name, address, and telephone number of the CP selected to

perform responsibilities specified in paragraph entitled "Competent Person (CP) Responsibilities." Provide documented construction project-related experience with implementation of OSHA's Lead in Construction standard (29 CFR 1926.62) which shows ability to assess occupational and environmental exposure to lead, experience with the use of respirators, personal protective equipment and other exposure reduction methods to protect employee health. Submit proper documentation that the CP is trained in accordance with applicable federal, State and local laws.

1.5.1.2 Training Certification

Submit a certificate for each worker and supervisor, signed and dated by the accredited training provider, stating that the employee has received the required lead training specified in 29 CFR 1926.62

1.5.1.3 Testing Laboratory

Submit the name, address, and telephone number of the testing laboratory selected to perform the air analysis, testing, and reporting of airborne concentrations of lead and other metals. Use a laboratory participating in the EPA National Lead Laboratory Accreditation Program (NLLAP) by being accredited by either the American Association for Laboratory Accreditation (A2LA) or the American Industrial Hygiene Association (AIHA) and that is successfully participating in the Environmental Lead Proficiency Analytical Testing (ELPAT) program to perform sample analysis. Laboratories selected to perform blood lead analysis shall be OSHA approved.

1.5.2 Requirements

1.5.2.1 Competent Person (CP) Responsibilities

- a. Verify training meets all federal, State, and local requirements.
- b. Review and approve Lead Compliance Plan for conformance to the applicable referenced standards.
- c. Continuously inspect PWL or MCL work for conformance with the approved plan.
- d. Perform (or oversee performance of) air sampling. Recommend upgrades or downgrades (whichever is appropriate based on exposure) on the use of PPE (respirators included) and engineering controls.
- e. Ensure work is performed in strict accordance with specifications at all times.
- f. Control work to prevent hazardous exposure to human beings and to the environment at all times.
- g. Supervise final cleaning of the lead control area, take clearance wipe samples if necessary; review clearance sample results and make recommendations for further cleaning.
- h. Certify the conditions of the work as called for elsewhere in this specification.

1.5.2.2 Lead Compliance Plan

Submit a detailed job-specific plan of the work procedures to be used in the disturbance of PWL or MCL. The plan shall include a sketch showing the location, size, and details of lead control areas, containment systems, physical boundaries, location and details of decontamination facilities, viewing ports, and mechanical ventilation system. Include a description of equipment and materials, work practices, controls and job responsibilities for each activity from which lead is emitted. Include in the plan, eating, drinking, smoking, hygiene facilities and sanitary procedures, interface of trades, sequencing of lead related work, collected waste water and dust containing lead and debris, air sampling, respirators, personal protective equipment, and a detailed description of the method of containment of the operation to ensure that lead is not released outside of the lead control area. Include site preparation, cleanup and clearance procedures. Include occupational and environmental sampling, training and strategy, sampling and analysis strategy and methodology, frequency of sampling, duration of sampling, and qualifications of sampling personnel in the air sampling portion of the plan. Include a description of arrangements made among contractors on multicontractor worksites to inform affected employees and to clarify responsibilities to control exposures. The Accident Prevention Plan (APP) shall include a Fall Protection Plan and Scaffolding Plan (if scaffolding is used) complying with Sections 21 and 22 of EM 385-1-1.

Where occupied buildings are in close proximity, the plan shall also include an occupant protection program that describes the measures that will be taken during the work to notify and protect the building occupants.

1.5.2.3 Occupational and Environmental Assessment Data Report

If initial monitoring is necessary, submit occupational and environmental sampling results to the Contracting Officer within three working days of collection, signed by the testing laboratory employee performing the analysis, the employee that performed the sampling, and the CP.

Review analytical information for existing paint systems provided with this solicitation and ensure that occupational monitoring complies with EM 385-1-1 and 29 CFR 1926 Subpart Z Toxic and Hazardous Substances requirements regarding monitoring for employee exposures to hazardous substances.

- a. The initial monitoring shall represent each job classification, or if working conditions are similar to previous jobs by the same employer, provide previously collected exposure data that can be used to estimate worker exposures per 29 CFR 1926.62. The data shall represent the worker's regular daily exposure to lead for stated work.
- b. Submit worker exposure data gathered during the task based trigger operations of 29 CFR 1926.62 with a complete process description. This includes manual demolition, manual scraping, manual sanding, heat gun, power tool cleaning, rivet busting, cleanup of dry expendable abrasives, abrasive blast enclosure removal, abrasive blasting, welding, cutting and torch burning where lead containing coatings are present.
- c. The initial assessment shall determine the requirement for

further monitoring and the need to fully implement the control and protective requirements including the lead compliance plan per 29 CFR 1926.62.

- d. Submit results of all project worker air sampling and environmental air sampling.
- e. Submit results of baseline and post-removal soil samples.
- f. Submit results of waste sampling for disposal.
- g. Submit Final Cleanup certification for review and approval.

1.5.2.4 Medical Examinations

Initial medical surveillance as required by 29 CFR 1926.62 shall be made available to all employees exposed to lead at any time (1 day) above the action level. Full medical surveillance shall be made available to all employees on an annual basis who are or may be exposed to lead in excess of the action level for more than 30 days a year or as required by 29 CFR 1926.62. Adequate records shall show that employees meet the medical surveillance requirements of 29 CFR 1926.33, 29 CFR 1926.62 and 29 CFR 1926.103. Provide medical surveillance to all personnel exposed to lead as indicated in 29 CFR 1926.62. Maintain complete and accurate medical records of employees for the duration of employment plus 30 years.

1.5.2.5 Training

Train each employee performing work that disturbs lead, who performs MCL/PWL disposal, and air sampling operations prior to the time of initial job assignment and annually thereafter, in accordance with 29 CFR 1926.21, 29 CFR 1926.62, and State and local regulations where appropriate.

1.5.2.6 Respiratory Protection Program

- a. Provide each employee required to wear a respirator a respirator fit test at the time of initial fitting and at least annually thereafter as required by 29 CFR 1926.62.
- b. Establish and implement a respiratory protection program as required by ANSI Z88.2, 29 CFR 1926.103, 29 CFR 1926.62, and 29 CFR 1926.55.

1.5.2.7 Hazard Communication Program

Establish and implement a Hazard Communication Program as required by 29 CFR 1926.59.

1.5.2.8 Lead Waste Management

The Lead Waste Management Plan shall comply with applicable requirements of federal, State, and local hazardous waste regulations. and address:

- a. Identification and classification of wastes associated with the work.
- b. Estimated quantities of wastes to be generated and disposed of.

- c. Names and qualifications of each contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location and operator and a 24-hour point of contact. Furnish two copies of USEPA, State, and local (if applicable) hazardous waste permits and USEPA Identification numbers.
- d. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.
- e. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.
- f. Spill prevention, containment, and cleanup contingency measures including a health and safety plan to be implemented in accordance with 29 CFR 1926.65.
- g. Work plan and schedule for waste containment, removal and disposal. Proper containment of the waste includes using acceptable waste containers (e.g., 55-gallon drums) as well as proper marking/labeling of the containers. Wastes shall be cleaned up and containerized daily.
- h. Include any process that may alter or treat waste rendering a hazardous waste non hazardous.
- i. Unit cost for hazardous waste disposal according to this plan.

1.5.2.9 Environmental, Safety and Health Compliance

In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, State, and local authorities regarding lead and other hazardous substances. Comply with the applicable requirements of the current issue of 29 CFR 1926.62. Submit matters regarding interpretation of standards to the Contracting Officer for resolution before starting work. Where specification requirements and the referenced documents vary, the most stringent requirement shall apply. The following laws, ordinances, criteria, rules and regulations regarding removing, handling, storing, transporting, and disposing of lead-contaminated materials apply:

- a. Administrative Rules of South Dakota, Department of Environmental and Natural Resources, Article 74
- b. South Dakota Codified Law Chapter 34-A, Environmental Protection

1.5.3 Pre-Construction Conference

Along with the CP, meet with the Contracting Officer to discuss in detail the Lead Waste Management Plan and the Lead Compliance Plan, including procedures and precautions for the work.

1.6 EQUIPMENT

1.6.1 Respirators

Furnish appropriate respirators approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services, for use in atmospheres containing lead dust, fume and mist. Respirators shall comply with the requirements of 29 CFR 1926.62.

1.6.2 Special Protective Clothing

Furnish personnel who will be exposed to lead-contaminated dust with proper disposable protective whole body clothing, head covering, gloves, eye, and foot coverings as required by 29 CFR 1926.62. Furnish proper disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining approval from the CP and COR.

1.6.3 Rental Equipment Notification

If rental equipment is to be used during PWL or MCL handling and disposal, notify the rental agency in writing concerning the intended use of the equipment.

1.6.4 Vacuum Filters

UL 586 labeled HEPA filters.

1.6.5 Equipment for Government Personnel

Furnish the Contracting Officer with two complete sets of personal protective equipment (PPE) daily, as required herein, for entry into and inspection of the lead removal work within the lead controlled area. Personal protective equipment shall include disposable whole body covering, including appropriate foot, head, eye, and hand protection. PPE shall remain the property of the Contractor. The Government will provide respiratory protection for the Contracting Officer.

1.7 PROJECT/SITE CONDITIONS

1.7.1 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better as determined by the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Protection

3.1.1.1 Notification

- a. Notify the Contracting Officer 20 days prior to the start of any lead work.
- b. Occupant Notification

Submit occupant written acknowledgment of the delivery of lead hazard information prior to commencing the renovation work.

3.1.1.2 Lead Control Area

Paint Exterior of Water Tower at VA Medical Center, Sioux Falls, SD

- a. Physical Boundary - Provide physical boundaries around the lead control area by roping off the area designated in the work plan and providing appropriate containment to ensure that lead will not escape outside of the lead control area.
- b. Warning Signs - Provide warning signs at approaches to lead control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

3.1.1.3 Decontamination Shower Facility

Provide clean and contaminated change rooms and shower facilities in accordance with this specification and 29 CFR 1926.62.

3.1.1.4 Eye Wash Station

Where eyes may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes shall be provided within the work area.

3.1.1.5 Mechanical Ventilation System

- a. To the extent feasible, use local exhaust ventilation or other collection systems, approved by the CP. Local exhaust ventilation systems shall be evaluated and maintained in accordance with 29 CFR 1926.62.
- b. Vent local exhaust away from nearby building ventilation intakes and ensure system is connected to HEPA filters.
- c. Use locally exhausted, power actuated tools or manual hand tools where applicable for the task.

3.1.1.6 Personnel Protection

Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking or application of cosmetics is not permitted in the lead control area. No one will be permitted in the lead control area unless they have been appropriately trained and provided with protective equipment.

3.2 ERECTION

3.2.1 Lead Control Area Requirements

Establish a lead control area by completely establishing barriers and physical boundaries around the area or structure where PWL or MCL removal operations will be performed.

Full containment - Contain removal operations by the use of a containment system with decontamination facilities for the lead control area. Ensure that airborne lead and dust is kept within the containment system. For containment areas larger than 1,000 square feet install a minimum of two 18 inch square viewing ports. Locate ports to provide a view of the required work from the exterior of the enclosed contaminated area.

3.3 APPLICATION

3.3.1 Lead Work

Perform lead work in accordance with approved Lead Compliance Plan. The Lead Compliance Plan shall also include all health and safety protocols for prevention of occupational exposures and environmental contamination from all hazardous substances present in the existing paint systems. Use procedures and equipment required to limit occupational exposure and environmental contamination with lead when the work is performed in accordance with 29 CFR 1926.62 and as specified herein. Dispose of all PWL or MCL and associated waste in compliance with federal, State, and local requirements.

3.3.2 Paint with Lead or Material Containing Lead Removal

Provide methodology for removing lead in the Lead Compliance Plan. Select lead removal processes to prevent contamination of work areas outside the control area with lead-contaminated dust or other lead-contaminated debris or waste and to ensure that unprotected personnel are not exposed to hazardous concentrations of lead. Describe this removal process for each area (interior tank, exterior tank, tank supports) in the Lead Compliance Plan. Describe means of access to each work area and equipment staging procedures for each area. In addition, describe means of collecting lead dust and waste for each area. Describe means of protecting and providing protected access to building at the base of the water tower.

3.3.2.1 Paint with Lead or Material Containing Lead - Outdoor Removal

Perform outdoor removal as indicated in federal, State, and local regulations and in the Lead Compliance Plan. The worksite preparation (barriers or containments) shall be job dependent and presented in the Lead Compliance Plan.

3.3.3 Personnel Exiting Procedures

Whenever personnel exit the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any clothing or equipment worn in the control area:

- a. Vacuum all clothing before entering the contaminated change room.
- b. Remove protective clothing in the contaminated change room, and place them in an approved impermeable disposal bag.
- c. Shower.
- d. Wash hands and face at the site, don appropriate disposable or uncontaminated reusable clothing, move to an appropriate shower facility, shower.
- e. Change to clean clothes prior to leaving the clean clothes storage area.

3.4 FIELD QUALITY CONTROL

3.4.1 Tests

3.4.1.1 Air Sampling

Paint Exterior of Water Tower at VA Medical Center, Sioux Falls, SD

Conduct sampling for lead and other hazardous substances as appropriate in accordance with 29 CFR 1926.62 and as specified herein. Air sampling shall be directed or performed by the CP.

- a. The CP shall be on the job site directing the air sampling and inspecting the PWL or MCL removal work to ensure that the requirements of the contract have been satisfied during the entire PWL or MCL operation.
- b. Collect personal air samples on employees who are anticipated to have the greatest risk of exposure as determined by the CP. In addition, collect air samples on at least twenty-five percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.
- c. Submit results of air samples, signed by the CP, within 72 hours after the air samples are taken.
- d. Conduct area air sampling daily, on each shift in which lead-based paint removal operations are performed, in areas immediately adjacent to the lead control area. Sufficient area monitoring shall be conducted to ensure unprotected personnel are not exposed at or above 30 micrograms per cubic meter of air. If 30 micrograms per cubic meter of air is reached or exceeded, stop work, correct the condition(s) causing the increased levels. Notify the Contracting Officer immediately. Determine if condition(s) require any further change in work methods. Removal work shall resume only after the CP and the Contracting Officer give approval.
- e. Before any work begins, collect and analyze baseline soil samples in accordance with methods defined by federal, State, and local standards inside and outside of the physical boundary to assess the degree of contamination underneath and surrounding the tank prior to lead disturbance or removal.

3.4.1.2 Sampling Before and After Removal

Prior to conducting external paint removal operations, conduct soil sampling if bare soil is present to determine the lead content parts per million for soil. After the visual inspection, conduct soil sampling if bare soil is present during external removal operations to determine the lead content parts per million (ppm) for soil. Provide test results to Contracting Officer for review and approval.

3.4.1.3 Testing of Material Containing Lead Residue

Test waste in accordance with 40 CFR 261 for hazardous waste. Ensure that hazardous waste sampling and testing includes appropriate analytical testing for all chemicals likely to be present in the waste. Provide results to Contracting Officer for review and approval.

3.5 CLEANING AND DISPOSAL

3.5.1 Cleanup

Maintain surfaces of the lead control area free of accumulations of dust and debris. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use pressurized air to clean up the area. At the end of each shift and when

the lead operation has been completed, clean the controlled area of visible contamination by vacuuming with a HEPA filtered vacuum cleaner, wet mopping the area and/or wet wiping the area as indicated by the Lead Compliance Plan. Reclean areas showing dust or debris. After visible dust and debris is removed, wet wipe and HEPA vacuum all surfaces in the controlled area. If adjacent areas become contaminated at any time during the work, clean and visually inspect all contaminated areas. The CP shall then certify in writing that the area has been cleaned of lead contamination before Contracting Officer inspection.

3.5.1.1 Final Cleanup

The CP shall certify in writing that air samples collected outside the lead control area during paint removal operations are less than 30 micrograms per cubic meter of air; the respiratory protection used for the employees was adequate; the work procedures were performed in accordance with 29 CFR 1926.62; and that there were no visible accumulations of material and dust containing lead left in the work site. Do not remove the lead control area or roped off boundary and warning signs prior to the Contracting Officer's acknowledgement of receipt of the CP certification.

For exterior work, soil samples taken at the exterior of the work site shall be used to determine if soil lead levels had increased at a statistically significant level (significant at the 95 percent confidence limit) from the soil lead levels prior to the operation. If soil lead levels either show a statistically significant increase above soil lead levels prior to work or soil lead levels above any applicable federal or state standard for lead in soil, the soil shall be remediated.

3.5.2 Disposal

- a. All material, whether hazardous or non-hazardous shall be disposed in accordance with all laws and provisions and all federal, State or local regulations. Ensure all waste is properly characterized. The result of each waste characterization (TCLP for RCRA materials) will dictate disposal requirements.
- b. Contractor is responsible for segregation of waste. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and lead-contaminated clothing that may produce airborne concentrations of lead particles. Label the containers in accordance with 29 CFR 1926.62 and 40 CFR 261.
- c. Dispose of lead-contaminated material classified as hazardous waste at an EPA or State approved hazardous waste treatment, storage, or disposal facility off Government property.
- d. Store waste materials in U.S. Department of Transportation (49 CFR 178) approved 55 gallon drums. Properly label each drum to identify the type of waste (49 CFR 172) and the date the drum was filled. For hazardous waste, the collection drum requires marking/labeling in accordance with 40 CFR 262 during the accumulation/collection timeframe. The Contracting Officer or an authorized representative will assign an area for interim storage of waste-containing drums. Do not store hazardous waste drums in interim storage longer than 90 calendar days from the date affixed

to each drum.

- e. Handle, store, transport, and dispose lead or lead-contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

3.5.2.1 Disposal Documentation

Submit written evidence to demonstrate the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead disposal by the EPA, State or local regulatory agencies. Submit one copy of the completed hazardous waste manifest, signed and dated by the initial transporter in accordance with 40 CFR 262. Contractor shall provide a certificate that the waste was accepted by the disposal facility.

3.5.2.2 Payment for Hazardous Waste

Payment for disposal of hazardous and non-hazardous waste will not be made until a signed copy of the manifest from the treatment or disposal facility certifying the amount of lead-containing materials or non-hazardous waste delivered is returned and a copy is furnished to the Government.

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EXTERIOR COATING OF STEEL STRUCTURES

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PART 1 GENERAL

The Tank requires coating all exterior steel surfaces for the nominal 100,000 gallon elevated storage tank. Item to be coated are the exterior stand pipe, exterior steel appurtances, steel supports, metal support bracing, ladders, railings and manway access. Also coat any steel supports (communication) that have been welded to the tank.

Do not coat any stainless, galvanized and aluminum surfaces. Verify all communication cables have been removed from the struction. The tank exterior is considered contaminated for bidding purposes. See Coating Test sample results for Lead, Chromium, Barium, and Arsenic. Contractor is responsible for environmental testing for Health and Safety purposes. Contractor must be QP 1 and 2 certified with 6 references concerning coating with Epoxies in the last three years.

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C 920	(2008) Standard Specification for Elastomeric Joint Sealants
ASTM D 1200	(1994; R 2005) Viscosity by Ford Viscosity Cup
ASTM D 3276	(2007) Painting Inspectors (Metal Substrates)
ASTM D 3925	(2002) Sampling Liquid Paints and Related Pigmented Coatings
ASTM D 4285	(1983; R 2006) Indicating Oil or Water in Compressed Air
ASTM D 7127	(2005) Measurement of Surface Roughness of Abrasive Blast Cleaned Metal Surfaces using a Portable Stylus Instrument

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 9001	(2008; R 2008; Cor 1 2009) Quality Management Systems- Requirements
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THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC AB 2	(1996; E 2004) Cleanliness of Recycled
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Ferrous Metallic Abrasive

SSPC AB 3	(2003; E 2004) Ferrous Metallic Abrasive
SSPC Guide 12	(1998; E 2004) Guide for Illumination of Industrial Painting Projects
SSPC Guide 6	(2004) Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations
SSPC PA 1	(2000; E 2004) Shop, Field, and Maintenance Painting of Steel
SSPC PA 2	(2004) Measurement of Dry Coating Thickness With Magnetic Gages
SSPC QP 1	(1998; E 2004) Standard Procedure for Evaluating Painting Contractors (Field Application to Complex Industrial Structures)
SSPC QP 5	(1999; E 2004) Standard Procedure for Evaluating the Qualifications of Coating and Lining Inspection Companies
SSPC QS 1	(2004) Standard Procedure for Evaluating a Contractor's Advanced Quality Management System
SSPC SP 1	(1982; E 2004) Solvent Cleaning
SSPC SP 10	(2007) Near-White Blast Cleaning
SSPC SP 7/NACE No.4	(2007) Brush-Off Blast Cleaning
SSPC SP COM	(2004) Surface Preparation Commentary for Steel and Concrete Substrates
SSPC VIS 1	(2002) Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008) Safety and Health Requirements Manual
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U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-A-22262	(1996; Rev B; Am 2) Abrasive Blasting Media Ship Hull Blast Cleaning
MIL-DTL-24441	(2009; Rev D) Paint, Epoxy-Polyamide, General Specification for
MIL-DTL-24441/19	(2009; Rev C) Paint, Epoxy-Polyamide, Zinc Primer, Formula 159, Type III

MIL-DTL-24441/31 (2009; Rev B) Paint, Epoxy-Polyamide,
White, Formula 152, Type IV

MIL-PRF-85285 (2009; Rev D; Am 3) Coating: Polyurethane
Aircraft and Support Equipment

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FED-STD-595 (Rev C) Colors Used in Government
Procurement

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

29 CFR 1910-SUBPART Z Toxic and Hazardous Substances

29 CFR 1910.1000 Air Contaminants

29 CFR 1910.134 Respiratory Protection

29 CFR 1926.59 Hazard Communication

1.2 DEFINITIONS

Definitions are provided throughout this Section, generally in the paragraph where used, and denoted by capital letters.

1.3 SUBMITTALS

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

SD-05, Design Data

Containment System; G-DO-GA

SD-06 Test Reports

Joint Sealant Qualification Test Reports; G-RO

Coatings Qualification Test Reports; G-RO

Metallic Abrasive Qualification Test Reports; G-DO-GA

Coating Sample Test Reports; G-DO-GA

Abrasive Sample Test Reports; G-DO-GA

Inspection Report Forms; G-RO

Daily Inspection Reports; G-RO

Recycled Metallic Abrasive Field Test Reports (Daily and Weekly);
G-RO

SD-07 Certificates

Contract Errors, Omissions, and Other Discrepancies; G-RO

Corrective Action Procedures; G-RO

Coating Work Plan and Safety Plan; G-DO-GA

Qualifications of Certified Industrial Hygienist (CIH); G-RO

Qualifications Of Individuals Performing Abrasive Blasting; G-RO

Qualifications of Certified Protective Coatings Specialist (PCS); G-DO-GA

Qualifications of Coating Inspection Company; G-DO-GA

Qualifications of QC Specialist Coating Inspector; G-RO

Qualifications of Testing Laboratory for Coatings; G-RO

Qualifications of Testing Laboratory for Abrasive; G-RO

Qualifications of Coating Contractors; G-DO-GA

Joint Sealant Materials; G-DO-GA

Coating Materials; G-DO-GA

Coating System Component Compatibility; G-DO-GA

Non-metallic Abrasive; G-RO

Metallic Abrasive; G-RO

SD-08 Manufacturer's Instructions

Joint Sealant Instructions; G-RO

Coating System Instructions; G-RO

SD-11 Closeout Submittals

Disposal of Used Abrasive; G-RO

Inspection Logbook; G-RO,

1.4 QUALITY ASSURANCE

1.4.1 Contract Errors, Omissions, and Other Discrepancies; G-RO,

Submit all errors, omissions, and other discrepancies in contract documents the Contracting Officer within 30 days of contract award for all work covered in this Section, other than the work that will not be uncovered until a later date. All such discrepancies shall be addressed and resolved, and the Coating Work Plan modified, prior to beginning the Initial and Follow-Up phases of work. Discrepancies that become apparent only after work is uncovered shall be identified at the earliest discoverable time and submitted for resolution. Schedule time (Float) should be built into the project schedule at those points where old work is

to be uncovered or where access is not available during the first 30 days after award, to allow for resolution of contract discrepancies.

1.4.2 Corrective Action (CA)

CA shall be included in the Quality Control Plan.

1.4.2.1 Corrective Action Procedures

Develop procedures for determining the root cause of each non-compliance, developing a plan to eliminate the root cause so that the non-compliance does not recur, and following up to ensure that the root cause was eliminated. Develop Corrective Action Request (CAR) forms for initiating CA, and for tracking and documenting each step.

1.4.2.2 Implement Corrective Action

The Contractor shall take action to identify and eliminate the root cause of each non-compliance so as to prevent recurrence. These procedures shall apply to non-compliance in the work, and to non-compliance in the QC System. Corrective actions shall be appropriate to the effects of the non-compliance encountered. Each CAR shall be serialized, tracked in a Log to completion and acceptance by the Contracting Officer, and retained in project records. The Corrective Action Log, showing status of each CAR, shall be submitted to the Contracting Officer monthly. A CAR may be initiated by either the Contractor or the Contracting Officer. The Contracting Officer must approve each CAR at the root cause identification stage, the plan for elimination stage, and the close out stage after verification that the root cause has been eliminated.

1.4.3 Coating Work Plan

This work plan shall be considered as part of the Quality Control Plan.

Provide procedures for reviewing contract documents immediately after award to identify errors, omissions, and discrepancies so that any such issues can be resolved prior to project planning and development of detailed procedures.

Provide procedures for verification of key processes during Initial Phase to ensure that contract requirements can be met. Key processes shall include surface preparation, coating application and curing, inspection, and documentation, and any other process that might adversely impact orderly progression of work.

Provide procedures for all phases of coating operations, including planned work, rework, repair, inspection, and documentation. Address mobilization and setup, surface preparation, coating application, coating initial cure, tracking and correction of noncompliant work, and demobilization. Coordinate work processes with health and safety plans and confined space entry plans. For each process, provide procedures that include appropriate work instructions, material and equipment requirements, personnel qualifications, controls, and process verification procedures. Provide procedures for inspecting work to verify and document compliance with contract requirements, including inspection forms and checklists, and acceptance and rejection criteria.

Provide procedures for determining the existing surface profile under paint, and procedures for ensuring that the profile is not increased beyond

the maximum profile specified herein.

Provide procedures for correcting noncompliant work. Detailed procedures are required in advance to avoid delays in meeting overcoat windows as well as to avoid delays in production. Provide procedures for repairing defects in the coating film, such as runs, drips, sags, holidays, overspray, as well as how to handle correct coating thickness noncompliance, any other areas of repair or rework that might be adversely affected by delays in preparing and approving new procedures.

If a procedure is based on a proposed or approved request for deviation, the deviation shall be referenced. Changes to procedures shall be noted by submittal number and date approved, clearly delineating old requirements and new requirements, so that the records provide a continuous log of requirements and procedures.

Health and Safety Plan. Include provisions of EM 385-1-1 (2008), Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS and 02 83 13.00 20 LEAD IN CONSTRUCTION, Confined Space, Lock out Tag Out, Respiratory Protection, Fall protection, PPE, crane safety, Activity Hazard Analysis and other Safety requirements.

1.4.4 Design Data

1.4.4.1 Containment System

Submit complete design drawings and calculations for the scaffolding and containment system, including an analysis of the loads which will be added to the structure by the containment system and waste materials. A registered engineer shall approve calculations and scaffold system design. The Containment shall be Class 2, flexible framing, fully sealed joints, fully sealed entryways, negative air, vapor barrier with negative pressure system. Filtration of air is required for a Lead and other contaminants Paint removal operations. Also Note building at base of tower requires access during coating work. So a separate access to this building is required without the need for the occupants to be suited up in protective clothing/respiratory protection.

1.4.5 Test Reports

1.4.5.1 Joint Sealant Qualification Test Reports

Submit test results from independent laboratory of representative samples of joint sealant material. Samples must have been tested within the last three years. Submit results as required in paragraph QUALITY ASSURANCE PROVISIONS of ASTM C 920. Note that testing in accordance with QUALITY ASSURANCE PROVISIONS is a pre-qualification requirement.

1.4.5.2 Coatings Qualification Test Reports

Submit test results from independent laboratory of representative samples of each coating material. U.S. Department of Defense laboratories are considered to be independent laboratories for purposes of compliance with "QUALIFICATION INSPECTION" requirements herein. Samples must have been tested within the last three years. Submit results for epoxy materials as required in paragraph QUALIFICATION INSPECTION of MIL-DTL-24441, and as revised by paragraph COATING SYSTEM herein. Submit results for polyurethane materials as required in paragraph QUALIFICATION INSPECTION of

MIL-PRF-85285, and as revised by paragraph COATING SYSTEM herein. Note that requirement for QUALIFICATION INSPECTION is a pre-qualification requirement, and involves the same testing required for listing in the Qualified Products List of the respective material. See appropriate Military Specification for specific test requirements.

1.4.5.3 Metallic Abrasive Qualification Test Reports

Submit results for abrasive as required in paragraph 4 REQUIREMENTS of SSPC AB 3. Submit test results from independent laboratory of representative samples of each abrasive to be used on the jobsite. Samples must have been tested within the last three years. Note that this testing is for the purpose of prequalifying the abrasive.

1.4.5.4 Recycled Metallic Abrasive Field Test Reports (Daily and Weekly)

Submit test results from independent laboratory of daily and weekly Quality Control testing required by SSPC AB 2, as modified in paragraph ABRASIVE.

1.4.6 Qualifications

1.4.6.1 Qualifications of Certified Industrial Hygienist (CIH)

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party CIH. Submit documentation that hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification. Provide evidence of experience with hazards involved in industrial coating application work.

1.4.6.2 Qualifications of Certified Protective Coatings Specialist (PCS)

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party PCS. Submit documentation that specialist is certified by SSPC: The Society for Protective Coatings (SSPC) as a PCS, including certification number and date of certification/recertification. If the PCS is employed by the same coating inspection company to which the coating inspector is employed, this does not violate the independent third-party requirements. The PCS shall remain certified during the entire project, and the Contracting Officer shall be notified of any change in certification status within 10 days of the change. The PCS shall not be the designated coating inspector.

1.4.6.3 Qualifications of Coating Inspection Company

Submit documentation that the coating inspection company that will be performing all coating inspection functions is certified by SSPC to the requirements of SSPC QP 5 or NACE Certified Level 2, and shall remain certified while accomplishing any coating inspection functions. The coating inspection company must remain so certified for the duration of the project. If a coating inspection company's certification expires, the firm will not be allowed to perform any inspection functions, and all surface preparation and coating application work must stop, until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. Notify the Contracting Officer of any change in coating inspection company certification status.

1.4.6.4 Qualifications of QC Specialist Coating Inspector

Inspecting

Submit documentation that each coating inspector is employed, and qualified to SSPC QP 5, Level III or NACE Level 2 Certified, by the selected coating inspection company. Each inspector shall remain employed by the coating inspection company while performing any coating inspection functions.

1.4.6.5 Qualifications Of Individuals ~~Performing~~ Abrasive Blasting

Submit name, address, and telephone number of each person that will be performing abrasive blasting. ~~Submit documentation that each blaster is qualified by SSPC to the SSPC C 7 Dry Abrasive Blaster Qualification Program and SSPC QP 2 Certified.. Each blaster shall remain qualified during the entire period of abrasive blasting, and the Contracting Officer shall be notified of any change in qualification status.~~

Qualified NACE
person shall
inspect blasting

1.4.6.6 Qualifications of Testing Laboratory for Coatings

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party laboratory selected to perform testing of coating samples for compliance with specification requirements. Submit documentation that laboratory is regularly engaged in testing of paint samples for conformance with specifications, and that persons performing analyses are qualified.

1.4.6.7 Qualifications of Testing Laboratory for Abrasive

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party laboratory selected to perform testing of abrasive for compliance with specification requirements. Submit documentation that laboratory has experience in testing samples of abrasive for conformance with specifications, and that persons performing analyses are qualified.

2

1.4.6.8 Qualifications of Coating Contractors

All Contractors and Subcontractors that perform surface preparation or coating application shall be ~~certified to either ISO 9001 or SSPC QP 1 and SSPC QS 1 or NACE CIP LEVEL 1~~ prior to contract award, and shall remain certified while accomplishing any surface preparation or coating application. The painting Contractors and painting Subcontractors must remain so certified for the duration of the project. If a Contractor's or Subcontractor's certification expires, the firm will not be allowed to perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. Notify the Contracting Officer of any change in Contractor certification status. In addition to the above certifications the Sub-Contractor or Contractor that is conducting surface prep and coating operations shall submit the Experience listed in paragraph 1.10.1 in Section 01 11 00 Scope of Work.

or

1.4.6.9 Joint Sealant Materials

Provide manufacturer's certification of conformance to contract requirements.

1.4.6.10 Coating Materials

Provide manufacturer's certification of conformance to contract requirements.

1.4.6.11 Coating System Component Compatibility

Provide certification from each manufacturer of components of the coating system, epoxy primer, epoxy intermediate, and polyurethane topcoat, that the supplied coating material is suitable for use in the specified coating system. Each manufacturer shall identify the specific products, including manufacturer's name, which their product may be used with. The certification shall provide the name of the manufacturer that will provide technical support for the entire system. When all coating materials are manufactured by one manufacturer, this certification is not required.

1.4.6.12 Non-metallic Abrasive

Provide manufacturer's certification that the materials are currently approved by the Naval Sea Systems Command and listed on the Qualified Products Lists (QPL) for the specified materials.

1.4.6.13 Metallic Abrasive

Provide manufacturer's certification of conformance to contract requirements and provide copies of test results.

1.4.7 Protective Coating Specialist (PCS)

The PCS shall be considered a QC Specialist and shall report to the QC Manager, as specified in Section 01 45 00.00 10 01 45 00.00 20 01 45 00.00 40 QUALITY CONTROL. The PCS shall approve all submittals prior to submission to the QC Manager for approval or submission to the government for approval.

1.4.8 Pre-Application Meeting

After approval of submittals but prior to the initiation of coating work, Contractor representatives, including at a minimum, project superintendent and QC manager, paint foreman, coating inspector, and PCS shall have a pre-application coating preparatory meeting. This meeting shall be in addition to the pre-construction conference. Specific items addressed shall include: corrective action requirements and procedures, coating work plan, safety plan, coordination with other Sections, inspection standards, inspection requirements and tools, test procedures, environmental control system, safety plan, and test logs. Notify Contracting Officer at least ten days prior to meeting.

1.5 PRODUCT DATA

1.5.1 Joint Sealant Instructions

Submit manufacturer's printed instructions including detailed application procedures, minimum and maximum application temperatures, and curing procedures. Include materials safety data sheets (MSDS) for materials to be used at the job site in accordance with 29 CFR 1926.59.

1.5.2 Coating System Instructions

Submit manufacturer's printed instructions including detailed mixing and application procedures, number and types of coats required, minimum and maximum application temperatures, and curing procedures. Include materials safety data sheets (MSDS) for materials to be used at the job site in accordance with 29 CFR 1926.59.

1.6 DELIVERY AND STORAGE

Ship, store, and handle materials in accordance with SSPC PA 1, and as modified in this Section. Maintain temperature in storage spaces between 40 and 85 degrees F, and air temperature more than 5 degrees F above the dew-point at all times. Inspect materials for damage prior to use and return non-compliant materials to manufacturer. Remove materials with expired shelf life from government property immediately and notify the Contracting Officer.

If materials are approaching shelf life expiration and an extension is desired, samples may be sent to the manufacturer, along with complete records of storage conditions, with a request for shelf life extension. If the manufacturer finds the samples and storage data suitable for shelf life extension, the manufacturer may issue an extension, referencing the product evaluation and the review of storage records. Products may not be extended longer than allowed in the product specification.

1.7 COATING HAZARDS

Ensure that employees are trained in all aspects of the safety plan. Specified coatings may have potential health hazards if ingested or improperly handled. The coating manufacturer's written safety precautions shall be followed throughout mixing, application, and curing of the coatings. During all cleaning, cleanup, surface preparation, and paint application phases, ensure that employees are protected from toxic and hazardous chemical agents which exceed concentrations in 29 CFR 1910.1000. Comply with respiratory protection requirements in 29 CFR 1910.134. The CIH shall approve work procedures and personal protective equipment.

1.8 JOB SITE REFERENCES

Make available to the Contracting Officer at least one copy each of ASTM D 3276, ASTM D 3925, ASTM D 4285, ASTM D 7127, SSPC SP COM, SSPC SP 1, SSPC SP 7/NACE No.4, SSPC SP 10, SSPC PA 1, SSPC PA 2, SSPC Guide 6, SSPC VIS 1, SSPC QP 1, SSPC QS 1, EM 385-1-1 and an SSPC Certified Contractor Evaluation Form at the job site.

PART 2 PRODUCTS

2.1 JOINT SEALANT

TT-S-00230, Type II, Class B

2.2 COATING SYSTEM

Alternate systems or products will not be considered. All primer, intermediate coat and topcoat materials shall be supplied by one supplier. The entire coating system is intended to be applied in the field.

The Military specification epoxy and polyurethane products specified in

this Section do not require approval for listing on the QPL prior to contract award, as indicated in paragraph 3.2 of MIL-DTL-24441 and paragraph 3.1 of MIL-PRF-85285. Testing of products by an independent laboratory to the QUALIFICATION INSPECTION requirements of MIL-DTL-24441 and MIL-PRF-85285 prior to contract award is required. See specific submittal requirements in paragraph QUALITY ASSURANCE.

2.2.1 Zinc-Rich Epoxy Primer Coat

Epoxy polyamide, MIL-DTL-24441/19 (Formula 159, Type III).

2.2.2 Epoxy Intermediate Coat

Epoxy polyamide, MIL-DTL-24441/31 (Formula 152, Type IV, White (Tinted)). Tint to approximately FED-STD-595 color number 27778 parchment using pigment dispersions prepared for epoxy paint tinting. Manufacturer shall tint material and appropriately label. All other requirements of this Military Specification apply.

2.2.3 Polyurethane Topcoat

Polyurethane coating topcoat of MIL-PRF-85285, Type II, shall be B-4 PMS280 (VA Standard) and submitted to the Government for Approval. The VA STANDARD White and Blue with a VA STANDARD FORMAT "FONT".

Modify paragraph 3.6.4 of MIL-PRF-85285, Viscosity and Pot Life, as follows:

The viscosity of the admixed coating, when tested in accordance with ASTM D 1200 through a No. 4 Ford cup, shall be as follows:

Time from mix (minimum)	Maximum time through a No. 4 Ford cup
Initially	30 seconds
2 hours	60 seconds
4 hours	No gel

Modify paragraph 3.7.1 of MIL-PRF-85285, Drying Time, as follows:

When applied by spray techniques and when tested in accordance with ASTM D 1640, the coating shall be set-to-touch within four hours and dry-hard within eight hours (see 4.6 and table I).

2.3 COATING SAMPLE COLLECTION AND SHIPPING KIT

Provide a kit that contains one quart can for the base of each coating material, an appropriately sized can for each activator, dipping cups for each component to be sampled, a shipping box sized for the samples to be shipped, and packing material. Mark cans for the appropriate component. Provide shipping documents, including either pre-paid shipping or a shipper number that can be used by the QC Manager to arrange pickup, addressed to the approved coating testing laboratory.

2.4 ABRASIVE SAMPLE COLLECTION AND SHIPPING KIT

Provide a kit that contains one suitable plastic bag or container for each sample to be collected. Mark containers for the appropriate component. Provide shipping documents, including either pre-paid shipping or a shipper number that can be used by the QC Manager to arrange pickup, addressed to the approved coating testing laboratory.

2.5 TEST KITS

2.5.1 Test Kit for Measuring Chloride, Sulfate and Nitrate Ions on Steel and Coated Surfaces

Provide test kits called CHLOR*TEST CSN Salts, as manufactured by CHLOR*RID International Inc. of Chandler, Arizona (www.chlor-rid.com) or equal. An "equal" test kit shall meet the following requirements:

- a. Kit contains all materials, supplies, tools and instructions for field testing and on-site quantitative evaluation of chloride, sulfate and nitrate ions;
- b. Kit extract solution is acidic, factory pre-measured, pre-packaged, and of uniform concentration;
- c. Kit components and solutions are mercury free and environmentally friendly;
- d. Kit contains new materials and solutions for each test extraction;
- e. Extraction test container (vessel, sleeve, cell. etc.) creates a sealed, encapsulated environment during salt ion extraction;
- f. Test extract container is suitable for testing the following steel surfaces: horizontal (up/down configuration), vertical, flat, curved, smooth, pitted, and rough;
- g. All salt ion concentrations are directly measured in micrograms per square centimeter.

2.5.2 Test Kit for Identifying Amine Blush on Epoxy Surfaces

After coating and/or primer has hardened and prior to applying the next coat, test for unreacted amines using the AMINE BLUSH CHECK, manufactured by Elcometer, Rochester Hills, Michigan, or equal. To be considered for approval as an "equal" test kit it shall meet the following requirements:

- a. Be a completely self-contained field test kit with all materials, supplies, tools and instructions to perform tests and indicate the presence of unreacted amines;
- b. Use an identifiable, consistent, uniform, pre-packaged, factory pre-measured indicating solution;
- c. Kit contains no mercury or lead and is environmentally friendly;
- d. Kit contains a solution of an unreacted amine for the purpose of "self checking" the indicator solution;

2.6 ABRASIVE

The referenced abrasive specifications have maximum limits for soluble salts contamination, however, this maximum level of contamination does not guarantee that contamination will not be transferred to the steel surface during abrasive blasting. Other factors such as on-site handling and recycling can allow contamination of abrasive. Contractors are cautioned to verify that the chosen abrasive, along with work and storage processes,

allow the final surface cleanliness requirements to be achieved. Successful testing of chlorides in abrasive does not negate the final acceptance testing of steel surfaces.

Interpret MIL-A-22262 to include the meaning that abrasive material contains a maximum one percent by weight of any toxic substance listed in either Table Z-1, Z-2, or Z-3 or 29 CFR 1910-SUBPART Z, with the exception of inert or nuisance dust materials, arsenic, beryllium, cadmium, cobalt, lead, mercury, rhodium, silver, tellurium, thallium, and uranium.

2.6.1 Non-metallic Abrasive

Conform to MIL-A-22262, Type I (Inorganic materials) except that the gross gamma radioactivity shall not exceed 5 picocuries per gram. Abrasive shall be approved by the Naval Sea Systems Command and listed on the appropriate Qualified Products List (QPL) for the specified materials. Use sampling procedures and testing frequencies as prescribed in MIL-A-22262. Use abrasive that is specifically selected and graded to provide a sharp, angular profile to the specified depth. Do not use ungraded abrasive. Make adjustments to processes or abrasive gradation to achieve specified surface profile. Recycled non-metallic abrasive shall meet all requirements of the specification each time that it is placed in the blast pot.

2.6.2 Metallic Abrasive

2.6.2.1 New and Remanufactured Steel Grit

Conform to the chemical and physical properties of SSPC AB 3 Class 1 (Steel) only, except that the gross gamma radioactivity shall not exceed 5 picocuries per gram. Class 2 (Iron) abrasive shall not be used.

To develop a suitable work mix from new steel abrasive, a minimum of 200 - 400 recycles is required, therefore, it is advantageous for a Contractor to use remanufactured steel grit or grit reclaimed from a previous project. Such grit shall be considered to conform if it can be traced to new grit conforming to SSPC AB 3 Class 1 and it meets all cleanliness requirements of SSPC AB 3 Class 1 when brought to the current jobsite. Submit one representative sample of this work mix to the laboratory for testing, along with samples of new material. Acceptance and use of this work mix shall not be used to justify any deviation from surface preparation requirements.

2.6.2.2 Recycled Steel Grit

Conform to the chemical and physical properties of SSPC AB 2

2.7 White Aluminum Oxide Non-skid Grit

Size #60, dust free (washed and dry), minimum 99 percent pure, having the following sieve analysis when tested in accordance with ASTM E 11 using a 2.2 poundsample:

<u>Sieve #</u>	<u>Percent Retained</u>
40	0
50	15-40
60	60-85

PART 3 EXECUTION

Perform all work, rework, and repair in accordance with approved procedures in the Coating Work Plan.

3.1 REMOVAL OF COATINGS CONTAINING HAZARDOUS MATERIALS

Coatings containing hazardous materials and identified for disturbance during surface preparation, including removal, shall be handled in accordance with Section 02 82 33.13 20 REMOVAL/CONTROL AND DISPOSAL OF PAINT WITH LEAD. Coordinate surface preparation requirements from Section 02 82 33.13 20 REMOVAL/CONTROL AND DISPOSAL OF PAINT WITH LEAD with this Section.

3.2 COATING AND ABRASIVE SAMPLE COLLECTION AND TESTING

Sample and test materials delivered to the jobsite. Notify Contracting Officer three days in advance of sampling. The QC Manager and either the PCS or coating inspector shall witness all sampling.

3.2.1 Coating Sample Collection

Provide a sample collection kit as required in paragraph COATING SAMPLE COLLECTION AND SHIPPING KIT. From each lot, obtain a one quart sample of each base material, and proportional samples of each activator based on mix ratio, by random selection from sealed containers in accordance with ASTM D 3925. Prior to sampling, mix contents of each sealed container to ensure uniformity. As an alternative to collecting small samples from kits, entire kits may be randomly selected and shipped to laboratory, observing all requirements for witnessing and traceability. For purposes of quality conformance inspection, a lot is defined as that quantity of materials from a single, uniform batch produced and offered for delivery at one time. A batch is defined as that quantity of material processed by the manufacturer at one time and identified by number on the label. Identify samples by designated name, specification number, batch number, project contract number, sample date, intended use, and quantity involved. The QC manager will take possession of the packaged samples, contact the shipping company to arrange for pickup, and relinquish the samples only to the shipping representative for shipment to the approved laboratory for testing as required by the paragraph COATING SAMPLE TEST REPORTS.

3.2.2 Abrasive Sample Collection

Provide a sample collection kit as required in paragraph ABRASIVE SAMPLE COLLECTION AND SHIPPING KIT. For purposes of quality conformance inspection, a lot shall consist of all abrasive materials of the same type from a single, uniform batch produced and offered for delivery at one time. Obtain samples of each abrasive lot using the sampling techniques and schedule of MIL-A-22262. The addition of any substance to a batch shall constitute a new lot. Identify samples by designated name, specification number, lot number, project contract number, sample date, intended use, and quantity involved. The QC manager will take possession of the packaged samples, contact the shipping company to arrange for pickup, and relinquish the samples only to the shipping representative for shipment to the approved laboratory for testing as required by the paragraph ABRASIVE SAMPLE TEST REPORTS.

3.2.3 Coating Sample Test Reports

Submit test results for each lot of coating material delivered to the jobsite. Test samples of primer, intermediate, and topcoat materials for compliance with requirements of Table I. Reject entire lot represented by samples that fail one or more tests, select new lots, and test samples.

3.2.4 Abrasive Sample Test Reports

Submit test results for each lot of abrasive delivered to the jobsite. Test samples of metallic abrasive to the requirements of paragraph REQUIREMENTS of SSPC AB 3, except paragraph 4.1.5 DURABILITY. Test samples of non-metallic abrasive as required in paragraph QUALITY CONFORMANCE INSPECTION of MIL-A-22262. Reject entire lot represented by samples that fail one or more tests, select new lots, and test samples.

3.3 SURFACES TO BE COATED

Coat exterior surfaces of tank shell, legs, stair, railing, riser pipe, fill pipe and other exterior appurtenances.

3.4 LIGHTING

Provide lighting for all work areas as prescribed in SSPC Guide 12.

3.5 ENVIRONMENTAL CONDITIONS

3.5.1 Containment

Design and provide a containment system for the capture, containment, collection, storage and disposal of the waste materials generated by the work under this Section, to meet the requirements of SSPC Guide 6, Class 2. Vapor concentrations shall be kept at or below 10 percent of Lower Explosive Limit (LEL) at all times. Containment may be designed as fixed containment for complete structure or portable containment for sections of structure, however, containment shall remain in any one place from beginning of abrasive blasting through initial cure of coating. Waste materials covered by this paragraph shall not include any material or residue from removal of coatings containing lead, chromium, cadmium, PCB, or any other hazardous material.

It is the Contractors responsibility to insure the feasibility and workability of the containment system. The Contractor shall perform his operations and work schedule in a manner as to minimize leakage of the containment system. The containment system shall be properly maintained and shall not deviate from the approved drawings. If the containment system fails to function satisfactorily, the Contractor shall suspend all operations, except those required to minimize adverse impact on the environment or government property. Operations shall not resume until modifications have been made to correct the cause of the failure.

3.5.2 Automated Monitoring Requirements

Provide continuous monitoring of temperature, relative humidity, and dew point data at pertinent points on the structure, during surface preparation, coating application, and initial cure. Locate sensors to provide pertinent data for the surface preparation and coat application being performed. Monitor any heating, cooling, or dehumidification equipment used. Make data available to the Contracting Officer through

Internet access. Provide monitoring equipment to perform as follows:

- a. Data is collected in the field unit in one minute increments, and available for download (on-site) in a standard format. Contractor shall collect this data and make available to the Contracting Officer;
- b. Monitoring equipment shall have backup power such that data collection and transmission to web server will be uninterrupted during the entire period of the dehumidification requirement;
- c. Monitoring equipment shall have capability to measure surface temperatures at a minimum of four locations anywhere on a 150 foot diameter by 50 foot high tank;
- d. Monitoring equipment shall have capability to measure interior and exterior dry bulb temperature (DB), relative humidity (RH), and dewpoint temperature (DP);
- e. Data shall be available continuously through secure Internet connection, using widely available web browsers;
- f. Internet accessible data shall be collected and stored in maximum 15 minute increments, and lag time between data collection and online availability shall be no greater than 70 minutes;
- g. Internet accessible data shall be available for viewing online in tabular format, and graphical format using selected data;
- h. Internet accessible data shall be available for download in user-defined segments, or entire project to date, in a standard format usable by Microsoft Excel and other spreadsheet programs.
- i. Internet-based controls shall provide alerts to pre-designated parties through email messaging;
- j. Internet-based controls shall monitor data uploads from field unit and issue alert if data not initiated within 60 minutes of last upload;
- k. Internet-based controls shall monitor operation of DH equipment and issues alert when power remains off for more than 15 seconds, or if pre-determined temperature, RH, or DP conditions are exceeded;

The requirements listed here were developed around the Munters Exactaire Monitoring System, as this was the only monitoring system having Internet connectivity known to be commercially available. There is no requirement for connectivity of the monitoring system to control the DH equipment, therefore, any combination of equipment having the required functionality will be accepted.

3.6 SURFACE PREPARATION

3.6.1 Abrasive Blasting Equipment

Use abrasive blasting equipment of conventional air, force-feed, or pressure type. Maintain a minimum pressure of 95 psig at nozzle. Confirm that air supply for abrasive blasting is free of oil and moisture when tested in accordance with ASTM D 4285. Test air quality at each startup, but in no case less often than every five operating hours.

3.6.2 Operational Evaluation of Abrasive

Test abrasive for salt contamination and oil contamination as required by the appropriate abrasive specification daily at startup and every five operating hours thereafter.

3.6.3 Surface Standard

Inspect surfaces to be coated, and select plate with similar properties and surface characteristics for use as a surface standard. Blast clean one or more 1 foot square steel panels as specified in paragraph SURFACE PREPARATION. Record blast nozzle type and size, air pressure at nozzle and compressor, distance of nozzle from panel, and angle of blast to establish procedures for blast cleaning. Measure surface profile in accordance with ASTM D 7127. When the surface standard complies with all specified requirements, seal with a clearcoat protectant. Use the surface standard for comparison to abrasive blasted surfaces throughout the course of work.

3.6.4 Pre-Preparation Testing for Surface Contamination

Perform testing, abrasive blasting, and testing in the prescribed order.

3.6.4.1 Pre-Preparation Testing for Oil and Grease Contamination

Inspect all surfaces for oil and/or grease contamination using two or more of the following inspection techniques: 1) Visual inspection, 2) WATER BREAK TEST, 3) CLOTH RUB TEST. Reject oil and/or grease contaminated surfaces, clean using a water based pH neutral degreaser in accordance with SSPC SP 1, and recheck for contamination until surfaces are free of oil and grease.

WATER BREAK TEST - Spray atomized mist of distilled water onto surface, and observe for water beading. If water "wets" surface rather than beading up, surface can be considered free of oil or grease contamination. Beading of water (water forms droplets) is evidence of oil or grease contamination.

CLOTH RUB TEST - Rub a clean, white, lint free, cotton cloth onto surface and observe for discoloration. To confirm oil or grease contamination in lightly stained areas, a non-staining solvent may be used to aid in oil or grease extraction. Any visible discoloration is evidence of oil or grease contamination.

3.6.4.2 Pre-Preparation Testing for Soluble Salts Contamination

Test surfaces for soluble salts, and wash as required, prior to abrasive blasting. Soluble salt testing is also required in paragraph PRE-APPLICATION TESTING FOR SOLUBLE SALTS CONTAMINATION as a final acceptance test of prepared surfaces after abrasive blasting, and successful completion of this phase does not negate that requirement. This phase is recommended since pre-preparation testing and washing are generally more advantageous than attempting to remove soluble salt contamination after abrasive blasting. Effective removal of soluble salts will require removal of any barrier to the steel surface, including rust. This procedure may necessitate combinations of wet abrasive blasting, high pressure water rinsing, and cleaning using a solution of water washing and soluble salts remover. The soluble salts remover shall be acidic, biodegradable, nontoxic, noncorrosive, and after application, will not interfere with primer adhesion. Delays between testing and preparation, or testing and coating application, may allow for the formation of new

contamination. Use potable water, or potable water modified with soluble salt remover, for all washing or wet abrasive blasting. Test methods and equipment used in this phase are selected at the Contractor's discretion.

3.6.5 Abrasive Blasting

Abrasive blast steel surfaces to near-white metal in accordance with SSPC SP 10. Prepared surfaces shall conform to SSPC VIS 1 and shall match the prepared test-panels. Provide a 2 to 3 mil surface profile. Reject profile greater than 3 mils, discontinue abrasive blasting, and modify processes and materials to provide the specified profile. Measure surface profile in accordance with ASTM D 7127, using Rmax as the measure of profile height. Record all measurements required in this standard. Measure profile at rate of three test areas for the first 1000 square feet plus one test area for each additional 1000 square feet or part thereof. When surfaces are reblasted for any reason, retest profile as specified. Following abrasive blasting, remove dust and debris by vacuum cleaning. Do not attempt to wipe surface clean.

3.6.6 Disposal of Used Abrasive

Dispose of used abrasive off Government property in accordance with Federal, State, and Local mandated regulations.

3.6.7 Pre-Application Testing For Surface Contamination

3.6.7.1 Pre-Application Testing for Oil and Grease Contamination

Ensure surfaces are free of contamination as described in paragraph PRE-PREPARATION TESTING FOR OIL AND GREASE CONTAMINATION, except that only questionable areas need be checked for beading of water misted onto surface.

3.6.7.2 Pre-Application Testing for Soluble Salts Contamination

Test surfaces for chloride contamination using the Test Kit described in TEST KIT FOR MEASURING CHLORIDE, SULFATE AND NITRATE IONS ON STEEL AND COATED SURFACES. Test all surfaces at rate of three tests for the first 1000 square feet plus one test for each additional 2000 square feet or part thereof. Concentrate testing of bare steel at areas of coating failure to bare steel and areas of corrosion pitting. Perform 30 percent of tests on bare steel at plate splices (Rivets), divided equally between horizontal and vertical plate splices (Rivets). One or more readings greater than 3 micrograms per square centimeter of chlorides or 10 micrograms per square centimeter of sulfates or 5 micrograms per square centimeter of nitrates is evidence of soluble salt contamination. Reject contaminated surfaces, wash as discussed in paragraph PRE-PREPARATION TESTING FOR SOLUBLE SALTS CONTAMINATION, allow to dry, and re-test until all required tests show allowable results. Reblast tested and cleaned areas as required. Label all test tubes and retain for test verification.

3.6.7.3 Pre-Application Testing for Surface Cleanliness

Apply coatings to dust free surfaces. To test surfaces, apply strip of clear adhesive tape to surface and rub onto surface with finger. When removed, the tape should show little or no dust, blast abrasive, or other contaminant. Reject contaminated surfaces and retest. Test surfaces at rate of three tests for the first 1000 square feet plus one test for each additional 1000 square feet or part thereof. Provide two additional tests for each failed test or questionable test. Attach test tapes to Daily

Inspection Reports.

3.7 MIXING AND APPLICATION OF SEALANT AND COATING SYSTEM

3.7.1 Preparation of Sealant and Coating Materials for Application

Each of the sealant, primer, intermediate, and topcoat materials is a two-component material supplied in separate containers.

3.7.1.1 Mixing Sealant, Primer and Intermediate Coat Materials

Mix in accordance with manufacturer's instructions, which may differ for each product. Do not mix partial kits, or alter mix ratios. Mix materials in same temperature and humidity conditions specified in paragraph DELIVERY AND STORAGE. Allow mixed material to stand for the required induction time based on its temperature.

3.7.1.2 Mixing Topcoat Material

Do not mix partial kits, or alter mix ratios. Mix polyurethane coating materials in same temperature conditions specified in paragraph DELIVERY AND STORAGE. The polyurethane coating material is moisture sensitive and any introduction of moisture or water into the material during mixing or application will shorten usable pot life. Use a mixer that does not create a vortex. Do not add solvent without specific written recommendation from the manufacturer. No induction time is required, only thorough agitation of the mixed material.

3.7.1.3 Pot Life

Apply mixed products within stated pot life for each product. Stop applying when material becomes difficult to apply in a smooth, uniform wet film. Add all required solvent at time of mixing. Do not add solvent to extend pot life. Pot life is based on standard conditions at 70 degrees F and 50 percent relative humidity. For every 18 degrees F rise in temperature, pot life is reduced by approximately half, and for every 18 degrees F drop it is approximately doubled. Usable pot life depends on the temperature of the material at the time of mixing and the sustained temperature at the time of application. Other factors such as the shape of the container and volume of mixed material may also affect pot life. Precooling or exterior icing of components for at least 24 hours to a minimum of 50 degrees F in hot climates will extend pot life. High humidity at time of mixing and application shortens pot life of the Polyurethane topcoat material. Following are approximate pot life times:

Epoxy primer and intermediate materials	4 hoursy manufacturer
Polyurethane topcoat materials	2 hours.

3.7.1.4 Application Conditions and Recoat Windows

The application condition requirements for the coating system are very time and temperature sensitive, and are intended to avoid the delamination problems frequently found on industrial structures. Plan coating application to ensure that specified temperature, humidity, and condensation conditions are met. If conditions do not allow for orderly application of sealant, primer, stripe coat, intermediate coat and topcoat, use appropriate means of controlling air and surface temperatures, as required. Partial or total enclosures, insulation, heating or cooling, or other appropriate measures may be required to control conditions to allow

for orderly application of all required coats.

Maintain air and steel surface temperature between 60 and 100 degrees F during application and the first four hours of cure for epoxy coats and the first eight hours of cure for polyurethane coats. Maintain steel surface temperature more than 5 degrees F above the dew-point of the ambient air for the same period.

Use Table entitled "RECOAT WINDOWS" to determine appropriate recoat windows for each coat after the initial coat. Apply each coat during appropriate RECOAT WINDOW of preceding coat. If a RECOAT WINDOW is missed, the minimum and maximum primer and intermediate coat thickness may be adjusted to accommodate a FILL COAT, however, requirements for total epoxy coating thickness and total coating thickness will not be modified. Missing more than one RECOAT WINDOW may require complete removal of coating if maximum total coating thickness requirements cannot be achieved.

If coating is not applied during RECOAT WINDOW, or if surface temperature exceeds 120 degrees F between applications, provide GLOSS REMOVAL, apply next coat within 24 hours. If next planned coat is topcoat, apply FILL COAT if required to fill sanding marks. Sanding marks from GLOSS REMOVAL of intermediate coat reflecting through topcoat will be considered as noncompliant. Apply FILL COAT within 24 hours of GLOSS REMOVAL, then apply topcoat within RECOAT WINDOW of FILL COAT.

RECOAT WINDOWS

EPOXY OVER EPOXY

Temperature degrees F	60-70	71-80	81-90	91-100	101-110	111-120
RECOAT WINDOW (Hrs.)	24-72	18-60	16-48	12-36	8-18	4-6

POLYURETHANE OVER EPOXY

Temperature degrees F	60-70	71-80	81-90	91-100	101-110	111-120
RECOAT WINDOW (Hrs.)	24-96	24-72	16-48	12-36	10-24	8-16

POLYURETHANE OVER POLYURETHANE

Temperature degrees F	60-70	71-80	81-90	91-100	101-110	111-120
RECOAT WINDOW (Hrs.)	8-48	6-48	4-36	3-24	2-12	1-2

The temperature ranges shown in the table above are for determining recoat windows. Choose recoat window based on the highest surface temperature that was sustained for one or more hours between coats. This applies to the entire time between coats. Measure and record air and surface temperatures on hourly basis to determine appropriate recoat windows. If surface temperature goes above 100 degrees F, measure and record temperatures every half hour.

FILL COAT - Where indicated, apply coat of intermediate coat epoxy, at 2 to 3 mils DFT, then apply next specified full coat within recoat window of FILL COAT. A FILL COAT may be used to adjust coating thickness to comply

with requirements or to fill sanding marks in intermediate coat.

GLOSS REMOVAL - Where required, hand sand in a linear fashion to remove gloss using 120-200 grit wet/dry sandpaper, followed by solvent wiping with a clean rag soaked with denatured alcohol to remove all dust. GLOSS REMOVAL of primer coat is to scarify surface and shall consist of removal of approximately 1 mil of coating. If steel is exposed during GLOSS REMOVAL, repair in accordance with paragraph PROCEDURE FOR HOLIDAY AND SPOT REPAIRS OF NEWLY APPLIED COATING. GLOSS REMOVAL of intermediate coat may include removal of up to 3 mils of coating to avoid excess thickness, prior to application of FILL COAT.

3.7.2 Amine Blush Testing of Epoxy Coat Prior to Overcoating

Test epoxy surfaces prior to application of roof joint sealant, epoxy coat, or polyurethane topcoat for amine blush contamination using the Test Kit described in paragraph TEST KIT FOR IDENTIFYING AMINE BLUSH ON EPOXY SURFACES. Test all surfaces at rate of three tests for the first 1000 square feet plus one test for each additional 2000 square feet or part thereof. Remove any identified contamination using an approved procedure.

3.7.3 Application of Coating System and Joint Sealant

Apply coatings in accordance with SSPC PA 1 and as specified herein. Apply coatings to surfaces that meet all stated surface preparation requirements.

After application of primer coat and prior to application of each subsequent coat, perform testing prescribed in paragraph PRE-APPLICATION TESTING FOR SURFACE CONTAMINATION, as necessary, to ensure minimal intercoat contamination. This testing may be reduced to one half of the prescribed rate for bare steel if the testing indicates no contamination when sampling is evenly distributed over surfaces being tested. If contamination is found between coats, revert to the specified testing rate. Generally, oil and grease contamination and soluble salts contamination are not encountered if subsequent coats are applied within specified recoat windows and unusual atmospheric events do not occur. Such atmospheric events as a coastal storm blowing onshore can bring unusual chloride contamination. Concern for intercoat contamination should be continually prevalent, and spot testing should be accomplished to verify satisfactory conditions. Where visual examination or spot testing indicates contamination, perform sufficient testing to verify non-contamination, or to define extent of contamination for appropriate treatment.

Apply each coat in a consistent wet film, at 90 degrees to previous coat. Ensure that primer and intermediate coat "cold joints" are no less than six inches from welds. Apply stripe coat by brush. For convenience, stripe coat material may be delivered by spray if followed immediately with brush-out and approved procedures include appropriate controls on thickness. Apply all other coats by spray application. Use appropriate controls to prevent airborne coating fog from drifting beyond 15 feet from the structure perimeter. Cover or protect all surfaces that will not be coated. The cleanliness, temperature, recoat windows, and airborne paint containment requirements may necessitate the use of enclosures, portable shelters, or other appropriate controls.

Apply coatings at the following specified thickness:

Coat	Minimum DFT (Mils)	Maximum DFT (Mils)
Primer	3	5
Intermediate	3	5
Top	2	3
	----	----
Total system	8	13

3.7.3.1 Application of Primer

Apply primer coat, maintaining paint supply container height within 3 feet of the paint nozzle for applying zinc primer. Maintain constant agitation of paint pot to ensure that zinc does not settle in container.

3.7.3.2 Application of Stripe Coat

Apply a stripe coat of intermediate coat epoxy material within RECOAT WINDOW of primer, allowing sufficient dry time to allow application of intermediate coat within RECOAT WINDOW of primer. Apply by brush, working material into corners, crevices, angles, and welds, and onto outside corners and angles.

3.7.3.3 Application of Intermediate Coat

Apply intermediate coat within RECOAT WINDOW of primer coat.

3.7.3.4 Non-skid for Stairs and Top

Where non-skid is required, apply a second intermediate coat, and immediately follow with application of non-skid grit, broadcast at the rate of 2 pounds per 100 square feet, and backroll. Apply topcoat as specified.

3.7.3.5 Application of Topcoat

Make all required repairs to primer and intermediate coats as specified in paragraph entitled "Procedure for Holiday and Spot Repairs of Newly Applied Coating" prior to applying topcoat. Apply topcoat within RECOAT WINDOW of intermediate coat. The polyurethane topcoat may require multiple passes to achieve desired aesthetics and required thickness. Consult manufacturer for thinning and application procedures for anticipated temperature, humidity, and wind conditions. Touch-up blemishes and defects within recoat window of polyurethane topcoat. Retain sample of polyurethane topcoat, from the same batch used to coat structure, to make touch-ups that might be required later.

3.7.3.6 Application of Joint Sealant

Apply joint sealant to back-to-back steel joints that are less than 3/8 inches wide and are not seal welded. Apply sealant to top and bottom, or each side, of narrow joints. Apply sealant within 48 hours of application of the topcoat, and touch-up with topcoat after appropriate cure of the sealant.

3.7.3.7 Procedure for Holiday and Spot Repairs of Newly Applied Coating

Repair coating film defects at the earliest practicable time, preferably before application of the succeeding coat. Observe all requirements for

soluble salts contamination, cleanliness between coats, and application conditions. Prepare defective area in accordance with SSPC SP 10, and feather coating as required to leave 4 inches of each succeeding coat feathered and abraded. Protect adjacent areas from damage and overspray. Remove dust and solvent wipe the prepared area plus an additional 4 inches beyond the prepared area with clean denatured alcohol. Apply each coat within RECOAT WINDOW of preceding coat. Within four hours of preparation, apply zinc-rich primer to prepared steel and feather onto prepared primer. Apply intermediate coat to primed area and feather to prepared intermediate area. Apply topcoat to intermediate coat and feather to prepared topcoat. Apply each repair coat to approximate thickness of surrounding coating system.

3.7.3.8 Structure Occupancy After Coating Application

Use clean canvas or other approved shoe covers when walking on coated surfaces, regardless of curing time allowed. For heavily trafficked areas, provide cushioned mats for additional protection.

3.8 PROJECT IDENTIFICATION

At the completion of the work, stencil the following information on the tank exterior adjacent to the main manway opening in 3/4 to one inch Helvetica style letters of contrasting color using acrylic stencil paint:

Date exterior coated:

Project Number:

Contractor:

Address:

Coating System

Surface Prep: SSPC SP _____ Profile: _____

Primer: _____ Thickness: _____

Intermediate: _____ Thickness: _____

Topcoat: _____ Thickness: _____

Total Thickness: _____

3.9 FIELD QUALITY CONTROL

For marking of tank surfaces, use chalk for marking bare steel, and water based markers for marking coated surfaces, and remove marks prior to coating. Do not use any wax or grease based markers, or any other markers that leave a residue or stain.

3.9.1 Coating Inspector

The coating inspector shall be considered a QC Specialist and shall report to the QC Manager, as specified in Section 01 45 00.00 10 01 45 00.00 20 01 45 00.00 40 QUALITY CONTROL. The Coating Inspector shall be present during all pre-preparation testing, surface preparation, coating application, initial cure of the coating system, during all coating repair work, and during completion activities as specified in Section 01 45 00.00 10 01 45 00.00 20 01 45 00.00 40 QUALITY CONTROL. The Coating Inspector shall provide complete documentation of conditions and occurrences on the job site, and be aware of conditions and occurrences that are potentially detrimental to the coating system. The requirements for inspection listed in this Section are in addition to the QC inspection and reporting requirements specified in Section 01 45 00.00 10 01 45 00.00 20 01 45 00.00 40 QUALITY CONTROL.

3.9.2 Field Inspection

3.9.2.1 Inspection Requirements

Perform field inspection in accordance with ASTM D 3276 and the approved Coating Work Plan. Document Contractor's compliance with the approved Coating Work Plan.

Provide all tools and instruments required to perform the required testing, as well as any tools or instruments that the inspector considers necessary to perform the required inspections and tests. Document each inspection and test, including required hold points and other required inspections and tests, as well as those inspections and tests deemed prudent from on-site evaluation to document a particular process or condition, as follows:

- a. Location or area;
- b. Purpose (required or special);
- c. Method;
- d. Criteria for evaluation;
- e. Results;
- f. Determination of compliance;
- g. List of required rework;
- h. Observations.

Collect and record Environmental Conditions as described in ASTM D 3276 on a 24 hour basis, as follows:

- a. During surface preparation, every two hours or when changes occur;
- b. During coating application and the first four days of initial cure, every hour, or when changes occur;
- c. Note location, time, and temperature of the highest and lowest surface temperatures each day;
- d. Use a non-contact thermometer to locate temperature extremes, then verify with contact thermometers.

Document all equipment used in inspections and testing, including manufacturer, model number, serial number, last calibration date and future calibration date, and results of on-site calibration performed.

Document Contractors compliance with the approved Coating Work Plan.

3.9.2.2 Inspection Report Forms

Develop project-specific report forms as required to report measurements, test results, and observations being complete and conforming to contract requirements. This includes all direct requirements of the contract documents and indirect requirements of referenced documents. Show acceptance criteria with each requirement and indication of conformity of each inspected item. The data may be in any format, but must be legible and presented so that entered data can be quickly compared to the appropriate requirement.

3.9.2.3 Daily Inspection Reports

Submit one copy of daily inspection report completed each day when performing work under this Section, to the Contracting Officer. Note all non-compliance issues, and all issues that were reported for rework in accordance with QC procedures of Section 01 45 00.00 10 01 45 00.00 20

01 45 00.00 40 QUALITY CONTROL. Each report shall be signed by the coating inspector and the QC Manager. Submit report within 24 hours of date recorded on the report.

3.9.2.4 Inspection Logbook

A continuous record of all activity related to this Section shall be maintained in an Inspection Logbook on a daily basis. The logbook shall be hard or spiral bound with consecutively numbered pages, and shall be used to record all information provided in the Daily Inspection Reports, as well as other pertinent observations and information. The Coating Inspector's Logbook that is sold by NACE is satisfactory. Submit the original Inspection Logbook to the Contracting Officer upon completion of the project and prior to final payment.

3.9.2.5 Inspection Equipment

All equipment shall be in good condition, operational within its design range, and calibrated as required by the specified standard for use of each device.

3.10 FINAL CLEANUP

Following completion of the work, remove debris, equipment, and materials from the site. Remove temporary connections to Government or Contractor furnished water and electrical services. Restore existing facilities in and around the work areas to their original condition.

TABLE 1
COATING QUALITY CONFORMANCE INSPECTION REQUIREMENTS

Table Ia - Zinc-rich Epoxy Primer Coat MIL-DTL-24441/19 Formula 159

Test	Component A		Component B		Mixed	
	Min.	Max.	Min.	Max.	Min.	Max.
Pigment content, percent (zinc dust)	---	---	81.5	85.5	---	---
Volatiles, percent	42.8	44.3	8.0	8.4	---	---
Non-volatile vehicle percent	53.7	57.7	8.3	8.7	---	---
Weight, Kilograms/liter	0.87	1.01	3.30	3.40	2.80	2.91
Pounds/gallon	7.3	8.4	27.5	28.4	23.4	24.4
Flashpoint Degrees C	35.6	---	37.8	---	---	---
Degrees F	96	---	100	---	---	---
Consistency, grams	---	---	250	500	150	300
Set to touch time, hours at 23 degrees C, 73 degrees F	---	---	---	---	---	2
Dry-hard time, hours at 23 degrees C, 73 degrees F	---	---	---	---	---	8
Pot life, hours at 23 degrees C, 73 degrees F	---	---	---	---	4	---
Sag resistance Micrometers	---	---	---	---	300	---
Mils	---	---	---	---	12	---
VOC Grams/liter	---	---	---	---	---	304
Pounds/gallon	---	---	---	---	---	2.5

NOTES:

Test methods as specified in MIL-DTL-24441.

TABLE 1
COATING QUALITY CONFORMANCE INSPECTION REQUIREMENTS

Table Ib. - Epoxy Intermediate Coat MIL-DTL-24441/31 Formula 152 Type IV
(White (Tinted))

Test	Component A		Component B		Mixed	
	Min.	Max.	Min.	Max.	Min.	Max.
Pigment content, percent	44.0	49.0	33.0	38.0	---	---
Volatiles, percent	29.0	35.0	16.0	21.0	---	---
Non-volatile vehicle, percent	17.5	23.5	44.0	49.0	---	---
Coarse particles, percent	---	0.3	---	0.3	---	---
Consistency, grams Weight	180	320	300	470	180	245
Kilograms/liter	1.39	1.45	1.29	1.35	1.34	1.40
Pounds per gallon	11.6	12.1	10.8	11.3	11.2	11.7
Set to touch, hours at 23 degrees C, 73 degrees F	---	---	---	---	---	3
Dry-hard time, hours at 23 degrees C, 73 degrees F	---	---	---	---	---	8
Fineness of grind, Hegman	4	---	4	---	---	---
Flashpoint						
Degrees C	35.5	---	37.8	---	---	---
Degrees F	96	---	100	---	---	---
Titanium dioxide, percent of pigment	91	---	---	---	---	---
Pot life, hours at 23 degrees C, 73 degrees F	---	---	---	---	4	---
Sag resistance						
Micrometers	---	---	---	---	300	---
Mils	---	---	---	---	12	---
Color of dry film to approximate color of FED-STD 595 color 27778	---	---	---	---	Conform	
Contrast ratio, at 75 micrometers, 3 mils DFT	---	---	---	---	0.98	---
Gloss, 60 degree specular	---	---	---	---	35	---
VOC						
Grams/liter	---	---	---	---	---	340
Pounds/gallon	---	---	---	---	---	2.8

GENERAL NOTES:

Test methods as specified in MIL-DTL-24441.

Where "Conform" is indicated, refer to specific requirements of MIL-DTL-24441/31.

TABLE 1
COATING QUALITY CONFORMANCE INSPECTION REQUIREMENTS

Table 1c - Polyurethane Topcoat MIL-PRF-85285 Type II
(White and Colors)

Test	Component A		Component B		Mixed	
	Min.	Max.	Min.	Max.	Min.	Max.
Moisture content, percent	---	2	---	---	---	---
Coarse particles, percent	---	---	---	---	---	.5
Viscosity	---	---	---	---	See Note 1	
Fineness of grind, Hegman	---	---	---	---	7	---
Drying to touch (See Note 2)	---	---	---	---	---	4
Dry hard (See Note 2)	---	---	---	---	---	8
VOC, grams per liter	---	---	---	---	---	340
Color	---	---	---	---	delta E+-1.0	
Gloss 60 degree specular gloss						
Gloss	---	---	---	---	---	90
Semi-gloss	---	---	---	---	15	45
Opacity	---	---	---	---	0.95	---
Flexibility	---	---	---	---	Conform	
Fluid resistance	---	---	---	---	Conform	
Heat resistance (cure)	---	---	---	---	Conform	
Solvent resistance (cure)	---	---	---	---	Conform	
Condition in container	---	---	---	---	Conform	
Odor	---	---	---	---	Conform	
Lead percent	---	---	---	---	---	0.06
Cadmium percent	---	---	---	---	---	0.06
Chromium percent	---	---	---	---	---	0.00

NOTES:

(1) Modify paragraph 3.6.4 Viscosity and Pot Life, of MIL-PRF-85285 as follows:

The viscosity of the admixed coating, when tested in accordance with ASTM D 1200 through a No. 4 Ford cup, shall be as follows:

Time from mix (minimum)	Maximum time through a No. 4 Ford cup
Initially	30 seconds
2 hours	60 seconds
4 hours	No gel

(2) Modify paragraph 3.7.1 Drying Time, of MIL-PRF-85285

When applied by spray techniques and when tested in accordance with ASTM D 1640, the coating shall be set-to-touch within four hours and dry-hard within eight hours (see 4.6 and table I).

GENERAL NOTES:

- Test methods as specified in MIL-PRF-85285.
- Where "Conform" is indicated, refer to specific requirements of MIL-PRF-85285.

-- End of Section --

SECTION 32 31 13
CHAIN LINK FENCES AND GATES

SPEC WRITER NOTES:

1. Delete or add information between //---// and any other items applicable to project. Cover any item added to the text under Applicable Publications and Products and renumber the paragraphs.
2. Use this section in specifying permanent chain link fence. Specify impermanent type fencing, such as Construction Fence, elsewhere.

PART 1 - GENERAL

1.1 DESCRIPTION

This work consists of all labor, materials, and equipment necessary for furnishing and installing chain link fence, gates and accessories in conformance with the lines, grades, and details as shown.

1.2 RELATED WORK

- A. Grounding of fencing for enclosures of electrical equipment and for lightning protection as shown: Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
- B. Temporary Construction Fence: Section 01 00 00, GENERAL REQUIREMENTS.
- C. Finish Grading: Provide positive drainage
- D. Guard Booths: Section 13 34 19, METAL BUILDING SYSTEMS
- E. Card readers and biometric devices: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS
- F. Intrusion alarm: Section 28 16 11, INTRUSION DETECTION SYSTEM
- G. Security fences: Section 32 31 53, PERIMETER SECURITY FENCES AND GATES.

1.3 MANUFACTURER'S QUALIFICATIONS

Fence, gates, and accessories shall be products of manufacturers' regularly engaged in manufacturing items of type specified.

1.4 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES, furnish the following:
 1. Manufacturer's Literature and Data: Chain link fencing, gates and all accessories.
 2. Manufacturer's Certificates: Zinc-coating complies with complies with specifications.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
- A121-07 Metallic Coated Carbon Steel Barbed Wire
 - A392-07 Zinc-Coated Steel Chain-Link Fence Fabric
 - A817-07 Metal-Coated Steel Wire for Chain-Link Fence
Fabric and Marcellled Tension Wire
 - C94/C94M-07..... Ready-Mixed Concrete
 - F567-07 Installation of Chain-Link Fence
 - F626-(R2003)..... Fence Fittings
 - F900-05 Industrial and Commercial Swing Gates
 - F1043-06..... Strength and Protective Coatings on Metal
Industrial Chain-Link Fence Framework
 - F1083-08..... Pipe, Steel, Hot-Dipped Zinc-Coated
(Galvanized) Welded, for Fence Structures.
- C. Federal Specifications (Fed. Spec.):
- FF-P-110J..... Padlock, Changeable Combination

PART 2 - PRODUCTS

2.1 GENERAL

Materials shall conform to ASTM F1083 and ASTM A392 ferrous metals, zinc-coated; and detailed specifications forming the various parts thereto; and other requirements specified herein. Zinc-coat metal members (including fabric, gates, posts, rails, hardware and other ferrous metal items) after fabrication shall be reasonably free of excessive roughness, blisters and sal-ammoniac spots.

2.2 CHAIN-LINK FABRIC

ASTM A392 9 gauge wire woven in a 50 mm (2 inch) mesh. Top and bottom selvage shall have twisted and barbed finish. Zinc-coating weight shall be 2.0 ounces per square foot.

2.3 POST, FOR GATES AND FENCING

ASTM F1083, Grade SK-40A, round, zinc-coated steel. Dimensions and weights of posts shall conform to the tables in the ASTM Specification. Provide post braces and truss rods for each gate, corner, pull or end

post. Provide truss rods with turnbuckles or other equivalent provisions for adjustment.

2.4 TOP RAIL AND BOTTOM RAIL

ASTM F1083, Grade SK-40A, round, zinc-coated steel. Dimensions and weights of posts shall conform to the tables in the ASTM Specification; fitted with suitable expansion sleeves and means for securing rail to each gate, corner, and end posts.

2.5 TOP AND BOTTOM TENSION WIRE

ASTM A817 and ASTM F626, zinc-coated, having minimum coating the same as the fence fabric.

2.6 ACCESSORIES

Accessories as necessary caps, rail and brace ends, wire ties or clips, braces and tension bands, tension bars, truss rods, and miscellaneous accessories conforming to ASTM F626

2.7 BARBED WIRE SUPPORT ARMS

ASTM F626, single arm type, steel or malleable iron.

2.8 BARBED WIRE

ASTM A121, zinc-coated steel wire and barbs; standard size and construction: 2.51 mm (0.099 inch) diameter line wire with 2.03 cm (0.080 inch) diameter, 2-point barbs.

2.9 GATES

ASTM F900, type as shown. Gate framing, bracing, latches, and other hardware zinc-coating weight shall be the same as the FABRIC. Gate leaves more than 2400 mm (8 feet) wide shall have either intermediate members and diagonal truss rods, or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gates less than 2400 mm (8 feet) wide shall have truss rods or intermediate braces. Attach gate fabric to the gate frame by method standard with the manufacturer, except that welding will not be permitted. Arrange latches for padlocking so that padlock will be accessible from both sides of the gate regardless of the latching arrangement. When required, extend each end member of gate frame sufficiently above the top member or provide three strands of barbed wire in horizontal alignment with barbed wire strands on the fence.

2.10 GATE HARDWARE

- A. Manufacturer's standard products, installed complete. The type of hinges shall allow gates to swing through 180 degrees, from closed to open position. Hang and secure gates in such a manner that, when locked, they cannot be lifted off hinges.
- B. Provide stops and keepers for all double gates. Latches shall have a plunger-bar arranged to engage the center stop. Arrange latches for locking. Center stops shall consist of a device arranged to be set in concrete and to engage a plunger bar. Keepers shall consist of a mechanical device for securing the free end of the gate when in full open position.
- C. Padlocks for gates are specified under Section 08 71 00, DOOR HARDWARE. Padlocks shall have chains that are securely attached to the gate or gate post.

2.11 CONCRETE

ASTM C94/C94M, using 19 mm (3/4 inch) maximum-size aggregate, and having minimum compressive strength of 25 mPa (3000 psig) at 28 days. Non-shrinking grout shall consist of one part Portland cement to three parts clean, well-graded sand, non-shrinking grout additive and the minimum amount of water to produce a workable mix.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fence by properly trained crew, on previously prepared surfaces, to line and grade as shown. Install fence in accordance with ASTM F567 and with the manufacturer's printed installation instructions, except as modified herein or as shown. Maintain all equipment, tools, and machinery while on the project in sufficient quantities and capacities for proper installation of posts, chain links and accessories.

3.2 EXCAVATION

Excavation for concrete-embedded items shall be of the dimensions shown, except in bedrock. If bedrock is encountered before reaching the required depth, continue the excavation to the depth shown or 450 mm (18 inches) into the bedrock, whichever is less, and provide a minimum of 50 mm (2 inches) larger diameter than the outside diameter of the post. Clear loose material from post holes. Grade area around finished concrete footings as shown and dispose of excess earth as directed by the Resident Engineer.

3.3 POST SETTING

Install posts plumb and in alignment. Set post in concrete footings of dimensions as shown, except in bedrock. Thoroughly compact concrete so as it to be free of voids and finished in a slope or dome to divert water running down the post away from the footing. Install posts in bedrock with a minimum of 25 mm (one inch) of non-shrinking grout around each post. Thoroughly work non-shrinking grout into the hole so as to be free of voids and finished in a slope or dome. Cure concrete and grout a minimum of 72 hours before any further work is done on the posts.

3.4 POST SETTING IN STRUCTURES

Install post in retaining walls, curbs, concrete slabs, or similar construction in proper size galvanized pipe sleeves set into the concrete or built into the masonry as shown. Set sleeves plumb and 13 mm (1/2 inch) above the finished structure. Fill space solidly between sleeve and post with non-shrinking grout, molten lead, or sulphur, and finish to divert water running down the post away from the post base.

3.5 POST CAPS

Fit all exposed ends of post with caps. Provide caps that fit snugly and are weathertight. Where top rail is used, provide caps to accommodate the top rail. Install post caps as recommended by the manufacturer and as shown.

3.6 SUPPORTING ARMS

Design supporting arms, when required, to be weathertight. Where top rail is used, provide arms to accommodate the top rail. Install supporting arms as recommended by the manufacturer and as shown.

3.7 TOP RAILS AND BOTTOM RAILS

Install rails before installing chain link fabric. Provide suitable means for securing rail ends to terminal and intermediate post. Top rails shall pass through intermediate post supporting arms or caps as shown. The rails shall have expansion couplings (rail sleeves) spaced as recommended by the manufacturer. Where fence is located on top of a wall, install expansion couplings over expansion joints in wall.

3.8 TOP AND BOTTOM TENSION WIRE

Install and pull taut tension wire before installing the chain-link fabric.

3.9 ACCESSORIES

Supply accessories (posts braces, tension bands, tension bars, truss rods, and miscellaneous accessories), as required and recommended by the manufacturer, to accommodate the installation of a complete fence, with fabric that is taut and attached properly to posts, rails, and tension wire.

3.10 FABRIC

Pull fabric taut and secured with wire ties or clips to the top rail bottom rail and tension wire close to both sides of each post and at intervals of not more than 600 mm (24 inches) on centers. Secure fabric to posts using stretcher bars and ties or clips.

3.11 BARBED WIRE

Install barbed wire, when required, on supporting arms above the fence posts. Extend each end member of gate frames sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence. Pull each strand taut and securely fasten to each supporting arm and extended member.

3.12 GATES

Install gates plumb, level, and secure for full opening without interference. Set keepers, stops and other accessories into concrete as required by the manufacturer and as shown. Adjust hardware for smooth operation and lubricate where necessary.

3.13 REPAIR OF GALVANIZED SURFACES

Use galvanized repair compound, stick form, or other method, where galvanized surfaces need field or shop repair. Repair surfaces in accordance with the manufacturer's printed directions.

3.14 FINAL CLEAN-UP

Remove all debris, rubbish and excess material from the station.

- - - E N D - - -