
APPENDIX I

GAC Vessel Specifications

PART 1 - GENERAL

1.01 Vessel Contractor shall furnish all labor, materials, equipment, and services necessary to perform all work described in accordance with these specifications and reference drawings.

- A. The Vessel Contractor shall provide all labor, materials, and equipment for the installation onto concrete equipment pads and pipe supports (concrete pads and concrete pier pipe supports to be provided as URS-furnished facilities to the Vessel Contractor through a General Contractor on a separate contract), multiple pairs of liquid-phase granular activated carbon (LPGAC) adsorbers including all related face and header piping (excluding concrete header supports), fittings, and appurtenances, instrumentation, seismic zone 4 anchorage and electrical controls, as described in these specifications and to the limits shown on the reference drawings.
- B. The Vessel Contractor shall coordinate scheduling, submittals, installation, startup and performance testing of the system with the General Contractor and URS to assure an efficient and orderly ~~sequence of installation of interdependent construction and~~ startup elements. The Vessel Contractor shall have a single 14- (fourteen) calendar day working window for installation of vessels and headers. Final fit-up between the yard piping and the vessel headers will be the responsibility of the General Contractor.
- C. All equipment furnished under this contract shall be shop primed, finish painted in the owner's selection of color, and each pair pre-assembled at the manufacturer's facility prior to shipment to assure a neat, cleanly plumbed final assembly. No expansion joints in manifold piping will be allowed. All equipment shall be shipped assembled to the greatest extent possible, consistent with handling and shipping limitations. Assemble piping manifolds in sections to allow for on-site inspection. The separation point shall be at the step-down section of header piping for influent, effluent and backwash return lines.

PART 2 - PRODUCTS

2.01 FILTERS

The treatment system shall consist of twelve (12) dual adsorber systems. The manifold of each pair shall be connected to a common header piping for influent, effluent, and backwash. The common header piping shall be above ground as shown in the reference drawings. Limits of work are shown in the reference drawings. (The General Contractor under a separate contract shall connect the header piping to below ground piping). Each pair shall be pre-plumbed with 8-inch influent and effluent piping and an 8" valve manifold to facilitate series (alternate lead/lag operation) or parallel operation with flanged influent, effluent, backwash, and spent backwash, and all other face piping including: carbon fill,

carbon removal, air/vacuum relief, washdown/manual air release, and compressed air connections. Each vessel shall be equipped with valving, piping, sample ports, pressure gauges, and instrumentation as shown on the reference drawings.

Design flow (maximum) per vessel: 972 gpm
Weight of carbon per vessel: 30,000 lbs.
Vessel diameter (standard): 11.5 - 12.0 feet
Vessel height (standard overall): not greater than 18.5 feet
Empty bed contact time: 8.2 minutes minimum per vessel pair at design flow

Design Pressure: ≥ 125 psi at 150°F
Pressure drop across each pair incl. piping and valves at 972 gpm: 7 psi (maximum)

A. ADSORBER VESSELS

Adsorbers shall be vertical cylindrical pressure vessels with a semi-elliptical top head. The adsorber shall be designed such that the LPGAC can be easily and completely discharged when spent.

The vessels shall be designed, constructed and stamped in accordance with the ASME Code, Section VII for a design pressure rating of 125 psig at 150°F. The vessel shall be equipped with a 20" round, flanged manway on the lower side for maintenance access. There shall be an additional 14"x18" elliptical quick-opening manway on the top of the vessel for access.

The adsorber shall be provided with 4" nozzles for LPGAC fill and discharge with 4" abrasion resistant inserts, 8" nozzles for raw water, treated water, and backwash connections, and 2" nozzles for bed sample taps, and 3" nozzles for the washdown lines. Sample taps shall extend approximately 12-inches into the bed and shall be located at 25, 50, and 75% of the bed height. Washdown nozzles shall extend no more than 8" below the top of the dome. All other nozzle connections shall be flush on the inside of the shell, and shall be provided with 150-pound flat face flanges for connection of interstitial piping.

The capacity of each adsorber vessel shall be designed to contain 30,000 pounds of granular activated carbon, and shall allow additional volume for at least 25% expansion of the LPGAC bed during backwash.

The adsorber shall be constructed of SA-516, Grade 70 carbon steel, all welds and any other sharp edges ground to a smooth radius of 1/8" minimum and all imperfections such as skip welds, de-laminations, scabs, slivers, and slag corrected to allow for effective surface preparation. All surfaces shall be degreased prior to surface preparation. The adsorber internal surface that will be lined shall be blasted to a white metal surface (Steel Structures Painting Council Specifications, SSPC-SPS10) to provide an anchor pattern in the metal corresponding to a degree of profile of 4 mils, minimum. The exterior of the adsorber shall be sandblasted or

power-tool cleaned to the degree specified by Steel Structures Painting Council Specifications, SSPC-SP2-63.

The interior of the adsorber that is in contact with the LPGAC shall be lined in order to prevent corrosion that will occur when wet-activated carbon is in contact with carbon steel. Immediately after sandblasting, the interior surface shall be lined with a vinyl ester and inert flake pigment abrasion-resistant protective coating in two multi-pass spray coatings to produce a minimum dry film thickness of 35-45mils. The abrasion resistant protective coating shall meet the requirements of U.S. Federal Register, Food and Drug Regulations Title 21, Chapter 1, Paragraph 175.300. Coating shall be U.S. Federal Register Placite 4110 and manufactured by Wisconsin Protective Coatings Inc., Green Bay, WI or an equivalent approved by URS.

Surfaces in contact with the LPGAC and other vessel internal wetted surfaces, if appropriate, shall also be lined with a thin film vinyl ester coating to retard rust formation.

Following cleaning of the exterior, prime and finish paint exterior surfaces per paint manufacturer's recommendations as described below.

1. Primer: Rust inhibitive primer: 4.0-6.0 mils.
2. Intermediate: Polyamidoamine or acrylic epoxy enamel: 4.0-6.0 mils.
3. Finish: Gross aliphatic acrylic polyurethane enamel: 2.0-4.0 mils.
4. Total dry film thickness: 10.0-16.0 mils.

B. UNDERDRAIN COLLECTION SYSTEM

The bottom of the carbon bed shall contain an underdrain collection system. The collection system shall allow collection of treated water from all zones in the cross sectional areas of each adsorber and allow distribution of backwash water at the bottom of the bed to evenly expand the bed without disrupting the classification of LPGAC in the bed. The system shall be designed to guarantee that it is structurally sound to retain carbon and to withstand forward flow, backwash flow and movement of the LPGAC as it is discharged from the adsorber. The underdrain collection system shall consist of a minimum of 8 ea. water well-type screens/nozzles spaced equally around the bottom head of the LPGAC vessel and provide for the process design flow rate of 972 gpm and the process design backwash rate of 1000 to 1500 gpm. The well-type screens/nozzles shall be externally removable in order to facilitate the removal and replacement of the LPGAC and constructed of type 316 stainless steel. The underdrain system shall be designed with minimum screened area of 7.85 ft² and minimum of 0.7 ft² cross sectional area for each screen/nozzle. The maximum fluid velocity through the nozzles shall be 3.3 ft/s and the maximum fluid velocity through the screened area shall be 1.3 ft/s.

C. PIPING NETWORK

A process-piping network shall be provided for the pair of adsorbers to allow the following operations to be performed:

1. TREATMENT

Under normal operation the full flow of up to 972 gpm per adsorber is accepted at the system battery limits and directed to the lead adsorber if operated in series. The interconnecting piping allows for either adsorber to be operated in the lead position, and the effluent from the first or lead adsorber shall be directed to the second or polish adsorber. The effluent from the second adsorber shall be directed to the battery limits as system effluent.

2. CARBON EXCHANGE

During carbon exchange, the adsorber being exchanged shall be isolated from the treatment process with valving in the piping network. The water flow shall then be reduced proportionately and directed to the other adsorbers. The second stage adsorber will be the lead adsorber in series operation after exchange is completed.

For carbon discharge, the adsorber shall be isolated, pressurized with air, and the ~~adsorber~~ nozzle/manual vent will be activated, after which the LPGAC is discharged through the outlet piping. For carbon fill, the adsorber vent shall be opened and LPGAC charged through the carbon fill line. After filling, the LPGAC bed shall be classified with a brief backwash procedure.

3. ADSORBER BACKWASH

The piping network shall be designed and constructed to enable the adsorber to be backwashed should an unacceptable pressure drop develop across the carbon bed due to the introduction of filterable suspended solids to the system. The adsorber being backwashed shall be isolated from the process flow as for carbon exchange.

Backwash water shall be introduced at the bottom of the LPGAC bed at the rate of 1000 to 1500 gpm to effect up to at least 25% bed expansion. Spent backwash water shall exit the top of the bed, and shall be directed to backwash sumps for temporary storage and subsequent disposal after backwash operations are completed.

4. PROCESS AND UTILITY PIPING

The process and utility piping on the adsorption system shall include influent water and backwash discharge to the top of the adsorber (8"), treated water and backwash source water to the bottom of the adsorber (8"), LPGAC fill and discharge lines (4") including abrasion resistant inserts (4"), manual vent and washdown line (3"). Flanged connections shall be on the primary lines for venting, pressure relief, utility water and air, sample and flush connections, and pressure instrumentation.

With the exception of LPGAC fill and discharge piping, all filter piping shall be Schedule 40 carbon steel piping, fabricated using ASTM A53, Grade B carbon steel, rated for 150 psig @ 500 degrees F. For 2" and larger, piping shall be Schedule 40 and provided with 150 pound ANSI B16.5, ASTM A105 forged steel slip-on or weld neck flanges. All piping welds shall be made in accordance with ANSI B31.3 by welders qualified under ASME Section IX.

Pipe fittings including tees shall be Class 125 pound flanged cast iron per ASTM A 126, Class B. Piping less than 2" in diameter shall be Schedule 80, threaded. Gaskets for the steel piping shall be red rubber. Manway gaskets shall be EPR type rubber.

Carbon fill piping beyond the fill valve and carbon discharge piping up to the discharge valve shall be corrosion resistant Schedule 10 304L stainless steel or polypropylene lined steel pipe rated at 150 psig to 225 degrees F. Stainless steel pipe shall be ASTM A 312 and shall conform to the requirements of AWWA C220. The steel pipe base for polypropylene lined pipe shall be Schedule 40, ASTM A53 steel pipe with 125 pound ASTM A126, Class B cast iron flanges and fittings. Bolts for stainless steel carbon fill piping shall be Type 316 Stainless Steel, ASTM A193, Grade B8M hex head. Nuts for stainless steel carbon fill piping shall be Type 316 Stainless Steel, ASTM A194, Grade 8M hex head.

Sample taps shall be provided that will allow sampling of the raw water, treated water, backwash, and carbon of each vessel. Sample taps shall be provided in areas that can be easily sampled without special equipment. The sample probes shall be removable from outside the LPGAC vessel and shall have slits or screens to allow for withdrawal of water and retention of carbon. Sample points shall be constructed of Type 304 Stainless Steel.

A wash station shall be installed on every 4th Adsorber vessel. The piping and fittings shall be copper and bronze. A 3/4" anti-siphon hose bibb and hose rack capable of holding 100 feet of 3/4" industrial grade hose will be installed at each station.

The exterior of the piping shall be power tool cleaned to the degree specified by Steel Structures Painting Council Specifications, SSPC-SP-3-63, and prime and finished painted per the paint manufacturer's recommendations and as described below.

- a. Primer: Rust inhibitive primer: 4.0-6.0 mils.
- b. Intermediate: Polyamidoamine or acrylic epoxy enamel: 4.0-6.0 mils.
- c. Finish: Gross aliphatic acrylic polyurethane enamel: 2.0-4.0 mils.
- d. Total dry film thickness: 10.0-16.0 mils.

5. PROCESS AND UTILITY VALVES

The process, backwash and utility piping, excluding LPGAC fill and discharge piping shall be equipped with gear-operated butterfly valves for tight shut-off, isolation and flow control. Butterfly valves shall be cast iron, one-piece wafer type body with a bronze disc and stainless steel one piece through shaft, designed to mate with Class 125 ANSI flanges. Valves shall be rated for minimum working differential pressure of 150 psig in a closed position at 180 degrees F, and meet or exceed all of the design strength, testing and performance requirements of AWWA Specification C-504 (laying length may vary). Valves with handwheel operators shall include locking devices that accept Masterlock No. 81 locks.

Valves on the LPGAC fill and discharges shall be 316 stainless steel full-bore ball valves with PTFE seats and seals. Valves shall be wrench operated, with 150 pound ANSI flanged ends.

Valving for small lines, including flush connections, sample points, pressure gauges and compressed air connections shall be bronze, forged brass or barstock brass body regular port ball valves, rated for 200 psig at 100 degrees F.

6. PIPING SYSTEM ACCESSORIES

a. Transfer Hose Connectors

The LPGAC piping shall be fitted with hose connectors, such that LPGAC transfer to and from the adsorbers can be facilitated with transfer hoses. Connectors shall be 4" Cam-Lock style Quick Disconnect Adapters constructed of aluminum.

Exposed Quick Disconnect points of connection shall be supplied with caps attached to the vessel with stainless steel cable.

b. Flush and Air Connections

Two flush connections shall be provided on the LPGAC fill line on each side of the valve. One flush connection on the discharge line downstream of the valve and an air connection shall be provided on the adsorber influent line. Connections shall be welded into the steel pipe, or provided in polypropylene "spacers," and shall consist of a short section of 3/4" pipe, a 3/4" ball valve as specified and a 3/4" quick disconnect adapter for hose connection. Exposed Quick Disconnect points of connection shall be supplied with caps attached to the vessel with stainless steel cable.

7. INSTRUMENTATION

a. Pressure Gauges

The adsorber-piping network shall be equipped with pressure gauges to indicate the pressure of water entering and exiting each adsorber to provide information on pressure drops across each adsorber and the system. Locations of pressure gages are shown in the drawing. Pressure gages shall be 2-1/2" dial size Bourdon tube type with stainless steel case with a pressure range of 0-60 psi and with 1/4" ANPT brass bottom, silicon filled and equipped with pulsation dampeners per the manufacturer's recommendations. Bourdon tube material and the gage shall be compatible for drinking water application. Pressure gages shall be U.S. Gage brand model specification number 153250 with phosphor bronze Bourdon tube, or an equivalent approved by URS.

b. Differential Pressure Transmitter

The multi-pair adsorption system shall be equipped with a single field calibratable indicating differential pressure transmitter to measure the pressure drop between the influent and effluent headers. The location of the transmitter is shown on the attached drawings. The transmitter shall be connected to taps on the influent and effluent headers. The instrument shall be a direct reading/transmitter type and have a pressure range of 0-30 psig and dial or readout divided into 0.5 psig divisions. The transmitter shall be provided with contacts for AC remote indication. The transmitter shall be Druck model STX -2100, part number STX-2100-09-3-A-2-O-L, 0-43 psig.

c. Flow Meters

The adsorption systems shall be equipped with one propeller type flow meter and solid state digital indicator-totalizer transmitter per pair of LPGAC adsorbers in the locations shown for measuring water flow rate and total flow at each adsorber pair. The flow meters and appurtenances shall be provided by a single manufacturer, shall conform to the requirements of AWWA 704 shall be sized to match adjoining pipe and provided with flanged end connections. The flow meters shall be manufactured with fabricated steel flow tubes and meter heads and shall be supplied with straightening vanes per the manufacturer's recommendations. The solid-state digital display indicator-totalizer transmitters shall be combination current/pulse type (4-20 mA current output type with a 2-wire circuit connection and one pulse per totalizer count type). Indicator units displayed shall be gallons per minute (G.P.M.). Totalizer units displayed shall be hundreds of cubic feet (X100ft³). Flow meters shall be Water Specialties Corporation Model ML-04D, or an equivalent approved by URS. Solid-state digital indicator-totalizer transmitters shall be

Water Specialties Corporation Model TR-28-2 or an equivalent approved by URS. The maximum scale for 4-20 mA output shall be 150-1500 G.P.M. continuous, 2000 G.P.M. peak. Flow meter and digital display shall have easily assessable calibration hardware.

d. Pressure Relief Components

An impervious graphite rupture disk and a 1-inch pressure-relief valve shall be used for each pair of carbon vessels and intake lines. The rupture disk shall be designed to relieve pressure at 125 psi \pm 5 percent and be ASME rated with relief pressure of 95 psi. The 1-inch pressure release valve shall be Watts Series 174A or equivalent approved by URS. Pressure relief valves shall include large orifice, low-pressure seats. All pressure relief components shall be piped to drain outlet.

e. Basis of Design

The carbon adsorption filter system basis of design is the U.S. Filter/Weststates HP System with SEPTA under drain design, an activated carbon system consisting of dual vessels, complete with distribution, under drain collection system and face piping for series (lead/lag) or parallel operation, Model HP1230S, or an equal approved by URS. Any substantial modifications to design philosophy, piping, valving, supports, or other parts of the design caused by an alternative carbon system, shall be redesigned by the manufacturer or supplier for approval by URS and at no additional cost. Schedule delays due to alternative products will not be accepted.

f. Acceptable Manufacturers

The following GAC vessel manufacturers produce products similar to the U.S. Filter/Weststates HP system and have been deemed acceptable manufacturers by URS: Calgon Carbon Corporation and Waterlink Barneby Sutcliffe. Other manufacturers may also be acceptable based on references, experience and approval of URS.

D. HEADER PIPING

All header piping shall be Standard Schedule carbon steel piping conforming to AWWA C200 with a design pressure of 150 psi. Flanges shall be 150 pound ANSI B16.5, ASTM A105 forged steel slip-on or weld neck flanges.

No field welding shall be permitted. Contractor shall have flexibility in locating joints for segments of steel welded pipe as shown on the representative drawings. Joint connections shall either be flanged or connected by harnessed mechanical couplings.

2.02 EXTERIOR PAINT

- A. Use products of a single manufacturer for coating systems for each type of surface.
- B. Use paint compatible with shop coating or primer for field coating of shop painted or primed surfaces.
- C. Use only mercury-free, fume proof paint for intermediate and finish coats.
- D. Use only lead-free paint.
- E. Provide tie coats where recommended by manufacturer.
- F. Vary slightly the color of successful coats to aid in verification of coverage.
- G. Locate line identification lettering and flow direction arrows near equipment served, adjacent to valves, both sides of walls and floors where pipe passes through, at each branch or tee, and at intervals of not less than 50 feet in straight runs of pipe.
- H. Coating Materials

1. Primers:

Rust Inhibitive: Ameron "Amerlock 400," Sherwin Williams "DTM Acrylic Primer/ Finish," Tnemec "Series 37H Chem-Prime HS," or equal.

2. Intermediate and Finish Coats:

- a. Gloss Aliphatic Acrylic Polyurethane: Ameron "Amershield," Tnemec "Series 74 Endura-Shield," or equal.

- b. Acrylic, Polyamidoamine & Catalyzed Epoxy Enamel: Ameron "Amerlock 400;" Sherwin Williams "DTM Acrylic Coating," Sherwin Williams "Hi-Solids Catalyzed Epoxy," Tnemec "Series 69 Hi-Build Epoxiline II," or equal.

- I. Coating Certification

1. Coatings shall be certified by third party, independent inspector who is certified to inspect steel coatings. Inspector shall be present during all surface preparation and steel painting applications and shall provide the San Bernadino Municipal Water District (SBMWD) and the United States Environmental Protection Agency (USEPA) with coating certifications for all vessels.

INTERIOR

PART 3 - EXECUTION

3.01 INSTALLATION, TESTING AND STARTUP

- A. The fabrication and construction of all equipment shall be completed in every detail in a professional manner.
- B. Prior to acceptance of all or any part of the work, the Vessel

Contractor shall test each piece of equipment and furnish written certification that it has been installed in accordance with the manufacturer's requirements and is ready to begin operation.

- C. Process performance testing shall be required within the time frame of one (1) month after start-up.
- D. Install the work of this section in strict accordance with manufacturer's recommendations and Shop Drawings as approved by URS, including pertinent requirements of the EPA, Regional Water Quality Control Board, Department of Health Services, and the City of San Bernardino and California Contractors Board
- E. Installers of carbon vessels shall have a current, Class A California contractors license.
- E. The carbon vessels shall be disinfected and flushed by the Vessel Contractor prior to installation of carbon. The Vessel Contractor shall be responsible for providing any temporary storage and disposing of water used during disinfection.
- F. Adsorption System Installation: The Vessel Contractor shall make all necessary arrangements and shall provide for the installation of the adsorption system including initial fill of LPGAC. The Vessel Contractor shall coordinate all necessary activities with the General Contractor and site personnel, including scheduling, site safety or other procedures, authorization of construction personnel and site responsibilities (services not provided by Vessel Contractor, but necessary for the installation and start-up of the adsorption system). Vessel Contractor shall have a 10 calendar day working window for LPGAC adsorber installation. The Carbon Contractor shall have a 7 calendar day working window for installation of LPGAC into adsorber vessels.
- G. Operator Training and Start-up Assistance: The Vessel Contractor shall provide the services of qualified personnel who will be responsible for pre-startup inspection of the adsorption system, site operator training (formal and informal) and assistance at the site during system startup. One day of field service (3 days each site, 6 total days) shall be provided for each of these activities. In the event additional field services are required by URS, the costs shall be as specified in section 13.2 of the contract.

PART 4 - PROCESS PERFORMANCE VERIFICATION

4.01 VERIFICATION OF PERFORMANCE

- A. URS will conduct performance tests during the first four weeks of process operation.
- B. The carbon adsorption filter system manufacturer's representative may be present to observe tests.

- C. Test shall be performed in accordance with the monitoring plan prepared for the site.
- D. Performance evaluation shall be based on the required effluent concentration.
- E. The carbon adsorption system shall be considered not to meet performance standards if the effluent concentration exceeds the effluent requirements stated in Section 2.02. The Vessel Contractor shall be responsible, at no cost to EPA or URS, for any work needed to correct deficient systems not meeting performance requirements.

PART 5 - OTHER REQUIREMENTS

5.01 SUBMITTALS

- A. Submit five sets (in addition to the number to be returned to the Vessel Contractor) of written details and shop drawings of the equipment proposed. Include complete design calculations instrumentation, and anchoring requirements for seismic zone 4. Calculations shall be signed and stamped by a California registered structural engineer. Submittals shall include P&ID and specifications for all piping, valves, instrumentation and system accessories.
- B. Submit paint manufacturer's color samples for color selection by URS.
- C. Submit any changes in dimensions, materials, or structural changes to that shown on the plans, in the form of revised drawings to be furnished by the carbon adsorption filter manufacturer.
- D. Submit four sets of complete installation, operation and maintenance instructions in manual form for all equipment two (2) weeks prior to shipment. This manual shall incorporate all necessary information from prior submittals. Operating section shall include complete instructions on staging the adsorbers, backwashing the carbon bed, unloading spent carbon, loading fresh carbon, and conditioning the new bed. The manual shall also include identification of personnel for on-going technical support.
- E. Submit carbon characteristics data, including size, iodine number, hardness number, abrasion number, moisture, mean particle diameter, shape and type.
- F. List of recommended spare parts.
- G. Statement of Warranty:

"I, _____ the carbon adsorption filter system manufacturer, warrants to URS and EPA that if the carbon adsorption system equipment is erected, started up, operated, and maintained in accordance with the manufacturer's drawings,

manuals, and instructions, the carbon adsorption filter system shall be capable of meeting the effluent requirements defined in Section 2.01 of this Specification."

5.02 QUALITY CONTROL

- A. Provide services of a competent factory trained individual representing the manufacturer supplying the equipment (Representative). The Representative shall provide installation assistance and verify the installation to manufacturer's satisfaction. The Representative shall provide, in writing, 48 hours prior to startup, a certification that the carbon units are properly installed and ready for startup. Any additional time required to receive certification shall be at no additional cost to URS.
- B. The Representative shall be present for start-up activities and provide troubleshooting services as necessary.
- C. A Representative of the manufacturer shall instruct and train the plant personnel on operation, maintenance, and servicing of each vessel of equipment during the start-up activities.

5.03 GUARANTEE

The Vessel Contractor shall take responsibility for the suitability and integrity of all equipment supplied and shall provide a process performance warranty covering a minimum of 12 months after acceptance of the system.

5.04 DELIVERY, STORAGE, AND HANDLING

- A. Transport, deliver, unload, and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to unload and handle products by methods to prevent soiling, disfigurement, or damage.
- D. All equipment supplied shall be shipped assembled to the greatest extent possible, consistent with handling and shipping limitations.
- E. All equipment and small loose pieces, tools, gaskets, etc. shall be adequately packed to prevent damage or loss during shipment or while in storage. All crates shall be identified with the equipment piece numbers. Major equipment shall bear the appropriate identification tag.
- F. Store and protect products in accordance with manufacturers instructions, with seals and labels intact and legible.
- G. Store sensitive products in weather tight, climate controlled enclosures.

- H. For exterior storage of fabricated products, place on sloped supports, above ground.
- I. Provide off-site storage and protection when site does not permit on-site storage or protection.
- J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

5.05 TESTS AND INSPECTION

- A. Completed units, partially completed units, and all materials used in the manufacture of equipment specified herein and all work performed, whether in the manufacturer's shop or elsewhere, shall be at all times subject to inspection, testing and approval by URS. URS reserves the right to perform inspections at any time. Manufacturer shall coordinate with URS to facilitate inspections in a cost effective and timely manner. Such action shall not release the Contractor from any responsibility or liability herein. The Vessel Contractor and/or suppliers of the Vessel Contractor shall provide all the required tools, instrumentation, and materials necessary to facilitate the appropriate tests and/or inspections.
- B. The Vessel Contractor shall be responsible for the protection of all instruments and devices that may be damaged by any test. Shop testing shall be done after manufacturing and assembly is complete and prior to shipping from the manufacturing facility.

5.06 REFERENCE SPECIFICATIONS

- A. The following standard specifications are included as part of this specification by reference.
 - 1. ASME Code Section VIII, Div. 1.
 - 2. Steel Structures Painting Council Specifications (SSPC).
 - 3. American Waterworks Association (AWWA) Standards

END OF SECTION