

SECTION 22 12 00 STORAGE TANKS FOR DOMESTIC WATER

PART 1 - GENERAL

1.01 RELATED WORK

- A. Section 22 05 23: Valves for Plumbing Piping
- B. Section 22 05 29: Hangers for Plumbing Piping
- C. Section 22 07 00: Plumbing Insulation
- D. Section 22 11 16: Domestic Water Piping
- E. Division 26: Electrical

1.02 SUBMITTALS

- A. Submit product data for review.

1.03 CODE COMPLIANCE /QUALITY INSURANCE

- A. Comply with the most stringent of applicable codes for the design, fabrication and installation of water tanks and systems.
- B. Design and install tanks in compliance with applicable Codes and requirements of authorities having jurisdictions including requirements of:
 - 1. Owner's insuring agency
 - 2. Approved edition of NFPA 22
 - 3. NFPA 780 - "Standard for the Installation of Lightning Protection Systems", Section 404

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Unitank
- B. Park Equipment Company
- C. Comply with requirements of Division 01 for product substitutions and options.

2.02 EXTERIOR TANKS

- A. Top, side and bottom - ¼" plate steel minimum, ASTM A36.
 - 1. Round tanks shall have a cone roof for structural purposes and to provide drainage for the roof.
 - 2. Square or rectangular tanks shall have a sloping roof to provide drainage for the top of the tank. The slope of the roof shall be no less than 1/4" per foot.
- B. Steel channel stiffeners, where required.
- C. Return bend vent pipe, diameter not less than one half the area of the overflow drain. Cover vent pipe with stainless steel screen.
- D. Stainless steel, 150 psi ANSI flanges and 3,000 psi stainless steel half couplings.

- E. Split flange float access opening for fill valves (if required).
- F. Stilling wells for floats and electrodes (if required).
- G. Water level check gauge with two, one-half inch angle valves with ball checks, ¼" needle drain valve and 5/8" rigid plastic sight glass. Sight glass to be run inside a continuous piece of baked urethane Unistrut channel for protection.
- H. Attach a metal nameplate in plain view indicating the name of fabricator, date of fabrication and serial number of tank.
- I. 2' x 2' anti-vortex plate on pump suction inlet.
- J. Refer to drawings and/or details for dimensions and additional equipment.

2.03 INTERIOR TANKS

A. Water Tank

1. Provide a single rectangular partitioned tank system for the protection of domestic water storage. The tank shall have two compartments with the dimensions as indicated on the contract drawings. Provide a double wall partition between the two compartments.
2. Double Wall Partition:
 - a. The partition shall extend to the top of the tank with each wall of the partition sealed with a continuous weld between the wall and four sides of the tank and be adequately stiffened to allow operation when one compartment only is drained.
 - b. An air space shall be provided between the walls of the partition of not less than (4) four inches with a height of (10) ten feet or less. (For tanks over (10) ten feet in height the space between the walls of the partition shall not be less than (6) six inches.
 - c. Provide a non-threaded opening at each end of the bottom of the partition. Perform a one psi air test soaped to assure no leaks in the partition chamber. Submit a notarized certification of compliance with this test.

B. Tank Fittings and Accessories: These shall include the following and such other items as required for a complete, code compliant system and as indicated on the Contract Drawings. Pipe connection size shall be as indicated on Contract Drawings.

1. Top, sides and bottom - 1/4" steel plate minimum, ASTM A36.
2. Steel channel stiffeners welded on top and sides where required.
3. 30"x30" manway with gasketed galvanized cover in top of each compartment.
4. 30"x30" manway with bolted and gasketed galvanized cover in sidewall of each compartment.
5. Stainless steel ladders inside each compartment and coated ladder on outside of tank.
6. A return bend vent pipe with an area not less than one half of the area of the overflow riser, vent opening and overflow riser covered with stainless steel screen.
7. Provide stainless steel 150 psi ANSI flanged nozzles and 3000 psi forged stainless steel half couplings.
8. Two inch half couplings for backup high level switch.
9. Three inch stilling well with 3"x2" flange for mounting Ultrasonic sensor; the stilling well to extend to the bottom of the tank; the bottom of the stilling well to be cut at a 45 degree angle.
10. Water level gauge consisting of two one half inch angle valves with ball checks, 1/2" angle valve with 5/8" rigid plastic sight glass on each tank or compartment. Rigid plastic sight glass to be run inside continuous baked urethane coated Unistrut to provide physical protection.
11. Metal nameplate affixed to tank giving the name of fabricator, date of fabrication and serial number of tank.

12. Domestic pump suction with 2'x2' anti-vortex plate.
13. Refer to drawings and/or details for dimensions and additional equipment.

2.04 PROTECTIVE COATINGS

- A. Surface Preparation: After fabrication and prior to applying interior tank coating, inside of tanks shall be thoroughly cleaned and abrasive blasted on all interior surfaces including ceiling, floor, walls, manways, and nipples to NASE No. 2 near white surface to obtain a minimum surface profile of 2 mils.
- B. Application: Conform to standards of Steel Structures Painting Manual, Volume I, Good Painting Practice.
- C. Interior Surfaces: Inside coating and top of tank coating will be McCrory 500 Epoxy Lining System and shall be applied with a minimum of (2) two coats to a minimum 15 to 18 mils D.F.T. (dry film thickness) to all interior surfaces including interior of nozzles and to the top of the tank. Tank coating system shall be manufactured and installed by the McCrory Engineering, Inc. A Certificate of Compliance stating that the lining was installed in accordance with these specifications shall be provided by the Manufacturer/Applicator. McCrory Engineering, Inc. warranty for McCrory 500 is (6) six years utilizing the McCrory Engineering Preventative Maintenance program of inspections of the application in year 2 and 4 following the application.
- D. Exterior Surfaces: Paint the outside of the tank, except top and bottom, with a shop coat of Aegeon 1112 VOC fast drying, lead and chromate free, rust inhibitive alkyd metal primer or equivalent. Two coats of Aegeon 1400 quick dry coal tar, 8 to 10 mils per coat shall be applied to the bottom of the tank or equivalent. After the tank has been erected at the site another coat of primer and a final coat of finish paint shall be applied under another Division. All primers and paint coating shall be approved by the Authorities Having Jurisdiction for use on potable water systems.
- E. Set the bottom of the tank in a coat of mastic that completely covers the area under the tank. The thickness of the mastic shall be as recommended by the manufacturer to form a monolithic, highly impermeable membrane system compatible with the material of the tank. Mastic shall be Aegeon 1400 quick dry coal tar or equivalent.

2.05 FILL VALVE

- A. CLA-VAL No. 124-01C, size and quantity shown on plans, pilot operated float valves, X46 strainer, brass float rods of required length, plastic floats, closing speed control, ductile iron and stainless steel seats.
- B. The cover of the fill valves and the fill valve pilot tubing shall be heat traced.

2.06 BLOCK VALVE

- A. CLA-VAL No. 136G-03AB, size as shown on drawing. Normally open (de-energize to open) solenoid valve with ductile iron body with stainless steel seats and closing speed control.

2.07 LEVEL ALARMS

- A. Provide electrode level alarm sensors with electrode fitting and level alarm panel with all control relays, terminals, level sensing equipment, alarms and all other accessories necessary for a complete control system. Entire alarm system shall be the responsibility of one supplier.

- B. Electrode Fittings and Electronics
 - 1. Warrick Wire Suspended Electrode Fittings. Three inch (3") flanged series 3G for each tank compartment.
 - 2. Warrick Type 3Z1A Electrode Suspension Wire as required with Type 3W2 SS Wire Suspended Electrodes. One set of electrodes is required for each tank compartment. Provide arrangements of electrodes from top of tank as follows:
 - a. High Level Alarm (and signal for block valve closure)
 - b. High Level Reference
 - c. Low Water Alarm
 - d. Domestic Pump Shut-Off
 - e. Low Level Reference

- C. Level Alarm Panel
 - 1. Unipoint alarm control panel, NEMA 4X fiberglass enclosure.
 - 2. Warrick solid state Electronic Liquid Level relay controls.
 - 3. Common alarm horn with silencing pushbutton.
 - 4. Red "High Level" and "Low Level" alarm lights, Amber "Power On" with nameplate for each function and tank or compartment identification, total of three (3) lights.
 - 5. Auxiliary alarm contacts for remote high and low level alarm devices.
 - 6. Numbered terminal strip for field connections to switches, domestic pump circuit, and remote alarm devices.
 - 7. Provide remote alarm panel within view of the domestic booster pump.
 - 8. Provide one set of extra terminal connections for Building Management System to monitor all system functions.

- D. Level Indicator/Gauge
 - 1. Exterior Tanks: Shand & Jurs liquid level indicator Model No. 92302, with an aluminum indicator board with gradations in feet and inches, stainless steel float, galvanized steel housing assembly and stainless steel guide wire.
 - 2. Interior Tanks
 - a. Provide clear plastic tubing with Unistrut housing and angle valves with drain.
 - b. Locate gauge on tank to be within view of the domestic booster pump.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Construct tanks in accordance with AWS specifications for vessel fabrication, with structural design in accordance with AISC latest issue and with all new material to assure against the possibility of contamination from previous usage.

- B. Interior Coating Inspection
 - 1. Inspection to commence only after the coating has sufficiently cured, usually one to five days (consult the coating manufacturer for specific curing schedule).
 - 2. Film Thickness: Check with a non-destructive, magnetic pull-off type gauge, such as Mikrotest model DFG-100 or electronic thickness gauge. Verify accuracy of thickness gauge with National Bureau of Standards certified thickness calibration plates.
 - 3. Provide written certification to the Architect and/or Owner's Representative that tests were performed and successful results obtained.
 - 4. Set water tank on the equipment pad prepared with two coats of Aegeon 1400 quick dry coal tar with final D.F.T. of 16-20 mils to cover the entire top and bottom of the water tanks (or equivalent).

- C. Fill Valves: Set floats on fill valves to provide water levels in tanks as detailed on the plans.

- D. Level Alarm Systems: Set electrodes to provide alarms at levels as detailed on plans. Provide a representative of the level alarm system manufacturer for a minimum of one day to supervise the final adjustment of the level alarms systems after installation is completed and to instruct the Owner's operating personnel in its use. The manufacturer is to maintain a local service organization and spare parts available from local stock.

- E. Tank Protection
 - 1. Locate tanks at an elevation to prevent tank from being subject to flooding conditions. Coordinate with project Civil Engineer and/or Owner's Representative to establish and/or confirm flood elevation criteria.
 - 2. Secure tanks against unauthorized entry with such protective measures as required by the Owner's Security Representative.
 - 3. Where required, seismic protection measures shall be employed in accordance with all applicable Codes and Authorities Having Jurisdiction.

- F. Installer Testing
 - 1. Tank Bottoms
 - a. Upon completion of the welding of the tank bottom, test welds by one of the following methods and shall be made entirely tight:
 - 1) Air pressure or vacuum applied to the joints, using soap suds, linseed oil, or other suitable material for the detection of leaks.
 - 2) Joints tested by the magnetic particle method.
 - b. General
 - 1) Upon completion of the tank construction, fill tank with water (furnished at the final tank site by the Contractor) using the pressure necessary to fill the tank to the maximum working water level. Any leaks in the shell, or bottom that are disclosed by the test shall be repaired by chipping or melting out defective welds and re-welding. Repair work shall be done on joints only when the water in the tank is a minimum of 2 ft. below the point under repair. The tank shall be tested as watertight to the satisfaction of the project engineer and/or Owner's Representative.
 - c. Disposal of Test Water
 - 1) The Contractor shall provide a means for disposing of test water.
 - d. Periodic Inspection
 - 1) During warranty period, periodically inspect, test, and maintain tanks in accordance with NFPA 25, local codes and facility engineering requirements.

END OF SECTION