# SECTION 13411***{Define Specification Number}***

# WELDED STEEL GROUND STORAGE TANK

PART 1 GENERAL

1.01 SCOPE

A. This specification covers the furnishing of all labor, material, equipment, tools, services, and erection of Welded Steel Water Storage Tank, as manufactured by Superior Tank Co., Inc., Rancho Cucamonga, CA or an approved equal, and as shown on the plans and specified herein.

1.02 REFERENCE SPECIFICATIONS

A. Perform the work in conformance with the following standards.

1. American Water Works Association (AWWA) Standard D100-11 Welded Carbon Steel Tanks for Water Storage.

1.03 SUBMITTALS

1. Shop Drawings: Submit shop drawings of the welded steel reservoir and all accessories for review and approval by the engineer prior to beginning any related shop fabrication or erection. Include sufficient data to show that the reservoir and accessories conform to the requirements to these Specifications. Submittals shall include:
2. Design calculations, signed by a civil or structural engineer registered in the State of ***{Enter State}.***
3. Fabrication and erection drawings and details for the reservoir and all accessories.
4. Certified mill tests on steel plate and structural members demonstrating that the physical and chemical requirements of this Specification have been met.

PART 2 PRODUCTS

2.01 GENERAL DESCRIPTION

A. The Contractor shall furnish, erect and test the tank on a gravel or concrete foundation, as required by AWWA D100-11. The Contractor shall be completely responsible for the design and construction and for the integrity and satisfactory performance of the tank during the guarantee period. The tank shall conform to AWWA D100-11, including Section 14, to the latest edition ***{Specify Code: International Building Code/ Applicable State Building Code}***, and to the requirements of the plans and these Specifications. The supplier shall submit for approval complete and detailed plans for the tank and appurtenances.

B. The welded steel tank shall have a nominal capacity of ***{Specify Capacity}***gallons. It shall have a nominal diameter of ***{Specify Diameter}*** feet and a nominal height of ***{Specify Height}*** feet. Provide the reservoir complete with all pipe connections, access openings, nozzles, taps, drains, ladders, vent, and other accessories as shown on the plans or required herein.

2.02 DESIGN DATA

A. The following data and information are supplied as a basis for design and erection of the tank and appurtenances:

1. Tank Capacity & Dimensions
2. Nominal Capacity *Specify Capacity*
3. Usable Capacity *Specify Capacity*
4. Inside Diameter *Specify Diameter*
5. Tank Height *Specify Height*
6. Seismic Design Criteria

a. Seismic Use Group *Specify Per D100 13.2.1*

b. Seismic Importance Factor, IE *Specify Per D100 13.2.2*

c. Site Class *Specify Per D100 13.2.4*

d. Ss *Specify Per D100 13.2.3*

e. S1 *Specify Per D100 13.2.3*

f. Fa *Specify Per D100 13.2.5*

g. Fv *Specify Per D100 13.2.5*

1. Design Wind Loading

a. Design Wind Speed, V *Specify Per D100 3.1.4.1*

b. Gust Factor, G *Specify Per D100 3.1.4*

c. Importance Factor, I *Specify Per D100 3.1.4*

d. Exposure Category *Specify Per D100 3.1.4.2*

1. Roof Design Loading

a. Roof Live Load *Specify Per D100 3.1.3.2*

b. Ground Snow Load *Specify Per D100 3.1.3.1*

1. Liquid to be stored Potable water
2. Allowable Soil Bearing Pressure *Specify Bearing Pressure*

2.03 TANK DESIGN

1. All plate and structural steel shall conform to AWWA D100, Section 14.
2. Tubular structural shapes shall be hermetically sealed to prevent internal corrosion. Protection solely by means of an interior coating system is not allowed.
3. The roof of the steel tank shall be sloped a minimum of 1 in. per foot.
4. Joint Welds
5. All shell joints shall be butt-welded.
6. Floor joints may be butt-welded or lap welded. In both cases an additional layer of padding shall be placed under the joint and extend a minimum of 6” either side of the joint.
7. The roof shall be of a low-cone design with a slope of %-inch on 12-inch minimum, or a self-supporting steel dome roof. The roof design shown on the plans shall be the basis of the roof design for the project.
8. Seal Welding:
9. All surface voids shall be seal welded. Surface voids include but are not limited to areas behind tank rafters, skip-welded lap joints, between back to back angle iron backing, and junction of rafters to column supports.

2.04 ACCESSORIES

A. Shell Manhole: Provide two (2) 30 inch, minimum, shell manholes located as shown on the drawings. The center of the manhole shall be located 30 inches above the bottom of the tank.

 B. Pipe Connections:

1. Provide inlet nozzle , outlet nozzle, and overflow and drain outlets as shown on the plans.

 C. Overflow Pipe:

1. Provide steel internal and external overflow pipe, internal weir box, if required, and supports as shown on the plans.

 D. Ladders:

* + - 1. Provide and install a steel tank ladder for the exterior of the tank. Equip the ladder with a safety cage and lockable cage cover. Ladder, safety cage, and other ladder accessories shall conform to the latest edition of the OSHA rules and regulations.

2. ***{Optional}*** Provide a welded galvanized steel interior ladder as shown on the plans. Ladder shall conform to the latest edition of the OSHA rules and regulations.

 E. Roof Openings:

1. A 24 inch screened vent shall be provided at the roof. The vent shall be fabricated to provide removable screened openings between the vertical support members of the vent. The screened openings of the vent shall be sized by the manufacturer to all venting of a ***{Specify Pumping Rate}*** gpm pumping rate. An effective area of 75% of screen opening shall be assumed. The screen shall consist of one layer of Type 316 stainless steel: 16 x 16 x 0.018 wire mesh insect screen.

2. The tank roof shall have a curbed, upward opening 24-inches square, minimum; hatch located near the ladder. The curb shell extend at least 4 inches above the tank. The hatch cover shall be hinged and shall have locking provisions. the hatch cover lip shall extend for a distance of 2-inches down on the outside of the curb.

F. Provide Superior Tank Model #2400 Full Travel Liquid Level Indicator with Type 316 stainless steel internals and complete with float and target board.

G. Gaskets and sealants shall meet or exceed AWWA, FDA, and EPA standards for potable water.

H. Anchor bolts and stirrups to be furnished by the Tank Contractor, if required by AWWA.

2.05 FOUNDATION

1. Prepare site in accordance with Section 02050 ***{Specify Specification Section}*** - Site Preparation, Clearing and Grubbing. Proof roll exposed subgrade with heavy rubber tire vehicle such as pneumatic-tire roller or loaded dump truck. If encountered, soft or wet soils should be undercut and replaced with compacted backfill having similar classification, moisture, and density as adjacent competent in situ soils.
2. The foundation will consist of fine gravel filled concrete retainer ring to be constructed as shown on the plans. The entire foundation area is to be cleaned and the subgrade cleared to not less than 6" below grade and compacted to 95% standard proctor density with select material.
3. The sand fill shall be installed after the concrete ring is constructed and filled with a minimum 4-inch layer free of clay lumps, and no size less than 10% passing a 200 mesh sieve. The sand shall then be wetted down and compacted by a power driven hand tamper.
4. The foundation shall be constructed of reinforced concrete per Section 03300***{Verify Specification Section}*** - Cast In Place Concrete.

PART 3 EXECUTION

3.01 CLEANING AND COATING

1. Cleaning and painting shall be done as specified in Section 09500***{Verify Specification Section}*** - Tank Coatings of these specifications.

3.02 CONSTRUCTION

A. The tank and appurtenances shall be assembled, erected, and cleaned in accordance with Section 10 of AWWA Standard D100. All weld irregularities such as sharp edges, sharp corners, and weld spatter shall be ground to a smooth surface. A door sheet may be included in the construction schedule. The door sheet must be the full height of a wall ring. Cutting of a partial section of any wall ring sheet is unacceptable.

3.03 TESTING AND INSPECTION

A. General: Inspection, testing and repair of welds shall be performed in accordance with Section 11 of AWWA D100. Vertical and horizontal shell joints shall be radiographed in accordance with AWWA D100. In addition, junctions of vertical and horizontal joints shall be radiographed to show clearly not less than two inches of horizontal shell weld length on each side of the intersection. At completion of the work, the Contractor’s representative who witnessed the inspection and test shall submit a report certifying that the tank is inspected in accordance with the above standard. The report shall include the content as specified in Section 11.2 of the Standard.

B. Bottom: All welds in the bottom of the tank shall be vacuum tested prior to the application of protective coatings. The surface of each weld shall be coated with soap suds and a vacuum tester passed over the weld. The tester shall be constructed with a suitable window to permit the operator to observe the effect of the soap suds as the tester is passed along the weld. Any leaks found shall be marked and the holes sealed by welding. Sealing by peening will not be permitted. The tester shall be equipped with a pressure gauge, and a partial vacuum of not less than 2 psi shall be maintained during the test.

C. Shell: Test by filling with water to elevation of overflow. Completed storage tank shall show no leaks at end of 24 hour test period. No charge will be made for water required to fill tank.

3.04 Disinfection:

A. General: After testing and painting has been satisfactorily completed, tank shall be disinfected.

B. Standards: Disinfecting of interior surfaces shall be performed in accordance with AWWA. After disinfection, the Owner shall take a water specimen for bacteriological test, as prescribed at Code 40 of the Federal Regulations, Sections 141.21 through 141.30, 141.41 and 141.42.

C. After disinfection, the tank shall be filled to the overflow level and allowed to stand for 5 days, minimum. After 5 days, the Owner shall take water specimens for V.O.C. test per EPA 502.2. The tank may be placed into service once acceptable test results are received.

END OF SECTION