

## **FIRE PROTECTION SPECIFICATIONS**

### **BOLTED STEEL TANK** **SECTION 13205**

#### **PART 1.00 – GENERAL**

##### **1.01 WORK INCLUDED**

###### **A. Tank Selection**

The Engineer’s selection of factory-coated bolted steel tank construction for this facility has been predicated upon the design criteria and construction methods specified. Deviations from the specified design and construction details will not be permitted.

###### **B. Drawings and Specifications**

Construction shall be governed by the drawings and specifications showing general dimensions and construction details. After approval by the Engineer of detailed erection drawings prepared by the Manufacturer, there shall be no deviation from these drawings and specifications except upon written order or approval from the Engineer.

Three (3) copies of the shop drawings covering tank, anchors, accessories, appurtenances and coatings provided shall be submitted in accordance with the “Submittals” and “Drawings and Specification” sections.

###### **C. Qualifications of Tank Manufacturer**

The Tank Manufacturer shall be a specialist in the design, fabrication, and erection of factory-coated bolted steel tanks. The manufacturer shall be quality certified, have an active API-Q1 and an ISO 9001 registration.

###### **D. Design Criteria**

Job Site Location	PH of Product
Product to be Stored	Temperature of Product
Specific Gravity	Minimum Capacity (Gallons)

Diameter (Feet)	Deck Live Load (25 PSF)
Maximum Depth (Feet) (erected)	Wind Speed (100 MPH When completely erected)
Minimum Freeboard (6 inches)	Seismic Zone
Design Pressure	

## 1.02 REFERENCES

AWWA D103 latest revision – Bolted steel tank fabrication and erection.

NFPA 22 version 1998 – Chapter 4 – Water tanks for private fire protection, factory-coated, bolted steel tanks.

## PART 2.0 – PRODUCTS

### 2.01 MATERIALS

#### A. Tank Structure

The materials, design, fabrication, and erection of the bolted steel tank shall conform to AWWA D103 latest revision, to the Principles of Standard Specification 12B of the American Petroleum Institute, or to USA Tank’s specifications which are de-rived from engineering principles, industry experiences, and the aforementioned standards and specifications.

#### 1. Steel

- a. Sheet. Steel sheets shall conform to or shall be at least equal to hot-rolled quality per ASTM A570 Grade 33 with a minimum yield strength of 33,000 psi. Minimum thickness shall be 12 gauge (0.0972” minimum)
- b. Plate. Steel plates shall conform to or at least be equal to the requirements of ASTM A36 with a minimum yield strength of 36,000 psi.
- c. Rolled Structural Shapes. Rolled structural shapes shall conform to ASTM A36.

#### 2. Bolts

- a. Galvanized bolts, nuts, and washers used in tank joints shall be minimum ½ inch bolt diameter and shall meet the minimum requirements of API 12B, Appendix A, except that bolt heads and nuts may be other than square at the option of the tank manufacture.
- b. Poly-capped bolt heads shall be used for additional corrosion protection.
- c. Other bolts shall conform to or at least be equal to the latest revision of ASTM A307.

### 3. Gaskets

- a. All bolted connections shall incorporate an EPDM (Buna N)\* prefabricated gasket minimum width 1 3/4". A single piece double-punched gasket shall be used at vertical seams which require two vertical rows of punching. Field caulking will be allowed when joining a discontinuous gasket section and at certain joint connections. Neoprene backed steel washers shall be provided at all bolts in contact with the stored liquid. No mastic sealant shall be used as the primary method of sealing the tank.

Note – Use of Buna N for wastewater applications only.

### 4. Multiple Row Punching

All sheets in the shell of the tank that require multiple vertical row punching (double or triple) must be in single stroke to insure proper alignment.

## B. Appurtenances

1. The contractor shall furnish and install the appurtenances as shown on the contract drawings and as specified below.
2. Unless otherwise noted, standard appurtenances shall be as follows per NFPA-22 and AWWA D103 latest addition:
  - a. Hatch. The tank roof hatch shall have a curbed, upward opening 24" square. The curb shall extend at least four inches above the tank. The hatch cover lip shall be hinged and provisions made for locking. The hatch cover lip should extend for a distance of two inches down on the outside of the curb.
  - b. Inlet and Outlet Connections. Inlet, outlet, and overflow connections shall conform to the sizes and locations specified on the plan sheets. Overflow shall be at least one pipe size larger than the fill line, and equipped with a weir box or concentric reducer inlet.
  - c. Discharge pipe shall be sized by the user, but not less than 6" diameter.
  - d. Pump suction nozzles shall have anti-vortex plates at least twice the diameter of the pipe.
  - e. Automatic fill piping shall be located at least 90 degrees from pump suction nozzle.
  - f. AWWA D103 latest edition wind design, seismic design, and live roof load shall be utilized. Minimum live load on roof shall be 25 psf.
  - g. First stave ring, or embedded ring, shall be either 3/16" min., or designed for a reduced net section allowable load.
  - h. Field welding is not permitted.

- i. Vent. A mushroom-screened vent shall be furnished above maximum water level of sufficient size to accommodate normal inlet and outlet flow. Roof vent with 3/8" min screen is required. Venting area to be at least 150% of area of largest fill or discharge pipe. The overflow pipe shall not be considered to be a tank vent. The vent shall be so designed and constructed as to prevent the entrance of birds or animals.
- j. Outside Tank Ladder. An outside OSHA ladder shall be furnished at the location designated.
- k. Inside wall mounted ladder.
- l. Liquid Level Indicator. A liquid level indicator with stainless steel float and target board shall be installed as detailed on the plans and to the tank manufacture's specifications.
- m. Two (2) - 24" x 46" Flush Cleanout Door (24" Diameter Shell Manway). The flush cleanout door (shell manway) shall conform to the sizes and locations specified on the plan sheets.
- n. Tanks subject to freezing shall be heated.
- o. Tanks shall be periodically inspected, tested, and maintained in accordance with NFPA-25.

### **C. Coating**

All metal plates, supports, members, and miscellaneous parts, except bolts, certain accessories, and appurtenances, shall be factory coated in accordance with the provisions of these specifications. Field coating, except for touch-up will not be permitted.

Interior: Thermally cured epoxy Epicon 925.

Exterior: Amine Epoxy primer with baked acrylic finish coat or equal.

## **2.02 ACCEPTED TANK SUPPLIER**

The steel tank and accessories furnished under this section shall be supplied by USA Tank Storage Systems of Seneca, Missouri (417-776-2500).

## **PART 3.00 – EXECUTION**

### **3.01 APPLICATION PROCEDURES FOR FACTORY COATING**

#### **A. Surface Preparation**

1. Tank parts are thoroughly washed and rinsed to remove grease, oil, and foreign matter.

2. Parts are then immediately oven-dried.
3. Parts are grit-blasted to SSPC-SP10-63T (near white blast cleaning) to 1-2 mil profile.
4. All parts must be coated within 15 minutes after blasting, and no further processing other than coating application shall be done.

#### **B. Interior Coating**

1. Thermally cured modified epoxy powder, Trico Bond EP by Columbian TecTank Company (includes underside of the steel floor)
2. Electrostatic applications of FDA and NSF approved thermoset epoxy, 5.0 mil average dry film thickness

#### **C. Exterior Coating**

1. Thermally cured modified epoxy powder, Trico-Bond EP and acrylic polyurethane by Columbian Tec Tank Company.
2. First Coat is to be a powder application of modified epoxy Trico-Bond EP, 2.5 mils average dry film thickness.
3. Second coat of acrylic polyurethane, 1.5 mil average dry film thickness.

### **3.02 DRYING AND SHIPPING COATED PARTS**

#### **A. Curing**

1. Baking ovens to be used after each coat. Final coat is to be cured in bake oven for at least 15 minutes.

#### **B. Preparation for Transport**

1. Material to be marked or tagged with part number and order number for field assembly requirements.
2. Tank material to be placed in racks or on pallets to facilitate transportation to jobsite. The racks will also prevent scratching by erection crews.
3. Touch-up paint with instructions for application by erection personnel.

### **3.03 TANK FOUNDATION**

1. The tank foundation shall be designed by the Owner's Engineer to safely sustain the loads from the tank.

2. Steel Bottom Tanks. The foundation shall be installed per AWWA D103 latest revision, Section 11.4. Supplying and installing these foundation materials shall be the responsibility of the customer.
3. The foundations shall be level with differential not exceeding +/- 1/8 inch in any 30-foot circumference under the shell. The levelness on the circumference shall not vary more than +/- 1/4 inch from an established plane.
4. Concrete used for foundations shall not be less than 3000 psi strength. Except for tanks with slab foundations, the steel bottom shall be crowned up at the center 1 inch per 10 feet with a minimum of 3" sand cushion. 1" sand or 1/2" cane fiberboard shall be used between a slab and steel bottom. Concrete ringwalls shall be a minimum of 10" wide and extend at least 30" below grade, and 6" minimum above grade.
5. Soil reports are required for foundation designs.

**Option:**

Base setting stave placement and concrete shall be factory certified in accordance with the tank manufacturer's recommendations. The tank manufacturers shall certify the placement of the setting stave.

**3.04 SHIPPING**

All plates, supports, members, and miscellaneous parts shall be packaged for shipment in such manner to prevent abrasion or scratching of the finished coating.

**3.05 ERECTION**

Field erection of factory-coated bolted steel tanks shall be in strict accordance with the tank manufacturer's recommendations. Particular care shall be exercised in handling and bolting of the tank plates, supports, and members to avoid abrasion or scratching of the coating. Touch-up coating shall be done in accordance with tank manufacturer's recommendations where and as directed.

**4.00 – TESTING**

**4.01 Testing**

Following completion of erection how clean the tank shall be tested for liquid-tightness by filling the tank to its overflow elevation. Any leaks disclosed by this tank test shall be corrected by the Erector Contractor in accordance with the tank manufacturer's recommendations. Water required for testing shall be furnished at the time of erection completion by the Owner without charge.

Tanks shall be periodically inspected, tested, and maintained in accordance with NFPA-25.

## **5.00 WARRANTY**

### **5.01 Warranty**

The tank manufacture shall warrant the tank system against any defects in workmanship and materials for a period of one (1) year from the date of final acceptance. In the event any defect should appear, it shall be reported in writing to the manufacturer during warranty period.

**END OF SECTION**