

TECHNICAL SPECIFICATIONS FOR WATER TANK

6 General

6.0 Scope of Work

The scope of work shall include furnishing and erection of bolted rolled tapered panel (RTP) steel tanks for RO water storage **(2nos of 100 m³ storage)**. The scope shall also include tank structure, factory powder coat process and all tank appurtenances with all the required labors, materials and equipment.

6.1 Qualifications of Tank Supplier

The client's selection of a fusion bond powder coated bolted steel tank shall be predicated on thorough examination of design criteria, construction methods, and optimum coating for resistance to internal and external tank corrosion.

Deviations from the specified construction or coating details shall not be permitted.

The manufacturer shall fabricate and coat the tank in the same facility which it owns and operates.

The tank shall be LIQ Fusion 7000/8000 FBE™ (or equivalent) powder coated, RTP bolted tank. **(As manufactured by Tank Connection Affiliate Group or equivalent)**

Fusion bond powder coated tank products provided by other manufacturers shall be considered for prior approval by the Clients representative.

Erection of the structure shall be by the tank manufacturer only. The contractor shall be fully responsible for the entire installation including tank erection, and the ultimate water tightness of the complete installation.

Strict adherence to the standards of fabrication, erection, product, quality, and long-term performance shall be met.

The tank suppliers wishing to pre-qualify shall submit the following to the client for consideration:

- Typical tank structure drawings.
- List of tank materials, appurtenances and tank coating technical specifications.
- Resume/experience of job installation superintendent.

- The contractor shall have the experience and knowledge necessary to furnish and erect the tank with highest degree of precision. Under no circumstances shall an inexperienced contractor be awarded the contract. The contractor shall be fully responsible for the entire installation including appurtenances and the final product.
- The components of the tank in contact with stored water shall be certified to meet ANSI/NSF additives standard No. 61.
- Only bids from tank suppliers who have successfully met pre-qualified criteria shall be considered.

6.2 Submittal Drawings and Specifications

Construction shall be governed by the approved drawings and specifications showing general dimensions and construction details. There shall be no deviation from the drawings and specifications, except upon written order from the Clients representative.

When approved, two sets of such prints and submittal information shall be returned to the contractor marked "APPROVED FOR CONSTRUCTION" and these drawings shall then govern the work detailed there on. The approval by the client of the tank supplier's drawings shall be an approval relating only to their general conformity with drawings and specifications and shall not guarantee detail dimensions and quantities, which remains the contractor's responsibility.

6.3 Tank Dimensions

Fusion bond powder coated bolt tank shall have a nominal inside diameter of 5.5m (± 500 mm) and nominal eave height of 5.0m (± 500 mm). Each tank shall have a storage capacity of 100m³.

6.4 Tank Design Specifications

The materials, design, fabrication and erection of the bolt together with tank shall conform to AWWA standard for "Factory-Coated Bolted Steel Tanks for Water Storage"- AWWA D103, latest addition.

The tank coating system shall conform solely to section 10.6 of thermoset powder coatings of AWWA D103, latest addition.

The RTP bolted tank shall have lap joint connections on both vertical and horizontal shell seams.

6.5 Tank Material Specifications

6.5.1 Sheet and plate materials

Mild Strength Carbon Steel:

- 0.1046 inch (2.7 mm) to 0.1345 inch (3.4 mm), ASTM A570 Grade 40, yield strength of 40 ksi (276 N/mm²)
- 0.1875 inch (4.8 mm) to 0.500 inch (12.7 mm), ASTM A36 Grade 36, yield strength of 36 ksi (248 N/mm²)

High Strength Carbon Steel:

- 0.1875 inch (4.8 mm) to 0.500 inch (12.7 mm), ASTM A572 Grade 50, yield strength of 50 ksi (345 N/mm²)
- 0.1875 inch (4.8 mm) to 0.500 inch (12.7 mm), ASTM A572 Grade 60, yield strength of 60 ksi (414 N/mm²)
- 0.1875 inch (4.8 mm) to 0.500 inch (12.7 mm), ASTM A572 Grade 70, yield strength of 70 ksi (483 N/mm²)

Stainless Steel:

- 0.1046 inch (2.7 mm) to 0.500 inch (12.7 mm), ASTM A304, yield strength of 30 ksi (207 N/mm²)

Steel for tank wall, roof and floor shall be of minimum 12 gauge steel.

6.5.2 Bolt Fasteners

Bolts used in tank shall be plastic encapsulated grade 8 bolts with flat washers and hex nuts. It shall have high impact polypropylene copolymer encapsulation of entire bolt head.

Bolt lengths shall be sized to achieve a neat and uniform appearance. Excessive threads extending beyond the nut after torquing shall not be permitted.

6.5.3 Structural shapes

- Angle and C-shapes - ASTM A36, yield strength of 36 ksi (248 N/mm²)
- W-shapes - A992 Grade 50, yield strength of 50 ksi (345 N/mm²)
- Pipe - A53 Grade B, yield strength of 42 ksi (290 N/mm²)

6.5.4 Sealants

The lap joint sealant shall be a one component, moisture cured, elastomeric sealant as appropriate for water tanks. The sealant shall be suitable for contact with potable water and shall be certified to meet NSF additives standard 61 for indirect additives.

The sealant shall be used to seal lap joints and bolt connections and edge fillets for sheet notches, starter sheets and all required areas. The sealant shall have excellent adhesion to the fusion bond coating, low shrinkage, and shall be suitable for interior and exterior use.

6.6 Coating Specifications

6.6.1 Cleaning

Following the fabrication process, sheets and tank components shall be thoroughly washed, rinsed and dried.

6.6.2 Surface Preparation

Sheets and tank components shall be blasted on both sides providing a surface profile of SSPC SP10.

6.6.3 Powder Coating System

After cleaning and blasting, the sheets and tank components shall receive fusion bond powder coating on both sides of steel. The powder coating shall be applied with an electrostatic process. The thermoset powder coat system shall be as specified:

Liquid Storage	Fusion System	DFT Range (min/max)
Interior lining	LIQ Fusion 8000 FBE™	5-9 mils
Exterior primer	EXT Fusion 8000 FBE™	3-5 mils
Exterior top coat	EXT Fusion SDP™	3-5 mils

* DFT - Nominal dry film thickness

Holiday testing shall be performed to ensure interior liquid zone coating is 100% holiday free.

6.7 Tank Structure

6.7.1 Fusion Bond Powder Coated Steel Floor

The floor shall be a fusion bond powder coated bolted steel floor. Bolted steel panels shall be placed over concrete slab. Non-extruding and resilient bituminous type filler should be placed between the tank floor and concrete slab to act as a cushion.

6.7.2 Side Wall Structure

Field erection of the fusion bond powder coated, bolted steel tank (side walls with no web truss) shall be in strict accordance with the procedures outlined by the manufacturer using factory trained erectors.

Particular care shall be taken in handling and bolting of the tank panels and members to avoid abrasion of the coating system. Prior to a liquid test, the Clients representative may visually inspect all the surface area of the tank.

The placement of sealant on each panel shall be inspected prior to placement of adjacent panels. However, the Clients representative’s inspection shall not relieve the contractor from his responsibility for liquid tightness.

No backfill shall be placed against the tank side wall without prior written approval and design review of the tank manufacturer. Any back fill shall be placed according to the strict instructions of the tank manufacturer.

6.7.3 Roof

Roof sheet design shall be as per AWWA D103 latest edition and roof structure design shall be as per the AISC Manual of Steel Construction.

The roof shall be steel cone style with 9 to 10-degree slope. It shall be clear span and self-supporting with internal rafters. Both live and dead loads shall be carried by the tank walls.

6.7.4 Appurtenances

Qty	Description
1	Identification Plate: A manufacturer's name plate shall be affixed on the tank which shall list the tank serial number, tank diameter and height, and maximum design capacity.
1	20" Diameter mushroom ventilator with aluminum bird screen.
1	24" Square roof manway with lockable hinged cover
1	24" Diameter shell manway with bolt-on hinged cover
3	2" Diameter 150# RFSO single flanged nozzle
1	4" Diameter internal 90-degree mitered elbow w/ weir cone & external 150# RFSO flanged nozzle for overflow
1	Full deck perimeter guardrail
1	External caged ladder with lockable hoop, including safety chain at entrance point
1	Liquid level indicator w/ gauge board & high visibility target – Full travel – Metric display (mechanical, float-type)
1	Lot of ½" thick asphalt impregnated fiberboard between tank bottom & concrete foundation
1	Lot of 4 mil polyethylene sheeting between foundation & fiberboard / tank bottom
1	Set of tank drawings shown in both imperial & metric dimensions (1 hardcopy, 1 pdf electronic format).

6.8. Tank Installation

Field erection of the bolted steel tank shall be in strict accordance with manufacturer's procedures using factory trained and certified erectors.

Particular care shall be taken to protect the baked on powder coated panels from damage (i.e., scratches, abrasion etc.) during field installation.

The tank shall be constructed utilizing synchronized (hydraulic screw) jacking process, which keeps construction crews at grade level for safety and point access quality control. Any coating damage shall be repaired per manufacturer's recommendations. No back fill shall be placed against the tank side wall during or after the construction process.

6.9. Field Testing

After complete erection and cleaning of the tank, the structure shall be tested for liquid tightness by filling tank to its over flow elevation. The contractor in accordance with the manufacturer's recommendations shall correct any leaks disclosed by this test.

The client shall furnish water required for testing at the time of tank erection completion, and at no charge to the contractor. Safe disposal of test water shall be the responsibility of the contractor.

6.10. Disinfection

The tank structure shall be disinfected at the time of testing in accordance with AWWA standard C652-02 "Disinfection of Water Storage Facilities" using chlorination method number two (2).

Disinfection shall not take place until tank sealant has fully cured.

6.11. Tank Manufacturer's Warranty

The tank manufacturer shall include a warranty on tank materials and workmanship for a specified period. As a minimum, the warranty shall provide assurance against defects in material, coatings and workmanship for a period of one (1) year and as a minimum, the warranty on the interior tank lining shall be of five (5) years.