



SPECIFICATION

BOLTED STEEL USA TANK STORAGE SYSTEMS FOR DRY BULK SOLIDS STORAGE

GENERAL

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.

DRAWINGS AND SPECIFICATIONS

After receipt of order, the Bidder is required to furnish, for the approval of the Engineer, complete specifications and construction drawings for all work shown on the bidding drawings. When approved, one set of such prints will be returned to the Bidder marked *Approved*, and these drawings will then govern the work detailed thereon. The approval by the Engineer of the Contractor's drawings shall be an approval relating only to their general conformity with the bidding drawings and specifications and shall not guarantee detail dimensions and quantities. Construction shall be governed by the Owner's drawings and specifications showing general dimensions and construction details. After approval by the Engineer of detailed erection drawings prepared by the Bidder, there shall be no deviation from the drawings and specifications except upon written order or approval from the Engineer.

QUALIFICATIONS OF BIDDER

The Bidder shall be a specialist in the design and fabrication of factory-coated, bolted steel tanks and shall submit with his bid a list of five comparable tanks now in service in the United States for references.

I. General

Owner's name _____
Jobsite location _____
Product to be stored in tank _____
Loose density of product _____ lbs./cu. ft.
Maximum compacted density of product _____ lbs./cu. ft.
Angle of repose _____ degrees
Required working capacity each tank _____ cu. ft.
Suggest tank diameter and straight sidewall height _____
Quality system conforms to requirements of ISO 9001, Certificate No. QSC- _____
Hopper slope (45°) (60°) (Other _____)
Clearance from foundation to hopper discharge _____ feet
(Mass Flow) (Funnel Flow) design loads _____
Operating pressure and vacuum _____ oz./sq. in.
Dust collector and/or equipment load lbs. _____
Roof live load: PSF _____
Earthquake: Seismic Zone per UBC _____
Wind: mph per ASCE 7-98 _____

II. Scope

- A. Furnish all material necessary for the tanks and appurtenances as specified hereinafter.
- B. Tanks will be self-supporting and erected on foundation or structures furnished by Owner.
- C. Receiving, unloading, and erection of tanks will be by (Owner) (Vendor).

III. Design Criteria

- A. Vendor to quote on the nearest standard size bolted steel tanks of manufacturer.
- B. Standard wind design is 90 MPH wind velocity using ASCE 7-98 as a reference.
- C. Seismic design (if applicable) is to be based on the 1997 edition of the *Uniform Building Code*. When designing a tank in a seismic zone, the load producing the higher stresses comparing wind and seismic will control the dynamic portion of design.
- D. Combined live and dead roof load shall be uniformly distributed with all nozzle, manhole, and filter locations designed for a minimum of 200 lbs. each. Live and dead loads to be a combined minimum of 25 psf. Roof to have 1:12 slope for water drainage. Roof is not designed as a working platform.
- E. Tank wall design is to be based on the critical buckling formula from the book *Structural Analysis of Shells* by Baker, Kovalevsky & Rish, page 230. The tank product area is to be designed using Janssen's formula for cylindrical bins.
- F. Tank shall be designed for (center fill) (off-center fill) (center discharge) (off-center discharge)
- G. Tank shall be designed for (mass) (funnel) flow loads.
- H. (Tank operating pressure shall be 0.5 oz. per square inch negative and 2.0 oz. per square inch positive.) (Design tank for atmospheric pressure.)
- I. Tank design to be based on a level full capacity using the maximum compacted density of product.
- J. Owner solicits recommendations that may improve the price, delivery, or performance of tanks. As an alternate, Vendor is invited to quote changes in physical dimensions, modifications to the design, fabrication, or stock of Vendor's standard equipment that would reduce the initial cost of the equipment as specified without changing the design premise. Alternate quotations shall be listed as such in the proposal specifying the alternate and the price and delivery for the alternate.

IV. Materials Specifications

A. Shell Structure

The materials, design, and fabrication of the bolted steel shell shall conform to the principles of *API Specification 12B* of the American Petroleum Institute, except as hereinafter modified:

1. Materials

- a. Carbon Steel
 - 1) Hot Rolled Sheet and Plate - ASTM A1011 Grade 40 or equal with a minimum yield strength of 40,000 psi..
 - 2) Structural Shapes - Carbon steel structural shapes shall conform to ASTM A36 or ASTM A992.
- b. Other Materials
 - 1) Aluminum - 5052-H32, 6061-T6 typical grades (limited size).
 - 2) Stainless steel - 304, 316, 316L, 317 typical grades.
 - 3) Other grades of carbon steel, stainless steel and aluminum are available.

2. Bolts

- a. Bolts used in shell joints shall be 1/2 inch diameter and shall meet or exceed *API Specification 12B*. USA Tank (USA TANK) standard bolt coating is mechanically galvanized per ASTM B695, Class 50.
- b. Anchor bolts conform to ASTM A36 or A307.
- c. Other bolts shall meet or exceed ASTM A307 or A325.

3. Gaskets

Bolted connections shall incorporate a nitrile prefabricated gasket MIL-G-1086D (or equal) (white EPDM for FDA) (Viton, high temperature) minimum width (one inch) (1.875 inch).

4. Coatings

All carbon steel plates, members, and miscellaneous parts (except bolts) shall be factory coated in accordance with the provisions of Section B of these specifications.

B. Coating Systems

1. Interior coating (product zone) shall be _____
Interior coating (skirt area) shall be _____
2. Exterior coating shall be _____
3. EdgeTec™: Exclusive coating system for enhanced edge protection of fabricated steel.

C. Appurtenances

STANDARD ACCESSORIES FURNISHED WITH TANK

2' x 5' walk-in door in skirt below hopper
20" center roof dome with cover plate
Foundation anchor bolts and saddles
Hardware and gasketing for assembly of tank

OPTIONAL ACCESSORIES

3'-0" x 6'-8" walk-in door with a 12" x 24" louver in lieu of standard 2' x 5' door
Hillside flange in deck for mounting filter (size and weight required)
Louvers for ventilation in skirt below hopper
20" diameter access in hopper or sidewall
12" diameter aluminum slidegate with control handle
Stub and flanged nozzles in deck and sidewall
Openings for level indicator
20" diameter ventilator in deck
Plastic cap bolts
20" diameter dust-tight manhole in deck
20" or 24" diameter combination manhole, pressure vacuum valve,
(2 oz. pressure and 0.5 oz. vacuum). Recommended for use with filter.
20" diameter hillside dome with cover for deck
Special hopper outlet opening
**Deck perimeter guardrails with toeboard (OSHA)
**Outside ladders with safety enclosures and rest platforms (OSHA)
**Crossovers for use between tanks (2'-6", 4', 6' x 8' long) (OSHA)
Exterior push caps

D. Shipping

1. All tank components and miscellaneous parts shall be prepared for shipment in such a fashion as to minimize damage of finished coating system.
 2. Shipment will be by truck or ocean container if export.
- **Hot-dip galvanized

BOLTED TANK SPECIFICATIONS

I. General

All labor and equipment furnished in this proposal to be guaranteed against defects in workmanship for a period of one year after delivery. This warranty excludes maintenance and repairs caused by normal usage and wear or abuse.

II. Owner to Furnish

- A. Any applicable state or local taxes on the equipment.
- B. Foundations.

III. Owner Agrees to the Following Conditions:

Provide adequate space adjacent to foundation for unloading.

BOLTED TANK ERECTION SPECIFICATION

I. General

A. Erection of the following USA Tank

Quantity _____

Size _____

Ladder and crossovers _____

Sketch or general description of accessories and coatings _____

B. Erection to start approximately , _____ 2 _____

C. Labor (union) (nonunion) (prevailing wage {union, nonunion})

II. Erector to Furnish/Conduct

A. All scaffolding, labor and tools unless otherwise specified.

B. Supervision at the jobsite for duration of project.

C. Labor to touch up erection scratches in the field per USA TANK procedures.

D. Certificate of Insurance prior to commencing construction.

E. Exterior water spray test to ensure silo construction is weather tight.

III. Owner to Furnish

A. Building permits, fees, licenses, etc.

B. Foundations/grouting

C. Builders' Risk Insurance

D. 120 Volt/AC 60 Amp current within 50 feet of work area.

E. Water supply, hose and nozzle for exterior water spray test conducted by erector.

F. Adequate storage space adjacent to foundation for staging of materials and equipment.

G. Unloading of materials at jobsite adjacent to foundation.

H. Operating engineer if union installation is required.

I. Dumpster/sanitary facilities.

COATING SPECIFICATIONS AVAILABLE FOR BOLTED USA TANKS

INTERIOR COATINGS

SURFACE PREPARATION

- A. Tank parts are thoroughly power-washed and rinsed to remove grease, oil and foreign matter.
- B. Cleaned parts are oven-dried.
- C. Parts are steel grit blasted to a near-white finish (SSPC-SP10) with a nominal 2 mil surface profile.

TRICO BOND EP

- A. One coat of NSF and FDA accepted epoxy powder, Akzo Nobel HE002Q (or equal), to 5.0 mils DFT.

CURING AND SHIPPING

- A. Baking oven to be used after each coat.
- B. Material to be marked or tagged with part mark and order number for field assembly requirements.
- C. All coated parts shall be inspected prior to shipment.
- D. Tank staves to be placed in disposable storage and handling racks to facilitate transporting to jobsite. Racks also minimize coating damage during transit and field handling.
- E. Touch-up paint with instructions shall be included for application by erection crew.

EXTERIOR COATINGS

SURFACE PREPARATION

- A. Tank parts are thoroughly power-washed and rinsed to remove grease, oil and foreign matter.
- B. Cleaned parts are oven-dried.
- C. Parts are steel grit blasted to a near-white finish (SSPC-SP10) with a nominal 2 mil surface profile.

TRICO BOND EP with ALIPHATIC ACRYLIC POLYURETHANE FINISH

- A. One coat of NSF and FDA accepted epoxy powder, Akzo Nobel HE002Q (or equal), to 3.0 mils DFT
- B. One coat aliphatic acrylic polyurethane, Technical Coatings #975-W-426 white (or equal), spray- applied to 1.5 mils DFT. (Light green, light blue, light gray or light brown also available.)
- C. Coating system to have 4.5 +/- 0.5 mils DFT.

CURING AND SHIPPING

- A. Baking oven to be used after each coat.
- B. Material to be marked or tagged with part mark and order number for field assembly requirements.
- C. All coated parts shall be inspected prior to shipment.
- D. Tank staves to be placed in disposable storage and handling racks to facilitate transporting to jobsite. Racks also minimize coating damage during transit and field handling.
- E. Touch-up paint with instructions shall be included for application by erection crew.