

# MODEL SPECIFICATION FOR CORGAL 4203-WT-CHR TANK – 30 DEGREE ROOF

## CORRUGATED, GALVANIZED STEEL WATER STORAGE TANK

### PART 1 GENERAL

- 1.01 SECTION INCLUDES  
Water storage tanks
- 1.02 RELATED SECTIONS  
Water supply piping, water use piping, electrical, irrigation, foundations, site plans.
- 1.03 REFERENCES  
IBC, FDA , NSF-61
- 1.04 SUBMITTALS  
Tank dimension drawings shall be submitted for approval prior to tank materials fabrication.
- 1.05 QUALIFICATION AND EXPERIENCE  
Tank fabricator shall be experienced in manufacturing corrugated galvanized steel bolted tanks. Tank installer shall be experienced in the installation of tanks and working on commercial construction job sites. Tank installer shall be trained in confined space protocols (OSHA) and be able to prove a minimum of five (5) years of tank building experience.
- 1.06 DELIVERY, STORAGE AND HANDLING  
Tank materials shall be shipped from factory on wood pallets designed to protect materials from normal shipping damage. Tank materials shall be stored to prevent the development of white rust onto galvanized steel.
- 1.07 WARRANTY  
The manufacturer shall warrant the tank structure against defects in workmanship and materials for a period of thirty (30) years from the date of shipment of the materials from the factory. The manufacturer shall warrant the main liner against defects in workmanship and materials for a minimum of (10) ten years from the date of shipment of the materials from the factory on a pro-rata basis.

### PART 2 PRODUCTS

- 2.01 WATER STORAGE TANK  
The water storage tank shall be a CorGal Model **4203-WT-CHR** with standard 30 degree corrugated roof having a nominal capacity of **104,000** US gallons. Nominal tank dimensions shall be 42'-0" diameter, 10'-9" eave height, and 23'-1" overall height.
- A. General  
The water storage tanks shall be standard factory engineered galvanized steel tanks with liquid tight liners. The water storage tanks shall be assembled and erected on site. The tank structure shall consist of corrugated, galvanized steel wall sheets, roof panels, one roof panel with access hatch, standard peak cap, roof ladder angles, anchor clips and necessary hardware for tank assembly.
- B. Acceptable manufacturers  
Water Storage Tanks, Inc. ([www.waterstoragetanksinc.com](http://www.waterstoragetanksinc.com); 800-463-1898)
- C. Bolted Tank Structure  
Galvanized steel tank wall and roof panels shall be pre-punched at the factory for field assembly.
- D. Preliner

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An 8 oz. black geotextile preliner shall be installed inside of the tank structure. The preliner shall cover the tank floor and the walls on all surfaces at which the main liner could contact the tank structure.

### E. Main Liner

Water containment system shall be a factory welded seam, flexible membrane main liner. The liners shall be installed inside of the water tank by the CorGal<sup>®</sup> method utilizing liner hanger bolts, seal washers and grommets for suspension.

## 2.02 TANK DESIGN CRITERIA

Water tank shall be designed to meet or exceed Seismic Zone 2B (Seismic Design Category C) conditions, 90 MPH (UBC), 110 MPH (IBC) wind speed and 20 PSF roof live load. The tank structure shall be designed to contain potable or non-potable water having a density of 62.4 pounds per cubic foot.

## 2.03 STRUCTURAL MATERIALS

Water tanks shall be manufactured from high yield strength US steel (minimum of 57 ksi (393 MPa) yield strength for wall panels) originally sourced from a US steel mill and rolled/corrugated in a US plant.

Wall sheets shall be continuous 2-2/3" depth x 1/2" pitch (67.7 MM x 12.7 MM) annularly corrugated galvanized steel, 20 gauge steel or heavier with minimum yield strengths of 57,000 psi (3990 Kg/CM<sup>2</sup>) (Tensile strength 65,000+ psi [4550 Kg/CM<sup>2</sup>+]). All zinc coating shall conform to G-115 (275 grams/square meter) specifications or higher. Bottom wall sheets have an inward return flange for additional bearing on foundation. Wall sheets shall have a coverage length of 9' 4-1/2" (2,858 M) long, except for some 6' 3" (1,905 MM) long sheets used adjacent to the access door.

Holes in vertical seams shall be punched for single row or double row connections at 1-1/3" o.c (34 MM). Use of single row or double row of bolts at vertical seam is dependent upon diameter and depth of tank.

Horizontal seams shall have a single lap connection with a maximum bolt spacing to be 9-3/8" (238 MM).

One-piece, 12 gauge (2.67 MM) or heavier galvanized steel die-formed or welded anchor clips shall be supplied for a minimum of one anchor clip per base wall panel. Anchor clips shall be bolted to the tank wall with four bolts to contact a concrete base.

Water tank roofs shall have a 30° slope, and use single-stage self-supporting roof sheets. Roofs shall be designed for a 2 psf dead load, 20 psf live load, 20 psf snow load, and a peak equipment load rating of 2000 pounds (907 Kg). The tank shall be capable of being engineered for higher load ratings should the local conditions require it.

Roof sheets shall have triangular sections of galvanized steel, with brake-formed raised ribs along each side, flat area between ribs and a 90° formed drip edge at the eave. Roof panels shall be manufactured from G-115 galvanized steel conforming to ASTM A 446, Grade C, or greater.

Roofs of tanks 27' through 48' (8.23 M – 14.63 M) diameter shall have 36 roof panels. Panels shall have a formed box-type rib with a rib height of 3-1/4 inch (82 MM) rise above flat area. Roof shall be a multi-stage engineered, raftered system utilizing A653 galvanized steel with a thickness of 12 gauge in an I-beam or channel

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configuration. Panels shall have a formed box-type rib with a rib height of 3-1/4 inch (82 MM) rise above flat area.

All roof panels shall be connected to the eave of the tank with center clips and a varying number of rib clips depending on tank diameter. Holes in the top ring wall sheets shall be factory punched for clip installation. Press-on bulb type neoprene eave seal and silicone caulking shall be used to seal between the top wall panel and the roof panel.

Roof ladder cleats shall extend from eave to center cap. Ladder cleats shall consist of galvanized steel cold-formed angles of varying lengths bolted to top of one roof panel.

### 2.04 TANK ACCESS

A 36" round access hole with cover shall be at the top center of the roof. For tanks 42' in diameter or greater, a 31" X 18" rectangular access hole with hinged cover shall be located on the lower end of one roof sheet. A 24" X 18" trapezoidal access hatch shall be an appropriate replacement. A 20" X 40" bolted side access panel shall be located 22" above the floor on a side panel. The side access shall be bolted closed before final installation of the main liner.

### 2.05 TANK PENETRATIONS

Tank penetrations through the floor of the tank or the tank wall within the water storage level shall be completed utilizing modified schedule 80 PVC flange sets. Flanges shall be bolted together with stainless steel or brass hex head cap screws with bonded sealing washers at all liquid side holes. Liquid seam sealant may be used to ensure effective sealing.

It is NOT acceptable to utilize flanges which use a single set of through-bolts which essentially "sandwich" the liner and flanges faces to the steel wall. This method may cause additional leak points and may compromise the structural integrity of the tank wall.

### 2.06 TANK FOUNDATION

The tank foundation shall be a concrete pad that will extend at least 9" outside of the tank wall in all directions. The foundation design and construction is not covered by this section of the specifications.

### 2.07 HARDWARE

All bolts and nuts shall be electro-galvanized with JS-1000 clear coat protective coating. Roof bolts shall have factory-installed steel-backed vinyl washers. Wall sheet bolts shall have slotted button heads for insertion from inside toward outside. All bolts shall be heat treated and meet SAE Grade 8.2 or stronger specifications.

### 2.08 FLEXIBLE MEMBRANE LINER

The flexible membrane liner shall have minimum a rated thickness of 24 mil (+/- 10%) and a minimum finished coated weight of 22.0 oz/yd<sup>2</sup> (+2/-1 oz/yd<sup>2</sup>). The liner shall be a PVC coated polyester fabric liner or polypropylene coated fabric reinforced liner. If the tank is intended for potable use, then the liner shall carry the NSF-61 certification. The liner shall be fabricated with a minimum of 1.5" factory welded seams and shall have a poly rope in the top hem for reinforcement. Metal or PVC grommets shall be evenly spaced along the top hem to facilitate the CorGal<sup>®</sup> method of liner hanging.

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### 2.09 ANCHOR CLIPS

The anchor clips and anchor bolts shall conform to the structural design calculation package, if provided, and shall always meet site-specific requirements to properly anchor the tank in accordance with seismic, wind load, and other environmental conditions. Anchor clips shall be placed no less than every 39" around the perimeter of the tank.

Where seismic anchors are not required, the base anchor shall be a pre-formed anchor clip made of 12 GA. hot dipped galvanized steel which conforms to the tank wall corrugations. The anchor clip shall have a 1" hole in the base to accommodate the specified anchor bolt. The anchor clip shall be secured to the wall of the tank with no fewer than four 3/8" bolts.

Where seismic anchors are not required, but wind loads or other environmental conditions exceed base tolerances, then a heavy duty anchor clip shall be used. The heavy duty anchor clip shall be made from 7 GA. hot dipped galvanized steel. The anchor clip shall have a 1" hole in the base to accommodate the specified anchor bolt. The anchor clip shall be secured to the wall of the tank with no fewer than four 3/8" bolts.

Where seismic anchor clips are required, an anchor "chair" shall be utilized with the anchor bolt extending through the base plate and through a 1" hole in the top plate of the chair. A minimum of 9 15/16" inches shall separate the two plates to allow for stretch of the anchor bolt during a seismic event. Additional spacing may be required for various duty of chairs. The anchor chair shall be secured to the wall of the tank with no fewer than six 3/8" bolts.

## PART 3 EXECUTION

### 3.01 INSTALLATION

Tanks shall be and assembled by personnel trained and experienced in the erection of bolted steel tanks and the installation of flexible membrane liners so as to not void any manufacturer warranties. Installation personnel entering the tank must be trained on confined space OSHA protocols.

### 3.02 FIELD QUALITY CONTROL

A representative of the tank materials supplier shall inspect the tank structure before installation of the preliner and main liner. Tank assembly contractor shall comply with tank supplier recommendations for the proper assembly techniques.

### 3.03 CLEANING and MAINTENANCE

Water tanks are classified as confined spaces and qualified personnel should be employed for any tank entry. The preferred method for cleaning the tanks is to open the bottom drain valve and drain the tank. Then open the roof side cover and use a hand-held water hose to wash down the tank walls and floor toward the tank drain. After cleaning is complete, close and secure the roof access cover and close the bottom drain valve.