

**SECTION 33 12 17.01
SURGE TANK**

EQUIPMENT AND COMPONENT NUMBER(S)

TK-7002: Reclaimed Water Surge Tank.

LCP-7002: Reclaimed Water Surge Tank Local Control Panel.

PART 1 GENERAL

1.01 RELATED SECTIONS

A. Related sections include, but not limited to, the following:

1. Division 01, General Requirements.
2. Section 03 62 00, Grouting.
3. Section 05 50 00, Metal Fabrications.
4. Section 09 90 00, Painting and Coating.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Society of Mechanical Engineers (ASME):
 - a. B16.5, Pipe Flanges and Flanged Fittings.
 - b. B16.11, Forged Steel Fittings, Socket-Welding and Threaded.
2. National Electrical Manufacturers Association (NEMA): ICS 1, General Standards for Industrial Control and Systems.
3. NSF International (NSF):
 - a. ANSI 61: Drinking Water System Components - Health Effects.
 - b. ANSI 372: Drinking Water System Components - Lead Content.
4. Steel Structures Painting Council (SSPC):
 - a. SP 6, Commercial Blast Cleaning.
 - b. SP 10, Near-White Blast Cleaning.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. Complete dimensional fabrication drawings of surge tank, accessories, and piping.
 - b. Complete piping schematic drawings showing air and liquid piping, and flows directly associated with surge tank.
 - c. Fabrication drawings of surge control tank panel.

- d. Complete electrical elementary diagrams and electrical interconnection diagrams for surge control tank. Diagrams in accordance with NEMA ICS 1.
- e. Complete interior and exterior tank painting systems.

B. Informational Submittals:

- 1. Submit anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
- 2. Statements of Qualification: Tank welders.
- 3. Tank manufacturer's written instructions.
- 4. Manufacturer's Certificate of Compliance, that tank is certified and stamped in accordance with ASME Section VIII, Division 1.
- 5. Test Reports:
 - a. Date and time of testing.
 - b. Description of method of testing, including pumping combinations and pressure records.
 - c. Description of observed leaks and method and date of repair.
 - d. Description of catastrophic failures.
- 6. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.
- 7. NSF certification(s) verifying products meet the requirements specified herein.

1.04 QUALIFICATIONS

- A. Functional Characteristics: Tank welders shall be ASME certified.
- B. Physical Characteristics: All bladders shall be manufactured by the tank manufacturer or the tank manufacturer shall be ISO 9001 certified.
- C. Performance Characteristics: Tank Manufacturers shall have at least 10 years' experience manufacturing bladder tanks for surge control.

PART 2 PRODUCTS

2.01 GENERAL

- A. Components and Materials in Contact with Water Consumed by Humans: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - 1. Components and materials shall be new.

2. There shall be no used or reused components or materials.
3. There shall be no use of new components or materials without a traceable certification of origin.

B. Manufacturers and Series:

1. Pulsco; Model VT-42-300-150.
2. Or equal.

2.02 RECLAIMED WATER SURGE TANK (TK-7002)

A. Design:

1. Tank shall specifically be designed for use on potable water systems. All materials in contact with fluid, including the bladder, shall be NSF 61 compliant.
2. Tank design and construction shall be such to minimize abrasion of the bladder, including eliminating rub points and providing anti-extrusion grid at the outlet.
3. The bladder shall be designed and sized for the specific geometry of the tank and shall not be a design for a range of geometries and sizes.
4. The bladder material shall be butyl rubber or PVC terpolymer elastomer with a minimum thickness of 0.065 inch with 0.125 inch thick reinforcement at nozzles and manways.
5. See Project P&ID and Contract Drawings for tank accessories provided with the surge tank including, level sight indicator, pressure indicator, differential pressure (level) transmitter, pressure safety valve and compressed air fill.
6. Prior to tank fabrication by the tank manufacturer, the tank and lining and coating shall be accepted by approved submittals in accordance with this specification and Section 09 90 00, Painting and Coating.
7. Prior to shipment, the tank shall be lined and coated by the tank manufacturer, in accordance with Section 09 90 00, Painting and Coating.

B. Design Data:

1. Physical Characteristics:
 - a. Net Volume: Not less than 300 gallons.
 - b. Maximum Diameter: 4 feet.
 - c. Maximum Height, including sidewall, legs and elliptical heads: 7 feet.
2. Functional Characteristics:
 - a. Configuration: Vertical cylindrical shape with elliptical heads.

3. Performance Characteristics:
 - a. Design Pressure: Rated for 190 psig.
 - b. Normal Operating Pressure: 140 psig.
 - c. Maximum Operating Pressure at Pump System Shut-off Pressure: 160 psig.
 - d. Initial Air Volume: 40 cubic feet.
 - e. Precharge Pressure: 50 psig.
 - f. Design Temperature: 40 degrees C, or 104 degrees F.

C. Tank Connections:

1. Physical Characteristics:
 - a. Nozzles/Connections:
 - 1) In accordance with ASME Code, Section VIII, Article D6.
 - 2) Sizes 2-1/2 Inches and Larger: 150-pound flanged, ASME B16.5.
 - 3) Sizes 2 Inches and Smaller: Either 3,000-pound screwed couplings, ASME B16.11, or for manway cover bind flanges, drilled and tapped connections with NPT threads.
 - b. Tank Support Legs: Provide four support legs sufficient in length to raise bottom of primary nozzle spool at least 6 inches above the bottom of the support legs.
2. Functional Characteristics:
 - a. Circular Manhole(s): One minimum, design and fabricate in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Article D10.
3. Performance Characteristics:
 - a. Pressure Relief (Safety) Valve (PRV-7062): In accordance with Boiler and Pressure Vessel Code, Section VIII, General Requirements, UG-125 and 126.

2.03 ACCESSORIES FOR EACH SURGE TANK

A. Functional Characteristics:

1. Lifting Lugs: Provide suitably attached for equipment assemblies and components weighing over 100 pounds.
2. Pipe Support Tabs: Provide tabs attached to tank for supporting small diameter air pipe, where shown on the Drawings.

B. Physical Characteristics:

1. Instrumentation and Controls: In accordance with general control requirements and component qualities specified in Section 40 99 90, Package Control Systems.
 - a. Instruments:
 - 1) Pressure indicator (PI-7063).

- 2) Pressure transmitter (PIT-7061).
- 3) Differential Pressure (Level) transmitter (LIT-7054).
- 4) Level sight indicator.
- b. Control Panel (LCP-7002):
 - 1) Panel mounted devices:
 - a) Level Indication.
 - b) Pressure Indication.
 - c) Common Alarm – pilot light.
 - 2) External Interface:
 - a) Remote dry contact output for: Common Alarm.
 - 3) Panel Enclosure Type: NEMA 4.
2. Manway Bolting Hardware: Type 316 stainless steel.
3. Accessory Piping: Type 316 stainless steel piping or tubing.
4. Ball Valves: Provide 1/2-inch stainless steel, female NPT end, ball valves for all compressed air and pressure sensing piping valves.
Manufacturer and Model:
 - a. Apollo, 76F-103-01A.
 - b. Or equal.
5. Equipment Identification Plates: Provide 16-gauge Type 316 stainless steel identification plate securely mounted on each separate equipment component in a readily visible location. Plate shall bear 1/4-inch-high engraved die-stamped block type black enamel filled equipment identification number and letters indicated in this Specification.
6. Anchor Bolts: Refer to Section 05 50 00, Metal Fabrications, for anchor bolt and post installed concrete anchor requirements.
- C. Performance Characteristics: Couplings as required for connected piping, valves, and instrumentation.

2.04 FABRICATION

A. Functional Characteristics:

1. Fabricate tank in accordance with ASME Boiler and Pressure Vessel Code, Section VIII.
2. Heads: As specified in ASME Code, Section VIII, Division 1.

B. Physical Characteristics:

1. Fabricate of welded carbon steel.
2. Shell and Head Thicknesses: Include minimum corrosion allowance of 0.125 inch.
3. Interior (Submerged) Surface Treatment: Clean and paint in accordance with Section 09 90 00, Painting and Coating, System No. 1.
4. Exterior Surface Treatment: Clean and paint in accordance with Section 09 90 00, Painting and Coating, System No. 4.

C. Performance Characteristics:

1. Plate Thicknesses: Determine in accordance with allowable stresses listed in the Code for material, pressure, and temperature specified.
2. Stamp and certify tank in accordance with ASME Code Section VIII, Division 1.

2.05 SOURCE QUALITY CONTROL

- A. Hydrostatically test tank in shop at 1.5 times design pressure for at least for 24 hours.
- B. Repair leaks found during testing prior to painting.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install tank in accordance with manufacturer's written instructions.
- B. Level tanks and grout support legs as specified in Section 03 62 00, Grouting, before anchoring.
- C. Assemble Accessories: Make process, control, and electrical connections.
- D. Make piping connections such that misalignment stresses are not induced in tank nozzles.

3.02 FIELD QUALITY CONTROL

- A. Field Static Test:
 1. Hydrostatically test installed surge control tank for 4 hours minimum at 1.5 times design pressure, before dynamic testing.
 2. Repair leaks detected during testing.
- B. Functional Test:
 1. Dynamic Test: Perform in response to flow startup and stoppage.
 2. Testing with Multiple Pumps: Increase number of pumps, one at a time.
 3. Record pressures for dynamic operation of each pump combination in startup and shutdown of flow.
 4. Inspect and test components for alignment, operation, and connection, and performance.

END OF SECTION