SECTION 50 02 01 HYDROPNEUMATIC TANK

PART 1. GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to procure and install upright, a replaceable bladder type pre-charged water well and pressure booster expansion tank. The hydropneumatic tank shall be installed vertically and comply with NSF/ANSI standard 61.

1.2 RELATED SECTIONS

A. Section 01 33 00 Submittals and Substitutions

B. Section 01 77 00 Project Closeout Procedures

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1. American Society of Mechanical Engineers (ASME) Code

2. National Sanitation Foundation and American National Standards Institute (NSF/ANSI 61)

3. FDA approved

1.4 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 Submittals:

A. Shop Drawings: Shop drawings shall include:

1. Service Conditions: Chemical environment and temperature.

2. Tank layout drawings showing dimensions, wall thickness, anchor and support layout, nozzle location and orientation, nozzle construction.

3. Nozzle Schedule: Include the following in the nozzle schedule:

a. Location, size and orientation
b. Thickness and rating
c. Connection type

B. Structural Design Calculations: Submit design calculations for:

1. Structural design of walls and design of tie-down lugs. Structural design shall consider the force of the fluid entering the tank during filling operations.

2. Details of all clips and lugs for tie-down lugs, pipe brackets, and anchor bolts, as integral parts of the tank.

3. Tank restraint – If supplied, the drawings and calculations for the system are to be provided.

4. Contractor shall submit detailed calculations illustrating the seismic characteristics and anchorage of the proposed tanks. Calculations shall be signed/sealed by a professional engineer licensed to practice in State of Pennsylvania

C. Supporting information on fittings and accessories to be supplied: saddle supports, nozzle fittings, coating and insulation etc.

D. Tank Certification: Submit a certificate listing:

1. The type of material of the tank, describing the manufacturer's brand name.

2. Manufacturer's certification that tank construction complies with ASME, NSF/ANSI-61 and FDA design standards.

3. Verification of hydrostatic testing, fitting placement, and visual inspection.

4. Verification that tank can hold the required volume of water (include specific gravity).

5. Verification of resistance for tank material and for material of construction of tank and accessories.

6. Verification of UV resistance.

E. Installation Instructions: Submit installation instructions including:

1. Installing tank on a concrete saddle or support.

2. Tank manufacturer's recommended bolt torque for flanges.

F. Contractor shall submit a Test Report describing the findings of the test results – see paragraph 3.4 for details.

G. Vendor Fabrication Drawings & Information (After Fabrication and Installation):

1. Approved Drawings: Two (2) copies of the drawings listed below shall be submitted for record purposes. Any subsequent revisions to the drawings or procedures shall be approved by the Owner. Drawings shall be checked and signed as checked before they will be accepted for approval. Approved drawings shall present the following information at a minimum:

   a. Certified dimensions of the tank, thickness, and attachments.
   b. Construction specifications.
   c. Shop testing procedures.
   d. Nozzle schedule, including size, location, thickness and rating.
   e. Details of all nozzles, joints and reinforcements.
   f. Details of all lifting, hold-down or support lugs.
   g. Specification for all supplied bolting and gaskets and accessory items.
   h. Weight when empty and full.
   i. Equipment capacity (gallons).
   j. UV absorbers or other pigments, if applicable.

1.5 SEISMIC LOADS

A. The structural aspects of the tanks shall be sufficient to meet the Pennsylvania 2015 International Building Code requirements for Seismic Design Category = B.

1.6 DELIVERY AND STORAGE

A. Protect all tanks delivered and designated for storage, from the weather, humidity and temperature variations, dirt and dust, or other contaminants. Temporarily strap down all tanks stored outdoors and protect from adverse weather conditions.

1.7 QUALIFICATION AND WARRANTY

A. Manufacturer Qualification

1. The tank shall be supplied by a reputable manufacturer having at least ten (10) years' experience in the design and fabrication of such tanks.

B. Warranty

1. Manufacturer shall provide warranty in accordance with Section 01 01 00 of the specifications.

PART 2. PRODUCTS

2.1 MATERIALS

A. Provide materials and equipment which are the standard products of a manufacturer regularly engaged in the manufacture of the products.

B. Hydropneumatic Tank Manufacturers include: Wessels Company (FXA-2500) or approval equal. Bladder integrity monitor/ protection mechanism to safeguard critical components of the mechanical system by monitoring the effectiveness of the system expansion tank. If the bladder extends beyond the normal movement, protection mechanism should activate an audible alarm and LED light to notify maintenance personnel of a potential system issue- compromised bladder integrity etc.

2.2 TANK DESCRIPTION

A. Tank Service: Following are the details of Hydropneumatic tank.

1. Tanks shall have ASME replaceable bladder for commercial and industrial well and water systems, booster systems, or other potable water applications.

2. They shall be designed to deliver water under pressure between pump cycles to provide sufficient flow to meet demands. The water shall be contained in a heavy-duty butyl bladder. All hydro-pneumatic tanks shall be installed vertically on a house keeping pad, and comply with NSF/ANSI Standard 61.

2.3 TANK CONSTRUCTION AND DESIGN PARAMETERS

A. Construction:

Shell:	Carbon Steel
Heads:	Carbon Steel
Exterior:	Carbocoat 140 - Harvester Red
Bladder:	Heavy Duty Butyl
FDA Approved, NSF 61 Listed	
System Connection:	Epoxy Lined

B. Design Parameters:

Maximum Design pressure:	125 psi
Operating Design pressure Range:	110 -120 psi
Temperature Range:	40^0F to 80^0F
Operating tank volume:	660 gallons
Tank Diameters:	4 feet
Tank height:	9’-2”
System connection size:	3 inch
Charging valve:	required size NC

C. Contractor shall furnish and install, as shown on drawings, a 660-gallon, 48" diameter X 110" (high) pre-charged steel pressure booster expansion tank with replaceable heavy-duty butyl bladder.

D. The tank shall have NPT epoxy lined system connections and a charging valve connection (standard tire valve) to facilitate the on-site charging of the tank to meet system requirements, a pressure gauge, and bladder integrity monitor.

E. The tank must be constructed in accordance with most recent addendum of Section VIII Division 1 of the ASME Boiler and Pressure Vessel Code. Products comply with NSF/ANSI Standard 61.

F. All tank nozzles shall be provided with locations (orientation and elevation) as shown on the Contract Drawings.

G. Nameplates: Each tank shall have the following information printed on its nameplate:

1. Name of Manufacturer
2. Capacity in Gallons
3. Chemical Environment
4. Manufacturer Serial Number
5. Year Built
6. Tank Number
7. Maximum Specific Gravity
8. Design Pressure and Temperature
9. Bladder Type
10. Shell and Head Material type
11. Exterior coating

PART 3. EXECUTION

3.1 GENERAL

A. The hydropneumatic tank shall be manufactured in accordance with the best trade practices, and in accordance with all applicable codes and regulations.

3.2 INSTALLATION

A. Transportation, handling, storage of the tanks, and installation shall be in accordance with the manufacturer's printed instructions.

B. Contractor shall utilize the services of a tank manufacturer's representative when installing the tanks.

C. The installer is to certify in writing that the tank system has been installed according to the tank manufacturer's Guidelines for Use & Installation.

D. Tank shall be installed vertically on their own on a concrete housekeeping pad as per contract drawings. Mounting clips available shall be used that can be fastened to concrete pad. Anchor bolts shall be provided by installer.

3.3 LABELLING

A. Contractor shall label all chemical tanks in accordance with OSHA's Hazardous Communication Standard requirements set out in 29 CFR 1910.1200 (HCS) updated in 2012.

3.4 TESTING

A. Hydrostatic Water Test: The hydrostatic water test shall consist of filling the tank to full capacity for a minimum of 12 (twelve) hours and conducting a visual inspection for leaks. This test shall be performed after the tanks and all piping are installed and connected.

B. Visual Inspection in the Field: The finished tank wall shall be free of visual defects such as foreign inclusions, air bubbles, pinholes, pimples, crazing, cracking and delaminations that will impair the serviceability of the vessel.

C. Field Testing: Tanks shall be cleaned of loose debris and dried prior to testing. Tanks shall be field tested for leaks or damage in shipment. Damage or leaks in tanks shall be repaired or tanks shall be replaced at no cost to the Owner.

D. Operation Testing: The tank's operating pressure shall be field adjusted and tested to meet the operating design pressure range from 80 – 125 psi max pressure. The pressure readings and flow measurements for pressure readings shall be recorded and included in the test report for review. The tank shall be started up and placed in full service only after review and approval of test reports.

E. Test Report: Contractor shall provide a test report for each of the tanks that shall include as a minimum a description of the test, methodology used, data and time when test was performed and the results of the testing. Should test runs fail to meet the requirements, an explanation shall be provided with the rationale for failure of the test.

3.5 REMEDY

A. If any of the above tests reveals deficiencies, corrective measures shall be taken until all the specified requirements are satisfied at no cost to the Owner.

3.6 MANUFACTURER SERVICES

A. The Contractor shall provide the following personnel:

1. One (1) representative of the Manufacturer who are experienced in the installation, adjustment, and testing of chemical tanks and appurtenances. The representative shall supervise the installation, adjustment, and testing of the tank – for 10 days (8 hours a day).

END OF SECTION