

INSTALLATION & OPERATION

Removable Bladder and Fixed Diaphragm Expansion Tanks

<u>APPLICATION</u>	<u>PRE-CHARGE</u>	<u>PRESSURE</u>
HYDRONIC HEATING/COOLING SYSTEMS	12 PSIG	125 PSIG
THERMAL EXPANSION POTABLE HOT WATER SYSTEMS	40 PSIG	150 PSIG
HYDROPNEUMATIC OR PRESSURE BOOSTER SYSTEMS	30 PSIG	125 PSIG

1. Visually inspect tank for damage, which may have occurred during transit.
2. Factory pre-charge pressure may not be correct for the installation.
3. Tank **MUST** be pre-charged to system design fill pressure **BEFORE** placing into operation. Remove pipe plug covering the valve enclosure, check and adjust the charge by adding or releasing air for each application.
4. If the system has been filled, the tank must be isolated from the system and the tank emptied before charging. This ensures all fluid has exited the bladder and proper charging will occur. **FOR HIGH PRESSURE APPLICATIONS** (typically 80 PSI and above), a small amount of water should be placed inside the bladder by opening the system valve momentarily. This helps to ensure the bladder is not extruded through the screen by the high pressure. Refer to **IO-High-Pressure-Expansion.pdf**
5. If pre-charge adjustment is necessary, oil and water-free compressed air or nitrogen gas should be used. To avoid excessive pressures, compressed air or nitrogen gas must be regulated (using an appropriate pressure regulating valve) at or below the maximum working pressure of the tank (as noted on the data plate). Check the pre-charge using an accurate pressure gauge at the charging valve (if not included) and adjust as required. Check air valve for leakage. If evident, replace with Schrader type tire valve core. Do not depend on the valve cap to seal the leak. After making sure air charge is correct, replace pipe plug over charging valve for protection.
6. Set tank in place and pipe system connection to system. Be sure to include isolation valve(s) and drain. Do not loosen nuts on cover plate -this will result in loss of pre-charge. Cover plate nuts should only be removed when replacing bladder, and then only after the air pressure in the tank has been bled off to zero-gauge pressure (note: some diaphragm-style tanks do not have bolted cover plates).
7. Purge air from system **BEFORE** placing tank into operation. All models have system water contained inside bladder.
8. When filling the system with water, open valves to tank to ensure that any residual air in the tank is displaced by water.
9. Models size 85 through 800: Both top and bottom system connections access the bladder. It is recommended only the bottom system connection be used for system feed. The top auxiliary connections may be used for gauges, relief valves, etc. Any connection not used must be plugged and checked for any air leakage.

WARNING: Improper installation will void warranty. Consult vendor with any questions.

SECTION 1: Inspecting the Tank

ASME tanks are rigidly constructed and designed to be easily handled by the end user. Upon receiving product, a visual inspection should be performed, as damage may have occurred during transit.

SECTION 2: Handling and Storage

All tanks should be moved using the lift lugs welded to the unit (if equipped). Lifting the tank by clipping an eye hook into the lift lugs is the safest and most effective way to move the unit. Note that not all lift lugs are placed at the center of gravity, the unit may shift once lift off the ground. Ensure that the weight of the unit does not exceed the rating of the rigging equipment.

WARNING: Bladder tanks are shipped from the factory with an air pre-charge. Damaging these tanks can be extremely dangerous.

Outdoor Storage:

- Cover all units with a tarp to protect from the elements.
- Do not store in potential flood plain.
- Cover all openings on the units to prevent foreign matter from entering the unit.
- Place in a safe location, away from heavy traffic.
- Bladder tanks are under pressure during shipment. Damaging these tanks could be extremely dangerous.

Indoor Storage:

- Cover all openings on the units to prevent foreign matter from entering the unit.
- Unit should be stored in a dry environment, away from any potential sources of moisture.
- Place in a safe location, away from heavy traffic.
- Bladder tanks are under pressure during shipment. Damaging these tanks could be extremely dangerous.

SECTION 3: Operation

- A bladder pressure tank contains pressurized air and water, separated by a flexible bladder that holds the water. These tanks are typically pre-charged with air at the factory. As water pressure changes, the volume of air in a bladder tank contracts and expands. Periodically, the amount of air in the tank should be measured and the tank recharged if the air is too low.
- A bladder tank's water storage capacity, or drawdown, for a typical commercial water system will typically be 30-40% of the tank's total volume. This volume performs several important functions:
 - It maintains the desired range of water pressure in the distribution system.
 - It minimizes pump cycling, preventing frequent starts and stops and protecting pumps from motor burnout or other water system components from damage.
 - Prevents water hammer.

SECTION 4: Preventative Maintenance

The bladder tank should be checked periodically (at least once per year) to ensure the pre-charge pressure is properly maintained. Changes in pre-charge pressure can significantly alter the tanks performance and reduce the life expectancy of the bladder. If it appears that a bladder tank is not operating correctly, check the tank's air pre-charge:

1. Disconnect electrical power to the pump.
2. Drain the tank by opening the closest faucet.
3. Check the tank's pressure on the gauge included in the Smart Bracket system.
4. Add air if the pressure is more than 2-3 psi below the pump cut-in pressure. Use caution when using an air compressor or air pump and follow compressor manufacturer's safety warnings. As air is added, note the discharge from the open faucet:
 - a. If water, continue adding pressure as needed to fully evacuate the water from the tank. Re-check the pre-charge pressure and adjust to 2-3 psi below pump cut-in pressure.
 - b. If air, there is a tear or hole in the bladder. The bladder will need to be replaced.

5. Release air if the pressure is equal to or above the pump cut-in pressure (lowest pressure in the operating range). There should always be a small amount of water in the bladder when the pump turns on to avoid a pressure “flat spot”. A “flat spot” is defined as a dramatic pressure drop that occurs while waiting for the pump to deliver water to the system piping.
6. Check for leaks in the air charging system by dripping a soap solution on the air charging valve.
7. Re-start the pump and run through a normal cycle to verify the setting. If tank pressure drops abnormally, the bladder inside the tank may have a tear or hole in it.

SECTION 5: Is the Tank Waterlogged?

You should also check a bladder tank to determine if it's waterlogged. A tank is waterlogged if it is completely filled with water or has too much water to function correctly. Waterlogged bladder pressure tanks contribute to the following problems:

- The pump motor cycles too often. Frequent cycling can shorten the lifespan of a pump.
- Because waterlogged tanks can contain stagnant water, there can be unsatisfactory coliform samples or taste and odor complaints.
- Premature tank failure: The inside walls of a waterlogged tank can corrode and weaken from the exposure to water.

Reasons for Waterlogging

Bladder tanks can become waterlogged for many reasons. Some of the more common reasons are:

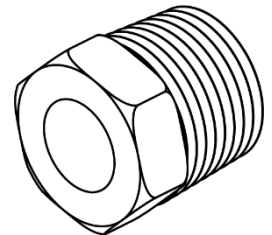
- Sediment, such as iron and manganese, can coat the surface of the bladder, causing it to harden and become less flexible.
- Sediments can plug the fill or draw line, preventing the tank from filling and emptying normally.
- Excessive levels of chlorine can damage the bladder, causing it to become brittle and less flexible.
- Tanks sitting directly on the ground or on another surface that is continually moist can rust and lose structural integrity.
- Chlorinators can give off corrosive vapors that cause the tank to rust.

SECTION 8: Troubleshoot Bladder Integrity Monitor

The Bladder Integrity Monitor is a specially designed sight glass adaptation that turns red when it contacts moisture. This usually means water has escaped or breached the internal tank bladder.

Is your monitor red? You may need to replace your bladder and bladder monitor.

WARNING: Release air pressure from the tank before replacing Bladder Integrity Monitor. Failure to remove air may lead to serious injury or death.



1. Slide the Smart Bracket Removable Plate up and off and depress air valve. If water sprays from the air valve, you likely have a ruptured bladder and will need to replace. See page 6 for instructions on how to replace a bladder.

If no water comes out, pre-charge your tank. If the pre-charge holds, your tank bladder is operating correctly. Contact your contractor for a bladder monitor replacement. If water sprays from the air valve, move on to step 2.

WARNING: Bladder Integrity Monitor can be triggered by highly humid or moist air. When pre-charging, make sure to use dry air or nitrogen.

2. If water sprays from air charge valve, isolate tank and drain of all water.
3. Pre-charge tank with dry air or nitrogen to the required setting, which is usually the same as the line pressure in the supply line.
4. Observe if air comes out from the water supply connection. If air is leaking, then the tank may be faulty and may require repair or replacement. If pre-charge holds and the air side of the tank is empty of water, please contact your contractor to request a replacement.