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Expansion and Compression Tanks in Hydronic Systems (Part 7): B&G Systemwise Program FAQs

Monday Morning Minutes | by Norm Hall, January 14, 2019

We conclude the expansion tank series of the R. L. Deppmann Monday Morning Minutes with a double feature: a short video showing how to use the B&G selection program and the most frequently asked questions (FAQs).

Let's start with a short video by one of our salesmen; Dave Chwalibog. Dave offers a couple of quick examples of the use of the B&G ESP-Systemwise for expansion tank sizing. Watch the video in the Monday Morning Minute post.



Frequently Asked Questions About Expansion Tanks

1. How do I select a B&G bladder tank to replace my plain steel compression tank?

Answer: I use the “reverse engineered” method. I determine what the minimum fill and maximum pressure at the existing tank should be. Then I find the fluid type (water? glycol?) and the design maximum temperature and temperature drop. Then I go into the B&G program with those estimates and go back and forth raising the volume until I get the existing tank size and a solution. Now I use that volume, refigure the fill and maximum pressures for the bladder tank selection, find the new tank model and raise it one size for safety.

2. What tank do I need for my XXX BTUH Boiler?

Answer: This is a dangerous question. There are many rules of thumb out there. Sometimes they work and sometimes they don't. I use rules of thumb for budget pricing and 90% reviews, but always select the tank using the correct information before scheduling and purchase.

3. Can I install the bladder/diaphragm tank on its side?

Answer: The construction of Bell and Gossett bladder and diaphragm tanks for horizontal or vertical installation are identical except for the drain connection. Remember from previous articles that the water is inside the balloon and the air is inside the tank. If the bladder breaks, how do you get the water out? The drain connection provides a means to drain the water out of the tank. The tank selected will operate in either horizontal or vertical installations. The trouble will come when you try to service the tank. It's pretty hard to remove a horizontal tank when it has 1,000 lbs. of water in it. Stick with the proper tank for the installation.

4. Why can't the factory charge my tank to something other than 12 PSIG?

Answer: The 12 PSIG fill is a carryover from residential two-story baseboard systems with a basement. If we take the 12 PSIG and subtract 4 PSIG for venting at the top, we get 8 PSIG or 18.5 feet. It is also the preset setting for most hydronic pressure reducing (PRV) fill valves. But what about the question? If the tank is in the penthouse, most engineers will default to the standard setting of 12 PSIG for the tank and the PRV. If the tank is below the penthouse, the fill pressure will depend on the location of the tank. If the factory fill is at 20 PSIG, someone will need it charged at 22 PSIG. If the factory setting fill is at 30 PSIG, then

someone will need 35 PSIG and so on. It causes the tank to become special because there is another labor component.

5. Why is my compression tank waterlogged? When I soap it, I can't find a leak.

Answer: This is the most common question asked by service contractors and owners about their compression tanks.

- We assume you have a B&G Airtrol Tank Fitting on the tank to stop gravity circulation which can pull air back into the system from the tank.
- Oh those gauge glass sets! The fibrous washer in the top gauge cock can and will dry out and shrink. When it shrinks, it can cause air to leak out and water levels in the tank to rise. When the water level reaches the gauge cock, the washer swells again and stops the leak. A frustrating circle of events you can never find! Close the gauge cocks and mark them "normally closed."
- If you have a second compression tank in another location in the system, water can leave one tank and move to another, taking air with it as it goes. Check your fill pressure since empty pipe at the top of the system will act like another expansion tank.

6. Can I use a bladder tank and a steel compression tank in the same system?

Answer: Yes you can, but I would exhaust options to keep them the same type first. If you mix the styles of tanks, they must be connected properly for the tank type and connected very close together (within a few feet). As an example, a compression tank is mounted properly above the Rolairtrol air separator and you add a bladder tank attached to the main pipe between the Rolairtrol and system circulating pump.

You would size the added tank based on the additional volume. Be careful if you change the fill or maximum pressures since the existing tank would have to be re-sized for the new conditions.

7. Adding on to my system, I need to increase my compression tank/expansion tank capacity. How do I put another tank in parallel with the existing tank, or if my existing tank is too small, how do I increase capacity?

Answer: Let's start with compression tanks. When adding a steel compression tank next to the existing steel compression tank, make sure the tops of the tanks are at the same level to ensure air is at the same level. If the tanks are the same size, then the bottoms of the tank will line up making it easy to install. Also, ensure pipe pitch is maintained with no drops before going to the tank or you will cause a trap which will keep air from rising to the tank. Check out the *Air Management TEH manual* for more details.

Bladder tanks should be mounted with the bottom of the tank at the same level since we are not interested in air moving in and out of the tank.

8. What happens if the bladder type tank air charge is not increased to the proper fill pressure?

Answer: The engineer may be blamed for undersizing the tank even though they didn't. Let me explain with an example. Let's assume a tank needed a volume of 200 gallons with a fill pressure or starting pressure of 50 PSIG. Let's assume the installing contractor left the tank with the 12 PSIG fill before connecting the system to the tank. When the 50 PSIG fill pressure in the system is attached to the tank, the tank will partially fill with water until the air side matches the water side at 50 PSIG. If someone checks the air side pressure, it will read 50 PSIG and the assumption is that it was pre-charged. In reality, you now have less than 100% of the tank available to limit the pressure in the system and it will act like an undersized tank. The pressure relief valve may blow before getting to the design temperature.

The only way to check the air charge in a system is to drain the water and the system pressure out of the tank and then check the air pressure!

This concludes the expansion and compression tank Monday Morning Minutes series. Look forward to next week when we'll provide information about a change to AHRI specifications that will affect your plate heat exchanger selections.