American WHEATLEY HVAC PRODUCTS®

Why do we need tanks in hydronic systems?

As water heats up it expands, and as it expands it needs a place to go, hence the need for a bladder type expansion tank.
As the water in a heating or cooling system rises in temperature it expands, this expansion also raises the pressure in a hydronic system. If there was nowhere for this expansion and increase in pressure to go, the relief valves would constantly be discharging as the pressure exceeds their safety set point.
Simply put, water is not compressible, however air is.
Remember, in a bladder type expansion tank, air is contained in the vessel, and system water is container within the bladder.

The key isn't so much the tank, as it is the air contained inside the tank. Since air is compressible and water is not, as the system heats and cools and the water expands and contracts within the bladder, the air compensates by compressing or expanding within the vessel. If you had no air in the tank, (a waterlogged tank) or no tank, the pressure increase due to expansion would either "pop" the relief valve or cause much more drastic system problems.

Which brings us to tank location, and the widely used term of **Pumping Away**. The tank should be installed before the pump suction so that you are **Pumping Away** from the tank.
When **pumping away** from the tank, the set pressure in the tank is the constant, and becomes the **Point of no pressure change**.
The pressure created by the pump will add to this set pressure and move the water around the system, gradually losing pressure as it works its way through the system load until it comes back to the tank. If the system is properly designed, the pump is sized properly, and you are **pumping away** from the tank, the increase in pressure created by the pump should theoretically be absorbed by the system load by the time it returns to the tank.
Example: Let's say your system pressure is 15 psi, and the system load is calculated to absorb 10 psi (pressure drop), the tank should be charged to approximately 13-15 psi, and obviously the pump should be sized to produce a 10 psi head pressure, or differential pressure of 10 psi across the pump.

The air separation device should also be installed at the lowest point of system pressure or the **point of no pressure change**, as air is more likely to separate from the water at this lower pressure.
At higher pressures, air tends to stay suspended in water.

You should get the idea by now, the tank AND the air separator should be installed before the pump, so that you are **pumping away** from the **point of no pressure change**.

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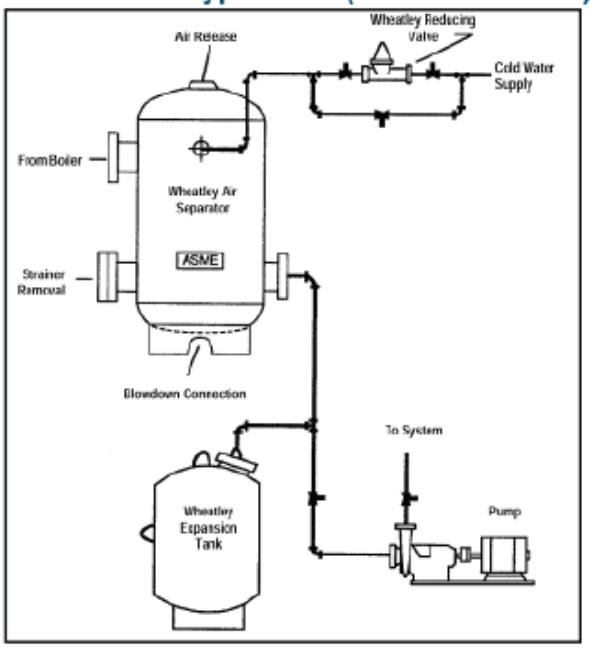
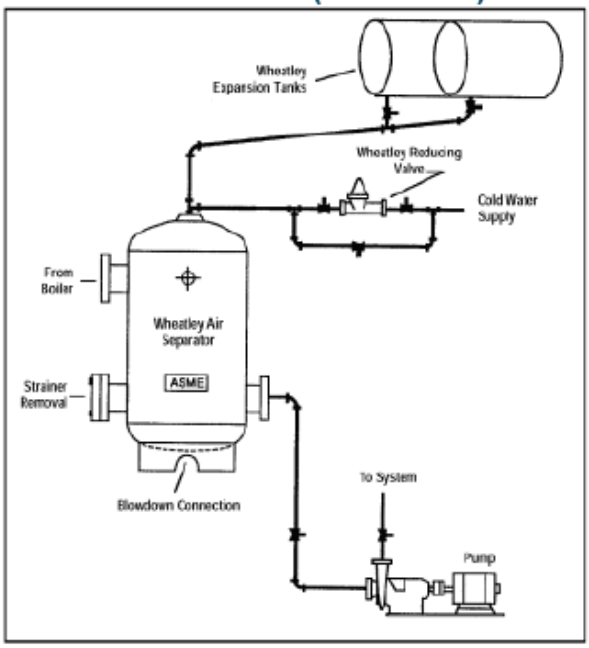
Typical Piping Details

With Bladder Type Tanks (WPA/WFA Series)



With Plain Steel Tanks (WPS Series)



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