Monday, December 10, 2018

Expansion and Compression Tanks in Hydronic Systems (Part 2): Initial or Cold Fill Pressure

Monday Morning Minutes | by Norm Hall, December 10, 2018

Cold fill pressure is defined as the initial pressure required to fill the hydronic system from the point of the gauge readout to the top of the system plus 4 PSIG for positive venting. This statement holds true for both chilled water and heating systems up to 220°F.

From 220°F to 250°F, consult the Bell and Gossett Air Management training manual, also available from the R L Deppmann Company, serving Michigan and Northern Ohio, or from your local B&G representative for other parts of the globe.

There is a short video from one of our engineers, Paul Prentice, explaining tank fill pressure in the Monday Morning Minute post.


Hydronic Systems
Expansion Tanks
Part 2: Cold Fill Pressure

Cold Fill Pressure in Hydronic Systems

To calculate the "fill pressure," take the elevation of the system above the gauge you are reading divided by 2.31, and add 4 PSIG to it. The cold fill pressure in the example below is the setting of the pressure reducing valve (PRV). The fill pressure at the compression or expansion tank may be slightly more or less depending on the elevation of the tank when compared to the elevation of the PRV.

If you are using Dowfrost™ or DowTherm™ glycols, the 2.31 number changes, but is normally insignificant for this calculation.

Proper Cold Fill Pressure: Provide a minimum of 4 PSIG at the top of the system
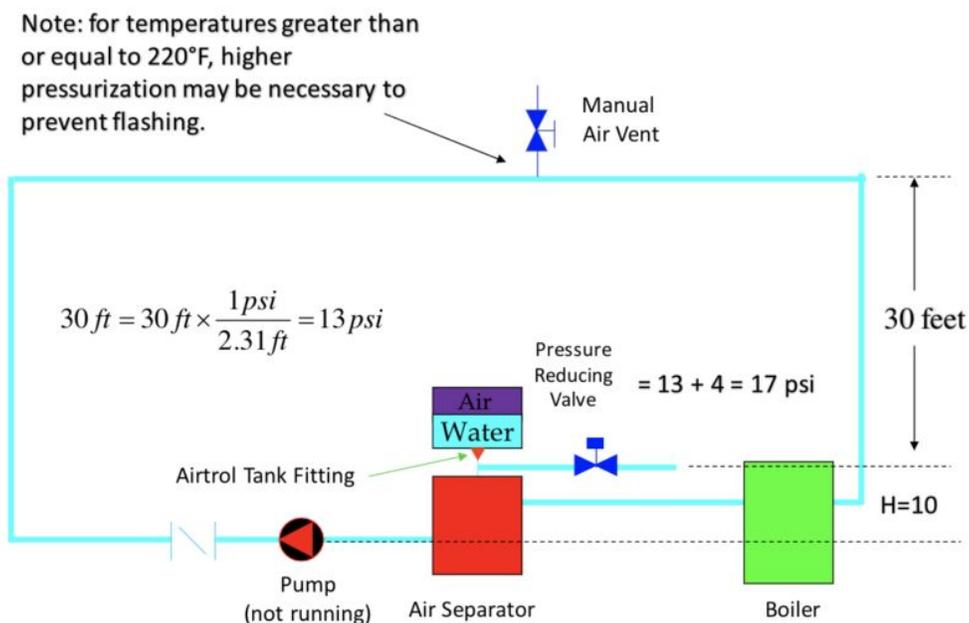
Let's assume that the compression tank in the example above is about 9 feet above the pressure reducing valve. Since 9 feet is about 3.9 PSIG, we would say the fill pressure in the tank is 13 PSIG (17 PSIG minus 3.9 PSIG is about 13 PSIG).

If the fill pressure is less than 8 PSIG, we recommend you use 8 PSIG as the minimum setting since the most standard PRVs start at 8 PSIG.

Answer to Question 1 (Monday Morning Minutes Quiz: 12/03/18)

Question 1: What is the fill pressure at the tank in PSIG?

Answer: The elevation of the system is about 36 feet. 36/2.31 ≈ 15.6 PSIG. We add 4 PSIG since the boiler temperature is only 180 degrees. There is no adjustment for the tank location since it is floor mounted and not elevated in the piping. The answer is 15.6 + 4 is about 20 PSIG. Any number like 18, 19, 19.6, or 20 is close enough.

In the next Monday Morning Minute, we will describe how to determine the maximum pressure at the tank.

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