R.L. DEPPMANN
Serving the industry since 1927

20929 Bridge Street, Southfield, MI 48033
4121 Brockton Drive SE, Grand Rapids, MI 49512
6200 Baron Drive, Bridgeport, MI 48722
6910 Treeline Drive, Suite A, Brecksville, OH 44141

Phone: (800) 589-6120 - Fax: (248) 354-3710
www.deppmann.com

October 17th 2011 ~ Monday Morning Minutes:

Expansion and Compression Tanks – Part 3

by Norman Hall

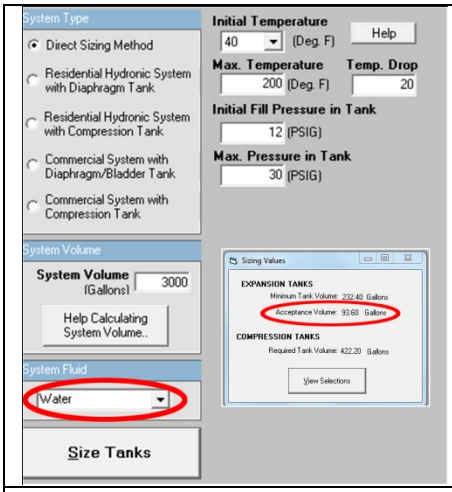
In part 2 of the R L Deppmann Monday Morning Minutes we determined the initial and final temperatures of the hydronic system in order to calculate the expansion tank selection. When we heat the water in a hydronic system, the water expands. This expansion is expressed as E_w in the formula:

$E_w - E_p$ = The expansion of the water minus the expansion of the pipe.

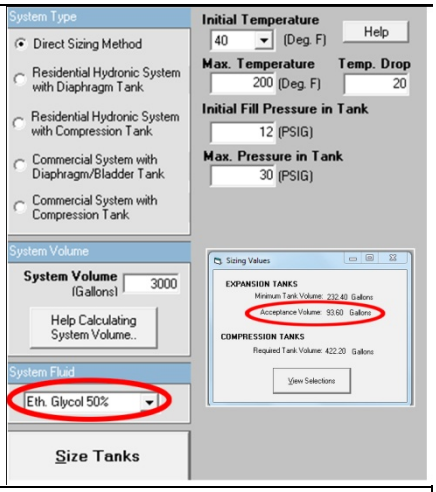
This expansion is calculated for you in the Bell and Gossett ESP-PLUS selection program when you enter the initial and final temperatures and the fluid. The term E_w is not a mystery. It is expressed as:

E_w = [((specific volume at hot Temp.)/ (specific volume at cold Temp.))-1]

The calculation of the required tank acceptance volume is ($E_f - E_p$) X system volume. Let's look at an example and assume the system has 50% Ethylene Glycol but you did not change the default from water.: Assume you have a closed hydronic heating system with a maximum temperature of 200°F and a 20°F ΔT. Assume the volume is 3000 gallons. What happens to the acceptance volume? The acceptance volume required in this example using 50%



The acceptance volume for water is 93.6 gallons



The acceptance volume for 50% E.G. is 125.4 gallons

As you can see in the example, forgetting to change the fluid type default results in a tank which is 25% undersized. The result of this might be weeping pressure relief valves at the elevated temperatures.

Next week we look at pressures in a hydronic system.