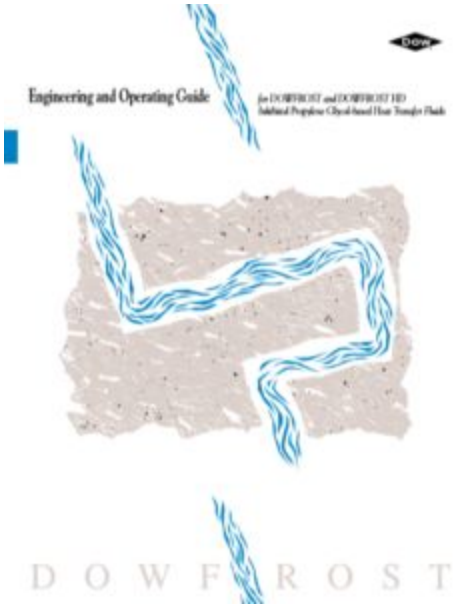
Monday, September 30, 2019

BTUH Correction Factors when using Ethylene Glycol in Hydronic HVAC Systems

Monday Morning Minutes | by Norm Hall, September 30, 2019



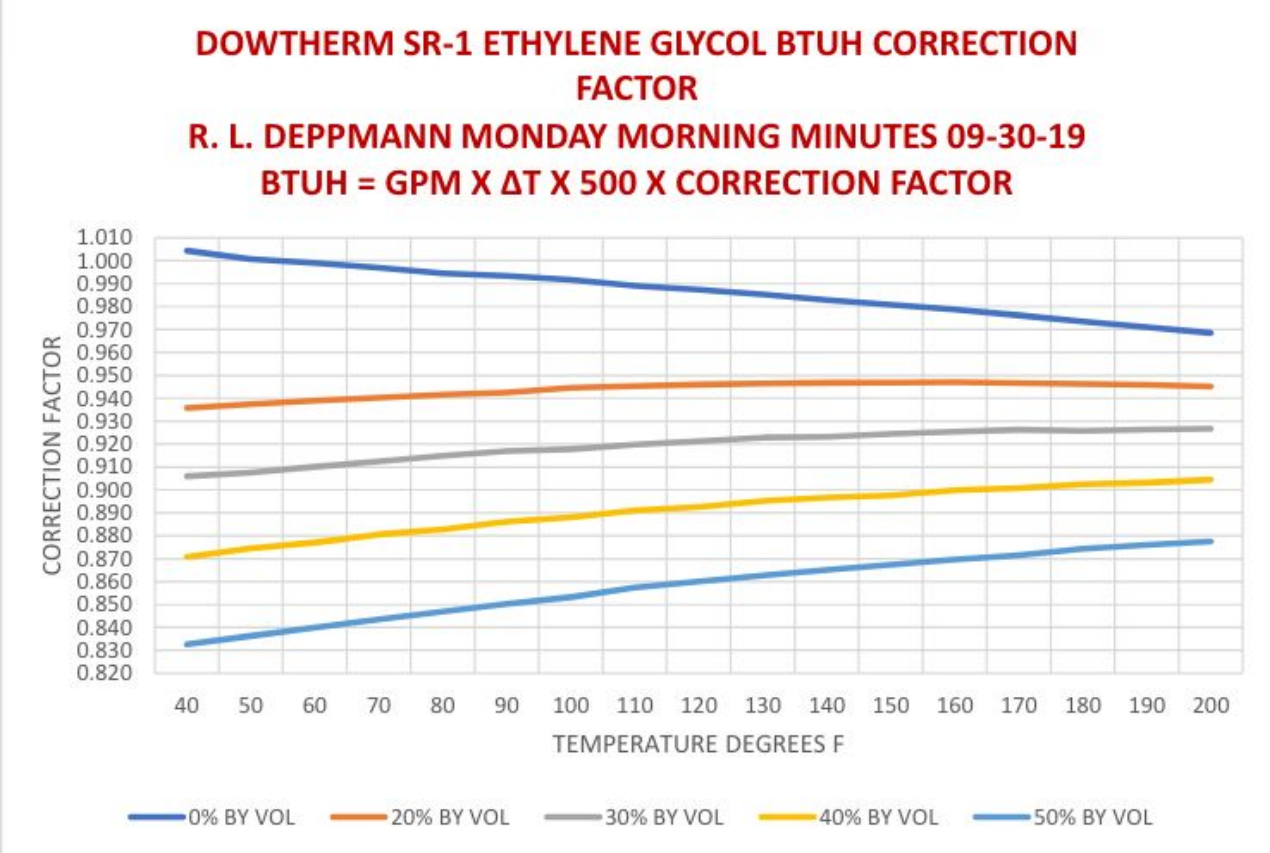
In the last R. L. Deppmann Monday Morning Minute, I provided the BTUH correction factors for propylene glycol. We don't want to play favorites so today we provide the same graph for ethylene glycol. We are all familiar with the BTUH formula (BTUH = GPM x ΔT x 500) which is used to calculate the gallons per minute (GPM) water flow rate when we have the temperature difference. What is the flow rate when using fluids other than water?

BTUH Formula for Fluids Other Than Water

The formula we use for BTUH in hydronics includes specific heat and a specific gravity of the fluid. Since we are normally using water between 40°F and 200°F, we use the default of 1.0 for both values. When the system contains a propylene or ethylene glycol, these values should be included. If we take the specific gravity times the specific heat, we could call it a correction factor.

GPM = BTUH / (GPM *X* ΔT X 500 *X* CORRECTION FACTOR)

The correction factor depends on the temperature and the percentage of the fluid. We offer you the following chart of these correction factors for ethylene glycol. Similar charts are available for propylene glycol. (See last week's MMM)



Examples Use of Correction Factors

EXAMPLE 1. What is the BTUH of a chilled water system with 40% Dowtherm SR-1* solution at a 40°F temperature difference and a measured flow rate of 100 GPM? If this was water, we would use BTUH = 100 x 40 x 500 = 2,000,000 BTUH. If we look at the chart provided below, we see the correction factor is 0.871. The BTUH for the new fluid is:

BTUH = 100 x 40 x 500 x .871 = 1,742,000

To illustrate the difference, the answer to this question for propylene glycol was 1,822,000 BTUH.

EXAMPLE 2. A heating system requires 4,000,000 BTUH. The fluid is 35% Dowtherm SR-1 at 150°F to 180°F. What flow rate is required for the 30°F temperature difference?

GPM = 4,000,000 / (30 X 500 X .91) = 293 GPM.

This compares with 267 GPM for water and 284 GPM for propylene glycol.

Dowfrost Barrel, Totes, and Installation

R. L. Deppmann Company will mix Dowfrost and Dowtherm* propylene and ethylene glycol solutions with deionized water in any percentage you want. In Northern Ohio and Michigan, we can save you money by installing it in the system. Visit our Glycol page for more information. Learn more about Dowfrost engineering and technical information from the Dowfrost Engineering and Operating Guide.

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