

FORMULA FOR CORRECTING BOILER GLYCOL FREEZE POINTS

Adjusting the freeze point of a glycol solution in a boiler can be difficult. This is because as you remove volume, you are also removing some of the existing glycol.

Example: You want to lower the freeze point of a propylene glycol solution from -14°C to -34°C in a 2700L boiler. How much solution needs to be removed and how much straight propylene glycol needs to be added?

A 30% propylene glycol solution has a freeze point of -14°C* and a 50% propylene glycol solution has a freeze point of -34°C*. Therefore we want to add enough propylene glycol to get the final volume of 2700L to a 50% solution (i.e. 1350L of 100% propylene glycol).

Formula:

$$[(\text{boiler volume}) \times (\text{desired P.G. \%})] = [(\text{boiler vol} - \mathbf{X}) \times (\text{current P.G. \%})] + [(\mathbf{X}) \times (100\% \text{ P.G.})]$$

X = volume to be removed from boiler and volume of 100% propylene glycol to be added

Example:

$$[(2700) \times (50)] = [(2700 - \mathbf{X}) \times (30)] + [100\mathbf{X}]$$

Solve for **X**:

$$135000 = [81000 - 30\mathbf{X}] + [100\mathbf{X}]$$

$$135000 = 81000 + 70\mathbf{X}$$

$$(135000 - 81000) = (81000 - 81000) + 70\mathbf{X}$$

$$54000 = 70\mathbf{X}$$

$$\mathbf{X} = (54000 / 70)$$

$$\mathbf{X} = \underline{771.42 \text{ Litres}}$$

To verify: Removed 771.4L of glycol solution. $(2700\text{L} - 771.4\text{L}) \times (30\%) = 578.7\text{L}$ of propylene glycol left in the boiler. Added 771.4L of propylene glycol. $771.4\text{L} + 578.7\text{L} = 1350.1\text{L}$ of propylene glycol in 2700L boiler = 50%. Correct!

Feel free to contact us at any time for answers to all of your difficult boiler and cooling tower questions.

* propylene and ethylene glycol solution freeze points source: engineeringtoolbox.com



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