GEO-FLO

Correcting fluid flow rate (GPM) displayed on rotameter (aka variable area flow meter) for use with antifreeze solutions.

$$GPM_{corrected} = GPM_{measured} \times \sqrt{\frac{(SG_F - 1) \times SG_L)}{(SG_F - SG_L)}}$$

Where:

$GPM_{corrected}$ = Actual flow rate of antifreeze solution (GPM)

$GPM_{measured}$ = Measured flow rate of antifreeze solution (GPM)

SG_L = Specific gravity of antifreeze liquid

SG_F = Specific gravity of rotameter float

The rotameter we supply has a stainless steel float with a SG_F =8.02

So the formula you use with our 0-20 GPM rotameter is:

$$GPM_{corrected} = GPM_{measured} \times \sqrt{\frac{(7.02) \times SG_L)}{(8.02 - SG_L)}}$$

Example:

The specific gravity of a loop filled with an ethanol solution is measured to be 0.980 (~20% ethanol solution). The GEO-METER tool shows a flow rate of 14 GPM. What is the actual flow rate?

$$GPM_{corrected} = 14 \times \sqrt{\frac{(7.02) \times .98)}{(8.02 - .98)}}$$

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$$GPM_{corrected} = 14 \times 0.977$$

$$GPM_{corrected} = 13.68 \text{ GPM}$$

Rotameter accuracy

The GEO-METER flow meter has a +/-4% full scale accuracy. Since the full scale of the meter is 0-20 GPM, the accuracy is +/-0.04 X 20 = 0.8 GPM. This means the accuracy one reads from the meter could be 0.8 GPM higher or lower at any reading. Therefore, if the flow meter reads 14 GPM with an ethanol solution as in the example above, the range of actual flow rate is 12.9 to 14.5 GPM. Note that this does not take into account any error introduced by incorrectly reading the meter, or having the meter in a non-vertical position. Rotameters must be completely vertical to provide the most accurate reading.