Application Note – Working with Thermal-based Mass Flow Controller Gas Correction Factors

The gas correction factor (GCF) is used to indicate the ratio of flow rates of different gases for a given output voltage from a mass flow controller (MFC). The basis gas is nitrogen (N_2) which, by convention, has $GCF_{N2} = 1$.

To calculate the mass flow of a gas for a MFC that is calibrated for a different gas, take the GCF of the gas being used and divide that by the GCF of the gas that the MFC was calibrated for.

Example:

A MFC is calibrated for Argon ($GCF_{Ar} = 1.39$) and the gas of interest is CO_2 ($GCF_{CO2} = 0.70$). The resulting effective GCF would be $GCF_{CO2} / GCF_{Ar} = 0.70 / 1.39 = 0.50$.

For a set point of 100 standard cubic centimeters per minute (sccm), the MFC calibrated for Ar will actually be flowing 100 sccm *x* 0.5 = 50 sccm of CO_2. If the gas were actually Argon, the mass flow would be 100 sccm. If the gas were N_2, the gas flow would be,

$$= 100 \text{ sccm } x \ (GCF_{N2} / GCF_{Ar}) = 100 \text{ sccm } x \ (1.0 / 1.39) = 72 \text{ sccm}$$

Note:

1. When using the GCF, the accuracy of the flow reading may vary by +/-5%.
2. The repeatability remains within +/-0.2% FS.

Mass flow controller gas correction factors for common gases are available at

http://www.mksinst.com/docs/ur/MFCGasCorrection.aspx

150 East Connecticut Ave, Southern Pines, North Carolina, USA 28387
Phone: +1-910-695-8884 · Fax: +1-910-695-8886 · www.scribner.com · Email: info@scribner.com