


Original Article

Measurement of Helium Micro Flows for Gas Chromatography by the Dilution Method

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Abstract

More and more chemical analysis laboratories using gas chromatography need to measure the different flows involved during the analysis process (split ratio, column flow). The measurement of the column flow is certainly the most difficult because the flow of carrier gas is generally very small. For example, the flow of helium (the most often used carrier gas) is typically $<15 \mu\text{g/s}$ ($5 \text{ cm}^3/\text{min}$). To calibrate helium flowmeters, the “traced gas method” developed at LNE for nitrogen has been optimized for helium microflow measurements in the range of $0.75\text{--}30 \mu\text{g/s}$ ($0.25\text{--}10 \text{ cm}^3/\text{min}$) with an expanded uncertainty of 0.6 % or less at the 95% confidence level. The traced gas method, the uncertainty estimation of the calibration bench and the calibration results of a laminar flow element type Molbloc and an industrial mass flowmeter are presented in this paper.

Keywords

Micro flow – Dilution method – Gas chromatography – MolblocTM – Traced gas method