

Stability and Material Testing Results of Aluminum Cylinders and Regulator Comparisons

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With so many standards and regulator types being used within the WMO/GAW community, we undertook several tests of commonly used materials as they relate to analyte stability. Aluminum (Luxfer) cylinders used under $5 \text{ l} \cdot \text{min}^{-1}$ delivery (high flow) exhibited CO₂ drift which increased after cylinder pressure decreased below 25 bar while lower flow ($0.3 \text{ l} \cdot \text{min}^{-1}$) exhibited stability to a lower pressure. Luxfer Superior Gas Stability™ (SGS) cylinders behaved no different than untreated bare aluminum cylinders for CO₂ although there is suggestion of increased drift of the CO concentration. Stability after storage or use of small carbon wrapped aluminum Luxfer cylinders show measureable drifts in CO₂. Airgas Kel-FTM tipped CGA590 fittings were compared to brass fittings of the same type and were found to give stable delivery of CO₂. Testing has expanded to include CH₄ and CO. Flushing cycles, conditioning and delivery stability of one preferred specific model each of Airliquide, Matheson, and Tescom regulators are compared.