U.S. Department of Commerce
Juanita M. Kreps
Secretary
National Bureau of Standards
Ernest Ambler, Acting Director

National Bureau of Standards Certificate of Analysis

Standard Reference Materials 2619-2626

Carbon Dioxide in Nitrogen

(Combustion Efficiency Gas Standards)

This Standard Reference Material is intended primarily for the determination of fuel efficiency of motor vehicles by a materials balance method and for other gas analysis applications where accurate measurements of carbon dioxide must be performed. It is not intended as a working standard, but rather as a primary standard to which the concentration of working standards may be related.

Cylinder Number

Carbon dioxide concentration: mole percent.

The concentration of carbon dioxide is relative to all other constituents of the mixture. Each cylinder is individually analyzed and the concentration applies only to the gases in the cylinder of the number shown in the certificate.

The overall direction and coordination of technical measurements leading to certification were performed under the chairmanship of E. E. Hughes and J. K. Taylor.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by W. P. Reed.

Washington, D.C. 20234
August 14, 1978
(Revision of Certificate
dated 12-28-76)

J. Paul Cali, Chief
Office of Standard Reference Materials

(over)

Analysis

The carbon dioxide concentration in this Standard Reference Material (SRM) was determined by comparison with a secondary standard which in turn had been intercompared with a set of primary gravimetric standards. The intercomparisons were performed using a gas chromatograph equipped with a thermal conductivity detector. The gravimetric standards were prepared from analyzed samples of nitrogen and carbon dioxide.

Accuracy

The uncertainty shown for the concentration of carbon dioxide in this SRM is the estimated upper limit of the total uncertainty and is based on the inaccuracy of the gravimetric standards, the imprecision of intercomparison between the gravimetric standards and the secondary standards, and the imprecision of intercomparison between the secondary standards and the Standard Reference Materials.

The inaccuracy of the gravimetric standards was estimated by intercomparing these standards, 29 in number, on a relative basis. The signal generated by each of these was plotted against the calculated value for each and a curve was obtained. The inaccuracy, based on the difference between the values calculated from gravimetric data and the values predicted from the coefficients of the curve, was ±0.012% relative.

The imprecision with which the intercomparison between gravimetric standards and any secondary standard was made did not exceed 0.05% relative.

The imprecision of intercomparison between the secondary standard and SRM did not exceed 0.05% relative for any individual cylinder based on at least two and often four or six measurements.

Stability

The stability of these mixtures is considered to be excellent. No loss of carbon dioxide has been observed in either the standards or the SRM. Periodic reanalyses of representative SRM's from this batch will be performed, and if any change in concentration is observed the purchasers of other SRM's from this batch will be notified. The value shown in this certificate is considered valid for a period of one year from receipt.

The SRM should be stored at room temperature and should not be allowed to experience either high or low ambient temperatures.

Cylinder

These gases are supplied in cylinders at 12.4 MNm^{-2} (1800 lb/in^2) pressure with a delivered volume of 0.88 m^3 (31 ft^3) at STP. The cylinders conform to the DOT3AA2015 specification and are equipped with CGA580 valves.