

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 1603

Carbon Dioxide in Nitrogen

Carbon dioxide concentration 0.0384±0.0004 mole percent

The molar concentration of carbon dioxide is relative to the molar concentration of all other gases including the nitrogen and possible trace impurities such as water vapor, oxygen, and argon. The uncertainty shown represents the 99 percent confidence limit for the mean based on nine determinations and allowances for the effects of known sources of possible error.

ANALYSIS—This standard reference material was prepared by stepwise dilution of mixtures containing higher concentrations of carbon dioxide [1]. The original mixture and each mixture during the dilution, including the final concentration, was analyzed for the carbon dioxide concentration. The carbon dioxide was determined by gravimetric analysis, by a mass spectrometric technique, and from the measured pressures involved in preparing the mixtures. The gravimetric technique involved the absorption of carbon dioxide on Ascarite from a carefully measured volume of the mixture. The mass spectrometric technique was developed specifically for this analysis and has been briefly described [1].

STABILITY—No change in concentration of carbon dioxide occurred during transfer of the sample from the batch container to the sample cylinder. No change was observed in the concentration of carbon dioxide in a sample cylinder stored at room temperature for three months. No change in the carbon dioxide concentration was observed when the pressure of a sample cylinder was reduced from filling pressure to atmospheric pressure.

No change was observed in the carbon dioxide content of a cylinder stored at 60 °C for a period of six weeks. Periodic analysis of the contents of the cylinder showed no change in the carbon dioxide content during this period. However, at the end of the storage period the pressure was reduced to slightly more than atmospheric and the cylinder was stored for another week at 60 °C. At the end of this period the carbon dioxide content had increased by 1.0 relative percent.

The carbon dioxide concentration shown above is considered to be accurate for the gas as contained in an unopened cylinder for a period of five years. Periodic analyses of the gas mixture will be continued, and should any significant deviations from the above value appear, the users will be notified.

Washington, D.C. 20234
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J. Paul Cali, Chief
Office of Standard Reference Materials

(Over)

USE AND STORAGE—Each cylinder has been leak-tested at the joint between valve and cylinder. Valves are hand tightened and are presumed leak-free. The valves are equipped to accept CGA-580 fittings. To prevent contamination of the contents, all connections should be evacuated, or flushed with the sample before use.

Cylinders should be stored at room temperature. Cylinder valves are equipped with rupture disk relief valves set to rupture at 1200 psi.

This is a disposable cylinder and will not be refilled.

SAMPLE VOLUME.—The cylinders are filled to about 500 psi. The total volume of gas is about 68 liters measured under standard conditions.

REFERENCE.—[1] J. K. Taylor, editor, NBS Technical Note 403, September 1, 1966.

CYLINDER NUMBER.—DOT special permit number 5075.