



Designation: D4984 – 06 (Reapproved 2015)

Standard Test Method for Carbon Dioxide in Natural Gas Using Length-of-Stain Detector Tubes¹

This standard is issued under the fixed designation D4984; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers a rapid and simple field determination of carbon dioxide in natural gas pipelines. Available detector tubes provide a total measuring range of 100 ppm (parts per million) up to 60 % by volume, although the majority of applications will be on the lower end of this range (that is, under 5 %). At least one manufacturer provides a special kit for measurements from 10 to 100 % CO₂, but the normal 100-cc hand pump is not used. See [Note 1](#).

NOTE 1—High-range carbon dioxide detector tubes will have measuring ranges in percent (%) CO₂, and low-range tubes will be in parts per million (ppm). To convert percent to ppm, multiply by 10 000 (1 % = 10 000 ppm).

1.2 The values stated in SI units are regarded as standard. The inch-pound units in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *Gas Processors Association Standard: 2337 Test for Hydrogen Sulfide and Carbon Dioxide in Natural Gas Using Length-of-Stain Tubes*²

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *detector tube pump*—a hand-operated pump of a piston or bellows type. It must be capable of drawing 100 mL per stroke of sample through the detector tube with a volume tolerance of ± 5 mL.³ It must be specifically designed for use with detector tubes.

3.1.1.1 *Discussion*—A detector tube and pump together form a unit and must be used as such. Each manufacturer calibrates detector tubes to match the flow characteristics of their specific pump. Crossing brands of pumps and tubes is not permitted, as considerable loss of system accuracy is likely to occur.³

3.1.2 *gas sampling chamber*—any container that provides for access of the detector tube into a uniform flow of sample gas at atmospheric pressure and isolates the sample from the surrounding atmosphere. A stainless steel needle valve (or pressure regulator) is placed between the source valve and the sampling chamber for the purpose of throttling the sample flow. Flow rate should approximate 1 to 2 volume changes per minute or, at minimum, provide exit gas flow throughout the detector tube-sampling period.

3.1.2.1 *Discussion*—A suitable sampling chamber may be devised from a polyethylene wash bottle of nominal 500-mL (16-oz) or 1-L (32-oz) size. The wash bottle's internal delivery tube provides for delivery of sample gas to the bottom of the bottle. A 14.7-mm ($\frac{1}{2}$ -in.) hole cut in the bottle's cap provides access for the detector tube and vent for the purge gas (see [Fig. 1](#)). (An alternate flow-through sampler may be fashioned using a 1-gal (3.8-L) "zipper"-type food storage bag. The flexible line enters one corner of the bag's open end and extends to the bottom of the bag. The opposite corner of the bag's top is sealed shut. The basic procedure for the sampler in [Fig. 1](#) applies.)

3.1.2.2 *Discussion*—An alternate sampling container is a collection bag made of a material suitable for the collection of natural gas (for example, polyester film). The sampling bag should have a minimum capacity of 2 L.

3.1.3 *length-of-stain detector tube*—a sealed glass tube with break-off tips sized to fit the tube holder of the pump. The reagent layer inside the tube, typically a silica gel substance coated with the active chemicals, must be specific for carbon dioxide and produce a distinct color change when exposed to a sample of gas containing carbon dioxide. Any substances known to interfere must be listed in the instructions accompanying the tubes. A calibration scale should be marked directly on the tube; however, other markings that provide for easy interpretation of carbon dioxide content from a separate calibration scale supplied with the tubes shall be acceptable.

¹ This test method is issued under the jurisdiction of ASTM Committee D03 on Gaseous Fuels and is the direct responsibility of Subcommittee D03.07 on Analysis of Chemical Composition of Gaseous Fuels.

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² Available from Gas Processors Association, 6526 East 60th St., Tulsa, OK 74145.

³ *First ed., American Industrial Hygiene Association, Akron, OH 44311.*