



# Standard Test Method for Hydrogen Sulfide in Natural Gas Using Length-of-Stain Detector Tubes<sup>1</sup>

This standard is issued under the fixed designation D4810; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method covers a procedure for a rapid and simple field determination of hydrogen sulfide in natural gas pipelines. Available detector tubes provide a total measuring range of 0.5 ppm by volume up to 40 % by volume, although the majority of applications will be on the lower end of this range (that is, under 120 ppm).

1.2 Typically, sulfur dioxide and mercaptans may cause positive interferences. In some cases, nitrogen dioxide can cause a negative interference. Most detector tubes will have a “precleanse” layer designed to remove certain interferences up to some maximum interferent level. Consult manufacturers’ instructions for specific interference information.

1.3 The values stated in SI units are to be regarded as the standard.

1.4 *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: No. 2377-86 Test for Hydrogen Sulfide in Natural Gas Using Length of Stain Tubes*<sup>2</sup>

## 3. Summary of Test Method

3.1 The sample is drawn through a detector tube filled with a specially prepared chemical. Any hydrogen sulfide present in the sampling reacts with the chemical to produce a color

<sup>1</sup> This test method is 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.

Current edition approved Nov. 1, 2015. Published December 2015. Originally approved in 1988. Last previous edition approved in 2011 as D4810 - 06 (2011). DOI: 10.1520/D4810-06R15.

<sup>2</sup> Available from Gas Processors Association, 1812 First National Bank Bldg., Tulsa, OK 74103.

change or stain. The length of the stain produced in the detector tube, when exposed to a measured volume of sample, is directly proportional to the amount of hydrogen sulfide present in the sample. A hand-operated piston or bellows-type pump is used to draw a measured volume of sample through the tube at a controlled rate of flow. The length of stain produced is converted to ppm (by volume) hydrogen sulfide (H<sub>2</sub>S), by comparison to a calibration scale supplied by the manufacturer for each box of detection tubes (higher range tubes have units of percent by volume). The system is direct reading, easily portable, and completely suited to making rapid spot checks for hydrogen sulfide under field conditions.

## 4. Significance and Use

4.1 The measurement of hydrogen sulfide in natural gas is important because of the gas quality specifications, the corrosive nature of H<sub>2</sub>S on pipeline materials, and the effects of H<sub>2</sub>S on utilization equipment.

4.2 This test method provides inexpensive field screening of hydrogen sulfide. The system design is such that it may be used by nontechnical personnel with a minimum of proper training.

## 5. Apparatus

5.1 *Length-of-Stain Detector Tube and Calibration Scale*—A sealed glass tube with breakoff tips sized to fit the tube holder of the pump. The reagent layer inside the tube, typically a silica gel substrate coated with the active chemicals, must be specific for hydrogen sulfide and must produce a distinct color change when exposed to a sample of gas containing hydrogen sulfide. Any substances known to interfere must be listed in the instructions accompanying the tubes. A calibration scale should be marked directly on the tube or other markings which provide for easy interpretation of hydrogen sulfide content from a separate calibration scale supplied with the tubes. The calibration scale shall correlate hydrogen sulfide concentration to the length of the color stain. Shelf life of the detector tubes must be a minimum of two years from date of manufacture when stored according to manufacturers’ recommendations.