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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Methods for Natural Gas Odor Intensity[1]

This standard is issued under the fixed designation D 6273; 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 These test methods cover the procedures for determining the odor intensity of natural gas through the use of instruments that dilute and mix the sampled natural gas with air. The mixed gas stream is then sniffed by the operator for the purpose of determining the threshold detection level or the readily detection level, or both, for odorant in the natural gas stream.

1.2 *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 *ASTM Standards:*

D 4150 Terminology Relating to Gaseous Fuels[2]

D 5287 Practice for Automatic Sampling of Gaseous Fuels[2]

E 253 Terminology of Sensory Evaluation of Materials and Products[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *odorant, n*—sulfur-bearing compound that gives natural gas a distinctive odor. For the purpose of these test methods, natural gas odorants may be compounds that are present at the wellhead or commercial mixtures that are added to the gas stream, or both.

3.1.2 *olfactory fatigue, n*—desensitization of the sense of smell through either prolonged exposure or repeated exposure over a short period of time to an odor, a mixture of odors, or series of odors.

3.1.3 *sniff, vi*—smell or snuff with short, audible inhalations.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *high pressure, n*—for the purpose of these test methods, high pressure refers to natural gas pressure greater than the maximum inlet pressure specified by the manufacturer of the gas dilution apparatus.

3.2.2 *intensity, n*—the magnitude of odor perceived by the operator.

3.2.3 *low pressure, n*—for the purpose of these test methods, low pressure refers to natural gas pressure less than or equal to the maximum inlet pressure specified by the manufacturer of the gas dilution apparatus.

3.2.4 *operator(s), n*—the person(s) performing the testing described in these test methods. Because of the nature of the testing described herein, the operator shall be qualified to perform this work (see 5.2).

3.2.5 *readily detectable level, n*—the concentration of natural gas and odorant mixture in air which the operator is able to detect and identify natural gas odor.

3.2.6 *threshold detection level, n*—the concentration of natural gas and odorant mixture in air which the operator is barely able to detect an odor.

3.3 For definitions of terms related to natural gas that are used in these test methods, refer to Practice D 5287.

3.4 For definitions of terms related to olfactory testing that are used in these test methods, refer to Terminology E 253.

4. Significance and Use

4.1 Federal regulations[4] state: “A combustible gas in a distribution line must contain a natural odorant or be odorized so that at a concentration in air of one-fifth of the lower explosive limit, the gas is readily detectable by a person with a normal sense of smell.” These regulations state further that “each operator shall conduct periodic sampling of combustible gases to assure the proper concentration of odorant in accordance with this section.” Additionally, a number of states have enacted legislation that requires natural gas to be odorized so that it is detectable at concentrations less than one fifth of the lower explosive limit.[5] While regulations do not specify the exact method for determining compliance, it has been documented that compliance testing must be olfactory in nature.[6]

4.2 These test methods cover procedures to measure the odor level of natural gas by way of olfactory determination. No direct correlation may be ascertained between these test methods and those methods available or under development

[1] These test methods are under the jurisdiction of Committee D-3 on Gaseous Fuels and is the direct responsibility of Subcommittee D03.05 on Determination of Special Constituents of Gaseous Fuels.

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[2] *Annual Book of ASTM Standards*, Vol 05.05.

[3] *Annual Book of ASTM Standards*, Vol 15.07.

[4] 49 CFR Part 192.625.

[5] For example, Massachusetts Section 192.625 MFS Standards requires that “... a concentration of fifteen hundredths of one percent gas in the air is readily perceptible to the normal or average olfactory senses of a person ... .”

[6] American Gas Association Operating Section Technical Note CAS-2-1-95, “ Natural Gas Odorization: Compliance with Federal Regulations.”