



Designation: **D4150 – 08 (Reapproved 2016) D4150 – 19**

Standard Terminology Relating to Gaseous Fuels¹

This standard is issued under the fixed designation D4150; 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 standard defines the terms used in standards that are the ~~responsibility~~responsibility of Committee D03 on Gaseous Fuels. These terms are used in:

- 1.1.1 The sampling of gaseous fuels,
- 1.1.2 The analysis of gaseous fuels for composition and various other physical properties, and
- 1.1.3 Other practices related to the processing, transmission, and distribution of gaseous fuels.

1.2 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*²

[D1142 Test Method for Water Vapor Content of Gaseous Fuels by Measurement of Dew-Point Temperature](#)
[D3588 Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels](#)

2.2 *ISO Standard:*³

[ISO NP-14532/7504 Natural Gas—Terminology Gas Analysis—Vocabulary](#)
[ISO 14687 Hydrogen Fuel Quality—Product Specification](#)

2.3 *SAE Standard:*⁴

[SAE J2719 Hydrogen Fuel Quality for Fuel Cell Vehicles](#)

2.4 *GPA Standard:*⁵

[GPA 2145 Table of Physical Properties for Hydrocarbons and Other Compounds of Interest to the Natural Gas and Natural Gas Liquids Industries](#)

3. Terminology

absolute pressure, *n*—pressure measured with reference to absolute zero pressure, usually expressed as kPa, mm Hg, bar, or psia.

acid gas—**gas**, *n*—natural gas containing high concentrations of hydrogen sulfide or carbon dioxide, or both, which is acidic when in contact with water or water vapor.

associated gas—**gas**, *n*—natural gas, also known as gas-cap gas or dome gas, that overlies and is in immediate contact, but not in solution, with crude oil in a reservoir.

at-line instrument—**instrument**, *n*—instrument requiring operator interaction to sample gas directly from the pipeline.

base conditions—**conditions**, *n*—temperature and pressure conditions at which natural gas volumes are determined for purposes of custody transfer. ~~In natural gas measurement the properties of interest are temperature, pressure, and composition. Assuming~~

¹ This terminology is under the jurisdiction of ASTM Committee D03 on Gaseous Fuels and is the direct responsibility of Subcommittee D03.92 on Terminology Classification and Specifications.

Current edition approved July 1, 2016 Dec. 15, 2019. Published August 2016 January 2020. Originally approved in 1982. Last previous edition approved in 2008 2016 as D4150 – 08: D4150 – 08(2016). DOI: 10.1520/D4150-08R16:10.1520/D4150-19.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>. International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

⁴ Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096, <http://www.sae.org>.

⁵ Available from Gas Processors Association (GPA), 66 American Plaza, Suite 700, Tulsa, OK 74135, <http://www.gpaglobal.org>.

ideal gas properties, for simplicity, tables of pure compounds can be prepared for use in calculating gas properties for any composition at “base conditions.” These “base conditions” are chosen near ambient.

DISCUSSION—

In natural gas measurements, the properties of interest are temperature, pressure, and composition. Assuming ideal gas properties, for simplicity, tables of pure compounds can be prepared for use in calculating gas properties for any composition at “base conditions.” These “base conditions” are chosen near ambient.

Btu—British thermal unit (Btu or BTU), *n*—British thermal unit, the amount of energy required to raise the temperature of one pound of water one degree Fahrenheit. One Btuone degree Fahrenheit_{IT} (International Table) is equal to 1055.056 J.

DISCUSSION—

One Btu_{IT} (International Table) is equal to 1055.056 J. The defining relationships are:

(a) 1 Btu·lb–1 = 2.326 J·g – 1 (exact)

(b) 1 lb = 453.592 37 g (exact).

By these relationships, 1 Btu = 1055.055 852 62 J (exact). For most purposes, the value rounded to 1 Btu = 1055.056 J is adequate.

calibration gas mixture, *n*—a certified gas mixture with known composition used for the calibration of a measuring instrument or for the validation of a measurement or gas analytical method.

DISCUSSION—

Calibration Gas Mixtures are the analogues of measurement standards in physical metrology (reference ISO 7504 paragraph 4.1).

calorimeter—calorimeter, *n*—a device to measure the evolved heat resulting from the combustion of a material.

compressed natural gas (CNG)—(CNG), *n*—natural gas that is typically pressurized to 3600 psi. CNG is primarily used as a vehicular fuel. has been compressed after processing for storage or transportation purposes.

DISCUSSION—

CNG is primarily used as a fuel for vehicles, typically compressed up to 24 821 kPa in the gaseous state.

compressibility—compressibility, *n*—the property of a material that permits it to decrease in volume when subjected to an increase in pressure.

compressibility factor (*z*)—(*z*), *n*—a factor calculated by taking the ratio of the actual volume of a given mass of gas at a specified temperature and pressure to its volume calculated from the ideal gas law at the same conditions.

constituent, *n*—component, compound, or element found within a mixture.

continuous fuel monitor, *n*—instrument that samples gas directly from a source and provides an analytical result on a continuous or semi-continuous basis.

dew point—point, *n*—the temperature at any given pressure at which liquid initially condenses from a gas or vapor. It vapor and is specifically applied to the temperature at which water vapor starts to condense from a gas mixture (water dew point), or at which hydrocarbons start to condense (hydrocarbon dew point).

DISCUSSION—

Charts of dewpoints versus pressure and water content are found in Test Method **D1142**.

direct sampling, *n*—sampling where there is a direct connection between the sample source and the analyzer.

dissolved gas—gas, *n*—natural gas held in solution in reservoir liquids at the prevailing temperature and pressure of the reservoir.

dry gas—gas, *n*—natural gas containing little or no water vapor.

dynamic calibration, *n*—calibration of an analytical system using a gaseous standard generated by dilution of the flow of a known quantity of gaseous analyte with a known quantity of diluent gas.

DISCUSSION—