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Standard Terminology Relating to Gaseous Fuels¹

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1. Scope

1.1 This standard defines the terms used in standards that are the responsibility of Committee ~~D-3~~ 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.

2. Referenced Documents

2.1 *ISO Standard:*

¹ This terminology is under the jurisdiction of ASTM Committee ~~D-3~~ D03 on Gaseous Fuels and is the direct responsibility of Subcommittee D03.92 on ~~Definitions, Terminology, Classification and Nomenclature, Specifications.~~

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3. Terminology

acid gas—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—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 requiring operator interaction to sample gas directly from the pipeline.

base conditions—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 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, the amount of energy required to raise the temperature of one pound of water one degree Fahrenheit. One Btu_{IT} (International Table) is equal to 1055.056 J.

compressed natural gas (CNG)—natural gas that is typically pressurized to 3600 psi. CNG is primarily used as a vehicular fuel.

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

compressibility factor (z)—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.

dew point—the temperature at any given pressure at which liquid initially condenses from a gas or vapor. It 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**).

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

dry gas—natural gas containing little or no water vapor.

gas quality—quality of gaseous fuel, which is defined by its composition and its physical properties.

gross heating value (also called higher heating value)—the amount of energy per volume transferred as heat from the complete, ideal combustion of the gas at standard temperature in which all the water formed by the reaction condenses to liquid.

hydrate—a solid, crystalline material composed of water and components of natural gas formed under pressure at temperatures above the freezing point of water.

hydrocarbon dew point—(see **dew point**)

inert components—those elements or components of natural gas (fuel gas) that do not contribute to the heating value.

in-line instrument—instrument whose active element is installed in the pipeline and measures at pipeline conditions.

lean gas—natural gas containing little or no hydrocarbons commercially recoverable as liquid products.

DISCUSSION—Water and recoverable hydrocarbons (ethane and heavier hydrocarbons) are customarily removed from natural gas to meet contractual or state statutory requirements.

liquefied natural gas (LNG)—natural gas that has been liquefied, after processing, for storage or transportation purposes. (This definition is from ISO NP 14532.)

natural gas—a naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in porous geological formations (reservoirs) beneath the earth’s surface, often in association with petroleum. The principal constituent of natural gas is methane.

natural gas odorant—an intensively smelling organic chemical or combination of chemicals (for example, sulfur compounds), added to fuel gases to impart a characteristic and distinctive (usually disagreeable) warning odor so gas leaks can be detected.

natural gas, processed—a methane-rich commercial gaseous product derived from naturally occurring gas mixtures by processing (also referred to as merchantable natural gas).

net heating value (also called lower heating value)—the amount of energy per volume transferred as heat from the complete, ideal combustion of the gas at standard temperature in which all the water formed by the reaction remains in the vapor state.

nonassociated gas—natural gas not in contact with, nor dissolved in, reservoir liquids.

on-line instrument—automated instrument that samples gas directly from the pipeline, but is installed externally.

relative density (specific gravity)—ratio of the density of the gaseous fuel, under specified conditions of temperature and pressure, to the density of normal dry air,³ at the same temperature and pressure.

rich gas—natural gas containing commercially recoverable amounts of condensable hydrocarbons.

sour gas—natural gas containing concentrations of sulfur compounds which make it impractical to use without purification because of toxicity or corrosive effects, or both, on piping and equipment.

sweet gas—natural gas with sulfur compounds low enough that it can be used without further purification.

water dew point—(see **dew point**)

wet gas—natural gas that contains water vapor in excess of sales or contractual specifications, or both.

² Available from American National Standards Institute, 1142nd 25 W. 43rd St., 13th 4th Floor, New York, NY 10036.

³ *Journal of Research*, National Institute of Standards and Technology, Vol 83, pp. 419, 1978.

DISCUSSION—The term is subject to varying legal definition as specified by contract or state statutes.

Wobbe index—a numerical value that is calculated as the heat value (calorific value/heat) on a volume basis at specified reference conditions, divided by the square root of the relative density at the same specified reference conditions. The Wobbe index is a measure of heat input to gas appliances derived from the orifice flow equation. It indicates the relative amount of energy that would flow through a small burner orifice jet.

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