



Designation: D1070 – 03 (Reapproved 2017)

Standard Test Methods for Relative Density of Gaseous Fuels¹

This standard is issued under the fixed designation D1070; 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 determination of relative density of gaseous fuels, including liquefied petroleum gases, in the gaseous state at normal temperatures and pressures. The test methods specified are sufficiently varied in nature so that one or more may be used for laboratory, control, reference, gas measurement, or in fact, for any purpose in which it is desired to know the relative density of gas or gases as compared to the density of dry air at the same temperature and pressure.

1.2 The procedures appear in the following sections:

	Section
Method A, Ac-Me Gravity Balance	7 – 9
Method B, Ranarex Recording and Indicating Gravimeter	10-11
Method C, UGC Gravimeter	12 – 14

NOTE 1—The test methods and apparatus described herein are representative of methods and apparatus used broadly in industry. Manufacturer's instructions for specific models should be consulted for further details and as supplements to the information presented here. In addition to instrumentation described below additional equally accurate and satisfactory instruments may be available.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered 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.*

1.5 *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

D5503 Practice for Natural Gas Sample-Handling and Conditioning Systems for Pipeline Instrumentation (Withdrawn 2017)³

3. Terminology

3.1 *Definitions:*

3.1.1 *density*—mass per unit of volume of the fuel gas or air being considered.

3.1.2 *gaseous fuel*—material to be tested, as sampled, without change of composition by drying or otherwise.

3.1.3 *relative density*—ratio of the density of the gaseous fuel, under the observed conditions of temperature and pressure, to the density of dried air, of normal carbon dioxide content, at the same temperature and pressure.

3.1.3.1 *Discussion*—In these test methods the term “relative density” has replaced the term “specific gravity.” The term, specific gravity, as used in a previous edition of these test methods, was used incorrectly.

3.1.4 *relative humidity*—ratio of actual pressure of existing water vapor to maximum possible pressure of water vapor in the atmosphere at the same temperature, expressed as a percentage.

4. Summary of Test Methods

4.1 *Displacement Balances*—This test method is based on the balancing of the weight of a fixed volume of gas at atmospheric pressure against the weight of dry air across the center of gravity of a balance beam. The amount of this “deflection,” subject to correction, for humidity, high CO₂ content or other factor measures the relative density. Instruments of this class may be either visual or chart recording.

4.2 *Kinetic Energy*—This test method measures the ratio of the change in kinetic energy between an impeller and an impulse wheel operating in gas and a second impeller and

¹ These test methods are under the jurisdiction of ASTM Committee D03 on Gaseous Fuels and is the direct responsibility of Subcommittee D03.03 on Determination of Heating Value and Relative Density of Gaseous Fuels.

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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 The last approved version of this historical standard is referenced on www.astm.org.