



Designation: D4175 – 23a

Standard Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants¹

This standard is issued under the fixed designation D4175; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This terminology standard covers the compilation of terminology developed by Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants, except that it does not include terms/definitions specific only to the standards in which they appear.

1.1.1 The terminology, mostly definitions, is unique to petroleum, petroleum products, lubricants, and certain products from biomass and chemical synthesis. Meanings of the same terms outside of applications to petroleum, petroleum products, and lubricants can be found in other compilations and in dictionaries of general usage.

1.1.2 The terms/definitions exist in two places: (1) in the standards in which they appear and (2) in this compilation.

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. Terminology

2.1 Alphabetical listing of terms with definitions for each term showing attributions as to source and subcommittee jurisdiction is in bold print following the definition. Those showing no attributes are under the jurisdiction of Subcommittee CS 95.

1,3-butadiene—hydrocarbon product containing more than 99 % 1,3-butadiene. [D02.D0] D5274

abrasion, *n*—wear by displacement of material caused by hard particles or hard protuberances. [D02.96] D7684, D7690

abrasive wear, *n*—wear due to hard particles or hard protuberances forced against and moving along a solid surface. [D02.B0] D4998; [D02.L0] D5182

¹ This terminology is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.95 on Terminology.

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DISCUSSION—Also called cutting wear in some instances such as machining swarf. [D02.96] D7898

absorbance, *n*—logarithm to the base 10 of the ratio of the reciprocal of the transmittance. [D02.03] D7740

absorbance, (*A*), *n*—the molecular property of a substance that determines its ability to take up radiant energy, expressed by:

$$A = \log_{10}(1/T) = -\log_{10}(T)$$

where *T* is the transmittance.

DISCUSSION—Absorbance expresses the excess absorption over that of a specified reference or standard. It is implied that compensation has been affected for reflectance losses, solvent absorption losses, and refractive effects, if present, and that attenuation by scattering is small compared with attenuation by absorption. [D02.14] D7996

absorbance, *A*, *n*—the molecular property of a substance that determines its ability to take up radiant power, expressed by:

$$A = \log_{10}(1/T) = -\log_{10}T$$

where *T* is the transmittance.

DISCUSSION—Absorbance expresses the excess absorption over that of a specified reference or standard. It is implied that compensation has been affected for reflectance losses, solvent absorption losses, and refractive effects, if present, and that attenuation by scattering is small compared with attenuation by absorption. [D02.04] D2008

absorbance (*A*), *n*—the logarithm to the base 10 of the reciprocal of the transmittance, (*T*).

$$A = \log_{10}(1/T) = -\log_{10}T$$

DISCUSSION—Absorbance is a measure of the capacity of a substance to absorb light of a specific wavelength. [D02.25] D8470

absorptivity, *a*, *n*—the specific property of a substance to absorb radiant power per unit sample concentration and path length, expressed by:

$$a = A/fbc$$

where:

A = the absorbance,

f = the dilution factor,

b = sample cell path length, and

c = the quantity of absorbing substance contained in a volume of solvent.

[D02.04] D2008

*A Summary of Changes section appears at the end of this standard

absorptivity, n —the absorbance divided by the product of the concentration of the substance and the sample pathlength, $a = A/(bc)$. The units of b and c shall be specified. [D02.25] D8321

acceptance limit (AL), n —a numerical value that defines the point between making the property conformance or non-conformance to a specification decision.

DISCUSSION—The AL is not necessarily the specification limit. It is a value that takes into account the specification limit, the test method precision, and the desired probability of making the conformance to specification decision if the true value (see 3.1.17) of the property is at the specification limit. [D02.94] D3244

accepted reference value (ARV), n —value that serves as an agreed-upon reference for comparison and that is derived as (1) a theoretical or established value, based on scientific principles, (2) an assigned value, based on experimental work of some national or international organization, such as the U.S. National Institute of Standards and Technology (NIST), or (3) a consensus value, based on collaborative experimental work under the auspices of a scientific or engineering group. [D02.04] D6596; [D02.25] D8340; [D02.94] D8428

DISCUSSION—In the context of this test method, accepted reference value is understood to apply to the cetane number of specific reference materials determined empirically under reproducibility conditions by the National Exchange Group or another recognized exchange testing organization. [D02.01] D613

DISCUSSION—In the context of this test method, accepted reference value is understood to apply to the ignition delay of specific reference materials determined under reproducibility conditions by collaborative experimental work. [D02.01] D6890

DISCUSSION—In the context of this test method, accepted reference value is understood to apply to the Motor octane number of specific reference materials determined empirically under reproducibility conditions by the National Exchange Group or another recognized exchange testing organization. [D02.01] D2700

DISCUSSION—In the context of this test method, accepted reference value is understood to apply to the Research octane number of specific reference materials determined empirically under reproducibility conditions by the National Exchange Group or another recognized exchange testing organization. [D02.01] D2699

DISCUSSION—In the context of this test method, accepted reference value is understood to apply to the supercharge and octane number ratings of specific reference materials determined empirically under reproducibility conditions by the National Exchange Group or another recognized exchange testing organization. [D02.01] D909

DISCUSSION—In the context of this test method, accepted reference value is understood to apply to standard fuel or check fuel average research or motor octane numbers determined under reproducibility conditions by a recognized exchange testing organization having a minimum of 16 participants. [D02.01] D2885

DISCUSSION—In the context of this method, accepted reference value is understood to apply to the ignition delay and the combustion delay of specific reference materials determined under reproducibility conditions by collaborative experimental work. [D02.01] D7668

accepted reference value (ARV), n —a value that serves as an agreed-upon reference for comparison, and which is derived as: (1) a theoretical or established value, based on scientific

principles, (2) an assigned or certified value, based on experimental work of some national or international organization, or (3) a consensus or certified value, based on collaborative experimental work under the auspices of a scientific or engineering group. [D02.25] D3764

accepted reference value, ARV—a value that serves as an agreed upon reference for comparison, and which is derived as: (1) a theoretical or established value, based on scientific principles, (2) an assigned value, based on experimental work of some national or international organization such as the U.S. National Institute of Standards and Technology (NIST), or (3) a consensus value, based on collaborative experimental work under the auspices of a scientific or engineering group. [D02.94] D6792

accommodation cracks, n —(also referred to as Mrozowski-like cracks) cracks and voids formed between basal planes and at domain interfaces throughout the graphite microstructure from thermal contraction of the graphite during carbonization/graphitization (sometimes referred to as calcination cracks), from chemical decomposition of the liquid crystal hydrocarbon precursor in graphite manufacture (also referred to as calcination cracks) and following cooling after graphitization (manufacture). In irradiated graphite, they also comprise cracks arising from anisotropic responses to irradiation. [D02.F0] D8075

accuracy, n —the closeness of agreement between a test result and an accepted reference value. [D02.91] D8164; [D02.07] D8278; [D02.94] D6792

acid number, n —the quantity of a specified base, expressed in milligrams of potassium hydroxide per gram of sample, required to titrate a sample in a specified solvent to a specified endpoint using a specified detection system. [D02.06] D8045; [D02.09] D943

DISCUSSION—In this test method, the acid number is calculated from the number of drops required to produce a change in solution color from blue-green to orange, compared to the number of drops required to produce an identical color change using a reference standard. Because this is a direct comparison method, the acid number value can be reported in milligrams of potassium hydroxide per gram of sample. [D02.06] D5770

DISCUSSION—In this test method, the indicator is *p*-naphtholbenzein titrated to a green/green-brown end point in a toluene-water-isopropanol solvent. [D02.06] D974

DISCUSSION—In this test method, the solvent is a toluene-water-isopropanol mixture and the end point is determined when a green/green brown color is obtained using the specified *p*-naphtholbenzein indicator solution. [D02.06] D3242

DISCUSSION—This test method expresses the quantity of base as milligrams of potassium hydroxide per gram of sample, that is required to titrate a sample in a mixture of toluene and propan-2-ol to which a small amount of water has been added from its initial meter reading in millivolts to a meter reading in millivolts corresponding to an aqueous basic buffer solution or a well-defined inflection point as specified in the test method. [D02.06] D664

DISCUSSION—This test method provides additional information. The quantity of base, expressed as milligrams of potassium hydroxide per gram of sample, required to titrate a sample in the solvent from its