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Standard Terminology Relating to Industrial and Specialty Chemicals¹

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1. Scope*

1.1 This standard covers terminology relating to industrial and specialty chemicals. It is intended to provide an understanding of terms commonly used in test methods, practices, and specifications throughout the industry.

NOTE 1—The boldface numbers following each definition refer to E15 standards in which the definition appears. Lightface numbers refer to the E15 subcommittee having jurisdiction.

2. Referenced Documents

2.1 ~~ASTM Standards:~~

~~D891~~ ASTM Standards:²

D 891 Test Methods for Specific Gravity, Apparent, of Liquid Industrial Chemicals

E70

E 70 Test Method for pH of Aqueous Solutions With the Glass Electrode

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals

E 200 Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis

E 201 Test Method for Calculation of Volume and Weight of Industrial Chemical Liquids (Discontinued 2001)

E 222 Test Methods for Hydroxyl Groups by Using Acetic Anhydride Acetylation

E 223 Test Methods for Analysis of Sulfuric Acid

E 224 Test Methods for Analysis of Hydrochloric Acids

E 234 Test Method for Total Bromine Number of Unsaturated Aliphatic Chemicals

E300

E 300 Practice for Sampling Industrial Chemicals

E 324 Test Method for Relative Initial and Final Melting Points and the Melting Range of Organic Chemicals (Discontinued 2001)

E 326 Test Method for Hydroxyl Groups by Phthalic Anhydride Esterification (Discontinued 2001)

E 335 Test Method for Hydroxyl Groups by Pyromellitic Dianhydride Esterification

E347

E 347 Test Method for Ash in Polybasic Acids

E410

E 410 Test Method for Moisture and Residue in Liquid Chlorine

E 1899 Test Method for Hydroxyl Groups Using Reaction with *p*-Toluenesulfonyl Isocyanate (TSI) and Potentiometric Titration with Tetrabutylammonium Hydroxide

3. Terminology

3.1 Definitions:

accuracy—the agreement between an experimentally determined value and the accepted reference value. In chemical work, this term is frequently used to express freedom from bias, but in other fields it assumes a broader meaning as a joint index of precision and bias. To avoid confusion, the term *bias* will be used in appraising of the systematic error of test methods for industrial chemicals. See also **bias**. —~~E180,~~ E 180, E15.04

ash—the residual inorganic matter obtained on ignition of a sample in air at a specified temperature. —~~E347,~~ E 347, E15.51

¹ This terminology is under the jurisdiction of ASTM Committee E15 on Industrial and Specialty Chemicals and is the direct responsibility of Subcommittee E15.01 on General Standards.

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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.

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

Baumé gravity—a unit of density based on specific gravity and defined by the following equation:

$$\text{Baumé gravity} = 145 - [145/\text{sp gr}] \text{ at } 15.5/15.5^{\circ}\text{C} (60/60^{\circ}\text{F}) \quad (1)$$

See also **density** and **specific gravity**. — ~~E223, E224, E324,~~ E 223, E 224, E 324, E15.51

bias—a constant or systematic error as opposed to a random error. It manifests itself as a persistent positive or negative deviation of the method average from the accepted reference value. See also **accuracy**. — ~~E180,~~ E 180, E15.04

bromine number, total—number of centigrams of bromine equivalent to the total unsaturation present in 1 g of sample. It is a measure of the total ethylenic unsaturation present in the designated aliphatic compound. E 234, E15.22

coefficient of variation—a measure of relative precision calculated as the standard deviation of a series of values divided by their average. It is often multiplied by 100 and expressed as a percentage. — ~~E180,~~ E 180, E15.04

density—the mass of a unit volume of a material at a specified temperature. The units shall be stated, such as grams per millilitre, grams per cubic centimetre, pounds per cubic foot, or other. The form of the expression shall be the following:

$$\text{Density at } x \dots$$

where x = ~~temperature of the material.~~ See also = temperature of the material, in <units>, for example, °C. See also **Baumé**

gravity and specific gravity . — ~~E201,~~ E 201, E15.23

density (of gases)—the mass of a unit volume of a gas at a stated temperature and pressure. The units shall be stated. The form of expression shall be the following:

$$\text{Density at } x, y$$

where:

~~x = temperature of the gas, and~~ = temperature of the gas units, for example, °C, and

~~y = pressure of the gas.~~ = pressure of the gas (units, for example, kPa).

E 12, E15.23

density, apparent—the weight in air of a unit volume of a material at a specified temperature. The units shall be stated. The form of expression shall be the following:

$$\text{Apparent density at } x$$

where x = ~~temperature of the material.~~ E201, = temperature of the material, in <units>, for example, °C. E 201, E15.23

duplicates—two independent determinations performed by one analyst at essentially the same time. ~~E180,~~ two independent determinations performed by one analyst in a short period of time, for example, one day. E 180, E15.04

error—*in a statistical sense*, any deviation of an observed value from the true, but generally unknown, value. When expressed as a fraction or percentage of the value measured, it is called a relative error. All statements of precision or bias should indicate clearly whether they are expressed in absolute or relative sense. — ~~E180,~~ E 180, E15.04

error, random—the chance variation encountered in all experimental work despite the closest possible control of variables. It is characterized by the random occurrence of both positive and negative deviations from the mean value for the method, the algebraic average of which will approach zero in a long series of measurements. — ~~E180,~~ E 180, E15.04

hydroxyl number—the milligrams of potassium hydroxide equivalent to the hydroxyl content of 1 g of sample. In the case of a pure compound, the hydroxyl number is inversely proportional to the hydroxyl equivalent weight:

$$\text{equivalent weight (g/equivalent)} = 56100/\text{hydroxyl number} \quad (2)$$

— ~~E222, E326, E335, E1889,~~ E 222, E 326, E 335, E 1889, E15.22

increments (solid sample)—portions of material selected from various parts of a lot, which may be tested individually or composited and tested as a unit. — ~~E300,~~ E 300, E15.05

lot (solid sample)—a discrete quantity of material. It may contain a single batch or several batches or be the product of continuous process broken into units on the basis of time or shipment. It is very desirable that individual batches in a lot be specifically identified so that they may become individual or stratified units for inspection. — ~~E300,~~ E 300, E15.05

melting point, final—the temperature at which the last crystal disappears into the melt. — ~~E324,~~ E 324, E15.23

melting point, initial—the temperature at which positive evidence of liquefaction is observed. — ~~E324,~~ E 324, E15.23

moisture—the volatile substances evolved during volatilization and purging of the sample-residue flask and absorbed on the desiccant contained in the absorption tubes under the conditions of the test.³ — ~~E410,~~ E 410, E15.57

95 % limit (difference between two results)—the maximum absolute difference expected for approximately 95 % of all pairs of results from laboratories similar to those in the interlaboratory study. — ~~E180,~~ E 180, E15.04

pH—defined formally as the negative logarithm to the base 10 of the conventional hydrogen ion activity. The pH of an aqueous solution is derived from E , the electromotive force (emf) of the cell:

$$\text{reference} || \text{solution} | \text{glass electrode}$$

(where the double vertical line represents a liquid junction)

when the electrodes are immersed in the solution, and E_s ,

³ This term or definition is specific to the standard under the test conditions.