



Standard Terminology Relating to Thermophysical Properties¹

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1. Scope

1.1 This is a compilation of terms and corresponding definitions commonly used in the study of thermophysical properties. Terms that are generally understood or defined adequately in other readily available sources are either not included or their sources identified.

1.2 A definition is a single sentence with additional information included in a *Discussion*.

1.3 Definitions of terms specific to a particular field (such as *dynamic mechanical measurements*) are identified with an italicized introductory phrase.

2. Referenced Documents

2.1 ASTM Standards:²

D4092 Terminology for Plastics: Dynamic Mechanical Properties

E7 Terminology Relating to Metallography

E344 Terminology Relating to Thermometry and Hydrometry

E2744 Test Method for Pressure Calibration of Thermal Analyzers

3. Terminology

3.1 Definitions:

absolute pressure, *n*—pressure measured relative to zero pressure corresponding to empty space.

DISCUSSION—Absolute pressure is atmospheric pressure plus gage pressure.

activation energy (E), *n*—in chemical kinetics, the energy that must be overcome in order for a chemical reaction to occur.

DISCUSSION—The term *activation energy* was introduced in 1889 by Svante Arrhenius as a mathematical term in the eponymous, empirical relationship between temperature and reaction rate constant.

¹ This terminology is under the jurisdiction of ASTM Committee E37 on Thermal Measurements and are the direct responsibility of Subcommittee E37.03 on Nomenclature and Definitions.

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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.

admittance, *Y*, *n*—the reciprocal of impedance.

alpha (α) loss peak, *n*—in *dynamic mechanical measurement*, first peak in the damping curve below the melt, in order of decreasing temperature or increasing frequency. **E7**

amorphicity, *n*—a relative measure of amorphous material content, expressed as a percent of the total material content.

angular frequency, ω , *n*—the number of radians per second traversed by a rotating vector that represents any periodically varying quantity.

DISCUSSION—Angular frequency, ω , is equal to two π times the frequency, *f*.

anisotropic, *adj*—having different values for a property in different directions.

anti-thixotropy, *n*—an increase of the apparent viscosity under constant shear stress or shear rate followed by a gradual recovery when the stress or shear rate is reduced to zero.

arrhenius equation, *n*—a mathematical relationship between the specific reaction rate constant and the temperature given as:

$$k = Ae^{-E/RT} \quad (1)$$

where:

k = the reaction rate constant,

A = the pre-exponential factor,

E = the energy of activation,

R = the gas constant, and

T = the absolute temperature.

atmospheric pressure, *n*—the pressure due to the weight of the atmosphere. **E2744**

DISCUSSION—Atmospheric pressure varies with elevation above sea level, acceleration due to gravity, and weather conditions.

barometer, *n*—an instrument for measuring atmospheric pressure.

beta (β) loss peak, *n*—in *dynamic mechanical measurement*, second discrete peak in damping curve below the melt, in order of decreasing temperature or increasing frequency. **D4092**

boiling pressure, *n*—at a specific temperature, the value of the vapor pressure of the liquid at which it is equal to the external pressure.