



Standard Terminology of Fire Standards¹

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1. Scope

1.1 This terminology covers terms, related definitions, and descriptions of terms used or likely to be used in fire-test-response standards, fire-hazard-assessment standards, and fire-risk-assessment standards. Definitions of terms are special-purpose definitions that are consistent with the standard definitions but are written to ensure that a specific fire-test-response standard, fire-hazard-assessment standard, or fire-risk-assessment standard is properly understood and precisely interpreted.

NOTE 1—For additional information, refer to ASTM Policy on Fire Standards.²

1.2 *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.*

1.3 This fire standard cannot be used to provide quantitative measures.

2. Referenced Documents

2.1 ASTM Standards:³

- [C1224](#) Specification for Reflective Insulation for Building Applications
- [C1313](#) Specification for Sheet Radiant Barriers for Building Construction Applications
- [D3675](#) Test Method for Surface Flammability of Flexible Cellular Materials Using a Radiant Heat Energy Source
- [D5865](#) Test Method for Gross Calorific Value of Coal and Coke
- [E108](#) Test Methods for Fire Tests of Roof Coverings
- [E84](#) Test Method for Surface Burning Characteristics of Building Materials

¹ This terminology is under the jurisdiction of ASTM Committee E05 on Fire Standards and is the responsibility of Subcommittee E05.31 on Terminology and Editorial.

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² Available from ASTM Headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

³ 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.

- [E136](#) Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C
- [E119](#) Test Methods for Fire Tests of Building Construction and Materials
- [E152](#) Test Method for Fire Tests Of Door Assemblies (Withdrawn 1995)⁴
- [E162](#) Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source
- [E603](#) Guide for Room Fire Experiments
- [E163](#) Test Method for Fire Tests Of Window Assemblies (Withdrawn 1999)⁴
- [E603](#) Guide for Room Fire Experiments
- [E648](#) Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
- [E800](#) Guide for Measurement of Gases Present or Generated During Fires
- [E814](#) Test Method for Fire Tests of Penetration Firestop Systems
- [E906/E906M](#) Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using a Thermopile Method
- [E970](#) Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source
- [E1317](#) Test Method for Flammability of Marine Surface Finishes
- [E1321](#) Test Method for Determining Material Ignition and Flame Spread Properties
- [E1352](#) Test Method for Cigarette Ignition Resistance of Mock-Up Upholstered Furniture Assemblies
- [E1353](#) Test Methods for Cigarette Ignition Resistance of Components of Upholstered Furniture
- [E1354](#) Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter
- [E1355](#) Guide for Evaluating the Predictive Capability of Deterministic Fire Models
- [E1474](#) Test Method for Determining the Heat Release Rate of Upholstered Furniture and Mattress Components or Composites Using a Bench Scale Oxygen Consumption Calorimeter

⁴ The last approved version of this historical standard is referenced on www.astm.org.

- E1509 Specification for Room Heaters, Pellet Fuel-Burning Type
- E1529 Test Methods for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies
- E1537 Test Method for Fire Testing of Upholstered Furniture
- E1590 Test Method for Fire Testing of Mattresses
- E1623 Test Method for Determination of Fire and Thermal Parameters of Materials, Products, and Systems Using an Intermediate Scale Calorimeter (ICAL)
- E1678 Test Method for Measuring Smoke Toxicity for Use in Fire Hazard Analysis
- E1725 Test Methods for Fire Tests of Fire-Resistive Barrier Systems for Electrical System Components
- E1740 Test Method for Determining the Heat Release Rate and Other Fire-Test-Response Characteristics of Wall Covering or Ceiling Covering Composites Using a Cone Calorimeter
- E1776 Guide for Development of Fire-Risk-Assessment Standards
- E1822 Test Method for Fire Testing of Stacked Chairs
- E1966 Test Method for Fire-Resistive Joint Systems
- E1995 Test Method for Measurement of Smoke Obscuration Using a Conical Radiant Source in a Single Closed Chamber, With the Test Specimen Oriented Horizontally
- E2010 Test Method for Positive Pressure Fire Tests of Window Assemblies (Withdrawn 2007)⁴
- E2032 Guide for Extension of Data From Fire Resistance Tests Conducted in Accordance with ASTM E 119
- E2058 Test Methods for Measurement of Synthetic Polymer Material Flammability Using a Fire Propagation Apparatus (FPA)
- E2061 Guide for Fire Hazard Assessment of Rail Transportation Vehicles
- E2067 Practice for Full-Scale Oxygen Consumption Calorimetry Fire Tests
- E2074 Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies (Withdrawn 2007)⁴
- E2102 Test Method for Measurement of Mass Loss and Ignitability for Screening Purposes Using a Conical Radiant Heater
- E2187 Test Method for Measuring the Ignition Strength of Cigarettes
- E2226 Practice for Application of Hose Stream
- E2307 Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus
- E2230 Practice for Thermal Qualification of Type B Packages for Radioactive Material
- E2231 Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics
- E2257 Test Method for Room Fire Test of Wall and Ceiling Materials and Assemblies
- E2280 Guide for Fire Hazard Assessment of the Effect of Upholstered Seating Furniture Within Patient Rooms of Health Care Facilities
- E2335 Guide for Laboratory Monitors
- E2404 Practice for Specimen Preparation and Mounting of Wall or Ceiling Coverings to Assess Surface Burning Characteristics
- E2405 Test Method for Determination of Fire and Thermal Parameters of Materials Using an Intermediate Scale Test with Vertically Oriented Specimen (Withdrawn 2011)⁴
- E2536 Guide for Assessment of Measurement Uncertainty in Fire Tests
- E2573 Practice for Specimen Preparation and Mounting of Site-Fabricated Stretch Systems to Assess Surface Burning Characteristics
- E2599 Practice for Specimen Preparation and Mounting of Reflective Insulation, Radiant Barrier and Vinyl Stretch Ceiling Materials for Building Applications to Assess Surface Burning Characteristics
- E2652 Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C
- E2653 Practice for Conducting an Interlaboratory Study to Determine Precision Estimates for a Fire Test Method with Fewer Than Six Participating Laboratories
- E2688 Practice for Specimen Preparation and Mounting of Tapes to Assess Surface Burning Characteristics
- E2707 Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure
- E2749 Practice for Measuring the Uniformity of Furnace Exposure on Test Specimens
- 2.2 *ISO Standards*⁵:
- ISO 1182, Fire Tests-Building Materials-Non-Combustibility Test
- ISO 13943, Fire Safety-Vocabulary

3. Significance and Use

3.1 *Definitions*—Terms and related definitions given in Section 4 are intended for use uniformly and consistently in all fire test standards and in all fire-test-response standards, fire-hazard-assessment standards, and fire-risk-assessment standards in which they appear.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 As indicated in Section 4, terms and their definitions are intended to provide a precise understanding and interpretation of fire-test-response standards, fire-hazard-assessment standards, and fire-risk-assessment standards in which they appear.

3.2.2 A specific definition of a given term is applicable to the standard or standards in which the term is described and used.

3.2.3 Different definitions of the same term, appearing respectively in two or more standards, are acceptable provided

each one is consistent with and not in conflict with the standard definition for the same term, that is, concept.

3.2.4 Each standard in which a term is used in a manner specially defined (see 1.1 and Section 5) shall list the term and its description under the subheading, Definitions of Terms.

3.3 Definitions for some terms associated with fire issues and not included in Terminology E176 are found in ISO 13943. When discrepancies exist, the definition in Terminology E176 shall prevail.

4. Terminology

4.1 Terms and their standard definitions within the scope of this standard are given in Section 4 in alphabetical order. Annex A1 contains the definitions of terms that are included in other fire standards.

4.2 Discussions associated with definitions are printed directly under the appropriate definition. The date following each definition or discussion indicates the year of introduction or of latest revision of that particular definition or discussion.

4.3 Definitions:

afterglow, *n*—persistence of glowing combustion after both removal of the ignition source and the cessation of any flaming. (2005)⁶

assembly, *n*—a unit or structure composed of a combination of materials or products, or both. (1990)

burn, *v*—to undergo combustion. (1989)

char, *v*—to form carbonaceous residue during pyrolysis or during incomplete combustion. (1979)

char, *n*—a carbonaceous residue formed by pyrolysis or incomplete combustion. (1979)

chimney effect—upward movement of hot fire effluent caused by convection currents confined within an essentially vertical enclosure. (2006)

DISCUSSION—This usually draws more air into the fire. (2006)

combustible, *adj*—capable of undergoing combustion. (1985)

DISCUSSION—The term combustible is often delimited to specific fire-exposure conditions. For example, building materials are considered combustible if they are capable of undergoing combustion in air at pressures and temperatures that might occur during a fire in a building. Similarly, some materials that are not combustible under such conditions may be combustible when exposed to higher temperatures and pressures or to an oxygen-enriched environment. Materials that are not combustible in bulk form may be combustible in finely divided form. (1985)

combustion, *n*—a chemical process of oxidation that occurs at a rate fast enough to produce temperature rise and usually light either as a glow or flame. (See also **glow** and **smoldering**.) (1989)

combustion products, *n*—effluent produced when a material undergoes combustion (see also **smoke**; see also **combustion**). (2001)

DISCUSSION—The combustion process releases effluents that have mass, in gaseous, liquid, or solid form, and generates radiant energy, as

heat or light, and sometimes sound. However, the common usage of the term *combustion products* in ASTM E05 standards is only for those which have mass. (2001)

composite, *n*—structured combination of two or more discrete materials. (2008)

continuous, *adj*—*in data collection*, conducted at intervals of 5 s or less. (2008)

effective heat of combustion, *n*—the amount of heat generated per unit mass lost by a material, product or assembly, when exposed to specific fire test conditions (contrast **gross heat of combustion**) (2003).

DISCUSSION—The effective heat of combustion depends on the test method and is determined by dividing the measured heat release by the mass loss during a specified period of time under the specified test conditions. Typically, the specified fire test conditions are provided by the specifications of the fire test standard that cites effective heat of combustion as a quantity to be measured. For certain fire test conditions, involving very high heat and high oxygen concentrations under high pressure, the effective heat of combustion will approximate the gross heat of combustion. More often, the fire test conditions will represent or approximate certain real fire exposure conditions, and the effective heat of combustion is the appropriate measure. Typical units are kJ/g or MJ/kg. (2001)

environment, *n*—*as related to fire*, the conditions and surroundings that may influence the behavior of a material, product, or assembly when it is exposed to ignition sources or fire. (1989)

fire, *n*—destructive burning as manifested by any or all of the following: light, flame, heat, smoke. (1988)

fire-characteristic profile, *n*—an array of fire-test-response characteristics, all measured using tests relevant to the same fire scenario, for a material, product, or assembly to address, collectively, the corresponding fire hazard. (See also **fire hazard**, **fire risk**, and **fire-test-response characteristic**.) (1993)

DISCUSSION—An array of fire-test-response characteristics in a set of data relevant to the assessment of fire hazard in a particular fire scenario. In other words, all the fire tests used would have a demonstrated validity for the fire scenario in question, for example by having comparable fire intensities. The fire-characteristic profile is intended as a collective guide to the potential fire hazard from a material, product, or assembly involved in a fire that could be represented by the laboratory test conditions. (1993)

fire exposure, *n*—process by which or extent to which humans, animals, materials, products, or assemblies are subjected to the conditions created by fire. (1991)

fire gases, *n*—the airborne products emitted by a material, product, or assembly undergoing pyrolysis or combustion, that exist in the gas phase at the relevant temperature. (1979)

fire hazard, *n*—the potential for harm associated with fire. (1989)

DISCUSSION—A fire may pose one or more types of hazard to people, animals, or property. These hazards are associated with the environment and with a number of fire-test-response characteristics of materials, products, or assemblies including but not limited to ease of ignition, flame spread, rate of heat release, smoke generation and obscuration, toxicity of combustion products, and ease of extinguishment. (1989)

⁶ Date indicates year of introduction or latest review or revision.

fire model, *n*—a physical representation or set of mathematical equations that approximately simulate the dynamics of burning and associated processes. (1992)

fire performance, *n*—response of a material, product, or assembly in a particular fire, other than in a fire test involving controlled conditions (different from **fire-test-response characteristic**). (1993)

DISCUSSION—The ASTM Policy on Fire Standards distinguishes between the response of materials, products, or assemblies to heat and flame under controlled conditions, which is fire-test-response characteristic, and under actual fire conditions, which is fire performance. Fire performance depends on the occasion or environment and may not be measurable. In view of the limited availability of fire-performance data, the response to one or more fire tests, appropriately recognized as representing end-use conditions, is generally used as a predictor of the fire performance of a material, product, or assembly. (1993)

fire performance characteristic, *n*—this term is deprecated. (See **fire-test-response characteristic** and **fire performance** (q.v.).) (1990)

fire performance test, *n*—this term is deprecated. (See **fire-test-response characteristic** and **fire performance** (q.v.).) (1990).

fireproof, *adj*—an inappropriate and misleading term. Do not use. (See commentary in X1.)

DISCUSSION—This term was originally used to describe buildings having all noncombustible structural elements and some degree of fire resistance. However, the term has been misunderstood to mean an absolute or unconditional property, and therefore the use of the term, fireproof, is inappropriate and misleading. (1990)

fire resistance, *n*—the ability of a material, product, or assembly to withstand fire or give protection from it for a period of time. (Contrast **fire resistance rating**.) (2004)

DISCUSSION—As applied to elements of buildings, fire resistance is characterized by the ability to confine a fire or to continue to perform a given structural function, or both. More specific examples of this ability include retention of stability (loadbearing capacity), integrity or thermal insulation. Once a measure of time is defined for fire resistance, and exposure conditions specified for that measure, the result is a fire resistance rating. (2004)

fire resistance rating, *n*—a measure of the elapsed time during which a material, product, or assembly continues to exhibit fire resistance under specified exposure conditions. (Contrast **fire resistance**.) (2004)

DISCUSSION—This term is defined because it is used in codes. As applied to elements of buildings, it is commonly measured by the methods and to the criteria defined in Test Methods E119 or Specification E1509. (2004)

fire resistant, *adj*—See **fire resistive**, the preferred term. (1983)

fire resistive, *adj*—having fire resistance (TCG-01). (1983)

fire retardant, *n*—a deprecated term. Do not use. (1986)

fire retardant, *adj*—not a defined term. Use as a modifier only with defined compound terms: **fire-retardant barrier**, **fire-retardant chemical**, **fire-retardant coating**, and **fire-retardant treatment**. (1986)

fire-retardant barrier, *n*—a layer of material which, when secured to a combustible material or otherwise interposed

between the material and a potential fire source, delays ignition and combustion of the material when the barrier is exposed to fire. (1986)

fire-retardant chemical, *n*—a chemical, which when added to a combustible material, delays ignition and combustion of the resulting material when exposed to fire. (1986)

DISCUSSION—A fire-retardant chemical can be a part of the molecular structure, an admixture, or an impregnant. (1986)

fire-retardant coating, *n*—a fluid-applied surface covering on a combustible material which delays ignition and combustion of the material when the coating is exposed to fire. (See also **flame-retardant coating**. Compare **fire-retardant barrier**.) (1986)

fire-retardant treatment, *n*—the use of a fire-retardant chemical or a fire-retardant coating. (See also **flame-retardant treatment**.) (1986)

fire risk, *n*—an estimation of expected fire loss that combines the potential for harm in various fire scenarios that can occur with the probabilities of occurrence of those scenarios. (1993)

DISCUSSION—Risk may be defined as the probability of having a certain type of fire, where the type of fire may be defined in whole or in part by the degree of potential harm associated with it, or as potential for harm weighted by associated probabilities. However it is defined, no risk scale implies a single value of acceptable risk. Different individuals presented with the same risk situation may have different opinions on its acceptability. (1993)

fire scenario, *n*—a detailed description of conditions, including environmental, of one or more of the stages from before ignition to the completion of combustion in an actual fire, or in a full scale simulation. (1998)

DISCUSSION—The conditions describing a fire scenario, or a group of fire scenarios, are those required for the testing, analysis, or assessment that is of interest. Typically they are those conditions that can create significant variation in the results. The degree of detail necessary will depend upon the intended use of the fire scenario. Environmental conditions may be included in a scenario definition but are not required in all cases. Fire scenarios often define conditions in the early stages of a fire while allowing analysis to calculate conditions in later stages. (1998)

fire test exposure severity, *n*—a measure of the degree of fire exposure; specifically in connection with Test Methods E119, E152, and E163, the ratio of the area under the curve of average furnace temperature to the area under the standard time/temperature curve, each from the start of the test to the end or time of failure, and above the base temperatures 68°F (20°C). (1976)

fire-test-response characteristic, *n*—a response characteristic of a material, product, or assembly, to a prescribed source of heat or flame, under controlled fire conditions; such response characteristics may include but are not limited to ease of ignition, flame spread, heat release, mass loss, smoke generation, fire resistance, and toxic potency of smoke. (1992)

DISCUSSION—A fire-test-response characteristic can be influenced by variable characteristics of the heat source, such as its intensity, or of the burning environment, such as ventilation, geometry of item or enclosure, humidity, or oxygen concentration. It is not an intrinsic

property such as specific heat, thermal conductivity, or heat of combustion, where the value is independent of test variables. A fire-test-response characteristic may be described in one of several terms. Smoke generation, for example, may be described as smoke opacity, change of opacity with time, or smoke weight. No quantitative correlation need exist between values of a fire-test-response characteristic for different materials, products, or assemblies, as measured by different methods or tested under different sets of conditions for a given method. (2005)

flame, *n*—a hot, usually luminous zone of gas produced by combustion. (2012)

DISCUSSION—The luminosity of a flame can be caused by the presence of suspended glowing particulate matter or radical species in the zone of hot gases. (2012)

flame front, *n*—the leading edge of a flame propagating through a gaseous mixture or across the surface of a liquid or solid. (1983)

flameproof, *adj*—an inappropriate and misleading term. Do not use. (1983)

DISCUSSION—This term was originally used to describe the treatment of textile fabrics or other organic products to make them resistant to ignition. However, the term has been misunderstood to mean an absolute or unconditional property, and therefore the use of the term, flameproof, is inappropriate and misleading. (1983)

flame resistance, *n*—the ability to withstand flame impingement or give protection from it. (1983)

flame resistant, *adj*—having flame resistance. (1983)

flame resistive, *n*—See **flame resistant**, the preferred term. (1983)

flame retardant, *n*—a deprecated term. Do not use. (1986)

flame retardant, *adj* —not a defined term. Use only as a modifier with defined compound terms: **flame-retardant chemical**, **flame-retardant coating**, and **flame-retardant treatment**. (1986)

flame-retardant chemical, *n*—a chemical, which when added to a combustible material, delays ignition and reduces flame spread of the resulting material when exposed to flame impingement. (See also **fire-retardant chemical**.) (1986)

flame-retardant coating, *n*—a fluid-applied surface covering on a combustible material which delays ignition and reduces flame spread when the covering is exposed to flame impingement. (See also **fire-retardant coating**.) (1986)

flame-retardant treatment, *n*—the use of a flame-retardant chemical or a flame-retardant coating. (See also **fire-retardant treatment**.) (1986)

flame speed, *n*—the velocity of propagation of a flame front through a gaseous mixture (fuel and oxidizer) relative to a reference point. (1982)

flame spread, *n*—propagation of a flame front (see **surface flame spread**, **volumetric flame spread**). (2005)

flame spread index, *n*—a comparative measure expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time in Test Method E84. (2001)

DISCUSSION—Classifications have been developed using these values. This index is different from that derived in Test Methods E162 or D3675. (2001)

flammable, *adj*—(1) capable of burning with a flame under specified conditions, or (2) when used to designate high hazard, subject to easy ignition and rapid flaming combustion. (1995)

DISCUSSION—The first definition is needed as it is the definition recognized by the principal international standardization bodies, the International Electrotechnical Commission (IEC) and the International Organization for Standardization (ISO). The second definition has been the ASTM Terminology E176 definition and is the principal definition recognized by the lay public. The terms in the second definition “easy ignition” and “rapid flaming combustion,” may seem insufficiently precise but are made precise in standards that use the terms in that way, such as standards on the fire hazards of materials (for example, NFPA 704; NFPA 321, on flammable liquids; and NFPA 55, on flammable gases). (1995)

flashover, *n*—the rapid transition to a state of total surface involvement in a fire of combustible materials within an enclosure. (1997)

DISCUSSION—Flashover is a fluid-mechanical combustion instability within an enclosure that occurs when the surface temperatures of an enclosure and its contents rise rapidly, producing combustible gases and vapors, and the enclosure heat flux becomes sufficient to heat these gases and vapors to their ignition temperatures. At flashover, the volume occupied by hot combustion gases rapidly increases and ends up comprising more than 50% of the enclosure’s volume. Experimentally it is found that flashover occurs when the upper gas layer temperature surpasses 600°C or when the radiant heat flux at the floor surpasses 20 kW/m². Visually, flashover often corresponds to a transition from flaming on a few surfaces to flames throughout the volume of the enclosure. (2002)

gasification, *n*—transformation of a solid and/or liquid material into a gaseous state. (2001)

glow, *n*—*as related to fire*, visible light emitted by a solid undergoing combustion. (See also **combustion** and **flame**.)

DISCUSSION—A solid undergoing combustion may itself glow or may produce a luminous flame consisting of hot gas with suspended glowing particulate matter. (2010)

gross heat of combustion, *n*—the maximum amount of heat per unit mass that theoretically can be released by the combustion of a material, product, or assembly; it can be determined experimentally only under conditions of high pressure and in pure oxygen (contrast **effective heat of combustion**). (2003)

heat flux, *n*—heat transfer to a surface per unit area, per unit time (see also **initial test heat flux**). (2008)

DISCUSSION—The heat flux from an energy source, such as a radiant heater, can be measured at the initiation of a test (such as Test Method E1354 or Test Method E906/E906M) and then reported as the initial test heat flux, with the understanding that the burning of the test specimen can generate additional heat flux to the specimen surface. The heat flux can also be measured at any time during a fire test, for example as described in Guide E603, on any surface, and with measurement devices responding to radiative and convective fluxes. Typical units are kW/m², W/cm², or BTU/(s ft²). (2009)

heat release rate, *n*—the thermal energy released per unit time by an item during combustion under specified conditions. (2006)

heat stress, *n*—(physiological) adverse condition caused by exposure to elevated temperature, radiant heat flux, or combinations of these factors. (1988)

ignition, *n*—the initiation of combustion. (1989)

DISCUSSION—The combustion may be evidenced by glow, flame, detonation, or explosion. The combustion may be sustained or transient. (1989)

ignition temperature, *n*—the lowest temperature at which sustained combustion of a material can be initiated under specified test conditions. (1990)

DISCUSSION—While the phenomenon of combustion may be transient or sustained, in fire testing practice, the ignition temperature is reached when combustion continues after the pilot source is removed. (1990)

incandescence, *n*—emission of light produced by a material when intensely heated; it can be produced with or without combustion. (1997)

initial test heat flux, *n*—the heat flux set on the test apparatus at the initiation of the test (see also **heat flux**). (2007)

DISCUSSION—The initial test heat flux is the heat flux value commonly used when describing or setting test conditions. (2007)

mass burning rate, *n*—mass loss per unit time by materials burning under specified conditions. (1989)

non-combustible, *adj*—not capable of undergoing combustion under specified conditions. (Contrast **combustible**.) (2004)

DISCUSSION—In fire testing, non-combustibility is often assessed by means of Test Method E136 or ISO 1182. (2001)

optical density of smoke, *D*, *n*—a measure of the attenuation of a light beam passing through smoke, expressed as the common logarithm of the ratio of the incident flux, I_o , to the transmitted flux, I . ($D = \log_{10} (I_o/I)$). (1989)

orientation, *n*—the plane in which the exposed face of the specimen is located during testing. (1977)

DISCUSSION—The orientation may be vertical, horizontal or at an angle. In the latter two cases, the specimen may be facing up or down. (1977)

oxygen consumption principle, *n*—the expression of the relationship between the mass of oxygen consumed during combustion and the heat released. (1998)

oxygen depletion, *n*—in a fire, reduction of oxygen (O_2) content of an atmosphere as a result of combustion. (1988)

oxygen index, *n*—minimum concentration of oxygen in a mixture of oxygen and nitrogen that will just support flaming combustion of a material under specified conditions. (2000)

piloted ignition, *n*—ignition of combustible gases or vapors by a pilot source of ignition (compare **spontaneous ignition**, **unpiloted ignition**). (1991)

pilot source of ignition, *n*—a discrete source of energy, such as, for example, a flame, spark, electrical arc, or glowing wire (compare **piloted ignition**, **unpiloted ignition**). (1991)

pyrolysis, *n*—process of simultaneous phase and chemical species change caused by heat (compare **smoldering**). (1991)

reaction to fire, *n*—response of a material in contributing by its own decomposition to a fire to which it is exposed, under specified conditions. (2002)

DISCUSSION—In fire testing, it is usual to distinguish between two types of fire-test-response characteristics: those associated with “reaction to fire” and those associated with “fire resistance” or “fire endurance.” (2002)

screening test, *n*—as related to fire, a fire-response test performed to determine whether a material, product, or assembly (a) exhibits any unusual fire-related characteristics, (b) has certain expected fire-related characteristics, or (c) is capable of being preliminarily categorized according to the fire characteristic in question. (1993)

self heating, *n*—a rise in the temperature of a material, assemblage, or product caused by internal, exothermic chemical reaction. (1985)

self ignition, *n*—See **spontaneous ignition**, the preferred term. (1985)

self-propagation of flame, *n*—propagation of a flame front after the removal of any applied energy source. (2001)

smoke, *n*—the airborne solid and liquid particulates and gases evolved when a material undergoes pyrolysis or combustion. (1989)

DISCUSSION—So-called chemical smokes are excluded from this definition. (1989)

smoke developed index, *n*—a comparative measure expressed as a dimensionless number, derived from measurements of smoke obscuration versus time in Test Method E84. (2001)

DISCUSSION—Classifications have been developed using these values. (2001)

smoke obscuration, *n*—reduction of light transmission by smoke, as measured by light attenuation. (2001)

smoke toxicity, *n*—the propensity of smoke to produce adverse biochemical or physiological effects. (See **smoke**.) (1988)

smoldering, *n*—combustion of a solid without flame, often evidenced by visible smoke. (1979)

DISCUSSION—Smoldering can be initiated by small sources of ignition, especially in dusts or fibrous or porous materials, and may persist for an extended period of time after which a flame may be produced. (1979)

spontaneous ignition, *n*—unpiloted ignition caused by an internal exothermic reaction (compare **piloted ignition**). (1991)

standard temperature/time curve (standard time/temperature curve), *n*—in fire testing, a graphical representation derived from prescribed time-temperature relationships and used to control furnace temperature with progressing time. (1989)

DISCUSSION—One example is found in Test Methods E119. (1989)

superimposed load, *n*—force applied to a specimen or structure other than that associated with its own mass. (1979)

surface flame spread, *n*—propagation of flame away from the source of ignition across a surface (see **flame spread** and compare **volumetric flame spread**). (2010)

sustained flaming, *n*—flame on or over the surface of a test specimen that lasts longer than a defined period of time (contrast **transitory flaming**). (2009)

DISCUSSION—Typically, the same defined period is used to define “transitory flaming.” See the specific standard test method for applicable defined period of time. (2009)

thermal decomposition, *n*—process whereby the action of heat or elevated temperature on an item causes changes to the chemical composition (different from **thermal degradation**, *q.v.*; compare **pyrolysis**). (2006)

thermal degradation, *n*—process whereby the action of heat or elevated temperature on a material, product, or assembly causes an adverse change in one or more properties (contrast **thermal decomposition**, *q.v.*). (2007)

DISCUSSION—Examples of properties that can be affected are physical, mechanical and electrical properties. Adverse change typically involves a loss in property. (2007)

time to sustained flaming, *n*—period of time from start of test to commencement of the first period of flaming lasting long enough to qualify as sustained flaming (see **sustained flaming**). (2009)

time to transitory flaming, *n*—period of time from start of test to commencement of the first period of flaming lasting long enough to qualify as transitory flaming but occurring before any period of flaming lasting long enough to qualify as sustained flaming (see **transitory flaming**). (2009)

total heat released, *n*—integrated value of the rate of heat release, for a specified time period. (2010)

toxicity, *n*—the propensity of a substance to produce adverse biochemical or physiological effects. (1988)

toxic hazard, *n*—*as related to fire*, the potential for physiological harm from toxic products of combustion. (1995)

DISCUSSION—Toxic hazard reflects both the quantity of toxic products and the quality of those products, which is given by toxic potency. Toxic hazard is not the only hazard associated with fire. Toxic hazard is not an intrinsic characteristic of a material or product but will depend upon the fire scenario, the condition of use of the material or product, and possibly other factors. (1995)

toxic potency, *n*—*as applied to inhalation of smoke or its component gases*, a quantitative expression relating concentration and exposure time to a particular degree of adverse physiological response, for example, death, on exposure of humans or animals. (1991)

DISCUSSION—The toxic potency of the smoke from any material, product, or assembly is related to the composition of that smoke which, in turn, is dependent upon the conditions under which the smoke is generated. (1991)

transitory flaming, *n*—flame on or over the surface of a test specimen that does not last longer than a defined period of time (contrast **sustained flaming**). (2009)

DISCUSSION—Typically, the same defined period of time is used to define “sustained flaming.” See the specific standard test method for applicable defined period of time. (2009)

unpiloted ignition, *n*—ignition caused by one or more sources of energy without the presence of a pilot source of ignition (compare **piloted ignition**, **spontaneous ignition**). (1991)

upholstered, *adj*—covered with material (as fabric or padding) to provide a soft surface. (1999)

volumetric flame spread, *n*—flame propagation through the volume of a gaseous mixture. (1989)

ANNEX

(Mandatory Information)

A1. DEFINITIONS OF TERMS

A1.1.1 *Definitions*: Terms, their definitions, and the standard(s) to which they apply are given below in alphabetical order:

accuracy of measurement, *n*—closeness of the agreement between the result of a measurement and the true value of the measurand. (2009) **E2536**

acoustical ceiling panel, *n*—a form of a prefabricated sound absorbing ceiling element used with exposed suspension systems (see Specification E1264). (1999) **E2032**

acoustical ceiling tile, *n*—a form of a prefabricated sound absorbing ceiling element used with concealed or semi-exposed suspension systems, stapling, or adhesive bonding (see Specification E1264). (1999) **E2032**

air drop, *n*—lengths of open run conductors or cables supported only at each end. (1995) **E1725**

attic, *n*—an accessible enclosed space in a building immediately below the roof and wholly or partly within the roof framing. (1996) **E970**

assembly, *n*—a unit or structure composed of a combination of materials or products, or both. (2000) **E1995, E2102**

backing board, *n*—a board with the same dimensions as the specimen and used to back the specimen so as to represent end-use conditions. (2005) **E2405**

backing board, *n*—a noncombustible insulating board, mounted behind the specimen during actual testing to satisfy the theoretical analysis assumption of no heat loss through

the specimen. It shall be roughly 25 ± 5 mm thick with a density no greater than 200 ± 50 kg/m³. (1997) **E1321**

batch sampling—sampling over some time period in such a way as to produce a single test sample for analysis. (1981) **E800**

beams, *n*—all horizontally oriented structural members employed in building construction and known variously as beams, joists, or girders. (1999) **E2032**

blackbody temperature, *n*—the temperature of a perfect radiator—a surface with an emissivity of unity and, therefore, a reflectivity of zero. (1997) **E648**

blockout, *n*—a recess formed in the floor assembly to accommodate the installation of the perimeter joint protection, flush with the wearing surface of the floor assembly. (2010) **E2307**

bolster, *n*—pillow or similarly shaped unit containing upholstery material covered by upholstery cover material that may or may not be attached to the upholstered furniture item but is sold and delivered with it. (1994) **E1352**

building element, *n*—a component or assembly of materials using products manufactured as independent units capable of being joined with or placed within other components or assemblies to create a structure. (2002) **E2226**

carboxyhemoglobin saturation, *n*—the percent of blood hemoglobin converted to carboxyhemoglobin from reaction with inhaled carbon monoxide. (1996)

DISCUSSION—The chemical reaction between carbon monoxide and hemoglobin in blood is reversible. The effect of carbon monoxide on the exposed person may not be reversible. **E1678**

ceiling protective membrane, *n*—a ceiling membrane attached to or suspended from the structural members of the floor or ceiling assembly, usually by hanger wire or threaded rods, consisting of a grid suspension system with lay-in ceiling panels or a grid of steel furring channels to which the ceiling membrane is directly attached, intended to provide fire protection, acoustical and or aesthetic enhancements, or both. (1999) **E2032**

combined standard uncertainty, *n*—standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or covariances of these other quantities weighted according to how the measurement result varies with changes in these quantities. (2009) **E2536**

combustion products—airborne effluent from a material undergoing combustion; this may also include pyrolysates. (1981) **E800**

compensating thermocouple, *n*—a thermocouple for the purpose of generating an electrical signal representing long-term changes in the stack metal temperatures wherein a fraction of the signal generated is subtracted from the signal developed by the stack-gas thermocouples. (1997) **E1317**

composite, *n*—a combination of materials, which generally are recognized as distinct entities, for example, coated or laminated materials. (2000) **E2067, E2102, E1995**

composite, *n*—as applied to loadbearing elements, an interaction between structural components which is to be taken into account in the evaluation of load capacity. (1999) **E2032**

composite, *n*—as related to a pipe or duct insulation, see **duct insulation system** or **pipe insulation system**. (2002) **E2231**

concentration-time curve, *n*—a plot of the concentration of a gaseous toxicant as a function of time. (1996)

DISCUSSION—The concentration-time curve can also be used to represent the sum total of all combustion products instead of just a single one. **E1678**

continuous (as related to data acquisition), *adj*—conducted at data collection intervals of 5 s or less. (2000) **E906/E906M, E1995, E2102**

continuous (as related to data acquisition), *adj*—conducted at data collection intervals of 6 s or less. (2000) **E2067**

corridor, *n*—an enclosed space connecting a room or compartment with an exit. The corridor includes normal extensions, such as lobbies and other enlarged spaces, where present. (1997) **E648**

coverage factor, *n*—numerical factor used as a multiplier of the combined standard uncertainty in order to obtain an expanded uncertainty. (2009) **E2536**

critical flux at extinguishment, *n*—a flux level at the specimen surface corresponding to the distance of farthest advance and subsequent self-extinguishment of the flame on the centerline of a specimen. (1997)

DISCUSSION—The flux reported is based on calibration tests with a special calibration dummy specimen. (1997) **E1317**

critical radiant flux, *n*—the level of incident radiant heat energy on the floor covering system at the most distant flame-out point. It is reported as W/cm² (Btu/ft² · s). (1997) **E648**

critical radiant flux, *n*—the level of incident radiant heat energy on the attic floor insulation system at the most distant flame-out point. It is reported as W/cm² (or Btu/ft² · s). (1996) **E970**

Ct product, *n*—the concentration-time product in (μL/L) · min obtained by integration of the area under a concentration-time curve. (1996)

DISCUSSION—Values expressed using this unit are numerically equal to those using the previously cited unit, ppm, a term whose use is discouraged. **E1678**

curtain wall assembly, *n*—either a rated or non-rated, non-bearing exterior wall assembly secured to and supported by the structural members of the building. (2010) **E2307**

deck, *n*—in upholstered furniture, the upholstered support under the seat cushion in a loose-seat construction. (1994) **E1352, E1353**

design load, *n*—the intended maximum design load condition allowed by design under appropriate nationally recognized structural design criteria. (1999) **E2032**

directly applied fire resistive coating, *n*—materials that are normally sprayed onto substrates to provide fire-resistive protection of the substrates. (1999) **E2032**

duct, *n*—*as related to heating ventilating, air conditioning or exhaust systems*, a passageway made of sheet metal or other suitable material used for conveying air or other gases. (2002) **E2231**

duct insulation system, *n*—*as related to fire testing*, system intended to insulate and cover, continuously for an extended length, the outside surface of a duct; the system shall have an insulation core, with or without a covering or vapor retarder facing which includes longitudinal closure systems (if used) and perhaps other duct insulation supplementary materials such as adhesives, fasteners, or tapes (if used). (2002)

DISCUSSION—Duct system components, including tapes, sealants, and fitting covers, that do not cover the duct continuously for an extended length, but which are associated with the duct insulation system are considered separately (see duct insulation supplementary materials). An extended length is not intended to imply a length of 25 ft, but a length of at least 3 ft. (2002) **E2231**

duct insulation supplementary materials, *n*—*as related to fire testing*, components, including tapes and sealants used for transverse joints as well as fitting covers that are intermittently spaced, as needed, within the duct insulation system, as well as adhesives used to bond the insulation to the duct substrate and that do not cover the duct continuously for an extended length. (2002) **E2231**

duct lining, *n*—material such as an insulation, coating or film, including adhesive, used to line the inside surface of a duct. (2002) **E2231**

dummy specimen, *n*—a noncombustible (as defined by 46 CFR 164.009) specimen used for standardizing the operating condition of the equipment, roughly 20 mm in thickness with a density of $750 \pm 100 \text{ kg/m}^3$. (1997) **E1317**

dummy specimen, *n*—a noncombustible insulating board used for stabilizing the operating condition of the equipment, mounted in the apparatus in the position of the specimen and removed only when a test specimen is to be inserted. It shall be roughly $20 \pm 5 \text{ mm}$ in thickness with a density of $750 \pm 100 \text{ kg/m}^3$. (1997)

DISCUSSION—For the ignition tests, the dummy specimen board shall have a hole at the 50-mm position for mounting the fluxmeter. (1997) **E1321**

effective area of the furnace opening—furnace opening within the boundaries of the monitoring instrumentation. (2010) **E2749**

effective heat of combustion, *n*—the measured heat release divided by the mass loss for a specified time period. (1997) **E1623**

effective heat of combustion, *n*—the amount of heat generated per unit mass lost by a material, product, or assembly, when

exposed to specific fire test conditions (see *gross heat of combustion*). (2007) **E1354, E1474, E1623, E1740**

DISCUSSION—The effective heat of combustion depends on the test method and is determined by dividing the measured heat release by the mass loss during a specified period of time under the specified test conditions. Typically, the specified fire test conditions are provided by the specifications of the fire test standard that cites effective heat of combustion as a quantity to be measured. For certain fire test conditions, involving very high heat and high oxygen concentrations under high pressure, the effective heat of combustion will approximate the gross heat of combustion. More often, the fire test conditions will represent or approximate certain real fire exposure conditions, and the effective heat of combustion is the appropriate measure. Typical units are kJ/g or MJ/kg. (2007) **E1354, E1474, E1623**

effective thermal property, *n*—thermal properties derived from heat-conduction theory applied to ignition/flame-spread data treating the material as homogenous in structure. (1997) **E1321**

electrical system components, *n*—cable trays, conduits and other raceways, open run cables and conductors, cables, conductors, cabinets, and other components, as defined or used in the National Electrical Code, and air drops as defined in A1.1.1. (1995) **E1725**

emissivity, *n*—the ratio of the power per unit area radiated from a material's surface to that radiated from a black body at the same temperature. (1994) **E1623**

equivalent thickness, *n*—the calculated solid thickness of concrete or masonry for purposes of determining fire resistance ratings of barrier elements on the basis of heat transmission end-point criteria. (1999) **E2032**

error (of measurement), *n*—result of a measurement minus the true value of the measurand; error consists of two components: random error and systematic error. (2009) **E2536**

essentially flat surface, *n*—surface where the irregularity from a plane does not exceed $\pm 1 \text{ mm}$. (2000) **E1995, E2102**

expanded uncertainty, *n*—quantity defining an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. (2009) **E2536**

expanded vinyl wall covering, *n*—a wall covering consisting of a woven textile backing, an expanded vinyl base coat layer (which is a homogeneous vinyl layer that contains a blowing agent), and a nonexpanded vinyl skin coat. **E2404**

expanded vinyl wall or ceiling covering, *n*—a wall or ceiling covering consisting of a woven textile backing, an expanded vinyl base coat layer (which is a homogeneous vinyl layer that contains a blowing agent), and a nonexpanded vinyl skin coat. (2010) **E2404**

exposed area—the total surface area of the test assembly that is subjected to the fire-resistance test including, when required, the supporting construction. (2010) **E2226**

exposed surface, *n*—that surface of the specimen subjected to the incident heat. (2000) **E906/E906M, E1995, E2102**

exterior wall assembly, *n*—a curtain wall or a loadbearing exterior wall that is either fire resistance rated or one that is not. (2010) **E2307**

fire-characteristic profile, *n*—array of fire-test-response characteristics, all measured using tests relevant to the same fire scenario, for a material product, or assembly to address, collectively, the corresponding fire hazard. (2000)

DISCUSSION—An array of fire-test response characteristics is a set of data relevant to the assessment of fire hazard in a particular fire scenario. In other words, all the fire tests used would have a demonstrated validity for the fire scenario in question, for example, by having comparable fire intensities. The fire-characteristic profile is intended as a collective guide to the potential fire hazard from a material, product, or assembly involved in a fire that could be represented by the laboratory test conditions. **E2061**

fire endurance, *n*—a measure of the elapsed time during which a material or assemblage continues to exhibit fire resistance. (1999) **E2032**

fire hazard, *n*—the potential for harm associated with fire. (2009)

DISCUSSION—A fire may pose one or more types of hazard to people, animals, or property. These hazards are associated with the environment and with a number of fire-test-response characteristics of materials, products, or assemblies including but not limited to ease of ignition, flame spread, rate of heat release, smoke generation and obscuration, toxicity of combustion products, and ease of extinguishment. (2009) **E2061**

fire performance, *n*—response of a material, product, or assembly in a particular fire, other than in a fire test involving controlled conditions (different from fire-test-response characteristics, q.v.) (2009)

DISCUSSION—The ASTM policy on fire standards distinguishes between the response of materials, products, or assemblies to heat and flame “under controlled conditions,” which is fire-test-response characteristic, and “under actual fire conditions,” which is fire performance. Fire performance depends on the occasion or environment and may not be measurable. In view of the limited availability of fire-performance data, the response to one or more fire tests, approximately recognized as representing end-use conditions, is generally used as a predictor of the fire performance of a material, product, or assembly. **E2061**

fire propagation, *n*—increase in the exposed surface area of the specimen that is actively involved in flaming combustion. (2003) **E2058**

fire resistance, *n*—the property of a material or assemblage to withstand fire or give protection from it. (1999) **E2032**

fire-resistive barrier system, *n*—a specific construction of devices, materials, or coatings installed around, or applied to, the electrical system components. (1995) **E1725**

fire resistive joint system, *n*—a device or designed feature that provides a fire separating function along continuous linear openings, including changes in direction, between or bounded by fire separating elements. (2000) **E1966**

fire scenario, *n*—a detailed description of conditions, including environmental, of one or more of the stages from before ignition to the completion of combustion in an actual fire, or in a full-scale simulation. (2009)

DISCUSSION—The conditions describing a fire scenario, or a group of fire scenarios, are those required for the testing, analysis, or assessment that is of interest. Typically they are those conditions that can create significant variation in the results. The degree of detail necessary will depend upon the intended use of the fire scenario. Environmental conditions may be included in a scenario definition but are not required in all cases. Fire scenarios often define conditions in the early stages of a fire while allowing analysis to calculate conditions in later stages. **E2061**

fire separating element, *n*—floors, walls, and partitions having a period of fire resistance determined in accordance with Test Methods E119 or E1529. (2000) **E1966**

fire stop—a through-penetration fire stop is a specific construction consisting of the materials that fill the opening around penetrating items such as cables, cable trays, conduits, ducts, and pipes and their means of support through the wall or floor opening to prevent spread of fire. (1997) **E814**

firestop system, *n*—a specific combination of penetrating item or items, the specific construction that is penetrated, and the materials or devices, or both, that seal the opening provided to accommodate one or more items that penetrate into or through a fire-resistance rated assembly. (2010)

DISCUSSION—The materials and devices used to seal the opening around penetrating items are sometimes referred to as “firestops.” Note that it is not “firestops” that are tested by this standard, but rather “firestop systems.” Due to the complex interaction during a fire between the penetrant, the penetrated assembly, the materials and/or devices used to seal the penetration, and the specific size and shape of the opening, it is not possible to simply test the “firestop” to develop fire resistance data. (2010) **E814**

fire test, *n*—a procedure, not necessarily a standard test method, in which the response of materials to heat or flame, or both, under controlled conditions is measured or otherwise described. (1981) **E800**

fire-test-response-characteristic index, *n*—a single quantitative measure that combines two or more fire-test-response characteristics for a material, product, or assembly, all developed under test conditions compatible with a common fire scenario, addressing collectively the corresponding threat. See also *fire-test-response-characteristic profile*, *fire hazard*, *fire risk*, *fire-test-response characteristic*. (1996) **E1776**

fire-test-response-characteristic profile, *n*—array of fire-test-response characteristics for a material, product, or assembly, all developed under test conditions compatible with a common fire scenario, addressing collectively the corresponding threat. See also *fire hazard*, *fire risk*, *fire-test-response characteristic*. (1996) **E1776**

fire window assembly, *n*—a window or glass block configuration, intended for use in walls or partitions, for which a fire endurance rating has been determined in accordance with this fire-test-response standard. (1999) **E2010**

flame-out, *n*—the time at which the last vestige of flame or glow disappears from the surface of the test specimen,

frequently accompanied by a final puff of smoke. (1997)
E648

flame spread index, *n*—a number or classification indicating a comparative measure derived from observations made during the progress of the boundary of a zone of flame under defined test conditions. **E84**

flaming mode, *n*—the mode of testing that uses a pilot flame. (1998) **E1995**

flashing, *n*—the flame fronts of 3 seconds or less in duration. (1999)

DISCUSSION—All flame fronts, however temporary, are to be taken into account. (1999) **E162**

flashing, *n*—existence of flame on or over the surface of the specimen for periods of less than 4 s. (1999) **E906/E906M**

flashing, *n*—existence of flame on or over the surface of the specimen for periods of less than 1 s. (2000) **E2102, E2405**

flashover, *n*—the rapid transition to a state of total surface involvement in a fire of combustible materials within an enclosure. (2009)

DISCUSSION—Flashover occurs when the surface temperatures of an enclosure and its contents rise, producing combustible gases and vapors, and the enclosure heat flux becomes sufficient to heat these gases and vapors to their ignition temperatures. This commonly occurs when the upper layer temperature reaches 600°C or when the radiant heat flux at the floor reaches 20 kW/m². (2009) **E2061**

floor assembly, *n*—a fire resistance rated loadbearing horizontal separating element adjacent to and separate from the floor of the observation room.

DISCUSSION—Floor assemblies tested in accordance with Test Methods E119 are required to be loadbearing. (2010) **E2307**

floor covering, *n*—an essentially planar material having a relatively small thickness in comparison to its length or width, which is laid on a floor to enhance the beauty, comfort, and utility of the floor. (1999) **E648**

floor covering system, *n*—a single material, composite or assembly comprised of the floor covering and related installation components (adhesive, cushion, etc.) if any. (1999) **E648**

flux profile, *n*—the curve relating incident radiant heat energy on the specimen plane to distance from the point of initiation of flaming ignition, that is, 0 cm. (1997) **E648**

fractional exposure dose (FED), *n*—the ratio of the integrated area under the concentration-time curve for a gaseous toxicant or the sum of all combustion products produced in a given test to that integrated C(t) area which has been determined statistically from independent experimental data to produce lethality in 50 % of test animals within a specified exposure and postexposure time.

DISCUSSION—When C is nearly constant over time, the time values in this ratio numerically cancel, and the FED is simply the ratio of the average concentration of a gaseous toxicant to its LC₅₀ value for the same exposure time. When only a single measurement of C is made during a test, the accuracy of this simplification is not known. When not used with reference to a specific toxicant, the term FED represents the

summation of FEDs for individual toxicants in a combustion atmosphere. (2010) **E1678**

frame, *n*—an item (plastic extrusion, wood, metal or other material) that is mounted to an existing substrate via mechanical fasteners or adhesive, that has a mechanism for holding an outer layer (fabric or vinyl) by tension. (2010) **E2573**

full length burn, *n*—the outcome of a determination in which the cigarette burns to or past the front plane of the tipping paper, which covers the filter and perhaps a short section of the tobacco column in a filter tip cigarette, or past the tips of the metal pins if the cigarette has no filter. (2002) **E2187**

full scale test, *n*—a test in which the product(s) to be tested is utilized in the same size as its end use. (1998)

DISCUSSION—In practical applications, this term is usually applied to tests where the item to be tested is larger than would fit in a bench-scale test. (1998) **E603**

fully developed stream—a coherent, forceful projection of water similar in shape and intensity to the stream being applied to the exposed side of the test assembly from the nozzle. (2002) **E2226**

fume stack, *n*—a box-like duct with thermocouples and baffles through which flames and hot fumes from a burning specimen pass whose purpose is to permit measurement of the heat release from the burning specimen. (1997) **E1317**

furniture mock-up or assembly, *n*—a representation of production furniture that uses the same upholstery cover material and upholstery material, constructed in the same manner as in production furniture, but with straight, vertical sides. (1994) **E1352**

gas phase ignition, *n*—ignition of pyrolysis products leaving a heated surface by a pilot flame or other ignition source that does not impinge on, nor significantly affect, for example, by re-radiation, the heated surface. (1997) **E906/E906M**

glass block assembly, *n*—a light transmitting configuration constructed of glass block held together with mortar or other suitable materials. (1999) **E2010**

glazing material, *n*—transparent or translucent material used in fire window assemblies. (1999) **E2010**

gross heat of combustion, *n*—the maximum amount of heat per unit mass that theoretically can be released by the combustion of a material, product, or assembly; it can be determined experimentally only under conditions of high pressure and in pure oxygen (contrast *effective heat of combustion*). (2010) **E1354, E1474, E1740**

heat flux, *n*—heat transfer to a surface per unit area, per unit time (see also *initial test heat flux*). (2010) **E1354, E1474, E1740**

DISCUSSION—The heat flux from an energy source, such as a radiant heater, can be measured at the initiation of a test (such as Test Method E1354 or Test Method E906/E906M) and then reported as the incident heat flux, with the understanding that the burning of the test specimen can generate additional heat flux to the specimen surface. The heat flux can also be measured at any time during a fire test, for example as

described in Guide E603, on any surface, and with measurement devices responding to radiative and convective fluxes. Typical units are kW/m^2 , $\text{kJ/(m}^2\text{)}$, W/cm^2 , or $\text{BTU/(s ft}^2\text{)}$. (2010) **E1354, E1474, E1740**

heating flux, *n*—the prescribed incident flux imposed externally from the heater onto the specimen at the initiation of the test. (2001)

DISCUSSION—The specimen, once ignited, also is heated by its own flame. This differs from the generic definition of heat flux in Terminology E176, because in this test method the heating flux of primary interest is the one imposed at the initiation of the test. (2001) **E1474, E1740**

heating flux, *n*—the incident flux imposed externally from the heater on the specimen at the initiation of the test. (1996)

DISCUSSION—The specimen, once ignited, is also heated by its own flame. (1996) **E1354, E1623**

heat for ignition, *n*—the product of time from initial specimen exposure until the flame front reaches the 150-mm position and the flux level at this position, the latter obtained in prior calibration of the apparatus. (1997) **E1317**

heat for sustained burning, *n*—the product of time from initial specimen exposure until the arrival of the flame front, and the incident flux level at that same location as measured with a dummy specimen during calibration. (1997) **E1317**

heat release rate, *n*—the heat evolved from the specimen, per unit of time. (2001) **E2061**

heat release rate, *n*—the heat evolved from the specimen, expressed per unit area of exposed specimen area per unit of time. (2000) **E1474, E1740**

heat release rate, *n*—the heat evolved from the specimen, per unit of time. (2000) **E1354, E2067**

heat release rate, *n*—the heat evolved from the specimen per unit of time and area. (1994) **E1623**

homogeneous product, *n*—a product with nominally uniform density and composition. (2009) **E2652**

hypothetical accident conditions, *n*—a series of accident environments, defined by regulation, that is a Type B package must survive without significant loss of contents. (2002) **E2230**

ignitability, *n*—the propensity to ignition, as measured by the time to sustained flaming, in seconds, at a specified heating flux. (1997) **E1354, E1623**

ignitability, *n*—the propensity for ignition, as measured by the time to sustained flaming at a specified heating flux. (1996) **E1474, E1740**

ignition, *n*—the initiation of combustion. (2000)

DISCUSSION—The combustion may be evidenced by glow, flame, detonation, or explosion. The combustion may be sustained or transient. (2000) **E1995, E2067**

initial test heat flux, *n*—the heat flux set on the test apparatus at the initiation of the test (see also *heat flux*). (2010) **E1354, E1474, E1740**

DISCUSSION—The initial test heat flux is the heat flux value commonly used when describing or setting test conditions. (2010) **E1354, E1474, E1740**

insolation, *n*—solar energy incident on the surface of a package. (2002) **E2230**

insulation, *n*—a material that is normally added to an assembly to provide resistance to heat flow for purpose of energy conservation. (1999)

DISCUSSION—Insulation materials are also used to improve sound control or improve fire resistance. (1999) **E2032**

insulation blanket, *n*—a relatively flat and flexible insulation in coherent sheet form furnished in units of substantial area. (2002) **E2231**

integrity, *n*—the ability of a test assembly, when exposed to fire from one side, to prevent the passage of flame and hot gases through it or the occurrence of flames on its unexposed side. (2000) **E2074**

integrity, *n*—the ability of a perimeter fire barrier, when exposed to fire from two sides, to prevent the passage of flame and hot gases through it and the occurrence of flames on its unexposed sides as determined by using a cotton pad. (2010) **E2307**

irradiance, *n*—quotient of the radiant flux incident on an infinitesimal element of surface containing the point, by the area of that element. (2005) **E2405**

irradiance (at a point of a surface), *n*—ratio of the radiant flux incident on a small but measurable element of surface containing the point, by the area of that element. (2000) **E2102**

joining material, *n*—the frame piece used to join two or more site fabricated stretch panels together, to create a midseam. (2010) **E2573**

joint, *n*—the linear void located between juxtaposed fire-separating elements. (2000) **E1966**

laboratory monitor, *n*—a representative of a subcommittee who is appointed to determine if the qualifications, equipment, personnel, and level of skill at a test facility meet the criteria necessary to participate in an interlaboratory test protocol. (2004) **E2335**

LC₅₀, *n*—a measure of lethal toxic potency; the concentration of gas or smoke calculated statistically from concentration-response data to produce lethality in 50 % of test animals within a specified exposure and postexposure time, expressed in $\mu\text{L/L}$. (1996)

DISCUSSION—Values expressed using this unit are numerically equal to those using the previously cited unit, ppm, a term whose use is discouraged. **E1678**

light flame, *n*—a flame approximately 6 in. (152 mm) long. (1999) **E2010**

lightweight aggregate concrete, *n*—concrete made with aggregates of expanded clay, shale, slag, or slate or sintered fly

- ash, and weighing 1360 to 1840 kg/m³ (85 to 115 pcf). (1999) **E2032**
- longitudinal midseam**, *n*—a seam made from the joining material used in the stretch system, which is centered on the test specimen and runs the entire length of the test specimen. (2010) **E2573**
- marine board**, *n*—an insulation board of 750 ± 100 kg/m³ density that meets the noncombustibility criteria of 46 CFR 164.009. (1997) **E1317**
- mass loss concentration**, *n*—the mass loss of a test specimen per unit exposure chamber volume in g · m⁻³. (1996) **E1678**
- mass optical density**, *n*—the ratio of the optical density of smoke and the mass loss of the test specimen, multiplied by the volume of the test chamber and divided by the length of the light path. (1998) **E1995**
- material**, *n*—single substance, or uniformly dispersed mixture, for example metal, stone, timber, concrete, mineral fiber, or polymer. (2000) **E2102**
- material, generic**, *n*—is one for which a nationally recognized Standard Specification exists. (1999) **E2032**
- material proprietary**, *n*—is one whose fire performance characteristics are determined in consideration of a formulation or process of production that is proprietary. (1999) **E2032**
- mattress**, *n*—a mattress is a ticking (outermost layer of fabric or related material) filled with a resilient material, used alone or in combination with other products, intended or promoted for sleeping upon. (1996) **E1474**
- maximum joint width**, *n*—the widest opening of an installed joint system. (2000) **E1966**
- maximum joint width**, *n*—the widest opening of the perimeter joint as defined by the test sponsor. (2010) **E2307**
- measurand**, *n*—quantity subject to measurement. (2009) **E2536**
- measured heat release of specimen**, *n*—the observed heat release under the variable flux field imposed on the specimen and measured. (1997) **E1317**
- membrane-penetration firestop system**, *n*—a firestop system that seals the opening provided to accommodate one or more items that penetrate the membrane on only one side of a fire-resistance rated assembly. (2010)
- DISCUSSION—Examples of penetrating items include cables, conduits, ducts, pipes, and electrical boxes. (2010) **E814**
- mineral fiber insulation**, *n*—insulation composed principally of fibers manufactured from rock, slag, or glass processed from molten state into fibrous form to comprise flexible batts or blankets, rigid or semi-rigid blocks and boards, or loose fill insulations, with or without binder. (1999) **E2032**
- minimum joint width**, *n*—the narrowest opening of an installed joint system. (2000) **E1966**
- minimum joint width**, *n*—the narrowest opening of the perimeter joint as defined by the test sponsor. (2010) **E2307**
- mirror assembly**, *n*—a mirror, marked and aligned with the viewing rakes, used as an aid in quickly identifying and tracking the flame front progress. (1997) **E1317, E1321**
- model evaluation**, *n*—the process of quantifying the accuracy of chosen results from a model when applied for a specific use. (1997) **E1355**
- model validation**, *n*—the process of determining the degree to which a calculation method is an accurate representation of the real world from the perspective of the intended uses of the calculation method. (1997)
- DISCUSSION—The fundamental strategy of validation is the identification and quantification of error and uncertainty in the conceptual and computational models with respect to intended uses. (1997) **E1355**
- model verification**, *n*—the process of determining that the implementation of a calculation method accurately represents the developer's conceptual description of the calculation method and the solution to the calculation method. (1997)
- DISCUSSION—The fundamental strategy of verification of computational models is the identification and quantification of error in the computational model and its solution. (1997) **E1355**
- movement cycle**, *n*—the change between the minimum and the maximum joint widths of a joint system. (2000) **E1966**
- movement cycle**, *n*—the change between the minimum and the maximum joint widths. (2010) **E2307**
- net heat of combustion**, *n*—the oxygen bomb (see Test Method **D5865**) value for the heat of combustion, corrected for gaseous state of product water. (1997) **E1354, E1474, E1623**
- DISCUSSION—The net heat of combustion differs from the gross heat of combustion in that the former assesses the heat per unit mass generated from a combustion process that ends with water in the gaseous state while the latter ends with water in the liquid state. **E1354E1474**
- net heat of combustion**, *n*—the oxygen bomb calorimeter value for the heat of combustion, corrected for the gaseous state of product water. (2000)
- nominal joint width**, *n*—the specified opening of a joint in practice that is selected for test purposes. (2000) **E1966**
- nominal joint width**, *n*—the specified opening of the perimeter joint as defined by the test sponsor that is selected for test purposes. (2010) **E2307**
- non-composite**, *n*—as applied to loadbearing elements, structural interaction between contiguous elements is assumed not to exist in the evaluation of load capacity. (1999) **E2032**
- nonflaming mode**, *n*—the mode of testing that does not use a pilot flame. (1998) **E1995**
- non-homogeneous product**, *n*—a product that does not satisfy the requirements of a homogeneous product.
- DISCUSSION—Non-homogeneous products are often composed of more than one component. (2009) **E2652**

normal conditions of transport, *n*—a range of conditions, defined by regulation, that a package must withstand during normal usage. **E2230**

observation room, *n*—the second-story room of the ISMA. (2010) **E2307**

obvious ignition, *n*—pronounced continuous and self-sustaining combustion of the test system accompanied by rapid generation of heat and smoke. It is a matter of operator judgment based upon experience in this type of operation. (1994) **E1353**

orientation, *n*—the plane in which the exposed face of the specimen is located during testing, either vertical or horizontal facing up. (1997) **E1354**

orientation, *n*—the plane in which the exposed face of the specimen is located during testing, which is horizontal facing up for this test. (2000) **E1740**

orientation, *n*—the plane in which the exposed face of the specimen is located during testing. (2000) **E2102**

orientation, *n*—plane in which the exposed face of the specimen is located during testing, either vertical or horizontally face upwards. (1999) **E906/E906M**

orientation, *n*—the plane on which the exposed face of the specimen is located during testing, which is horizontal facing up for this test. (1996) **E1474**

orientation, *n*—the vertical plane in which the exposed face of the test specimen is located during testing. (2009) **E2707**

oxygen consumption principle, *n*—the expression of the relationship between the mass of oxygen consumed during combustion and the heat released. (2000) **E1354, E1474, E1623, E1740**

paper wall covering, *n*—a wall covering with a top layer consisting of paper or an alternative cellulosic-based material, but not consisting of a wood product. (2005) **E2404**

paper wall or ceiling covering, *n*—a wall or ceiling covering with a top layer consisting of paper or an alternative cellulosic-based material, but not consisting of a wood product. (2010) **E2404**

perimeter fire barrier, *n*—the perimeter joint protection that provides fire resistance to prevent the passage of fire from floor to floor within the building at the opening between the exterior wall assembly and the floor assembly. The boundaries are the edge of the floor assembly and the interior face of the exterior wall assembly in contact with the perimeter joint protection. (2010)

DISCUSSION—For the purpose of this standard, a knee wall is not to be considered as part of the exterior wall. (2010) **E2307**

perimeter joint, *n*—the linear void located between a juxtaposed exterior wall assembly and floor assembly to accommodate various movements induced by thermal differentials, seismicity, wind loads, and misalignments of the floor and wall during construction. (2010) **E2307**

perimeter joint protection, *n*—a fire-resistive joint system located between the exterior wall assembly and the floor assembly that fills the perimeter joint. (2010)

DISCUSSION—Fire-resistive joint system is defined in Test Method E1966. (2010) **E2307**

pipe, *n*—*as related to heating, ventilating, or air conditioning systems*, a cylindrical conduit for the conveyance of liquids or semi-solids. (2002) **E2231**

pipe insulation system, *n*—*as related to fire testing*, system intended to insulate and cover, continuously for an extended length, the outside surface of a pipe; the system shall have an insulation core, with or without a covering or vapor retarder facing which includes longitudinal closure systems (if used) and perhaps other pipe insulation supplementary materials such as adhesives, fasteners, or tapes (if used). (2002)

DISCUSSION—Pipe system components, including tapes, sealants, and fitting covers, that do not cover the pipe continuously for an extended length, but which are associated with the pipe insulation system are considered separately (see pipe insulation supplementary materials). An extended length is not intended to imply a length of 25 ft, but a length of at least 3 ft. (2002) **E2231**

pipe insulation supplementary materials, *n*—*as related to fire testing*, components, including tapes and sealants used for transverse joints as well as fitting covers that are intermittently spaced, as needed, within the pipe insulation system, as well as adhesives used to bond the insulation to the pipe substrate and that do not cover the pipe continuously for an extended length. (2002) **E2231**

polymeric wall or ceiling covering, *n*—a wall or ceiling covering with a top layer consisting of polymeric-based material. (2010) **E2404**

post-flashover, *n and adj.*—referring to the stage of a fire after flashover. (2010) **E1678**

precision, *n*—variability of test result measurements around reported test result value. (2009) **E2536**

prepared roof covering—products consisting of shingles, tiles, panels or rolled materials that are typically used for high slope roof applications which are applied directly to the roof deck (usually with one or more layers of underlayment and with or without battens) in accordance with installation instructions supplied with the products. (2010) **E108**

product, *n*—the upholstered furniture for which information is required. (1996) **E1537**

product, *n*—material, composite or assembly about which information is required. (2005) **E2405**

product, *n*—mattress, or mattress with foundation, for which fire-test-response characteristics are to be measured. (1996) **E1590**

product, *n*—material, component, or complete end-use product, in use in rail transportation vehicles. (2003) **E2061**

quilted, *n*—fused or stitched with thread through the upholstery cover material and one or more layers of upholstery material. (1994) **E1352**

radiant barrier, *n*—a low emittance (0.1 or less) surface used in the construction of a radiant barrier system. (2010) **E2599**

DISCUSSION—Radiant barrier materials are defined in Specification C1313. (2010) **E2599**

radiant flux profile, *n*—the graph relating incident radiant heat energy on the specimen plane to distance from the point of initiation of flaming ignition, that is, 0 mm. (1996) **E970**

radiant panel index, *I_s*, *n*—the radiant panel index is the product of the flame spread factor, *F_s*, and the heat evolution factor, *Q*. **E162**

random error, *n*—result of a measurement minus the mean that would result from an infinite number of measurements of the same measurand carried out under repeatability conditions. (2009) **E2536**

regulatory hydrocarbon fire, *n*—a fire environment, one of the hypothetical accident conditions, defined by regulation, that a package shall survive for 30 min without significant release of contents.

reflective insulation, *n*—thermal insulation consisting of one or more low emittance surfaces bounding one or more enclosed air spaces. (2010) **E2599**

DISCUSSION—Reflective insulation materials are defined in Specification C1224. (2010) **E2599**

reflective plastic core insulation, *n*—an insulation material packaged in rolls, that is less than 0.5 in. (12.7 mm) thick, with at least one exterior low emittance surface (0.1 or less) and a core material containing voids or cells. (2010) **E2599**

DISCUSSION—Reflective plastic core insulation materials are one specific type of reflective insulation materials. (2010) **E2599**

repeatability (of results of measurements), *n*—closeness of the agreement between the results of successive independent measurements of the same measurand carried out under repeatability conditions. (2009) **E2536**

repeatability and reproducibility—these terms deal with the variability of test results obtained under specified laboratory conditions. Repeatability concerns the variability between independent test results obtained within a single laboratory in the shortest practical period of time by a single operator with a specific set of test apparatus using test specimens (or test units) taken at random from a single quantity of homogeneous material obtained or prepared for the ILS. Reproducibility deals with the variability between single test results obtained in different laboratories, each of which has applied the test method to test specimens (or test units) taken at random from a single quantity of homogeneous material obtained or prepared for the ILS. (2009) **E2653**

repeatability conditions, *n*—on identical test material using the same measurement procedure, observer(s), and measuring instrument(s) and performed in the same laboratory during a short period of time. (2009) **E2536**

reproducibility (of results of measurements), *n*—closeness of the agreement between the results of measurements of the same measurand carried out under reproducibility conditions. (2009) **E2536**

reproducibility conditions, *n*—on identical test material using the same measurement procedure, but different observer(s) and measuring instrument(s) in different laboratories performed during a short period of time. (2009) **E2536**

reverberatory wires, *n*—a wire mesh located in front of, but close to, the radiating surface of the panel heat source which serves to enhance the combustion efficiency and increase the radiance of the panel. (1997) **E1317**

sample, *n*—an amount of the material, product, or assembly, to be tested, which is representative of the item as a whole. (1998) **E1995, E2067, E2102**

sample integrity—the unimpaired chemical composition of a test sample upon the extraction of said test sample for analysis. (1981) **E800**

sampling—a process whereby a test sample is extracted from a fire test environment. (1981) **E800**

sand-lightweight concrete, *n*—concrete made with a combination of expanded clay, shale, slag, or slate or sintered fly ash and natural sand and generally weighing between 1680 and 1920 kg/m³ (105 to 120 pcf). (1999) **E2032**

self-supporting specimen, *n*—a specimen that remains in place by its own structural characteristics both before and during the fire test. (2002) **E2231, E2404, E2688**

self-supporting specimen, *n*—a specimen that remains in place by its own structural characteristics both before and during the fire test or is burnt or pyrolyzed prior to falling away from its original position. (2010) **E2573**

separating element, *n*—a floor assembly or exterior wall assembly. (2010) **E2307**

sheathing, *n*—the material placed on an exterior wall beneath cladding or siding and directly attached to the wall system used over the wall framework and is attached directly to the wall framing members. Materials called sheathing that are not placed beneath cladding or siding shall be classified as cladding or siding. (2009) **E2707**

siding (cladding), *n*—any material that constitutes the exposed exterior covering of an exterior wall and such material is applied over sheathing or directly attached to the wall system. (2009) **E2707**

significant lateral spread—surface flaming beyond 1-ft. from the lead edge, extending outward to both lateral edges of the test deck assembly or to both inner edges of metal batten strips, if used, along the side edges of the test deck assembly. (2010) **E108**

site-fabricated stretch system, *n*—a system, fabricated on site and intended for acoustical, tackable or aesthetic purposes, that is comprised of three elements: (a) a frame (constructed of plastic, wood, metal or other material) used to hold fabric in place, (b) a core material (infill, with the correct properties for the application), and (c) an outside layer, comprised of a textile, fabric or vinyl, that is stretched taut and held in place

- by tension or mechanical fasteners via the frame. (2010)
E2404, E2573, E2599
- smoke**, *n*—the airborne solid and liquid particulates and gases evolved when a material undergoes pyrolysis or combustion. (2009)
E2061
- smoke developed index**, *n*—a number or classification indicating a comparative measure derived from smoke obscuration data collected during the test for surface burning characteristics.
E84
- smoke obscuration**, *n*—reduction of light transmission by smoke, as measured by light attenuation. (2000)
E1354, E1623
- smoke obscuration**, *n*—the reduction in visibility due to smoke (ISO Guide 52). (1998)
E1995
- SMOKE unit**, *n*—the concentration of smoke particulates in a cubic metre of air that reduces the percent transmission of light through a 1-m path to 10 %. SMOKE = Standard Metric Optical Kinetic Emission. (1997)
E906/E906M
- special calibration board**, *n*—a specially assembled noncombustible insulating board used for standardizing the operating condition of the equipment which is used only to measure the flux distribution at specified intervals along the specimen surface. It shall be roughly 20 ± 5 mm in thickness with a density of 750 ± 100 kg/m³. (1997)
E1321
- special calibration dummy specimen**, *n*—a dummy specimen made of the same material as the dummy specimen, intended only for use in calibration of flux gradient along the specimen. (1997)
E1317
- specified load**, *n*—as applied to loadbearing elements, the test load applied to the element in a Test Method **E119** test. (1999)
E2032
- specimen**, *n*—representative piece of the product which is to be tested together with any substrate or treatment. (2000)
E2067, E2102, E2257
- specimen**, *n*—the actual section of material, product, or assembly, to be placed in the test apparatus. (1998)
E1995
- specimen**, *n*—manufactured item of the product, representative prototype of the product, or mock-up of the product. (1996)
E1537
- specimen**, *n*—the manufactured item of the product, or representative prototype of the product. (1996)
E1590
- specimen**, *n*—a construction consisting of electrical system components and a fire-resistive barrier system. (1995)
E1725
- specimen**, *n*—representative piece of the product which is to be tested together with any substrate or treatment. The specimen may include an air gap. The specimen may also be tested as a stand-alone product without substrates if this is representative of end-use conditions. (2005)
E2405
- splice**, *n*—the connection or junction within the length of a joint system. (2000)
E1966
- splice**, *n*—the connection or junction within the length of a perimeter joint protection. (2010)
DISCUSSION—A splice is a result of the device or method used to connect or join multiple lengths of the perimeter joint protection. (2010)
E2307
- stacking chair**, *n*—chair that is intended to be stacked when not in use. (1999)
E1822
- standard deviation**, *n*—a quantity characterizing the dispersion of the results of a series of measurements of the same measurand; the standard deviation is proportional to the square root of the sum of the squared deviations of the measured values from the mean of all measurements. (2009)
E2536
- standard uncertainty**, *n*—uncertainty of the result of a measurement expressed as a standard deviation. (2009)
E2536
- substrate**, *n*—a material which is used or is representative of that used, immediately beneath a surface product in end-use, for example, skimmed plasterboard beneath a wall-covering. (2005)
E2405
- supporting construction**, *n*—the arrangement of separating elements forming the intersection into which the perimeter joint protection is installed. (2010)
E2307
- surface flame spread**, *n*—the propagation of a flame away from the source of ignition across the surface of the specimen.
E84
- supporting construction**, *n*—the arrangement of building sections forming the fire-separating elements into which the joint systems are installed. (2000)
E1966
- supporting construction**, *n*—construction required for the testing of some building elements into which the test specimen is assembled, for example, the wall into which a door is fitted. (2002)
E2226
- supporting construction**, *n*—the arrangement of separating elements forming the intersection into which the perimeter joint protection is installed. (2010)
E2307
- surface flame spread**, *n*—the propagation of a flame away from the source of ignition across the surface of the specimen. (2000)
E84
- sustained flaming**, *n*—the existence of flame on or over the surface of the specimen for periods of 4 s or more. (2000)
E1474, E1740, E2102
- sustained flaming**, *n*—existence of flame on or over most of the specimen surface for periods of at least 4 s. (1997)
DISCUSSION—Flaming of less than 4 s duration is identified as flashing or transitory flaming. (1997)
E1354
- sustained flaming**, *n*—existence of flame on or over the surface of the specimen for periods of 5 s. (1994)
DISCUSSION—Flaming of less than 5 s duration is identified as flashing or transitory flaming. (1994)
E1623
- sustained flaming**, *n*—the existence of flame on or over the majority of the surface of the specimen for a period of 4 s or more. (1999)
E906/E906M

- sustained flaming**, *n*—existence of flame on or over most of the specimen surface for periods of more than 4 s. (2005) **E2405**
- sustained flaming**—any flaming which continues uninterrupted for 5 seconds or more. **E108**
- sustained flaming (for testing at 750°C)**, *n*—sustained flaming for testing at 750°C (1382°F) is the persistence of a flame on or over any part of the visible part of the test specimen lasting 5 s or longer. (2009) **E2652**
- systematic error (or bias)**, *n*—mean that would result from an infinite number of measurements of the same measurand carried out under repeatability conditions minus the true value of the measurand. (2009) **E2536**
- tenability (of humans to fire-generated conditions)**, *n*—the capability of humans to occupy a room without becoming incapacitated or being killed as a result of a fire. (2003) **E2280**
- tenability limit (of humans to fire-generated conditions)**, *n*—limit at which a human being is rendered physically incapacitated or dies as a consequence of exposure to one or more factors (such as toxic gases, temperature, heat flux, or smoke obscuration) generated by a fire. (2003) **E2280**
- test assembly**, *n*—the complete assembly of test specimens together with their supporting construction. (2000) **E1966**
- test assembly**—the wall or floor into which the test sample(s) is (are) mounted or installed. (1981) **E814**
- test assembly**, *n*—horizontal or vertical construction on which test specimens are to be mounted together with associated instrumentation. (1995) **E1725**
- test assembly**, *n*—the building element or elements being tested and, if applicable, the supporting construction. (2002) **E2226**
- test assembly**—the wall or floor that is part of the firestop system being tested into which the test specimen(s) is (are) mounted or installed. (2010) **E814**
- test assembly**, *n*—the complete assembly of the test specimen together with the test apparatus. (2010) **E2307**
- test method and protocol**—*in this practice*, the term “test method” is used both for the actual measurement process and for the written description of the process, while the term “protocol” is used for the directions given to the laboratories for conducting the ILS. (2009) **E2653**
- test room**, *n*—the first-story room of the ISMA. (2010) **E2307**
- test sample**—a representative part of the experimental environment (gases, liquids, or solids) for purposes of analysis. (1981) **E800**
- test specimen**, *n*—the specific construction assembly that was tested in accordance with Test Method **E119**. (1999) **E2032**
- test specimen**, *n*—a joint system of a specific material(s), design, and width. (2000) **E1966**
- test specimen**, *n*—the fire stop being tested. (1997) **E814E2226**
- test specimen**, *n*—stack of five identical stacking chairs. (1999) **E1822**
- test specimen**—the penetrating item or items and the materials or devices, or both, that seal the opening in the firestop system being tested. (2010) **E814**
- test specimen**, *n*—the specific test details of the perimeter fire barrier. (2010) **E2307**
- textile**, *n*—originally a woven fabric, now generally applied to (1) staple fibers and filaments suitable for conversion to or use as yarns or for the preparation of nonwoven fabrics, (2) yarns made from natural or manufactured fibers, and (3) fabrics made from fibers as defined in (1) and (2) and from yarns. (2010) **E2404**
- thermal operating level**, *n*—the operating condition at which the radiance of the heat source produces a specified constant heat flux to some specified position at the specimen surface. (1997) **E1321**
- thermal qualification**, *n*—the portion of the certification process for a radioactive materials transportation package that includes the submittal, review, and approval of a Safety Analysis Report for Packages (SARP) through an appropriate regulatory authority, and which demonstrates that the package meets the thermal requirements stated in the regulations. (2002) **E2230**
- thermally thick**, *n*—the thickness of a medium that is large enough to have the predominate thermal (temperature) effects experienced within that distance, that is, negligible heat is lost from its unexposed side. (1997) **E1321**
- through-opening**, *n*—a uninterrupted hole in the test assembly that is seen from the unexposed side when viewing the suspected hole from a position perpendicular to the plane of the test assembly. (1999) **E2010, E2074**
- through-penetration firestop system**, *n*—a firestop system that seals the opening around penetrating items that pass through the entire fire-resistance rated assembly. (2010)
DISCUSSION—Examples of penetrating items include cables, cable trays, conduits, ducts, and pipes. (2010) **E814**
- time to ignition**, *n*—time between the start of the test and the presence of a flame on the specimen surface for a period of at least 4s. (1998) **E1995**
- time to ignition**, *n*—time between the start of the test and the presence of a flame on or over most of the specimen surface for a period of at least 4 s. (2000) **E906/E906M, E2102**
- time to sustained flaming**, *n*—time to ignition. (2000) **E906/E906M, E2102**
- time to sustained flaming on the exposed side**, *n*—time to ignition, in s. (2004) **E1623**
- time to sustained flaming on the unexposed side**, *n*—test duration, in s. (2004) **E1623**

time zero, *n*—the point in time when the chamber door is closed, which needs to occur within 3 s after the specimen has been moved into the chamber. (2010) **E648**

total cold wall heat flux, *n*—the heat flux that would be transferred to an object whose temperature is 70°F (21°C). (1993) **E1529**

total flux meter, *n*—the instrument used to measure the level of radiant heat energy incident on the specimen plane at any point. (1997) **E648, E970**

total heat released, *n*—integrated value of the rate of heat release, for a specified time period. **E603**

transfer, *n*—the process of substituting a loadbearing element from one test specimen for the loadbearing element in another test specimen, or utilizing a loadbearing element from one test specimen for use in another test specimen that does not include a loadbearing element. (1999) **E2032**

transitory flaming, *n*—the existence of flame on or over the surface of the specimen for periods of between 1 and 4 s. (2000) **E2102**

transitory flaming, *n*—existence of flame on or over most of the specimen surface for periods between 1 and 4 s. (2005) **E2405**

tufted, *n*—buttoned or laced through the upholstery cover material and upholstery material. (1999) **E1352**

type A evaluation (of uncertainty), *n*—method of evaluation of uncertainty by the statistical analysis of series of observations. (2009) **E2536**

type B evaluation (of uncertainty), *n*—method of evaluation of uncertainty by means other than the statistical analysis of series of observations. (2009) **E2536**

Type B package, *n*—a transportation package that is licensed to carry what the regulations define to be a Type B quantity of a specific radioactive material or materials. **E2230**

ultimate capacity, *n*—*as applied to loadbearing elements*, the actual maximum load carrying capacity of an element based on properties specific to the material constituting the element. (1999) **E2032**

uncertainty of measurement, *n*—parameter, associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand. (2009) **E2536**

unit weight, *n*—as applied to concrete, weight per unit volume. (1999) **E2032**

upholstered, *adj*—covered with material (as fabric or padding) to provide a soft surface. (1994) **E1353, E1474, E1537, E1822**

upholstery cover material, *n*—the outermost layer of fabric or related material used to enclose the main support system or upholstery materials, or both, used in the furniture unit. (1999) **E1537, E1822**

upholstered furniture, *n*—a unit of interior furnishing that (1) contains any surface that is covered, in whole or in part, with a fabric or related upholstery cover material, (2) contains upholstery material, and (3) is intended or promoted for sitting or reclining upon. (1994) **E1353, E1352**

upholstered seating furniture, *n*—a unit of interior furnishing that (1) contains any surface that is covered, in whole or in part, with a fabric or other upholstery cover material, (2) contains upholstery material, and (3) is intended or promoted for sitting upon. (1999) **E1537, E1822, E2280**

upholstery cover material, *n*—the outermost layer of fabric or related material used to enclose the main support system or upholstery materials, or both, used in the furniture item. (1999) **E1352, E1353, E1474, E2280**

upholstery cover material, *n*—the outermost layer of fabric or related material used to enclose the main support system, or upholstery materials, or both, used in the furniture unit. (1994) **E1537, E1822**

upholstery material, *n*—the padding, stuffing, or filling material used in a furniture item, which may be either loose or attached, enclosed by an upholstery cover material, or located between the upholstery cover material and support system, if present. (2001)

DISCUSSION—This includes, but is not limited to, material such as foams, cotton batting, polyester fiberfill, bonded cellulose, or down. (2001) **E1352, E1353, E1474, E1537, E1822, E2280**

viewing rakes, *n*—a set of bars with wires spaced at 50-mm intervals for the purpose of increasing the precision of timing the flame front progress along the specimen. (1997) **E1317, E1321**

vinyl stretch ceiling material, *n*—a vinyl material stretched and mechanically fastened to a noncombustible frame and intended to be used as a suspended ceiling without associated backing material. (2010) **E2599**

vinyl wall covering, *n*—a wall covering produced by applying a poly(vinyl chloride) (PVC, vinyl) based coating, or laminating a preformed vinyl film, onto a woven or nonwoven fabric substrate or paper. (2005) **E2404**

vinyl wall or ceiling covering, *n*—a wall or ceiling covering produced by applying a poly(vinyl chloride) (PVC, vinyl) based coating, or laminating a preformed vinyl film, onto a woven or nonwoven fabric substrate or paper. (2010) **E2404**

wall covering, *n*—*for purposes of this practice*, a paper- or vinyl-based product designed to be attached to a wall surface for decorative or acoustical purposes. (2005) **E2404**

wall covering system, *n*—*for purposes of this practice*, an assembly of a paper wall covering or a vinyl wall covering, adhesive (if used), and substrate (if it is part of the assembly) used as a wall treatment for decorative or acoustical purposes. (2005)

DISCUSSION—The wall covering material is usually intended to be directly attached to a substrate, via adhesives or mechanical fasteners. In some cases the wall covering system will be supported by a frame

system some distance away from the wall covering material. (2005)
E2404

wall or ceiling covering, *n*—a textile-, paper- or polymeric (including vinyl) based product designed to be attached to a wall or ceiling surface for decorative or acoustical purposes. (2010)
E2404

DISCUSSION—Wall or ceiling coverings with ink or topcoat layers added as part of the manufacturing process are included in this definition. (2010)
E2404

wall or ceiling covering system, *n*—an assembly of a textile wall or ceiling covering, a paper wall or ceiling covering or a polymeric (including vinyl) wall or ceiling covering, adhesive (if used), and substrate (if it is part of the assembly) used as a wall or ceiling treatment for decorative or acoustical purposes. (2010)
E2404

DISCUSSION—The wall or ceiling covering material is usually intended to be directly attached to a substrate, via adhesives or mechanical fasteners. In some cases the wall or ceiling covering system will be supported by a frame system some distance away from the wall or ceiling covering material. (2010)
E2404

wallcovering, *n*—a fabric, vinyl, or paper-based product designed to be attached to a vertical wall surface for decorative or acoustical purposes. (2000)
E1740

wallcovering composite, *n*—an assembly of a wallcovering, adhesive (if used), and substrate used as a vertical wall treatment for decorative or acoustical purposes. (2000)
E1740

welt, *n*—the piping effect produced when welt cord and cover fabrics are sewn together for ornamental purposes to finish the edges between intersecting surfaces of upholstered furniture cushions, pillows, arms, or backs. (1994)
E1352, E1353

welt cord, *n*—the continuous small-diameter cylindrical material that is wrapped in fabric and sewn as part of the cover to make a welt edge on upholstered furniture. (1994)
E1352, E1353

wide span system, *adj*—a system that employs a wide span fabric or vinyl, from 10 ft or more in width and minimizes the use of a midseam or “joining” material. (2010)
E2573

window assembly, *n*—an integrally fabricated unit containing a glazed light(s) placed in an opening in a wall or partition and that is intended primarily for the transmission of light, or light and air, and not primarily as an entrance or exit. (1999)
E2010

APPENDIXES

(Nonmandatory Information)

X1. HISTORICAL COMMENTARY

X1.1 In the 1970s ASTM decided to develop a Policy on Fire Standards. At the same time, the ASTM Committee on Terminology (COT) created a Terminology Coordinating Group under its auspices. This Terminology Coordinating Group was designated TCG-01. It consisted of representatives of Committee E05 on Fire Standards, COT and other interested technical committees.

X1.2 The responsibility of TCG-01 was to consider and recommend terms and definitions in the field of fire technology for the purpose of minimizing redundancies and eliminating conflicts in such terminology.

X1.3 That committee recommended several definitions, many of which have been amended over the years. Such definitions have included: afterglow, char (both as a noun and as a verb), fire exposure, fire gases, fire resistant (inappropriate and misleading), fire resistive, flame, flame front, flame resistance, flame resistant, flame resistive (as a less satisfactory alternative to flame resistant), flash point, glow, ignition, mass burning rate, optical density of smoke, piloted ignition, smoke, spontaneous ignition, surface flame spread rate, temperature and unpiloted ignition. Not all of these terms are still included in Terminology E176 and some of the definitions have since been amended.

X2. KEYWORDS

X2.1 Scope

X2.1.1 This appendix of keywords is provided as a resource and a convenience to aid in providing index and keyword items for fire standards of Committee E05 as well as other ASTM Committees preparing fire standards. The list has been compiled from a list prepared by the Subcommittee at the time when mandatory keyword sections were first being added to most ASTM standards. Other appropriate keywords may apply.

X2.2 Guidelines

X2.2.1 Keywords should be selected on the basis of those that best represent the technical information presented in the standard.

X2.2.2 Select the keywords from the title and body of the standard and include general, vernacular and trade terms.

X2.2.3 Select three or more keywords that describe the names of tests, procedures, special materials, or the specific application(s) that will facilitate the identification and retrieval of the standard.

X2.2.4 All selected keywords should be stand-alone terms; the type of standard, incomplete phrases, unattached adjectives, and so forth should not be used.

X2.3 Resource List of Keywords

X2.3 acid gases

activation energy
acute toxicity
afterburner
afterburning
afterglow
air leakage
air mixtures
air ratio
air movement
air velocity
analyzer
anhydrous fuels
animal models atmospheric
animal atmosphere
anoxia
asphyxia
autoignition
autoignition temperature
autooxidation
axisymmetric
behavior models
bench scale tests
blackbody
blackbody temperature
building code
buoyant flumes
buoyant flow
burn room
burnout parameter

burnout
burn through
burner
burning
burning velocity
burning rate
burning brand test
cable insulation
cable jacket
cable trays
cable sheath
calibrate
calibration burner
calorimeter
calorimetry
candle
carbon monoxide
carbon balance method
carbon dioxide
carboxyhemoglobin
ceiling jet
cellulosic fuel
chamber
char
char depth characteristic
characteristic time
charring
chimney
cigarette ignition
cigarette test method
combustibility
combustible properties
combustible elements
combustible
combustion gases
combustion toxicity
combustion efficiency
combustion products
combustion rate
combustion theory
combustion temperature
combustion toxicology
combustion test
combustion
cumulative smoke release
compartment fire
compartment
conductive heat transfer
conduction
conductivity
cone calorimeter
cone corrosimeter
confined conical heater
conical heater
containment

convection	extinguish
convective heat transfer	extinguisher
corner test	fabric flammability
corridor test	fabric flammability testing
corridor test, quarter scale	false alarm
crib fire	fatality
crib test	fault trees
crib	field models
critical temperature	fire
critical radiant flux	fire area
critical flux for spread	fire behavior
critical irradiance	fire brand
critical temperature ignition	fire chemistry
critical flux for ignition	fire code
damper	fire containment
decomposition	fire containment walls
deformation	fire characteristic index
degradation	fire characteristic profile
deluge	fire control
detection systems	fire effect
differential pressure	fire effluent
diffusion fire	fire endurance
diffusion flame	fire endurance test
diffusivity	fire exposure
door assemblies	fire gases
dosage	fire hazard
dosimeter	fire hazard analysis
drape	fire hazard assessment
dual l _{co}	fire incident
dummy specimen	fire model
effective heat of combustion	fire penetrations
effective thermal properties	fire performance
egress	fire physics
electrical cable	fire point
emission	fire prediction
emissivity	fire prevention
emittance	fire propagation
enclosure environment	fire propagation index
enclosure fire	fire properties
endothermic	fire protection
energy balance	fire research
enthalpy	fire resistance
entrainment	fire resistive
entropy	fire resistive material
evacuation	fire retardant barrier
event	fire retardant chemical
exhaust duct	fire retardant coating
exhaust gases	fire retardant treatment
exhaust velocity	fire risk
exit	fire risk analysis
exothermic	fire risk assessment
experimental animals	fire risk assessment standard
experimental design	fire safety
explosion	fire scenario
exposure	fire severity
extinction	fire simulation
extinction coefficient	fire size
extinction time	fire spread

fire statistic	flue
fire stop	flux
fire test	flux distribution
fire test chamber	flux gage
fire test response	flux profile
fire test response standard	flux time products
fire tube apparatus	flux uniformity
fire tube assembly	fluxmeter
fire test response	flying brand test
fire test response standard	forest fuels
fire wall	fractional radiation
fireball	free burning fires
firebox	free convection
firestop	free radical
flame	free ventilation
flame emissivity	froude number
flame entrainment coefficient	fuel
flame extinction coefficient	fuel-air
flame front	fuel-air ratio
flame heating parameter	fuel-contributed index
flame heat transfer factor	fuel load
flame propagation	full-scale fire tests
flame radiation	furnace
flame region	furniture calorimeter
flame resistance	gas air
flame resistant	gases
flame retardant chemical	gas density
flame retardant coating	gas phase ignition
flame retardant treatment	gas velocity
flame speed	gasification
flame spread	glow
flame spread rate	gravimetric soot sampler
flame spread test	graybody radiation
flame temperature	halon
flame travel rate	hazard
flame spread classification	hazard analysis
flame spread index	hazard assessment
flame velocity	hazardous materials
flameless	hazardous vapors
flameout	heat
flameover	heat balance
flameproofing	heat capacity
flaming	heat feedback
flaming combustion	heat flow
flaming ignition	heat flux coefficient
flammability	heat loss
flammability apparatus	heat of activation
flammability limits	heat of combustion
flammability measurements	heat of gasification
flammability tests	heat of pyrolysis
flammable gases	heat of reaction
flammable liquids	heat of solution
flammable materials	heat of vaporization
flammable solids	heat release
flashpoint	heat release fraction
flashback	heat release rate
flashover	heat resistant coatings
floor radiant panel tests	heat resistant materials

heat resistant plastics	laminar flow
heat transfer	laminar heat transfer
heat transfer coefficient	laminar jet flames
heat transport	laminar mixing
heater	large scale tests
heating	laser extinction beam
heating flux	latent heat
heating tests	lateral flame spread
homogeneous gas reactions	lc50
homogeneous mixtures	lc (ct) 50
hose stream test	life hazards
hydrant	life safety
hydrocarbon combustion	lift apparatus
hydrocarbon fuel	light
hydrocarbon pool fires	light absorption
hyperbaric	light extinction beam
hyperoxia	light intensity
hypoxemia	light path
hypoxia	limiting oxygen index
ic50	liquid fuel
ideal gas law	luminous flames
ignitability	mass burning rate
igniter	mass flow
igniting burner	mass loss
ignition burner	mass loss rate
ignition	mass optical density
ignition circuit	mass transfer
ignition correlation parameter	mass transfer rate
ignition resistance	mathematical models
ignition source	measurement methods
ignition temperature	medium scale tests
ignition tests	melting point
ignition time	methenamine pill
incandescence	methodology
incendiary	model
incinerator	model validation
index	model verification
induction	modeling
inert	moisture
infrared	mortality
inhalation toxicity	mounting methods
input	multiple lc50
intensity	multiroom fires
interior finish	multiventilation
intermittent flame exposure	national fire incident
intumescence test	reporting system (nfirs)
intumescent	net heat of combustion
intumescent coatings	noncombustibility
irradiance	noncombustibles
irradiation isothermal	nonconductor
jet entrainment	nonflaming
jet flames	nonflaming combustion
kindling	nonignition
kinetic	non-load bearing
laminar burning	nonluminous
laminar burning velocity	nonthermal damage
laminar flame propagation	occupational hazards
laminar flames	occupancy

occupancy classification	radiant heat furnace
offgassing	radiant heat source
Ohio State University	radiant heat transfer
Ohio State University model	radiant panel test method
opacity	radiation
optical calibration filters	radiation absorption
optical density	radiation exposure
optical path length	radiometer
optical properties	rate of heat release
output	rate of mass loss
oven	rate of smoke release
overheating	refractory tube method
oxygen concentration	release rates
oxygen consumption	residence time
oxygen consumption calorimeter	residual flame time
oxygen consumption principle	residue
oxygen index	response surface method
oxygen index test	response time
particulate mass concentration	restraint
party-wall	reynolds number
pathological effects	risk
permeability	risk analysis
photochemical oxidation	risk assessment
photochemical reaction	risk elements
photometer	risk rating factors
physiological effects	room burns
pill test	room fire tests
pilot	room fires
pilot burner	scale effect
pilot flame	scaling
pilot source of ignition	scenario
piloted ignition	scorching
plasma	screening test
plenum cable	self propagating flux
plume	self extinguishment
plume entrainment coefficient	self-heating
pool fire	side wall sprinkler systems
post-fire	skin burns
post-flashover	small scale fire test
post-ignition	smoke
postheating	smoke control
potential heat	smoke corrosivity
precombustion	smoke damage
prefire	smoke density
preflashover	smoke density chamber (e 662)
preignition	smoke density index
propagation	smoke emission factor
purposeful ignition	smoke filling
pyrolysis	smoke flow
pyrolysis front	smoke generations
pyrolysis temperature	smoke measurement
pyrometer	smoke movement
radiant combustion apparatus	smoke obscuration
radiant energy	smoke opacity
radiant flux	smoke penetration
radiant flux profile	smoke release
radiant heat	smoke release rate
radiant heat fill	smoke toxicity

smoke unit	thermal decomposition
smoke yield	thermal degradation
smoldering	thermal draft coefficient
smoldering combustion	thermal effects
smoldering ignition	thermal equilibrium
solid fuels	thermal inertia
solid propellant ignition	thermal operating level
soot	thermal properties
soot formation	thermally thick
soot sampling	thermally thin
spark	thermochemistry
specific extinction area	thermocouple
specific heat	thermogravimetric analysis
specific optical density	thermometer
specific smoke extinction area	thermopile
spontaneous combustion	through penetration fire stop
spontaneous ignition	time to ignition
sprinkler	time to sustained burning
sprinkler system	torch
stack	total flux meter
stack action	total heat flux
stack effect	total heat release
stagnation	total smoke release
standard fire tests	toxic fire hazard
standard flammability apparatus	toxic hazard
standard temperature time curve	toxic potency
steady state combustion	toxic potency test
steady state gasification	toxicity
steiner tunnel	toxicity tests
stephan-boltzman constant	tunnel furnace
stoichiometric ratio	tunnel tests
stove	turbulent burning
stratification	turbulent burning velocity
stratified flow	turbulent combustion
sublimation	turbulent flames
substrate	turbulent jet flames
superimposed load	two stage ignition
suppression	University of Pittsburgh
suppression devices	unpiloted ignition
surface emissivity	unpiloted ignition toxicity
surface flame spread	urban fires test (upitt)
surface flame spread rate	urban fuels
sustained flaming	van der waals effects
temperature	vertical furnace
temperature effects	visible smoke
temperature gradients	volume flame spread
temperature measurements	wall fires
temperature rise	weight loss rate
temperature tests	wood smoke
thermal analysis	xp2 chamber test
thermal conductivity	zone models
thermal damage	

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