



Designation: F2417 – 23

Standard Specification for Fire Safety for Candles¹

This standard is issued under the fixed designation F2417; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification is intended to prescribe minimum safety requirements for candles and candle ensembles to provide a reasonable degree of safety for normal use with candles, thereby improving personal safety and reducing fires, deaths, and injuries.

1.2 This specification is not intended to replace other important safety practices that should be in place, such as adult supervision, close monitoring, fire detection, alarm or suppression systems, and use of candles away from combustible materials.

1.3 *This specification is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire hazard or fire risk assessment of the materials, products, or assemblies under actual fire conditions.*

1.4 *This standard is used to predict or provide a quantitative measure of the fire hazard from a specified set of fire conditions involving specific materials, products, or assemblies. This assessment does not necessarily predict the hazard of actual fires which involve conditions other than those assumed in the analysis.*

1.5 *Fire testing is inherently hazardous. Adequate safeguards for personnel and property shall be employed in conducting these tests.*

1.6 This specification states values in inch-pound units which are to be regarded as the standard. The values given in parenthesis are for information only.

1.7 *This specification 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, health, and environmental practices and determine the applicability of regulatory requirements prior to use.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standard-*

ization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*²

D92 Test Method for Flash and Fire Points by Cleveland Open Cup Tester

D93 Test Methods for Flash Point by Pensky-Martens Closed Cup Tester

E136 Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 °C

E176 Terminology of Fire Standards

F1972 Guide for Terminology Relating to Candles and Associated Accessory Items

F2058 Specification for Candle Fire Safety Labeling

2.2 *NFPA Standard:*³

NFPA 909 Code for the Protection of Cultural Resources

3. Terminology

3.1 Certain candle-related terminology is addressed in Guide **F1972**, and the reader is directed to that guide for definitions not found in 3.2. For definitions of terms associated with fire issues, see Terminology **E176**.

3.2 *Definitions: Candle Classification Terms:*

3.2.1 *candle, n*—one or more combustible wicks supported by a material that constitutes a fuel which is solid, semi-solid, or quasi-rigid at room temperature, 68 °F to 80 °F (20 °C to 27 °C); it can also contain additives that are used for color, scent, stability, or to modify the burning characteristics; the combined function of which is to sustain a light-producing flame.

3.2.2 *candle-making kit, n*—a set of ingredients and materials packaged together that the end consumer uses to make a candle.

¹ This specification is under the jurisdiction of ASTM Committee **F15** on Consumer Products and is the direct responsibility of Subcommittee **F15.45** on Candle Products.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, <http://www.nfpa.org>.

3.2.2.1 *Discussion*—Not all materials necessary to make a candle are needed in a candle-making kit; for instance, fragrance options may be sold separately.

3.2.3 *extended use candle, n*—a candle that is intended for home use to be burned continuously for longer than 4 h, excluding tealight candles.

3.2.3.1 *Discussion*—Examples of extended use candles include religious candles, available to consumers, intended to be burned continuously for 24 h or multiple days.

3.2.4 *filled candle, n*—a candle produced and used within the same container or vessel.

3.2.5 *freestanding candle, n*—a rigid candle that is intended to be burned outside a container and does not require a holder to keep it upright, excluding votive candles.

3.2.5.1 *Discussion*—Examples of freestanding candles include pillar-shaped, column-shaped, and figurine candles.

3.2.6 *gel-containing candle, n*—a candle where the primary fuel is a liquid, such as mineral oil, terpene type chemicals, or modified hydrocarbons that are not mineral oil based, which may or may not contain organic functional groups; it also contains a chemical agent to increase the viscosity (thicken) to a point where the candle has a quasi-rigid property.

3.2.7 *non-freestanding birthday candle, n*—any candle or candle ensemble that does not include pyrotechnics and is designed and marketed for use with birthday cakes and does not comply with the applicable stability requirements.

3.2.7.1 *Discussion*—4.5 contains safety requirements for stability.

3.2.8 *outdoor candle, n*—a candle intended to be burned outdoors.

3.2.9 *religious/ceremonial candle, n*—a candle that is predominantly intended, constructed, packaged, and labeled for use in a public venue during a religious or similar ceremony.

3.2.9.1 *Discussion*—Candles such as an Easter, Paschal, sacramental, or altar (or some combination, for example Easter/Paschal), generally 17 in. (43 cm) or more in length are considered religious/ceremonial candles. These candles are generally displayed and burned in the place of worship as the focal candle during a ceremony, service, or event. These candles may be adorned with symbols and ornamentation as required and deemed appropriate.

3.2.10 *tealight candle, n*—a cylindrical filled candle produced with a diameter and height of approximately 1.5 in. (38 mm) and 0.75 in. (19 mm) respectively.

3.2.11 *votive candle, n*—a candle produced for use fully within a candle accessory, specifically, a votive holder.

3.3 Definitions: General Terms:

3.3.1 *barrier technology, n*—a functional design element of a candle accessory that minimizes the risk of the flame spreading to combustible components of the candle accessory as a result of foreseeable misuse or failure of the candle.

3.3.1.1 *Discussion*—Examples include a durable, noncombustible wall, or space absent of combustible objects.

3.3.2 *base material, n*—the intended fuel source for the candle.

3.3.3 *burn cycle, n*—the length of time a candle burns from when it is lit to when it is manually extinguished or from when it is lit until it extinguishes on its own at end of useful life.

3.3.3.1 *Discussion*—Burn cycles for tealight candles are until end of useful life; burn cycles for gel-containing candles are 8 h; burn cycles for extended use candles are as labeled or intended; and burn cycles for all other candles are 4 h.

3.3.4 *burn time, n*—the time a material supports sustained flaming combustion after removal of the ignition source until all flaming ceases.

3.3.5 *candle flashover, n*—the condition where the base material's vapors ignite over the entire fuel pool.

3.3.6 *coating*—any material, other than wax based, which is used to cover at least a portion of the candle.

3.3.6.1 *Discussion*—This material includes, but is not limited to, paint, glue, glitter, wood, plastic, or any other material that is not wax-based (which is generally considered an overdip).

3.3.6.2 *Discussion*—Excludes product labeling on bottom and any packaging meant to be removed prior to use.

3.3.7 *diffusion flame, n*—a type of flame where the fuel is not premixed with air or other oxygen source.

3.3.7.1 *Discussion*—Diffusion flames are typically red, yellow, or orange in color.

3.3.8 *end of useful life, n*—when the candle ceases to support combustion and the candle flame(s) goes(go) out on its own, as designed, and cannot be re-lit.

3.3.9 *ensemble, n*—a candle and items physically packaged together and intended for use with the candle for sale as one unit at the retail level.

3.3.10 *flame height, n*—the length of the candle flame from the base to the tip.

3.3.11 *flame impingement, n*—the situation where the flame makes contact with a surface.

3.3.11.1 *Discussion*—Within this standard, the concern is when a freestanding candle flame impinges on the supporting surface at the end of useful life.

3.3.12 *fuel pool, n*—pool of molten base material.

3.3.13 *noncombustible, adj*—not capable of igniting and burning when subjected to a fire under specified conditions.

3.3.13.1 *Discussion*—Materials that are reported as passing Test Method E136 are considered noncombustible.

3.3.14 *place of worship, n*—any building that functions primarily as a group meeting place for the practice of religion (see NFPA 909).

3.3.14.1 *Discussion*—This includes, but is not limited to, churches, synagogues, cathedrals, temples, mosques, and meeting halls.

3.3.15 *secondary ignition, n*—a self-sustained flame other than that on the intended wick(s) that occurs during candle use, including candle flashover.