



Designation: E2785 – 26

Standard Practice for Exposure of Firestop Materials to Various Specified Enhanced Environmental Factors¹

This standard is issued under the fixed designation E2785; 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.

INTRODUCTION

Firestops are installed in buildings to prevent the spread of fire. Each firestop design is dependent on its specific arrangement, thickness, density, and shape of materials used in its construction and upon the specific assembly in which it is fire tested. There are at least five types of materials used in firestops. They are endothermic, intumescent, insulative, subliming, and ablative. Some firestops use more than one type in a specific design. The purpose of this practice is to provide a common set of procedures for evaluating the potential behavior of materials used in firestops to various environmental conditions. There are other materials used in firestop systems that are not of the five types listed above, which are not intended to be evaluated by this practice.

1. Scope

1.1 This practice evaluates a change in physical properties of firestop materials after exposure to an enhanced environmental factor. This practice does not evaluate the fire performance of the firestop materials.

1.2 This practice uses the following exposures:

- 1.2.1 Elevated temperature,
- 1.2.2 High humidity,
- 1.2.3 Carbon dioxide and sulfur dioxide with moisture present,
- 1.2.4 Water immersion,
- 1.2.5 Temperature cycling,
- 1.2.6 Wet-freeze-dry cycling, and
- 1.2.7 Weathering.

1.3 This practice establishes indicators that will aid in determining the use of the tested material in buildings.

1.4 This practice evaluates the properties of component products used within a firestop system, and does not evaluate the properties of assembled firestop systems.

NOTE 1—This practice does not preclude the possibility of exposing complete firestop systems to one or more severe environmental exposures and then exposing the complete firestop system to a fire test. After subjecting materials to exposures covered in this practice, the results of a fire test can be affected positively or negatively.

¹ This practice is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.21 on Serviceability.

Current edition approved Jan. 1, 2026. Published January 2026. Originally approved in 2011. Last previous edition approved in 2025 as E2785 – 25a. DOI: 10.1520/E2785-26.

1.5 This practice is intended to be a screening method in the evaluation of the change in physical properties of a specific material before and after various specified enhanced environmental factors. Individual tests are not intended to be the only determining factor in evaluating or selecting a firestop material because each test has limitations.

1.6 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of

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

the Guarded-Hot-Plate Apparatus
C1442 Practice for Conducting Tests on Sealants Using Artificial Weathering Apparatus
D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
D870 Practice for Testing Water Resistance of Coatings Using Water Immersion
D2041/D2041M Test Method for Theoretical Maximum Specific Gravity and Density of Asphalt Mixtures
D3045 Practice for Heat Aging of Plastics Without Load
D3850 Test Method for Rapid Thermal Degradation of Solid Electrical Insulating Materials By Thermogravimetric Method (TGA)
D4714 Test Method for Determination of Effect of Moist Heat (50 % Relative Humidity and 90°C) on Properties of Paper and Board (Withdrawn 2010)³
D5510 Practice for Heat Aging of Oxidatively Degradable Plastics (Withdrawn 2010)³
E84 Test Method for Surface Burning Characteristics of Building Materials
E119 Test Methods for Fire Tests of Building Construction and Materials
E145 Specification for Gravity-Convection and Forced-Ventilation Ovens
E176 Terminology of Fire Standards
E473 Terminology Relating to Thermal Analysis and Rheology
E631 Terminology of Building Constructions
E814 Test Method for Fire Tests of Penetration Firestop Systems
E1966 Test Method for Fire-Resistive Joint Systems
E2307 Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus
E2786 Test Methods for Measuring Expansion of Intumescent Materials Used in Firestop and Joint Systems
E2837 Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies
E2923 Practice for Longevity Assessment of Firestop Materials Using Differential Scanning Calorimetry
F495 Test Method for Weight Loss of Gasket Materials Upon Exposure to Elevated Temperatures
G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
G155 Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials

3. Terminology

3.1 *Definitions*—Definitions in the following standards will prevail for terms not defined in this practice.

3.1.1 For definitions of general terms used in this practice related to building construction, refer to Terminology **E631**.

3.1.2 For definitions of general terms used in this practice related to fire standards, refer to Terminology **E176**.

3.1.3 For definitions of general terms used in this practice related to thermal analysis and rheology, refer to Terminology **E473**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *ablative, adj*—characterized by the capability for rapidly dissipating heat from a substrate.

3.2.2 *endothermic, adj*—characterized by a process or change that takes place with absorption of heat and requires high temperature for initiation and maintenance.

3.2.3 *insulative, adj*—characterized by an extremely low dielectric constant, low thermal conductivity, or both.

3.2.4 *intumescent, adj*—characterized by foaming and swelling when exposed to high surface temperatures or flames.

3.2.5 *subliming, adj*—characterized by the direct passage of a substance from solid to vapor without appearing in the intermediate (liquid) state.

4. Summary of Practice

4.1 This practice describes the following test sequence and procedure:

4.1.1 The firestop material is measured for its physical properties or chemical properties, or both, before exposure to standardized severe environments.

4.1.2 The firestop material is exposed to standardized severe environmental exposures for a specific time period and retested for its physical properties or chemical properties, or both, at various time periods.

4.1.3 After the total exposure time period, the firestop material's physical properties or chemical properties, or both, and performance is calculated and reported as a percentage of initial values.

5. Significance and Use

5.1 This practice is intended to evaluate the material performance after exposure to specified environmental factors. It is understood that these performance values are dependent upon these specified exposure periods and intensities of environmental factors. Other values are possible if the exposure period or intensity of environmental factor, or both, are changed.

5.2 This practice is intended to be used where the material is exposed to the specific extreme environmental condition in its intended field of application.

5.3 The user shall establish which properties are relevant to the application at hand, in order to determine the properties to be tested.

NOTE 2—It is not intended for all properties to be tested in all cases.

5.4 This practice is intended to evaluate only the following types of materials, as defined by their physical properties used in penetration firestops:

5.4.1 Endothermic,

5.4.2 Intumescent,

5.4.3 Insulative,

5.4.4 Ablative, and

5.4.5 Subliming.

³ The last approved version of this historical standard is referenced on www.astm.org.