



Designation: E 1321 – 97a

An American National Standard

Standard Test Method for Determining Material Ignition and Flame Spread Properties¹

This standard is issued under the fixed designation E 1321; 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 fire test response standard determines material properties related to piloted ignition of a vertically oriented sample under a constant and uniform heat flux and to lateral flame spread on a vertical surface due to an externally applied radiant-heat flux.

1.2 The results of this test method provide a minimum surface flux and temperature necessary for ignition ($\dot{q}''_{o,ig}$, T_{ig}) and for lateral spread ($\dot{q}''_{o,s}$, $T_{s,min}$), an effective material thermal inertia value ($k\rho c$), and a flame-heating parameter (Φ) pertinent to lateral flame spread.

1.3 The results of this test method can be used to predict the time to ignition, t_{ig} , and the velocity, V , of lateral flame spread on a vertical surface under a specified external flux without forced lateral airflow. This can be done using the equations in Appendix X1 that govern the ignition and flame-spread processes and which have been used to correlate the data.

1.4 This test method can be used to obtain results of ignition and flame spread for materials. Data are reported in units for convenient use in current fire growth models.

1.5 SI units are used throughout the standard.

1.6 *This standard should be used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions and should not be used to describe or appraise the fire-hazard or fire-risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire-hazard assessment or a fire-risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard or fire risk of a particular end use.*

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 and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see Section 7.

2. Referenced Documents

2.1 ASTM Standards:

E 84 Test Method for Surface Burning Characteristics of Building Materials²

E 162 Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source²

E 176 Terminology of Fire Standards²

E 286 Test Method for Surface Flammability of Building Materials Using an 8-ft (2.44-m) Tunnel Furnace³

E 648 Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source²

E 970 Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source²

E 1317 Test Method for Flammability of Marine Surface Finishes²

2.2 ASTM Adjuncts:ASTM

Detailed drawings (19), construction information, and parts list (Adjunct to E 1317)⁴

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology E 176.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *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.

3.2.2 *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 ± 5 mm in thickness with a density of 750 ± 100 kg/m³.

3.2.2.1 *Discussion*—For the ignition tests, the dummy specimen board shall have a hole at the 50-mm position for mounting the fluxmeter.

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

3.2.4 *mirror assembly, n*—a mirror, marked and aligned with the viewing rakes, used as an aid for quickly identifying

¹ This test method is under the jurisdiction of ASTM Committee E-5 on Fire Standards and is the direct responsibility of Subcommittee E05.22 on Surface Burning.

Current edition approved June 10, 1997. Published August 1997. Originally published as E 1321 – 90. Last previous edition E 1321 – 97.

² *Annual Book of ASTM Standards*, Vol 04.07.

³ Discontinued; see 1992 *Annual Book of ASTM Standards*, Vol 04.07.

⁴ Available from ASTM Headquarters. Order ADJE1317.