



Designation: D 3894 - 88

AMERICAN SOCIETY FOR TESTING AND MATERIALS

1916 Race St., Philadelphia, Pa. 19103

Reprinted from the Annual Book of ASTM Standards, Copyright ASTM
If not listed in the current combined index, will appear in the next edition.

Standard Test Method for Evaluation of Fire Response of Rigid Cellular Plastics Using a Small Corner Configuration¹

This standard is issued under the fixed designation D 3894; 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 test method describes a small-scale laboratory procedure used to observe and measure the response of rigid cellular plastics, under specific exposed or protected conditions, to a standardized heat and flame exposure. Measurements of flame travel, maximum temperature, and material damage are made and reported. Mechanical failures from cracking, spalling, loss of adhesion, and other fire response factors useful in screening for protective purposes may also be noted.

1.2 This test method has been found useful in screening rigid cellular plastics in exposed or protected conditions, using standard configurations (two adjacent walls; two adjacent walls and ceiling) of similar materials in order to predict the performance of such materials in a Factory Mutual Full-Scale Corner Wall Test.

1.3 *This test method is intended for research and development or for internal quality control purposes. It should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory 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 risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use. It is not intended as a basis for ratings used in material specifications or for building code purposes.*

NOTE 1: Warning—During the course of combustion, gases or vapors, or both, are evolved that may be hazardous to personnel.
Precaution—Adequate precautions shall be taken to protect the operators.

1.4 The values stated in SI units are to be regarded as the standard. The values in parentheses are given for information only.

1.5 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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. Specific hazards statements are given in Notes 1 and 7.*

2. Referenced Documents

2.1 ASTM Standards:

D618 Methods of Conditioning Plastics and Electrical Insulating Materials for Testing²

D3195 Practice for Rotameter Calibration³

E691 Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods⁴

2-2 OSHA Standard:

General Industry Safety and Health Standard Provision 1910.1001 on Asbestos⁵

3. Summary of Test Method

3.1 The cellular plastic specimen, consisting of two sides (walls) assembled to form a corner or consisting of two sides (walls) and a ceiling assembled to form a covered corner, is ignited with a gas burner. The flame spread, temperature rise, and damage are recorded.

4. Significance and Use

4.1 A full-scale corner test is a widely recognized configuration for conducting large-scale fire test evaluations for demonstrating the flame spread potential and the material damage characteristics of insulated walls and ceilings. Such a test is described by the Factory Mutual Corner Wall procedure and is recognized as a diversified test for evaluation of flame propagation by the Model Building Codes.

4.2 A corner provides a critical surface geometry for evaluating the fire response of material surfaces. It incorporates three adjacent surfaces (two walls and ceiling) providing a combined heat flux that includes the conductive, convective, and radiative responses of any specific burning material.

4.3 Large-scale corner tests are expensive to conduct. A scaled-down screening test which exhibits good reproducibility and good correlation is therefore useful for predicting the results of full-scale corner testing. This test method has been judged to meet these criteria. Test assembly dimensions and testing times are convenient. Several tests can be conducted daily. Reproducibility, ease of performance, and economy of operation, as well as a minimum correlation to the Factory Mutual Corner Wall Test of 75 %, have been reported.⁶ This method is presently being used in industry and is the subject of further study by independent testing

² Annual Book of ASTM Standards, Vol 08.01.

³ Annual Book of ASTM Standards, Vol 11.03.

⁴ Annual Book of ASTM Standards, Vols 14.02, 08.03, and 06.03.

⁵ Available from the U. S. Government Printing Office, Washington, DC 20010.

⁶ "Mini-Corner Fire Test Method to Evaluate the Surface Burning Characteristics of Building Materials for The Society of the Plastics Industry, Inc.," Serial No. 22000.5, Factory Mutual Research, Norwood, MA, Feb 3, 1976.

¹ This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.30 on Thermal Properties (Section D20.30.03).

Current edition approved March 25, 1988. Published June 1988.