Designation: E906/E906M – 14

An American National Standard

Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using a Thermopile Method[1]

This standard is issued under the fixed designation E906/E906M; 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 provides for determining the release rates of heat and visible smoke (Note 1) from materials, products, or assemblies when exposed to different levels of radiant heat.

NOTE 1—Visible smoke is described in terms of the obscuration of transmitted light caused by combustion products released during the tests (see 14.2.1).

1.2 This fire-test-response method assesses heat release by a thermal method, thermopile, using a radiant heat source composed of an array of four electrical resistance elements.

1.3 This test method provides for radiant thermal exposure of a specimen both with and without a pilot. Piloted ignition results from direct flame impingement on the specimen (piloted, point ignition) or from use of the pilot to ignite gases evolved by pyrolysis of the specimen.

1.4 Heat and smoke release are measured from the moment the specimen is injected into a controlled exposure chamber. The measurements are continued during the period of ignition (and progressive flame involvement of the surface in the case of point ignition), and to such a time that the test is terminated.

1.5 The apparatus described in this test method is often referred to as the Ohio State University (OSU) rate of heat release apparatus. Configurations A and B are variations on the original design.

1.6 This test method is suitable for exposing essentially planar materials, products or assemblies to a constant, imposed external heat flux that ranges from 0 to 80 kW/m^2.

1.7 This test method is intended for use in research and development and not as a basis for rating, regulatory, or code purposes.

1.8 The apparatus described in this test method has been used in two configurations. Configuration A is that which is used by the Federal Aviation Administration for assessing materials for aircraft use, at an external heat flux of 35 kW/m^2 (DOT/FAA/AR-00/12), while configuration B is suitable, at various incident heat fluxes, for research and development purposes.

1.9 This test method does not provide information on the fire performance of the test specimens under fire conditions other than those conditions specified in this test method. Known limitations of this test method are described in 1.9.1 – 1.9.5.

1.9.1 Heat and smoke release rates depend on a number of factors, including the formation of surface char, the formation of an adherent ash, sample thickness, and the method of mounting.

1.9.2 Heat release values are a function of the specific specimen size (exposed area) tested. Results are not directly scaleable to different exposed surface areas for some products.

1.9.3 The test method is limited to the specified specimen sizes of materials, products, or assemblies. If products are to be tested, the test specimen shall be representative of the product in actual use. The test is limited to exposure of one surface; the options for exposed surface are vertical and horizontal facing up.

1.9.4 At very high specimen heat release rates, it is possible that flaming is observed above the stack, which makes the test invalid.

1.9.5 No general relationship has been established between heat release rate values obtained from horizontally and vertically oriented specimens. Specimens that melt and drip in the vertical orientation shall be tested horizontally.

1.10 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.11 Fire testing involves hazardous materials, operations, and equipment. See Section 6.

1.12 *This standard is used to measure and describe the response or materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself*

[1] This test method is under the jurisdiction of ASTM Committee E05 on Fire Standards and is the direct responsibility of Subcommittee E05.21 on Smoke and Combustion Products.

Current edition approved April 1, 2014. Published May 2014. Originally approved in 1983. Last previous edition approved in 2010 as E906 – 10. DOI: 10.1520/E0906-14.

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