



Standard Test Method for Flammability of a Membrane Switch in Defined Assembly¹

This standard is issued under the fixed designation F2866; 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 covers the determination of the flammability characteristics of a membrane switch.

1.2 This test method defines the MSB rating of a membrane switch. Each character of the MSB rating represents a discrete characteristic of a membrane switch performance under destructive thermal loading.

1.3 This test procedure will be destructive, but should provide an insight into the relative performance flame-resistance characteristics of differing designs or assemblies, or both.

1.4 This test method will focus on the use of convective contact (burner flame) method for ignition, though other methods of ignition are available.

1.5 This test method is designed to determine if the membrane switch assembly will add (or detract) from the flame propagation from an exterior flame/fire source.

1.6 If this test is intended to be used for an internal flammability source then set up the unit under test (UUT) appropriately and note it in the test scope and results.

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.*

2. Referenced Documents

2.1 ASTM Standards:²

E906 Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using a Thermopile Method

¹ This test method is under the jurisdiction of ASTM Committee F01 on Electronics and is the direct responsibility of Subcommittee F01.18 on Membrane Switches.

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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. Terminology

3.1 Definitions:

3.1.1 *burn damage*—percentage of the UUT that is damaged due to burn test. This is a visual observation.

3.1.2 *flame propagation*—refers to patterns in the flame front that are examined (for example, uniform rate of advance, spotty ignition or charring, etc.). These observations are qualitative and should be noted in the data field.

3.1.3 *flame spread rate (FSR)*—the rate at which a flame front travels along the surfaces of tested materials/assemblies, typically measured in mm/s or in./min.

3.1.4 *flame target area*—refers to the normalized target area of a UUT that will be used for ignition location. Any variations should be noted.

3.1.5 *flame time (F_{time}) or flame endurance*—amount of time, usually in seconds, that a self-sustaining flame will endure after removal of initial ignition source before flame on UUT is extinguished.

3.1.6 *flame time of drippings ($F_{time,drip}$)*—amount of time that burning drippings, if any, remain burning. Typically measured in seconds.

3.1.7 *gauze ignition*—this is a verification that UUT ignites the gauze.

3.1.8 *ignition source*—the source that provides the heat-flux to begin the flammability test. This test method will recommend a convective flame for the ignition source, however, care should be taken that any comparative tests should use the same method of ignition.

3.1.9 *mass-loss (m_{loss})*—the mass from a test specimen it lost to smoke, vaporization and char debris carried away or fallen away, or both, during the flammability test cycle. Typically measured in grams (average).

3.1.10 *membrane switch assembly*—the membrane switch should not be tested in its unmounted state. The switch sample should be mounted onto the final end-use enclosure, panel, bezel, or agreed upon material.

3.1.10.1 *Discussion—Assembly Specimen*: This test method is trying to provide a practical world analog for the results herein obtained. As a result, the unit under test (UUT) must in the final mounted condition. The test is able to show flame-resistance in the final assembly as it interacts with the membrane switch's construction.