Designation: F2749 – 15

Standard Test Method for Determining the Effects of Creasing a Membrane Switch or Printed Electronic Device[1]

This standard is issued under the fixed designation F2749; 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 establishes a method for the creasing of any part of a membrane switch or printed electronic device with conductive circuits.

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

1.2 *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. Terminology

2.1 *Definitions:*

2.1.1 *crease*—a ridge or groove made by folding and pressing.

2.1.1.1 *Discussion*—The fold mark in the substrate will be caused by a roller rolled over a fold that will likely remain in the substrate after testing.

2.1.2 *crease cycle*—a 180 degree crease followed by a straightening of the crease (see Fig. 1).

2.1.3 *membrane switch*—a momentary switching device in which at least one contact is on, or made of, a flexible substrate.

2.1.4 *membrane switch tail*—a flexible portion of a membrane switch used for input/output connection.

3. Significance and Use

3.1 Creasing of membrane switches, printed electronic device, or their components can affect their visual appearance, mechanical integrity or electrical functionality. This practice simulates conditions that may be seen during manufacture, installation or use.

3.2 Crease testing may be destructive, therefore any samples tested should be considered unfit for future use.

3.3 Specific areas of testing include, but are not limited to:

3.3.1 Membrane switch flex tails or printed electronic device, and

3.3.2 Any component of a membrane switch or printed electronic device that may be subjected to creasing.

4. Interferences

4.1 The following parameters may affect the results of this test:

4.1.1 temperature,

4.1.2 humidity, and

4.1.3 orientation of the conductor (either extension or compression) could have significant impact on the results.

4.1.4 Inelasticity and parallelism of roller and test bed will affect the displacement of the force across the sample. In other words, the roller and test bed must not be compressible or subject to warping or distortion during the test cycle. Furthermore, the roller must remain parallel to the test bed through the entire test cycle.

NOTE 1—Experience has shown that some conductors recover their conductive properties if allowed to stabilize after the dynamic portion of the test. Therefore, continuous monitoring is necessary.

5. Apparatus

5.1 *Roller,* allowed to rotate smoothly around its longitudinal axis, rigid, low friction smooth surface.

5.1.1 *Roller,* measuring 50.8 mm (2 in.) in diameter, tolerance ±5 %.

5.2 Fixture to hold test sample securely in place in a horizontal manner (refer to Fig. 1).

5.3 Mechanisms capable of providing a constant force and rate of travel to roller.

5.4 Equipment for the continuous monitoring and recording of resistance.

NOTE 2—Experience has shown that some conductors recover their conductive properties if allowed to stabilize after the dynamic portion of the test. Therefore, continuous monitoring is necessary.

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

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