**Designation: F 1680 – ~~96~~02**

# Standard Test Method for Determining Circuit Resistance of a Membrane Switch [1]

This standard is issued under the fixed designation F 1680; 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 circuit resistance of a membrane switch utilizing a predetermined force.

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. Referenced Documents

2.1 *ASTM Standards:*

---

[1] This test method is under the jurisdiction of ASTM Committee ~~F-1~~ F01 on Electronics and is the direct responsibility of Subcommittee F01.18 on Membrane Switches.
Current edition approved ~~Feb. 10, 1996.~~ Jan. 10 2002. Published ~~Ap~~ March 2002. Originally published as F 1680–96. Last previous edition F 1680–96.

D 2240 Test Method for Rubber Property-Durometer Hardness [2]

## 3. Terminology

3.1 *Definitions:*

3.1.1 *circuit resistance*—electrical resistance as measured between two ~~terminations~~ test points whose internal contacts, when held closed, complete a circuit.

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

3.1.3 *test points*—two preselected conductive points in a circuit loop, possibly including a switch.

## 4. Significance and Use

4.1 Resistance is useful to manufacturers and users when designing membrane switch interface circuitry.

## 5. Apparatus

5.1 *Test Probe*, built to either of the configurations shown in Fig. 1 or Fig. 2, are acceptable but must be made of an inert elastomeric material with a hardness number equivalent to A/45 ± 5 as measured in accordance with Test Method D 2240. Test probes that do not meet the above criteria must be specified and recorded fully.

5.2 *Test Surface* to be flat, smooth, unyielding and larger than switch under test.

5.3 *Device*, to hold test probe securely and provide perpendicular movement into and away from switch under test.

5.4 *Resistance Measuring Device*, that is ohm meter. The device should not apply a voltage outside the operating range of the switch contacts.

5.5 *Suitable Device*, to apply a predetermined force on test probe.

## 6. Procedure

6.1 *Pre-Test Setup*:

6.1.1 Secure switch on test surface.

6.1.1.1 Precondition switch by depressing manually 25 times.

6.1.2 Position test probe over desired area of switch.

6.1.3 Lower probe until tip is just above top surface of switch without touching.

6.1.4 Connect switch terminals to resistance measuring device.

6.2 *In-Process Test*:

6.2.1 Depress switch with probe until predetermined force on probe is achieved.

6.2.2 Stop downward movement of test probe.

6.2.3 Record resistance.

6.2.4 Retract test probe to the same position as 6.1.3.

## 7. Report

7.1 Report the following information:

7.1.1 Barometric pressure,

7.1.2 Test probe shape and durometer,

7.1.3 Predetermined force,

7.1.4 Resistance,

[2] *Annual Book of ASTM Standards*, Vol 09.01.

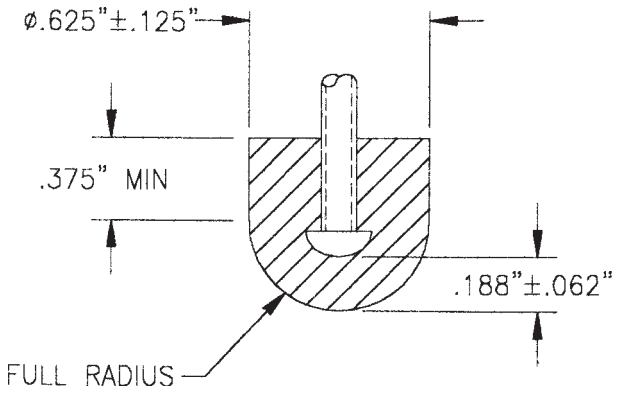


**FIG. 1 Test Probe Option**

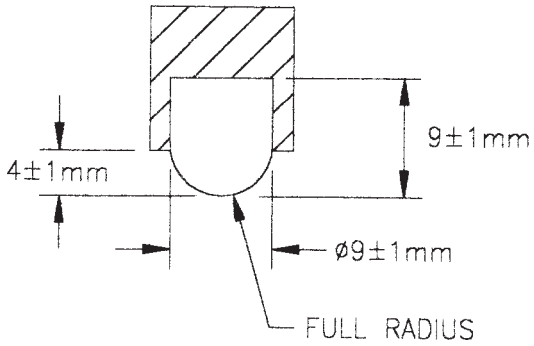


**FIG. 2 Test Probe Option**

7.1.5 Description of probe holding fixture and monitoring device,
7.1.6 Part number or description of switch, or both,
7.1.7 Identify termination points, and
7.1.8 Date of test.

## 8. Precision and Bias

8.1 The precision and bias of this test method are under investigation.
8.2 Repeated testing will improve precision.

## 9. Keywords

9.1 membrane switch; resistance