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Standard Practice for Exposing a Membrane Switch to Variation in Atmospheric Pressure [1]

This standard is issued under the fixed designation F 1762; 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 practice covers a procedure for exposing a membrane switch to variations in atmospheric pressure. It can be used to determine the effects of pressure variations on chemical and mechanical properties and functional characteristics of the switch.

2. ~~Referenced Documents~~

~~2.1*ASTM Standards:*~~
~~F 1570Test Method for Determining the Tactile Ratio of a Membrane Switch~~
~~F 1597Test Method for Determining the Actuation Force and Contact Force of a Membrane Switch~~

~~3.~~Terminology

~~3.1*Definitions:*~~
~~3.1.1~~
2.1 *Definitions:*
2.1.1 *circuit resistance*—electrical resistance as measured between two test points whose internal contacts, when held closed, complete a circuit.
~~3.1.2~~
2.1.2 *contact closure*—the event at which a specified resistance is achieved on a membrane switch.
~~3.1.3~~
2.1.3 *membrane switch*—a momentary switching device in which at least one contact is on, or made of, a flexible substrate.
~~3.1.4~~
2.1.4 *specified resistance*—the maximum allowable circuit resistance as measured between two test points whose internal contacts, when held closed, complete a circuit.
~~3.1.5~~
2.1.5 *test points*—two preselected conductive points in a circuit loop, possibly including a switch.

~~4.~~

3. Significance and Use

~~4~~3.1 Erratic operation or malfunction of a membrane switch resulting from changes in the specified switch characteristics,
~~4~~3.2 Rupture, implosion or explosion of seals due to pressure variations,
~~4~~3.3 Change in physical or chemical properties due to pressure differentiations, and
~~4~~3.4 Delaminations of a membrane switch may occur due to pressure variations.

~~5.~~4. Interferences

~~5.1Time~~4.1 Time duration before, during and after pressure cycling,
~~5~~4.2 Temperature,
~~5~~4.3 Humidity,
~~5~~4.4 Mounting Method (if applicable).

~~6.~~5. Apparatus

~~6.1~~

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5.1 *Pressure Chamber*, a chamber or cabinet capable of maintaining a specified pressure. If procedurally required, the apparatus shall be capable of providing pressure variation at a specified rate.

~~6.2~~

5.2 *Monitoring Device*, suitable to detect contact closure (that is, ohm meter, etc.).

~~7.~~

6. Conditioning

~~7~~6.1 Condition all specimens for 72 h at ambient laboratory conditions immediately prior to exposure, or prior to pressure cycling. This is to enable the specimens to stabilize.

~~8.~~7. Procedure

~~8.1~~

7.1 *Pretest Setup*:

~~8.1.1~~

7.1.1 Measure or observe the desired characteristics of the switch so that comparable measurements and observations can be made during or after the test.

~~8~~7.1.1.1 Document the setup, test equipment, and mounting procedure (if applicable) used to measure the characteristics.

~~8~~7.1.2 Connect predetermined switch terminations to contact closure measuring device.

~~8.2~~7.2 *In-Process Test*:

~~8~~7.2.1 Place specimens in the chamber at ambient conditions, record time and date, and initiate contact closure monitoring device.

~~8~~7.2.2 Adjust the ramp rate to decrease air pressure at 2000 ft/min unless otherwise specified.

~~8.2.3Set~~7.2.3 Set pressure as specified.

~~8~~7.2.4 Maintain the chamber pressure for the specified time interval.

~~8~~7.2.5 Return chamber pressure to the initial ambient conditions at the specified rate.

~~8~~7.2.6 Remove specimens and record time and date.

~~8.3~~7.3 *Post Test*:

~~8~~7.3.1 Measure and observe the characteristics of the switch as in ~~8.1.1~~7.1.1. Record time and date for each characteristic measured.

~~8.4For determining the tactile ratio of a membrane switch, test in accordance with Test Method F 1570.~~

~~8.5For detemining the actuation force and contact force of a membrane switch, test in accordance with Test Method F 1597.~~

~~9.~~

8. Precision and Bias

~~9.1The~~8.1 The precision and bias of this test are under investigation.

~~10.~~9. Keywords

~~10.1contact~~9.1 contact closure; delamination; membrane switch