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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Practice for Exposing a Membrane Switch to Variation in Atmospheric Pressure[1]

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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 1570 Test Method for Determining the Tactile Ratio of a Membrane Switch[2]

F 1597 Test Method for Determining the Actuation Force and Contact Force of a Membrane Switch[2]

3. Terminology

3.1 *Definitions:*

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

3.1.2 *contact closure*—the point at which a specified resistance is achieved.

3.1.3 *specified resistance*—the maximum allowable resistance as a measure between two terminations whose internal switch contacts complete a circuit when held closed.

4. Significance and Use

4.1 Erratic operation or malfunction of a membrane switch resulting from changes in the specified switch characteristics,

4.2 Rupture, implosion or explosion of seals due to pressure variations,

4.3 Change in physical or chemical properties due to pressure differentiations, and

4.4 Delaminations of a membrane switch may occur due to pressure variations.

5. Interferences

5.1 Time duration before, during and after pressure cycling,

5.2 Temperature,

5.3 Humidity,

5.4 Mounting Method (if applicable).

6. Apparatus

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

7. Conditioning

7.1 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. Procedure

8.1 *Pretest Setup*:

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

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

8.1.2 Connect predetermined switch terminations to contact closure measuring device.

8.2 *In-Process Test*:

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

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

8.2.3 Set pressure as specified.

8.2.4 Maintain the chamber pressure for the specified time interval.

8.2.5 Return chamber pressure to the initial ambient conditions at the specified rate.

8.2.6 Remove specimens and record time and date.

8.3 *Post Test*:

8.3.1 Measure and observe the characteristics of the switch as in 8.1.1. Record time and date for each characteristic measured.

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

8.5 For detemining the actuation force and contact force of

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[2] *Annual Book of ASTM Standards*, Vol 10.05.

a membrane switch, test in accordance with Test Method F 1597.

9. Precision and Bias

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

10. Keywords

10.1 contact closure; delamination; membrane switch