



## Standard Test Method for Determining the Tactile Ratio of a Membrane Switch <sup>1</sup>

This standard is issued under the fixed designation F 1570; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope

1.1 This test method covers the determination of the tactile response of a membrane switch as defined by tactile ratio.

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 *contact closure (make)*—point at which specified resistance is achieved.

2.1.2 *contact force*—force at contact closure.

2.1.2.1 *Discussion*—ideal value for  $F_{min}$

2.1.3 *displacement*—distance traveled by the surface in contact with the test probe.

2.1.4  $F_{max}$  (*actuation force*)—maximum force measured prior to or including point at which contact closure ( $F_{min}$ ) is achieved (see Fig. 1 and Fig. 2).

2.1.5  $F_{min}$ —minimum force seen between  $F_{max}$  and point at which probe movement ceases.

2.1.5.1 *Discussion*— $F_{max}$  can equal  $F_{min}$ .

$F_{min}$  is ideal location for contact closure.

2.1.6 *force-displacement curve*—relationship between force applied and displacement of a membrane switch.

2.1.6.1 *Discussion*—Usually expressed as a line graph (see Fig. 1 and Fig. 2).

2.1.7 *non-tactile switch*—a switch assembly that has a tactile ratio equal to zero.

2.1.8 *specified resistance*—maximum allowable resistance as measured between two terminations whose internal switch contacts, when held closed, complete a circuit.

2.1.9 *tactile ratio*—a measure of tactile response (see Eq 6.2).

2.1.10 *tactile response*—a sudden collapse or snapback of a membrane switch prior to contact closure or after contact opening.

2.1.10.1 *Discussion*—The amount of tactile response is determined by the equation shown in 6.2.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee F-1 on Electronics and is the direct responsibility of Subcommittee F01.18 on Membrane Switches.

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### TYPICAL TACTILE FORCE-DISPLACEMENT CURVE

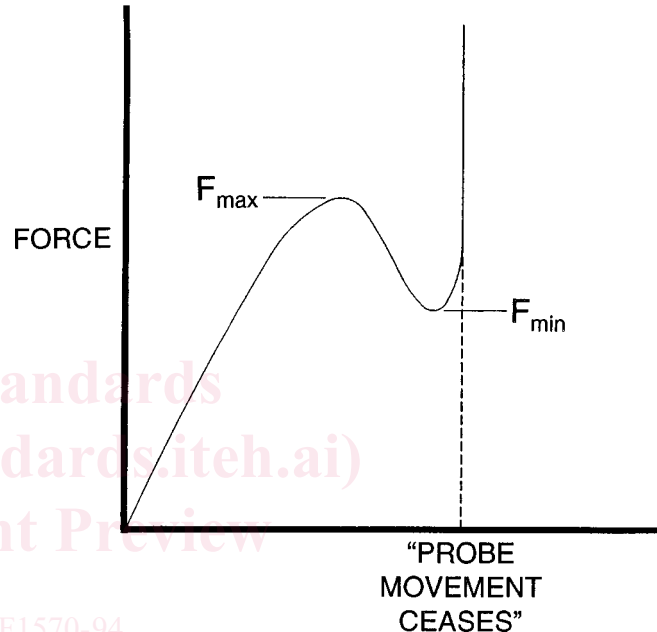


FIG. 1 Typical Tactile Force-Displacement Curve

2.1.11 *tactile switch*—a switch assembly that provides a tactile ratio greater than zero.

### 3. Significance and Use

3.1 The tactile ratio is useful in quantifying the feel of a membrane switch. Factors other than tactile ratio may affect the “feel” of a tactile switch.

3.2 Always report the tactile ratio as a function of measured  $F_{max}$ . This is important because it is possible to have the same tactile ratio for different values of  $F_{max}$ .

### 4. Apparatus

4.1 *Test Probe*, made of nonelastic material with shape and size to be specified.

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

4.3 *Monitoring Device*, suitable to detect  $F_{max}$  and  $F_{min}$ .

4.4 *Test Surface*, flat, smooth, unyielding, and larger than switch under test.