

Elastomer keypad

This quick reference sheet will help our clients make choices that will ensure the parts they specify meet performance requirements and can be manufactured reliably and cost effectively.

Durometer:

the hardness of all keytops (switches) on the keypad and the hardness of the base material (unless keypad is a dual durometer keypad). The higher the durometer of the keytop or base material, the harder the material.

Dual Durometer:

describes a method of molding a higher durometer keytop onto a lower durometer base material.

Keytop:

the top surface of the switch that is the direct interface with the user.

Actuation Web:

the non-conductive "hinge", "cushion" or "membrane" creates tactile and stroke possible for each switch on the keypad.

Actuation Force:

the maximum force required to begin the switch stroke, and flex the actuation web for each switch on the keypad.

Contact Force:

the force a switch typically realizes when contact is made with the printed circuit board.

Stroke/Travel:

the distance from bottom of the conductive pill (contact) to the top surface of the printed circuit board.

Base:

the sheet material that forms the "apron" for all switches on the keypad. The base of the keypad ties or connects all switches on the keypad together.

Conductive Pill:

the current carrying contact (silicone rubber impregnated with amorphous carbon) under each keytop that completes electrical connection with the printed circuit board when the keytop (switch) is actuated.

Air Channel:

air path from switch to switch allowing keytops to return to normal position after actuation and avoid suction effect. Switches are normally vented on at least two (2) sides by air channels.

Bezel

the faceplate (typically made of plastic or metal) that "egg crates" all switches on the rubber keypad and typically covers the base material of the keypad so that it cannot be touched with human hands.



Physical Characteristics:

UL Flammability Rating	94HB
Specific Gravity at 25 °C	1.1 - 1.4
Durometer (Shore A)	40 - 80 +/- 5 (Typical = 60+/-5)
Tensile Strength (Kg/cm ²)	55 - 75
Compression Set %	11 - 22
Insulation Breakdown	26k V/mm
Volume Resistivity	3x10 to 14 th power – 10 to 15 th power

Mechanical Characteristics:

Key Stroke	0.25 - 5.0 mm
Actuation Force	20 - 350 grams
Operating Life	1 million actuations (typical)
Operating Temperature	-30 - +180°C
Storage Temperature	-42 -+250°C

Electrical Characteristics:

Contact Resistance	<200 Ohms
Insulation Resistance @ 500VDC	>100 Ohms
Contact Bounce	<12 msec
Contact Rating	30 mA @ 12V DC .5 sec.
Dielectric Strength	>1 min. @ 500V RMS

Dimensional Tolerances:

Great care should be exercised when a keypad is designed using silicone rubber because it is a highly elastic material subject to manufacturing variations. Tolerances for silicone rubber, by nature, need to be considerably larger than those for less-elastic materials because silicone tolerances are affected by variances in shrink rates, molding conditions and material compounds.

Dimension mm (inches)	Tolerance (+/-) mm (inches)
0.0 - 10.0 · 0.000 - 0.394	0.10 mm · 0.004
10.1 - 20.0 · 0.397 - 0.787	0.15 mm · 0.006
20.1 - 30.0 · 0.791 - 1.181	0.20 mm · 0.008
30.1 - 40.0 · 1.185 - 1.574	0.25 mm · 0.010
40.1 - 50.0 · 1.578 - 1.968	0.30 mm · 0.012
50.1 - 100.0 · 1.972 - 3.937	0.35 mm · 0.014
100.1 and up · 3.94 and up	0.5%

