

What Makes A Device Rugged?

It's more than just an IP rating and drop test

Ingress Protection



Dust (1st number)

- 0 No protection
- 1 Protected against objects > 50mm (hands)
- 2 Protected against objects > 12mm (fingers)
- 3 Protected against objects > 2.5mm (tools/wires)
- 4 Protected against objects > 1mm (small tools)
- 5 Protected against dust, limited ingress
- 6 Totally protected against dust



Liquids (2nd number)

- 0 No protection
- 1 Protection against dripping water or condensation
- 2 Protection against water spray 15 degree from vertical
- 3 Protection against water spray 60 degree from vertical
- 4 Protection against water spray from all directions
- 5 Protection against low pressure jets of water
- 6 Protected strong jets of water
- 7 Protection against the effects of immersion (6 inches to 3.3 feet)
- 8 Protection against long periods of immersion under pressure

Drop & Shock Resistance

Ensure your customers have confidence that their device is capable of performing in the harshest conditions.



Hard drive disk failures and broken displays are common if a handheld, laptop or tablet is dropped. Rugged devices are designed to absorb and resist impacts from up to 3m.

Temperature Tolerance



Temperature tests are conducted to ensure rugged devices are capable of surviving extreme and sudden temperature changes.

Up to -20°C to 60°C

Humidity Resistance

Moisture can cause physical and chemical deterioration of hardware including corrosion and biologic growth, changes in hardware properties due to moisture penetration, and electrical or mechanical performance issues due to condensation.



Rugged devices go through rigid humidity testing to ensure performance is maintained even in highly humid conditions.

Vibration Resistance

Vibration testing is performed on rugged devices to ensure they remain operational despite enduring high vibration levels.

If they cannot, vibrations can cause:

- Wire chafing
- Loosening of fasteners
- Intermittent electrical contacts
- Touching and shorting of electrical parts
- Seal deformation
- Component fatigue
- Display / Touch Panel misalignment
- Cracking and rupturing
- Excessive electrical noise



Particle Resistance

Operating out in the field leaves your customers and their devices exposed to the elements. Dust and dirt have a tendency of finding their way into all exposed areas of mobile computers. This can lead to potential problems with the functionality of the keyboard and other components, slowing productivity and efficiency.



Rugged devices are put through MIL-STD-810G resistance testing against dust and sand infiltration to protect the device.

Pressure Resistance

Pressure testing is completed to ensure devices used in military and civilian aircraft, and emergency service helicopters can operate whilst being exposed to the varying effects of atmospheric pressure.

Business rugged models need to be resistant to crushing in crowded commuter trains and able to withstand heavy objects placed on them accidentally.

