



Rugged Devices Explained

Date: 12th June 2009

Website: <http://www.ruggedandmobile.com>

Learn with us blog: <http://blog.ruggedandmobile.com>

Innovation Twitter: <http://www.twitter.com/ruggedandmobile>

Facebook group: <http://www.facebook.com/ruggedandmobile>

Our forum: <http://forum.ruggedandmobile.com>

About Rugged and Mobile

What do we do?

Rugged and Mobile develops mobile, data and web solutions, delivering into the rugged, enterprise and consumer mobile markets. Offering end to end solutions our services include:

- Hardware reselling of rugged and mobile devices, selling anything from barcode readers to Windows mobile phones and supporting them.
- Bespoke software consultancy, delivering tailored software and project management into businesses. We deliver both Microsoft and Apple iPhone solutions.
- SOA/SaaS solutions, serving businesses and individual customers with new, exciting and flexible mobile services.

Our Culture

Rugged and Mobile is a newly founded company. We understand how to run a tech company right and how to treat the people within it. We work hard, we play hard and mostly the two are the same thing!

Company Vision

We want to become the leading UK provider of mobile solutions. We intend to do this by keeping at the forefront of mobile and data capture technologies, by providing excellent service to our customers and by employing the right people who can help deliver our vision.

Ruggedness explained - an introduction

Rugged and mobile, as the name suggests, sells rugged data capture equipment and a lot of customers come to us with their own idea as to what the term “rugged” actually means. What I’m going to talk about in this article are all the different aspects that make a device truly rugged.

Essentially there are 3 main facets to a device ruggedness:

- IP Rating
- Impact Protection
- Other considerations

IP Rating

IP or “Ingress Protection” is an internationally recognised classification system (EN60529), demonstrating how well sealed enclosures of electrical equipment are against foreign bodies. In layman’s terms it’s a measure of how dust and water proof a device is. IP ratings always come with 2 numbers, “IP54” for example.

The 1st digit indicates the degree of protection against solid objects and due to the range of equipment types IP ratings cover this can measure things as large as people’s hands or fingers (deliberate access) to smaller objects such as dust, which are more appropriate to the kind of devices we sell at Rugged and mobile.

The 2nd digit indicates the degree of protection against harmful entry of various forms of moisture covering anything from water drips, to spray, to total immersion in water.

Let’s look at the official table of IP ratings below:

0	No protection
1	Protection from large surface of the body such as a hand, (deliberate access not covered). Solids objects > 50mm in diameter.
2	Protection against fingers or other < 12.5mm in diameter.
3	Protection from using tools, wires, etc. with a diameter > 2.5mm.
4	Protection from solid objects with a diameter > 1.0mm.
5	Not fully dustproof, protection from dust that would interfere with operation of device.
6	Dust tight.

Table 1 - 1st IP Digit, dust protection

0	No protection
1	Protection from dripping water (Vertical drops)
2	Protection from vertically dripping water at 15 degrees from normal position.
3	Protection from water sprayed up to 60 degrees from normal position.
4	Protection from splashing water from any direction.
5	Protection from water projected by a nozzle from any direction.
6	Protection against powerful jets of water from any direction.
7	Protection against immersion < 1m.
8	Protection against complete, continuous submersion in water > 1m (see manufacturer specification).

Table 2 - 2nd IP Digit, water resistance

IP examples

So, for example an outdoor plug socket could have an IP rating of IP22, which means it cannot be accessed by bodies 12.5mm in size and it will have a degree of resistance to dripping water if tilted away by 15 degrees.

At the other end of the scale you can get underwater equipment that is IP68 rated which means it is totally protected against dust penetration and is also able to work totally and continually immersed under at least 1m of water.

Typical Rugged device IP ratings.

Rugged PDA's and Barcode readers are typically IP rated between IP30 and IP67. We are seeing a trend now towards newer devices being IP67 where typically they have been IP54 in the past.

IP rating is an industry standard rating. Manufacturers have to work hard to register their devices and it is a reliable, if not slightly arbitrary at times, measure. So if you want a device that's dust and waterproof to some degree look for the IP rating. We rate all our devices on our website under the features tab on the product page. You can also search our site for specific IP rated devices.

Impact Protection

Being dust and water proof and having a good IP rating is a good start but there is more you need to consider. A truly rugged device also needs to withstand a certain amount of impact or shock when dropped.

Impact protection gets a little bit trickier and there are various standards that have been imposed and dropped and depending which country you are operating in there are adopted standards. Here in the UK however there are currently 2 ways you can get an idea of how impact resistant a device is with one dropped standard I discuss first.

IP 3rd number

Originally there was a 3rd number to the IP rating which to the best of my knowledge was adopted by the IP standard but then later dropped. The rating went from 0 to 6 but what I do know is that I can't remember the last time I saw this rating used on the kind of devices we sell!

So for example an IP676 device would be fully dustproof, be able to be immersed in up to 1m of water and would be protected against a 5KG weight dropped onto it from 40cm.

IK Rating

This is a current standard, however again I rarely see it used myself and to be honest it doesn't really help at all when buying the kind of rugged devices we sell.

I'm not sure if both of the above methods would tell us much about the toughness of the device anyway but there is a more reliable measure that is commonly used today.

Drop Specification

A useful measure of impact, and one that most manufacturers have adopted, is known as drop testing that results in a drop specification for the device. It is important to mention here that there is actually no adopted industry standard when it comes to drop specs and some manufacturers are a little more open than others about how they test but most do test by dropping the device onto hard concrete from a height. This is a much more realistic way of testing. I have heard of some manufacturers drop testing onto hard rubber, carpet or other surfaces but the main ones do state the test conditions in the device specification.

Drop spec's are rated in metres or feet and typically range from 0.9 to 2.1 metres for the kind of devices we sell at Rugged and mobile.

So a good IP rating does not necessarily mean you can drop a device which I feel is often overlooked when choosing the right rugged hardware. However it is rare to find a highly IP rated device that doesn't also have a decent drop specification.

Other considerations

I want to add some experience of other things you can look out for that can help make a device more rugged or not.

Protruding parts

Take a look at the device itself. If it's a PDA, does it have a protruding aerial? The device might be able to withstand a drop of 6 feet but what if it lands on the aerial? There are more and more devices that now have built in, non protruding aerials so this isn't the issue it used to be and popular devices such as the Motorola MC70 have a pretty fat, stubby tough aerial that I personally know withstands drops well. However there are cheaper devices out there that have pathetic little weak aerials that are very susceptible to this sort of damage.

Also we see a lot 3rd party or snap-on modules, especially RFID scanners that are susceptible to drops, so look out for that too. You may buy a great device only a year later to find the snap-ons are just not going to work for you.

Screen

As with the aerial, a PDA can also do a lot more to protect its screen. Again a device might have a good drop spec but with the best will in the world you can't expect to drop a device onto its screen and expect it to survive. Look for how well the screen is recessed as this helps protect it if dropped. Does the device fall naturally on its end or back so that it keeps the weaker parts away from any impact? And let's not forget that the screen itself is subject to scratching and pressure from the stylus (or the inevitable steel pen!) and dirty gritty gloves or hands. Add this abuse up over 12 months and the device could be unusable.

Cables

If it's a barcode scanner then look at the cable. What happens if it's pulled too hard? Is the cable secured well inside the unit? Does the cable detach in the event of over stretching and is the cable itself protected from abuse?

Medical treatments

Not necessarily “Rugged” but some devices are better suited for laboratory or medical use where the cleanliness of the device is critical. Is it coated so that it is easy to keep clean and what restrictions do you have when cleaning the device of harmful substances?

Temperature

Definitely a measure of ruggedness to some. If temperature is critical to your environment then you need to look at the operating temperatures of the devices as they do differ. Some do go lower and higher than others.

Accessories

Lastly accessories that can help protect the device further are especially useful if you’re using it in a truly rugged environment. Zebra do a range of covers for their printers that increase the IP rating for the device and the HTC P6500 has a great case that turns it from a non IP rated device into a rugged one. Screen protectors, cables, cases, cradles etc can all help to either protect the device or prevent a working practise that puts the life of the devices at risk and you should always try and understand how the devices will be used and how an accessory could help extend the life of it.

So that’s it. I really made myself think when I first went through all this but then quickly realised these are all very real problems I see companies come up against almost on a daily basis. If you consider them now, you’ll save time and money later.

