

Rugged Two-Way Radios: IP Ratings and Durability for Dusty, Hot and Wet Sites

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A radio that works in the office can fail on a construction site. Dust, sand, rain, washdown, drops and heat are what kill radios in the field, and the specification sheet answers them with codes such as IP54, IP67 and MIL-STD-810. Knowing what those codes do and do not promise saves you from buying too little protection, or paying for more than the job needs.

This guide explains the codes in plain terms and shows which level of protection suits different sites.

The short answer. For hotels, offices and retail, IP54 is usually enough. For warehouses and plants with dust and light spray, IP54 or IP55 is a sensible minimum. For construction, ports and open-air work in dust, sand and rain, choose IP67. If radios are regularly hosed down, look for IP66 as well as IP67.

How to Read an IP Code

The IP (ingress protection) code comes from the IEC 60529 standard. It has two digits. The first rates protection against solid objects and dust, and the second rates protection against water.

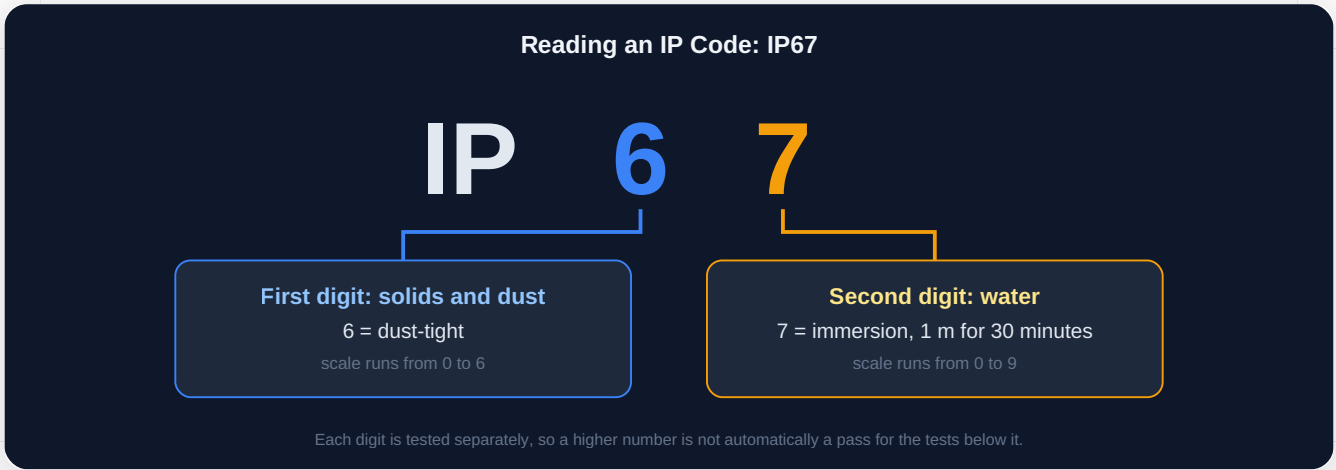


Figure 1 — An IP67 radio is dust-tight and survives temporary immersion up to 1 m for 30 minutes.

Code	Dust	Water
IP54	Dust protected, with limited ingress	Splashing water
IP55	Dust protected, with limited ingress	Water jets
IP66	Dust-tight	Powerful water jets
IP67	Dust-tight	Immersion up to 1 m for 30 minutes
IP68	Dust-tight	Continuous immersion, to the depth and time the manufacturer states

IP67 does not automatically include IP66. Jets and immersion are different tests. A radio can pass one without being tested for the other, and some are rated for both, for example IP66/IP67. If radios are hosed down, check for both.

What IP Ratings Do Not Cover

- **Drops and shock**, which are tested separately.
- **Heat and cold**. Check the operating and storage temperature range on the datasheet.
- **Sun, salt and chemicals**, which age plastics, seals and screens.

- **Seal wear.** The rating applies to a new radio with the right battery and covers fitted. Gaskets age and knocks can damage them.

MIL-STD-810: What It Means

MIL-STD-810 is a US military standard that defines environmental test methods, such as vibration, shock, temperature, humidity, dust and salt fog. A radio that “meets MIL-STD-810” has been tested to some of those methods, not all of them, and not as a simple pass mark for being unbreakable. Look at which methods the manufacturer lists and whether they match your conditions.

Which Protection for Which Site

Suggested Minimum Protection by Site (Guide)		
Hotels, offices, retail	IP54	Indoor, occasional splashes
Warehouses, plants	IP54 to IP55	Dust and light spray
Construction, ports, outdoors	IP67	Rain, dust, sand, rinsing
Regular hose-down areas	IP66 + IP67	Hoses and pressure jets

A guide, not a rule. Check the actual conditions on your site and the radio's datasheet.

Figure 2 — Match protection to the site. Paying for more than you need adds cost, and buying less costs repairs.

Practical Tips for Dust, Sand and Heat

- **Fit the accessory cover** whenever a speaker microphone or earpiece is unplugged. An open audio connector is the usual way dust and water get in, and the IP rating no longer applies.
- **Rinse and dry radios** after sandy or wet work, and keep connectors and gaskets clean.
- **Keep them out of the sun and hot vehicles.** Heat shortens battery life, as we explain in our guide to [batteries and accessories](#).
- **Use genuine batteries.** A poor-fitting third-party pack can compromise the seal.
- **Check gaskets and seals** during routine maintenance and replace them when they look worn.

Hazardous areas are a different requirement. Where flammable gas or dust may be present, radios must be certified for that purpose, for example under ATEX or IECEx. An IP rating does not replace that certification.

To compare radio brands, see our [Motorola vs Kenwood vs ICOM guide](#), and browse the [portable radio range](#).

Frequently Asked Questions

+ What does IP67 mean on a two-way radio?

It means the radio is dust-tight and has passed a test of temporary immersion in water up to 1 m for 30 minutes, when it is in good condition with the right battery and covers fitted.

+ Is IP68 better than IP67?

IP68 means continuous immersion, but the depth and time are set by the manufacturer, so the conditions differ between products. Read the stated test conditions rather than assuming one is simply better.

+ Does MIL-STD-810 mean a radio is unbreakable?

No. It is a set of test methods. A radio is tested to specific methods, such as vibration or dust, and the datasheet should say which ones.

+ Do I need a rugged radio for a hotel or office?

Usually not. IP54 is generally adequate for indoor use with occasional splashes. Save the extra cost of IP67 for sites that really need it.

Two-Way Radios Built for Your Site

Bravosatcom supplies two-way radios from Motorola, ICOM and Kenwood, with the batteries and accessories to keep them working.

