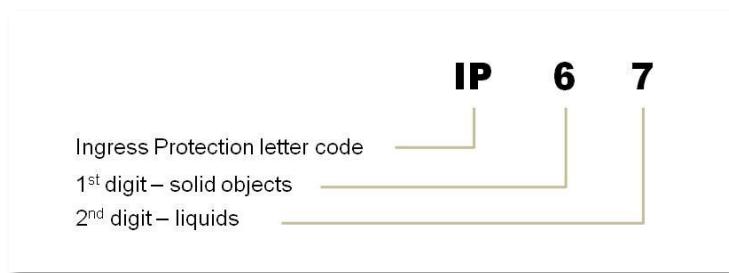


Ingress Protection Ratings (IP Codes)

By: Wolfgang Damm, Director Product Marketing, Wireless Telecom Group

Electrical equipment can be damaged if unwanted objects or particles ingress into it; liquid ingress is as damaging. Many products have to function under challenging circumstances; a cellular tower would be just one example of a system facing tough weather conditions. Even more important than malfunctioning equipment is the safety of the operator or people in close proximity. Protecting people and protecting the equipment are interestingly closely tight together. Ingress Protection ratings combine exactly this. Standards for ingress protection are:

- BS EN 60529 Specification of Degrees of Protection Provided by Enclosures
- IEC 529 Specification of Degrees of Protection Provided by Enclosures



Both offer a numerical code that classifies the degree of protection. The characters "IP" followed by two digits distinguish products that are Ingress Protection rated. The first digit specifies the protection against solid objects, the second on

against liquids. Figure 1 shows an Example of an IP67 rated product. This product is dust tight ("6") and protected against immersion at 1 meter depth for 30 minutes ("7").

Many Microlab telecommunication components are available as high IP rated products up to IP67. They are well suited for most demanding outdoor applications. Please refer to the datasheets and look for Environmental specifications, contact one of our global support offices or consult your next international sales representatives for further information on Ingress Protection.

Impedance:	50Ω nominal
PIM (Intermod):	<-150 dBc (+43dBm) <-160 dBc typical
Peak Power:	3 kW
Environment:	-35° to +75°C*, IP67
Finish:	RoHS Compliant
Body:	Passivated aluminum
Connectors:	Triplate, N Optional brackets or tapped holes



Division of Wireless Telecom Group, Inc.

25 Eastmans Road
Parsippany, NJ 07054, USA

The numbering code in the following table shows which protection is offered.

Ingress Protection Rating			
First Number Solids	Protection Provided	Second Number Liquids	Protection Provided
0	No Protection	0	No Protection
1	Protected against solid objects up to 50mm e.g. accidental touch by hands	1	Protected against vertically falling drops of water e.g. condensation, dripping water. Test duration 10 mins.
2	Protected against solid objects up to 12mm e.g. fingers	2	Protected against direct sprays of water up to 15 deg from the normal position. Test duration 10 mins.
3	Protected against solid objects over 2.5mm e.g. tools, screws	3	Protected against direct sprays of water up to 60 deg from the vertical. Test duration 5 mins.
4	Protected against solid objects over 1mm e.g. wires	4	Protected against water sprayed from all directions - limited ingress permitted. Test duration 5 mins.
5	Protected against dust - limited ingress permitted but no harmful deposits allowed. Full protection against human contact	5	Protected against low-pressure jets of water (6.3mm nozzle) from all directions. Limited ingress is permitted. Test duration 3 mins.
6	Dust tight - totally protected against dust. Complete protection against human contact	6	Protected against strong jets of water (e.g. for use on ship decks) - limited ingress permitted. Test duration 3 mins.
		7	Protected against the effects of immersion at a depth of 1 m, Test duration 30 mins.
		8	Protected against long periods of immersion under pressure (beyond 1m) – depth specified by the manufacturer. Test duration: continuous.