# Water & Dust Proofing IP Ratings

**References:** DSM&T http://www.dsmt.com/resources/ip-rating-chart/ 2016 .

Wikipedia https://en.wikipedia.org/wiki/IP_Code 2016

I learnt something new the other day which I thought may be of interest to you. Have you ever wondered about the IP rating system for equipment like driving lights, winches, hand held radios or whatever? For example you often see something rated at IP65 or IP68. What does this mean? Well …. The following is a simplified summary.

The **IP** stands for **Ingress Protection** from dust and water. Technically it is an international standard or rating (IEC Standard 60529 / EN 60529) to provide users more detailed information than vague marketing terms such as *waterproof*. It classifies the degrees of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact, and water in electrical enclosures.

The **first number** is a rating (0 to 6) for solid object (eg dust) protection.

The **second number** is a rating (0 – 8) for protection against liquids.

The ratings are:

**IP first number: Protection against solid objects**

| | |
|---|---|
| 0 | No protection against contact and ingress of objects |
| 1 | Protected against solid objects over 50 mm e.g. accidental touch by a person's hands |
| 2 | Protected against solid objects over 12 mm e.g. a person's fingers |
| 3 | Protected against solid objects over 2.5 mm e.g. tools and wires |
| 4 | Protected against solids objects over 1 mm e.g. tools, screws, wires |
| 5 | Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment; complete protection against contact |
| 6 | Totally protected against dust and contact |

**IP second number: Protection against liquids**

| | |
|---|---|
| 0 | No protection |
| 1 | Protected against vertically falling drops of liquid e.g. dripping water, condensation |
| 2 | Vertically dripping water shall have no harmful effect when the enclosure is tilted at an angle up to 15° from its normal position. |
| 3 | Water falling as a spray at any angle up to 60° from the vertical shall have no harmful effect. |
| 4 | Water splashing against the enclosure from any direction shall have no harmful effect. |
| 5 | Low pressure jets of water from all directions shall have no harmful effects. |
| 6 | Water projected in powerful jets (12.5mm nozzle) against the enclosure from any direction shall have no harmful effects. |
| 7 | No harmful ingress of water when immersed up to 1 m. |
| 8 | The equipment is suitable for continuous immersion in water under conditions which shall be specified by the manufacturer. Normally, this will mean that the equipment is hermetically sealed. However, with certain types of equipment, it can mean that water can enter but only in such a manner that it produces no harmful effects. |

I hope this has been useful. *John Kent Training Co-ordinator*