

IP Rating Reference for Cable Assemblies

Ref IP-REF-01 | What IP65 to IP69K test, and what no rating covers | Last updated 15 September 2026

Two digits, two separate tests

An IP marking is two independent numbers defined in IEC 60529. The first covers solids - dust, and contact by fingers, tools or wire. The second covers liquids. The digits are read independently: a 6 on the first digit says nothing at all about water.

The rating applies to the enclosure **in the mated state**, assembled and tightened as the manufacturer specifies. A plug lying on a bench carries no rating.

Second digit - liquids

Digit	What the test is	What it is good for	What you must also state
5	Water jets from a nozzle, low pressure	Rain, splash, a hose at end of shift	Mated, and torque
6	Powerful water jets	Deck wash, weather exposure on machinery	Mated, and torque
7	Temporary immersion under stated conditions	A puddle at the base of the frame, brief dunking	Depth and duration
8	Continuous immersion under conditions the manufacturer states	Submerged pumps, below-grade boxes, flooded pits	Depth, duration, water chemistry
9K	Close-range high-pressure, high-temperature spray from several angles	Documented washdown and clean-in-place cycles	Pressure, temperature, nozzle distance, detergent

The 9K mark comes from ISO 20653 and DIN 40050-9 for road vehicles; IEC 60529 lists the same high-pressure, high-temperature jet test. Suppliers quote both forms, so ask which standard the test report actually cites.

First digit - solids

Digit	What it means
5	Dust-protected. Ingress is not fully prevented but does not interfere with operation.
6	Dust-tight under the defined test.

IP69K is not IP68 plus one

This is the mistake that costs the most. IP68 and IP69K are different load cases, run on different equipment. IP68 is hydrostatic pressure over hours; IP69K is jet impact plus heat plus detergent. An enclosure tuned to deflect a hot jet is not automatically the one you want sitting under water for a month. And a part marked IP68 is not automatically compliant with IP67 - the 8 is assessed against the conditions the manufacturer states, not against the IP67 test. If a part has to survive both a dunk and a long soak, ask for both marks in writing.

What no IP rating covers

Exposure	Why the digits do not help	The real answer
Cutting oil, coolant, caustic cleaner, solvent	The digits are about water and dust, not chemical compatibility	Name the chemicals on the drawing
Sunlight and weathering	UV degrades jackets and plastic coupling nuts	Specify a UV-stable compound
Hot wash then cold rinse	Thermal cycling works the seal mechanically	Ask for a cycle count, not a rating
Drag chain and continuous flex	Movement loads the strain relief, not the seal	Construction: stranding, jacket, strain relief geometry
Condensation inside a sealed box	Humid air breathes in and out of any sealed enclosure	Vent, breather or potted joint

Exposure	Why the digits do not help	The real answer
Unmated connectors	Every rating applies mated and correctly torqued	Cap it, or specify a mating cap

A seal is a system, not a connector specification

An assembly seals in four places: the face gasket between the halves, the coupling nut and its thread, the cable-to-overmold interface, and the panel interface where there is a bulkhead. A connector datasheet normally covers only the first two, tested in isolation. The last two are where assemblies weep. Cable outer diameter is the usual culprit - an overmold seals against a stated OD range, and a jacket outside that range is a compromised seal before the part ships. Torque is the second: under-tightened weeps, over-tightened deforms the gasket.

Turning this into a drawing line

Every row in this sheet is only useful once it is written down. The drawings we can quote fastest name the ingress rating and the conditions behind it along with the mating part, the length and the quantity, and say where a value is mandatory rather than preferred. Where a number is not yet known, write the operating condition instead - the detergent, the depth, the cycle count, the chemical - and we will work back from it.

What we need from you	What you get back
A drawing, sketch or photo of the mating part	A quoted assembly, built to the drawing you send
Length, quantity and the standard you are tested to	Continuity and pinout verified on every unit
Operating conditions where a rating is unclear	A recommendation on material and construction, with the reasoning

Capability, stated plainly

Four assembly lines and around 40 assemblers at our Longgang plant in Shenzhen, roughly a million pieces a year, built to IPC-WHMA-A-620 Class 3 under an ISO 9001 quality management system. Conductors from 32 to 12 AWG. Over 100 sets of tooling made in-house, so an overmold does not have to wait on a toolmaker. Jacketed samples in three working days; series production from MOQ 500 pcs, shipping fourteen working days after sample approval. Send the drawing to hkwirecable.com and we will come back with a quote or a question - not a generic brochure.

Note. General reference only. Electrical ratings, temperature limits and chemical compatibility are not set by any code letter or marking - they come from the connector body, cable compound and overmold geometry named on your drawing. HKWIRE builds and inspects to what your drawing states.