
SEALED PROTECTION WHEN YOU NEED IT MOST

Product Solution Guide



INGRESS PROTECTION (IP) RATING CHART

Our sealed connector portfolio offers products with varying degrees of IP rated sealing protection. From splash resistant to water proof - depending on your specific design needs. TE Connectivity (TE) has solutions for applications used in water related or high humidity areas as well as solutions for applications used in harsh environments.

IP ratings are represented by combining the first and second digits of the following columns:

FIRST DIGIT PROTECTION FROM SOLIDS



0	ZERO PROTECTION	
1	PROTECTED Against solid objects >50mm	
2	PROTECTED Against solid objects >12.5mm	
3	PROTECTED Against solid objects >2.5mm	
4	PROTECTED Against solid objects >1mm	
5	DUST PROTECTED Ingress of dust is not entirely prevented but does not interfere with the operation of the equipment	
6	DUST TIGHT No ingress of dust	

SECOND DIGIT PROTECTION FROM LIQUIDS



0	ZERO PROTECTION	
1	PROTECTED Against vertically dripping water	
2	PROTECTED Against dripping water when tilted up to 15°	
3	PROTECTED Against spraying water at any angle up to 60° from the vertical	
4	PROTECTED Against splashing water from any direction	
5	PROTECTED Against water jets from a 6.3mm nozzle from any direction	
6	PROTECTED Against high-power water jets from a 12.5mm nozzle from any direction	
7	PROTECTED Against immersed in water under defined conditions of pressure and time (up to 1m of submersion)	
8	PROTECTED Against continuous immersion >1m in conditions specified by the manufacturer	
9	PROTECTED Against high-power, high-temperature water jets	

EXAMPLE:

IP65 → **PROTECTED**
Against water jets from a 6.3mm nozzle from any direction

↓

DUST TIGHT
No ingress of dust

CONNECTORS

MATE-N-LOK CONNECTORS

UNIVERSAL MATE-N-LOK CONNECTORS



APPLICATIONS:



Vending Machine



Architectural Lighting



Refrigeration



Welding Equipment



Power Supplies



Production Equipment



Wiring Harness Assemblies



Rack-mount Servers

BENEFITS:

- Existing applications using Universal MATE-N-LOK connectors can be upgraded to a splash-proof system with two wire seals and one interface seal
- Flanged twist and lock (TNL), bulkhead, and in-line cap and plug housings available
- New terminal position assurance (TPA) for single row 2-5 position cap and plug housings
- Positive polarization, positive locking, and rear cavity identification for error-resistant assembly

MINI UNIVERSAL MATE-N-LOK CONNECTORS



APPLICATIONS:



HVAC



Security Systems



Refrigeration

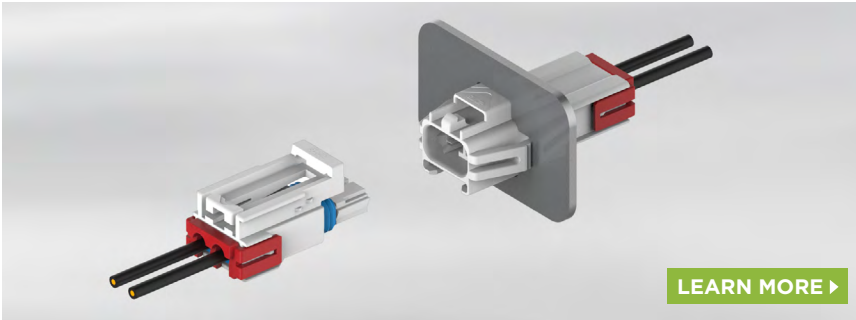


Storage & Networking Systems

BENEFITS:

- IP57 rated, splash-proof design for applications that require sealing
- Lanceless contacts for tangle-free handling
- Three-point stabilization to provide better terminal position
- Compact, durable housings that accommodate both pins and sockets

POWER VERSA-LOCK CONNECTORS



APPLICATIONS:



Marine



Automotive



Refrigeration



Lighting



Vending Machine



Industrial Machinery



Gaming Equipment



HVAC



Coffee Machines

BENEFITS:

- IP67 optional sealing system using gang seals with perimeter interface seal for lower mating force, easing assembly
- Terminal position assurance (TPA) for unsealed applications to prevent terminal backouts for enhanced reliability
- Various keys and colors available to assist in fail-proof assembly
- 18° angled twist and lock (TNL) connector that allows condensation to drip away from the connection
- Tab and receptacle contact design with four points of contact for higher reliability

2.5MM SEALED SIGNAL DOUBLE LOCK CONNECTORS



APPLICATIONS:



Lighting



Refrigeration



Automotive



Agricultural



Lawn & Garden Equipment

BENEFITS:

- IP67 rated protection against water and dust
- 2.5mm centerline to provide a compact design solution
- Snag-proof latch for ease of assembly
- Optional terminal position assurance (TPA) that helps ensure proper assembly
- Lance-less polarized terminals that help to prevent incorrect insertion, reducing assembly errors

HEAT SHRINK TUBING

PROTECTION WHERE YOU NEED IT



INSULATION

Protects and minimizes heat transfer for solid thermal and electrical insulation with operating temperatures ranging from -55°C to 150°C



STRAIN RELIEF

Allows for greater flexibility in areas where stress can cause failures, such as connector pins and splices, enabling a reliable connection



PROTECTION

Designed for the harshest environments with cut-through, chemical, fluid, abrasion, and anti-fungal resistance



SEALING

Keeps out moisture, water, bacteria, fuels, and fungus



IDENTIFICATION AND SAFETY

Helps identify wires for grounding and color-coding capabilities to reduce safety hazards

ES-2000 HEAT SHRINK TUBING



[LEARN MORE >](#)

APPLICATIONS:



Specially designed for environmental sealing and electrical insulation of wire splices, terminations, and components.

BENEFITS:

- 4:1 shrink ratio allows a few sizes to cover a wide range of splice and component diameters
- Flame-retardant and mechanically tough, the tubing provides strain relief and abrasion protection of wire splices, terminals, and other components
- Thick adhesive liner forms an effective barrier against fluids and moisture and performs well at an extended temperature range

ATUM AND DWFR HEAT SHRINK TUBING

ATUM HEAT SHRINK TUBING



BENEFITS:

- Tubing environmentally seals and protects components and interconnections (moisture and corrosion)
- Higher shrink ratios allow for connector-to-cable sealing
- Medium wall provides increased mechanical protection
- ATUM heat shrink tubing's adhesive bonds to a wide variety of materials (plastics, rubbers, and metals, including polyethylene, aluminum, steel, and copper)
- DWFR adhesive bonds to variety of materials

DWFR HEAT SHRINK TUBING



APPLICATIONS:



Sealing and protection of connector backshells, breakouts, and connector-to-cable transitions



High shrink ratio that allows for repair of damaged cable jackets without removing connectors

QSZH HEAT SHRINK TUBING



BENEFITS:

- Excellent environmental sealing
- Quick installation
- Zero halogen
- Mechanical protection against flexing, abrasion and cut-through
- RoHS/ELV compliant

APPLICATIONS:



Zero halogen, dual wall heat shrinkable tubing designed to provide environmental sealing and mechanical and electrical protection of in-line splices in automotive T2 environment



One tubing size that covers a broad range of ground wire sizes and wire combinations

CONDUCTIVE ELASTOMER



BENEFITS:

- Thickness from 0.5mm
- Wide temperature range: -55°C to +200°C
- Fluorosilicone for harsh environments: fuel oils and solvents
- Choice of materials for galvanic compatibility
- Flame-retardant to UL94 V-0
- Available with conductive self-adhesive backing on sheets

APPLICATIONS:



Industrial Controls



Test & Measurement Instruments



Military Equipment



Avionics



Medical Electronics



Electronic Equipment

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APPLIANCES / SEALED PROTECTION WHEN YOU NEED IT MOST

