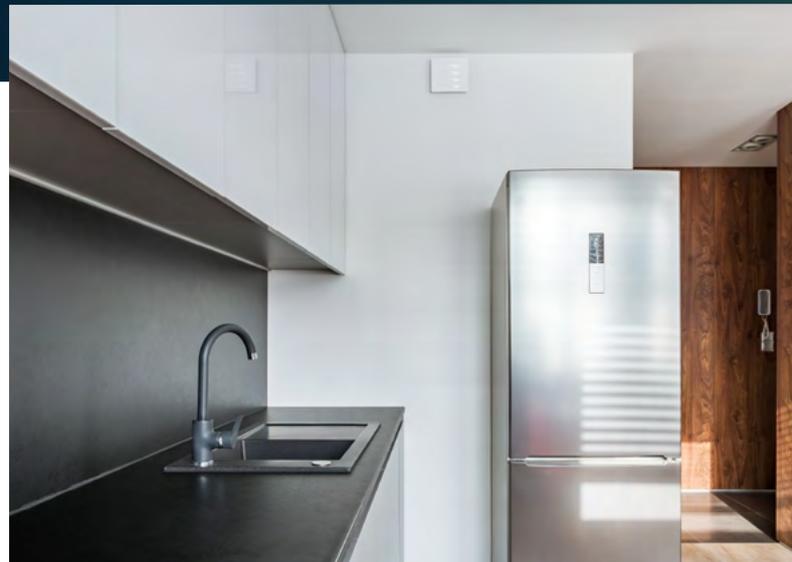**Envalior**
Imagine the Future

MEETING THE DEMAND FOR *SAFE, SUSTAINABLE* APPLIANCE CONNECTORS

We live in an increasingly connected world. Smart home technology and the Internet of Things (IoT) enhance convenience and security in our lives by enabling us to wirelessly connect to a range of home appliances via our smart devices.
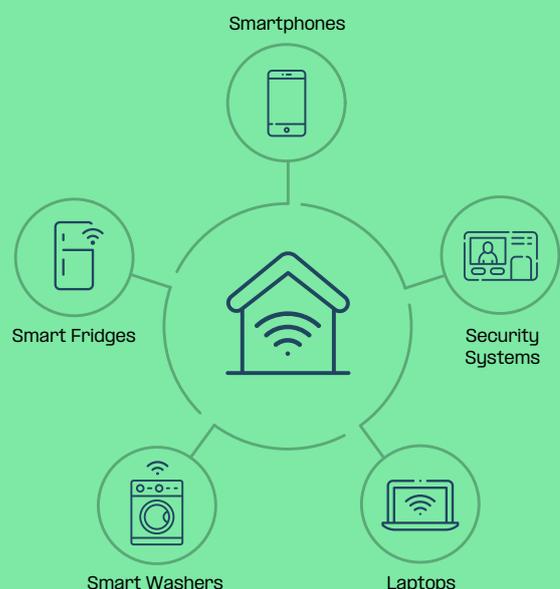
The growing adoption of connected living technology is driving transformation in the electrical appliances industry at the same time. Although smart homes are controlled virtually, appliances still require physical connectors to operate. As manufacturers produce more appliances that integrate with smart homes, the demand for smaller connectors with better performance, reliability and user–friendliness is increasing rapidly.

Connector safety is a concern in smart home appliances since they are often switched on and operated without any direct human supervision. If designed poorly, connectors increase the risk of electrical failure, which can lead to a fire. To eliminate the risk of accidents, connector manufacturers require insulating thermoplastics that pass regulated safety tests —

Key connector applications

Smartphones

Smart Fridges

Security Systems

Smart Washers

Laptops

including comparative tracking index (CTI), glow wire ignition tests (GWIT) and UL 94 flammability testing — which have different requirements in various regions.

In addition to ensuring connectors are safe, manufacturers must comply with mandates to improve material sustainability — which may mean removing potentially hazardous additives used to improve safety. To support the demand for miniaturization of connectors, materials must also offer high design flexibility for molding thin walls — without sacrificing performance or reliability. Finding materials that cost—effectively meet all of these requirements is often a challenge for manufacturers.

ENVALIOR'S COMPREHENSIVE PORTFOLIO OF *CONNECTOR MATERIALS*

Envalior initially developed Akulon® SafeConnect to meet universal flame resistance and electrical property requirements for connectors — and has since added ForTii® PA4T and EcoPaXX® PA410 to better accommodate customers' individual needs. All of our solutions are designed to exceed international safety standards and adhere to sustainability needs of manufacturers. By utilizing the same connector material in any market they sell in, we enable our customers to simplify their supply chain and reduce their costs significantly.

Portfolio features

- Full compliance with EN 60335—1 international standard on home appliance safety
- Excellent stiffness and dimensional stability
- High flow and processability for thin—walled designs
- Unmatched CTI up to 600V
- Highest UL 94 flammability rating at 0.4mm thickness
- GWIT up to 960°C at 0.4mm thickness
- High heat resistance for reflow soldering
- Relative temperature index (RTI) up to 150°C at 0.4mm thickness
- Fully halogen—free and flame—retardant grades
- Bio—based options
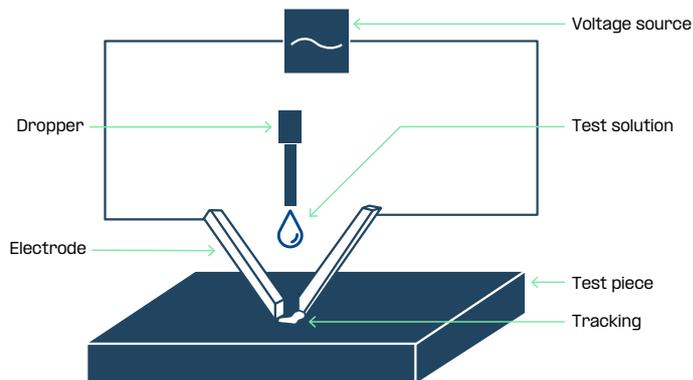
>**600V**
Comparative Tracking Index (CTI)

Up to
150°C
Relative temperature index (RTI) at 0.4mm thickness

Exceptional tracking resistance

Connectors made from materials with a low CTI typically use a plastic housing to prevent the build up of moisture and particles that cause tracking. With an industry–leading CTI up to 600V, Envalior connector solutions eliminate the need for protective casing, reducing production costs for manufacturers. A higher CTI is also essential for miniaturized connectors, due to shorter distances between metal contacts. At Envalior, we conduct CTI testing according to the IEC 60112 standard to verify the tracking resistance of each material.

UL94 V–0 and GWIT Performance

Beyond standard safety testing

Envalior prioritizes end consumer safety above all else. We ensure our solutions provide superior flame resistance by conducting glow wire testing (GWT) on finished connectors — as opposed to on plaques — with different material thicknesses, and at various angles and directions. With GWT performance up to 900°C, we give our customers the freedom to manufacture without worrying about re–testing parts or recalling finished products.

Product Line	Grade	Flammability UL 94 rating	GWFI	GWIT	CTI (V)	RTI Elec.
ForTii® PA4T GF	F11	V–0 at 0.2mm	960°C at 0.25mm	750°C at 0.4mm	600	130°C at 0.2mm
Akulon® PA66 GF	SafeConnect SC22	V–0 at 0.4mm	960°C at 0.4mm	875°C at 0.4mm	300	—
Akulon® PA66 UF	SafeConnect SC21	V–0 at 0.4mm	960°C at 0.4mm	960°C at 0.4mm	250	125°C at 0.4mm
Akulon® PA6 UF	K225–KS	V–0 at 0.4mm	960°C at 0.4mm	960°C at 0.4mm	600	150°C at 0.75mm
EcoPaXX® PA410 UF	Q–KS	V–0 at 0.4mm	960°C at 0.75mm	960°C at 0.75mm	600	130°C at 0.4mm

As the adoption of smart home technology increases the demand for reliable, high–performance connectors, Envalior continues to research, develop and test solutions that comply with evolving safety and sustainability regulations. In addition to ExoPaXX, our most established biobased engineering plastic, we supply fully halogen–free and flame–retardant grades suitable for connectors used in appliances, and work closely with regulatory bodies to address future material requirements. Wherever your business needs are, we're prepared to help drive your success in a highly connected world.

To learn more, contact us via Envalior.com.

Envalior
Imagine the Future