

# Conformal coating for an additional layer of protection

Safeguarding your protection relay against harsh environments



For outstanding performance also in the most extreme environments, ABB offers its Relion® 615, 620 and 640 protection relays with conformal coating as an option. This additional layer of protection increases the relay's resistibility against harsh environmental conditions, and thereby the reliability of the entire power distribution system, with optimal asset management as a result.

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01 Industrial plants often represent challenging and harsh environments.

## Conformal coating – maximizing the resistibility against moisture and corrosive agents

Electronic components such as printed wired boards (PWBs) can be exposed to a variety of harsh conditions during the lifetime of the protection relay. Heavy moisture, chemicals and other corrosive agents such as H<sub>2</sub>S (hydrogen sulfide) gas commonly found in certain industries create a harsh environment that might negatively impact both the durability and reliability of the relay.

Adding a conformal coating to the PWB not only protects the electronic circuits from the harsh environment, but thereby also enhances the reliability and extends the durability of the entire relay. Reliable operation throughout the relay's life cycle translates into less unplanned maintenance breaks and maximized uptime as well as maximum return on investment.

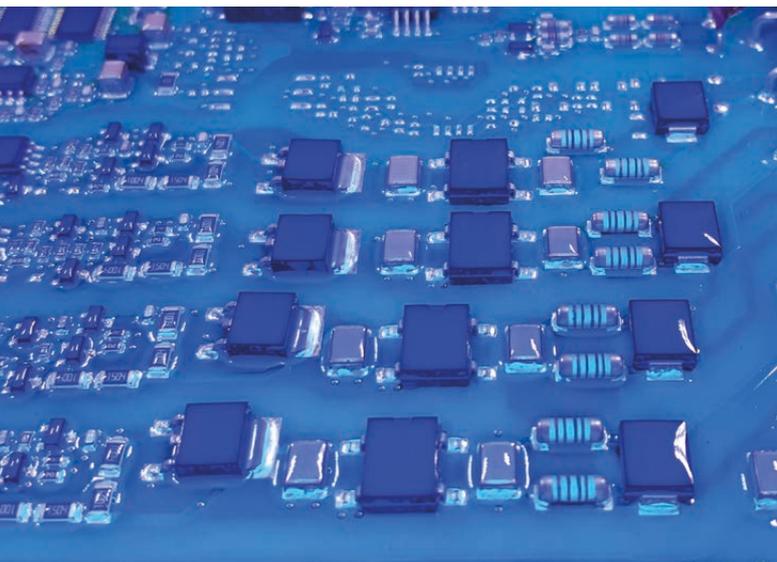
## Accredited coating for excellent performance

ABB has chosen a single-component, high-solid, acrylated polyurethane coating for excellent resistance to moisture and chemicals. In addition to combating corrosion, the coating provides a highly durable protective shield against mechanical stress.

The chosen coating is recognized by Underwriters Laboratories (UL) and compliant with the US military specification MIL-I-46058C, IPC-CC-830 (Institute of Printed Circuits) and the RoHS (Restriction of Hazardous Substances) directive 2002/95/EC.

## Benefits

- Additional layer of protection for the electronic circuits on PWBs
- Maximized resistibility against high-humidity conditions, and corrosive and contaminant agents in the environment
- Minimized costly production downtime and power outages in the distribution network through reliable performance of the relay
- Optimal asset management and return on investment due to enhanced durability and reliability in harsh environments



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01 The PWB is covered with a high-class coating, following ABB's strict coating procedures.

02 The Relion® 615, 620 and 640 protection relays can be conformal-coated for optimal resistance to harsh environmental conditions.



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### Standardized testing for optimal reliability

All ABB's medium-voltage protection relays are extensively tested to meet or exceed the requirements of the latest industry standards.

The following environmental tests are performed on both uncoated and coated relays:

Decription	Type test value	Reference
Dry heat	96 h at +55°C 16 h at +85°C	IEC 60068-2-2
Dry cold	96 h at -25°C 16 h at -40°C	IEC 60068-2-1
Damp heat	6 cycles (12 h + 12 h) at +25°C ..+55°C, humidity >93%	IEC 60068-2-30
Change of temperature	5 cycles (3 h + 3 h) at -25°C ...+55°C	IEC 80068-2-14
Storage	96 h at -40°C 96 h at +85°C	IEC 80068-2-1 IEC 80068-2-2

Both the uncoated and coated relays fulfill the specified requirements in all parts of the type tests.

The following additional tests are performed on relays with conformal coating:

- Mixed gas corrosion test according to IEC 60068-2-60:2015, test procedure 2
- Salt mist test according to IEC 60068-2-52, test Kb, severity level 2

For the mixed gas corrosion test, the following outdoor test parameters according to GR-63-CORE, Issue 4, April 2012 are used:

Method	Temp (°C)	RH (%)	H <sub>2</sub> S (ppb)	Cl <sub>2</sub> (ppb)	NO <sub>2</sub> (ppb)	SO <sub>2</sub> (ppb)
Outdoor	30±1	70±2	100±15	20±3	200±30	200±30

The chosen standard-compliant test duration is 21 days.

### Conformal-coated Relion® 615, 620 and 640 protection relays

ABB has a long history within distribution protection and control, with more than 1.5 million relays in use all over the world. The vast experience and in-depth knowledge ABB has acquired over the years guarantee optimal performance throughout the relay's entire life cycle.

To ensure outstanding performance also in extreme environments, ABB offers the latest version of all 615 and 620 series relays, the all-in-one protection and control relay REX640, and the grid automation relays REC615 and RER615 with conformal coating as a convenient optional add-on at the ordering stage.