Press release

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Additional impact protection for electric vehicles

Frenzelit supplies aramid protective sheath for Audi e-tron

If an electric car is involved in a crash, the DC-DC converter for the low-voltage vehicle electrical system can pose a hazard for vehicle occupants and emergency responders if it breaks and comes into contact with live parts. For added protection, Audi has contracted Frenzelit GmbH to supply an aramid textile that covers the entire DC-DC converter in the Audi e-tron.

Roland Wegscheider, Design Power Electronics/Charging Systems at Audi, explains the requirements for the protective material: “We defined all the key properties in our specifications. At the top of the list were cut resistance, electrical insulation, temperature resistance and media resistance, e.g. against oils.” Frenzelit – a specialist for gaskets, technical textiles and high-temperature-resistant insulation – has developed a protective sheath made of aramid fibers called thermoREFLEX® with an additional UV and moisture-resistant coating for increased dielectric strength. The insulation resistance is 10 megaohms even after being subjected to a range of weathering processes.

Test results exceed statutory requirements

Aramid was the material of choice for the Audi developers from the outset. It is used in the Audi e-tron in crash sensitive areas as cable sheathing thanks to its cut resistance, so it also appeared to be a good candidate to protect the DC-DC converter.

Audi subjected the thermoREFLEX® protective sheath to tests that go beyond the statutory requirements. Roland Wegscheider explains: “Our requirements for vehicle approval are high, especially when it comes to safety. We want to consider all possible eventualities and therefore go above and beyond what is legally required.” For example, one statutory requirement is that active discharge of the high-voltage intermediate circuit must take place within five seconds in the event of a crash. First responders generally do not reach the vehicle in five seconds, and

occupants do not touch any live parts within this short period either. Nevertheless, if a connection breaks at the DC-DC converter and the capacitor is not immediately discharged internally, Frenzelit's thermoREFLEX® sheathing provides additional protection by preventing contact with live parts.

Protective sheath as a safety factor

The testing included a climatic shock resistance test with a temperature range of plus 80 to minus 40 degrees Celsius and a temperature shock test from minus 40 to max. plus 95 degrees Celsius. The requirement: No changes in tensile strength. Resistance to moisture was also tested under conditions of 40 degrees Celsius for over 400 hours. Since the joints represent a potential weak point, it also had to pass a seam test. The aramid protective sheathing proved to be an additional safety factor in all scenarios.

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Images:

Image 1: The Audi e-tron has an aramid sheath for additional protection of the DC-DC converter. Image: © AUDI AG

Image 2: The thermoREFLEX® protective sheath by Frenzelit provides added safety against electric shock in case of accidents involving electric cars. Image: © Frenzelit GmbH

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About Frenzelit

Frenzelit GmbH develops, produces and sells gaskets and gasket materials, expansion joints for plant engineering and technical textiles for insulation, seals and filtration systems. Around 500 employees work at the Bad Berneck and Himmelkron plants. The family-owned company from Upper Franconia operates internationally with its own location in North Carolina, USA and has a global presence with additional subsidiaries and sales offices in the Czech Republic, China, India and Dubai. Frenzelit has been successful in the marketplace since 1881 and is certified according to IATF 16949 and ISO 9001 (Quality Management, ISO 14001 (Environmental Management) and ISO 50001 (Energy Management).

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