

## PRESS INFORMATION

---

### *Fakuma Press Release*

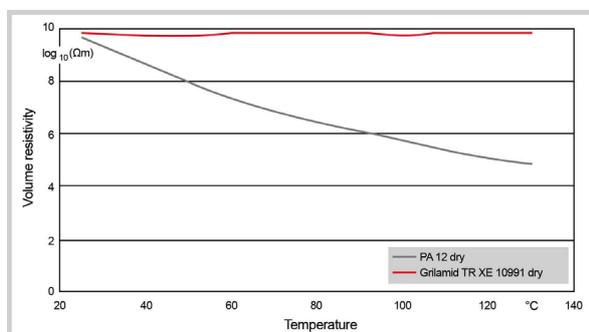
## High-voltage solutions in automotive applications

**EMS-GRIVORY sets new standards with polymer insulation specially designed for electromobility. The material surpasses the property profile of conventionally used polyamide (PA) 12. The new material, Grilamid TR XE 10991, will enable rapid progress in the field of electromobility to be achieved.**

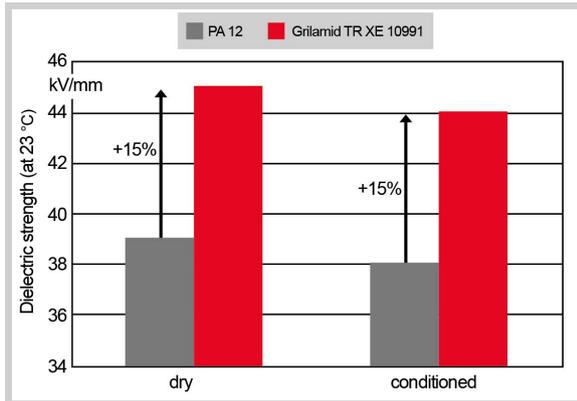
Insulating high-voltage (HV) components for electric automobile drive systems is no mean feat, due to new challenges during processing and increasing stipulations regarding the materials used. What's more, car manufacturers are only too aware that electrical vehicles which are more powerful, lightweight and compact in their design are also more popular with customers. Accordingly, this makes a well-designed electronic power system and thin-walled components that can be used safely at high voltages indispensable. The new high-performance polymer, Grilamid TR XE 10991, combines excellent insulation behaviour under extreme external conditions with straightforward processing for the manufacture of HV components. Flame retardancy requirements for flat conductor sheathing for e-mobility applications are also fulfilled.

### Outstanding insulation properties

Grilamid TR XE 10991 is clearly superior to conventional PA 12 materials used as conductor sheathing at high voltages due to its more stable electrical properties at lower layer thicknesses. Grilamid TR XE 10991 exhibits high volume resistivity that remains unchanged even at high temperatures (Fig. 1). Even after moisture absorption, the dielectric strength of the high-performance polymer remains superior to that of a PA12 (Fig. 2). The creep resistance of 825 V further highlights Grilamid TR XE 10991's suitability for use in conductor insulation applications at high voltages. The unvarying volume resistivity, combined with high dielectric strength and creep resistance, enables the product to pass the necessary standard tests under extreme conditions, such as high voltages and temperatures under exposure to salt and water, with flying colours. The combination of high insulating properties, exhibited by Grilamid TR XE 10991, opens a world of new possibilities for car manufacturers to implement high-performance, light-weight and compact designs for e-car electric drive technology.



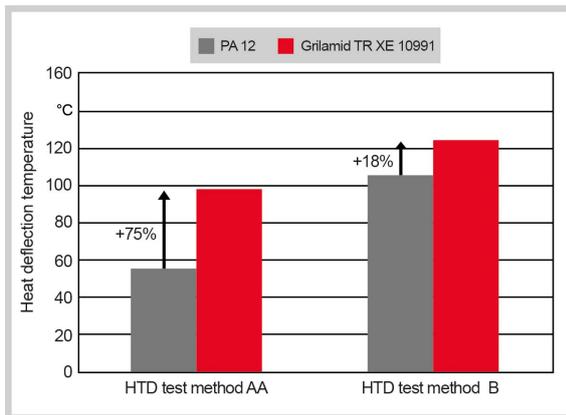
In contrast to PA 12, the volume resistivity of Grilamid TR XE 10991 remains stable - even at higher temperatures.



Grilamid TR XE 10991 shows higher dielectric strength in dry and conditioned states than PA 12.

### Excellent expansion behaviour for less stress cracking

Insulation sheathing in automobiles must exhibit no stress cracking caused by thermal loading. The expansion behaviour of Grilamid TR XE 10991 between 0°C and 100°C is similar to that of the metals used for HV conductors, thus reducing the risk of stress cracking. Even under load, Grilamid TR XE 10991 maintains its shape more successfully than a PA12 (HDT, Fig. 3). These properties allow the material to be used at higher temperatures without loss of functionality due to deformation.



Grilamid TR XE 10991 has a higher heat deflection temperature under load than PA 12.

### Minimal impact of moisture

Material property fluctuations, typical for polyamides, have also been reduced in the new material. Grilamid TR XE 10991 behaves in a way similar to materials with low water absorption such as polyethylene (PE). The mechanical properties of the specialty polymer remain practically unchanged by moisture absorption. The material's elastic limit, for example, remains largely stable after conditioning, illustrates the stability of Grilamid TR XE 10991's property profile.

As an insulation material suitable for use at high voltages and with excellent material-typical properties, such as constant volume resistivity, high dielectric strength and creep resistance, Grilamid TR XE 10991 opens up a world of new possibilities for smart vehicle design. This outstanding property profile remains stable when subjected to temperature, humidity and mechanical stress, providing high material strength when used as conductor sheathing. The PA is easy to process, can be applied in a thin coating layer to automotive components and passes the strictest tests with flying colours. The material is primarily designed for extrusion as a thin-layer coating material but is also suitable for injection moulding. Grilamid TR XE 10991 is available in the safety orange characteristic

### **Contact for technical inquiries**



Dr. Doris Abt  
Project Manager Research & Development  
EMS-GRIVORY  
Email: [welcome@emsgrivory.com](mailto:welcome@emsgrivory.com)



### **Contact for the press**

Janne Egli  
Communication  
Tel.: +41 81 632 72 62  
Email: [janne.egli@emsservices.com](mailto:janne.egli@emsservices.com)