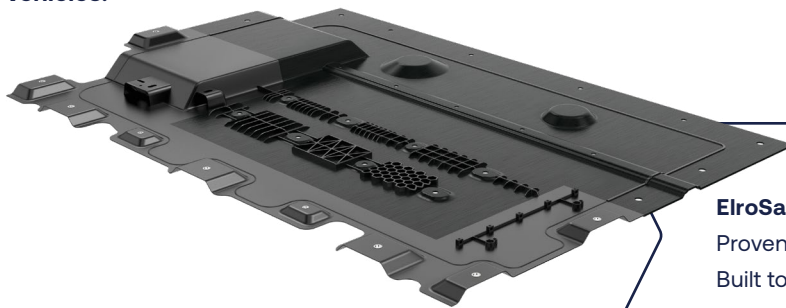


FACT SHEET

ElroSafe™ underbody shielding for battery pack protection

ElringKlinger's underbody shielding made out of thermoplastic sandwich material based on glass fiber reinforcements offers excellent impact behavior as well as thermal shielding and insulation for battery packs of electric vehicles.



ElroSafe™ by ElringKlinger:

Proven protection.

Built to integrate.

Technology

Sandwich panels are manufactured by using two surface layers made of unidirectional (UD) thermoplastic tapes with glass or carbon fiber reinforcement and a solid core which is also a fiber reinforced thermoplastic material. The panels are compression-molded into skid plates up to a size of 2.2 by 1.6 m.

HIGH STRENGTH AND FLEXIBILITY

Compared to aluminum (Al) or thermoset composites the thermoplastic materials UD-tape and DLFT provided by ElringKlinger offer high strength (800 to 1.000 MPa) in combination with high flexibility, which results in a superior damage tolerance. At low day-to-day impact loadings Al deforms permanently due to a lower strength of around 250 MPa, which can result in multiple replacements of the complete part during service. Thermoset composites fail at significantly lower impact energy levels compared to thermoplastic ones because the brittle matrix resins are less ductile.

FUNCTIONAL INTEGRATION

Further functions such as local fixation points for electronic components, electromagnetic shielding or vent gas separation from TP events, can easily be integrated by injection molding or welding.

EXCELLENT SHIELDING AGAINST HIGH-SPEED IMPACTS

Compared to Al or thermoset materials, ElroSafe™ shows highest resistance performance against high-speed impact test. Under conditions where competing technologies are showing failure, ElroSafe™ shows minor impact marks due to its combination of high strength and energy absorption in elastic way.

HIGH LEVEL OF THERMAL AND ACOUSTIC INSULATION

Underbody shielding made from thermoplastic sandwich materials allow improved thermal management of the battery pack as well as acoustic shielding for better noise reduction.

THERMAL PROPAGATION AND DI-ELECTRIC STRENGTH

ElroSafe™ systems offer high thermal propagation resistance and di-electric strength. The sandwich structure offers the ability for additional functional layers.

ELECTROMAGNETIC SHIELDING

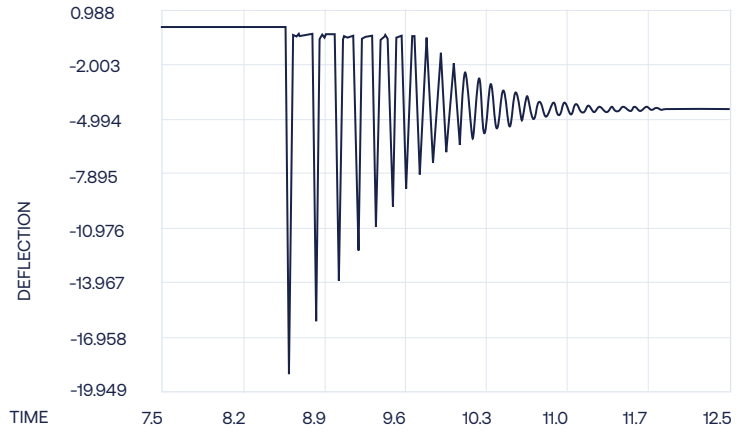
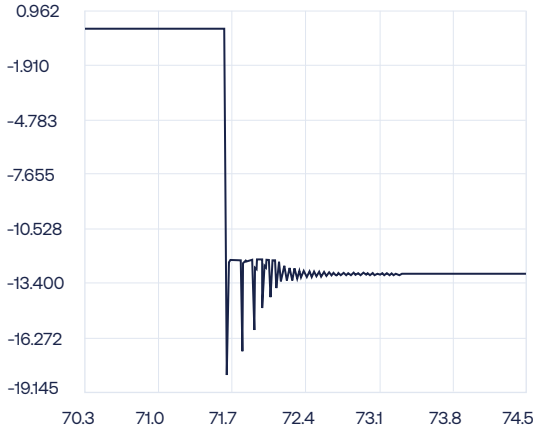
Further the sandwich structure allows to integrate further function layers for enhanced TP resistance or electromagnetic shielding if required.

Parameters

DEFLECTION UNDER LOAD IMPACT (IMPACTOR: D=180MM/100KG/84J)

Panel size: 340 mm x 290 mm, free bending length: 280 mm

Source: ElringKlinger AG, R&D



Aluminum EN AW-5754 H22

3mm | 8,1kg/m²

Total deflection: 19mm

Remaining deflection: 12mm

Thermoplastic composite sandwich

5mm | 8,1kg/m²

Total deflection: 17mm

Remaining deflection: 0mm

Benefits

- » Excellent damage tolerance under high-speed impact loading
- » Higher durability leading to reduced cost for repair and maintenance
- » High level of thermal insulation
- » High level of design freedom for various space requirements
- » Various material combinations possible
- » Further functional integration easily possible
- » High level of sustainability

**ELRINGKLINGER – YOUR PARTNER
FOR COMPOSITE COMPONENTS**

Product Development (Design, Engineering, Simulation and Material expertise) – Process Development – Tool Shop – Tool Sampling/ Prototyping – Testing – Change-Management – Series Production – Part Measurement and Components

YOUR CONTACT

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▶ **SHAPE³⁰**

The strategic direction of
the ElringKlinger Group

