

MARKETS // PRODUCTS

PRODUCTS FOR AEROSPACE



vonRoll

VON ROLL PRODUCTS FOR AEROSPACE

For years, Von Roll products are approved and flying. Customers value our service, machining precision and quality. Composites can replace aluminium parts in many places in aircraft interiors, with their lighter weight, not sacrificing mechanical strength. Our product portfolio includes:

- + Machined composite parts as fastening elements and edge reinforcements in Interior sandwich panels
- + Machined composite parts for electrical cabinets
- + Low FST resins and epoxy based preregs

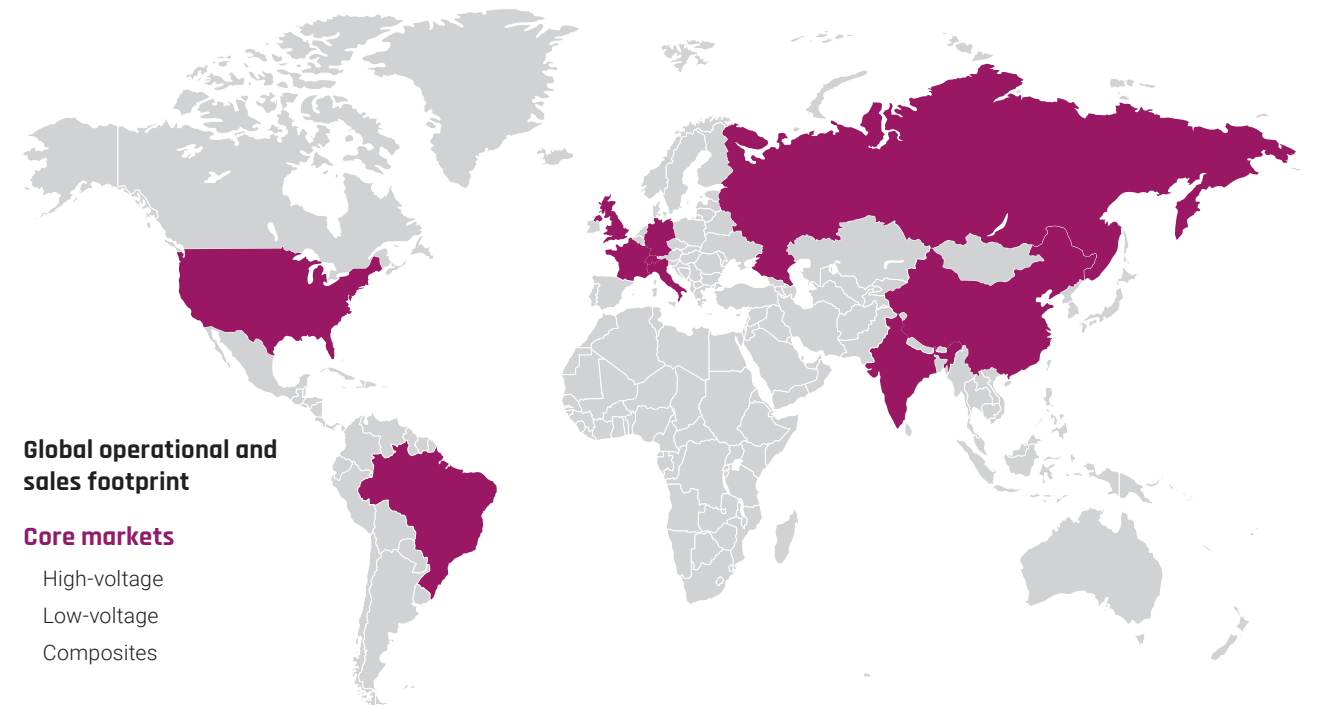
We are convinced that the interior design market is looking for new and innovative materials. Von Roll has therefore been working on new technologies to offer important advantages to our customers today:

- + Light-weight material solutions
- + Reduced part cost manufacturing
- + Reduced ESH risks to exposure and handling
- + Easy handling, storage and transportation
- + Automatization process

We are welcoming new partners and customers to collaborate and built together the future of Aerospace cabin interior design. Please contact our experts for discussing new opportunities.

WHO ARE WE?

Von Roll is a traditional Swiss industrial company, since 1803. We are market leader for high voltage insulation systems. Our composites product line delivers products along the value chain to aviation, automotive, energy generation and distribution, electronic, defence and general industrial markets.

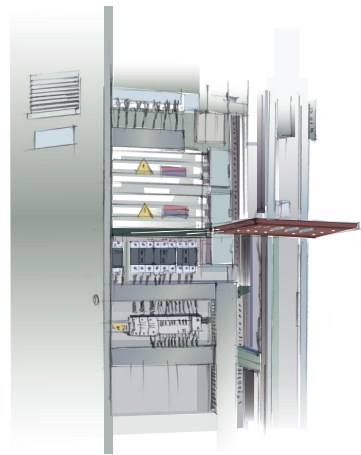


MACHINED LAMINATES

Von Roll is a market leader in **machined composite parts** for:

- + Fastening elements and edge reinforcements in interior sandwich panels
- + Electrical cabinets

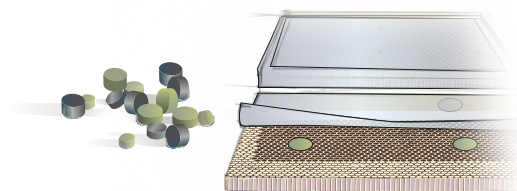
FAA-approved products	Resin system	Key properties	Application
Vetronite® EGS 619	Structural Epoxy	High mechanical strength	Fastening elements in honeycomb panels edge reinforcement
Vetronite® FR-5 HF CTI 600M	Halogen free fire retardant Epoxy	High performance at elevated temperatures. Excellent electrical properties.	High-temperature applications Electrical components
Vetronite® PGS	Phenolic	Excellent FST properties	Exposed surfaces (e.g. galleys, trolleys)



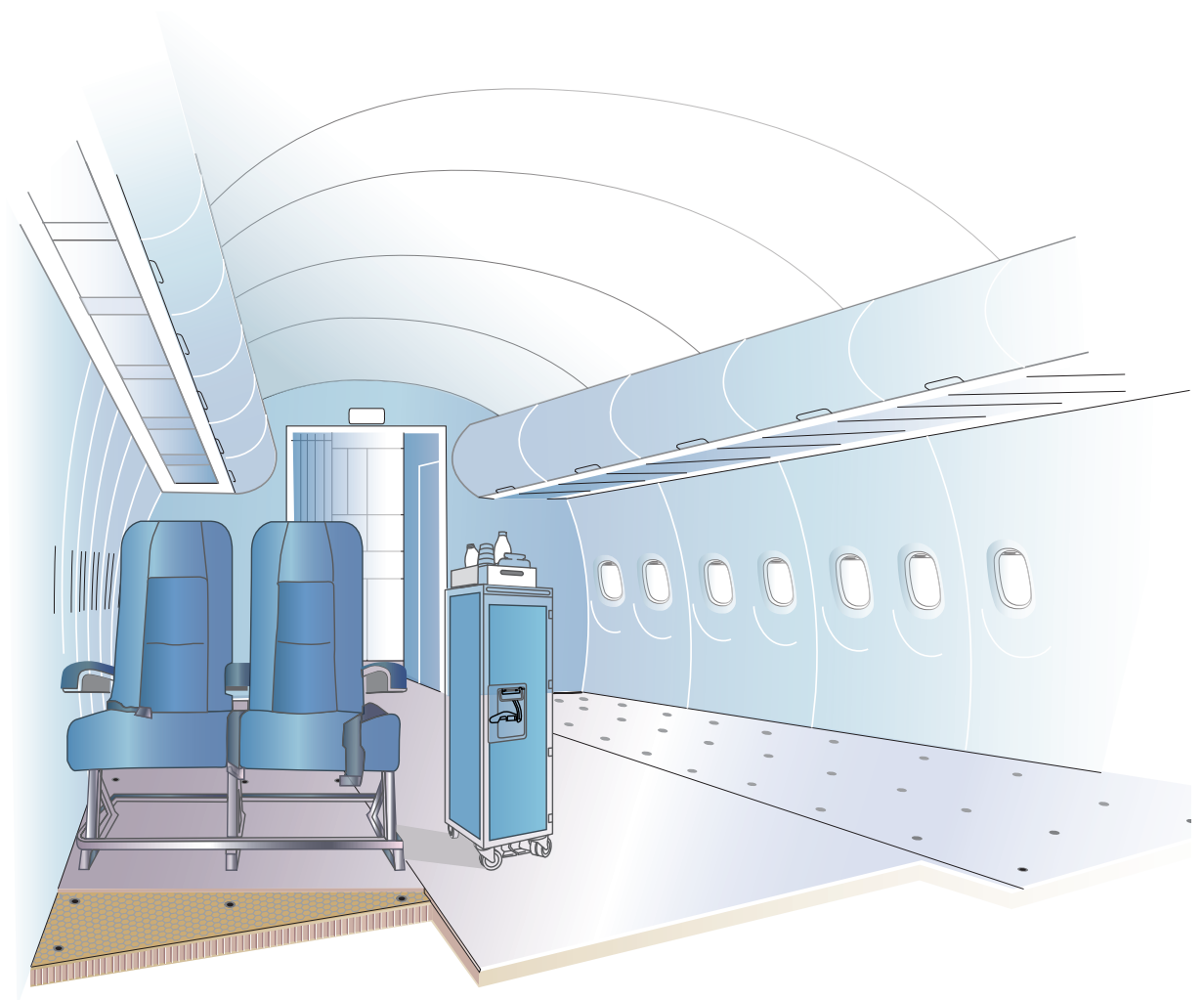
Panels in Vetronite® FR-5 HF CTI 600M for electrical panels



Phenolic panels for monolithic application in FAA approved Vetronite® PGS



Fastening elements in honeycomb panels
Manufactured with machined Vetronite® EGS 619

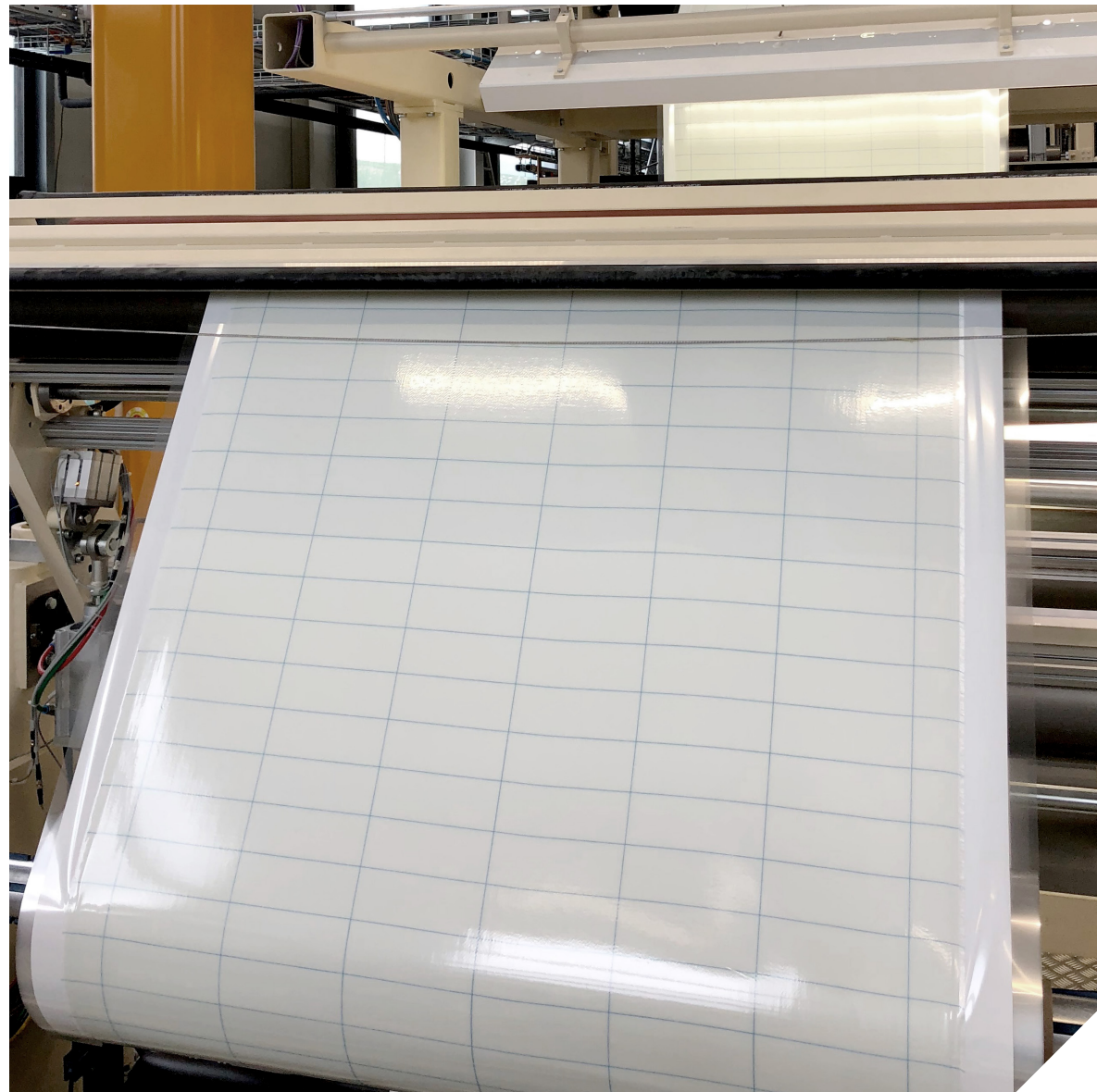


VON ROLL PRODUCT OFFERING FOR NEXT GENERATION CABIN PARTS OFFER COST ADVANTAGES FOR PART MANUFACTURES AND COMPLIANCE WITH HIGHEST STANDARDS.

NEW FST RESIN AND PREPREG

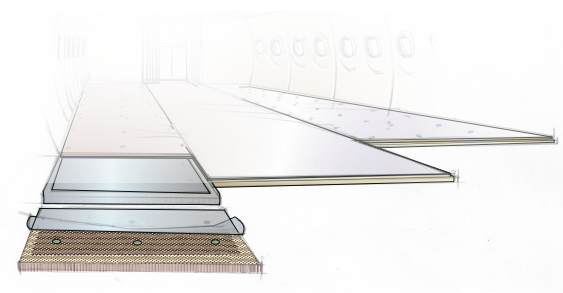
- + Epoxy based
- + Halogen-free
- + No volatile release
- + Good surface quality
- + Compliant with FAR 25.853

Von Roll has various impregnation lines to support the prepreg market needs, using different technologies and processes. New high speed line is available in Breitenbach (Switzerland) for running both solvented resin systems and the new FST solvent free epoxy resin system.

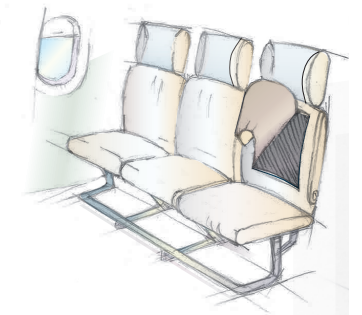


Von Roll NXT GEN prepregs for Aerospace industry offer the following benefits:

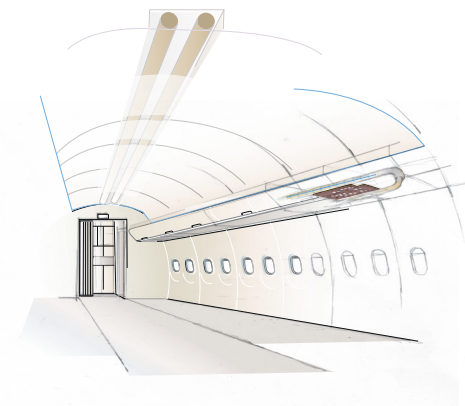
- + Anhydride-, halogen- free
- + Ambient temperature storage conditions
- + Suitable for fast processing
- + Heat release / FST-compliant acc. to relevant fire safety standard
- + Superior mechanical properties
- + Excellent surfacing properties



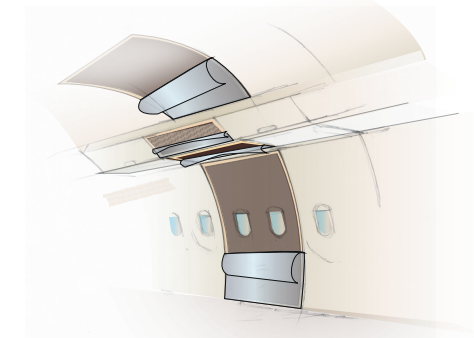
EP200
Prepreg for floor panels and cargo
Low FST



EP230
Prepreg for floor panels and cargo
Low FST and HR (carbon)



EP210
Prepreg for ducts
Low FST



EP220
Prepreg for ceiling, lining, bins etc.
Low FST and HR (glass)

Prepreg	Key characteristic	Fire safety Compliance	Applications
EP200 glass reinforced	<ul style="list-style-type: none"> • High toughened resin system • Suitable for high impact requirement • Very high peeling resistance • Low tack • Curing at 120-160°C 	<ul style="list-style-type: none"> • Compliant with 12sec, 60sec, smoke and toxicity • FAR 25.853 	<ul style="list-style-type: none"> • Floor • Secondary structures
EP210 glass reinforced	<ul style="list-style-type: none"> • Medium toughened epoxy resin system • Suitable for VBO • Medium-high tack • Curing at 120-160°C 	<ul style="list-style-type: none"> • Compliant with 12sec, 60sec, Very Low smoke and toxicity • FAR 25.853 	<ul style="list-style-type: none"> • Ducting
EP220 glass and EP230 carbon reinforced	<ul style="list-style-type: none"> • Medium toughened epoxy resin system • Suitable as phenolic replacement • Suitable for VBO and press • Medium-high tack • Curing at 120-160°C 	<ul style="list-style-type: none"> • Compliant with 12sec, 60sec, Very Low smoke and toxicity • Very low Heat release • FAR 25.853 	<ul style="list-style-type: none"> • Cabin interior • Lining, partitioning walls • Seat components

*Common glass US styles available are: 6580, 7781 and 120

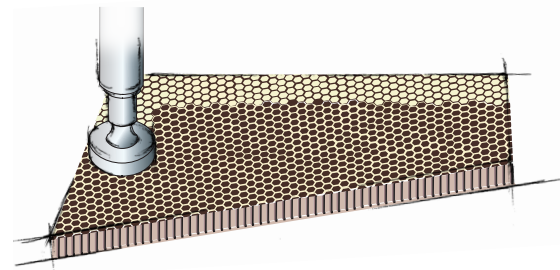
NEW FILLER FOR HONEYCOMB CORE

- + One component
- + Anhydride-free
- + Halogen-free
- + Compliant with FAR 25.853
- + Suitable for manual and automated potting

Benefits vs state-of-the-art

- + 1 component resin
- + Low tack and thixotropic behaviour
- + Higher stability at room temperature (2 months)

Storage	2 months @ room temperature
Density	0.75 gr/cm3
Exothermy	< 35 °C at 150 °C curing
Extrusion rate	40 g/min even after days in open container
Compressive strength	45MPa

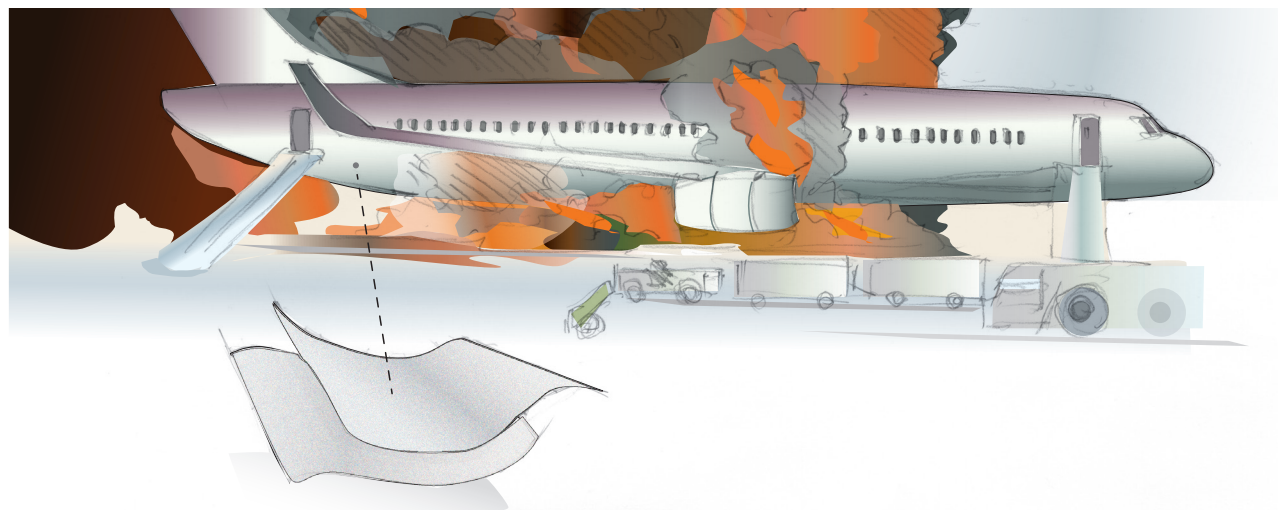


NEW SAMICA® FIREPROOF

- + Special Mica product
- + Very light-weight
- + Excellent fire barrier
- + Compliant with FAR 25.853

What is Samica® fireproof?

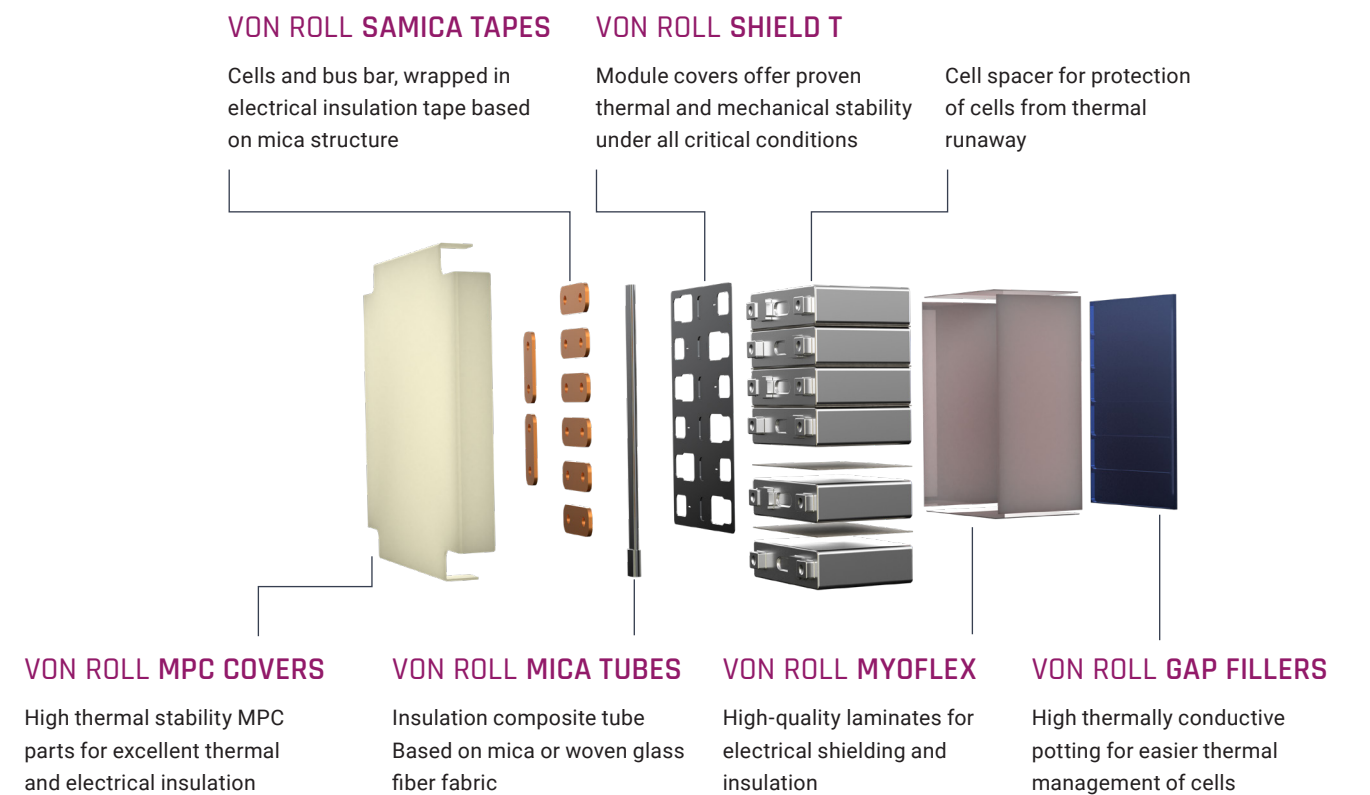
- + Prepreg manufactured from Mica and silicone resin
- + Special variant is available for co-curing with traditional fiber reinforced prepregs
- + Resistant to temperature and fire above 1000°C
- + Superior thermal insulation properties



SOLUTIONS FOR BATTERY PROTECTION

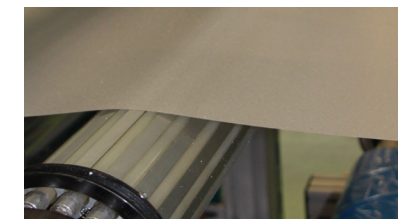
Von Roll is a market leader in **thermal and electrical insulation materials**. Special products are available to meet the needs of the emerging urban air mobility market, especially for **battery protection**.

Failure of a single battery cell can trigger a chain reaction known as thermal runaway, which leads to immediate destruction of the whole battery pack or even the electric vehicle itself. Von Roll developed a special range of products to protect batteries for current and next generation electric planes.



Mica based product portfolio comprises:

- + Rigid Mica plates - Mica with low content of resin press-cured above 150°C
- + Compressible Mica products - Mica with silicone combined with additional layers for multifunctional purposes
- + Flexible Mica products as a single or multilayer structure



TESTING



Materials and systems have to be tested in order to ensure the requested specifications concerning mechanical, electrical and thermal characteristics.

At Von Roll HV laboratories we are able to test our customers' materials and systems according to IEC, UL and other specifications.

- + Thermal, electrical and mechanical aging tests
- + Tan δ -measurements at different temperatures
- + Partial discharge measurements with different voltage ranges



Testing in the Von Roll laboratory



Training courses

TRAINING

For a number of years we have been offering a unique program of high-voltage insulation training within our Von Roll Corporate University. The objectives of this program are:

- + Better understanding of high-voltage insulation technology for rotating machines and up-to-date knowledge on insulating materials and systems
- + Practical experience in the application of electrical insulating materials

WE ENABLE ENERGY

Von Roll is the sole full-range supplier of materials and systems for the insulation of electrical machines as well as high-performance products for various high-tech industries.



Mica

All materials related to high-voltage insulation. Von Roll's commitment to mica starts with mining and ends with finished tapes.



System components

Producer of integrated and ready-to-install system components for high-voltage electric motors, railway drives and generators.



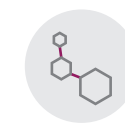
Cables

Mica tapes for fire-resistant cables. Von Roll provides a wide range of products that are ideally suited to all commonly used standards.



Resins

Impregnation resins for high- and low-voltage, potting resins, casting resins, as well as encapsulating and conformal coatings.



Composites

Engineered materials made from a resin and a support structure with distinct physical, thermal and electrical properties. We offer molded, machined or semi-finished products.



Flexibles

Insulating flexible materials for low-voltage applications.



Ballistic Protection

High-quality systems for armored defense based on thermoset / thermoplastic products in single-use or tailored combinations.



Testing

Von Roll provides electrical, thermal and mechanical testing of individual materials as well as of complete insulating systems.



Training

Von Roll Corporate University provides a training program in high- and low-voltage insulation for its customers.

As one of Switzerland's longest-established industrial companies, Von Roll focuses on products and systems for electrical power generation, transmission, storage and industrial applications.

Von Roll's business portfolio is divided into the following businesses: Von Roll Insulation offers electrical insulation products, systems and services for generators, high- and low-voltage motors, transformers and other applications. Von Roll Composites produces composite materials and parts for a variety of industrial equipment.

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The logo for vonRoll, featuring the word "vonRoll" in a bold, blue, sans-serif font. The "v" is lowercase and the "o" is lowercase, while "nRoll" is uppercase.