

MARKETS // PRODUCTS

COMPOSITES

FOR INDUSTRIAL APPLICATIONS

vonRoll

WE ENABLE ENERGY

As one of the oldest industrial companies in Switzerland, founded in 1803, we focus on products and systems for power generation, transmission and distribution, rotating machines and mechanical engineering. Von Roll is the global market leader for insulation products and the only company to offer the complete range of insulation products, composites, consulting, tests and services for the electrotechnical industry.

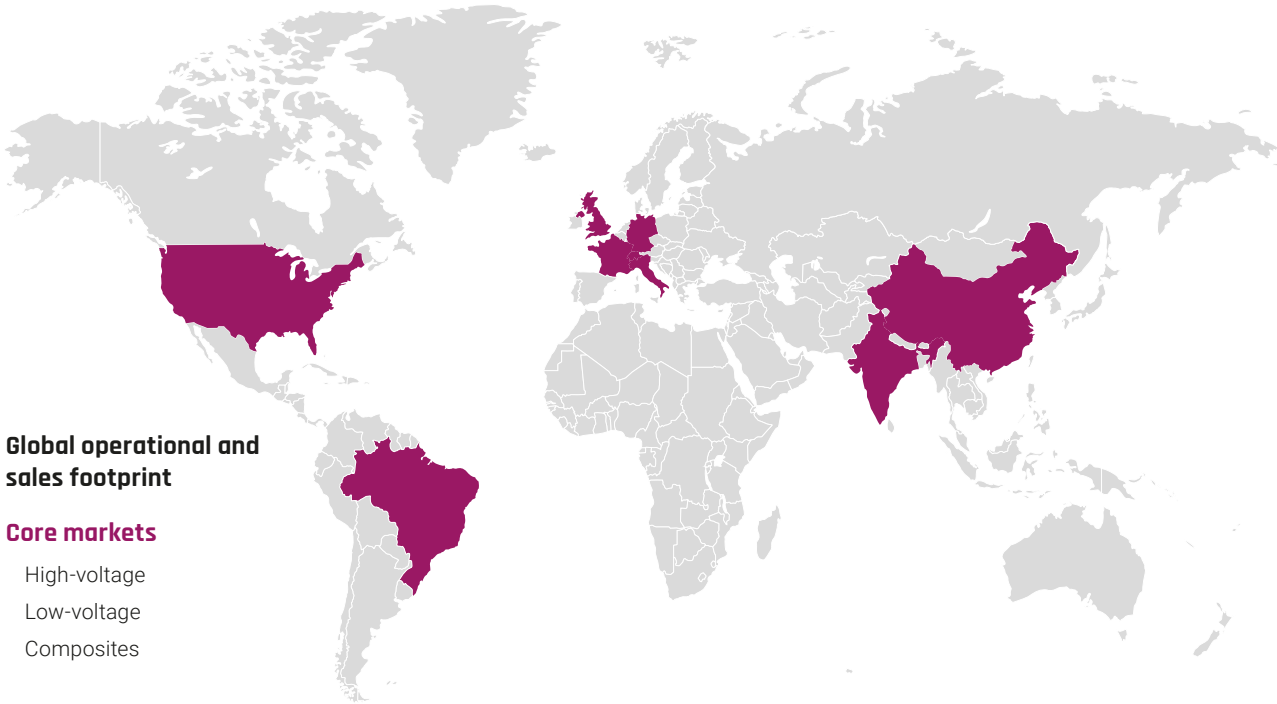
For more than 100 years, we have been making outstanding contributions to this market, developing a number of highly innovative products that have enabled both steady increases in power output and smaller and more compact machines.

Customers enjoy the following benefits:

- + One single source for all insulating materials
- + Thorough expertise from power generation and transmission to its efficient utilization
- + Proven compatibility for system components
- + Testing at Von Roll of both materials and systems
- + Consulting for applications and technologies
- + Training in insulation materials and systems

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.



CnC machining in Augsburg, Germany



Composite R&D center in Breitenbach, Switzerland



Laboratory prepeg line in Breitenbach, Switzerland

AN ENDLESS VARIETY OF COMPOSITES

- + From mica, glass, synthetic fibers, natural reinforcement materials, polyester to high temperature- resistant resin systems: many combinations are possible.
- + The wide variety of attributes, combined with the experience and technology of our machining centers, allows us to offer you the perfect solution.

CHEMISTRY

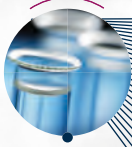
Epoxy
Polyester
Silicone
Phenolic
Polyesterimide
Polyvinyl-Butyral
Melamine
Rubber
Inorganic

SUCH AS

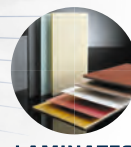
Glass fabric sheets
Glass mat sheets
Cotton fabric sheets
Paper sheets
Carbon sheets
Aramid sheets
Polyethylen sheets
Sheets laminated with combined materials
Long sheets & profiles
Molded parts
and other varieties

SUCH AS

Glassfabric tubes
Cotton fbric tubes
Papertubes
Mica tubes
and other varieties



RESINS



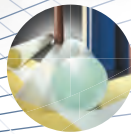
LAMINATES



MACHINED PARTS



REIN-
FORCEMENT



PREPREGS



TUBES

SUPPORT

Glass Fabric
Glass Mat
Mica Paper
Aramid Fabric
Cotton Fabric
Paper
Carbon Fabric
Glass Roving
Polyester Fabric
Unidirectional Glass
Unidirectional Aramid
Thermoplastic

SUCH AS

Rolls aramid fabric phenolic resin
Rolls glass fabric solvent free resin
Rolls carbon fabric epoxy resin
and other varieties

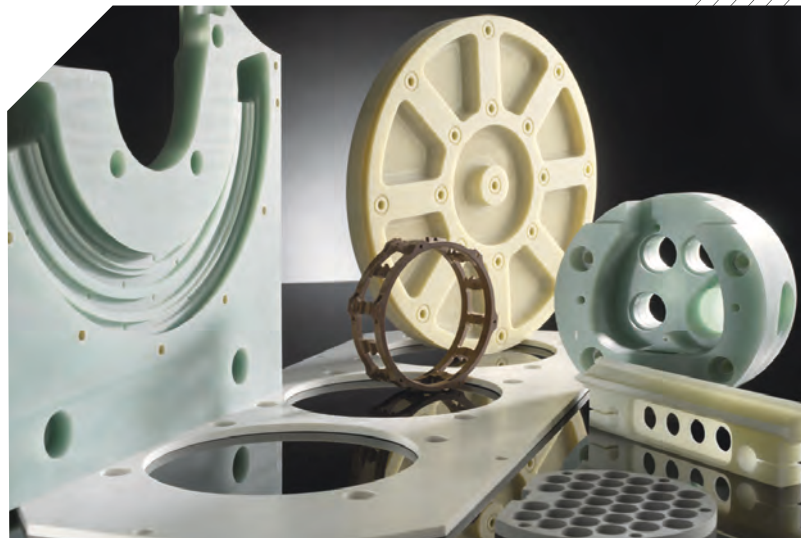
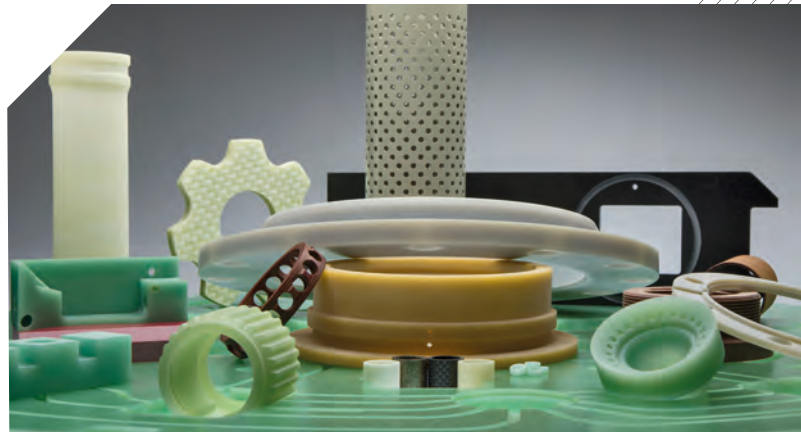
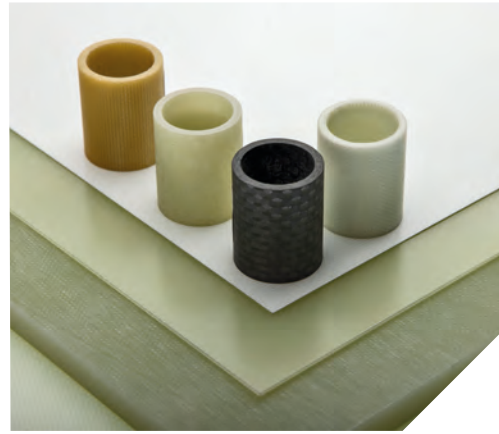
SUCH AS

Machined parts from sheets
Machined parts from tubes
Assembled parts
and other varieties



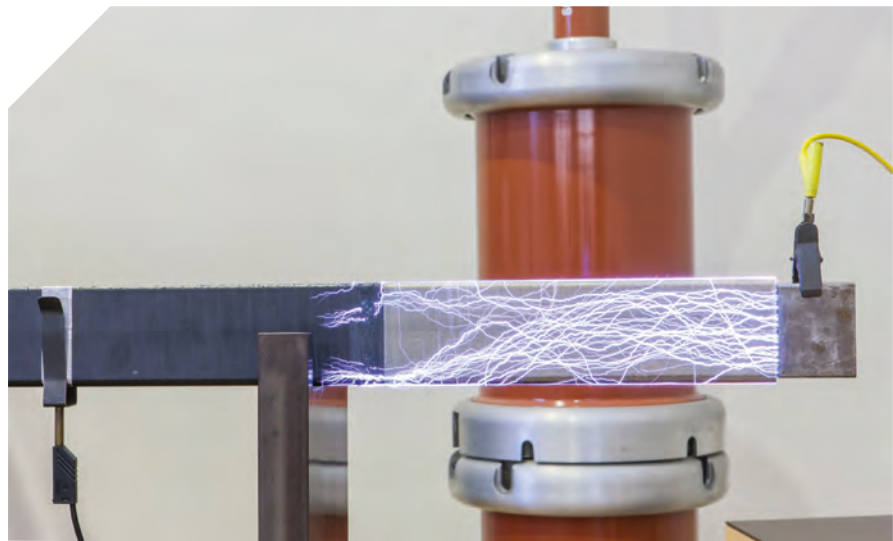
AN ENDLESS VARIETY OF COMPOSITES

- + We can supply machined parts from customers' drawings, ready-made to be incorporated into many types of applications.
- + Such parts include an extensive range of top-quality tubes and cylinders made from various reinforcement materials, such as Samica®, glass fabric, glass mat, cotton, paper, aramid, polypropylene.



KEY COMPOSITE ASSETS

- + State-of-the art industrial plans for resins, prepreg, and composite manufacturing
- + Strong background in resin formulations for thermal and electrical insulation
- + Strong know-how in high and low pressure laminating technology.
- + Global R&D and sales organization supporting the industrial and mass transportation business.



Unique testing capabilities



Wide range of Horizontal and Vertical prepreg lines

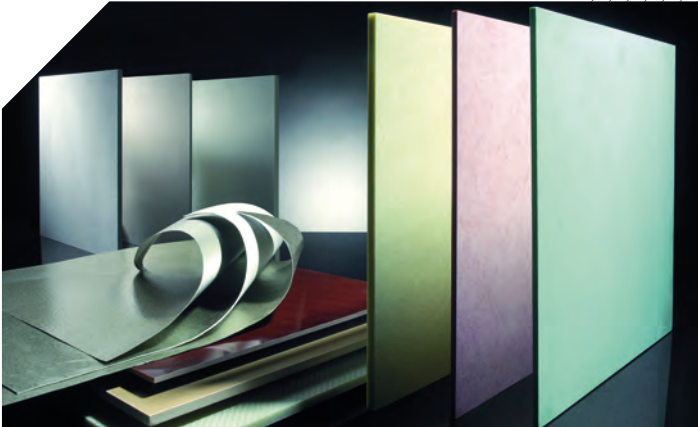
THERMAL APPLICATIONS

- + Von Roll is a market leader of thermal resistance laminates for insulating parts of ovens, furnaces and presses.
- + Our products offer key benefits such as high compression from 23°C to 250°C, low thermal conductivity and relatively low density.

	Description	Density (gr/cm ³)	Flexural strength @ 23°C (Mpa)	Compression strength @23°C (Mpa)	Heat resistance temperature (short timing)	Thermal conductivity (W /m k)
VETROTHERM	High pressure laminate	2.05	730	750	280	0.30
VETROTHERM F	Low cost grade	1.85	180	330	230	0.30
VETROTHERM R	Low density grade	1.95	650	700	260	0.30
VETROTHERM S	High Tg laminate	1.85	160	330	500	0.29
VETROTHERM Light	Lowest density grade	1.25	150	270	230	0.15
Pamitherm 41140	Highest temperature resistance	2.20	170	350	600	0.21
EGR T23	High pressure laminate	1.85	170	480	220	0.30

Other applications include:

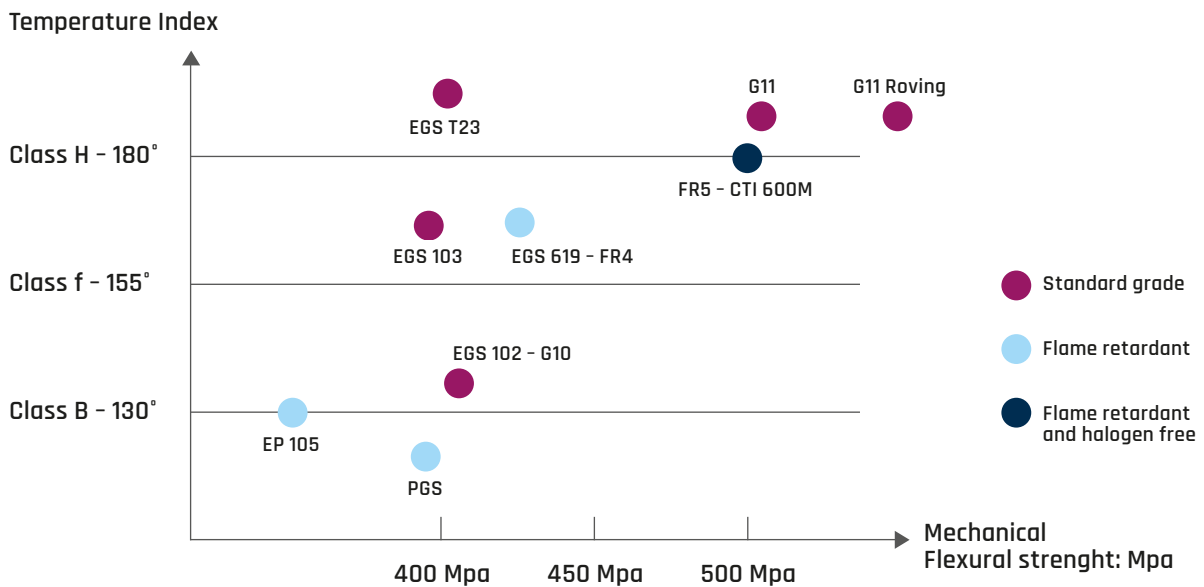
- + Shield T Mica based composite parts for battery protection and thermal runaway prevention.
- + Thermal insulation parts for industrial applications including: gaskets, seals, spacers



ELECTRICAL INSULATION

Von Roll Augsburg has developed since many years high pressure laminate products for electrical insulation.

- + Broad portfolio available
- + Products specific for various thermal class systems.
- + Certifications available
- + Own formulations
- + Flame retardant versions

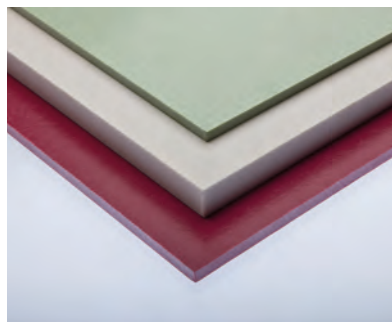


Alternatively glass mat laminates are manufactured using low-pressure techniques and are characterized using mainly glass mat or chopped glass as a reinforcement material bonded with a polyester or epoxy resin system.

Durapol® laminates are widely used in the electro-mechanical industries.

Durapol F200 SMC

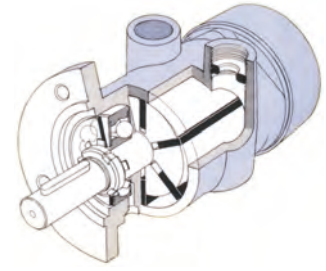
- + Halogen free and flammability V-0 according UL 94 even with thickness greater than 3 mm.
- + Mainly used for switchgears



Durapol M602 SMC

- + UL 94 V0 even above 5mm.
- + Very high Dielectric strength, 90°C in oil, perpendicular: 13 KV/mm.
- + Mainly used for transformers.

HIGH PRESSURE LAMINATES FOR ANTI-FRICTION



Von Roll offers high performance products for slides and vanes in pumps and compressors and compressed air motors. Two product families are available:

Cotton phenolic slides (Canevasite)

- + Most of the grades need to be oil lubricated.
- + They are mainly used for compressed air motors.

Glass epoxy or phenolic slides

- + Run in flood lubricated pumps.
- + Used if higher temperature stability is required



- + Known under the trademark Canevasite®, the range of phenolic cotton laminates comprises several grades, each having specific properties.
- + Machined parts made from Canevasite® substantially extend the life of machines and mechanically stressed components, thereby resulting in excellent cost savings.

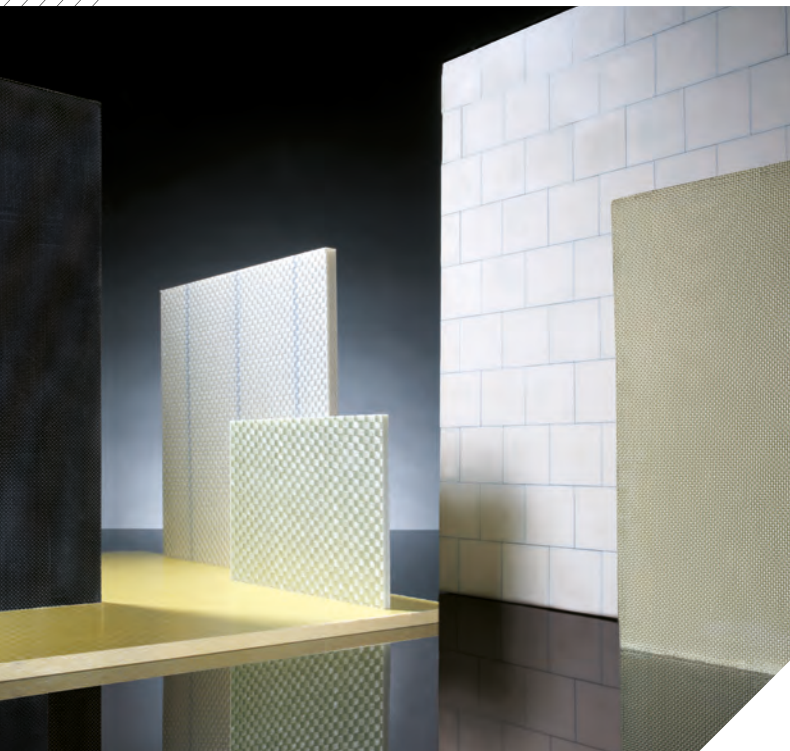
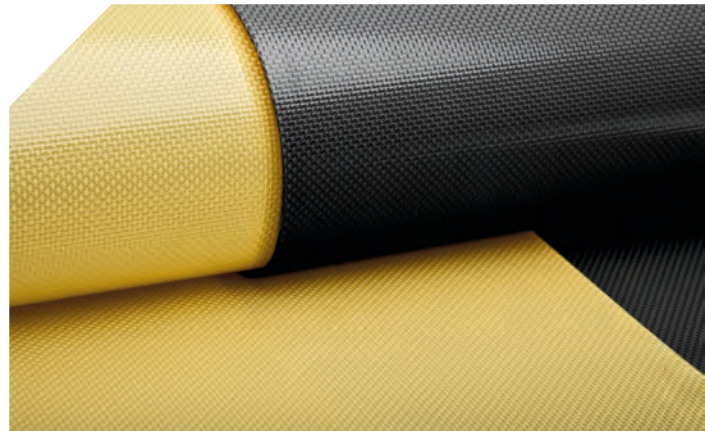
	Description	Density (gr/cm ³)	Flexural strength @ 23°C (Mpa)	Compression strength @23°C (Mpa)	Breakdown voltage // (KV)	Comp. Tracking Index (V)
CANEVASIT PF CC 201	Standard PF CC 201 – NEMA C	1.34	120	300	5	150
CANEVASIT PF CC 202	Standard PF CC 202 – NEMA CE	1.34	135	300	24	200
CANEVASIT PF CC 203	Standard PF CC 203 – NEMA L	1.35	155	310	10	200
CANEVASIT PF CC 204	Standard PF CC 204 – NEMA LE	1.34	140	310	27	200
CANEVASIT FF 5964	Based on very thin cotton fabric for good resistance to wear, vanes in air motors (oil-greased)	1.34	130	300	12	150
CANEVASIT VRI-BAT	Based on Batist cotton fabric and used for miniature parts, e.g. ball bearing cages, vanes for high speed air motors (oil-greased) in dental equipment.	1.30	135	340	15	120
CANEVASIT FF-PTFE	Self-lubricating and elastic features, vanes in air motors (oil-less)	1.45	135	250	15	120
CANEVASIT F18 C6	High pressure laminate	1.37	135	270	15	120

BALLISTIC AND DEFENSE

- + As a unique partner for composites, we have successfully transferred our long experience with thermoset materials to the field of ballistic protection. Today we also contribute to control of ballistic energy with our solutions for military, paramilitary and civilian purposes.
- + Von Roll provides high-quality materials for individual protection and spall liners, add-ons or backings for various uses, such as light reconnaissance and troop-transport vehicles, tanks and tank turrets, shelters, transmission centers, ambulances, warships, minesweepers and special containers.



Spall liners



Selected products:

- + Para-Lite® Flex, Para-Lite® 65400 and PGR 20 provided as laminate and machined parts
- + Durapreg® prepregs for manufacturing personal ballistic protection parts

MASS TRANSPORTATION

Cabin interiors

- + Von Roll provides laminates and prepreg based on fire retardant resins and structural fabrics that find specific applications as “Low smoke density and Low flammability” panel for trolleys, cable ducts and other flat walls and parts inside aircraft cabin (acc. to ATS 1000.001 / FAR 25.853) and train (acc. to EN45545).

Key products are:

- + Vetronit FR5 HF CTI 600M: special laminate made of fine weave glass fabric bonded with halogen free and temperature resistant epoxy resin.
- + NXT GEN EP200: FST epoxy based prepreg series designed for sandwich parts such a floor panels, sidewalls and ceiling parts where also low flammability and heat release are required.

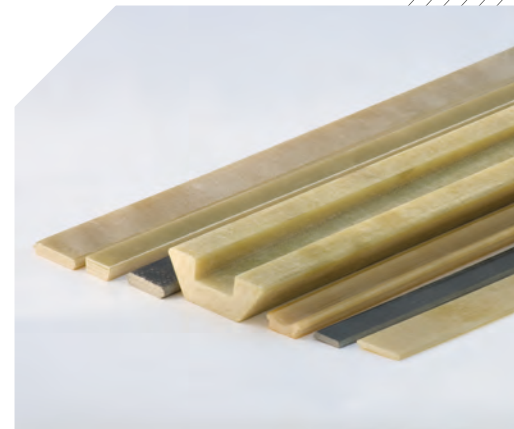


SLOT WEDGE FOR TRACTION MOTORS

- + Von Roll provides slot wedges, used primarily in big motors (wind generators) or traction motors.
- + Slot wedges are used to hold the stator windings in the slots formed between the stator teeth.

KEY PRODUCTS ARE:

- + Vetronite G11: a specific electrical insulating laminate.
- + Vetroferrite laminate and Vetroferrite Prepreg composed of a very special type of glass fabric and high temperature epoxy resin with high content of iron powder. These products are specifically used for magnetic slot wedges, often used to improve starting performance of large induction motors.



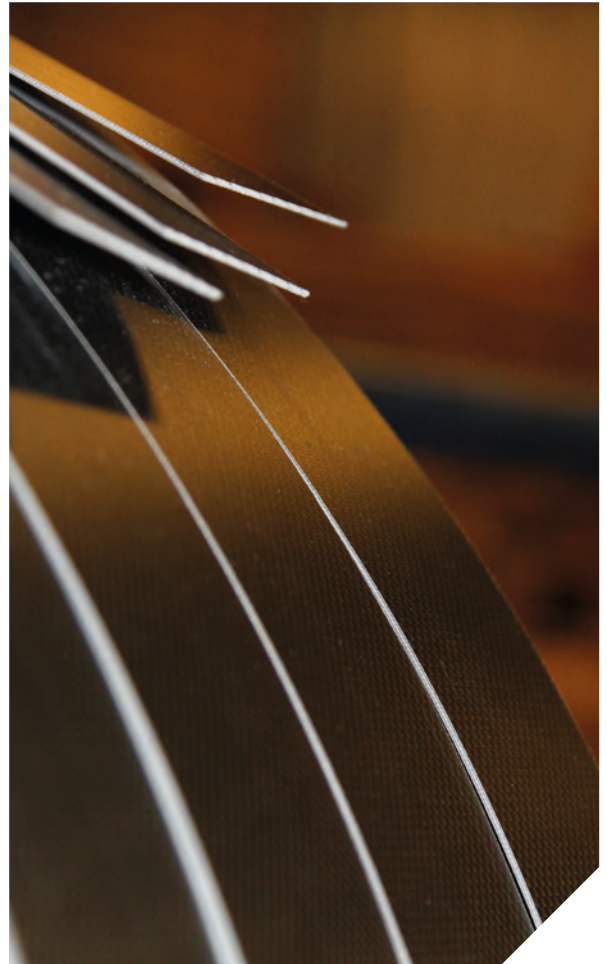
SPECIALITIES

DOCTOR BLADES

- + Doctor blades are thin composite coils designed for use in paper-making equipment.
- + Based on different reinforcement materials (glass, aramid, carbon and cotton) with specific fillers (abrasive, graphite) and resin systems, doctor blades manufactured by Von Roll provide the solution to various problems relating to corrosion resistance, temperature resistance, wear and softness for paper machine cylinders.
- + Doctor blade products are manufactured in rolls up to 150 meters in length, and in various thicknesses up to 3.25 millimeters. Coils can be chamfered or routed.



Doctor blades are used in the paper industry



Carbon doctor blades in roll strips

ELECTRONICS

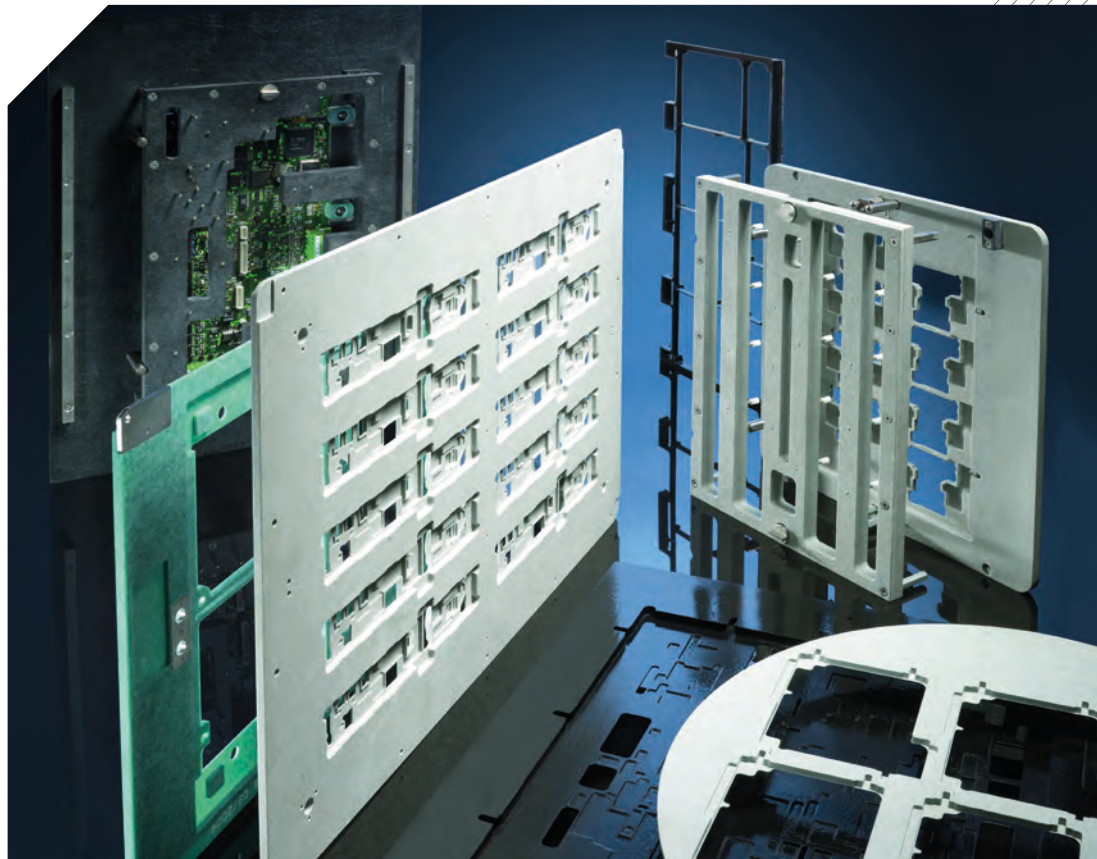
Laminates with antistatic features

Offering of products with special dissipative performance:

- + EP 105 and EP 105 AS epoxy paper /glass epoxy
- + Adaptonit 105 AS with a phenolic paper core
- + Vetronite EGS T23 AS
- + Vetronit EGS 619 AS with self-extinguishing characteristics

Special applications

- + Antistatic parts
- + Solder frame, antistatic
- + Test adapter
- + Measurement devices



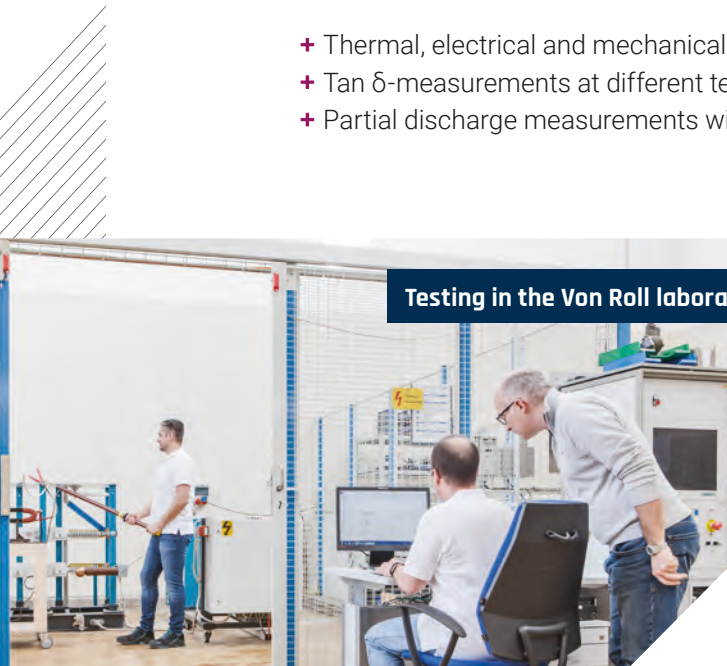
TESTING



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



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, dark blue, sans-serif font. The 'v' is lowercase and the 'o' is lowercase, while 'nRoll' is uppercase.