



Company profile and product overview

The fascination of solutions
lappinsulators.com

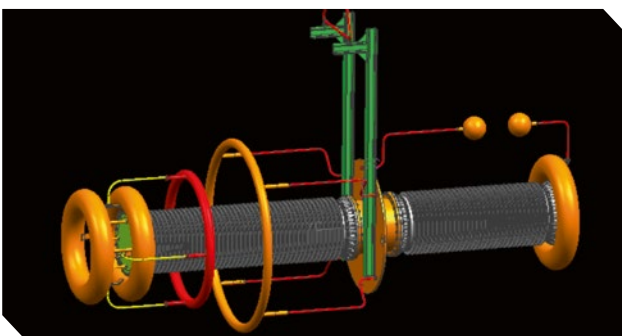


Where innovation meets application



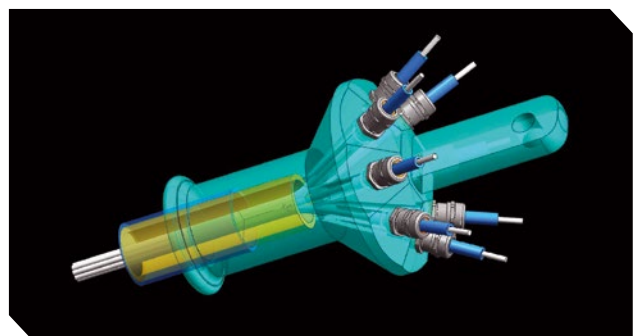
LAPP Insulators Group is the leading manufacturer and supplier of high voltage insulators with global sales and references in more than 70 countries. Our company reaches back to 1916 with the founding of *LAPP Insulators* in LeRoy, New York, USA and from the traditional roots of the European renowned manufacturers Rosenthal and Siemens.

Innovative research



For more than 100 years *LAPP Insulators* has been internationally known for innovative solutions. These are derived from continuous research and development and our claim to offer our clients customized individual concepts with first class products and strong service.

Product competence

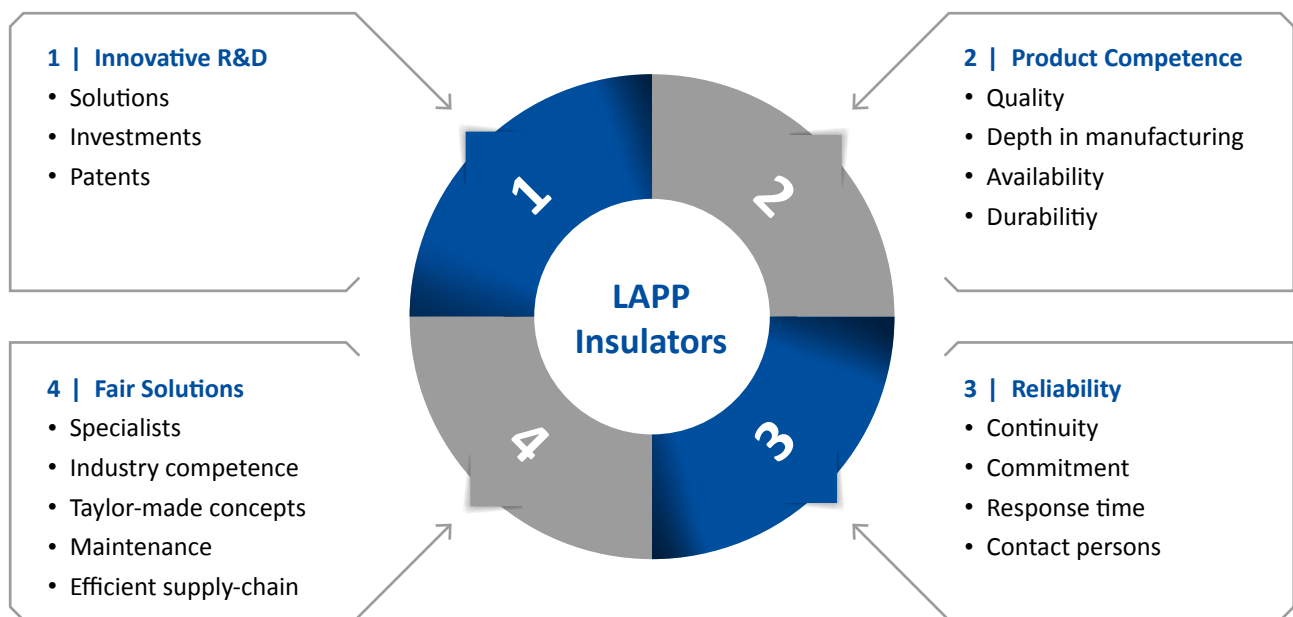


Our production chain reaches from the raw material to the finished product. This guarantees for our customers not only the highest failure-proof and operational safety but also the best availability. The durability of our products brings further profitability for our customers.

The fascination of solutions

We love what we do. That makes the difference. And that's the reason why *LAPP Insulators* is a source of continuous innovation. Our secret? We mix knowledge with creativity and apply both to a given situation. The outcome: Unique and fascinating solutions operated by high-end products. That's what we understand as the fascination of solutions.

Core Competences



Customized solutions



Our teams at *LAPP Insulators* are formed from competent specialists – not only in product matters but also in the respective business segments. Together with our customers we develop fast and efficient individual concepts and complete solutions.

Reliability



For more than 100 years *LAPP Insulators* reliability means meeting deadlines and fast and flexible response times characterized by optimum sales support and best delivery performance.

Transmission & Distribution Overhead lines

Requirements



Besides mechanical and electrical stresses, environmental influences such as rain snow and ice as well as other extreme climatic conditions place a challenge on materials and products.

Solutions

Our products are customized and engineered to meet the customer specifications. Our engineers work hand in hand with our clients to design long lasting products while maintaining high quality standards.

Especially the transition to alternative energy in Germany can be taken as a good example: Germany's existing grid infrastructure and transport of energy from North to South requires insulators that withstand the most varied weather conditions along the long route from the sea to the mountains.

Porcelain Longrod Insulators



Longrod Insulators for transmission lines are produced in accordance with international standards and the respective customer specifications for high voltage transmission lines. In addition we design complete string sets from longrod insulators. To improve the performance under polluted conditions these insulators are also available with RTV silicone coating.

Industry - specific solutions

- Suspension and tension towers for high voltage transmission lines

Main advantages

- Highly reliable insulator product (CIGRE Study / survey WG 22.03)
- Type A (non puncturable) according to IEC 60383
- High mechanical strength up to 550 kN per unit
- Life-expectancy > 40 years
- Standardised string designs
- Silicone coatings available for applications under extreme pollution
- Proven for more than 70 years

RODURFLEX Suspension Insulators



The unique design of *RODURFLEX* suspension insulators which is achieved by using our patented modular system allow a combination of different connecting lengths, various shed profiles and flexible creepage distances. In addition, a large selection of fittings can be used. Due to these versatile possibilities our *RODURFLEX* insulators can be produced in line with customer requirements for all possible applications.

Industry - specific solutions

- Suspension and tension towers for high voltage transmission lines
- Special designs like fibre - optic bushings available

Main advantages

- Superior pollution performance (Hydrophobicity transfer mechanism)
- Earthquake resistant
- Vandalism proof
- Able to withstand extreme dynamic and impact loads
- Light weight: easy transport, handling, installation
- Flexible in design (modular system) up to 8000 mm in single piece, up to 1500 kN SML
- Technology proven since more than 45 years

Porcelain Suspension Insulators



All suspension insulators from *LAPP Insulators* are manufactured to specifications developed utilizing decades of experience in leading technical advancements in the suspension insulator marketplace, resulting in rigorous standards exceeding ANSI and CSA.

Each manufacturing lot is held to rigorous quality control standards and scrutinized by our quality control team to ensure continuous improvement in product performance under sample destructive testing. This strict attention to detail in manufacturing, materials, design and quality control results in a consistent, repeatable, and reliable insulator that once put into service provides our customers peace of mind.

Industry - specific solutions

- Suspension and tension towers for high voltage transmission lines

Special Applications available upon request

- Extra high strength options 300 & 400 kN available
- Alternate creepage / shed profiles
- DC designs
- Silicone coating
- IEC ratings
- Available for use in porcelain horizontal vee assemblies
- Color striping of hardware

Porcelain Medium Voltage Insulators



The application of medium insulators is versatile. Therefore, *LAPP Insulators* offers a wide product range in the low and medium voltage range for 10 kV – 100 kV. Our production range includes e.g. insulator bushings, cable supports and chain, transformer and railway insulators.

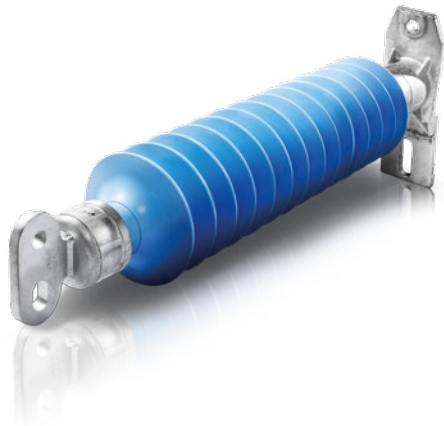
Industry - specific solutions

- Railway electrification
- Medium voltage transformers
- Distribution networks

Main advantages

- Type A (non puncturable) according to IEC 60383
- High mechanical strength
- Life-expectancy > 40 years
- Standardised designs (DB E.B.S. system)
- Full capability of mechanical combined load options
- Silicone coatings available for applications under extreme pollution

RODURFLEX Line Post Insulators



The product range of *RODURFLEX* transmission line insulators includes products for vertical and horizontal installation. With various configuration options for the live end and ground end hardware fitting designs for different voltage levels are also possible for our line post insulators.

Industry - specific solutions

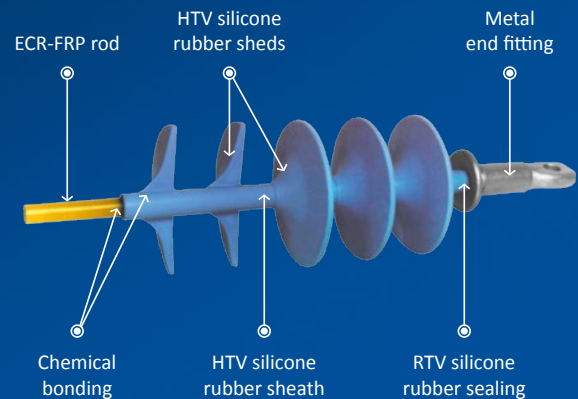
- Compact line insulation for suspension towers in high voltage networks
- Braced post assemblies
- Jumper application

Main advantages

- Enables compact OHTL design
- Braced applications offer extra high strength
- Superior pollution performance (hydrophobicity transfer mechanism)
- Earthquake resistant
- Vandalism proof
- Fail-safe arrangements (bendable bases)
- Able to withstand extreme dynamic and impact loads
- Light weight: easy transport, handling, installation
- Flexible in design (modular system)
- Technology proven since more than 40 years

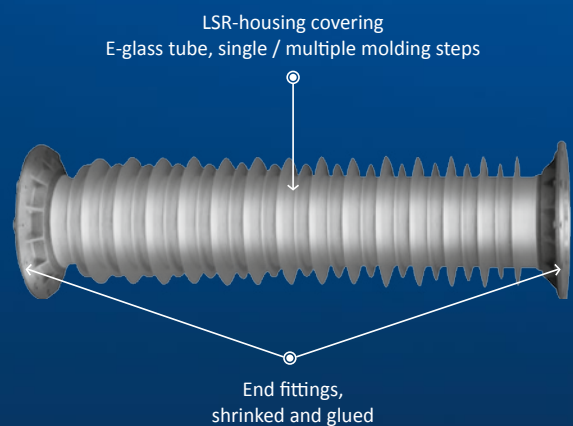
RODURFLEX A solution by LAPP Insulators

Components of a *RODURFLEX*® insulator



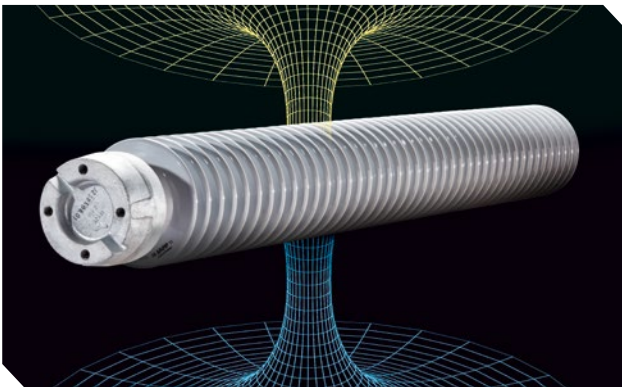
SIMOTEC A solution by LAPP Insulators

Components of a *SIMOTEC*® insulator



Transmission & Distribution Substations

Requirements



Installed outdoors, our post insulators from ceramics and composites are exposed to environmental contamination, climatic conditions and sometimes extreme weather conditions that must not impact performance.

Flawless operational safety and long-standing functionality determine the reliability and reputation of their operators – and are special characteristics of the products from *LAPP Insulators*.

Solutions



Mechanical and geometric adaptation to the local conditions, those are the outstanding features of our insulators – whether of ceramic or composite design.

Porcelain Post Insulators



LAPP Insulators post insulators are made of high strength porcelain C130 for maximum mechanical performance. They are used as busbar supports in high voltage substations and apparatus such as disconnect switches over decades without any need for maintenance.

Industry - specific solutions

- Device and plant construction, e.g. switchgear, for busbars and disconnect switches
- Platform support for capacitor banks

Main advantages

- Standardised designs in accordance with IEC 60273 (C4, C6, C8 ... types)
- Standardised designs in accordance with ANSI C29.9 (TR types)
- 1-piece designs up to 245 kV
- 2 piece design up to 525 kV
- 3 piece design for 800 kV
- Life-expectancy > 40 years
- Full customer specific design options
- Silicone coatings available for applications under extreme pollution
- RG® options available

RODURFLEX Station Post Insulators



Since 1967 *LAPP Insulators* produces the *RODURFLEX* brand insulator in accordance with a patented production method. The most striking feature of the *RODURFLEX* insulators is their flexibility with regards to design options and voltage levels, because their underlying modular system permits a wide range of variations.

Industry - specific solutions

- Busbar supports
- Disconnect switches

Main advantages

- Superior pollution performance (hydrophobicity transfer mechanism)
- Earthquake resistant
- Vandalism proof
- Able to withstand extreme dynamic and impact loads
- Light weight: easy transport, handling, installation
- Flexible in design (modular system)
- Technology proven for more than 45 years

OEM



Requirements

Safety – this means a shatter-proof housing withstanding the most varied forces over many decades. In addition to high inner pressure the housings must in particular withstand mechanical bending stress under normal service conditions and also in case of earthquakes or other natural incidents.

Efficiency – this means a compact design, excellent insulation performance, durability and reliability over the entire product life time while offering the best possible economics. For composite products exposure to UV radiation must also be taken into consideration. In brief: Application specific demands such as location, environmental conditions and climate drive unique solutions allowing OEM customers to protect the reputation of their brand.

Solutions

We respond to these requirements by adjusting design and construction parameters to the particular needs of our various OEM customers. Our experts work hand in hand with our clients to re-design existing products for cost and geometry optimizations while maintaining the same high quality standards.

Our products are tested extensively - with regards to production technology, materials and workmanship.

Porcelain Hollow Core Insulators



LAPP Insulators hollow core insulators are made of high strength C130 porcelain in accordance to IEC and ANSI standards. They are available in cylindrical, conical or round-bodied geometries up to a height of 2800 mm in a single piece.

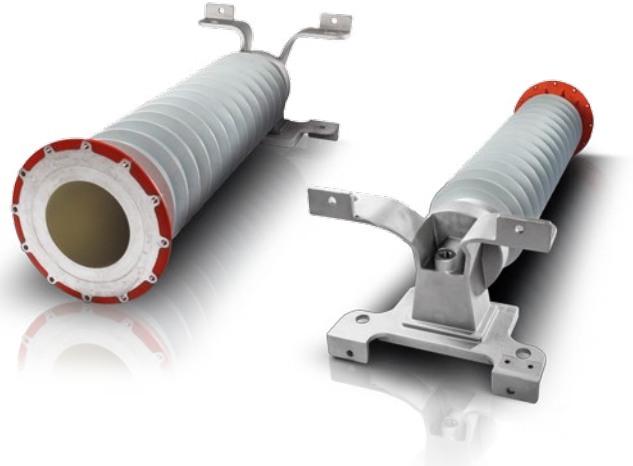
Industry - specific solutions

- Circuit breakers (live and dead tank breakers)
- Current and voltage transformers, surge arresters, SF6-Air bushings

Main advantages

- Highly reliable hollow insulator product
- Extreme weather and environmental resistant
- High / ultra high mechanical strength
- Extreme low deflections under mechanical loading (in comparison to composite hollow core insulators)
- Life-expectancy > 40 years
- Full customer specific design options
- Max. height: 2800 mm single piece
- Max. height: 9000 mm glued / sintered

SIMOTEC[®] Composite Hollow Core Insulators



SIMOTEC hollow core insulators are installed in explosion-proof switchgear that are usually exposed to aggressive contamination and weather conditions during operation. However, due to their design and the high quality material the hollow insulators cope with these conditions for many decades.

Industry - specific solutions

- Circuit breakers (live and dead tank breakers)
- Current and voltage transformers, surge arresters, SF6-Air bushings

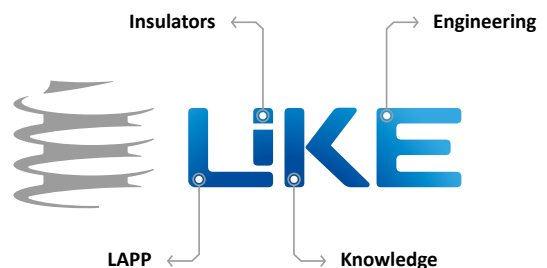
Main advantages

- Enables new apparatus designs
- Enhanced safety (explosion proof)
- Superior pollution performance (hydrophobic transfer mechanism)
- Earthquake resistant
- Vandalism proof
- Able to withstand extreme dynamic and impact loads
- Light weight: easy transport, handling, installation
- Short lead-time
- Technology proven since more than 20 years
- Polyester liner for SF6 applications
- Single piece up to 7500 mm



LAPP LIKE – Living innovation

Our business division *LIKE* (*LAPP Insulators Knowledge and Engineering*) bundles the entire experience and knowledge at a central location to offer our customers individual and innovative solutions. *LIKE* offers optimized service covering consultancy, research innovation and high quality products. Consequently, the proven after sales service of *LAPP Insulators* is also included.



Designed for you — Customized bushings

We design all gas-insulated bushings according to customer / project / test specifications. Special tests such as SVTI, ISPESL, APAVE, TÜV can be implemented as routine / type / sample tests. We also design according to dynamical and mechanical requirements, like seismic or load transfer response.

LIKE offers Engineering and R&D services including electrical and mechanical numeric analysis and owns a HV laboratory in Germany in order to perform all type and routine tests in accordance with IEC 60137. Tightness and mechanical test facilities are also integrated in this process.

Tests:	
PD Tests	1000 kV
Switching Impulse Voltage	1300 kV
Lightning Impulse Voltage	2400 kV
AC Voltage Tests	1300 kV
Radio Interference Tests	
SF6 Gas Tightness Tests	

Available bushing types

EcoHQ Series

Economical high quality GIS and Circuit Breaker Bushings $U_m = 72.5$ to 170 kV for sub-transmission applications

Um in [kV]	72.5	123	145	170
Technology	P/C	P/C	P/C	P/C
I_R in [A]	2500, 3150, 4000	2500, 3150, 4000	2500, 3150, 4000	2500, 3150, 4000
PF wet [kV]	140	230	275	325
BIL in [kV]	325	550	650	750

Creepage distance: 25 ... 40 mm / kV. Rated filling pressure: 520 kPa. All bushings are routine tested (mechanical, electrical (PD) and SF6 tightness) and certified respectively.

G Series

Long-term service experience proven GIS (G) - Outdoor Bushings for transmission applications $U_m = 245$ to 800 kV

Um in [kV]	245 / 300	362 / 420	550	800
Technology	P/C	P/C	P/C	P/C
I_R in [A]	2500, 3150, 4000	2500, 3150, 4000	2500, 3150, 4000	2500 – 8000
PF wet [kV]	460 / 510	460 / 510	460 / 510	960
BIL in [kV]	1050, 1175	1050, 1175	1050, 1175	1950 / 2100

Creepage distance: 25 ... 40 mm / kV. Rated filling pressure: 520 kPa. All bushings are routine tested (mechanical, electrical (PD) and SF6 tightness) and certified respectively.

Research labs

LAPP Insulators invests in research and innovation for high performance ceramics and composites. The group of companies has its own test lab at each production location monitoring the manufacture of the products from high performance ceramics and composites during and after the production process.



„Hochvolthaus“

The company's own high voltage laboratory – the so-called „Hochvolthaus“ in Selb – is unique in Europe and conducts AC and DC tests on objects from LAPP Insulators' own production as well as on behalf of third parties. These include e.g. type and design tests for insulators and insulator strings in accordance with all IEC, ANSI and DIN-VDE standards.



Chemical-physical laboratory

Our chemical-physical laboratories are used for central quality control. The analyses include wavelength-dispersive X-ray fluorescence spectrometry, atomic absorption spectrometry, UV / VIS spectrometry, selected methods of X-ray diffractometry, hot gas extraction methods for O2 / N2 detection in inorganic materials and BET detection using gas adsorption methods.



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LAPP Insulators Redwitz GmbH (Germany)

LAPP Insulators Group
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LAPP Insulators "Hochvolthaus" (Germany)

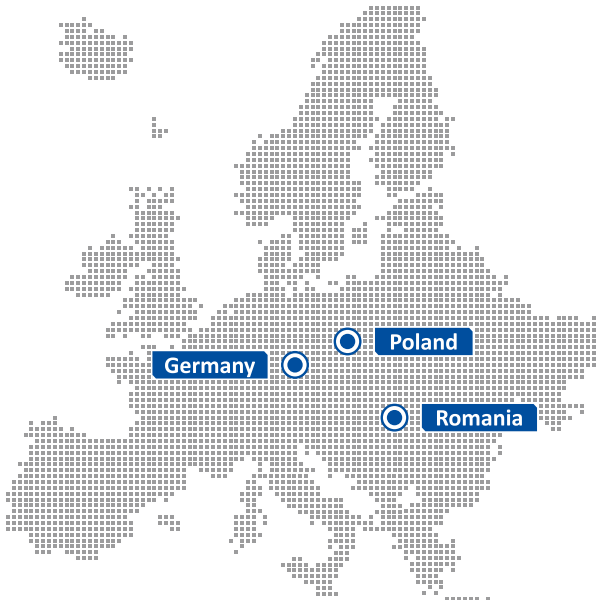
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China

Dalian LAPP Insulator Co. Ltd.

LAPP Joint Venture



Wunsiedel

- Corporate Office of *LAPP Insulators*, R&D Center, Marketing & Sales
- **Production - Porcelain:**
Longrod insulators, Porcelain Station Post Insulators, Porcelain Hollow Core Insulators
- **Production - Composite:**
RODURFLEX Suspension Insulators, *RODURFLEX* Line Post Insulators, *RODURFLEX* Station Post Insulators



Redwitz

- *SIMOTEC* competence center
- OEM competence center
- **Production - Porcelain:**
Longrod insulators, Porcelain Station Post Insulators, Porcelain Hollow Core Insulators
- **Production - Composite:**
SIMOTEC Hollow Core Insulators



Selb

- Company-owned high voltage lab with capabilities for electrical type tests on insulator units and strings up to 765 kV
- Electrophysical demonstrations for companies, schools and universities
- Routine testing of GIS bushings:
 - PD measurement
 - Tightness test of assembled bushings



LeRoy

- ANSI insulator competence centre
- *RG® glaze* competence centre
- **Production - Porcelain:**
Suspension insulators, post insulators and hollow core insulators
- **Production - Composite:**
RODURFLEX Suspension Insulators, *RODURFLEX* Line Post Insulators, *RODURFLEX* Station Post Insulators



Jedlina Zdròj

- **Production:**
Medium voltage and railway porcelain and composite insulators



Turda

- **Production - Porcelain:**
Longrod insulators, station post insulators and hollow core insulators



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