

ABB Composites

Insulating composite components for reliable performance

ABB in Piteå

ABB Composites in Sweden develops and manufactures Power Composites - high performance insulating components made of fiber composite materials for power and high voltage applications. Our mission is to produce world-class, cost-efficient products for customers all over the world. ABB has a long history of working with composite materials dating back to 1918.

ABB Composites is located in Piteå in the northern part of Sweden. Our company was founded by pioneers in the Swedish polymer industry, and production of electrical insulating material started in 1918. The present location was established in 1967 and today there are approximately 160 employees. Our core competence resides in our knowledge of the electrical, mechanical and physical properties of composite materials and in our ability to engineer unique insulation solutions for our customers.

Our main product areas are Composite Insulators, Technical Laminates, Machined Composite Components, Filament Wound Products and Breaker Components.

ABB Sweden

In Sweden, ABB has about 8,700 employees at 35 locations. The company is a leading supplier of products and systems for power transmission as well as for process and industrial automation.





Group photograph 1926

This group photograph of our personnel was taken way back in 1926. Some of the faces are those of pioneers in the Swedish polymer industry. When the picture was taken, they had already been working on polymers for eight years. The pioneering spirit has lived on and has made us into a leading company with high levels of expertise and extensive production resources.

History of ABB Composites

In 1918, the Asea insulation plant in Västerås initiated manufacturing of electrical insulating polymers, resins and varnishes. Development work continued on phenolic resin-based laminates and molding compounds in 1920. In 1921, we began the production of Bakelite, which made us one of the first companies in Sweden to include synthetic plastics in its production program. The first melamine molding compound was produced in 1945, and in 1965 the company introduced SMC (Sheet Molding Compound) on the market. Production was moved to Piteå in 1967, and during that year, injection molding of thermosets also started. Filament winding for lightweight, strong and rigid products was introduced in the early 1970s.

Over the years we have also been a supplier for various industries such as automotive, railway, medicine, fire appliance, aerospace and defense. Today our main focus is power and high voltage applications. As part of ABB, we know the requirements of high voltage applications and the essence of being a reliable business partner with the highest quality standards.

Development and design

Composite materials can offer increased product performance relative to traditional materials. Composites can offer integration of insulating and mechanical functions, weight reduction and strength improvements. Composite materials can be tailor made for specific applications, which enables a highly efficient use of materials.

Product development projects for composite materials require an integrated approach, from idea to completion. ABB has built a strong development team with competence in polymer chemistry, composite engineering, solid mechanics and composite manufacturing processes.

We focus on continuous improvements in the areas of new materials, technologies, design and production. Product developments occur in close cooperation with our customers. In this way we can optimize utilization of composite materials while moving quickly from idea to product inception.

Electrical and mechanical testing

ABB has a material testing laboratory, which supports both production and development activities. The major areas of testing are for electrical, mechanical and physical properties of polymer and composite materials. Data are measured and documented on a routine basis to confirm all important material properties.

Composite Insulators

Composite insulators with silicone rubber insulation possess unique properties. Silicone rubber is the fastest-growing, most dominant polymeric insulation material for high voltage products. By choosing ABB composite insulators, excellent performance and reliability can be assured for the lifetime of the equipment.

Composite insulators were first introduced more than 30 years ago, and the use of hollow composite insulators on high voltage apparatuses is now well-accepted. They offer significant benefits compared to porcelain insulators. Increased safety, light weight, superior pollution and insulation performance are some of the reasons for OEMs and utilities worldwide to shift to ABB composite insulators.

ABB hollow composite insulators are made of glass fiber reinforced epoxy resin tubes with silicone rubber sheds and aluminum end fittings.

In-house production of glass fiber tubes

The insulator tubes are made of electrical-grade glass fiber-reinforced epoxy resin using a wet filament winding technique. Precise and defined winding of the fiber onto the mandrel ensures uniform laminates of the highest quality.

Silicone rubber sheds for best performance

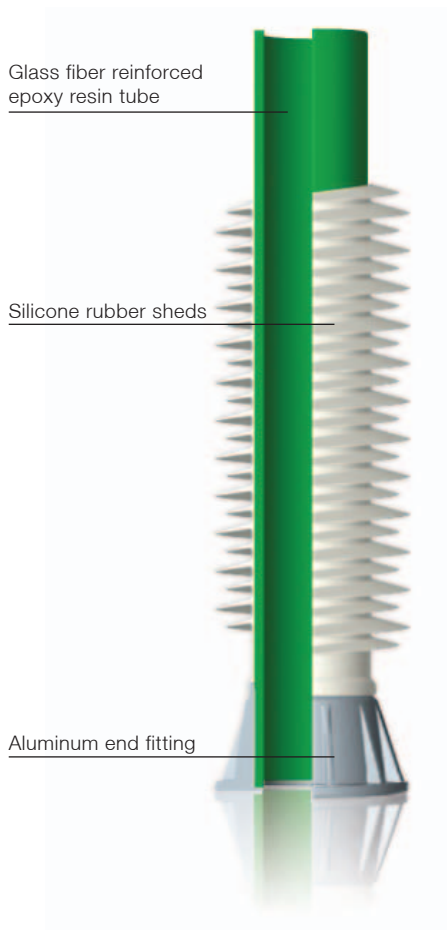
The fiberglass tubes are coated with specially formulated high-temperature vulcanized (HTV) silicone rubber weather sheds, using a void-free helical extrusion process. ABB has developed a unique patented method of extruding the sheds with a helical pattern. This method ensures the best possible interface between the silicone and the tube and a seamless silicone coating with no molding lines. The flexibility of this method also ensures that any customer dimension (diameter, length or shape) can be met, even with the highest creepage distance requirements. HTV silicone rubber ensures the highest possible durability of the sheds, as well as outstanding tracking and erosion resistance.

Extensive testing

ABB composite insulators are thoroughly tested to international standards and higher. They are installed all over the world and have proven excellent performance under all climates and harsh conditions such as coastal, desert and industrial environments.

Applications

We are currently providing hollow composite insulators in the voltage range from 72 kV - 1 100 kV AC / 800 kV DC and in lengths up to 11 m. More than 100 different composite insulators are in production, and each composite insulator design is tailor-made to the customer's requirements. All composite insulators are tested and certified according to IEC 61462.





Examples of applications in which ABB composite insulators are used:

- High voltage circuit breakers (live tank and dead tank)
- Outdoor instrument transformers (current and voltage)
- Surge arresters
- Cable terminations
- Transformer bushings
- Wall bushings
- Gas insulated switchgear (GIS)
- HVDC support insulators
- Voltage dividers

In total, over 60,000 ABB hollow composite insulators have been supplied to customers worldwide. The volume is increasing year by year.



Technical Laminates & Machined Composite Components

ABB Composites has long experience as a supplier of high performance insulating composite components made of technical laminates. We offer a unique combination of technical expertise in the manufacture of both laminates and components, which allows us to adapt the best technical solution for almost any application.

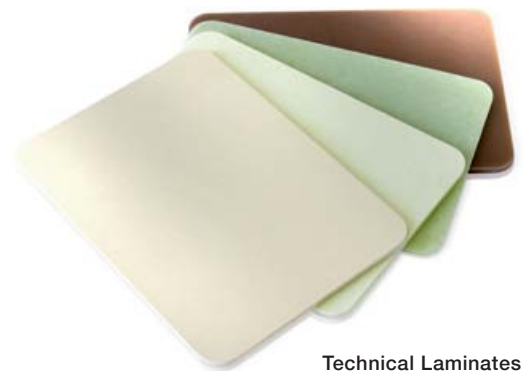
Technical Laminates

A technical laminate of composite is a combination of reinforcement, polymers and additives. We have a number of standard types of laminates with proven properties. Our in-house production of laminates allows us to tailor the material properties to meet individual applications.

They can be designed to resist corrosion, chemicals, high temperatures and fire; the mechanical properties can also be tailored.

Our most common types of laminates can be found below. Detailed material data sheets are available upon request.

Article no	Type of laminate
DE10 20900	Polyester laminate General purpose Temp index F, 155°C
DE10 20910	Polyester laminate High flame retardance and arc resistance Temp index F, 155°C
DE10 20810	Vinylester laminate High mechanical strength and thermal properties Temp index H, 180°C
DE10 20999	Epoxy laminate Type G11, High mechanical strength and thermal properties Temp index H, 180°C



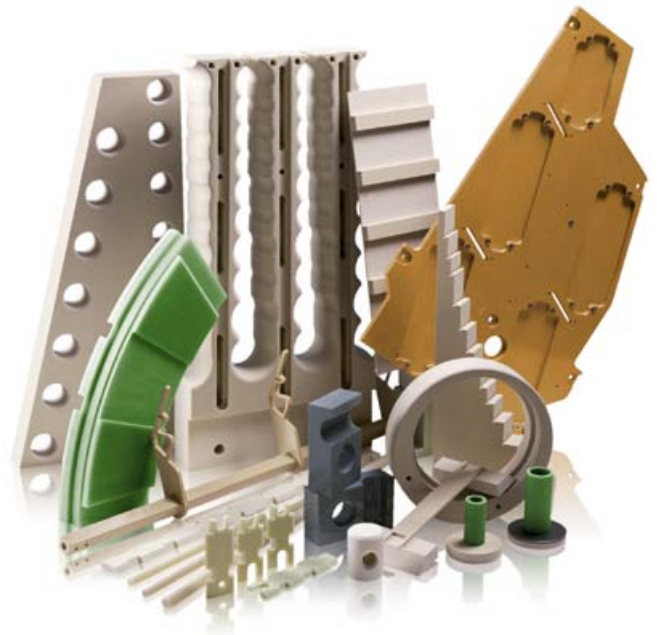
Technical Laminates

High performance Composite Components

Fiber composites combine high strength and low density with excellent insulating properties. In addition, they offer a high resistance to chemicals, heat and fire. Composites are an evolving group of engineering materials with high potential. ABB controls the full process, from producing the technical laminate to machining it to components.

Modern equipment, specially adapted to ensure high quality and efficiency, is used in the manufacturing process from laminate to insulating component. Our modern production facilities include computer controlled machines for water jet cutting, milling and turning.

We are able to produce complex components with narrow tolerances. Manufacturing flexibility enables us to produce just-in-time parts in varying quantities.



Machined Composite Components

Applications

Examples of applications for Machined Composite Components made of Technical Laminates are:

- Core insulation for power transformers
- Insulation for railway transformers
- Slot wedges and frames for power generators and machines
- Insulation components for tap changers, converters, circuit breakers and filters
- Threaded rods and nuts



Filament Wound Products & Breaker Components

The strongest composite materials are produced with guided continuous fibers and high fiber content. This is achieved through filament winding. The characteristics of filament wound materials make them suitable for a wide range of power applications.

A combination of high strength and low weight presents many engineering advantages. The end products are light, strong, stiff and tailor-made to fit the customer's requirements. We use glass, aramid or polyester fibers together with either wet

filament winding or dry filament winding followed by a vacuum injection process. Achieving the desired results requires experience and in-depth knowledge of the production process.



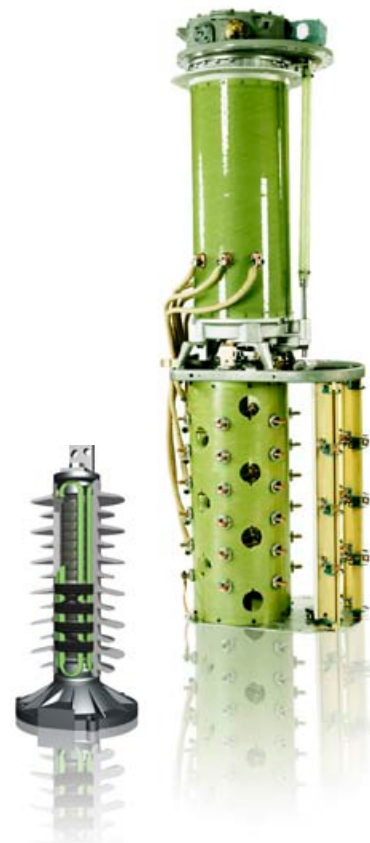
Filament winding



Applications

Examples of applications are:

- Insulating rods for live tank circuit breakers (LTB)
- Insulating rods and tubes for dead tank circuit breakers (DTB), generator circuit breakers (GCB) and gas insulated switchgear (GIS)
- Insulating cylinders for power transformer tap-changers
- Glass fiber loops for high voltage surge arresters
- Shunt reactor cylinders
- Insulating flanges for cable terminations



Contact us

ABB AB**Composites**

Box 273

SE-941 26 Piteå

SWEDEN

Phone: +46 911 728 00

Fax: +46 911 728 84

E-Mail: OrderComposites@se.abb.com

www.abb.com/composites