EB REBOSIO

HIGH VOLTAGE COMPOSITE INSULATORS

132 kV to 400 kV

REBOSIO

GRUPPO BONOMI

ISOFLON-E®

HIGH VOLTAGE COMPOSITE INSULATORS

Investment in automation and new products

Turnover of more than £ 40.000.000

Transmission insulators supplied in over 20 Countries

EB Rebosio have been involved in composite insulator development since the 1950s and have evolved their technology into their Isoflon-E range, introduced in 1986.

Injecting Silicone Rubber in a High Temperature Vulcanised process ensures highly resilient bonding of all insulator components.

Together with redundant seals and close manufacturing control, EB Rebosio polymeric insulators outperform traditional Porcelain and Glass products in comparative tests.

Having welcomed many leading European Energy and Railway operators to their Factory near Bergamo Italy, EB Rebosio have built a reputation for outstanding quality procedures and reliable products.

The worldwide trend toward increasing adoption of composite insulators is reflected in the strong growth of EB Rebosio's production. This growth has been matched by investment with a new factory, increased logistics facilities and greater automation of EB Rebosio production lines.

REBOSIO

Producing world class composite insulators for more than 50 years

Isoflon-E® insulators

Main advantages of Isoflon-E® insulators:

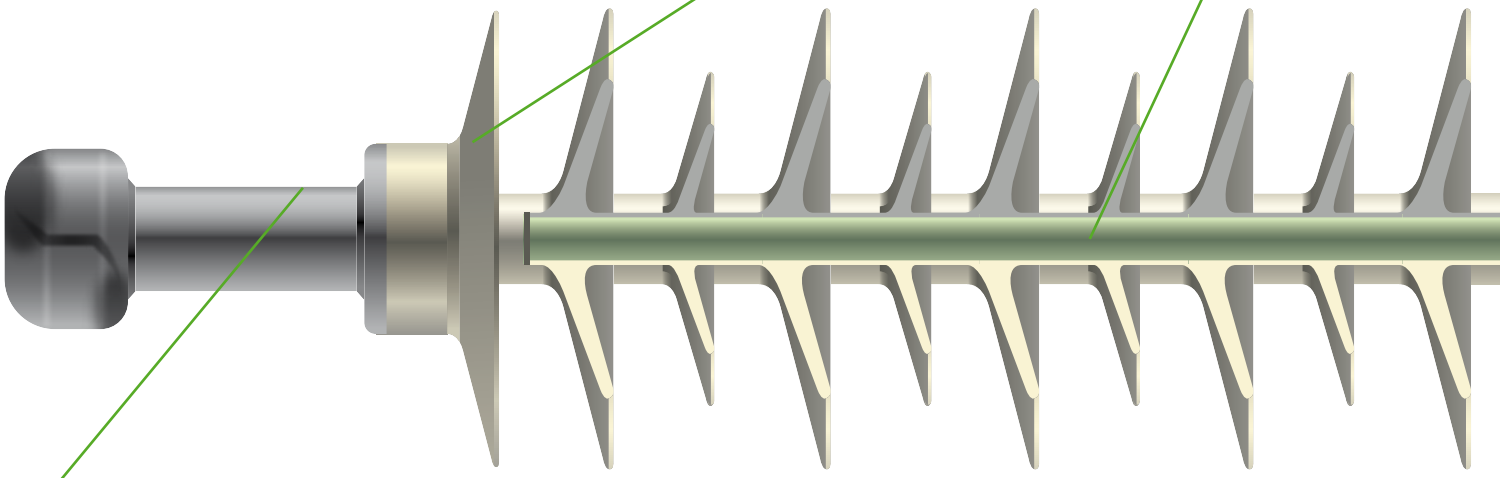
- Light-weight combined with very high mechanical strength
- 90% lighter than conventional insulators
- Robust and shock resistant: added protection against vandalism
- One-piece silicone rubber housing: impenetrable rod protection
- Resistance to atmospheric, chemical and saline pollution
- Standard service life expected based on 30 years' experience
- Use of water-repellent silicone rubber – a key factor
- Very low fume emissions and toxicity
- Low packaging, freight and installation costs

Fiberglass rod

The epoxy-resin rod is reinforced with glass filaments to comply with the mechanical design features in terms of high tensile strength, compressive strength, and bending and twisting resistance.
EB Rebosio have outstanding knowledge and control of our fibreglass rod properties, with in house manufacturing.

Silicone rubber housing

The high temperature vulcanized silicone rubber housing safeguards the electrical features, insulation, tracking and erosion resistance, which determine the life of the insulator during service.



End Fittings

The standard end fittings are made of hot-dip galvanised forged steel, or alternatively stainless steel, black core malleable cast iron, aluminium alloy or copper alloy.
Their high degree of standardisation make them easily interchangeable with conventional insulators, and custom solutions can be developed to meet specific requirements.

Production process and control

Compression of end fittings

Radial compression, which distributes pressure equally, ensures friction with an optimal gradient between the end fitting and the rod. This friction determines the main mechanical properties of the insulator and guarantees long life in service.

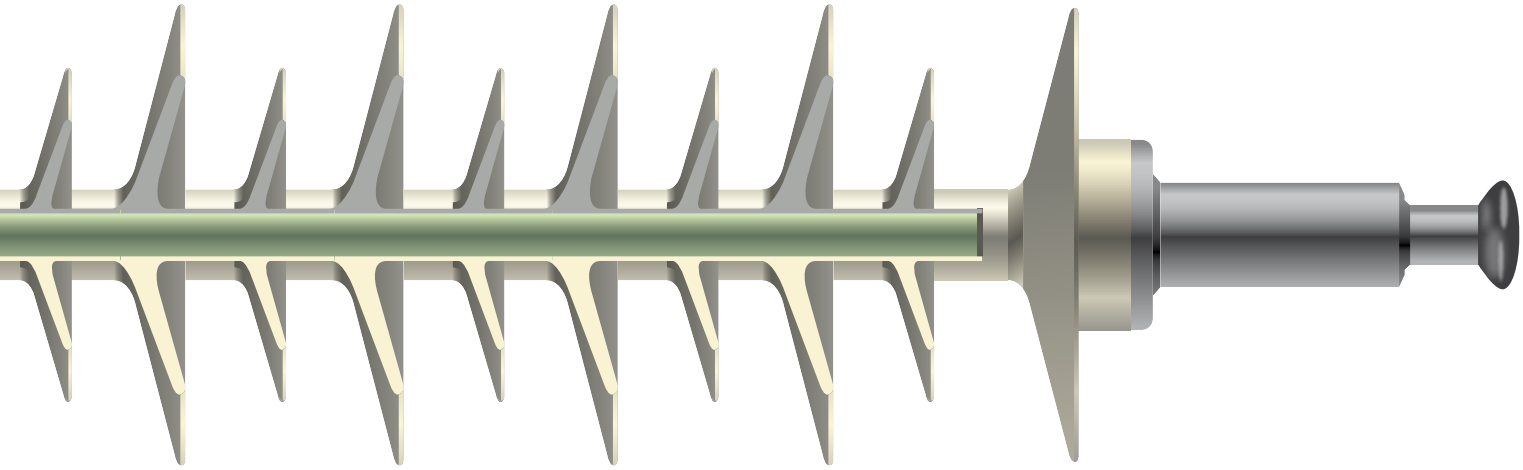
EB Rebosio's manufacturing technologies provide full process control and enable us to record all the data associated with each production batch.

Compression process control in combination with an acoustic-emission crack detection system makes the product extremely reliable, even under high mechanical loads.

HOUSING INJECTION

Water repellence is a key property for the reliable in-service operation of insulators, even in highly polluted conditions, there is minimal need to clean and lubricate EB Rebosio insulators, thus allowing considerable saving in terms of maintenance costs. The HTV silicone rubber used in our products combines excellent trace and erosion resistance, while maintaining a high degree of water repellence, even under heavy-duty service conditions.

The silicone rubber compound used by EB Rebosio possesses a high level of loss and recovery of the surface layer, which allows the insulating surface to “recover” after prolonged exposure to heavy pollution. Top performance in terms of resistance to electric discharges can be achieved despite reduced dimensions compared to conventional insulators, thanks to the key property of water repellence (typical of silicone rubber) and the specific design.



Silicone rubber moulding

Since HTV silicone rubber, the preferred grade, has a high degree of viscosity, it requires an injection process that combines high pressure (up to 200 bar) and high temperature (up to 130° C).

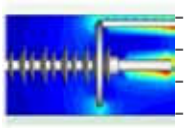
EB Rebosio production process is the injection of HTV silicone rubber, which forms the shedding cover directly on the rod complete with end fittings. This is housed in one modular mould that provides a truly monolithic and homogeneous cover, adhering perfectly to the end fitting and rod, thus preventing the penetration of polluting elements.

QUALITY CONTROL AND TEST

EB Rebosio is certified to ISO 9001:2008 by the Lloyd's Register. Product control involves preparing manufacturing and control plans, accompanied by procedures and instructions. Most of the data collected and the control documents issued are entered in the customised SPI management ùinformation system.

Internal procedures and instructions comply with or exceed the requirements of CEI IEC 61109, 61952, 62217 and 62231.

In connection with in-house product development, EB Rebosio test laboratories, though not independent, conduct the following tests in accordance with CEI–IEC 62217, 61109 and 61952 regulations:



- electrical ageing tests, such as the 1000h salt fog and wheel tests
- thermomechanical traction and bending tests
- long-duration mechanical tests
- electrical tests at an industrial frequency of up to 250 kV cr.

Trace and erosion resistance tests as well as the usual mechanical characterisation tests are carried out on the silicone rubber compounds used.
All this goes to show that EB Rebosio optimises both materials and design before conducting conception and type-approval tests at approved independent laboratories.

Below is the list of the laboratories that EB Rebosio uses:

KEMA - Arnhem, Holland
EGU - Prague, Czech Republic
FGH - Mannheim, Germany
ICMET - Craiova, Romania
CESI - Milan, Italy
ZKU - Prague, Czech Republic
VNL - Budapest, Hungary

Special requirements originating from customer specifications are handled and monitored separately.
For example, if protections or earthing fields need to be designed, Rebosio has its own programme dedicated to the study of electrical fields and purpose-trained personnel.

Under our quality control system, production batches can be traced fully since only the end fittings are outsourced from a factory not belonging to the Group.

EB Robosio has its own laboratories equipped to conduct the following tests: routine tests in accordance with the above standards; for instance, traction tests can be performed on insulators up to 6 m long and subjected to a load of 600 kN; acceptance tests, also with reference to the above standards, including bending, compression and twisting tests on the entire production range.

Isoflon-E®: 220 kV Transmission lines
EWZ (Switzerland)
Extremely severe pollution (cement factory smoke) is not affecting the insulators performance in service since 1989

Isoflon-E®: 220 kV Transmission lines
EWZ-Switzerland

Isoflon-E®: 400 kV Transmission lines
ADWEA Substation in Abu Dhabi.
Successful install in high salinity conditions.

Isoflon-E®: 132 kV Transmission lines
wood poles MG Route (UK)

Supplies&Volumes

Transmission up to150 kV

- ENEL - Terna (Italy) - 57,000
- TEIAS & Contractors (Turkey) - 88,700
- MENA Utilities - 20,000
- UK Utilities - 10,500
- Italian Railways - TAV (Italy) - 18,500
- Iberdrola, Endesa, Union Fenosa (Spain) - 27,000
- Vattenfall (Sweden) - 3,000

Transmission up to190 kV up to 320 kV

- ENEL - Terna (Italy) - 11,000
- ONE (Morocco) - 10,600
- SAE & Kalpataru (Ethiopia)- 8,000
- MENA Utilities - 6,000
- Sonelgas (Algeria) - 8,100
- Iberdrola (Spain) - 7,200
- Tennet (Holland) - 1,900

Transmission from 300 up to 400kV

- ENEL - Terna (Italy) - 5,500
- TEIAS & Contractors (Turkey) - 41,400
- Nepco (Jordan) - 4,000
- ONE (Morocco) - 25,500
- Iberdrola (Spain) - 3,000

GRUPPO

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