Electrical Insulators & Accessories

ECMEI

By ELSEWEDY ELECTRIC

INDEX

INTRODUCTION

A global leader that has evolved from a local manufacturer of electrical products into an integrated infrastructure solutions provider, with over 19,000 employees and with recorded revenues of more than USD 5.13 billion in 2024.
We operate in five key business sectors: Wire, Cable & Accessories, Electrical Products, Engineering & Construction, Digital Solutions, and Infrastructure Investments. With a strong presence in 19 different countries, 34 production facilities are spread across African and Asian countries including Egypt, Algeria, KSA, Qatar, Indonesia, Pakistan, and Tanzania. We export a wide range of high-end products to over 110 countries worldwide. At the heart of our approach is an all-in-one integrated Engineering, Procurement & Construction (EPC) service, enabling us to deliver the most complex turnkey projects on time and with the highest efficiency.

A vital part of our mission is ensuring that the communities where we operate develop and flourish. We work to facilitate the global transition toward a sustainable energy future, by establishing green energy projects and smart cities across Africa, the Middle East, and Eastern Europe. In alignment with our 2030 sustainability strategy, we aim to extend and enhance our positive impact, provide energy services to a growing customer base, and drive decarbonization, digitalization, and sustainable transition in Egypt and beyond.

Our growth has been fueled by hiring talent and empowering the businesses and communities where we operate. We help customers digitize and tackle the challenges of an ever-changing world. Our extensive range of digital solutions allows them to become smarter, faster, and more agile. We are dedicated to doing our best to serve our customers while caring for the environment. We aim to use our knowledge of our environmental impact to better develop more sustainable business scenarios and evaluate our future policies.

ECMEI

In June 2008, ELSEWEDY ELECTRIC acquired the Egyptian Company for Manufacturing Electrical Insulators (ECMEI), a distinctive company in the Middle East and Africa in manufacturing ceramic Insulators.
ECMEI was established in 1994 with an annual production capacity of 7000 tons under the license of CERAM group with a wide range of products and long-standing experience in high tension insulators for different applications up to 210 KN, 765 KV Network.

This comprises - but is not limited to - the following:
• Disc insulators with different types: " Open profile , normal, and Anti- fog … "
• Pin insulators • Post • Line post • LV Insulators • Bushing

ECMEI is certified with the following:
• (ISO 9001/2008) for Quality Management System
• (ISO 14001/2008) for the Environment Management System
• ISO 45001:2018 for Occupational Health and Safety
• ISO / IEC 17025:2005 for High Voltage Testing Lab
• ISO 50001:2018

ECMEI – as a part of ELSEWEDY ELECTRIC Group – has embarked on a two – way strategic plan calling for vertical and horizontal integration.
In 2016, ECMEI launched its reliable production line for Polymer insulators rated up to 400 KN and 765 KV under the brand name "Elsewedy Polymer Insulators" (SPI).
Recently in 2019,ECMEI Elise "Elsewedy Fitting" (SF) for manufacturing MV & HV fittings of OHTL GW & Conductors.
up to 765 KV.

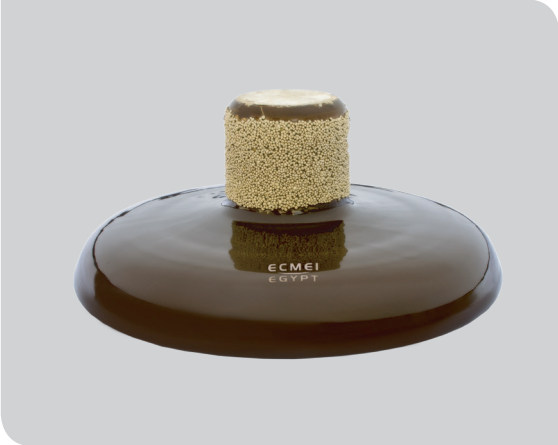
In addition ECMEI provides different Services on the OHTL Field and S/S such as:
• Insulators mechanical clean-up and Maintenance.
• Erections / Rehabilitations of Complete Insulator strings.
• Supplying & applying Anti-flash over RTV Coating material
• Special raw materials supplying (such as fine-grade grinding quartz sand for different applications)

Our vision:
To be one of the leading companies in the field of manufacturing electrical insulators and providing related services worldwide.
Our mission:
Manufacture different electrical insulators and supply to international markets as well as enhancing and developing our society.
Our Values:
• Mutual respect, Credibility, reliability, and integrity.
• Human resources are our dearest asset.
• Loyalty for our customers
• Innovation, Creation and Continues Improvement.
• Working in a safe friendly environment.
• Quality is Uncompromised.

Porcelain Insulators

Porcelain Insulators

1- DISC INSULATORS:



Main Features:

1- ECMEI disc insulator contours ensure maximum creepage path due to their distinctive geometrical configuration .Smooth rounded shell provides protection against chipping.

2- applied glaze is compressive in nature, enhancing mechanical strength and providing a smooth surface for self-cleaning under contamination. Standard glaze colours are Brown or Grey

Caps are made of malleable cast iron and pins are made of forged steel. These are galvanized to provide better protection against corrosion .

3- Socket caps and pins are checked by specified gauges one and all to assure interchangeability . The socket portion suits the R clip. The security clips are made of bronze or stainless steel as per the customer's choice.

4- Afine, resilient bitumen coating on the side of the cap and the surface of the ball pin, as well as on the sand band on the head and in the cavity in contact with cement, is applied to absorb stresses developed due to thermal expansion . It also protects the metal part.

5- The application of Gravel on the shell helps in the uniform transfer of static and dynamic stresses by providing a firm gripping surface for the cement, which serves as a filler between the porcelain and metal parts.

6- Rapid hardening Portland cement with special sand, and jigs equipped with vibrating arrangements, ensure proper distribution of the bonding medium in the assembly of the metal part.

7- Insulators having alternative electro-mechanical ratings, spacing or Creepage distance to suit environmental conditions. Sacrificial collars of Zinc of 99.9 % purity to serve corrosion-polluted areas can be provided as optional features.

Standards:

Porcelain cap and pin insulator complies with the standard specifications of (IEC, IS, EN, ANSI)

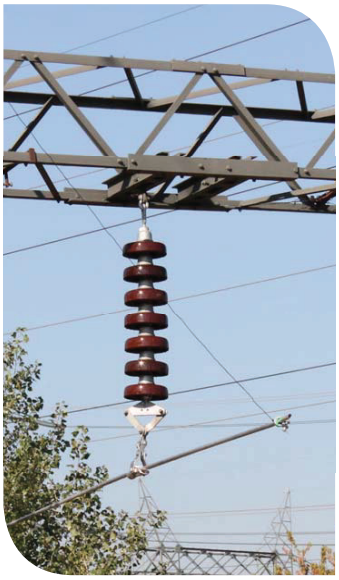
Tests:

Tests are carried out on ECMEI cap and pin insulators in compliance with National, International standards, or the customer's standard.

1 PORCELAIN INSULATORS

Application Guide:

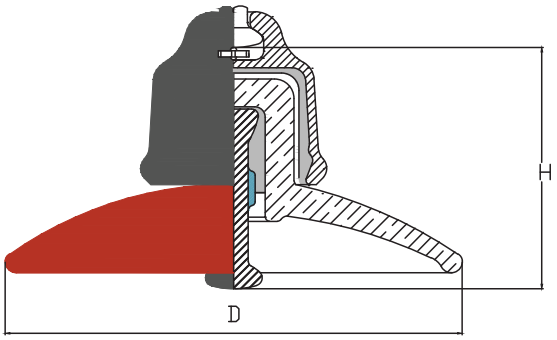
Suspension insulators — or disc porcelain insulators — are the most commonly used types for transmission and distribution lines. In strings, they can be used for any voltage, depending on the number of units connected in series. Their design varies to suit different types of polluted zones and mechanical strength as per the customer's requirements. It is possible to connect strings in parallel in sets of two or more to provide adequate mechanical strength for large spans or heavy conductors. The life expectancy of these insulatorsis extremely high but may be adversely affected if operated beyond the specified limits of electrical or mechanical stress.



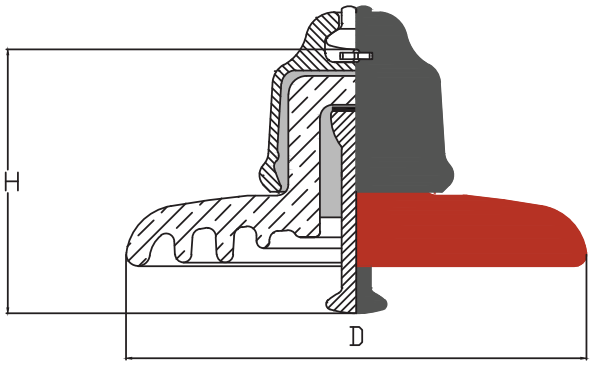
CAP & PIN PORCELAIN INSULATORS

A- Normal Disc & Open Profile types

Cap and pin insulators are generally used on over head transmission and distribution networks to evacuate bulk power over long distances.The insulators could be in suspension or tension made in string form to insulate the conductor from the tower. The Open profile's pin includesa zinc sleeve, and the normal Profile's pin excludes a zinc sleeve unless required. Every insulator is tested with hydraulic pressure and a combination of high and power frequency electrical test; followed by routine mechanical and electrical test as per IEC standard after assembling with cement and metal parts.



Open Profile Type



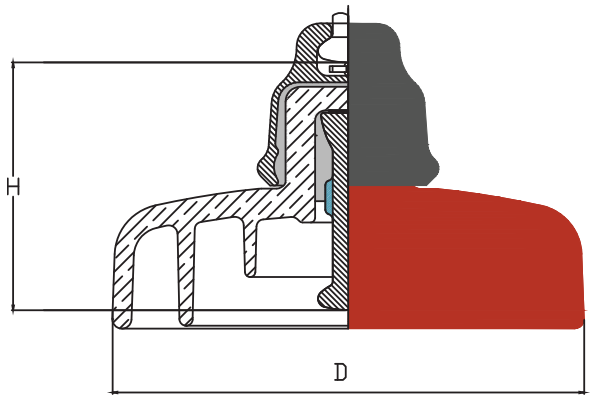
Normal Type

B- Anti Fog Profile

Cap and pin insulators are generally used on over head transmission and distribution network to evacuate bulk power over long distances. The insulators could be in suspension or tension made in string form to insulate the conductor from the tower.

We manufacture anti-fog type insulators up to 765 KV. In a straight head design, the insulator pin includes a zinc sleeve.

Every insulator is tested with hydraulic pressure — a combination of high-frequency and power-frequency electrical tests — followed by routine mechanical and electrical testing according to IEC standards, after being assembled with cement and metal parts.



Anti-Fog Type

2- SOLID CORE LINE POST INSULATOR:

Main Features:

ECMEI Solid core line post insulators conform to the specifications of IEC 383 and ANSI-C29.7.

1-ECMEI product range includes a line post with a clamp top and a stud base for both horizontal and vertical mounting .Conductor groove type line posts are supplied with a short stud or a long stud as required.

2- ECMEI insulators are made from the highest quality wet process porcelain having excellent electrical and mechanical characteristics. Metal parts are made of malleable iron or steel, both of which are galvanized according to ASTM specifications. The cementing operations are carried out under rigidly controlled conditions.

3- ECMEI insulators feature streamlined designs with symmetrical upper and lower electrodes, which prevent the accumulation of salt and dust, thereby providing excellent antipollution performance.

4- These insulators have high arc resistibility similar to solid core long rod insulators. There will be a little decrease in flashover voltage if a shed gets damaged. The sufficient distance between electrodes makes these insulators puncture-proof.

5- Owing to a relatively longer distance between the upper and lower electrodes, the RIV is extremely low.

6- Insulators are normally brown glazed or light grey.

Tests:

The following tests are conducted on ECMEI solid core line post insulators in compliance with national and international standards:

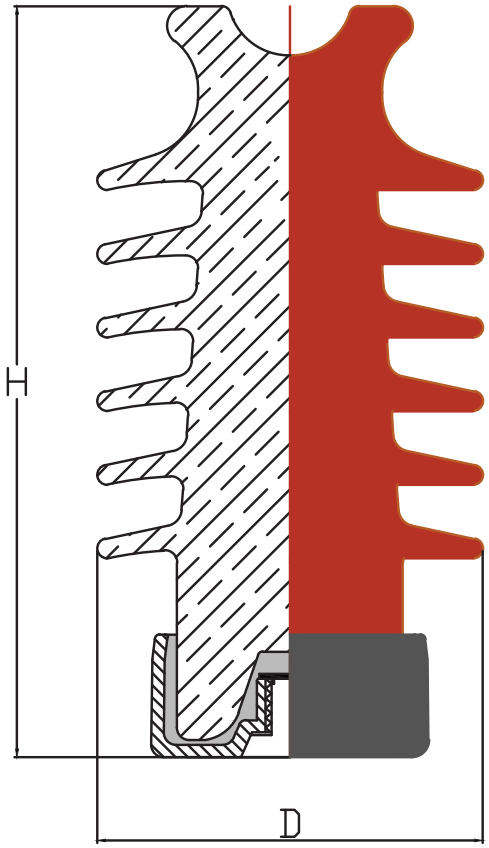
Application Guide:

ECMEI solid core line post insulators up to 33 kV can be used for constructing overhead lines at a lower cost, while maintaining the reliability of a line using suspension long rod insulators. To supplement the deficiencies of pin insulators. The solid core line post insulators based on the long-rod concept are recommended for distribution lines up to 33 kV. Further line construction costs using a solid core line post insulator are cheaper than those using long rod insulators for suspension. These insulators can be used as support for conductors on cross-arms of transmission and distribution line poles.

SPECIFICATIONS:

Line Post Insulator

Line post insulators are used on medium-voltage overhead distribution lines up to 36 KV for attaching conductors to tower structures and are employed in the town's distribution systems. We manufacture these insulators with a leakage path from 356 mm up to 1660 m with mechanical strength up to 12.5 KN.



3- PIN INSULATOR:

Main Features:

1- ECMEI pin insulators are made of high-grade wet process and are normally brown glazed.

2- Pin insulators of ECMEI are manufactured as one piece. One type of thread is normally provided, with a non–ferrous metal insert cemented inside the pin hole. Metal insert (thimble) is made of lead or Zinc.

3- The height of the pins used shall be suitable to provide maximum dry arc distance. Pin insulator with special head grooves to accommodate special conductors can be supplied on request.

Standards:

Pin insulators conforms to specifications of IEC 383

Tests:

Type, sample, routine, and special tests are carried out on ECMEI pin insulators in compliance with National, International standards, or the customer's standard.

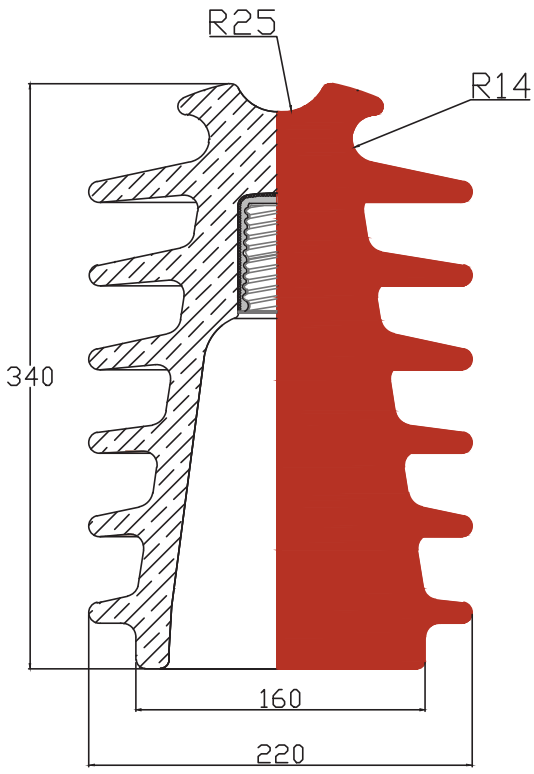
Application Guide:

• Pin insulators of one-piece construction are widely used in low-cost distribution lines. ECMEI manufactures a full range of pin insulators for application in sub-transmission and distribution lines up to system voltage 33 kV.

• These insulators are available with a creepage distance to meet different pollution requirements on request.

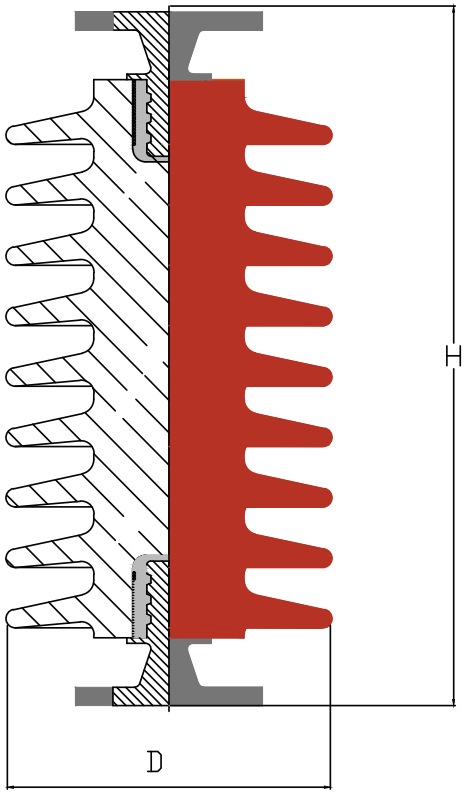
SPECIFICATIONS:

Pin insulators are used on medium voltage overhead distribution lines (15, 25, and 36 KV) to fix conductors to tower bodies, distributing power from the substation to the town and within the town networks. The insulators are manufactured with a leakage path ranging from 330 mm to 1250 mm and a 10 KN bending strength, or they can be customized to meet client requirements.



4- POST/ STATION POST INSULATORS

Post insulators are used in medium, and high voltage 12, 25 KV, 36kV, and 66KV with a leakage path of 440mm up to 2310 mm, with mechanical strength up to 4 KN. They can be used for indoor and outdoor applications.

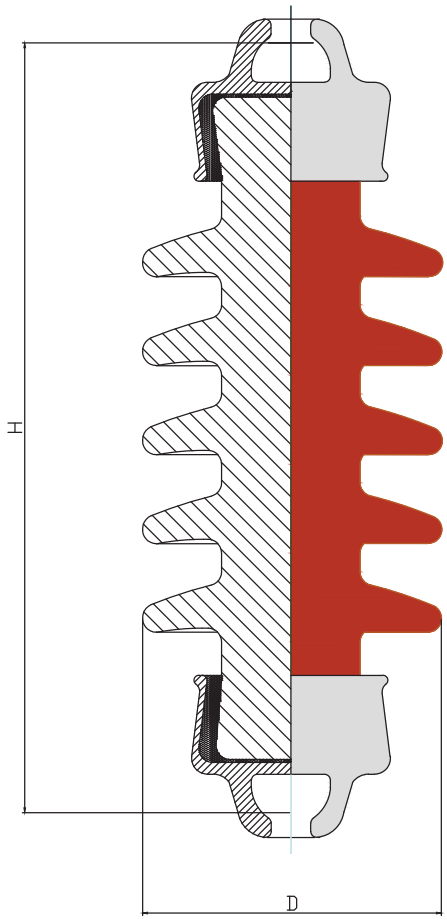


5 - LONG ROD INSULATOR

Long rod insulators are applied to medium and high overhead distribution and transmission lines to suspend or tension the conductor to the tower bodies.

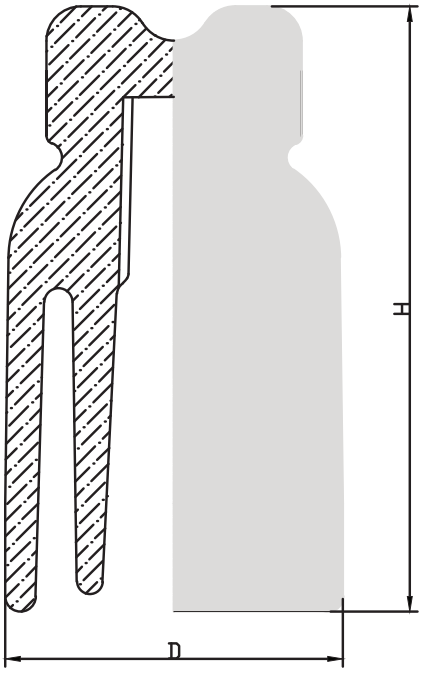
We produce long insulators with ball and socket coupling. The long rod insulators are absolutely puncture-proof and have excellent anti-pollution performance.

Long rod insulators are made with ceramic materials, and they can be manufactured with other voltage levels and higher leakage paths as per the customer's request.



6 - LOW VOLTAGE PIN INSULATOR

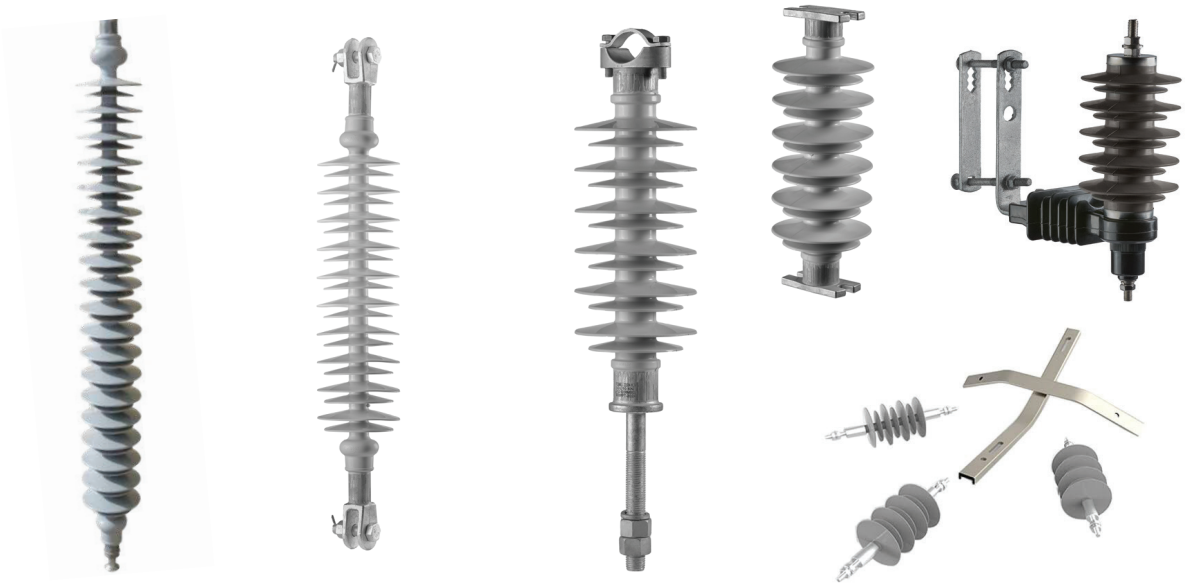
These insulators are fitted on low voltage overhead lines (1 KV) for fixing the conductor to poles and in the distribution system of the town with a leakage path of 150 mm to 280 mm and with a bending load of 8KN to 18KN.



Polymer Insulators

2

INTRODUCTION



ECMEI

The Egyptian Company for Manufacturing Electrical Insulators (ECMEI) is one of the few companies that can offer both porcelain and polymer electrical insulator products. Our insulators are the result of more than 20 years of research and development.

ISO certification 9001, 14001, 18001, ISO 500, and a special one, ISO 17025, have been achieved due to our extensive engineering expertise and shared experience with our esteemed customers.

The high performance and quality of our polymer insulators have been demonstrated through strict attention to quality control processes, advanced manufacturing rules, and the selection of the best materials and optimal designs. These factors enable us to be a leader in our field and meet our customers' requirements.

We have conducted the standard tests specified in international standards, such as IEC. These include various tests, from chemical analysis of the materials to full-scale electrical and mechanical tests on polymer insulators, fulfilled in accredited independent international laboratories.

Our process is a highly automated method that mainly relies on high temperature and pressure vulcanization (HTV) of shedded housing that is injected and vulcanized directly onto the fiberglass rod already fitted with the crimped end fittings. This ensures its high quality and complete reliability.

The full range of our insulators, from the simplest to the most demanding of applications, is produced with the same materials and technology.

Some of the advantages of ECMEI Polymer Insulators are:

- High mechanical strength and low weight using FRP rod that has a high mechanical and acid resistance utilizing ECR glass fiber reinforcement.
- Robust and shock-resistant: anti-vandal
- Pollution resistance with weather sheds design Pollution resistance chemical or natural
- High hydrophobic housing
- very high track and arc resistance
- very low smoke emission and low toxicity
- Two metal end fittings are radially compressed onto the Fiberglass rod.

Polymer Insulators

Composite Long rod Insulator

2.1

45 SPI SILICONE LONG ROD INSULATORS

Overview:

The composite long rod insulators are mainly used in suspension strings on straight-line supports and as tension strings in anchor towers and dead-end structures towers. Also, they are used in jumpers or portals of outdoor substations. In some cases, composite long rods are used as wooden poles, and more rarely as steel towers.

45 SPI – HTV silicone rubber housing for the best pollution performances:

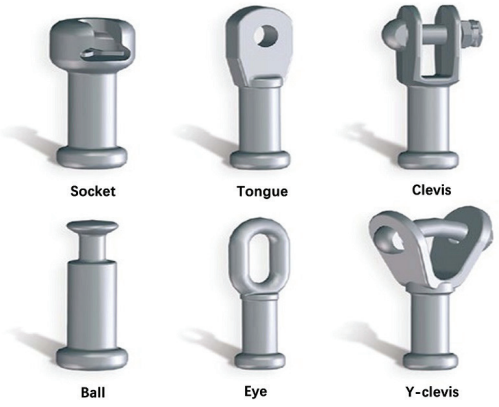
The excellent pollution layer characteristics of the HTV silicone rubber ensure maximum reliability of the 45SPI insulator, even under extreme service conditions like heavy sandstorms or high IR levels in sunny areas. The high hydrophobic housing prevents the formation of a conductive film on its surface. Even under the most severe polluted conditions, such as salt fog in coastal areas or dust-laden air in industrial zones, it cannot impair the intrinsic hydrophobicity of the HTV silicone rubber. Surface currents and discharges are ruled out. Neither water nor dirt on the housing surface can cause insulator flashovers.

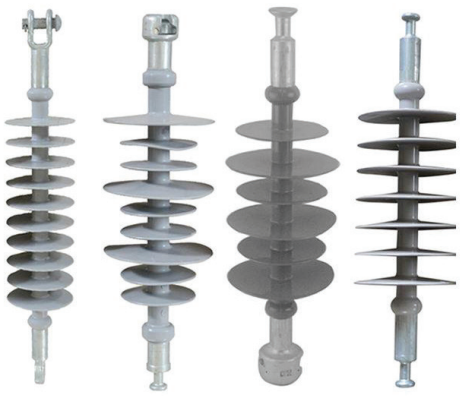
Core:

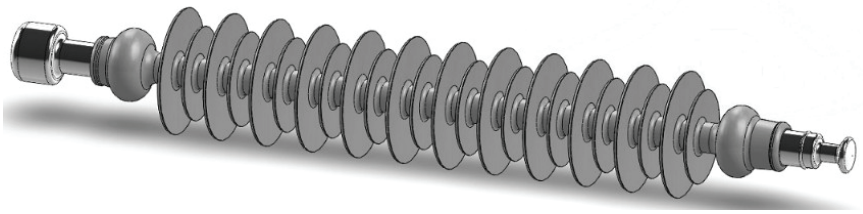
The core rod is a boron-free, corrosion-resistant ECR glass fiber reinforced plastic (FRP) rod. Due to the extremely high hydrolysis and acid resistance of the FRP rod, the risk of so-called brittle fracture is completely eliminated for 45 SPI insulators.

End Fittings:

We use only the end fittings, made of high-grade hot-dip galvanized forged steel, not ductile cast iron, to ensure durability in various climatic conditions for a very long time. They are directly attached to the FRP core rod by a circumferential crimping process. Each crimping process is strongly monitored with a special control system. A complete range of end fittings, compliant with the latest IEC and ANSI standards, is available up to 340 kN of SML. The 45SPI is 100% exchangeable and compatible with existing insulators and line hardware of all types.







Polymer Insulators

Composite Station Post Insulator

2.2

COMPOSITE STATION POST INSULATOR

Overview:

The composite station post insulators are widely used to support bus-bars in transformer sub-station yards, support breakers in switchgear, and support capacitor banks, etc. These polymer post insulators are generally subjected to bending, torsion, and compression forces in service. They may also be installed horizontally, vertically, or underhung sometimes, and different installations will be according to different applications. They can be designed according to IEC, ANSI, and other standards or to customer specifications.

45 SPI – HTV silicone rubber housing for the best pollution performances

The excellent pollution layer properties of HTV silicone rubber ensure maximum reliability of the 45SPI insulator, even in extreme conditions like heavy sandstorms or high IR levels in sunny areas. The highly hydrophobic housing prevents the formation of conductive films on its surface. Even in the harshest polluted environments, such as salt fog in coastal regions or dust-laden air in industrial areas, the intrinsic hydrophobicity of the HTV silicone rubber remains unaffected. Surface currents and discharges are eliminated. Neither water nor dirt on the housing surface can cause insulator flashovers.

Core:

The core rod is a boron-free, corrosion-resistant ECR glass fiber reinforced plastic (FRP) rod. Due to the extremely high hydrolysis and acid resistance of the FRP rod, the risk of so-called brittle fracture is completely eliminated for 45 SPI insulators.

Polymer Insulators

Composite Line Post Insulator

2.3

COMPOSITE LINE POST INSULATOR

Overview:

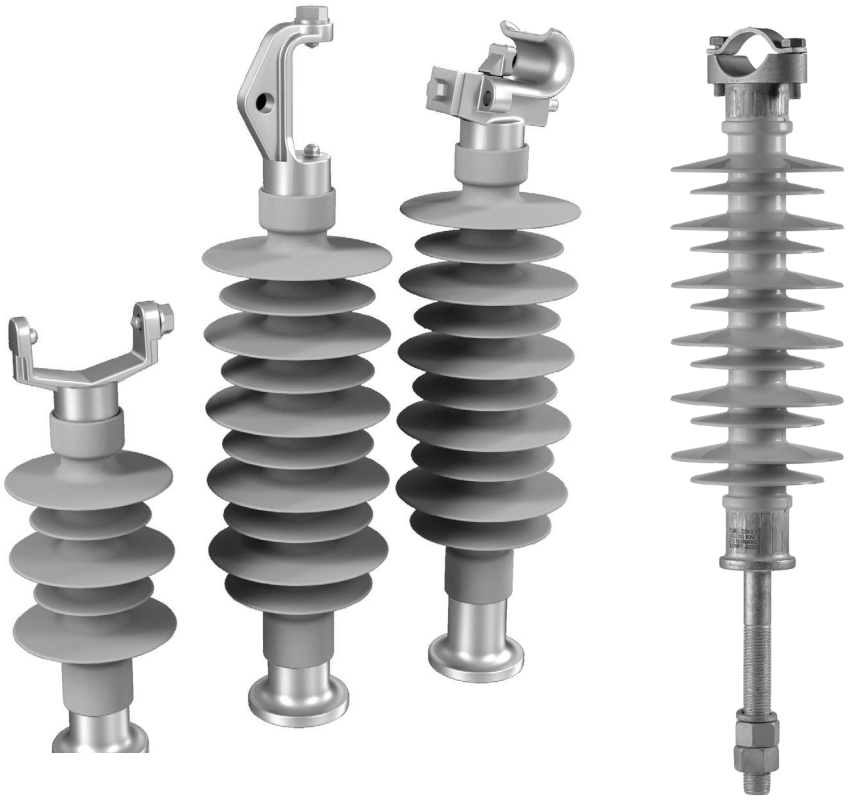
The composite line post insulators are widely used to support conductors on the cross-arms of distribution line poles. They can be designed according to IEC, ANSI, and other standards or to customer specifications.

45 SPI – HTV silicone rubber housing for the best pollution performances

The excellent pollution layer characteristics of the HTV silicone rubber ensure maximum reliability of the 45SPI insulator, even under extreme service conditions like heavy sandstorms or high IR levels in sunny areas. The high hydrophobic housing prevents the formation of a conductive film on its surface. Even the most severe polluted conditions, such as salt fog in coastal regions or dust-laden air in industrial areas, cannot impair the intrinsic hydrophobicity of the HTV silicone rubber. Surface currents and discharges are ruled out. Neither water nor dirt on the housing surface can cause insulator flashovers.

Core:

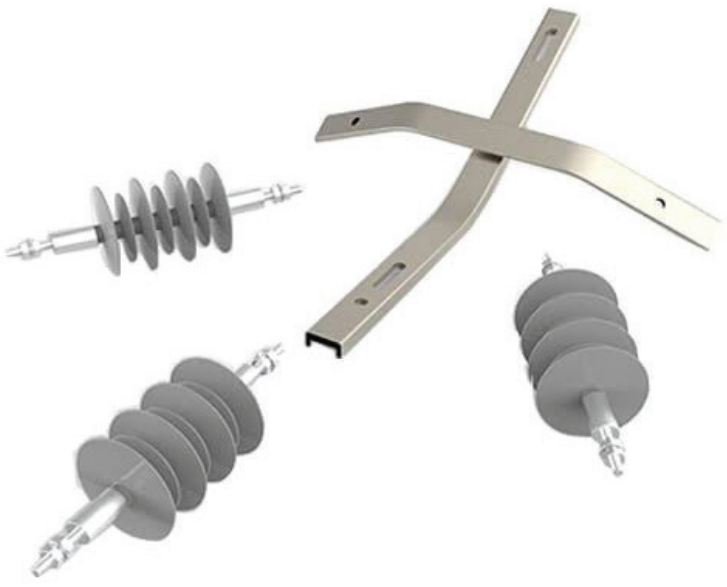
The core rod is a boron-free, corrosion-resistant ECR glass fiber reinforced plastic (FRP) rod. Due to the extremely high hydrolysis and acid resistance of the FRP rod, the risk of so-called brittle fracture is completely eliminated for 45 SPI insulators.



Polymer Insulators

Composite Stand-off Insulator

2.4



COMPOSITE STAND-OFF INSULATOR

Overview:

The composite stand-off insulators are used to mount outdoor cable terminations onto poles or other suitable structures for connection to overhead lines.

HTV silicone rubber housing for the best pollution performances

The excellent pollution layer characteristics of the HTV silicone rubber ensure maximum reliability of the 45SPI insulator, even under extreme service conditions like heavy sandstorms or high IR levels in sunny areas. The high hydrophobic housing prevents the formation of a conductive film on its surface. Even the most severe polluted conditions, such as salt fog in coastal regions or dust-laden air in industrial areas, cannot impair the intrinsic hydrophobicity of the HTV silicone rubber. Surface currents and discharges are ruled out. Neither water nor dirt on the housing surface can cause insulator flashovers.

Core:

The core rod is a boron-free, corrosion-resistant ECR glass fiber reinforced plastic (FRP) rod. Due to the extremely high hydrolysis and acid resistance of the FRP rod, the risk of so-called brittle fracture is completely eliminated for 45 SPI insulators.

End Fittings:

We use only the end fittings, made of high-grade hot-dip galvanized forged steel, not ductile cast iron, to ensure durability in various climatic conditions for a very long time. They are directly attached to the FRP core rod by a circumferential crimping process. Each crimping process is strongly monitored with a special control system.

Polymer Insulators

Composite Zinc-oxide (Zno) Surge Arrester

2.5

COMPOSITE ZINC OXIDE SURGE ARRESTER

Overview:

The main task of an arrester is to protect equipment from over-voltage effects. Under normal operation, an arrester should not negatively impact the power system. Additionally, the arrester must be able to handle typical surges without damage. Nonlinear resistors meet these criteria due to their specific properties:

-Low resistance during surges, to limit overvoltages.

-High resistance in normal operation to avoid negative effects on the power system.

-Sufficient energy absorption capability for stable operation.

ZINC-OXIDE (Zno): the core of surge arrester:

ZINC-OXIDE (Zno) varistors provide a high energy absorption capability and a very low protection level. This means they absorb a high amount of energy while avoiding thermal runaways.

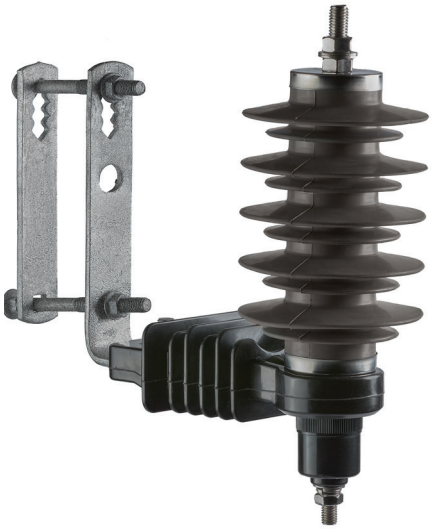
Self-destruction, and they maintain their characteristics throughout their lifetime.

their single impulse energy absorption capability. Surge arresters are less prone to self-heating and consequent

The ZINC-OXIDE is characterized by its high long-duration current impulse withstand capability, an indirect measure of

45 SPI – HTV silicone rubber housing for the best pollution performances:

The excellent pollution layer characteristics of the HTV silicone rubber ensure maximum reliability of the 45SPI insulator, even under extreme service conditions like heavy sandstorms or high IR levels in sunny areas. The high hydrophobic housing prevents the formation of a conductive film on its surface. Even the most severe polluted conditions, such as salt fog in coastal regions or dust-laden air in industrial areas, cannot impair the intrinsic hydrophobicity of the HTV silicone rubber. Surface currents and discharges are ruled out. Neither water nor dirt on the housing surface can cause insulator flashovers.



INSULATED MOUNTING BRACKET

ARRESTER DISCONNECTOR

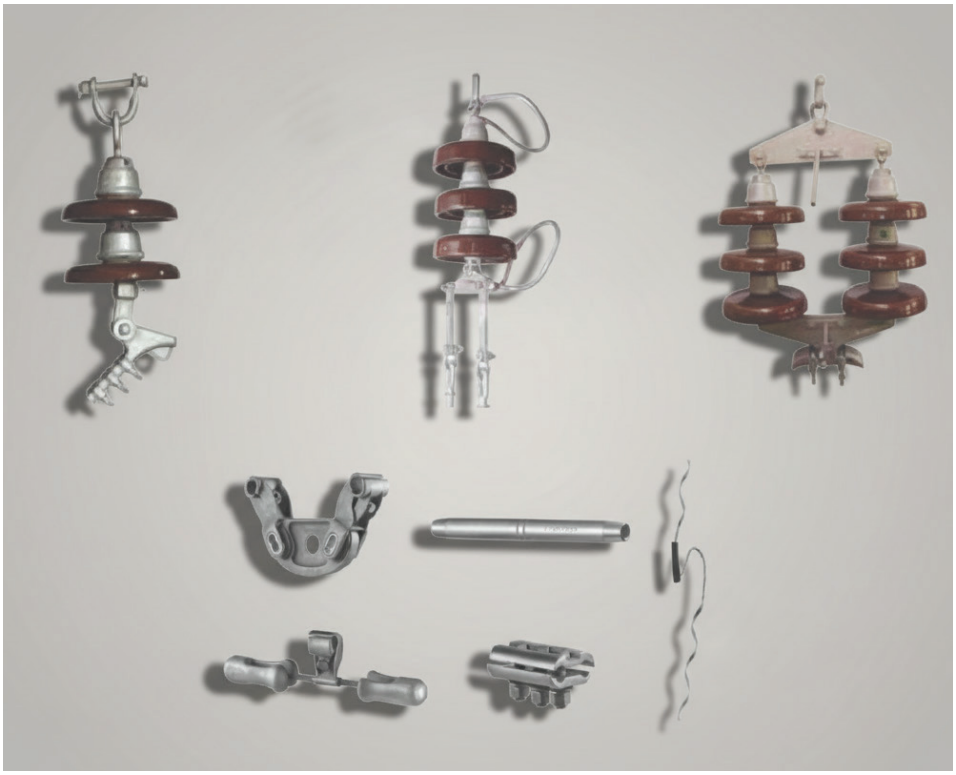
ZINC-OXIDE (ZNO) VARISTORS

NEMA BRACKET

GROUND LEAD

Insulator Fitting

3

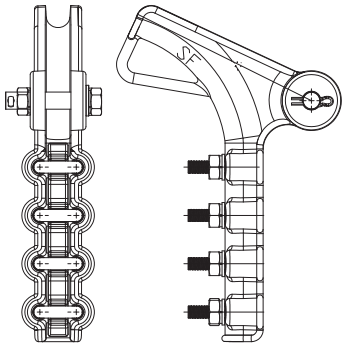


INSULATOR STRING FITTING

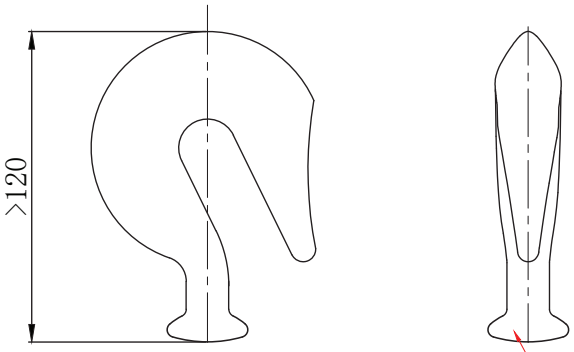
Insulator fitting set up to 36 KV

It is the string that contains some of the following parts to make a complete insulator string, mainly for disc and long rod insulators.

Tension clamp

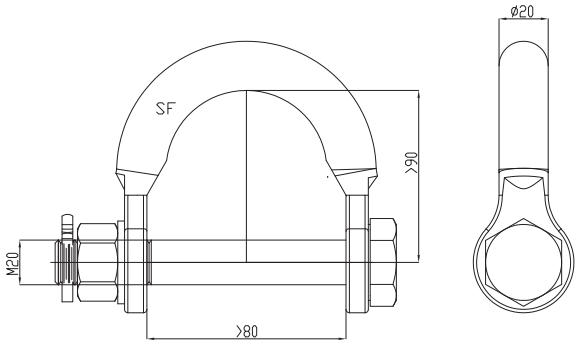


Tension Clamp

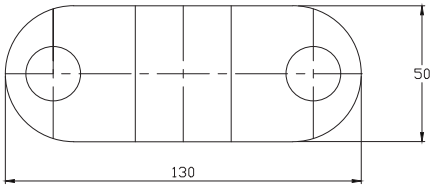


Hook

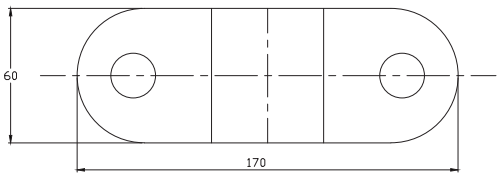
IEC 120 ball size 16A



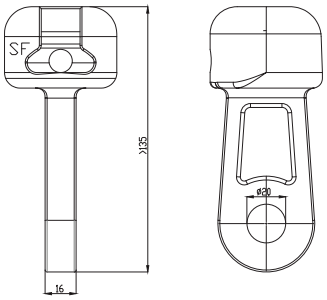
Chain Shackle



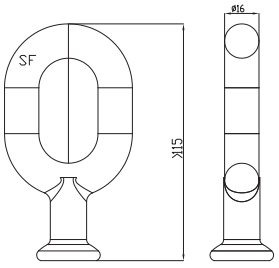
Extension link for 3u bolt tension clamp



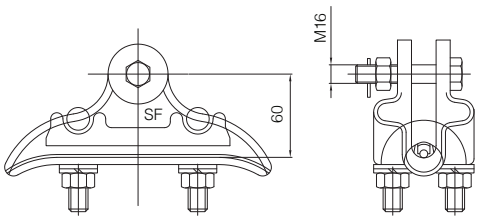
Extension link for 4u bolt tension clamp



Socket Eye



IEC 120 ball size 16A
Ball eye

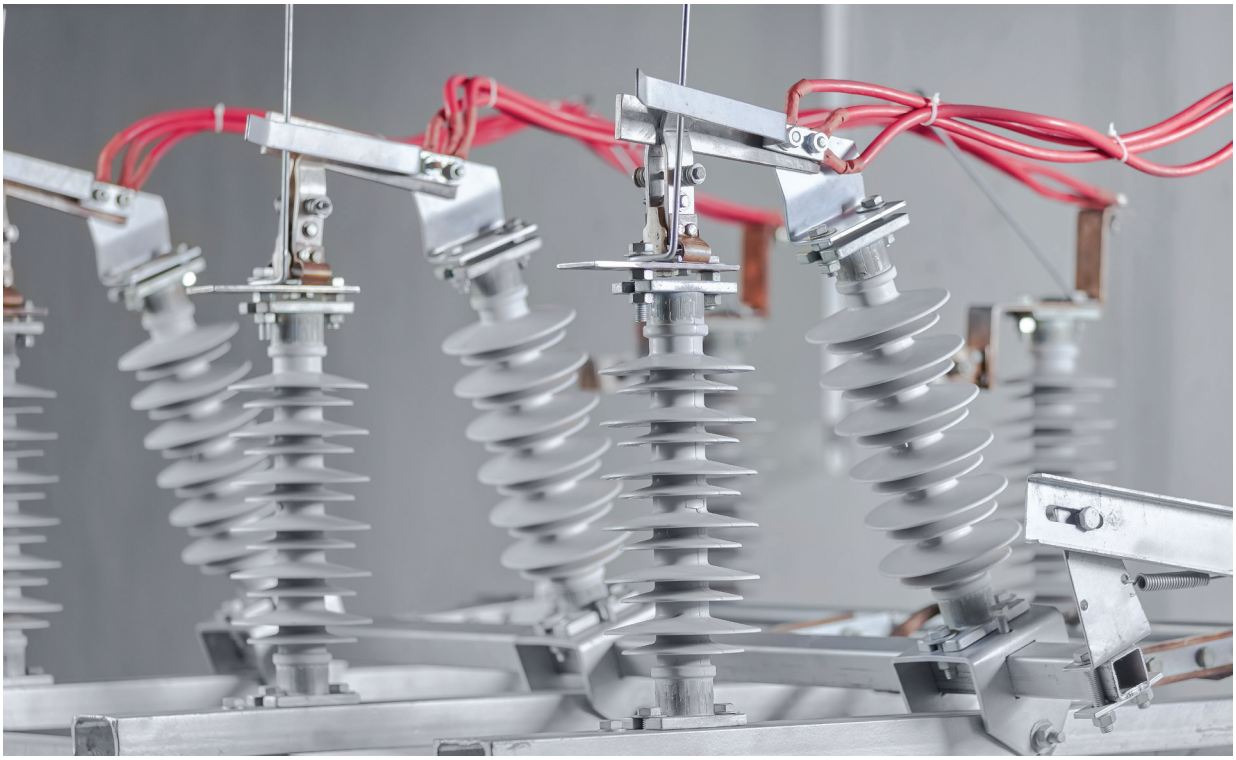


Suspension Clamp

Insulators Fittings

Air Disconnector Switch

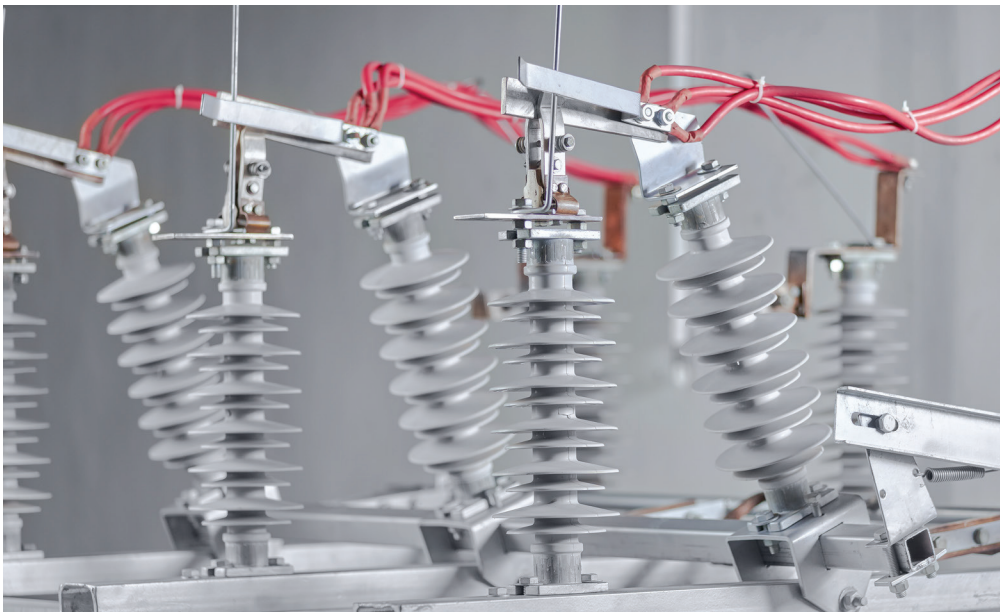
3.1

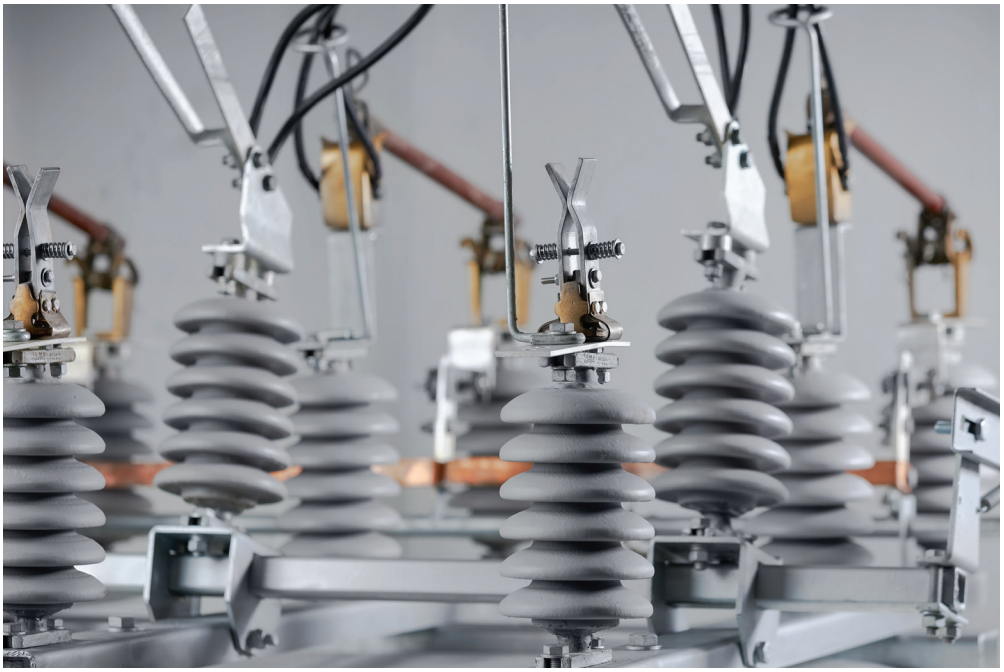


AIR DISCONNECTOR SWITCH

Overview:

The medium voltage outdoor switches and disconnectors provide comprehensive solutions up to 36kV for disconnection and load break operations of overhead lines, with ratings of 200, 400, and 630A. It can be equipped with a drop-out fuse.
ECMEI produces different types of air-disconnector switches, including the following:
- Air Disconnector Switch (Porcelain Coated RTV).
- Air Disconnector Switch
- (Polymer) One-way earthing switch.
- Two-way earthing switch.





RTV Coating

4

Porcelain strength meets hydrophobicity

To avoid leakage currents, discharges, and pollution flashovers, a silicone layer is applied to the insulator surface by using a special spray coating technique. This silicone layer provides a hydrophobic surface, combating the negative effects of contamination and enhancing electrical characteristics, including low leakage currents, in highly polluted areas.

ECMEI is one of the few insulator manufacturers that can offer RTV coating directly to our customers without involving an external company for this service.

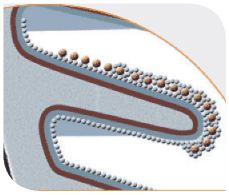
Hydrophobicity Transfer

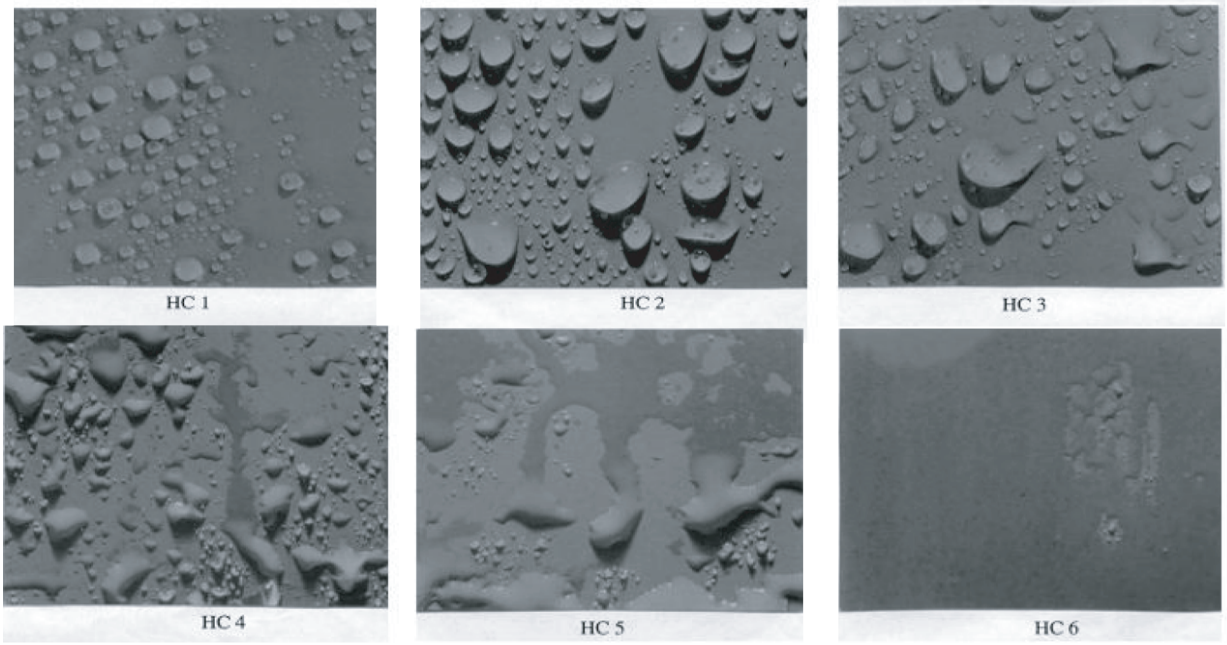
In the case of pollution particle deposition on the coated layer, the low molecular weight (LMW) siloxanes will spread from the silicone bulk material to the pollution layer and encapsulates these particles within a short time period. Now the insulator surface is hydrophobic again.

In-house coating is especially advantageous for projects using new insulators. A product ready for installation is delivered, ensuring a hydrophobic insulator surface from the first day. De-energizing of the substations for frequent washing is no longer required and maintenance expenditure is reduced to a minimum compared to conventional porcelain insulator surfaces.

Main benefits of RTV-Silicone coating:

- Excellent self-cleaning characteristics and long-term resistance to weathering and difficult environments.
- Long-term hydrophobicity due to the migration of low molecular weight (LMW) siloxanes into the pollution layer. Suppression of leakage current, discharges, and pollution flashover.
- Long-term RTV stability makes repeated application of grease unnecessary.
- Reduced maintenance expenditure, as washing, compared to conventional insulator surfaces
- RTV-coated surfaces withstand high-pressure jet washing up to 90 bar (normal application, 25cm distance).
- The best of both worlds, the mechanical strength of porcelain and the pollution performance of silicone rubber
- Non-toxic and environmentally friendly material.
- Transmission reliability as well as environmental and resource conservation by efficiently utilizing generated power.





Certificates & Approvals

SYSTEM CERTIFICATES

THE LABS IN WHICH THE INSULATORS ARE TESTED

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