



**Electrical
Insulators &
Accessories**

ECMEI

By ELSEWEDY ELECTRIC

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INTRODUCTION

ELSEWEDY ELECTRIC

75 years ago, we started with a clear vision to position Elsewedy Electric for successful growth, inspired by innovation, determination and spirit of hardworking staff, empowered and liberated by a strong enterprise system.

Since Elsewedy Electric started, we made the same motto did not change till today... Behind our success is a professional dedicated team and latest technologies which deliver comprehensive product portfolio and unmatched services. Elsewedy Electric always delivers top-rated products and services customers need with the best results they deserve. Our creative solutions help corporations and organizations to quickly adapt to new technologies that enhance business productivity and enable them to stay ahead of the competition.



At Elsewedy Electric, we focus on three pillars of sustainability: Human, Environment, and Technology. We are working to produce the best products and offer a wider selection of solutions in order to meet growing energy demands. We are striving to reduce our impact on the environment, conserve natural resources, and reducing our operating costs in the process.

Our heritage, as an energy solutions provider, runs deep. What began with Elsewedy Cables more than 30 years ago and became Elsewedy Electric has transformed into a global diversified company with more than 10,000 employees and 30 production facilities.

We are one of the top Energy Solutions companies in Middle East and Africa operating in 5 diversified energy segments; cables & accessories, electrical products, energy measurement & management, transformers, engineering & construction.

We are proud of what we have achieved so far but recognize that there is much work to be done to meet the aggressive goals we have set for ourselves. Elsewedy Electric has the capacity and the will to lead. We will continue to work & fight for those things that make the world a better place.

We remain dedicated to penetrate new markets with a vision of providing the best products and services to our clients and shareholders and create a good working environment for our employees. That's Performance with purpose. That's what every business owner should strive for.



ECMEI

In June 2008, Elsewedy Electric has acquired The Egyptian Company for Manufacturing Electrical insulators (ECMEI), the distinctive company in the middle East in manufacturing ceramics insulator.

ECMEI was established in 1994 with an annual production capacity of 7000 tons under license of CERAM group who have wide range of products and long standing experience in high tension insulators of different applications up to 210 KN in 765 KV Network.

We have also **ISO9001:2008** for Quality Management System, **ISO 14001:2004** for Environmental Management System, **OHSAS 18001:2007** for Occupational Health and Safety , **ISO/IEC 17025:2005** for High voltage testing lab.

ECMEI - as a part of Elsewedy Group - has embarked on a two-way strategic plan calling for vertical and horizontal integration.

Our Vision:

To be one of the pioneer companies in the field of manufacturing electrical insulators and provide related services world wide

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 continuous improvement.
- Working in a safe friendly environment.
- Quality is uncompromised

Porcelain Insulators



1- DISC INSULATORS:



Main Features:

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

2- The glaze applied is compressive in nature which adds to mechanical strength and provides smooth surface for self cleaning under contamination. Standard glaze colours are Brown or Grey

3- Caps are made of malleable cast iron and pins are made of forged steel. These are galvanized to provide better protection against corrosion .Socket caps and pins are checked by specified gauges one and all to assure interchangeability . Socket portion suits R clip. The security clips are made of bronze or stainless steel as per customer's choice.

4- A fine resilient bitumen coating on side of the cap and surface of the ball pin as well as on 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 metal part.

5- Application of Gravel on shell helps in uniform transfer of static and dynamic stresses by providing firm gripping surface for the cement which is used as filler between porcelain and metal part.

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

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

Application Guide:



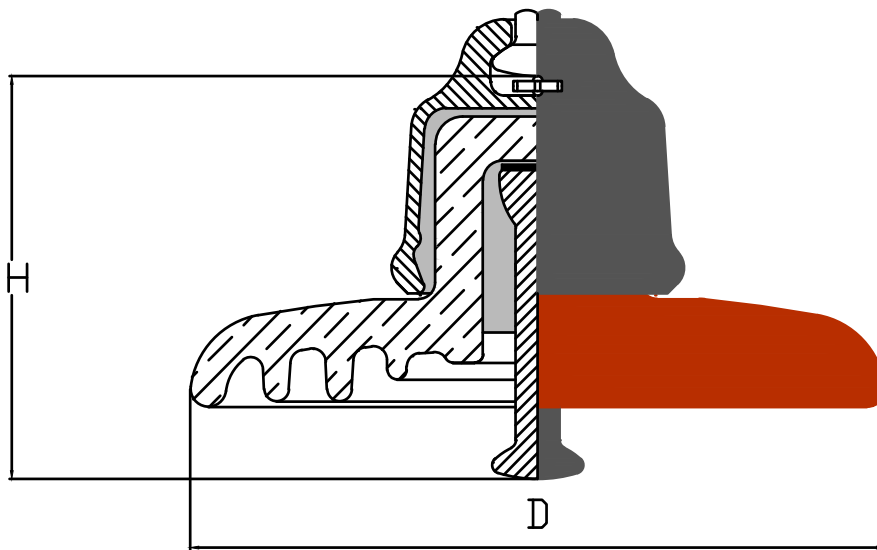
Suspension insulators (disc porcelain) are the most widely used models for transmission and distribution lines. In strings they can be used for any voltage depending on the number of units mounted in series.

Their design varies to suit different types of polluted zones and mechanical strength as per 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. Life expectancy of these insulators are extremely high but may be adversely affected if operated beyond specified limits of electrical or mechanical stress.

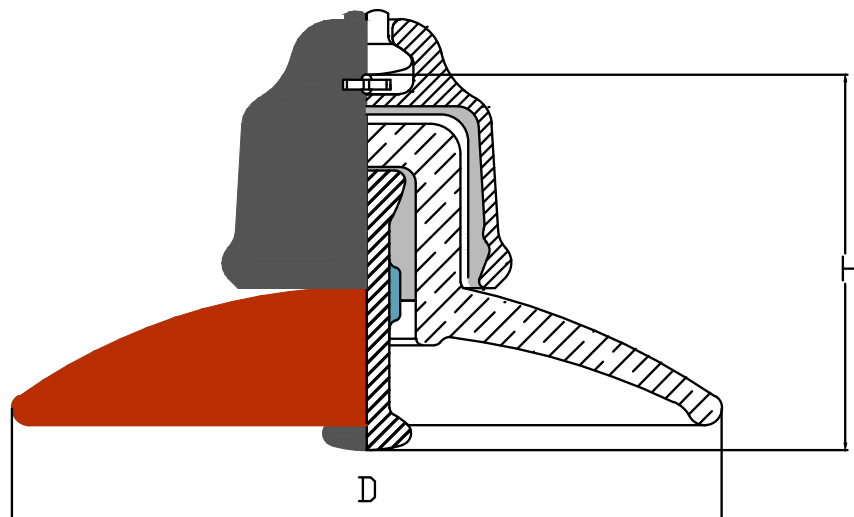
Cap & Pin porcelain insulators

A- Normal Disc & Open Profile types

Cap and pin insulators are generally used on over head transmission and distribution 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 tower. We manufacture Normal Profile type up to 320 mm leakage path. Open profile type up to 350 mm leakage path. The Open profile's pin includes zinc sleeve; and for normal Profile's pin excludes zinc sleeve unless if required. Every insulator is tested with hydraulic pressure and 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.



Normal Type



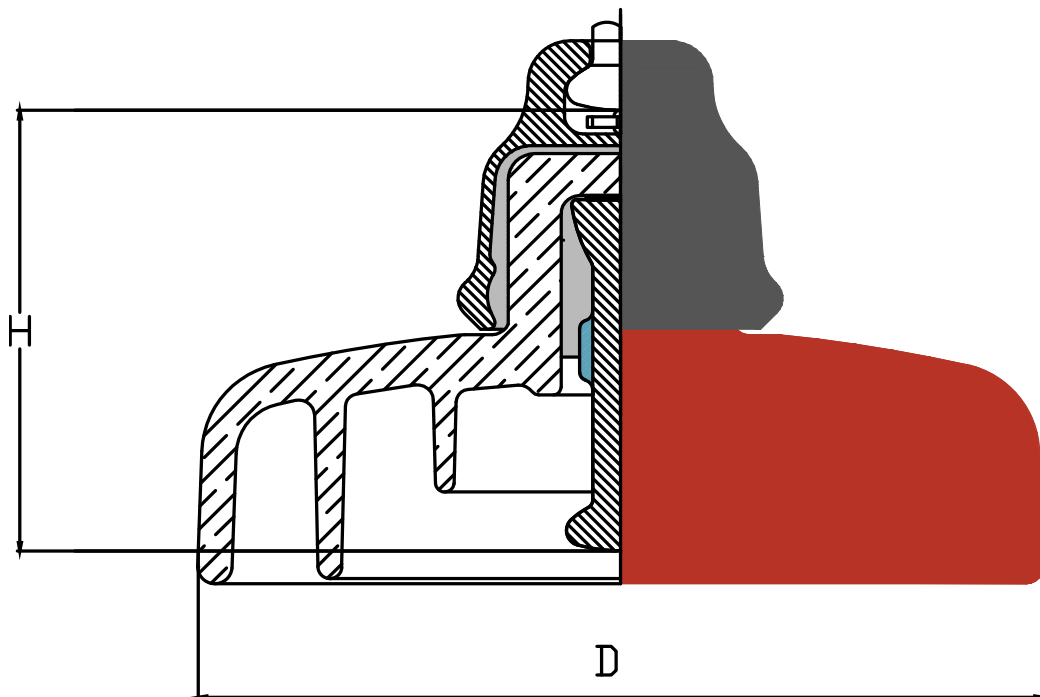
Open Profile Type

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 tower.

We manufacture Anti-fog type up to 555 mm leakage path for networks up to 500 KV. In a straight head design, the insulator pin includes zinc sleeve.

Every insulator is tested with hydraulic pressure and 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.



Anti-Fog Type

2- SOLID CORE LINE POST INSULATOR:**Main Features:**

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

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

2- ECMEI insulators are made from highest quality wet process porcelain having excellent electrical and mechanical characteristics. Metal parts are made of malleable iron or steel both galvanized as per ASTM specifications. Cementing operations are carried out under rigidly controlled conditions.

3- ECMEI insulators have stream-lined feature with symmetrical upper and lower electrodes which prevent accumulation of salt and dust and therefore have an excellent antipollution performance.

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

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

6- Insulators are normally brown glazed or light grey.

Tests:

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

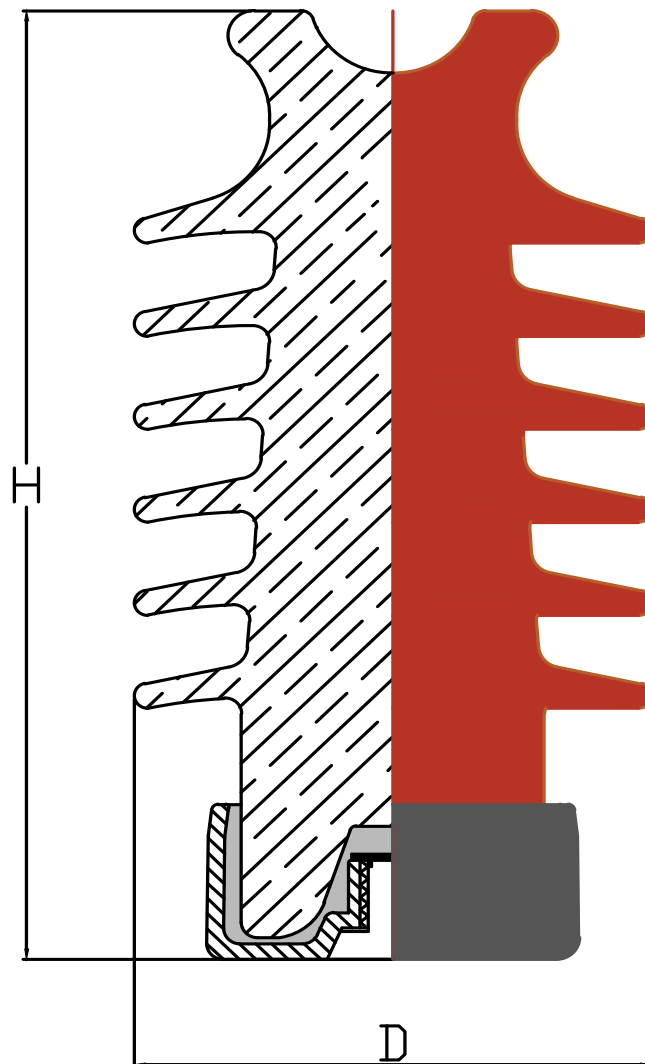
**Application Guide:**

ECMEI solid core line post insulators up to 33 kv can be used for construction of overhead lines at a cheaper cost but having the reliability of a line using suspension long rod insulator. To supplement the deficiencies of pin insulators, Solid core line post insulators based on long-rod concept are recommended for distribution lines up to 33 kv. Further line construction cost using solid core line post insulator is cheaper compared with that 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 applied on medium voltage overhead distribution lines up to (36KV) for fixing conductors to tower bodies and used in the distribution systems of the town. We manufacture these insulators with 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 normally brown glazed.
- 2- Pin insulators of ECMEI are one piece manufactured. One type of threads is normally provided, a non -ferrous metal insert is cemented inside the pin hole .Metal insert (thimble) is made of lead or Zinc.
- 3- 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 standard of IEC 383

Tests:

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

**Application Guide:**

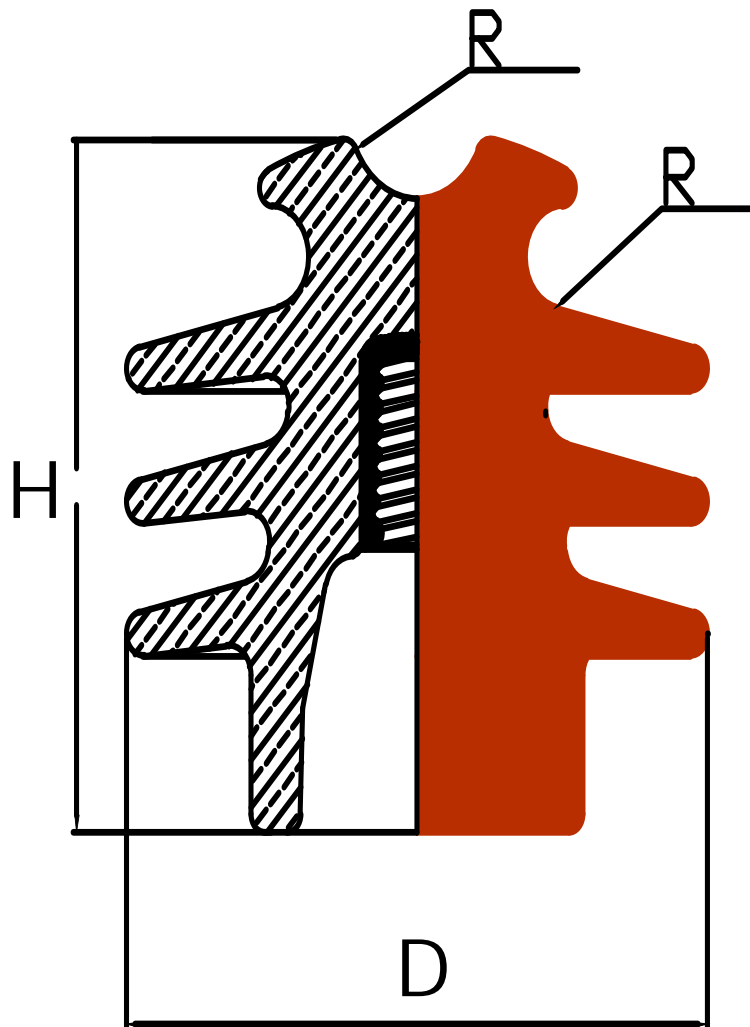
- Pin insulators of one piece construction are widely used in low cost distribution lines. ECMEI manufactures full range of pin insulators for application in sub-transmission and distribution lines up to system voltage 33 Kv .
- These insulators are available with creepage distance to meet different requirements of pollution on request.



SPECIFICATIONS:

Pin Insulator

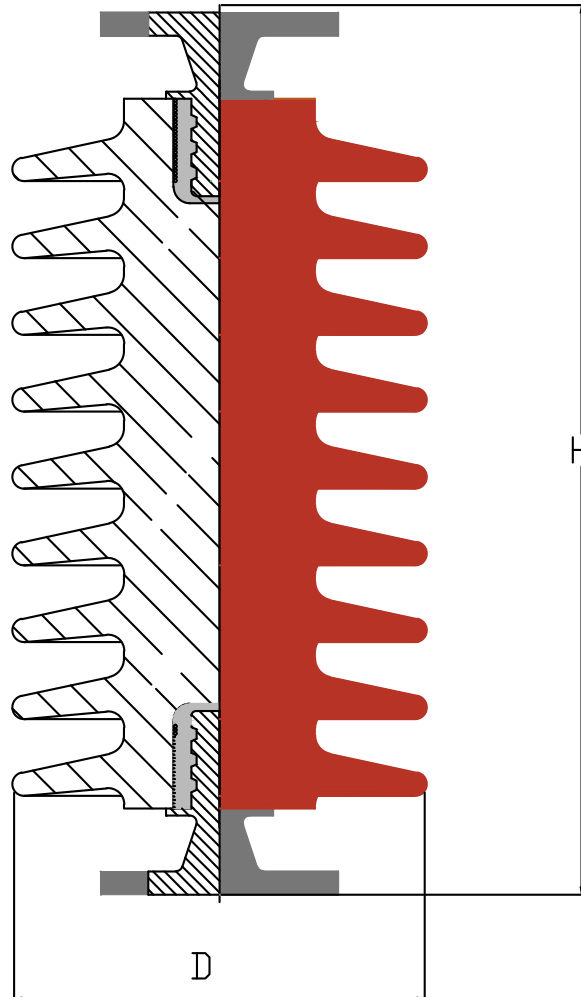
Pin insulators are used on medium voltage over head distribution lines (15, 25 and 36 KV) for fixing conductors to tower bodies to distribute power from substation to town and inside the town networks. The insulators are manufactured with leakage path from 330 mm up to 1250 mm and 10 KN bending strength or subject to client requirements.



1 PORCELAIN INSULATORS

4- POST INSULATOR

Post insulators are used in medium voltage 12, 25, 36, and 66 KV with leakage path 440mm up to 1047 mm, with mechanical strength up to 4 KN. It can be used for indoor and outdoor applications.

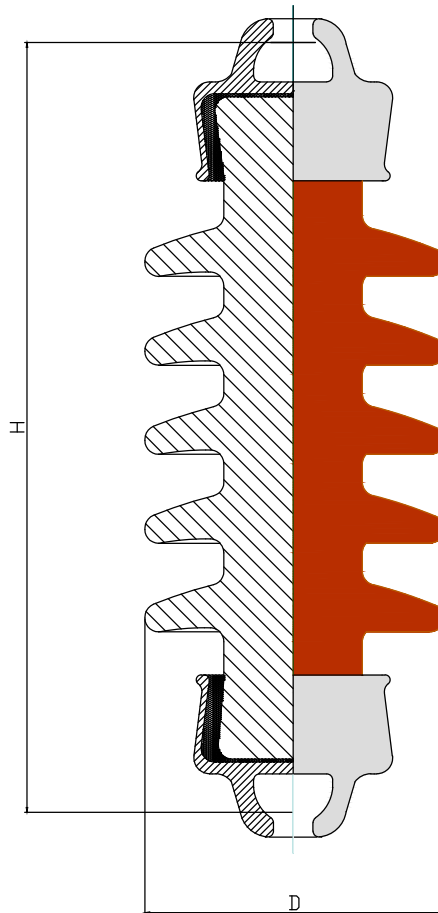


5- LONG ROD INSULATOR

Long rod insulators are applied on medium and high over head distribution and transmission lines for suspension or tension of conductor to tower bodies.

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

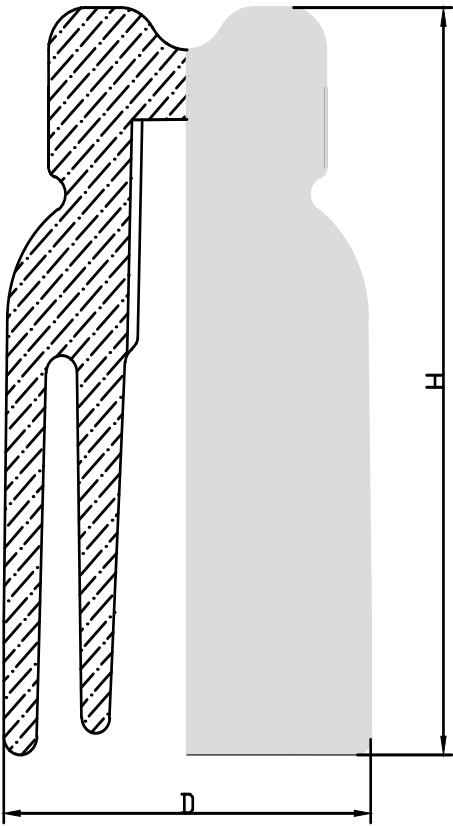
Long rod insulators are made with ceramic materials and it can be manufactured with other voltage levels and higher leakage path as per customer's request.



1 PORCELAIN INSULATORS

6- LOW VOLTAGE PIN INSULATOR

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





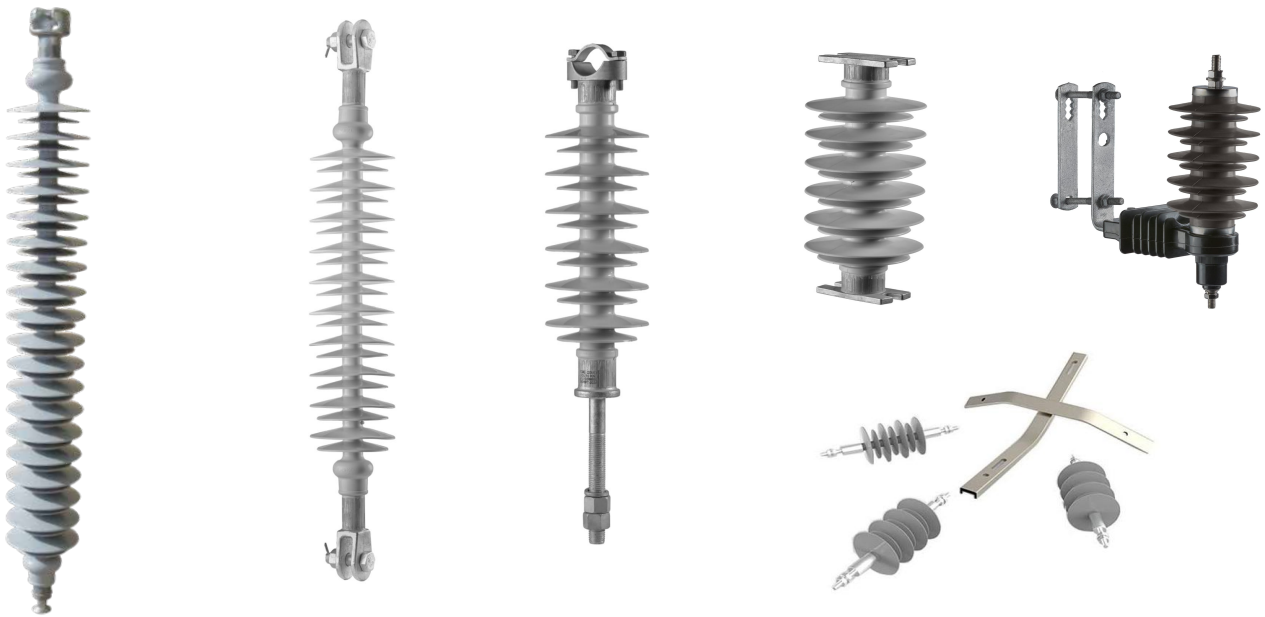
Porcelain Insulators



**Elsewedy
Polymer**



INTRODUCTION



ECMEI

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

ISO certification 9001, 14001, 18001 and special one **ISO17025** has been achieved due to our wide engineering special knowledge and shared experience with our esteemed customers.

High performance and quality of our polymer insulators have been proven by strict attention paid to the quality control processes, advanced manufacturing rules and selection of the best materials and optimum designs give us the capabilities to be leader in our field and meet our customers' requirement.

We have conducted the standard tests specified in international standards, such as IEC .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 highly automated process mainly depend on high temperature and pressure vulcanized (HTV) shedded housing that is injected and vulcanized directly on the fiberglass rod already equipped with the crimped end fittings This guarantees its high quality, and total reliability.

All 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 resistance: 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 radial compressed onto the Fiberglass rod.



Elsewedy Polymer Composite Long rod Insulator



Composite long rod insulator

Overview:

The composite long rod insulators are primarily used in suspension strings in straight-line supports and as tension strings in anchor towers and dead-end towers. They are also used in jumpers or portals of outdoor substations. In some cases, composite long rods are used in the guise of wooden poles, and more rarely in the guise of steel towers.

45 SPI – HTV silicone rubber housing for best pollution performances

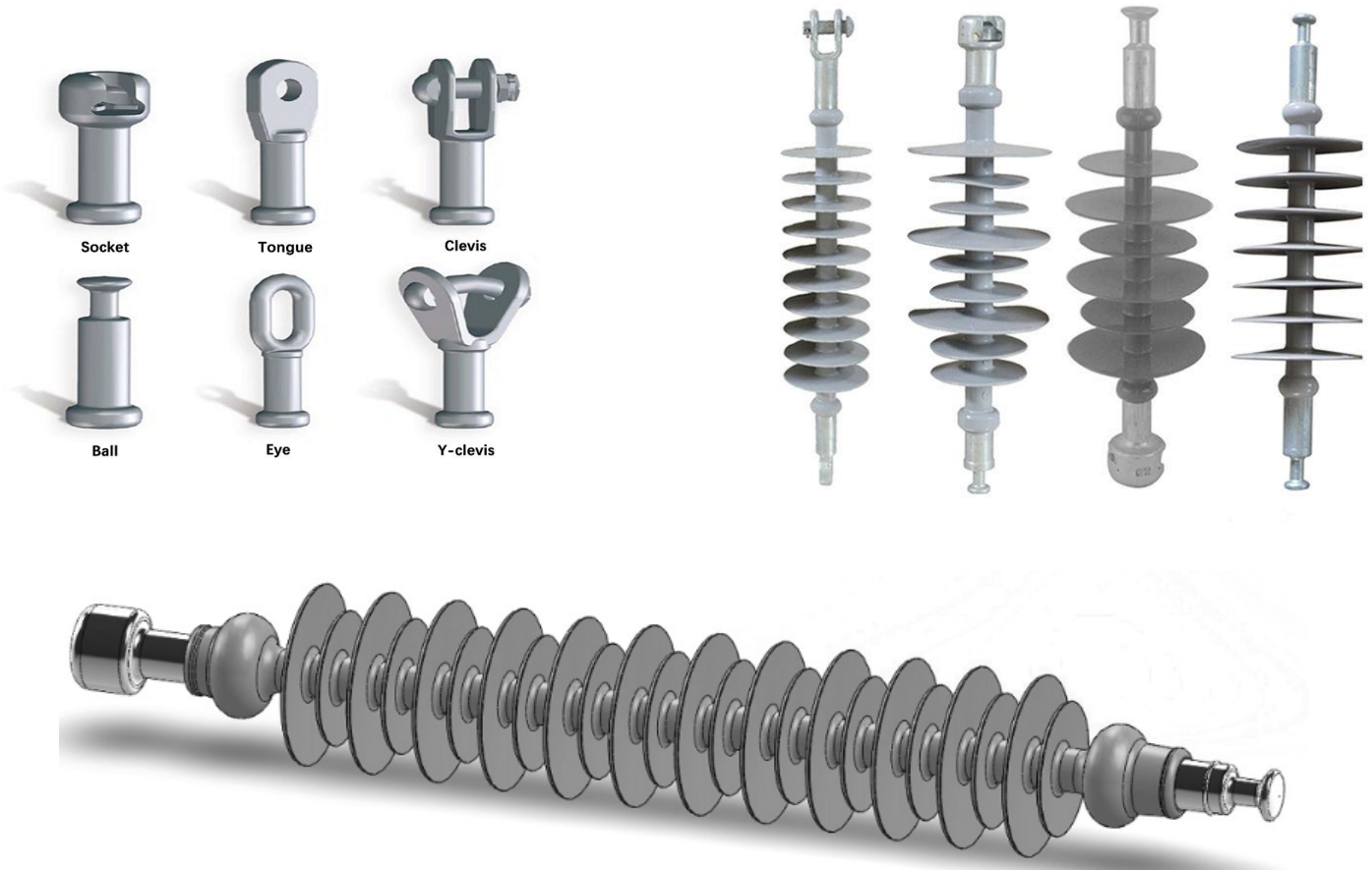
The excellent pollution layer characteristics of the HTV silicone rubber ensure maximum reliability of the 45SPI insulator, even under extreme service conditions like heavy sand storms or high IR levels in sunny areas. The high hydrophobic housing prevents the formation of conductive film on its surface. 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 rod (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 the durability for very long time in different climatic condition, 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 according to the latest IEC and ANSI standards is available up to 500 kN of SML. The 45SPI is 100% exchangeable and compatible with existing insulators and line hardware of all types.



Elsewedy Polymer Composite Station Post Insulator



Composite Station post Insulator**Overview:**

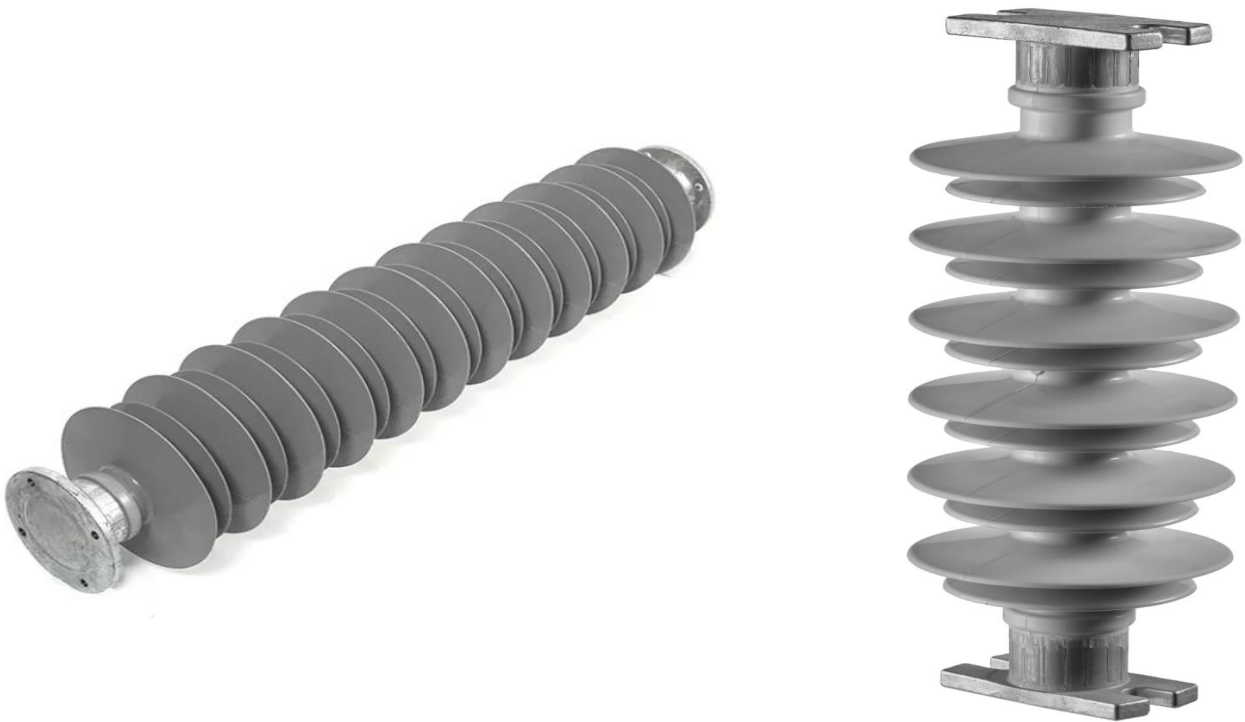
The composite station post insulators are widely used to support bus-bars in transformer sub-station yards, support breakers in switchgear, and support capacitor banks etc. These polymer post insulators are generally subjected to bending, torsion and compression forces in service. They may also be installed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

45 SPI – HTV silicone rubber housing for 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 sand storms or high IR levels in sunny areas. The high hydrophobic housing prevents the formation of 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:

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Elsewedy Polymer Composite Line Post Insulator



Composite line post Insulator**Overview:**

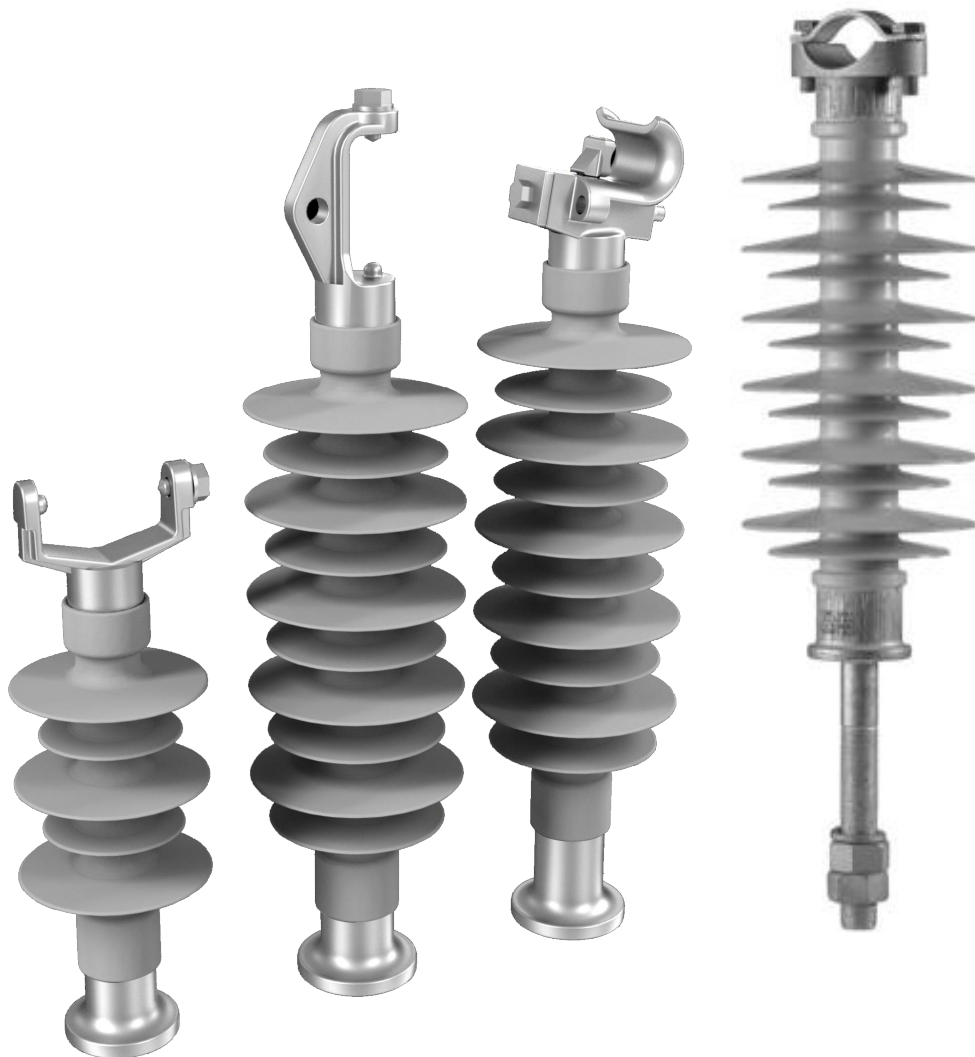
The composite station post insulators are widely used to support for conductors on cross-arms of distribution line poles. They can be designs according to IEC, ANSI and other standards or to customer specification.

45 SPI – HTV silicone rubber housing for 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 sand storms or high IR levels in sunny areas. The high hydrophobic housing prevents the formation of 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 rod (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.





Elsewedy Polymer Composite Stand-Off Insulator



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 onto overhead lines.

HTV silicone rubber housing for 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 sand storms or high IR levels in sunny areas. The high hydrophobic housing prevents the formation of 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 rod (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 the durability for very long time in different climatic condition, 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.





Elsewedy Polymer Composite Zinc-Oxide (Zno) Surge Arrester



Composite Zinc Oxide (Zno) Surge Arrester

Overview:

The main task of an arrester is to protect equipment from the effects of over-voltages. During normal operation, an arrester should have no negative effect on the power system. Moreover, the arrester must be able to withstand typical surges without incurring any damage. Nonlinear resistors fulfill these requirements thanks to the following properties:

- Low resistance during surges, so that overvoltages are limited.
- High resistance during 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. The ZINC-OXIDE are characterized by their high long-duration current impulse withstand capability, an indirect measure of their single impulse energy absorption capability. Surge arrester are less prone to self-heating and consequent self-destruction, and they maintain their characteristics throughout their lifetime.

45 SPI – HTV silicone rubber housing for 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 sand storms or high IR levels in sunny areas. The high hydrophobic housing prevents the formation of 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 Disconnecter



ZINC-OXIDE (Zno) varistors



NEMA Bracket



Ground Lead

Elsewedy Fitting

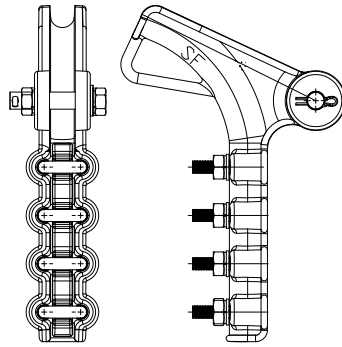


INSULATOR STRING FITTING

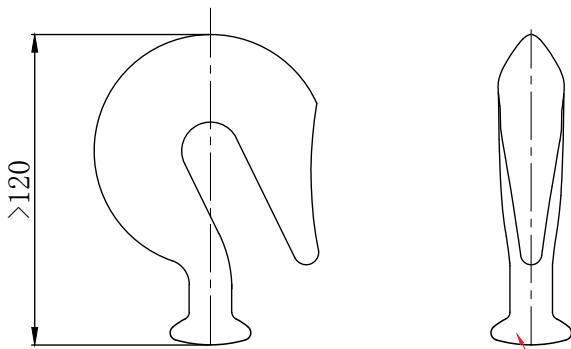
Insulator fitting set up to 36 Kv

It is the string which contain some of the following parts to make a complete insulator string mainly for disc and long rod insulators

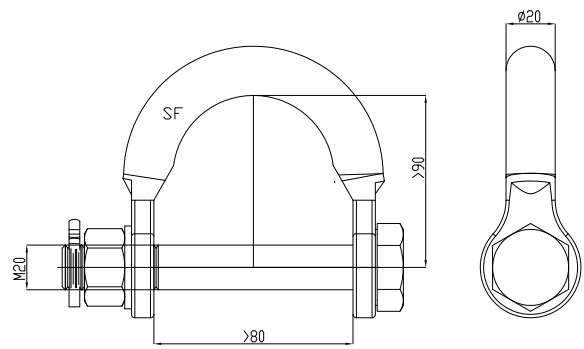
***Tension clamp**



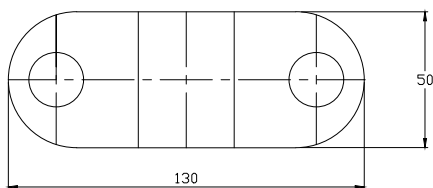
Tension Clamp



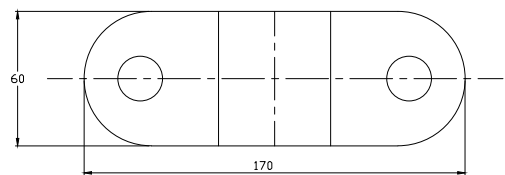
Hook IEC 120 ball size 16A



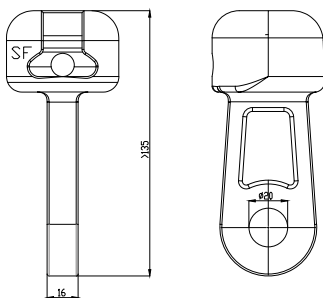
Chain Shackle



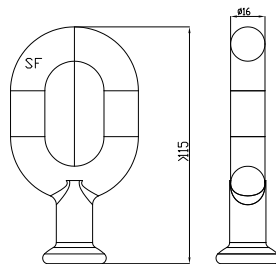
Extension link for 3u bolt tension clamp



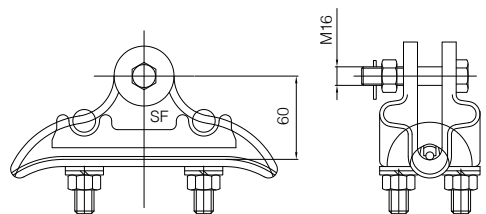
Extension link for 4u bolt tension clamp



Socket Eye



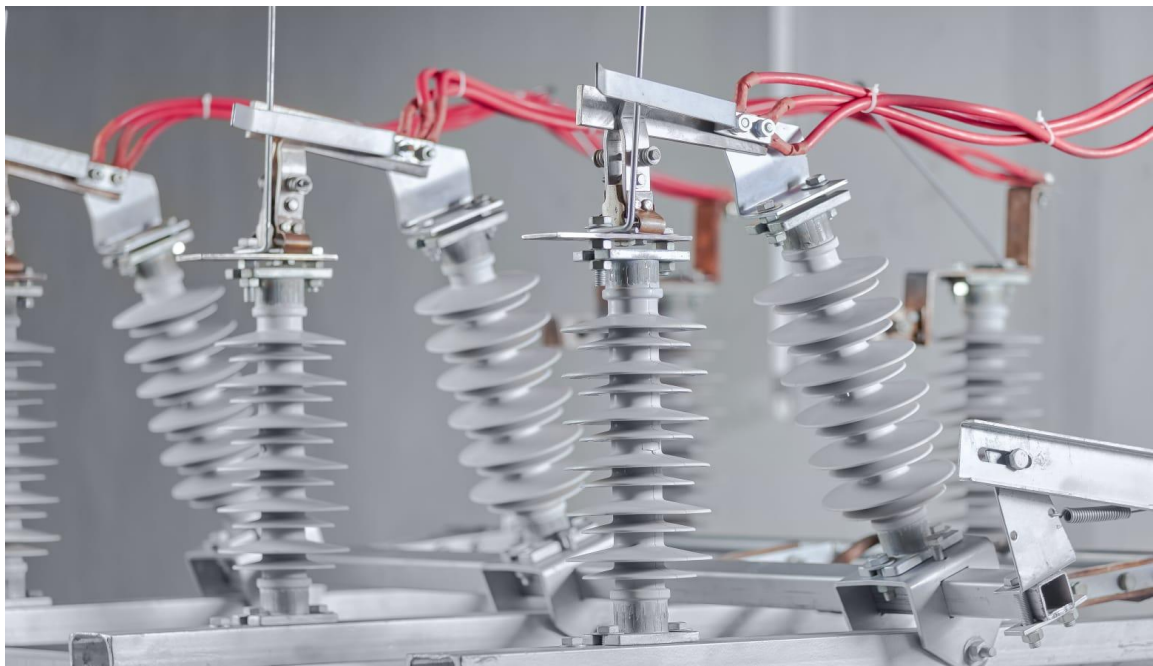
IEC 120 ball size 16A Ball eye



Suspension Clamp



Elsewedy Fitting Air Disconnecter Switch



Overview:

The medium voltage outdoor switches and disconnectors offering provides all solutions up to 36kV for disconnection, load break operation of overhead lines with rating 200, 400, and 630A. It can be equipped with drop out fuse.

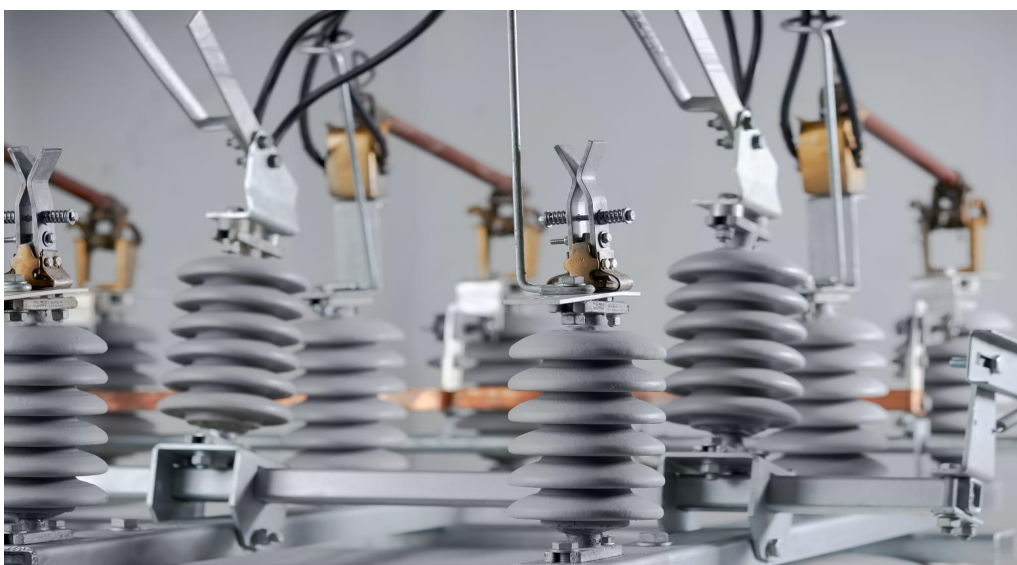
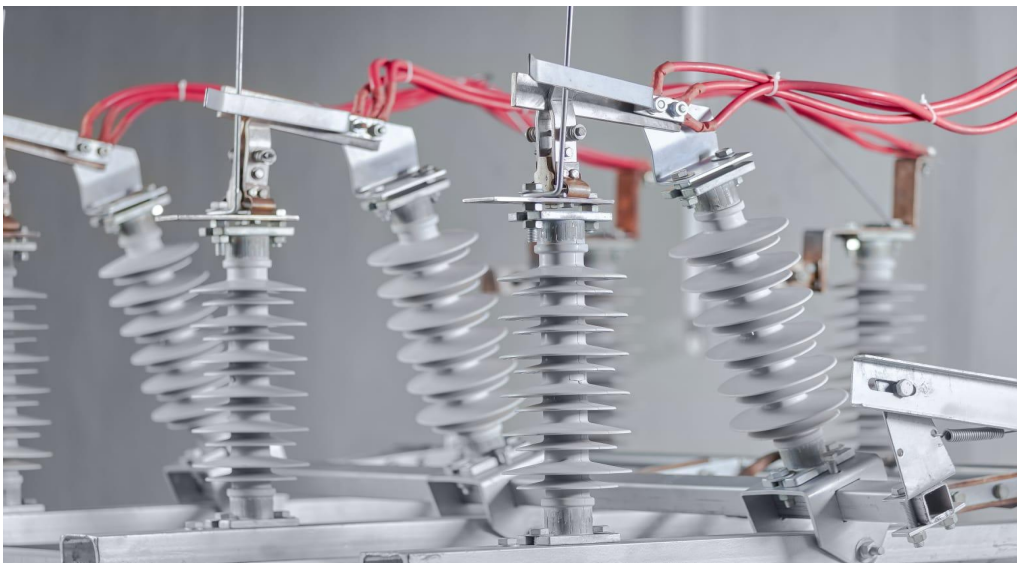
ECMEI produce a different types of air-disconnector switches such as follows.

Air Disconnect Switch (Porcelain Coated RTV).

Air Disconnect Switch (Polymer).

One way earthing switch.

Two ways earthing switch.



RTV Coating



Porcelain strength meets hydrophobicity

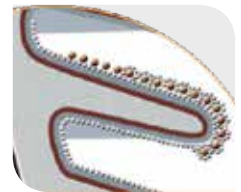
To avoid leakage currents, discharges and pollution flashovers, a silicone layer is applied to the insulator surface by using a special spray coating technique. This silicone layer provides a hydrophobic surface, combating the negative effects of contamination and enhancing the electrical characteristics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

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

Hydrophobicity Transfer

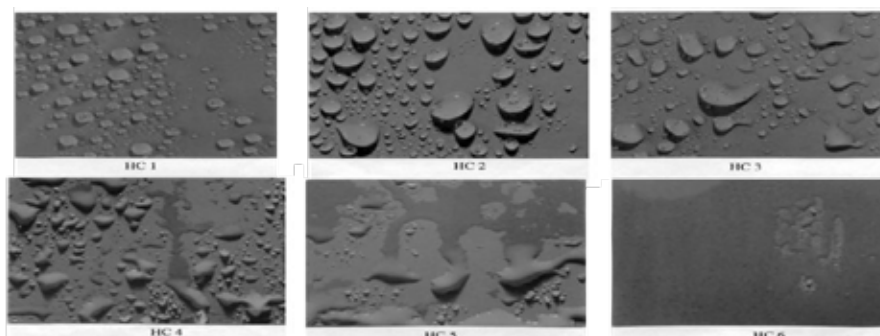
In the case of pollution particle deposition on the coated layer, the low molecular weight (LMW) siloxanes will spread from the silicone bulk material to the pollution layer and encapsulates these particles within a short time period. Now the insulator surface is hydrophobic again.

In-house coating is especially advantageous for projects using new insulators. A product ready to be installed is delivered and a hydrophobic insulator surface is assured 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 in 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, mechanical strength of porcelain and 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



केन्द्रीय विद्युत अनुसंधान संस्थान
(विद्युत मंत्रालय भारत सरकार के अधीन स्वायत्त संसाधनी)
Central Power Research Institute
(An autonomous society under Ministry of Power, Govt. of India)



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