Electrical Insulators & Accessories

ECMEI

By ELSEWEDY ELECTRIC

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INTRODUCTION

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 measurment & 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.

ABOUT US

ECMEI

In June 2008, Elsewedy Electric has acquired the Egyptian Company for Manufacturing Electrical Insulators (ECMEI), the 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 license of CERAM group with 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 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 Environment Management System
• ISO 45001:2018 for Occupational Health and Safety
• ISO / IEC 17025:2005 for High Voltage Testing Lab.

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 trusted production line for Polymer insulators up to 210 KN and up to 765 KV under 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 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) • And more ...

Our vision:
To be one of the pioneer companies in the field of manufacturing electrical insulators and provide 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

1

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:

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

(A) Routine test:

- Hydraulic proof load test on porcelain shells
- High frequency flash over test on porcelain shells
- Power frequency flash over test on porcelain shells
- Visual examination
- Routine mechanical test on assembled cap & pin insulators
- Power frequency flash over on assembled cap &pin insulators

(B) Sample test:Test samples are subjected to acceptance test in the order indicated below:

- Verification of locking system
- Verification of dimensions
- Temperature Cycle test
- Mechanical falling load test
- Electro-Mechanical falling load test
- Puncture test
- Porosity test
- Galvanizing test

(C) Type test:

- Visual examination
- Verification of dimensions
- Impulse voltage withstand test
- Wet power frequency withstand voltage
- Temperature Cycle test
- Electromechanical falling load test
- Under oil puncture test
- Mechanical falling load test

(D) Additional tests for EHV insulator string: (above 220kv)

- Wet switching withstand test
- Radio interference voltage test mechanical strength of complete string
- Thermal mechanical performance test

(E) Special test to meet customer's requirements:

- Steep front wave flashover test with an effective rate of rise of 2500kv/us
- Power arc test of 10 kA (sym) RMS for 0.1 sec.
- Pollution test
- Autoclave test (for cement expansion)

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.

(a) choice of insulator profile

Normally three types of shell profile are available. The standard profile is used in temperate climate and reasonably clean areas. The anti fog type for the same insulator string length provides a longer leakage distance. Open profile insulators are meant to reduce accumulation of dust in desert area where rainfall is scare, due to aerodynamic characteristics of insulator profile.

(b) Choice of string length for unpolluted areas

Standard profile is recommended, the string length is determined by the parameters of the system voltage and network.
For service voltage up to 220kv, the electrical criterion should be the dry impulse withstands/ flashover voltage of the insulator string which depends on the dry arcing distance of the complete strings set.
For service voltage above 220kv, the electrical criterion should be the wet switching surge withstand/flashover voltage. This depends on the length of the insulator string, the shape and position of string fittings and the location of the string with respect to the metal body of the tower.

(c) Choice of string lengths for polluted areas

The insulator string lengths with insulators subjected to polluted, wetted and max service voltage conditions are determined by its power frequency withstand voltage. According to severity of pollution, the performance of insulator string may reduce widely.
The wetting caused by fog, drizzle or sea spray, controls the severity of pollution .heavy rain may remove the contaminants and thereby improve upon the performance of insulators strings.
The length of the insulator string can be calculated by using the recommended insulation level (mm/kv) for a certain profile and taking into account of the unit spacing of the selected insulators. Any increase in string length results in increase of height of tower with consequential higher line cost

Recommended profile of insulators and creep age paths for various categories of pollution zones are indicated in the following table:

CAP AND PIN INSULATORS

(recommended profile for polluted areas)

Suspension strings (vertical)			
Area	**Normal**	**Anti-fog type profile**	**Open profile**
coastal	Possible	Recommended	Possible
Desert	Possible	Recommended	Recommended
Industrial	Possible	Recommended	Recommended
Mixed	Not-advisable	Recommended	Recommended
Tension strings (horizontal)			
Area	**Normal**	**Anti-fog type profile**	**Open profile**
coastal	Possible	Recommended	Possible
Desert	Possible	Recommended	Recommended
Industrial	Possible	Recommended	Recommended
Mixed	Not-advisable	Recommended	Recommended

Table II (recommended creepage path)		
Pollution level	**Typical environmental condition**	**Recommended creepage Distance mm/kv of highest System voltage**
Light	Agricultural areas, mountain areas, low density industrial/ housing areas but subject to frequent clean winds and rain falls. The above areas should be at least 20 km from sea and should not be exposed to direct sea breezy and dry weather.	30-35
Medium	Industrial areas not producing any polluting smoke ,high density industrial/ housing areas with frequent winds and rain falls. Areas not close to sea.	35-40
Heavy	Areas subject to severe industrial pollution; areas close to sea and exposed to sea winds.	40-45
Very heavy	Areas subject to conductive dust, industrial smoke producing conductive deposits, desert areas with terrain close to coast and exposed to sea spray and polluting sea wind.	45-55

Notes

- **Creepage distance mm/kv correspond to highest system voltage in kv (phase to phase)**
- **In areas with no significant pollution a creepage distance not lower than 16 mm/kv may be considered**
- **Creepage distance higher than 45 mm/kv in case of exceptionally high polluted areas, may not be a solution. RTV coating, periodical cleaning and live line washing are recommended in such cases.**

(d) string length at strain points

Dead end or large angle structures are often located where safety is important such as at road or rail road crossings or where other utilities are crossed.

Mechanical or electrical failures can least be afforded at these points. Since electrical troubled are followed by mechanical troubled, longer strings are recommended in strain points than at regular suspension points.

Flashover values, both power frequency dry or impulse for insulator strings in the strain position are less than those for the same string length in the vertical position, as the sagging of horizontal strings reduces the arcing distance. Further reduction of approximately 8 to 10% in power frequency dry and impulse flashover values of strings in horizontal position is expected due to distortion of electrostatic field at the line end of strain strings where change in direction is involved . As drip water does not accumulate on horizontal string unlike on vertical string , the wet flashover value of a horizontal string is only slightly lower than its power frequency dry flashover value.

(e) choice of M & E rating

Generally loads applied to the insulator on an operating line are calculated by taking into account the weight of conductors and wind velocity under everyday load condition, on the most loaded section of the line conventional safety factor is thereafter to be applied for determining the minimum M & E rating of the insulators.
ECMEI suspension disc insulators can be loaded permanently at 40% of the catalogue rating taking advantage of their high reliability and insensitiveness to continuous and changing mechanical, electrical and thermal influences. The maximum load should not however exceed 65% of the rated M & E strength.

(f) corrosion

For polluted areas use of pins protected by a sacrificial zinc sleeve fused around the pin at air cement interface is recommended. the zinc sleeve does not take part in the mechanical structure of the insulator and its gradual elimination does not affect the mechanical characteristics of the whole complex.

(g) General guide for Ball & Socket coupling standards for designing insulator strings

IEC standard	
Minimum failing load in KN	**Standard (ball& socket size) mm**
70	16
80	16
90	16
120	16
120	20
160	20
210	20

(h) Correction for Altitude and Ambient temperature

The flashover voltage of String insulators decreases due to lower atmospheric pressure in high altitude or due to exposure of - insulators to tropical climates having temperature above 400C. At altitudes of over 1000 M above sea level or in places with temperature over 400C, it is recommended that the flashover voltage value at Normal condition is multiplied by the following factor and the number of insulators is increased to meet the requirement.

Correction factor for t°c Service temperature $= \frac{273 + t°}{313}$

Correction factor H meters of Altitude above sea level $= 1 + \frac{01\ (H - 1000)}{100}$

(*)Power arcs

Short circuit currents of high magnitude may cause melting of the insulator pins. It is therefore, necessary to have the protection fittings in an insulator string carefully designed. It may noted that short circuit currents of 20000 and 30000 amps. of one second duration cause melting of steel bars of 16 mm and 20 mm diameter respectively.

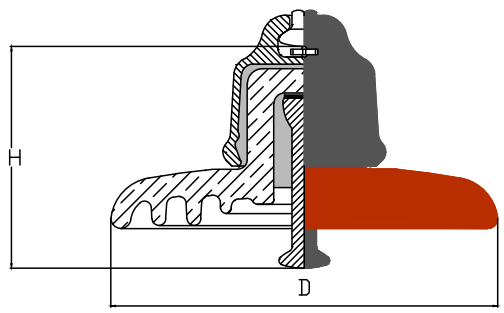
SPECIFICATIONS:

A- Normal Disc & Open Profile types

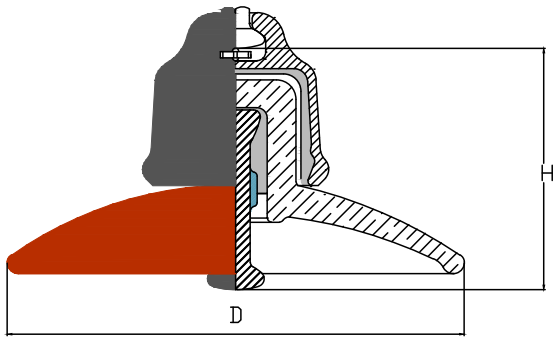
Cap and pin insulators are generally used on over head transmission and distribution network to evacuate bulk power over long distances.The insulators could be in suspension or tension made in string form to insulate the conductor from tower. We manufacture Normal Profile type up to 120 KN electro-mechanical strength and up to 320 mm leakage path. Open profile type is up to 120 KN electro-mechanical strength and 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.

STANDARD PARTICULARS										
Product No.				**040-00**	**044-00**	**044-01**	**044-02**	**044-06**	**053-00**	**053-01**
Porcelain Dia.(D)			mm	175	255	255	255	255	330	320
Spacing (H)			mm	110	146	146	146	146	146	146
Creepage Distance	Total Creepage		mm	190	320	320	320	320	295	350
	Protected Creepage		mm	100	165	165	165	165	150	250
Combined Electro Mechanical Strength			KN	40	90	100	70	120	80	120
Flashover voltage	Power Frequency	Dry	KV	55	75	75	75	75	75	75
		Wet	KV	37	45	45	45	45	45	50
	Impulse	Positive	KV	75	115	115	115	115	115	115
		Negative	KV	80	120	120	120	120	115	115
Withstand Voltage	one minute power frequency	Dry	KV	50	70	70	70	70	70	70
		Wet	KV	33	40	40	40	40	40	45
	Impulse	Positive	KV	70	110	110	110	110	110	110
		Negative	KV	75	115	115	115	115	110	110
Visible Discharge Voltage			KV	9	9	9	9	9	9	9
Power frequency Puncture Voltage			KV	90	110	110	110	110	125	130
Ball Socket Size			mm	11	16	16	16	16	16	16
Net Weight (Approx.)			kg	2.5	5	5	5	5	5.5	6

* We have the ability to fulfill client requirements within international standards



Normal Type



Open Profile Type

B- Anti Fog Profile

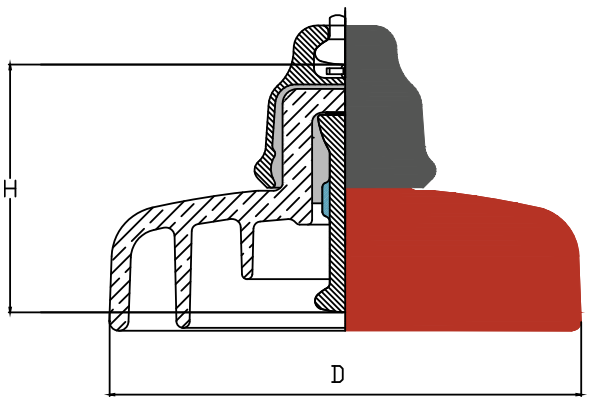
Cap and pin insulators are generally used on over head transmission and distribution network to evacuate bulk power over long distances. The insulators could be in suspension or tension made in string form to insulate the conductor from tower.

We manufacture Anti-fog type to 210 KN electro-mechanical strength insulators and 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.

STANDARD PARTICULARS														
Product No.					**041-00**	**043-00**	**045-00**	**045-01**	**045-02**	**046-00**	**046-01**	**050-00**	**050-02**	**052-00**
Porcelain Dia.(D)				mm	255	280	280	280	280	320	320	320	320	320
Spacing (H)				mm	110	146	170	146	146	146	146	175	175	175
Creepage Distance	Total Creep age			mm	320	450	450	450	450	465	465	555	555	555
	Protected Creep age			mm	220	320	320	320	320	320	320	400	400	400
Combined electo-mechanical strength				KN	40	90	120	120	120	90	120	160	120	210
Flashover Voltage	Power Frequency	Dry		KV	78	80	80	80	80	85	85	95	80	95
		Wet		KV	45	48	45	45	45	55	55	60	45	60
	Impulse	Positive		KV	120	125	125	125	125	145	145	150	125	150
		Negative		KV	125	130	130	130	130	150	150	155	130	155
Withstand Voltage	one minute power frequency	Dry		KV	70	75	70	70	70	80	80	90	70	90
		Wet		KV	40	42	40	40	40	45	45	50	40	50
	Impulse	Positive		KV	115	120	120	120	120	135	135	140	120	140
		Negative		KV	120	120	125	125	125	140	140	150	125	150
Visible Discharge Voltage				KV	9	18	18	18	18	18	18	18	18	18
Power frequency Puncture Voltage				KV	110	130	130	130	130	140	140	140	130	140
Ball Socket Size				mm	11	16	20	20	16	16	16	20	20	20
Net Weight (Approx.)				kg	3.7	8	8.5	8.5	8.5	9	9	11	11	11.25

* We have the ability to fulfill client requirements within international standards



Anti-Fog Type

2- SOLID CORE LINE POST INSULATOR:

Main Features:

ECMEI Solid core line post insulators conforms 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:

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

Routine test:

- Visual examination
- Routine mechanical test

Sample test:

- Verification of dimensions
- Temperature Cycle test
- Mechanical falling load test (Cantilever)
- Galvanizing test
- Porosity test

Type test:

- Visual examination
- Verification of dimensions
- Impulse voltage withstand test
- Wet / Dry power frequency withstand voltage
- Mechanical falling load test (cantilever)

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.

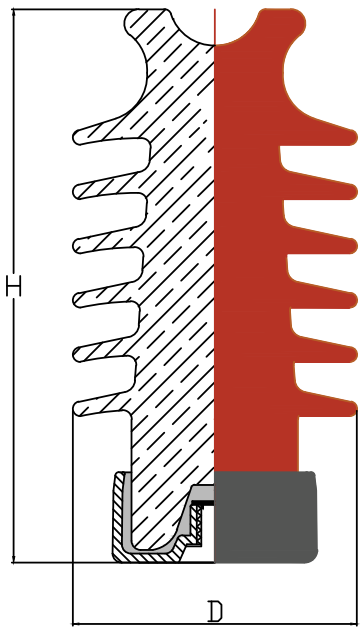
SPECIFICATIONS:

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.

STANDARD PARTICULARS									
Product No.				**090-00**	**090-01**	**090-02**	**090-03**	**090-04**	**090-07**
Recommended voltage			KV	24	15	36	36	36	36
Insulator length (H)			mm	305	230	510	368	381	506
Insulator biggest diameter (D)			mm	152	145	185	178	165	232
Creepage distance			mm	560	356	1320	825	737	1660
Dry arcing distance			mm	228	166	450	310	312	500
Stud size			mm	20	20	20	20	20	20
Cantilever strength			KN	12.5	12.5	12.5	12.5	12.5	12.5
Flashover Voltage	Power Frequency	Dry	KV	110	80	175	125	125	155
		Wet	KV	85	60	150	100	100	135
	Impulse	Positive	KV	180	130	290	210	210	300
		Negative	KV	205	155	350	260	260	350
Withstand Voltage	one minute power frequency	Dry	KV	90	70	160	100	100	150
		Wet	KV	65	53	135	93	93	130
	Impulse	Positive	KV	150	110	250	170	170	270
		Negative	KV	150	110	250	170	170	270
Net Weight (Approx.)			kg	7.5	4.5	21	10	10	22

* We have the ability to fulfill client requirements within international standards



Line Post Insulator

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 specifications of IEC 383

Tests:

The following tests are carried out on ECMEI pin insulators in compliance with national and international standards:

(A) Routine test:

- Routine electrical test
- Routine visual examination

(B) Sample test:

- Verification of dimensions
- Temperature Cycle test
- Mechanical falling load test (Cantilever)
- Puncture test
- Porosity test
- Galvanizing test

(C) Type test:

- Visual examination
- Verification of dimensions
- Impulse voltage withstand test
- Wet power frequency withstand voltage
- Temperature Cycle test
- Mechanical falling load test (cantilever)
- Under oil puncture test

(D) Additional test

- Dry power frequency flashover test
- Wet power frequency flashover test
- Artificial pollution test.

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 up to 45mm/Kv

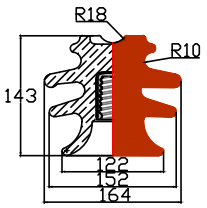
SPECIFICATIONS:

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 990 mm and 10 KN bending strength or subject to client requirements.

STANDARD PARTICULARS										
Product No.				**024-00**	**024-01**	**024-02**	**024-05**	**025-00**	**025-01**	**025-03**	**033-02**
Highest System voltage			KV	15	15	36	15	36	36	36	11
Total creepage distance			mm	440	535	686	330	990	990	990	115
Cantilever strength			KN	10	10	10	10	10	10	10	4
Flashover Voltage	Power Frequency	Dry	KV	85	100	110	45	120	105	120	44
		Wet	KV	45	50	60	40	100	85	100	25
	Impulse	Positive	KV	125	125	140	85	175	120	175	85
		Negative	KV	130	130	140	90	175	120	175	90
Withstand Voltage	one minute power frequency	Dry	KV	80	90	100	40	110	96	110	28
		Wet	KV	40	45	55	35	90	80	90	20
	Impulse	Positive	KV	120	120	130	75	170	125	170	75
		Negative	KV	120	120	130	75	170	125	170	75
Power frequency Puncture Voltage			KV	135	135	150	95	180	180	180	NA
Net Weight (Approx.)			kg	5.4	5.5	7	2.7	12.5	12	11	1

* cantilever strength is subject to the required spindle



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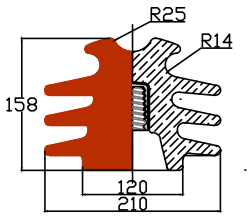

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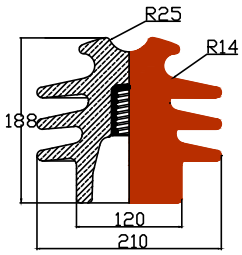

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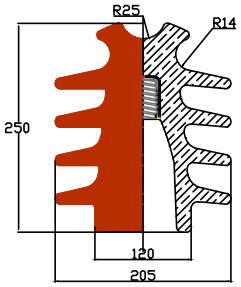

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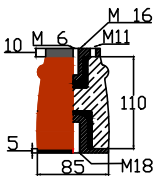
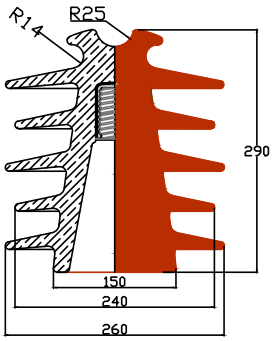


033-02



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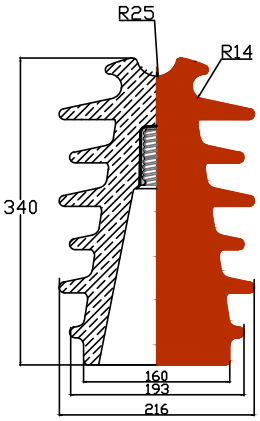

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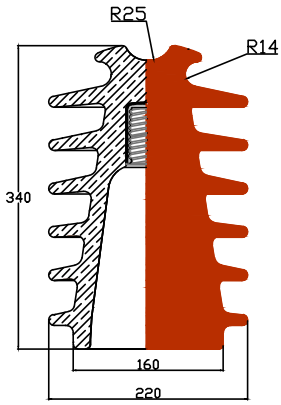


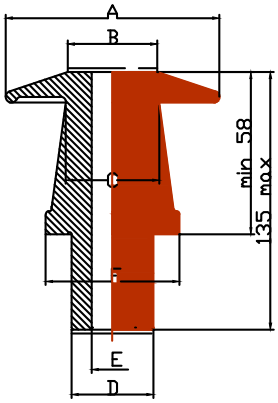
025-00

4- A- LOW VOLTAGE DISTRIBUTION TRANSFORMER BUSHING

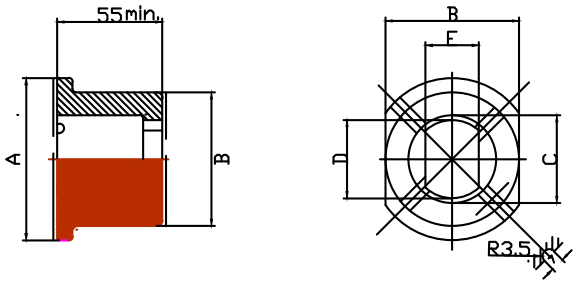
We manufacture low voltage distribution transformer bushings with leakage path up to 100 mm which support the low voltage side of the transformer to carry the output cables up to 3150A .

STANDARD PARTICULARS

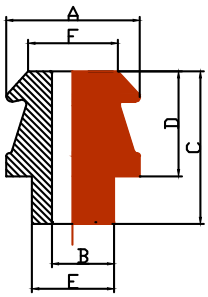
Product No.		003-00		006-00		005-00		004-00		001-00		011-00		010-00		009-00		008-00		007-00	
Transformer rating KV/Amp		1KV/250		1KV/630		1KV/1000		1KV/2000		1KV/3150		1KV/250		1KV/630		1KV/1000		1KV/2000		1KV/3150	
		Amp		Amp		Amp		Amp		Amp		Amp		Amp		Amp		Amp		Amp	
Part		I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Dimensions	A mm	75	70	90	85	110	110	125	125	145	150	50	60	70	85	70	110	104	125	125	150
	B mm	32	60	47	70	65	90	80	105	100	125	14	20	22	28	32	37	44	51	50	61
	C mm	30	40	45	46	65	57	80	70	100	90	70	30	80	30	85	36	85	35	85	35
	D mm	37	26	43	41	53	46	66	64	86	80	45	50	55	70	55	90	55	104	55	125
	E mm	14	20	22	28	32	37	44	51	50	61	27	26	53	41	53	46	66	64	86	80
	F mm	60	---	70	---	90	---	105	---	125	---	32	30	47	46	65	57	80	71	100	90
Power Frequency Withstand Voltage	Dry KV	25		25		25		25		25		25		25		25		25		25	
	Wet KV	21		21		21		21		21		10		10		10		10		10	
Impulse withstand voltage KV		45		45		45		45		45		45		45		45		45		45	
Net Weight (Approx.) kg		0.43	0.12	0.8	0.4	1.1	0.7	1.4	0.75	1.5	0.9	0.2	0.1	0.4	0.2	0.7	0.5	0.9	0.6	1.5	0.8



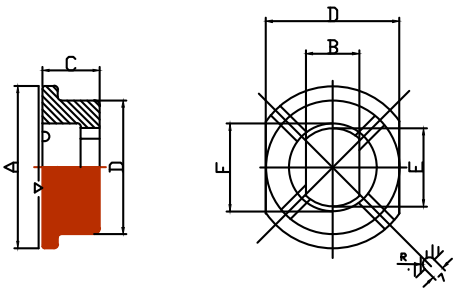
(Upper Insulator)
I



(Lower Insulator)
II



(Upper Insulator)
I

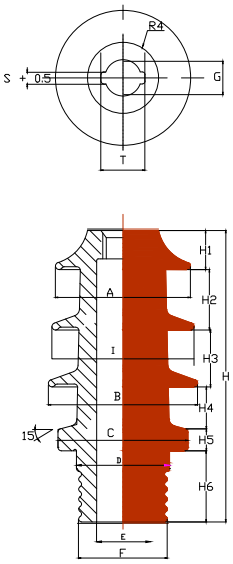


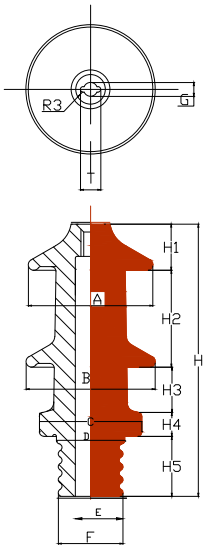
(Lower Insulator)
II

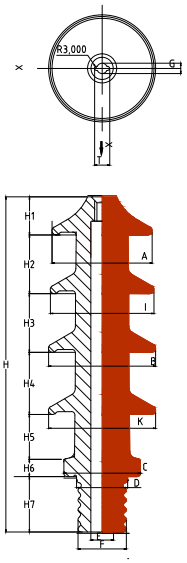
4- B- MEDIUM VOLTAGE DISTRIBUTION TRANSFORMER BUSHING

Transformer bushing for outdoor and indoor are used as structure carrying on conductor through a partition from the transformer tank.

STANDARD PARTICULARS										
Product No.			**016-00**	**015-00**	**014-00**	**013-00**	**012-00**	**019-00**	**018-00**	**017-00**
Transformer rating		KV/Amp	20NF/250	20NF/630	30NF/250	30NF/630	20NF/3150	10NI/250	10NF/250	10NF/630
			Amp	**Amp**	**Amp**	**Amp**	**Amp**	**Amp**	**Amp**	**Amp**
Dimensions	Dia. A	mm	145	155	145	165	190	95	135	145
	Dia. B	mm	155	165	155	175	210	100	140	150
	Dia.I	mm	150	160	150	170	200	111	111	128
	Dia.K	mm	---	---	155	160	---	74	74	88
	Dia.C Max	mm	111	128	111	128	187	33	33	39
	Dia.D Max	mm	74	88	74	88	130	70	70	85
	Dia E Min	mm	33	39	33	39	74	33	33	39
	Dia F	mm	70	85	70	85	125	70	70	85
	Dia G	mm	15±1	24.5±1	15±1	24.5±1	17±0.5	15±1	15±1	24.5±1
	T	mm	22±1	30.5±1	22±1	30.5±1	62±0.5	22±1	22±1	30.5±1
	H	mm	385	385	485	510	410	245	295	295
	H1	mm	55	55	55	60	55	35	50	50
	H2	mm	85	85	85	80	85	245	295	295
	H3	mm	90	90	85	85	80	35	50	50
	H4	mm	50	50	90	90	60	75	105	105
	H5	mm	25	25	65	70	30	45	50	70
	H6	mm	80	80	25	25	100	25	25	25
	H7	mm	---	---	80	100	---	65	65	65
Visible Discharge Voltage		KV/Amp	12	12	12	12	12	12	12	12
Power Frequency one minute withstand voltage	Dry	KV	45	45	45	45	45	45	45	45
	Wet	KV	45	45	45	45	45	45	45	45
Impulse withstand voltage		KV	95	95	95	95	95	95	95	95
Net Weight (Approx.)		kg	5.9	6.8	7.6	9.6	6	2.7	3.8	4.9



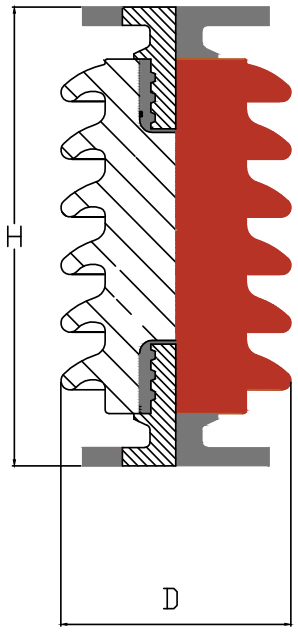




5- POST INSULATOR

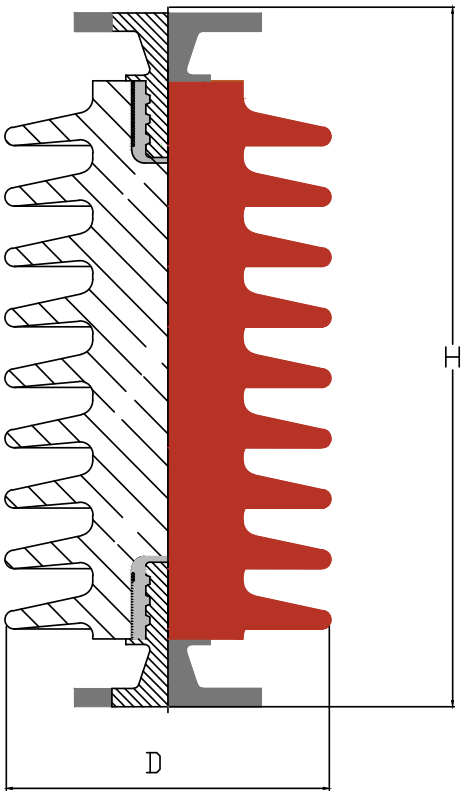
Post insulators are used in medium voltage 12, 25 KV with leakage path 440mm up to 1047 mm, with mechanical strength up to 4 KN and also for 66 KV with leakage path 2450mm. It can be used for indoor and outdoor applications.

STANDARD PARTICULARS									
Product No.				**029-00**	**029-01**	**029-03**	**030-00**	**030-01**	**030-02**
Type				**P70**	**P70s**	**P70**	**P13s**	---	---
Rated Insulation voltage			KV	25	25	25	36	72.5	36
Total creepage distance			mm	440	500	550	1047	2450	1200
Height (H)			mm	250.5	257	280	380	902	460
Biggest Diameter			mm	127	131	136	180	180	180
Bending falling load			KN	4	4	4	2.3	2.3	2.3
Number of sheds			Nos.	6	6	6	9	20	10
Arcing Distance			mm	193	193	194	305	820	385
Withstand Voltage	one minute power frequency	Wet	KV	50	50	50	50	185	80
		Impulse	KV	130	130	130	150	410	200
Net Weight (Approx.)			kg	4.5	4.5	5	11	25	13.5



P70

029-00



P13

030-00

6- LONG ROD INSULATOR

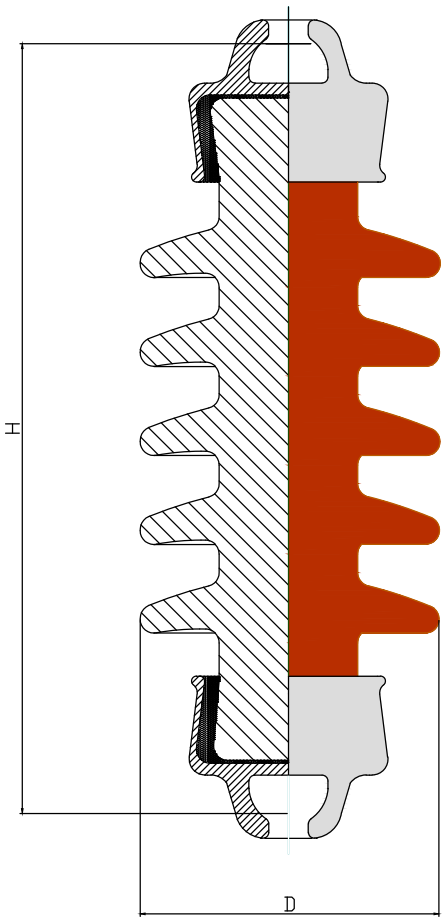
Long rod insulators are applied on medium and high over head distribution and transmission lines for suspension or tension of conductor to tower bodies.

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.

STANDARD PARTICULARS

Product No.				**037-00**	**037-02**	**037-03**	**037-04**	**037-05**	**037-06**	**037-07**	**037-08**	**037-09**	**037-10**
Type of insulator according to IEC433				**L 90E 240**	**L 70 E 175**	**L 70 E 245**	**L 70 E 310**	**L 70 E 380**	**L 100 E 380**	**L 100 E 411**	**L 100 E 550**	**L 120 E 550**	**----**
Insulator length (H)			mm	390	340	410	460	550	580	611	895	915	847
Insulator diameter (D)			mm	150	180	180	180	180	190	150	190	200	185
Creepage distance			mm	550	400	500	650	800	800	1000	1200	1200	1800
Type of coupling			mm	16	16	16	16	16	16	16	16	16	20
Mechanical breaking load			KN	90	70	70	70	70	100	100	100	120	160
Withstand Voltage	Power ferquency	Wet	KV	70	50	70	85	95	95	70	140	140	200
	Impulse	Dry	KV	170	125	170	200	250	250	170	325	325	400
Net Weight (Approx.)			kg	9	7	8	9.5	12	12.2	13.5	13.5	14	20



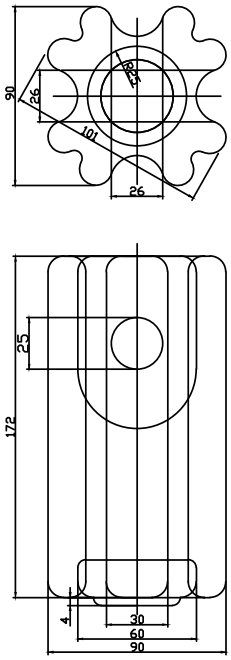
7- STAY INSULATOR

Stay insulators give protection in case of accidentally broken live wire that can accidentally energize a stay wire and remains in contact with line which doesn't trip. In some cases the bottom portion of the stay would have no voltage due to insulation, stay insulator will normally be installed in the middle of stay wire.

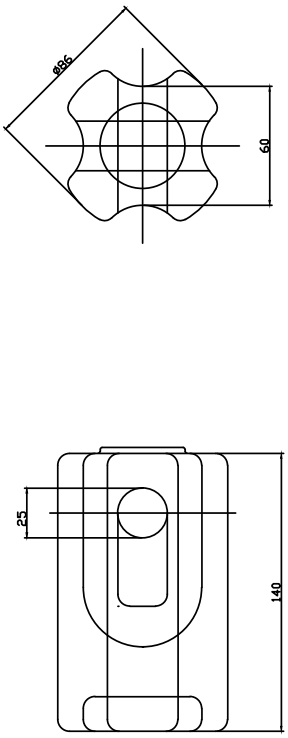
Three types of stay insulators are generally used for rural and railway:

- **1.1 KV stay**
- **15 KV stay**
- **36 KV stay**

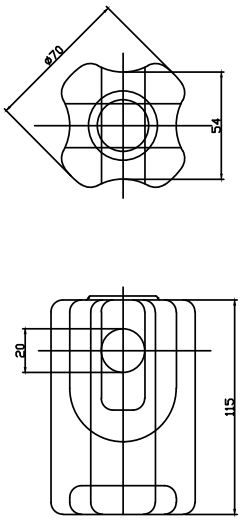
STANDARD PARTICULARS						
Product No.				**080-00**	**080-01**	**080-02**
Highest voltage			KV	36	1.1	15
Creepage distance			mm	76	48	57
Tensile strength			KN	89	53	80
Withstand Voltage	Power frequency	Dry	KV	40	30	35
		Wet	KV	23	15	18
Net Weight (Approx.)			kg	1.9	0.7	1.5



080-00



080-02

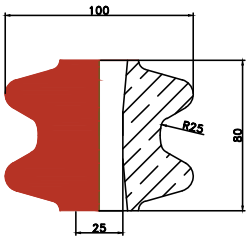


080-01

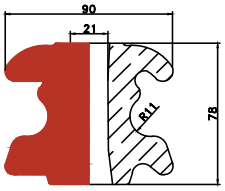
8- LOW VOLTAGE SPOOL & SHACKLE INSULATOR

These insulators are applied on low voltage over head distribution lines for fixing of conductors to poles.
This group of our manufacturing range includes low voltage insulators (Shackle, Spool) standardized in accordance with DIN and ANSI standard application.

STANDARD PARTICULARS										
Product No.					**039-00**	**039-01**	**039-02**	**055-01**	**076-00**	**076-01**	**076-03**
Creepage distance				mm	65	66	60	60	60	57	57
Mechanical strength				KN	8	8	6	8	12	12	12
Withstand Voltage	Power frequency	Dry		KV	22	23	22	20	18	18	20
		Wet		KV	9	10	8.5	9	6	6	8
Net Weight (Approx.)				kg	0.55	0.6	0.5	0.3	0.5	0.4	0.5



039–00



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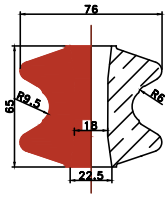
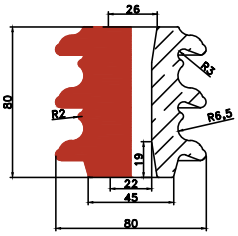
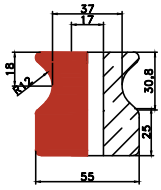


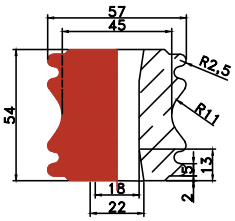
039–02



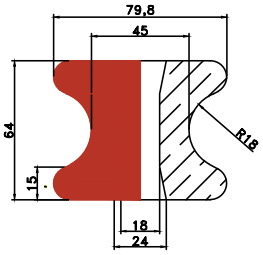
055–01



076–00



076–01



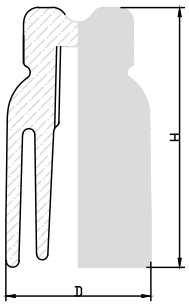
076–03

9- LOW VOLTAGE PIN INSULATOR

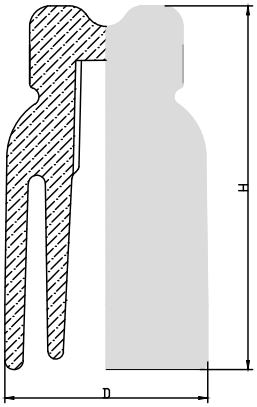
These insulators are fitted on low voltage over head lines (1.1KV) for fixing of conductor to poles and in the distribution system of the town with leakage path 150 mm up to 280 mm and with bending load 8KN to 18 KN.

STANDARD PARTICULARS

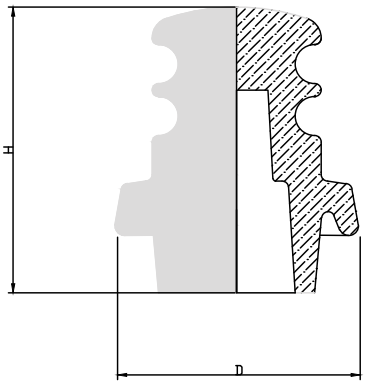
Product No.			RM I 026-01	RM II 027-01	055-00
Creepage distance		mm	280	175	150
Biggest diameter (D)		mm	86	71	93
Height (H)		mm	140	100	110
Bending failing load		KN	10	8	18
Power frequency Withstand Voltage	Dry	KV	40	20	20
	Wet	KV	30	10	10
Lightining Impulse voltage		KV	75	55	40
Puncture voltage in oil		KV	70	50	35
Net Weight (Approx.)		kg	1	0.5	0.7



027-01
RMII



026-01
RMI



055-00

Porcelain Insulators

Elsewedy Polymer

2

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.

45 SPI SILICONE LONG ROD INSULATORS

General features:

The new ECMEI long rod insulators type 45SPI is one of our technologies marked with "Elsewedy Polymer Insulators". combine the highest levels of electrical insulation and mechanical tensile strength with a compact, light weight design. The superior design and low weight of 45SPI long rod insulators makes it especially suited for overhead compact line applications where low tower design and short line spans are required.

They are also more economical to transport and install.Polymer insulator of are one piece products up to 6 m with no joints on the housing (sheath) or at the weathershed interfaces.Housing is directly vulcanized to the core during compression molding process, providing superior bonding performance. Also, pressure controlled uniform crimping provides superior long-term mechanical performance.

Design:

The 45SPI insulator housing is HTV1 silicone rubber housing made by intelligent joint technique IJT2 by injection molding process. The HTV silicone is directly molded onto the core rod by overlapping the triple junction point and part of the metal end fittings. The design ensures a total enclosure of the most critical parts of a silicone insulator – the triple point (metal end fitting/FRP rod/silicone housing), where usually the highest electrical field strength is concentrated. This overlapping system eliminates any need of traditional sealing systems while preventing any moisture ingress attacks. On the basis of contamination level , We can propose best fit shed profile . Shed profile complies with IEC standard.

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 340 kN of SML. The 45SPI is 100% exchangeable and compatible with existing insulators and line hardware of all types.

The special design of the end fitting in the junction minimizes the electrical field strength and partial discharge inside the junction zone as well as on the silicone housing surface, by utilizing an integrated grading ring. This reliably prevents corrosion of the insulating material and eliminates the risk of subsequent failure of the insulator.

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.

Quality

According to long-established Elsewedy tradition and experience in high-voltage equipment for more than a 50 years, each production step for the 45SPI – beginning with numerous incoming raw material inspections through the assembly of the individual components to routine tests of the finished product – is rigorously monitored and well controlled

Long Lasting Service Life-No moisture ingress

The intelligent joint technique for housing of the 45SPI insulators, weather sheds design and core rod sheath (coating) with optimal design triple junction point, all work in coherent performance to minimize the electrical field stress, which can easily lead to erosion damage of the polymer interfaces. In particular leading to erosion of the bonding between sheds and rod sheath, and thus damage to the insulator housing. Triple junction point in the connection zone, where all three elements (FRP rod, metal end fitting, and silicone housing) meet each other, is absolutely water- and air-tight sealed during manufacturing by using an overmolding housing system.

It totally encloses this junction point with the HTV silicone rubber of the housing itself. Also the highest bonding strength of the HTV silicone housing to the FRP core rod via special interface matreial combined with the overmolding design system prevent moisture ingress at the connection zone of the insulator.

Minimized electrical field strength

After numerous electrical calculations regarding E-field distribution along the insulator, and the connection zone on the High-voltage side in particular, the design of the 45SPI insulator was optimized for maximum reduction of electrical field stress,reduced corona effect, and minimized RIV value.

Two design keys ensure improved life expectancy by reducing electrical field stress in the triple point and on the silicone surface:

- The spherical-shaped rim of the end fitting inside the housing homogenizes the E-field distribution on the high-voltage side of the 45SPI insulator with an integrated grading ring up to 170 kV.

- The over molded design system and the silicone housing shape at the connection zone reduce the electrical field strength inside the housing, at the inner triple point in particular, as well as on the silicone surface directly. This by displacing the higher electrical field strength outside the housing (i.e. to the surrounding air area), and by taking advantage of the higher silicone relative permittivity.

- In this way, 45SPI insulators can be applied on 170 kV systems without the need for additional grading/corona rings.

Standards & Tests

All 45SPI long rod insulators are designed and tested in compliance with the latest IEC standards.
Each 45SPI insulator is routinely tested with a corresponding mechanical tensile test load of at least 50 percent of the defined SML load for at least ten seconds.

IEC 61109	Insulators for overhead lines – Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1,000 V
IEC 62217	Polymeric insulators for indoor and outdoor use with a nominal voltage >1,000 V
IEC 60815	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions
IEC 61466-1, -2	Composite string insulator units for overhead lines with a nominal voltage greater than 1,000 V

Configuration of End Fitting:

Dimensions in mm
SML (Specified Mechanical Load) : The SML is a load specified by the manufacture that has to be verified during a mechanical test. It forms the basis for selection of an insulato RTL (Routine Test Load):

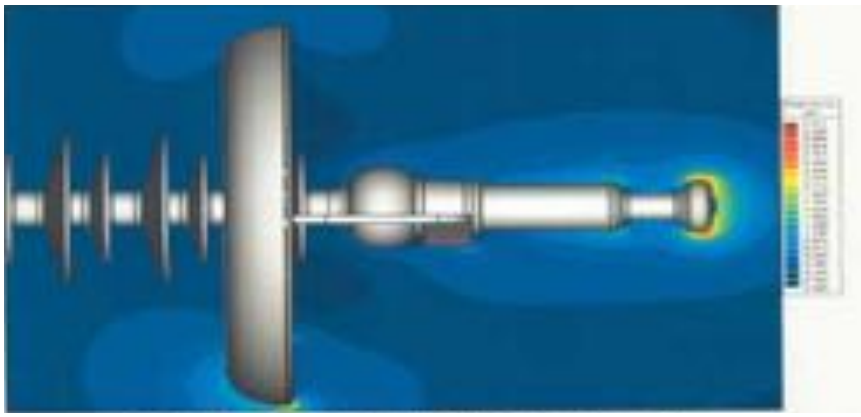
The RTL is rating equal to 50% of the SML.

SOCKET & BALL ACC TO IEC 60120	
Designation	**SML**
16	70kN/ 100kN/ 120kN
20	120 KN/ 160 KN/ 210 KN
24	210kN/ 340kN

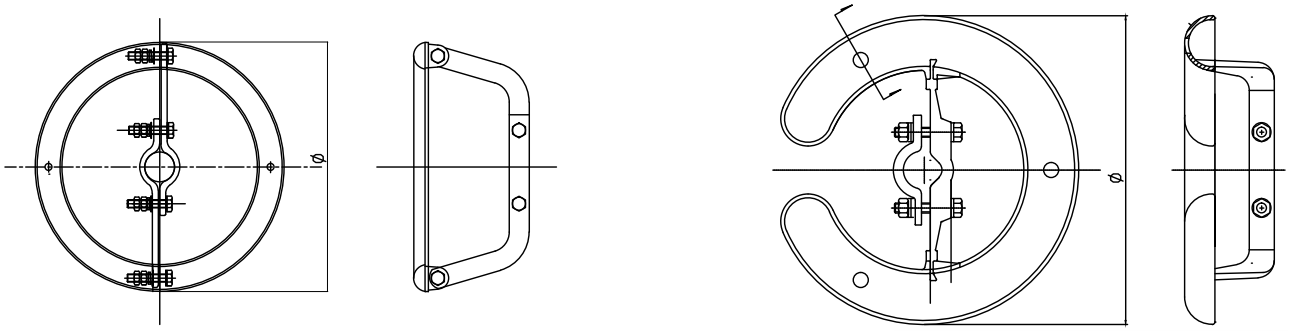
CLEVIS	
Designation	**SML**
13L	70kN
16L	100kN/ 120kN
16N	100kN/ 120kN
19L	160 kN
19N	160 kN
22L	210kN
22N	210kN

Accessories:

Arc protection devices such as arcing horns and corona rings for reduction of electrical field stress Customer-specific solutions as well as other connection and cable clamps are also available on request.



Corona are carefully designed based on numerous electrical simulations regarding electrical field distribution. For system voltages above 170 kV corona rings are included in 45SPI



Corona Ring

Recommended corona rings (diameter in mm) by line voltage

Line voltage (KV)	Ground end (top end fitting)	Line end (conductor end fitting)
≤ 170	None	None
245	None	Ø 250
420	Ø 310	Ø 310
550	Ø 310	Ø 310

Nominal operated voltage and related SML

Maximum values		Units	PL3	PL0	PL1	PL2
Highest voltage for equipment, Um	From to	KV KV	12 36	72.5 145	245 <420	420 550
Nominal system voltage , Un	From to	KV KV	11 33	66 132	220 <400	400 500
Specified mechanical failing load (SML)	From to	KN KN	70 100	100 160	120 210	160 340

BALL & SOCKET LONG ROD INSULATOR

Ball & socket long rod polymer insulator for suspension and tension applications are available up to 765 KV .Just afew selected insulator are listed below , Shorter or longer lengths and mechanical load are available on request .

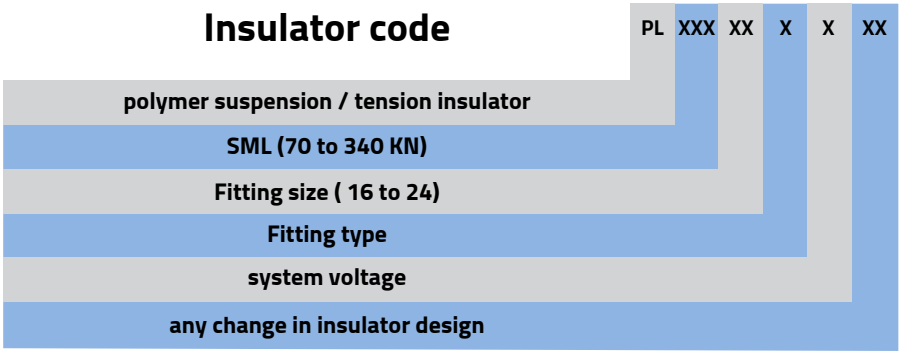
CAT.NO.	* Highest voltage KV	insulator Length (H) mm	Arcing distance mm	Leakage path mm	Coupling size	Wet Power freq. withstand Kv	Lightening impulse withstand KV	Specified mechanical load (SML) KN	Routine test load KN	Approx. weight KG
PL09016H300	12	355	205	560	16A	80	170	90	45	1.45
PL09016H301	24	488	340	1100	16A	100	200	90	45	1.9
PL09016H303	36	578	440	1400	16A	115	220	90	45	2.3
PL09016H302	36	623	475	1620	16A	130	250	90	45	2.4
PL10016H000	72.5	1110	1000	3600	16A	300	500	100	50	4.75
PL12016H000	72.5	1128	1000	3600	16A	300	500	120	60	5
PL12020H000	72.5	1145	1000	3600	20	300	500	120	60	5.3
PL16020H000	72.5	1196	1000	3600	20	300	500	160	80	6.25
PL10016H001	145	1290	1180	4320	16A	350	650	100	50	5.5
PL12016H001	145	1305	1180	4320	16A	350	650	120	60	5.75
PL12020H001	145	1325	1180	4320	20	350	650	120	60	6
PL16020H001	145	1375	1180	4320	20	350	650	160	80	6.7
PL10016H005	145	1690	1585	5950	16A	400	750	100	50	7.1
PL12016H002	145	1710	1585	5950	16A	400	750	120	60	7.4
PL12020H002	145	1725	1585	5950	20	400	750	120	60	8.2
PL16020H001	145	1765	1585	5950	20	400	750	160	80	8.9
PL12016H003	145	1890	1765	6650	16A	510	950	120	60	8.7
PL12016H101	245	2030	1835	7220	16A	460	1050	120	60	9
PL16020H101	245	2047	1850	7220	20	460	1050	160	80	10.7
PL12016H100	245	3202	3075	11930	20	645	1600	120	60	12.5
PL16020H100	245	3255	3075	11930	20	645	1600	160	80	13.5
PL16020H201	420	4750	4560	17890	20	680	1800	160	80	19.7
PL21020H201	420	4750	4560	17890	20	680	1800	210	105	19.7
PL16020H200	550	6240	6045	23875	20	710	2250	160	80	24.7
PL21020H200	550	6240	6045	23875	20	710	2250	210	105	24.7

SOCKET/SOCKET LONG ROD INSULATOR

Socket/ socket long rod polymer insulator for suspension and tension applications are available up to 765 KV .Just afew selected insulator are listed below , Shorter or longer lengths and mechanical load are available on request

CAT.NO.	* Highest voltage KV	insulator Length (H) mm	Arcing distance mm	Leakage path mm	Coupling size	Wet Power freq. withstand Kv	Lightening impulse withstand KV	Specified mechanical load (SML) KN	Routine test load KN	Approx. weight KG
PL09016S300	12	343	195	560	16A	80	170	90	45	1.75
PL09016S301	24	476	330	1100	16A	100	200	90	45	2.2
PL09016S303	36	566	430	1400	16A	115	220	90	45	2.6
PL09016S302	36	611	465	1620	16A	130	250	90	45	2.7
PL10016S000	72.5	1098	990	3600	16A	300	500	100	50	5
PL12016S000	72.5	1116	990	3600	16A	300	500	120	60	5.3
PL12020S000	72.5	1134	990	3600	20	300	500	120	60	5.6
PL16020S000	72.5	1180	990	3600	20	300	500	160	80	6.5
PL10016S001	145	1278	1170	4320	16A	350	650	100	50	5.3
PL12016S001	145	1293	1170	4320	16A	350	650	120	60	6
PL12020S001	145	1314	1170	4320	20	350	650	120	60	6.3
PL16020S001	145	1360	1170	4320	20	350	650	160	80	7
PL10016S005	145	1675	1575	5950	16A	400	750	100	50	7.4
PL12016S002	145	1695	1575	5950	16A	400	750	120	60	7.7
PL12020S002	145	1710	1575	5950	20	400	750	120	60	8.5
PL16020S001	145	1810	1575	5950	20	400	750	160	80	9.2
PL12016S003	145	1875	1755	6650	16A	510	950	120	60	9
PL12016S101	245	2018	1825	7220	16A	460	1050	120	60	9.3
PL16020S102	245	2030	1840	7220	20	460	1050	160	80	11
PL12016S100	245	3190	3065	11930	20	645	1600	120	60	12.8
PL16020S100	245	3240	3065	11930	20	645	1600	160	80	13.8
PL16020S201	420	4734	4550	17890	20	680	1800	160	80	20
PL21020S201	420	4734	4550	17890	20	680	1800	210	105	20
PL16020S200	550	6225	6035	23875	20	710	2250	160	80	25
PL21020S200	550	6225	6035	23875	20	710	2250	210	105	25

CODING STRUCTURE



Elsewedy Fitting

3

ELSEWEDY OVERHEAD TRANSMISSION METAL FITTING SF

Introduction:

Elsewedy Fitting (SF) is our trusted mark which ECMEI introduces as metal fitting configurations required for insulators string up to 500 kV overhead transmission lines

- Long rod string
- Cap & Pin string
- Polymeric string
- Ground wire strings
- Conductor's accessories
- Ground wire accessories

Manufacturing facility:

ECMEI operates from a purpose built unit which is committed to produce high quality products relating of Fitting for Overhead Transmission segment of the Power Industry SF manufacturing program offers wide range of solutions for its customers based in different parts of world.

Quality Control:

Whole process under strict & stringent quality control at every stage from raw materials to finished products. The factory is also equipped with a tool development facility, R & D Unit with a State of the advanced Laboratory capable of conducting various tests as per customer requirements & various standards.

Material Used for Transmission Line Equipment:

• Aluminum

Parts in contact with aluminum or aluminum alloy conductors should be made of aluminum to prevent fretting corrosion. Suspension clamp, strain clamps, spacers, parallel groove clamps etc. are cast from aluminum or aluminum alloys. Aluminum being a good conductor material, aluminum clamps affords high short circuit resistance and largely eliminates inherent losses, as they are non-magnetic.

• Steel

The following parts are mainly made of steel:

Drop Forged Steel : All insulator string accessories subject to pull (sag) load such as Ball eye, Double Eye Clamps etc.
Sheet Steel : Yoke Plates.
Flat Bar Stock : Suspension are Yoke Shackles Extension Links.
Round Bar or Tubular Stock : Arcing and Guard fittings.
Screw Steel : Rivet head bolts, Threaded bolts etc.

All steel components are hot dip galvanized conforming to BS-729

• Galvanizing Steel

Hot Zinc galvanizing is considered to be the most effective protective coating for steel and malleable cast iron under normal conditions. That is why we exclusively use hot galvanizing wherever possible. A farther advantage of this protective method that zinc remains relatively inert against other metals such as aluminum or copper, so that it can brought into direct with them without reservation.

To ensure that dimension of bolts, holes eyes, clevises etc. will be accurate after galvanizing, blanks are made accordingly, ie. screw threads are cut undersize, hexagons of socket head fasteners are pressed oversize.

Galvanizing and the corresponding test are carried out according to Bs 729 specification and renowned international Standards.

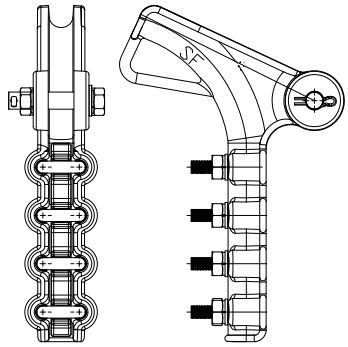
INSULATOR STRING FITTING

Insulator fitting set up to 36 Kv

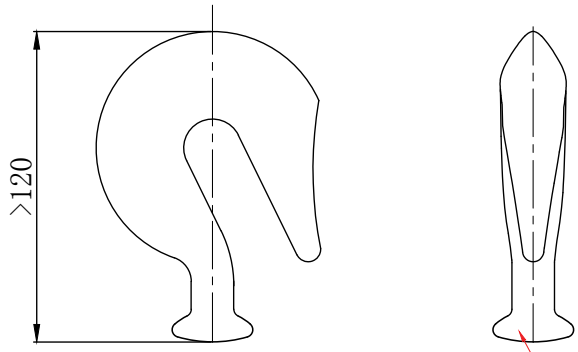
It is the string which contain some of the following parts to make a complete insulator string mainly for disc and long rod insulators

*Tension clamp

Code	No. of bolts	Conductor Dia. (mm)		Ultimate strength (KN)
		From	To	
A-01	2	4	10	45
B-01	3	10	18	70
C-01	3	14	22	90
D-01	4	18	24	100

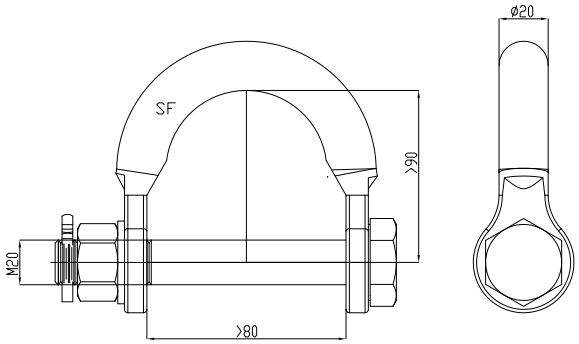


Tension Clamp

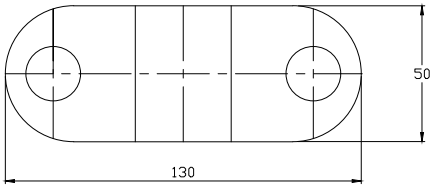


Hook

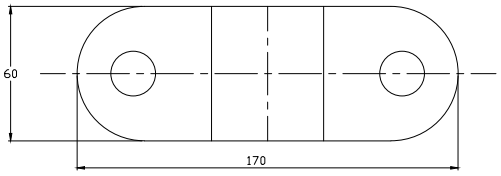
IEC 120 ball size 16A



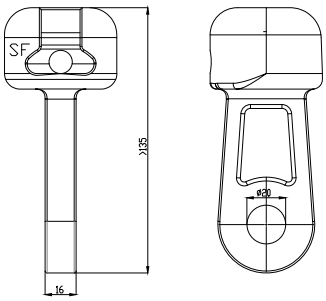
Chain Shackle



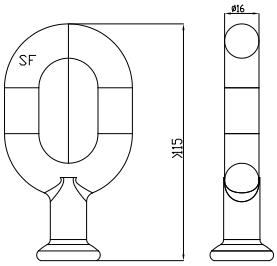
Extension link for 3u bolt tension clamp



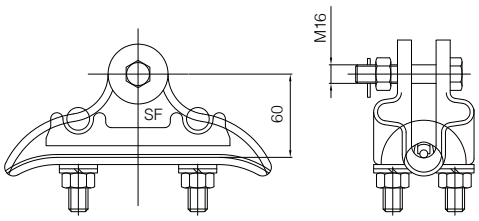
Extension link for 4u bolt tension clamp



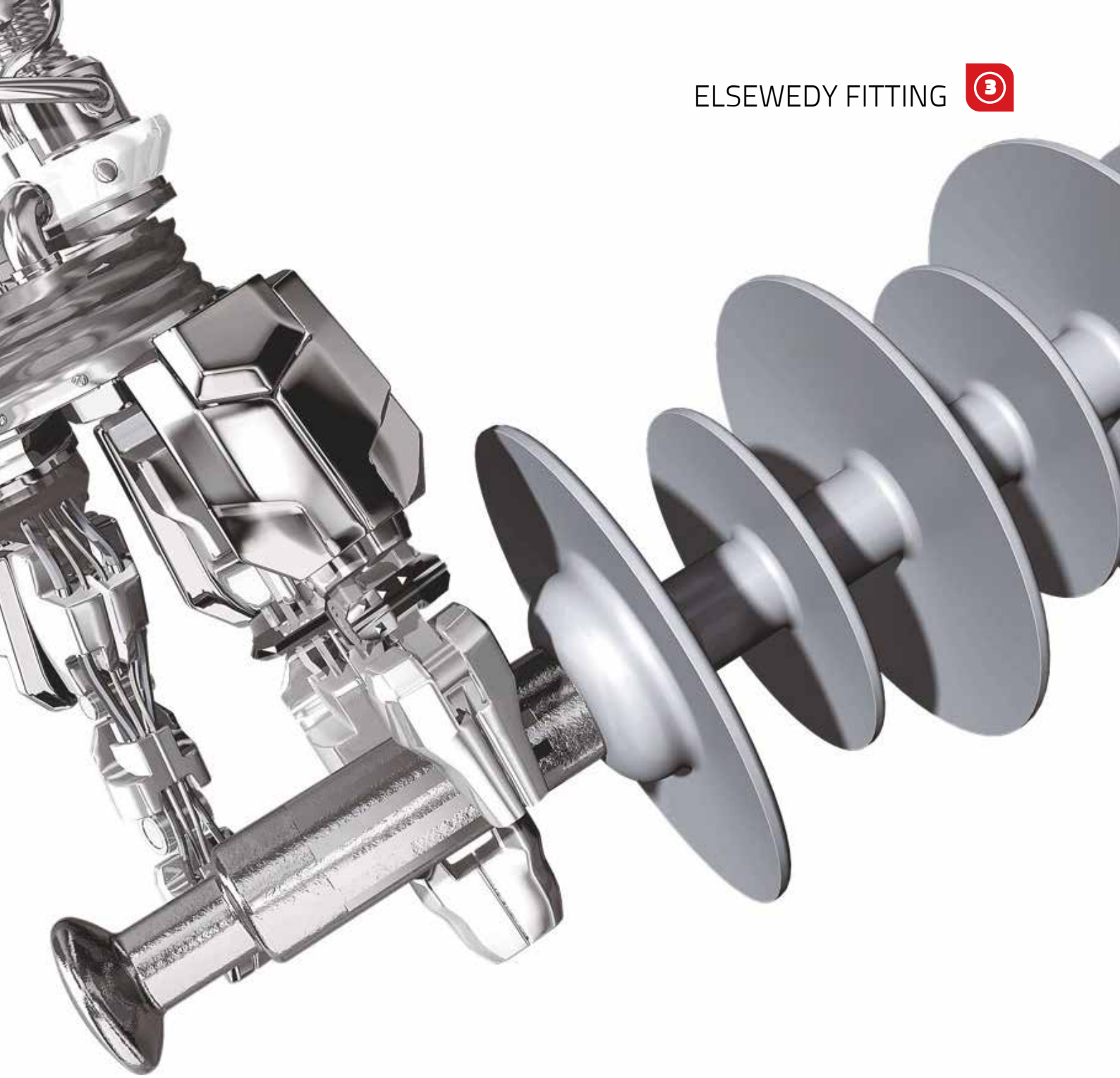
Socket Eye



IEC 120 ball size 16A
Ball eye



Suspension Clamp



RTV Coating

4

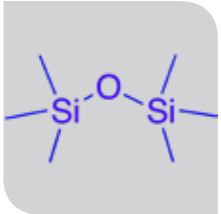
Porcelain strength meets hydrophobicity

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 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.

Definitions: RTV silicone

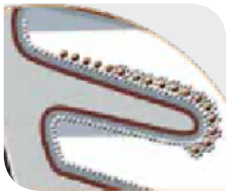
RTV Silicone (Room Temperature Vulcanizing silicone) is a type of silicone rubber made from a two-component system (base plus curative; A+B) available in a hardness range of very soft to medium - usually from 15 Shore A to 40 Shore. RTV Silicones can be cured with either a platinum catalyst or a tin catalyst. Applications include low temperature over molding, making molds for reproducing, and some optically clear grades have lens applications.



Vulcanization or vulcanization is a chemical process for converting rubber or related polymers into more durable materials via the addition of sulfur or other equivalent "curatives" or "accelerators".

These additives modify the polymer by forming crosslinks (bridges) between individual polymer chains. Vulcanized materials are less sticky and have superior mechanical properties. A vast array of products are made with vulcanized rubber including tires, shoe soles, hoses, conveyer belts and hockey pucks. The process is named after Vulcan, Roman god of fire. Hard vulcanized rubber is sometimes sold under the brand names ebonite or vulcanite, and is used to make hard articles such as bowling balls and saxophone mouth pieces.

Hydrophobicity Transfer

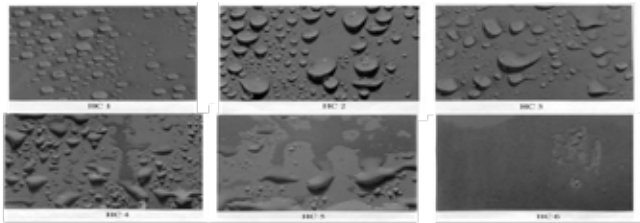


In the case of pollution particle deposition on the coated layer, the low molecular weight (LMW) siloxanes will spread from the silicone bulk material to the pollution layer and encapsulates these particles within a short time period. Now the insulator surface is hydrophobic again.

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

5

SYSTEM CERTIFICATES

intertek

CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Egyptian Co. For Manufacturing Electrical Insulators (ECMEI)

Main Site: Area (1/4)-South (A-1), 10th of Ramadan City–Egypt

has been registered by Intertek as conforming to the requirements of:

ISO 9001:2015

The management system is applicable to:

DESIGN AND MANUFACTURING OF ELECTRICAL INSULATORS.

Certificate Number: 16065-02 QMS EG
Initial Certification Date: 22 October 2009
Last Certificate Expiry Date: 21 October 2018
Date of Recertification Audit: 03 & 04 November 2018
Certification Cycle Start Date: 16 December 2018
Certificate Issue Date: 16 December 2018
Certificate Expiry Date: 21 October 2021

Calin Moldovean
President, Business Assurance

Intertek Certification Limited
10A Victory Park, Victory Road
Derby DE24 8ZF, United Kingdom

Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the client, and then only in accordance with the agreed-upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone. The certificate remains the property of Intertek, to whom it must be returned upon request.

intertek

CERTIFICATE OF REGISTRATION

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Egyptian Co. For Manufacturing Electrical Insulators (ECMEI)

Main Site: Area (1/4)-South (A-1), 10th of Ramadan City–Egypt

has been registered by Intertek as conforming to the requirements of:

ISO 14001:2015

The management system is applicable to:

DESIGN AND MANUFACTURING OF ELECTRICAL INSULATORS.

Certificate Number: 16065-02 EMS EG
Initial Certification Date: 22 October 2009
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Date of Recertification Audit: 03 & 04 November 2018
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Certificate Expiry Date: 21 October 2021

Calin Moldovean
President, Business Assurance

Intertek Certification Limited
10A Victory Park, Victory Road
Derby DE24 8ZF, United Kingdom

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intertek

CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Egyptian Co. For Manufacturing Electrical Insulators (ECMEI)

Main Site: Area (1/4)-South (A-1), 10th of Ramadan City–Egypt

has been registered by Intertek as conforming to the requirements of:

ISO 45001:2018

The management system is applicable to:

DESIGN AND MANUFACTURING OF ELECTRICAL INSULATORS.

Certificate Number: 16065-01 OHSMS EG
Initial Certification Date: 22 October 2009
Last Certificate Expiry Date: 21 October 2018
Date of Recertification Audit: 03 & 04 November 2018
Certification Cycle Start Date: 16 December 2018
Certificate Issue Date: 16 December 2018
Certificate Expiry Date: 21 October 2021

Calin Moldovean
President, Business Assurance

Intertek Certification Limited
10A Victory Park, Victory Road
Derby DE24 8ZF, United Kingdom

Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the client, and then only in accordance with the agreed-upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone. The certificate remains the property of Intertek, to whom it must be returned upon request.

Arab Republic of Egypt

Egyptian Accreditation Council (EGAC)

CUSTOMER APPROVALS & PRODUCT CERTIFICATES

HV Laboratory a.s.
HIGH VOLTAGE TESTING LABORATORY

HV Laboratory a.s.
HIGH VOLTAGE TESTING LABORATORY

KEMA

TEST REPORT

N° RP LS 05/113/A

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TEST REPORT

N° RP LS 05/113/B

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THE LABS IN WHICH THE INSULATORS ARE TESTED

VNL VEIKI a DEKRA company

EGU HV Laboratory a.s.

DNV·GL KEMA Laboratories

LABORATORIO SVEPPI Siemens S.p.A.

केन्द्रीय विद्युत अनुसंधान संस्थान
(विद्युत मंत्रालय भारत सरकार के अधीन स्वायत्त सोसाइटी)
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