



TE Connectivity Silicone Suspension /
Tension Insulators 70kN
up to LIWV 450kV (BIL)

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MV Silicone Tension Insulators

The high tensile strength of glass fibre has been combined with our HV shed profile, to produce this rugged, light-weight tension insulator for overhead line applications up to LIWV (BIL) rating of 450kV

The glass fibre core provides high mechanical strength with tensile values of greater than 70kN. TE's silicone insulator profile utilises similar designs, materials, technology and know how that has been employed for nearly 40 years in the Raychem, Bowthorpe EMP and Axicom medium and high voltage insulator product portfolios.

Silicone is a hydrophobic material with a performance today of both proven tracking and erosion resistance and UV stability that gives a good balance of technical performance in a wide range of climatic and pollution conditions.

The construction consists of TE compact creepage design insulator profile which have the same diameter sheds in order to maximise flashover performance in polluted environments over a minimum insulator length.

The hydrophobic silicone housing is moulded directly over the glass fibre rod and an erosion resistant sealant is used between the end fitting and silicone to give a moisture resistant barrier.

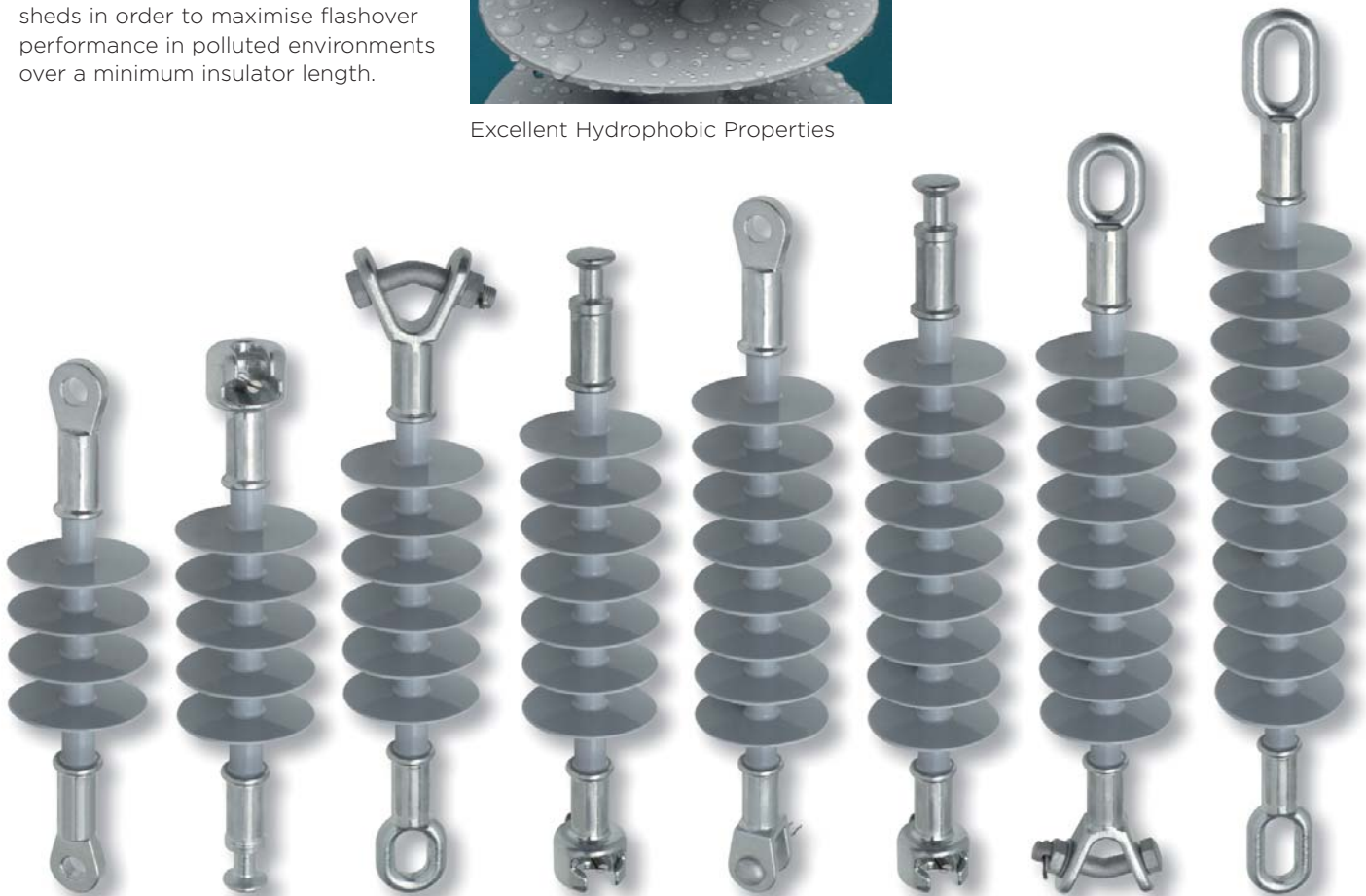
The hot dip galvanised steel end fittings are crimped onto the glass fibre core providing high strength corrosion resistant fixing points.



Excellent Hydrophobic Properties

Benefits and Key Features

- TE Connectivity Know how
- TE Connectivity branded, contract manufactured
- 70kN Tension rating (SML)
- Interchangeable metal end fitting selection
- Reliable tensile performance
- Light weight for easier installation
- Silicone housing has excellent hydrophobic properties
- Shed design to minimize insulator length per kV rating
- Shock and vibration resistant,
- Good tracking and erosion resistance performance
- Maintenance free
- Tested in accordance to IEC61109 & IEC62217
- Quality design and manufacture to ISO9001



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Insulator Considerations

TE Connectivity 70kN Silicone Suspension / Tension insulator range is designed for 7 different metal end fittings, each of which can be selected with any other to make any combination required.

The overall total insulator length will vary dependant upon the metal end fitting selections.

Electrical Properties Selection

Select either the operating voltage or the LIWV (BIL) rating from the below chart, read off the creepage distance and compare this value with your minimum creepage requirement for your application. If the creepage value is less than your minimum requirement then search down the creepage column until you either exceed or get very close to your actual minimum creepage requirement. Read off the shed number and verify all electrical parameters on the selected row meets the electrical insulation needs.

Metal End Fitting Selection

Choose any combination or orientation, between the seven below metal end fittings and from the table overleaf note the specific characteristics of each end fitting you have selected.



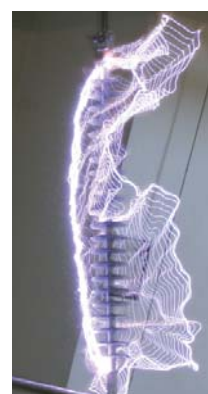
Max System Voltage	Nominal Creepage (mm)	Nominal Dry Arc (mm)	Number of Sheds	Min Dry AC Withstand (kV)	Min Wet AC Withstand (kV)	Min Dry AC Flashover (kV)	Min Wet AC Flashover (kV)	Min Lightning Impulse Withstand LIWV (kV)
17.5	455	205	4	80	50	85	60	125
24	558	240	5	95	70	105	80	170
36	660	275	6	105	80	115	90	195
36	766	310	7	115	80	125	90	195
36	865	345	8	130	100	135	115	245
36	968	380	9	140	115	145	125	275
52	1070	415	10	150	125	155	140	300
52	1173	445	11	160	135	165	150	305
65	1890	697	18	245	195	255	215	440
65	2330	835	22	290	230	300	260	495

Alternatively cross reference the Lightning Impulse Withstand Voltage (LIWV) kV peak rating chart below, to determine minimum system voltage and then take into account your pollution / creepage considerations.

Highest voltage for equipment (Um) kV (r.m.s. value)	Standard rated short duration power-frequency withstand voltage kV (r.m.s. value)	Standard rated lightning impulse withstand voltage (LIWV) kV (r.m.s. value)
3.6	10	20
		40
7.2	20	40
		60
12	28	60
		75
17.5*	38	95
		75
24	50	95
		125
36	79	145
		170
52*	95	250
72.5	140	325
100**	185	450

NB * These Um are non preferred values in IEC 60038 and thus no most frequently combinations standardized in apparatus standards are given

**This Um value is not mentioned in IEC 60038 but has been introduced in the range in some apparatus standards



22 Shed Wet AC test



22 Shed Dry LI test



22 Shed Dry AC test

Contact us at: insulators@te.com

TE Connectivity Silicone Suspension / Tension Insulators up to LIWV 450kV (BIL)

Specifying and Naming Convention

Specifying

Silicone Tension / Suspension Insulators

To specify the correct insulator, it is necessary to define the following characteristics:

- Specified mechanical load (SML) [kN]
- Operating Voltage and or LIWV (BIL) [kV]
- Nominal Creepage Distance [mm]
- Metal End Fittings or couplings

Designation of

Silicone Tension / Suspension Insulators

In accordance with IEC 61466-1, composite tension insulators are assigned a reference designation which indicates:

- Insulator type
- Mechanical strength
- Metal End Fitting type

Requirement designation examples:

- 1) CS 70 S16 B16
- 2) CS 70 T16N C16N

Where:

CS = Composite longrod insulator

70 = 70kN specified mechanical load

S16 = Top end Socket fitting, according to IEC 120, size 16

B16 = Bottom end Ball fitting, according to IEC 120, size 16

T16N = Top end Tongue fitting, according to IEC 61466-1, size 16N

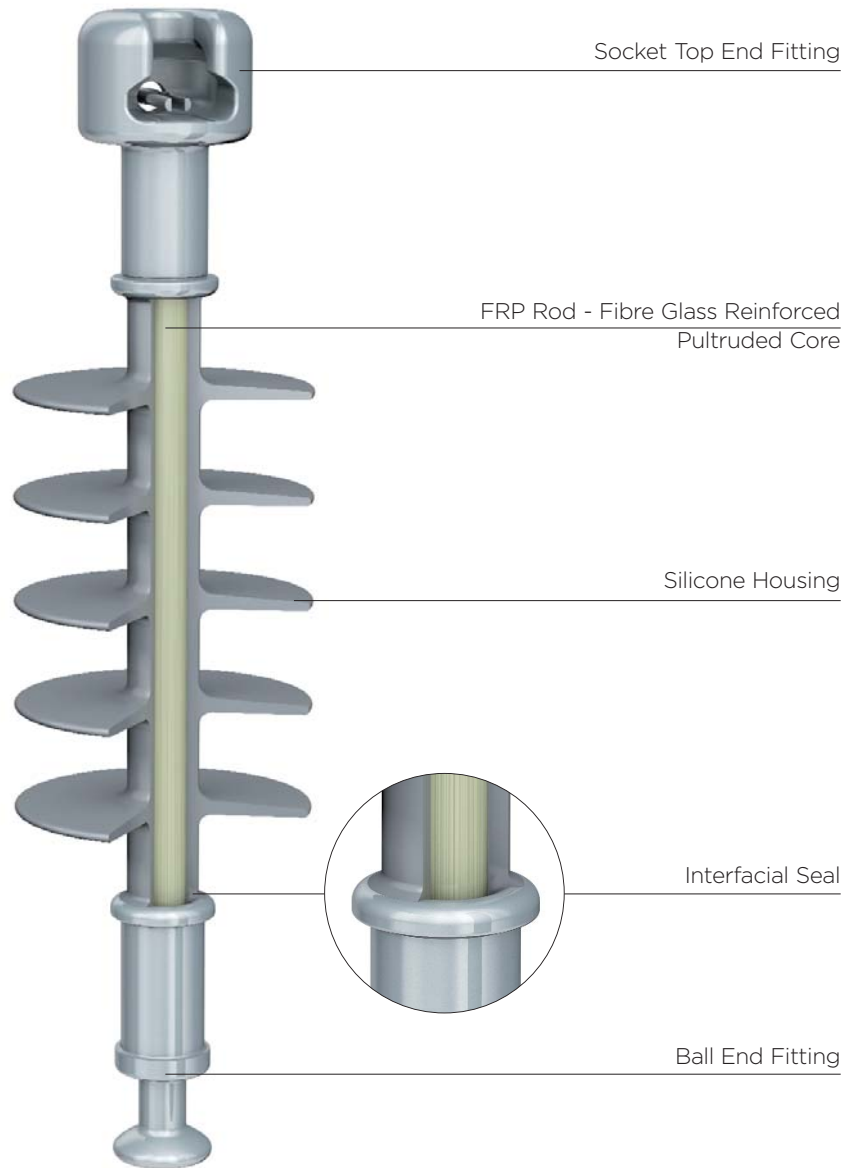
C16N = Bottom end Clevis fitting, according to IEC 61466-1, size 16N

TE Naming examples:

1) LR-CSxxxSByyyy-zzzzCSG

2) LR-CSxxxTCyyyy-zzzzCSG

EF's are designed to relevant IEC Spec



TE Naming Conventions

IEC designation for composite Long Rod

SML [kN]

eg: 70

Top Coupling

eg: B, S, T, C, Y, E, A

Bottom Coupling

eg: B, S, T, C, Y, E, A

LIWV Rating (BIL) [kV]

eg: 95, 145, 170, 250, 325, 450

Creepage [mm]

eg: 455, 558, 660, 766, 865, 968, 1070, 1173, 1890, 2330

Material

eg: Composite

Housing

eg: Silicone

Colour

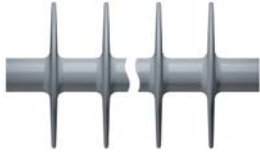








eg: Grey

LR-CSxxxTByyyy-zzzzMMF

Contact your local TE Connectivity Salesperson for either support in selecting your configuration or else with your naming convention ready for a pricing and lead-time quotation

TE Connectivity Silicone Suspension / Tension Insulators up to LIWV 450kV (BIL)

Insulator Configuration

Schematic	Schematic	Description	Designation	Operating Length (mm)	Total Length (mm)	Comment
		Insulator Core	Shed No:			Creepage
		Silicone Covering	4	175	175	455
		FRP Core e-glass	5	210	210	558
		Compliant to IEC 61109	6	245	245	660
			7	280	280	766
			8	315	315	865
			9	350	350	968
			10	385	385	1070
			11	420	420	1173
			18	665	665	1890
			22	805	805	2330
 		Ball and Socket Galvanised Steel*	B	82	95	IEC Spec Size 16
			S	88	97	IEC Spec Size 16
 		Tongue and Clevis Galvanised Steel**	T	85	105	IEC Spec Size 16N
			C	85	105	IEC Spec Size 16N
 		Y and Eye Galvanised Steel**	E	104	119	IEC Spec Size 17
			Y	93	120	IEC Spec Size 16
 		Eye Forged Steel**	A	108	136	IEC Spec Size 17

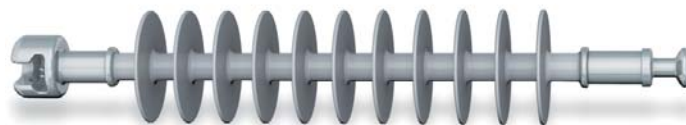
* compliant to IEC 120
 ** compliant to IEC 61466-1

Overall Tension Insulator Dimensioning

Choose any combination or orientation, between the seven metal end fittings from the table above noting the specific characteristics of each end fitting selected and simply add the respective selected measurements to determine the overall length and the operating length

Example 1: (Operating length)

11 Shed Socket & Ball = (11 Shed = 420mm) (Ball = 82mm) (Socket = 88mm) therefore, $420+82+88 =$ operating length 590mm



Example 2: (Total length)

6 shed Eye (cast), Eye (cast) = (6 shed = 245mm) (Eye = 119mm) (Eye = 119mm), therefore, $245+119+119 =$ total length 483mm



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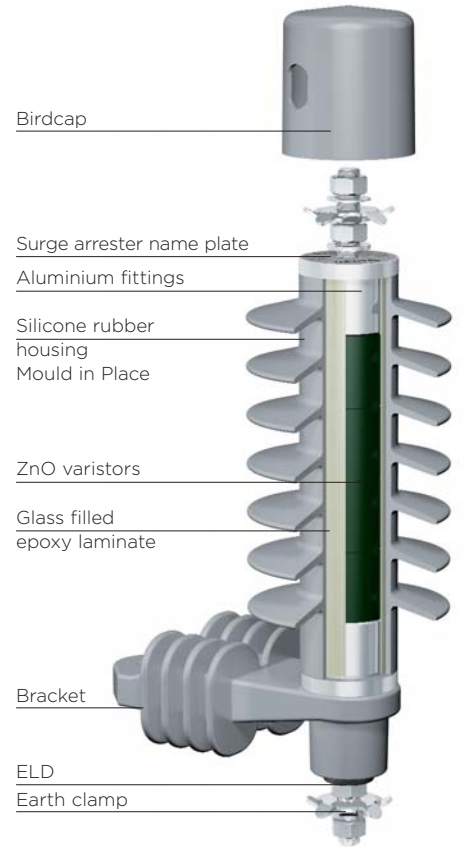
Other TE Energy Insulation products

DA1 Surge Arrester



Bowthorpe EMP DA1 series surge arrester benefits:

- Tested in accordance with IEC60099-4 at independent accredited laboratories
- Direct moulded housing to prevent moisture ingress
- Low residual voltages
- High-energy handling
- Safe non-shattering short circuit behavior to higher current levels
- Maintenance free
- Hydrophobic silicone housing: (Tracking and erosion resistant)
- Excellent cantilever and tensile performance
- Quality design and manufacturing meeting international standards

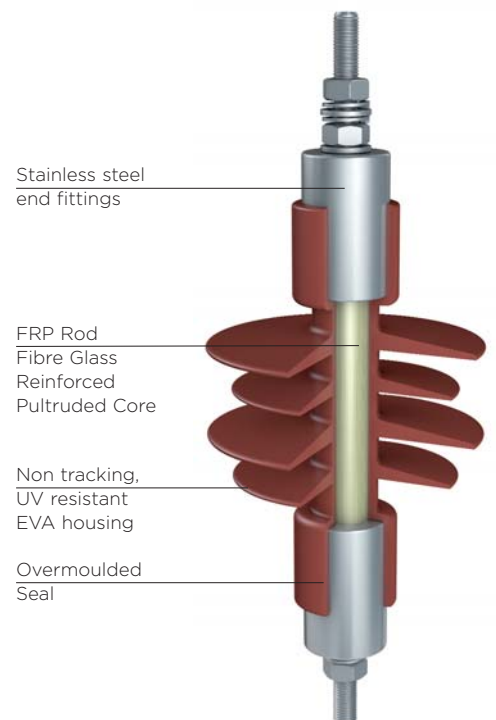


EPBI Standoff Insulator



Raychem EPBI standoff insulator benefits:

- High strength FRP core
- Standard stainless steel fittings
- Impenetrable interfacial sealing
- Pollution resistant EVA HV insulation housing in service since the 1970's.
- Alternating shed configuration for optimal pollution flashover performance
- Lightweight - easy installation and reduced transport costs
- High corrosion resistance
- Excellent performance in polluted environments
- Excellent resistance to vandalism
- Shatterproof design - breakages eliminated during installation.



Other TE Energy Insulation and Protection Catalogues and Brochures

Raychem Polymeric Insulators

Raychem EPBI Standoff Insulators (EPBI)	Catalogue No: EPP 0415
Raychem Station Post (RAP)	EPP 0945
Raychem Suspension Tension Insulators (RST)	EPP 1138
Raychem Line Post Insulators F-Neck (RLP)	EPP 1376
Raychem Line Post Insulators Horizontal Clamp (RLP)	EPP 1377
Raychem Line Post Insulators Vertical Clamp (RLP)	EPP 1378

Silicone Polymeric Insulators

TE 70kN Silicone Tension / Suspension Insulators (LR-70-CSG)	EPP 1930
TE 120kN Silicone Tension / Suspension Insulators (LR-120-CSG)	EPP 1931

Surge Arresters

Bowthorpe EMP Transmission Line Arrester	EPP 0004
Bowthorpe EMP Transmission Porcelain Surge Arresters	EPP 0015
Bowthorpe EMP Transmission Polymeric Surge Arresters	EPP 0016
Bowthorpe EMP PCA Single Column Polymeric Surge Arrester	EPP 0018
Raychem LV/MV Metal Oxide Surge Arresters for Distribution Networks	EPP 0533
Raychem MV Surge Arresters MPA for Indoor Applications	EPP 0533-1
Raychem MV Surge Arresters RDA for Indoor Applications	EPP 0533-2
Raychem MV Surge Arresters SPA for Indoor Applications	EPP 0533-3
Raychem MV Surge Arresters Type HE 60 for DC Railway Applications	EPP 0533-4
Raychem MV Surge Arresters CPA for cable sheath protection system	EPP 0533-5
TE Connectivity MV Surge Arresters CLX for covered conductors	EPP 0533-7
Raychem Metal-Oxide Low Voltage Arresters	EPP 1083
Bowthorpe EMP MV Surge Arresters OCP Open Cage Polymeric series	EPP 1098
Bowthorpe EMP surge arrester Distribution metal oxide surge arrester DA1 Series (IEC)	EPP 1496
Bowthorpe EMP TLPCA transmission line polymeric (class 3) surge arrester range	EPP 1677
Bowthorpe EMP surge arrester Distribution metal oxide surge arrester DAO Series (IEC)	EPP 1716

Raysulate Asset Protection

Raychem High Voltage Creepage Extenders HVCE	EPP 0355
Raychem Heat shrinkable busbar insulation tubing BBIT Voltage class 36kV Dia 11-125mm	EPP 0607
Raychem Heat shrinkable busbar insulation tubing BPTM Voltage class 25kV Dia 6.5-220 mm	EPP 0608
Raychem Insulation sheets HVIS Voltage class 36kV Max busbar width 150mm	EPP 0609
Raychem Busbar insulation tape HVBT Voltage class 25kV	EPP 0610
Raychem Medium voltage line cover MVLC	EPP 0764
Raychem Medium Voltage Conductor Covers for Outage Prevention MVCC	7-1773453-7 E329
Raychem Medium Voltage Fusion Tape MVFT	7-1773453-8 E330
Raychem High Voltage Creepage Extender Wraparound HVCE WA	8-1773444-9 E133

TE Energy Total Commitment To Quality

Even the best technology must be backed up by a thorough and consistent quality assurance programme. At TE Energy, we subject every product to an extensive quality control regime which includes the following procedures

At every production stage, beginning with the raw materials and continuing through to the packaged product, the QC lab tests all physical and electrical characteristics which can influence quality.

By means of batch identification the Quality Assurance Programme ensures traceability backwards all the way to the details of the compound batch test reports. We carry out re-qualification testing on a regular basis

Quality Assurance at TE Energy is not static, but rather a constantly improving process directed towards our goals: complete customer satisfaction. The TE Energy Insulator and Arrester manufacturing sites are certified according to ISO9001 and ISO14001. Our vendor routine tests and internal incoming inspection, confirm performance of all critical components used in the assembly of our insulators and arresters

TE Energy also contract manufactures out certain product lines. TE Energy requires that our contract manufacturers are also certified to ISO9001 and to our stringent TE Energy standards, in order to qualify these products as TE Energy branded products.

Contact us at: insulators@te.com

Other products and brochures available from TE Energy

<p>Asset protection</p>	<p>Insulation enhancement systems for substations and overhead. Designed to prevent unplanned outages due to accidental bridging and to help upgrade insulation levels at critical points in systems.</p> <p>Contact us at: assetprotection@te.com</p>	
<p>Low-voltage surge arresters</p>	<p>LV arresters are used to provide protection for LV overhead lines, consumer in-house supplies, distribution transformers and other appliances.</p> <p>Contact us at: surgearresters@te.com</p>	
<p>Medium-voltage surge arresters</p>	<p>Metal oxide varistor, distribution arresters for indoor and outdoor applications for protection of overhead lines, DC locomotives and switchgear applications.</p> <p>Contact us at: surgearresters@te.com</p>	
<p>High-voltage surge arresters</p>	<p>Porcelain and polymeric series parallel and single column constructed arresters for protection of transmission systems up to 550 kV.</p> <p>Contact us at: hvsurgearrester@te.com</p>	
<p>Polymeric insulators</p>	<p>Insulators and insulating components/housings providing reliable solutions for power utilities and railway customers with installations in high pollution environments and applications up to 400 kV.</p> <p>Contact us at: insulators@te.com</p>	
<p>Porcelain insulators</p>	<p>Insulators for applications up to system voltages of 132 kV. This range of insulators offers a cost-effective solution for low and medium polluted environments.</p> <p>Contact us at: insulators@te.com</p>	

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TE Energy - innovative and economical solutions for the electrical power industry: cable accessories, connectors & fittings, insulators & insulation, surge arresters, switching equipment, street lighting, power measurement and control.

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