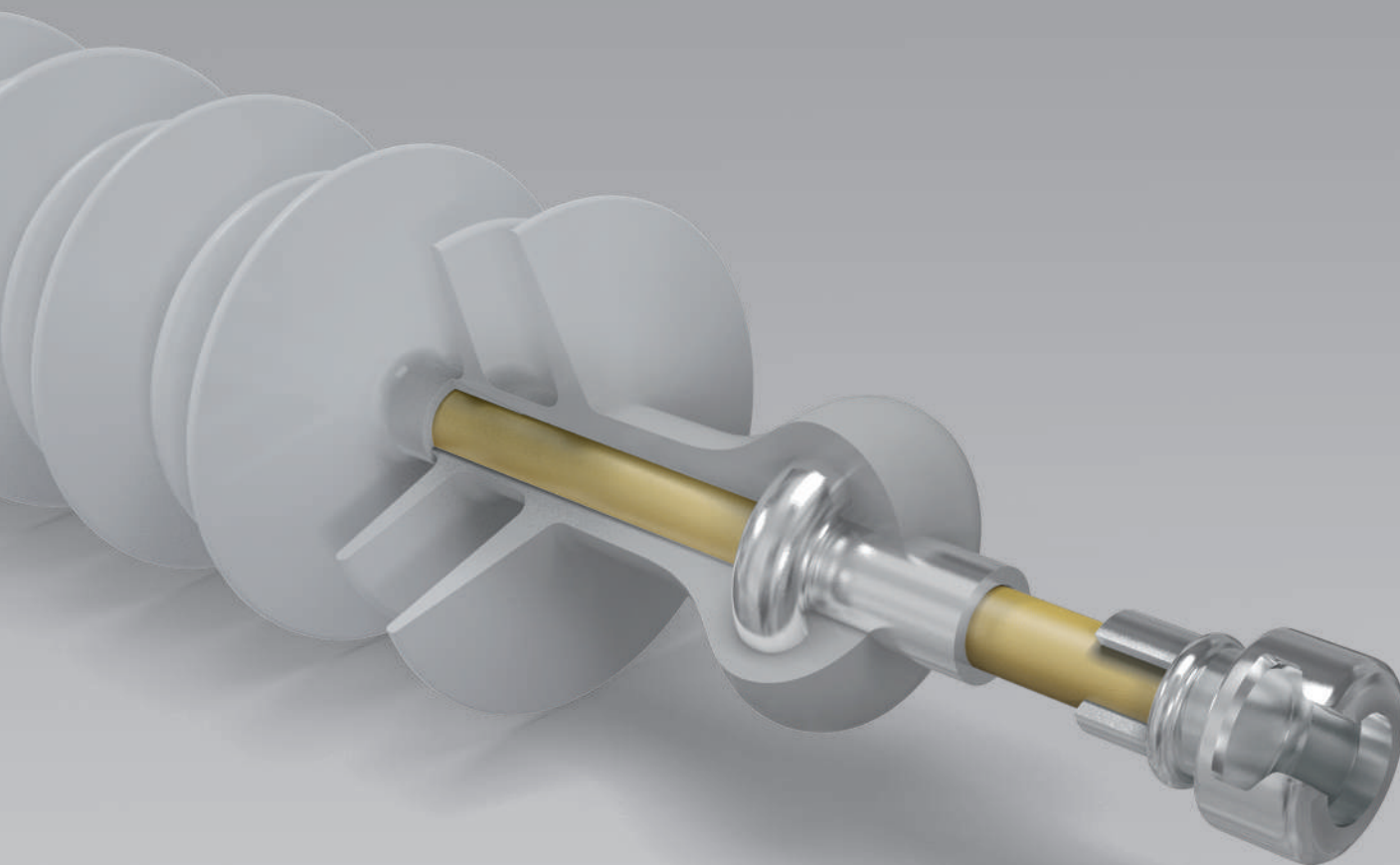


DOROOD KELID

ELECTRIC COMPANY

Composite Insulators

(دانش بنیان)



NRI



About Us

Dorood Kelid Electric Co is one of the leaders in producing electrical equipment with more than 30 years of experience. DK Electric Co is now proud to sell more than 5 million insulators up to 500 kV for the first time in Iran.

Our belief is to respect the international standards; hence, DK Electric Co has coordinated with various international companies and national experts for over eight years in order to optimize the quality of its products. In line with this trend, DK Electric Co has benefited from the latest technologies and innovations of leading research institutions such as NRI, STRI, and EPRI among others.

Our products are standardized, as demonstrated in the insulator's characteristics section. Resistance maximisation of the rods, high resistance fittings, reduction in the electrical field, minimised partial discharge are just a few of the characteristics of the insulators that highlight the innovative and cutting-edge technology used in DK Electric Co's product range.

Combining our 30 years of experience with the innovative technology has provided us an exceptional opportunity to produce insulators with unique features, which we strongly believe, will provide us with the opportunity to supply our products globally and play a major role in the international market.

Our high quality and low prices will enable us to compete with international companies in the field of electrical equipment production. Our aim is to gain customer confidence and satisfaction. In order to accomplish our aim, shareholders of DK Electric Co attempt to equip themselves with latest industry knowledge and technology.



Characteristics of Composite Insulators

The rods utilized in producing insulators of this company are ECR which possess a high degree of resistance confronting the process of erosion and are anti Acid. The utilized compound is a combination of the best type of Silicone and high quality fillers which protect the cover of the insulator against harsh environment such as U.V, Ozone, acids, pollution and humidity. Fittings are produced under the forge method.

The design of the insulators' sheds is appropriate for different regions with various climates especially regions with heavy pollution; this process is according to standards such as IEC60815. Fittings are assembled with the method of crimping with high level of assurance and they are passed quality tests.

Modern and developed machinery and equipment are used for crimping, with the possibility of examining the quality of the crimping process (by using Sonar sensors). The design of the Corona rings is done by accurate digital assimilation in order to reduce and to balance the electrical field around and on the insulator's sheds.

In order to optimize the sheds and dimensional characteristics of different parts of the insulators

the most recent findings of the research institutions such as EPRI, STRI, and NRI and others are considered. The Corona ring is made of aluminium which is resistant against harsh weather conditions; it is polished for the reasons of reducing Corona and partial discharge.

The utilized bolts and arms in Corona ring all are made of stainless steel in order to be anti-corrosion. It is considered some projections on Corona ring and fitting to lock Corona ring on fitting (to prevent movement in service). This helps to convenience and fast installation. The special design of the Corona ring makes installation accurate. In order to maximize the resistance of the insulator's rod against humidity and pollution, the thickness of the sheath on the rod is between 3-4mm. In order to maximize the sealing of the rod against humidity, the fitting is covered with Silicone.

Moreover, in order to maximize the assurance of the sealing two grooves are considered in the design of the fittings which are filled by Silicone.

To increase the resistance against absorption in the part of sealing, different parallel methods are used; the reason is to prevent

any deficiency such as break of the rod which is one of the most common and dangerous deficiencies of insulators. Simulation method is used in designing the insulator's sheds and sealing, this method is utilized in order to decrease the electrical field on the sheath and sheds and consequently increasing the age of the insulator.

As a result of decreasing of the electrical field on the surface of the sheath and sheds, the partial discharge on the Silicone is minimized; which prevents the tracking and erosion of the surface and the water slip.

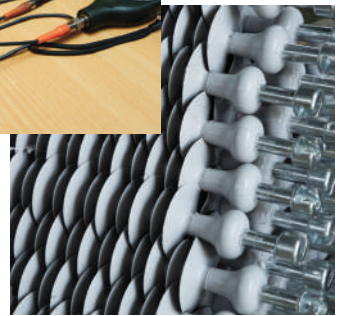
Because of special insulator design, corona ring is not required for insulators up to 132kV, although it can be installed upon request. During the producing process, quality control is performed and finally routine tests are executed on the production.



DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

Our Factory & Laboratory





DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

Medium Voltage Pin Type Insulator



24 KV

PT-13.4-300-PTF-25-N



36 KV

PT-13.4-420-PTF-28-N



36 KV

PT-13.4-450-PTF-31-N



Fittings



Material of the end fitting: Drop Forged Steel with Dip Galvanized or Aluminium Alloy Casting.

Catalog Number	Ur	Specified Mechanical Load	Section Length	Creepage Distance	Arcing Distance	Lighting Impulse Withstand Voltage (kV)		Power Frequency Withstand Voltage (kV)	
	kV	kN	mm	mm	mm	Pos	Neg	Dry	Wet
PT-13.4-292-PTF-23-N	24	13.4	292	550	217	150	170	80	60
PT-13.4-300-PTF-23-N	24	13.4	300	550	225	160	180	90	65
PT-13.4-300-PTF-25-N	24	13.4	300	600	250	170	200	90	70
PT-13.4-360-PTF-32-N	24	13.4	360	765	285	180	210	105	75
PT-13.4-355-PTF-22-N	36	13.4	355	780	277	185	210	80	65
PT-13.4-420-PTF-28-N	36	13.4	420	1000	370	240	265	100	70
PT-13.4-450-PTF-31-N	36	13.4	450	1120	385	250	270	110	80
PT-13.4-450-PTF-35-N	36	13.4	450	1280	385	260	280	115	85

**DK ELECTRIC**

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

Medium Voltage Suspension / Tension Insulator

**24 KV**

TS-70-433-CT-28-N

**24 KV**

TS-70-477-CT-32-N

**36 KV**

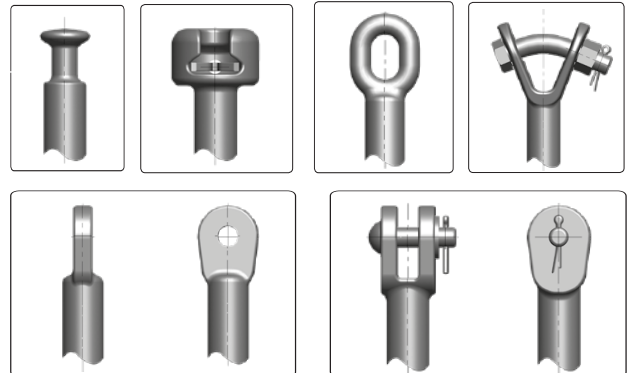
TS-70-603-CT-32-N

Line & Lower End Fittings

Complies with IEC 60471 & IEC 61466 & ICE 60120

Tongue & Clevis	Coupling Size 13 or 16
Ball & Socket	Coupling Size 16
Oval Eye	Coupling Size 17
Y Clevis	Coupling Size 16

Fittings



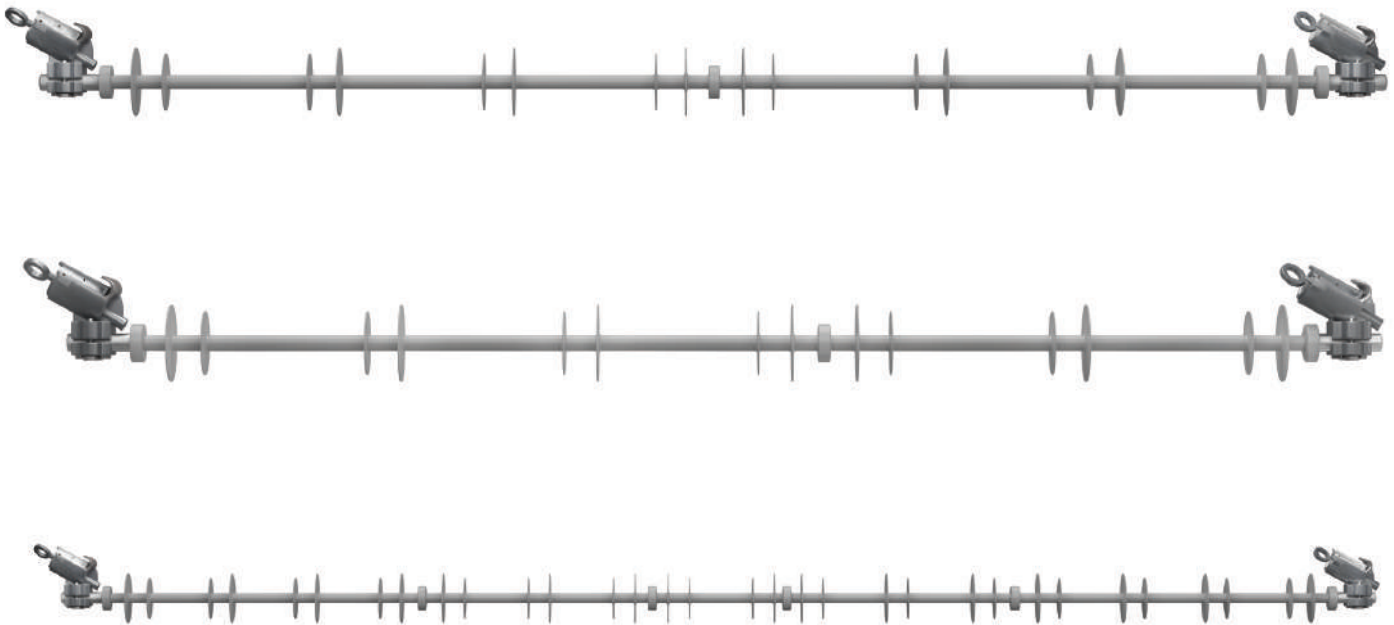
Catalog Number	Ur	Specied Mechanical Load	Section Length	Creepage Distance	Arcing Distance	Lighting Impulse Withstand Voltage		Power Frequency Withstand Voltage	
	kV	kN	mm	mm	mm	Pos	Neg	Dry	Wet
TS-70-422-CT-26-N	24	70	422	634	328	200	215	90	65
TS-70-433-CT-28-N	24	70	433	680	310	220	235	100	70
TS-70-433-SB-28-N	24	70	433	680	310	220	235	100	70
TS-70-477-CT-32-N	24	70	477	772	340	250	270	110	80
TS-70-603-CT-28-N	36	70	603	1050	476	270	290	130	95
TS-70-603-CT-32-N	36	70	603	1140	470	290	305	140	110
TS-70-603-CB-32-N	36	70	603	1140	470	290	305	140	110
TS-70-603-CT-35-N	36	70	603	1280	470	290	305	145	115



DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

Medium Voltage Inter-Phase Spacers



Fittings



Ur	Specied Mechanical Load	Section Length	Creepage Distance	Arcing Distange	Lighting Impulse Withstand Voltage		Power Frequency Withstand Voltage	
kV	kN	mm	mm	mm	Pos	Neg	Dry	Wet
24	70	840	1100	716	400	440	235	225
36	70	1100	1360	976	465	505	280	265

All different length can be produced as request



DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

Medium Voltage - Silicone Cover



DK-CIC



DK-SIC



DK-SAC



DK-TBC-H



DK-TBC-A



DK-CFC



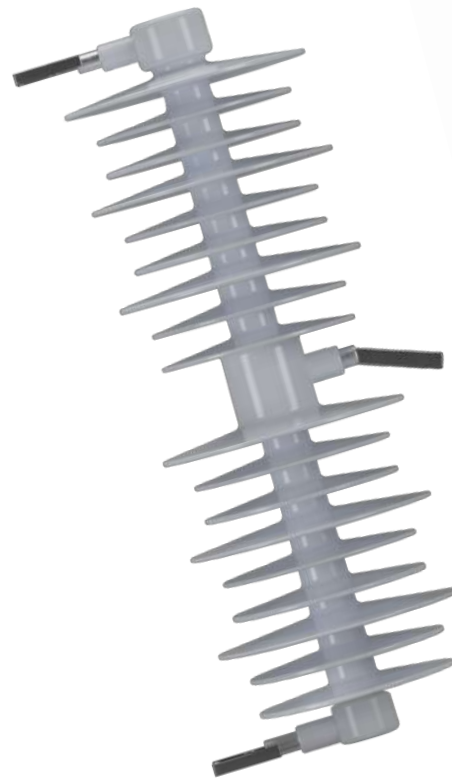
DK-CFC

All products are UV-resistant and Non-ammable with High quality silicon rubber.

Product	Description	Ur	Breakdown Voltage
		kV	kV
Cut Out Fuse Cover	Cut out fuse insulator cover	24 & 36	51
Bushing Cover	Knobbed type with output angle of 45 °	24 & 36	39
	Knobbed type with output angle of 90 °	24 & 36	39
Insulator Cover	Porcelain insulator cover	24 & 36	39
	Silicone insulator cover	24 & 36	39
Surge Arrester Cover	Surge arrester cover	24 & 36	39



Silicone Rubber insulator Fuses Cut-Out



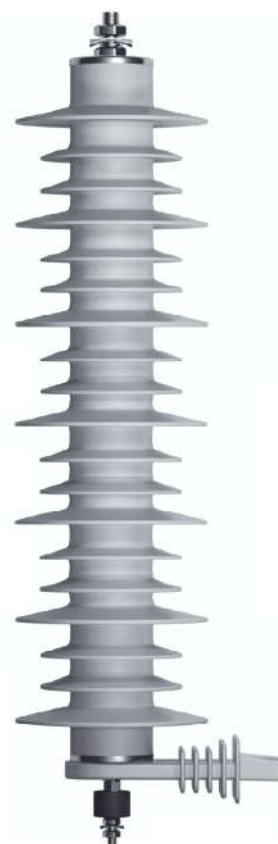
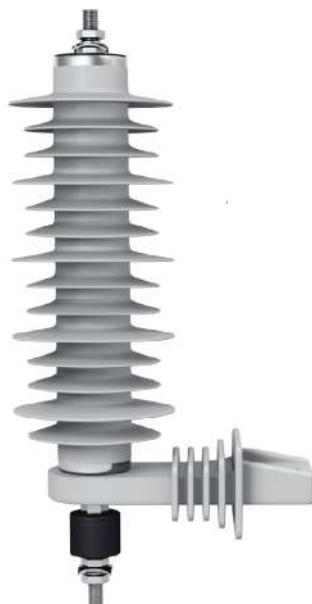
Rated voltage	Section length	Creepage distance	Power frequency withstand voltage	Lightning impulse withstand voltage
kV	mm	mm	kV	kV
24	360	680	65	150
24	360	860	70	150
36	445	980	75	170
36	445	1130	80	170



DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

Medium voltage Surge Arrester



SURGE ARRESTER DISTRIBUTION CLASS

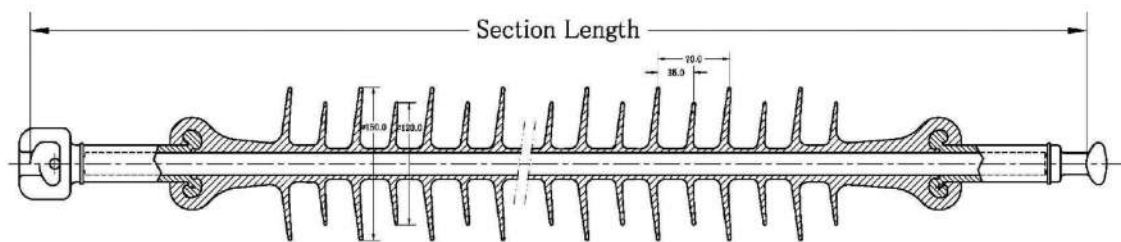
		24 KV	36 KV
Long Duration Current Impulse	A	400	400
High Current Impulse	kA	100	100
U RES-MAX RESIDUAL VOLTAGE	8/20 μ S Lightning Current Impulse	69	107
	30/60 μ S Switching Current Impulse	55	85
	1/20 μ S Steep Current Impulse	77	116
Creepage Distance		820	1250
Power Frequency Withstand Voltage	Wet	85	105
	Dry	100	125
Lightning Impulse Withstand Voltage	kV	240	170
Standard	kV	IEC60099-4 ANSI C62.11	IEC60099-4 ANSI C62.11
Accessories :			
Ground Lead Disconnecter		Yes	
Insulator Bracket		Yes	
Line Terminal With Stainless Steel Wire Clamp & Nut		Yes	
Ground Terminal With Stainless Steel Wire Clamp & Nut		Yes	



Catalog Numbering System

TYPE OF INSULATOR	SML (kN)	SECTION LENGTH (mm)	TOWER END FITTING	LINE END FITTING	SPECIFIC CREEPAGE DISTANCE (mm)	CORONA RING
TS: Tension Suspension SP: Spacer PT: Pine Type	70 120 160 210	Section Length of Insulator in millimeter	S: Socket Y: Y Clevis C: Clevis E: Oval Eye T: Tongue B: Ball CL: Clamp PTF: Pin Type Fitting	B: Ball S: Socket Y: Y Clevis C: Clevis E: Oval Eye T: Tongue CL: Clamp PTF: Pin Type Fitting	Specific Creepage Distance of Insulator rounded to the nearest millimeter	X: (Both Ends) Y: (Line End) Z: (Optional: Line End) N: None

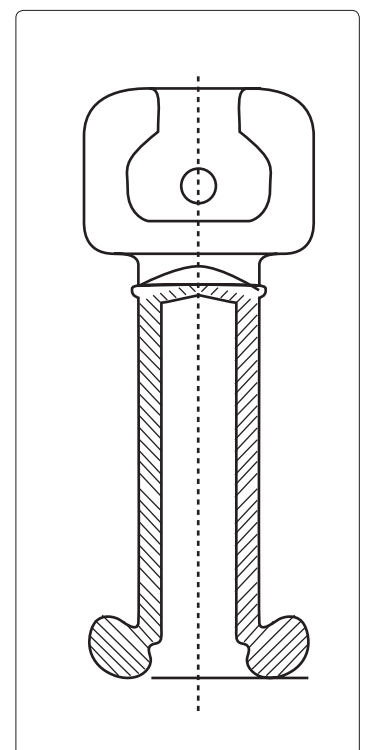
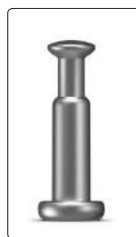
Sample Number: TS-210-4690-SB-37-X



Unique Design of High Voltage Fittings

In order to maximize the assurance of the sealing, two grooves are considered in the design of the fittings which are filled by silicone. All fittings are produced under the forage method.

Fittings are assembled with the method of crimping with high level of assurance and they have passed quality tests. Modern and developed machinery and equipment are used for crimping, with the possibility of examining the quality of the crimping process (by using sonar sensors).



HIGH VOLTAGE SUSPENSION / TENSION INSULATOR



63 KV

TS-120-1095-SB-40



132 KV

TS-160-2000-SB-41



230 KV

TS-210-3150-SB-41



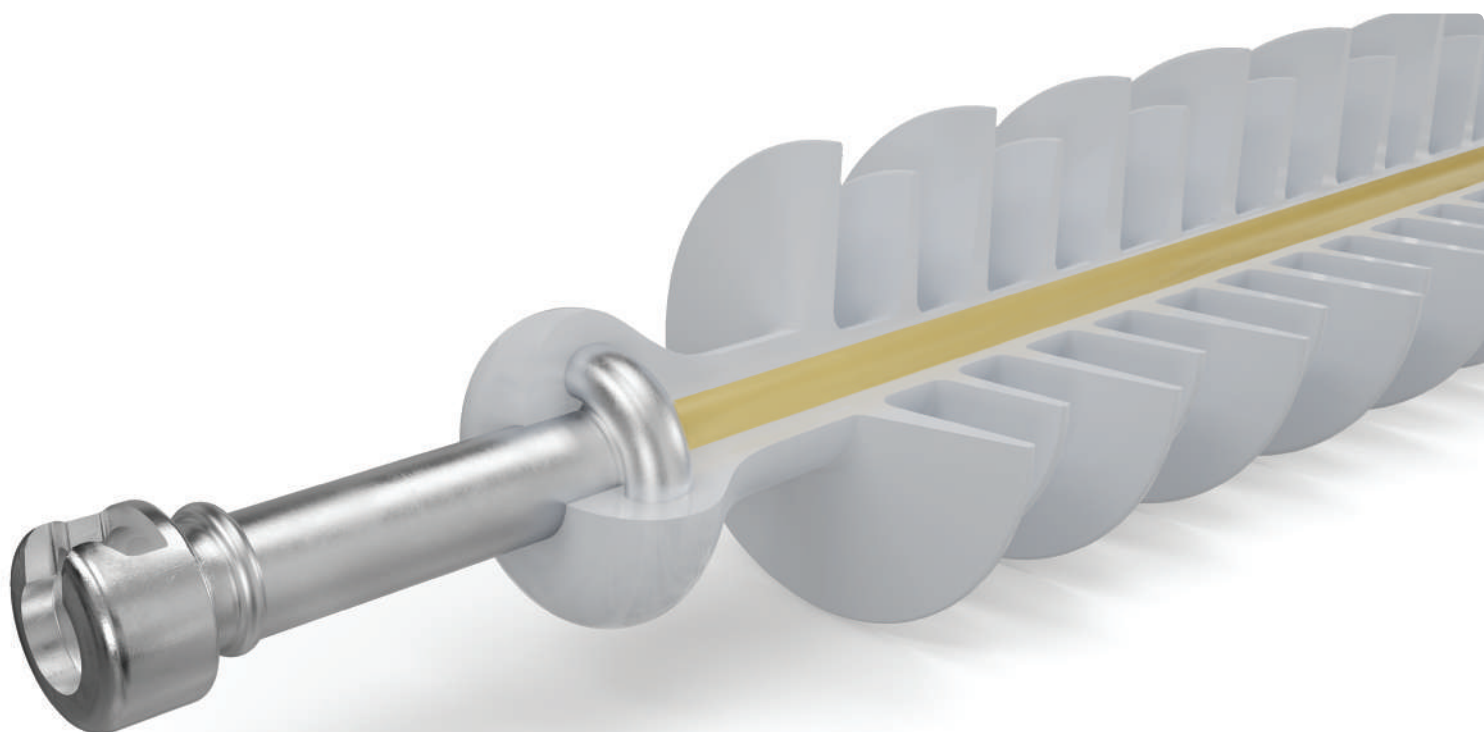
400 KV

TS-210-4200-SB-33



Catalog Number	Ur	Specified Mechanical load	Section length	Creepage Distance	Arcing Distance	lighting Impulse Withstand Voltag		Power Frequency Withstand Voltage	
	KV	KN	mm	mm	mm	Pos	Neg	Dry	Wet
TS-120-956-SB-33-N	63	120	956	2341	846	500	520	230	195
TS-120-1020-SB-36-N	63	120	1000	2624	910	530	540	250	220
TS-120-1090-SB-40-N	63	120	1095	2870	985	555	690	290	266
TS-120-1295-SB-25-Z	132	120	1295	3590	1170	570	585	390	300
TS-160-1375-SB-25-Z	132	160	1375	3590	1170	570	585	390	300
TS-120-1575-SB-32-Z	132	120	1575	4591	1450	700	720	460	340
TS-160-1655-SB-32-Z	132	160	1655	4591	1450	700	720	460	340
TS-120-1720-SB-36-Z	132	120	1720	5145	1595	750	765	510	440
TS-160-1800-SB-36-Z	132	160	1800	5145	1595	750	765	510	440
TS-120-1920-SB-41-Z	132	120	1920	5873	1805	850	875	520	445
TS-160-2000-SB-41-Z	132	160	2000	5873	1805	850	875	520	445
TS-210-2020-SB-42-Z	132	120	2020	6091	1870	860	880	530	450
TS-210-2100-SB-42-Z	132	160	2100	6091	1870	860	880	530	450
TS-120-2000-SB-25-Y	230	120	2000	6091	1870	860	880	530	450
TS-160-2080-SB-25-Y	230	160	2080	6091	1870	860	880	530	450
TS-210-2100-SB-25-Y	230	210	2100	6091	1870	860	880	530	450
TS-120-2490-SB-32-Y	230	120	2490	7871	2360	1100	1135	620	560
TS-160-2570-SB-32-Y	230	160	2570	7871	2360	1100	1135	620	560
TS-210-2590-SB-32-Y	230	210	2590	7871	2360	1100	1135	620	560
TS-120-2700-SB-35-Y	230	120	2700	8631	2570	1210	1240	650	590
TS-160-2780-SB-35-Y	230	160	2780	8631	2570	1210	1240	650	590
TS-210-2800-SB-35-Y	230	210	2800	8631	2570	1210	1240	650	590
TS-120-3050-SB-41-Y	230	120	3050	9914	2920	1520	1670	715	650
TS-160-3130-SB-41-Y	230	160	3130	9914	2920	1520	1670	715	650
TS-210-3150-SB-41-Y	230	210	3150	9914	2920	1520	1670	715	650
TS-120-3255-SB-44-X	230	120	3255	10671	3125	1520	1560	820	650
TS-160-3335-SB-44-X	230	160	3335	10671	3125	1520	1560	820	650
TS-210-3355-SB-44-X	230	210	3355	10671	3125	1520	1560	820	650

Catalog Number	Ur	Specified Mechanical load	Section length	Creepage Distance	Arcing Distance	lighting Impulse Withstand Voltag		Power Frequency Withstand Voltage	
	KV	KN	mm	mm	mm	Pos	Neg	Dry	Wet
TS-120-3255-SB-25-X	400	120	3255	10671	3125	1520	1560	820	650
TS-160-3335-SB-25-X	400	160	3335	10671	3125	1520	1560	820	650
TS-210-3355-SB-25-X	400	210	3355	10671	3125	1520	1560	820	650
TS-120-4100-SB-33-X	400	120	4100	13733	3970	1850	1900	960	790
TS-160-4180-SB-33-X	400	160	4180	13733	3970	1850	1900	960	790
TS-210-4200-SB-33-X	400	210	4200	13733	3970	1850	1900	960	790
TS-120-4590-SB-37-X	400	120	4590	15506	4460	2100	2150	1050	860
TS-160-4670-SB-37-X	400	160	4670	15506	4460	2100	2150	1050	860
TS-210-4690-SB-37-X	400	210	4690	15506	4460	2100	2150	1050	860
TS-120-5070-SB-41-X	400	120	5070	17300	4950	2330	2365	1160	955
TS-160-5150-SB-41-X	400	160	5150	17300	4950	2330	2365	1160	955
TS-210-5170-SB-41-X	400	210	5170	17300	4950	2330	2365	1160	955





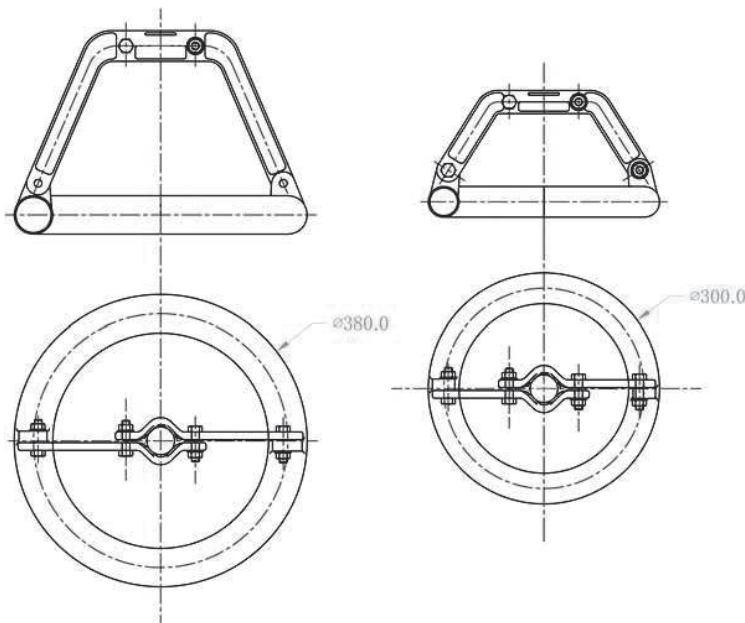
Corona Ring

Recommended Corona Ring Application

Rated voltage	63 kV	132 kV	230 kV	400 kV
Line end	No	No	Yes	Yes
Ground end	No	No	No	Yes
Part number suffix	N	Z	Y	X

The Design of the corona ring is done by accurate digital assimilation in order to reduce and to balance the electrical field around and on the insulator's sheds. The corona ring is made of aluminum which is resistant against harsh weather conditions, it is polished for the reasons of reducing corona and partial discharge. The utilized bolts and arms in corona rings are stainless steel in order to be anti corrosion. The special design of corona rings make accurate installation.

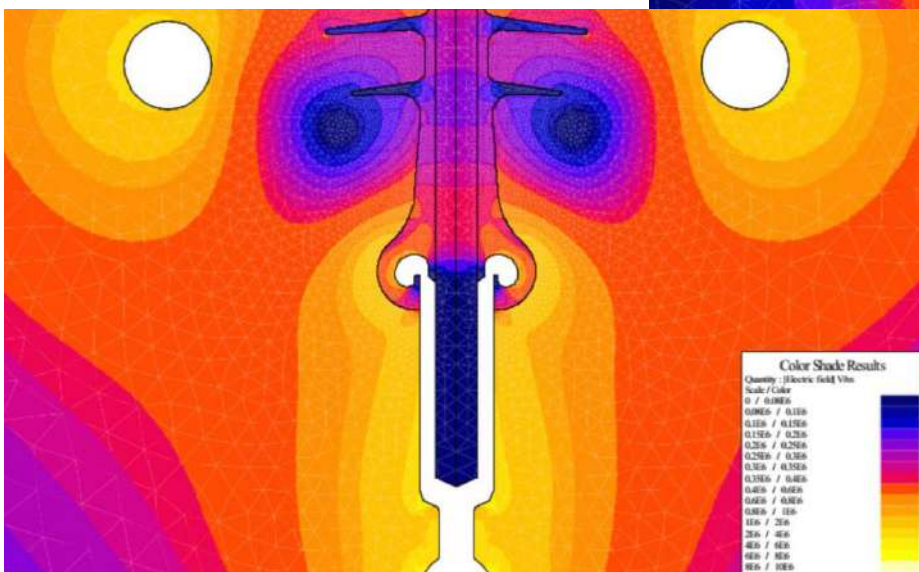
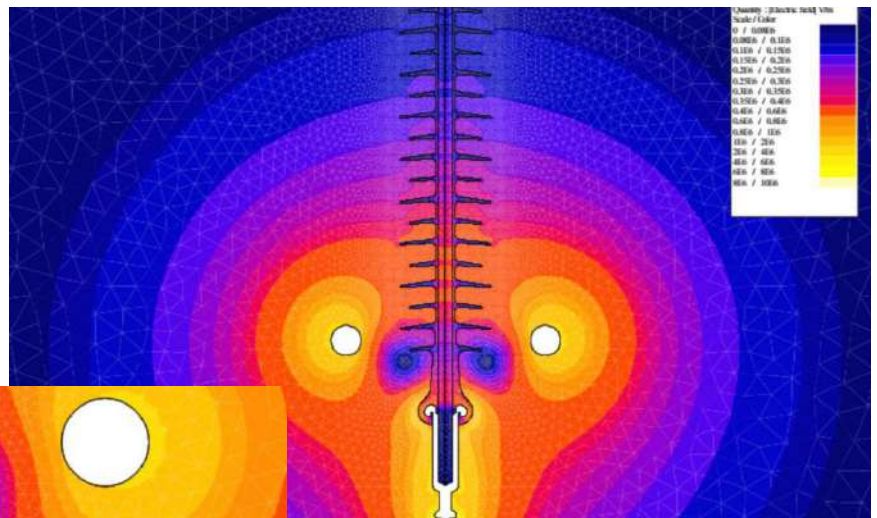
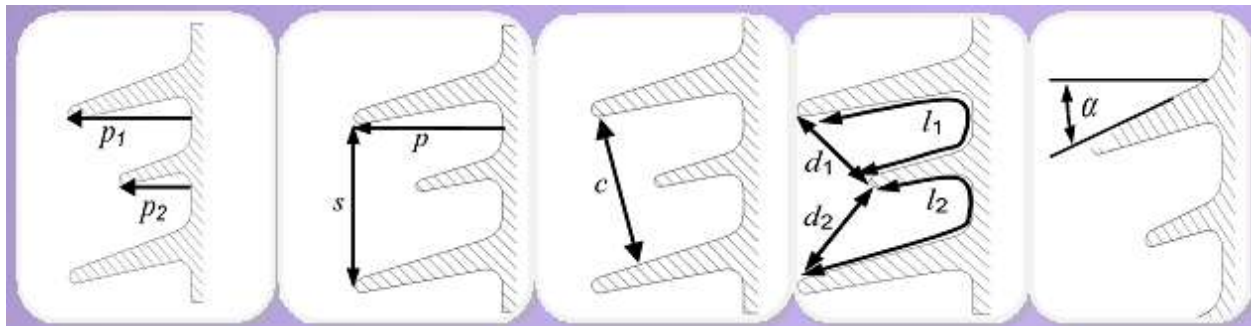
Because of special insulator design, corona rings are not required for insulators upto 132 kV, although it can be installed upon request.

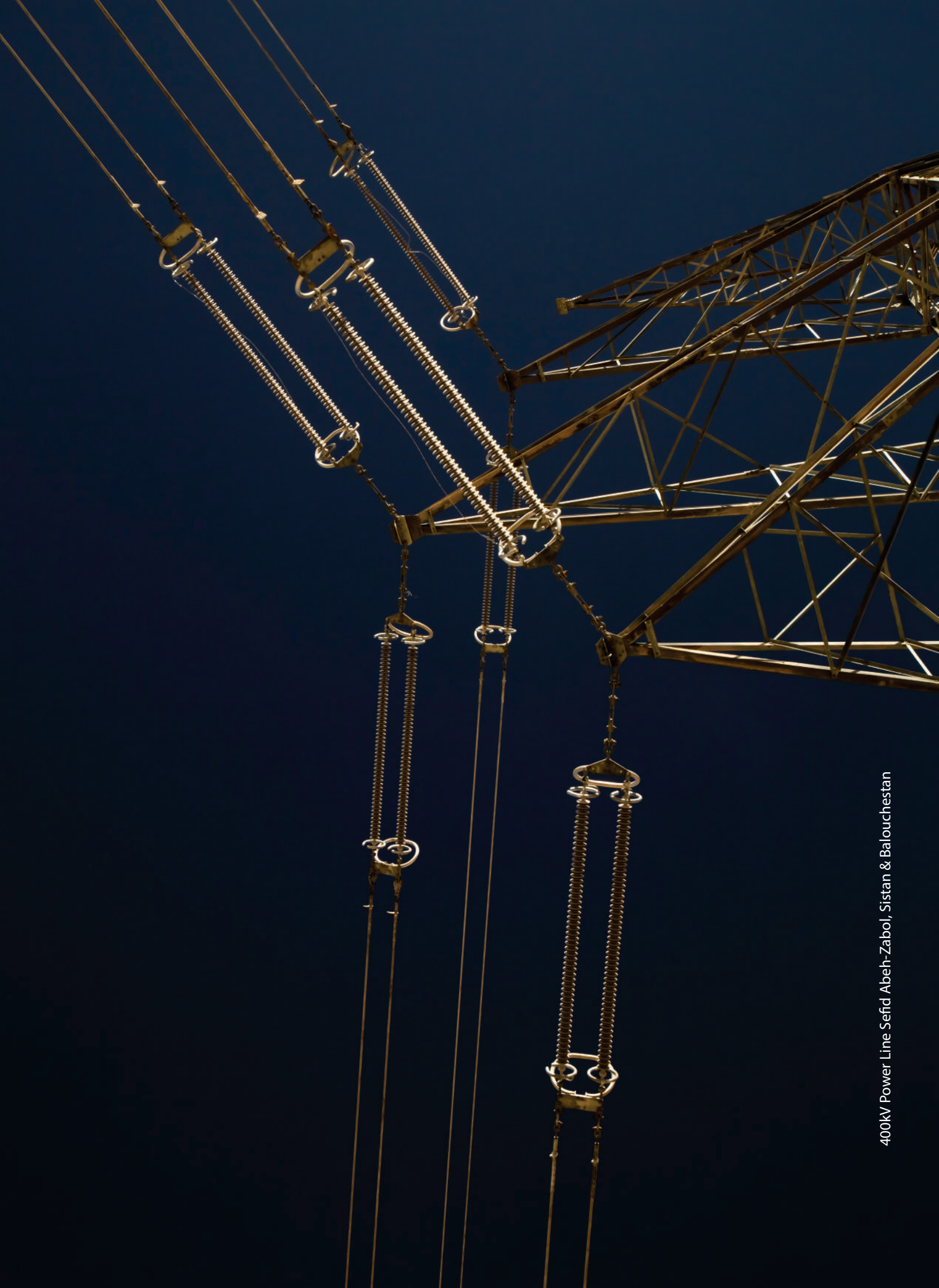




Technical Advantages of our Products

- The lowest electric field around the insulator
- The most impervious Interface and seal
- Reduce leakage current
- Reduce the probability of occurrence of corona phenomena
- Design of shed profile in accordance with climatic conditions and contamination of isolation & IEC recommendation
- No need for a corona ring at voltage level of 63 and 132 kV





400kV Power Line Sefid Abeh-Zabol, Sistan & Balouchestan



DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

High Voltage Inter Phase Spacer

Type #1



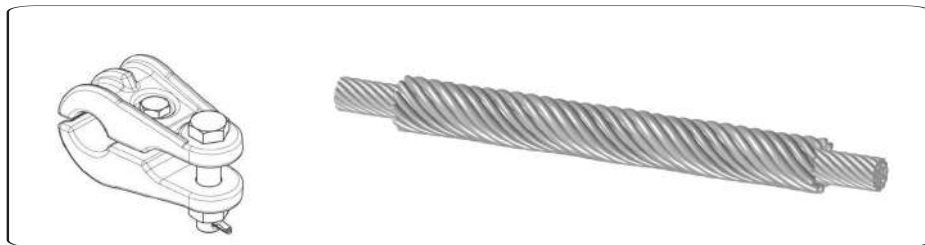
Type #2



Type #3



Type #4



*** Clamp with tension 80/120/160 kN and armor rod with length of 90/110/130 cm can be produced.

*** Different profiles, different lengths , different models (type#1 to type#4) can be produced.

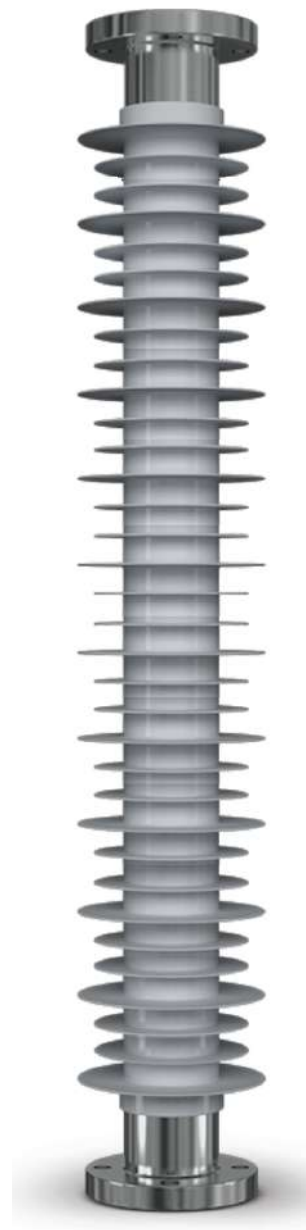
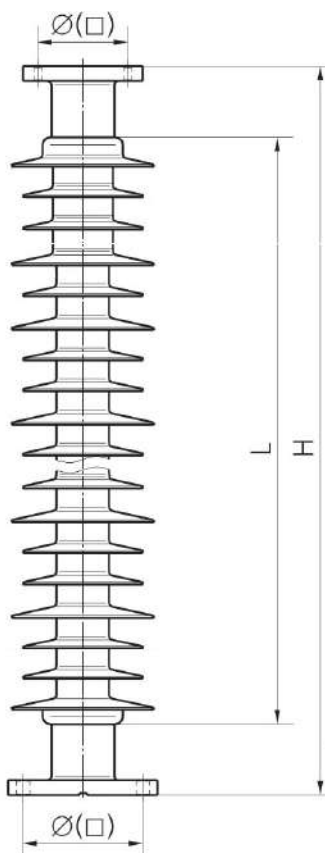
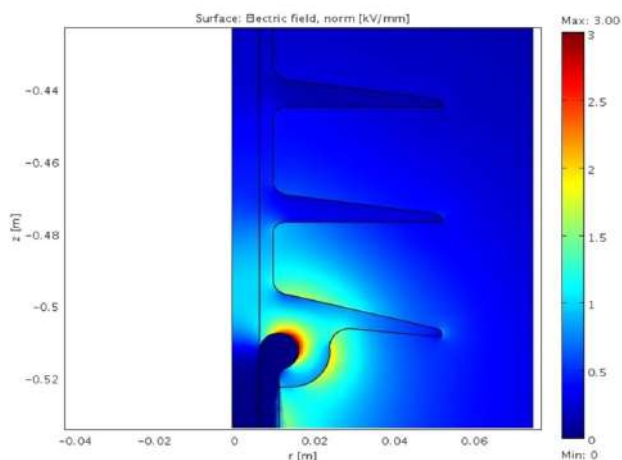
Rated voltage	Section length	Specic tension load	Creepage distance	Dry lighting impulse withstand (kV)	Wet power frequency withstand (kV)
63	2400	120	370	700	400
63	3200	120	5000	800	450
132	4500	120	7100	1300	550
230	6200	160	9660	1800	650
400	8100	210	1340	2200	850



DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

High Voltage Station Post Insulator

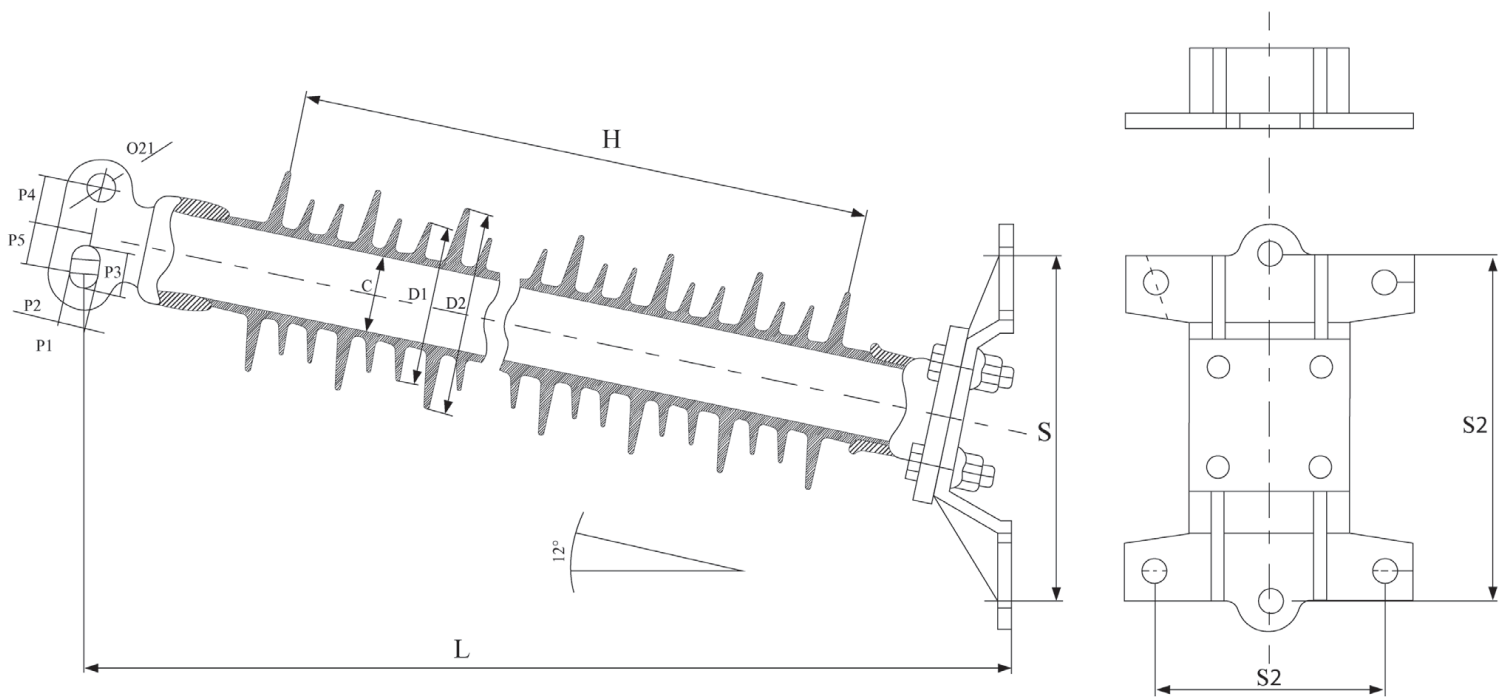


Technical Data

Rated Voltage	kV	63	132	230	400	
Section Length	mm	800	1600	2300	3400	
Specic Cantilever Load	kN	8 - 10 - 12.5	8 - 10 - 12.5	10 - 12.5- 16	10 - 12.5- 16	
Ceepage Distance	mm	2300	4800	7900	11500	
Specic Torsional Load	N.m	4000	4000 - 5000 6000	4000 - 5000 6000	4000 - 5000 6000	
Power Frequency	kV	Wet	190	340	680	680
Withstand Voltage		Dry	225	460	580	750
Dry Lightning Impulse	kV	Pos	420	650	1100	1520
Withstand Voltage		Nec	480	680	1135	1560



High Voltage Cross-Arm Insulator



TECHNICAL DATA

Rated Voltage	kV	63	132	230	400
Section Length	mm	800~1000	1250~1600	2100~2800	3300~4600
Creepage Distance	mm	1800 ~ 2800	3500~6000	6000~10000	10000~17000
Specic Cantilever Load	kN	6-8-10-12	6-8-10-12	6-8-10-12	6-8-10-12
Dry Lightning Impulse Withstand	kV	> 325	>685	>1000	>1500
Wet Power Frequency Withstand	kV	>140	>300	>450	>650

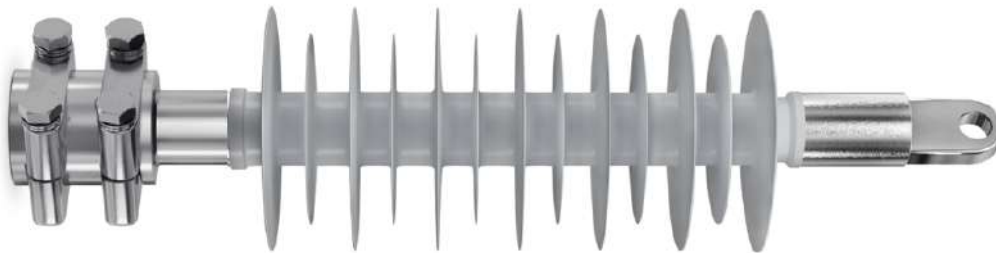
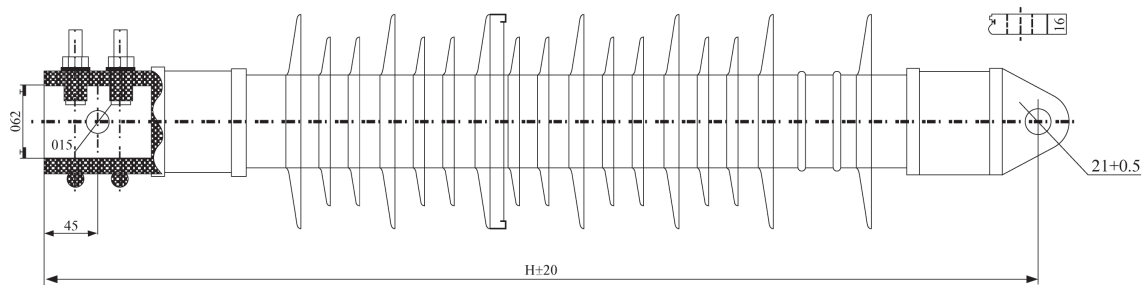




DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

Electric Railway Insulator



ELECTRIC RAILWAY INSULATOR

TECHNICAL DATA

Type		1	2	3	4
Rated Voltage	kV	25	25	25	25
Section Length	mm	610	770	820	880
Ceepage Distance	mm	1300	1200	1400	1600
Mechanical Cantilever Load	kN	6	8	12	16
Mechanical Tension Load	kN	60	80	100	120
Mechanical Torsion Load	N.m	4000	4000	6000	8000
Wet PowerFrequency Withstand	kV	135	135	145	155
Dry Lightning Impulse Withstand	kV	275	275	295	315
Road Diameter	mm	45	53	70	80



RTV Silicone Coating In High Voltage Substation



Raw Material will Supply From Wacker -Germany Company with Garde of Powersil 552

WACKER**POWERSIL®****Product data**

Typical general characteristics	Inspection Method	Value
Product data (liquid state)		
Viscosity, dynamic at 25 °C (shear rate = 10 1/S)	DIN EN ISO 3219	3000 mPa.s
Density at 23 °C	DIN EN ISO 2811-2	1,11 g/cm ³
Flash point	ISO 13736	19 °C
Skin forming time at 23 °C, 50 % RH		9 min
Product data (solid state)¹⁾		
Color		dark gray
Density	ISO 2781	1,41 g/cm ³
Hardness Shore A	ISO 868	68
Tensile strength	ISO 37	3,0 N/mm ²
Elongation at break	ISO 37	100 %
Tear strength	ASTM 624 B	9,0 N/mm
Dielectric strength (1mm)	IEC 60243	> 28 kV/mm
Volume resistivity	IEC 60093	> 5 x 10 ¹⁵ Ω cm
Permittivity (50 Hz)	IEC 60250	2,9 ε _r
Dissipation factor (50 Hz)	IEC 60250	< 10 ⁻³ tan δ
Arc resistance	IEC 61621	420 s
Tracking resistance	IEC 60587	1 A 4.5 kV



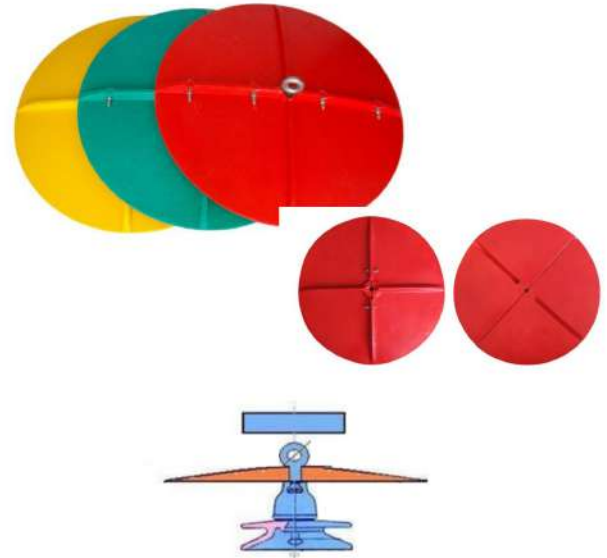
DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

Insulation Protection Cover



Bird & Ice Protection





DK ELECTRIC

MANUFACTURER OF ALL TYPE OF COMPOSITE INSULATOR

Qualification Certificates

VEIKI High voltage laboratory

ISO & HSE certificates



NRI High voltage laboratory



TAVANIR certificates





400kV Power Line Sefid Abeh-Zabol, Sistan & Balouchestan



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