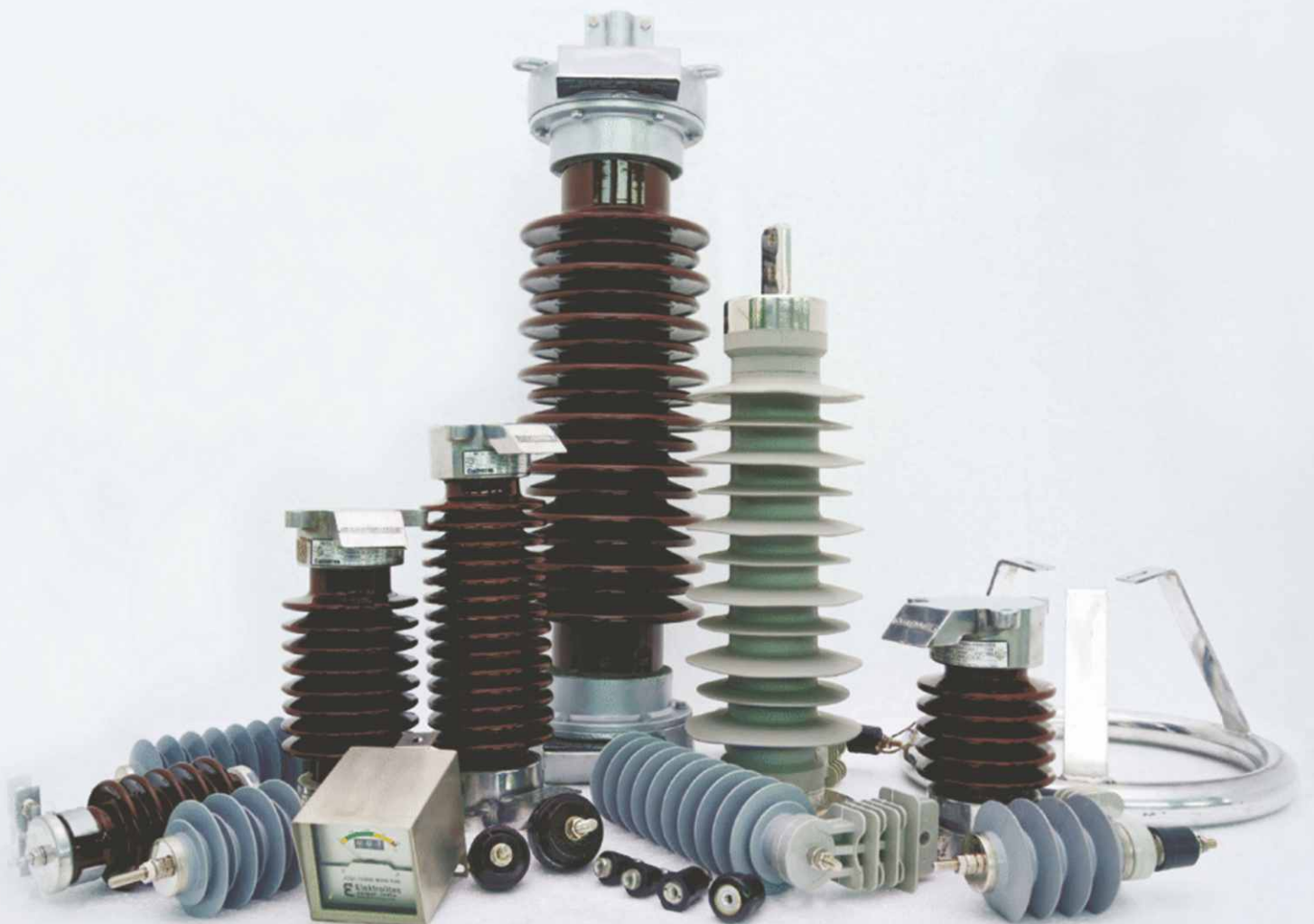


# **SURGE ARRESTERS**

**Upto 420kV Class I-IV**

**Polymer & Porcelain**



# About us

We embarked on our journey in 1966 with trading in power station equipment. The company commenced production of 11 kV Isolator in 1982 and expanded its product range for various switchgears upto 420 kV. The company further diversified in 2010 with various smart grid products for power sector at its newly built world-class industrial complex at Bagru in Jaipur district, Rajasthan.

# History

## 1966-81

- Trading of substation equipments

## 1982-95

- Design, type-test, and manufacturing of 11kV-245kV disconnectors
- Turnkey order completed for 245kV motor operated disconnectors at thermal power plant
- Type-test and manufacturing of clamps, connectors, and substation hardware

## 1996-06

- Successful supply and commissioning of 420kV disconnectors at Heerapura
- Became the largest manufacturer of disconnectors in India
- Design, type-test and manufacturing of surge arresters up to 33kV
- Design, type-test and manufacturing of new patented invention '11kV Switch Fuse Unit' and sold more than 200,000 units

## 2007-09

- Design, type-test and manufacturing of VCB up to 33kV
- Design, type-test and manufacturing of Surge Arresters up to 245kV
- Type-tested our products at international laboratories like KERI (South Korea) and KEMA (The Netherlands)

## 2010-14

- Developed and type-tested 40+ design of switches and 15+types of surge arresters
- Became the only disconnector manufacturer to receive recognition from The Government of India as an 'In-House R&D Centre'
- Design, type-test and manufacturing of Load Break Switches up to 33kV

## 2015-18

- Developed and type-tested Fault Passage Indicators (FPI) 11-66 kV
- Developed and type-tested 25kV Railway Type motorized and manual switches
- Secured Orders worth 2.4 million US \$ from Indian Railways.

## 2019-23

- Collaboration with NOJA Power for AUTORECLOSER
- Collaboration with DRIESCHER for Railways LBS
- Collaboration with STREAMER for Line Lighting Protection Device
- Secured Order in Indian Utilities & Export for Smart Grid Products



## Leadership Team



**Anil Saboo**

Chairman &  
Managing Director

He is an entrepreneur, innovator, mentor and a philanthropist by heart. His venture Elektrolites has earned its steady growth and success through its core principles of innovation, ethics, excellence, and customer focus. He is an engineer from BITS Pilani and VRCE Nagpur. Mr. Saboo launched his venture at a young age of 20. He believes passion, patience, persistence & perseverance make an unbeatable combination for success. And innovation is key to driving it further.

His quest to consistently innovate and motivate MSME units has also allowed him to take up additional responsibilities with renowned industrial councils. He is serving :

- President – IEEMA 2020-21
- Chairman – ELECRAMA 2020
- Director-IIT Jodhpur TECHPARK
- National CII Council Member, New Delhi
- National Executive Council Member- IEEMA (since 1997 )
- Vice President- CIGRE India 2020-21
- Chairman – CII Rajasthan 2018-19
- Executive Council Member of National IWPA, Chennai
- Founder Trustee – JAGRITI NGO, Jaipur

Apart from his corporate lineage, Mr. Saboo is Founder Trustee of Jagriti NGO at JAIPUR. This NGO serves society by transforming the lives of underprivileged children and connects them to the mainstream of society by providing quality education free of cost. Since its inception in 2010, (with the first school of 30 children) JAGRITI has adopted 18 Government schools till now and has more than 4000 children with the privilege of free education.



**Anju Saboo**

Director

Ms. Anju Saboo graduated from Nirmala Niketan, Mumbai. A highly focused & dedicated professional with 10 years of experience in HR & Administration, and develops and executes comprehensive strategies and plans for fulfilling business objectives efficiently by motivating the Elektrolites team.

- A member of Indian Women Network (IWN) , CII Rajasthan 2018-19.



**Ankit Saboo**

Chief Executive  
Officer

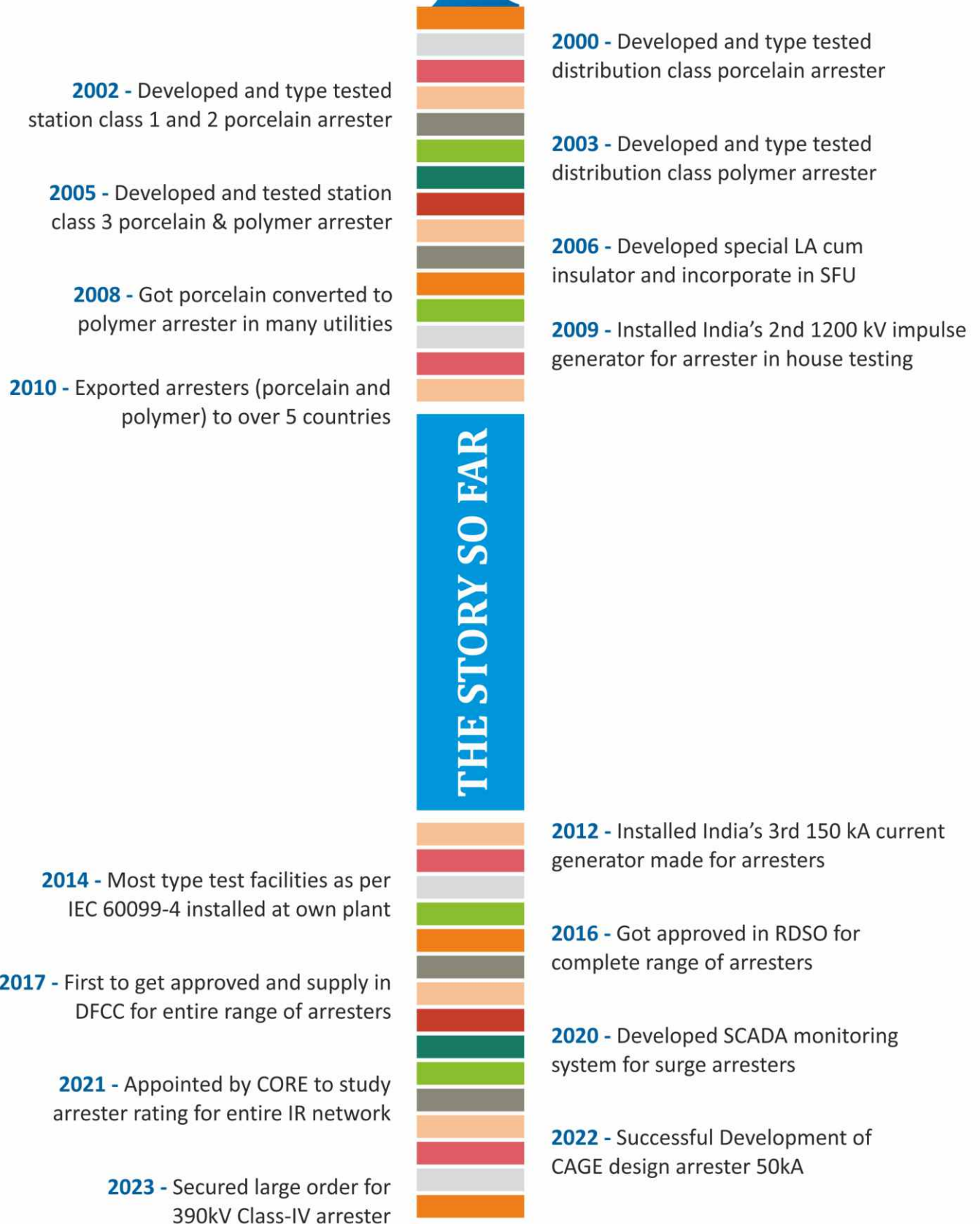
An Engineer from BITS Pilani and Purdue University (Indiana, USA), Ankit is working towards the vision of making Elektrolites the preferred partner for solving problems pertaining to the power industry through research and innovation. He has 2 patents to his name for switchgear products developed in India.

Under his leadership, Elektrolites has significantly improved the lead time of supply, reduced time to market for new products, developed an array of new solutions, and expanded rapidly into the railway segment. He has also been responsible for bringing strategic partnerships which has led to expansion into previously uncharted territories and products, hence bringing in revenue and improving the overall footprint.

From 2016 to 2018, Ankit co-founded a SCUBA diving startup – aimed at opening up diving to people and helped build the country’s first SCUBA Diving Festival (The Underwater Festival). He is passionate about making an organization efficient by defining processes centered around its people.

He is a member of:

- National Executive Council – IEEMA 2021-22
- Rajasthan Solar Association (RSA) for the session 2021-22
- Organizing Committee – ELECRAMA 2023
- BIS ETD30 (Surge Arresters)
- IEC TC37/MT10 India Representative (Surge Arresters Application)
- INMR Congress 2023 Speaker on Short Circuit Performance of Surge Arresters



# Surge Arrester

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Surge arresters are critical components in electrical systems, protecting against voltage surges or transients that can damage sensitive equipment and infrastructure. Two common types of surge arresters are made from different materials: polymer and porcelain

## Porcelain Surge Arresters

Porcelain surge arresters have been widely used in electrical systems for many years and are a well-established technology in surge protection. The housing of porcelain surge arresters is made from high-quality porcelain, providing certain unique characteristics and benefits.

### Key Characteristics and Advantages:

**Material:** Porcelain is a ceramic material used for the housing of these surge arresters. Porcelain provides high mechanical strength, thermal stability, and excellent electrical insulating properties.

**Excellent Electrical Insulation:** Porcelain has outstanding dielectric properties, making it an ideal material for high-voltage applications where effective insulation is crucial.

**Long Operational Life:** Porcelain surge arresters have a long operational life and can endure extreme weather conditions, making them suitable for outdoor installations.

**Robust Construction:** Porcelain surge arresters are robust and provide excellent resistance to mechanical stresses, ensuring durability in demanding environments.

**High Mechanical Strength:** Porcelain housing offers high mechanical strength, capable of withstanding the forces exerted during installation and operation.

### Working Principle:

Porcelain surge arresters operate on the same fundamental principle as polymer surge arresters, utilizing the Metal Oxide Varistor (MOV) to divert surge currents to the ground and protect the electrical system.

### Applications:

Porcelain surge arresters are primarily used in High-voltage substations, Transmission lines, Heavy industrial settings, Power plants

They protect equipment like transformers, circuit breakers, and other high-voltage apparatus from lightning-induced surges and switching surges.

## Polymer Surge Arresters

Polymer surge arresters, also known as silicone rubber surge arresters, have gained significant popularity in recent years due to their advanced technology and numerous benefits. These surge arresters are made of high-quality polymer materials, which offer several advantages in terms of design, performance, and versatility.

### Key Characteristics and Advantages:

**Material:** The housing of polymer surge arresters is made of silicone rubber or other polymeric materials. This design makes them lightweight, flexible, and highly resistant to weathering, UV radiation, pollution, and chemicals.

**Lightweight and Compact:** Polymer surge arresters are significantly lighter and more compact than their porcelain counterparts, making them easier to handle, install, and transport.

**Good Pollution Performance:** They exhibit excellent pollution performance, making them suitable for use in areas prone to pollution and harsh environmental conditions.

**Self-Healing Properties:** Some polymer surge arresters possess self-healing properties, allowing them to recover from minor electrical stresses, thus extending their operational life.

**High Surge Current Handling Capability:** Polymer surge arresters can handle high surge currents, providing efficient protection against lightning strikes and other voltage surges.

**Easy Installation:** Due to their lightweight and compact design, polymer surge arresters are easier and quicker to install, reducing installation time and costs.

**Low Maintenance:** These surge arresters typically require minimal maintenance, contributing to their cost-effectiveness over the long term.

### Working Principle:

Polymer surge arresters operate on the principle of the Metal Oxide Varistor (MOV). When a surge voltage exceeds a certain threshold, the MOV rapidly switches to a low-resistance state, allowing the surge current to be safely diverted to the ground. This action protects the connected electrical system from the surge and keeps the voltage within safe limits.

### Applications:

Polymer surge arresters find extensive applications in Distribution networks, Substations, Renewable energy installations, Residential buildings, Industrial facilities

They protect various equipment including transformers, switchgear, power cables, and electronic devices from voltage surges.

## Comparative Analysis:

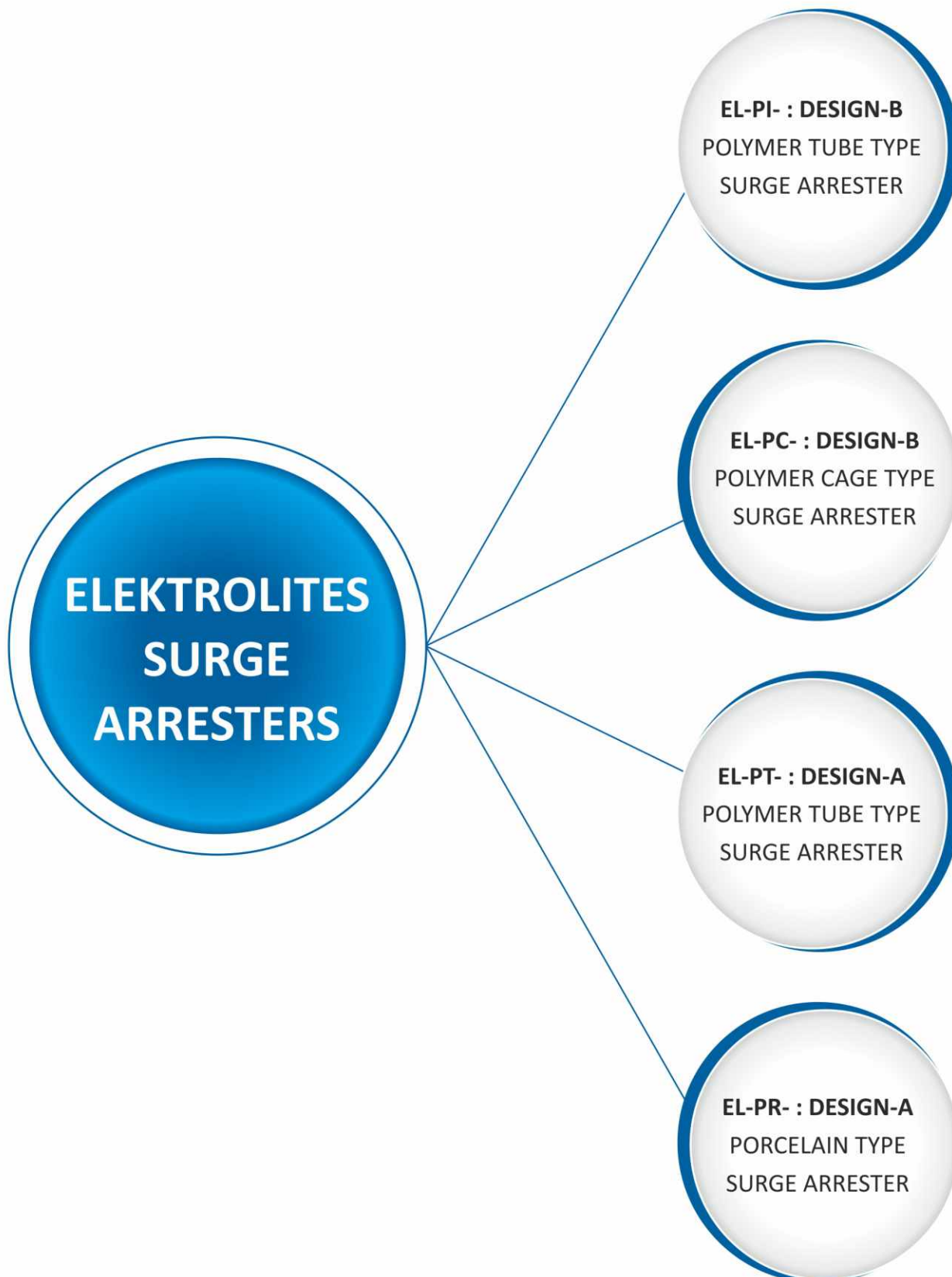
PARAMETERS	POLYMER SURGE ARRESTER	PORCELAIN SURGE ARRESTERS
Material and Construction	Polymer surge arresters use silicone rubber or other polymers, providing flexibility and resistance to environmental factors.	Porcelain surge arresters are made of porcelain ceramic, offering superior mechanical strength and high electrical insulation.
Weight and Size	Polymer surge arresters are lightweight and compact, making them easier to handle and install.	Porcelain surge arresters are heavier and larger compared to polymer surge arresters.
Environmental Resistance	Polymer surge arresters offer better resistance to pollution, UV radiation, and chemicals due to their polymer housing.	Porcelain surge arresters are more resilient to extreme weather conditions and mechanical stresses.
Installation and Maintenance	Polymer surge arresters are easier and quicker to install due to their lightweight and compact design.	Porcelain surge arresters may require more effort and time for installation due to their larger size and weight.
Applications	Polymer surge arresters are commonly used in medium-voltage applications and distribution networks.	Porcelain surge arresters are prevalent in high-voltage applications, including substations and transmission lines.

### Conclusion:

Polymer and porcelain surge arresters serve the crucial purpose of protecting electrical systems from harmful voltage surges. Each type has its own set of advantages and is suitable for specific applications based on factors like voltage class, environmental conditions, and installation requirements. The choice between polymer and porcelain surge arresters depends on the specific needs of the electrical system and the criticality of surge protection in the given application. Understanding the characteristics and capabilities of both types is essential for making informed decisions to ensure the reliable and safe operation of electrical networks.

## Description of Item Codes

We have four types of design for surge arrester

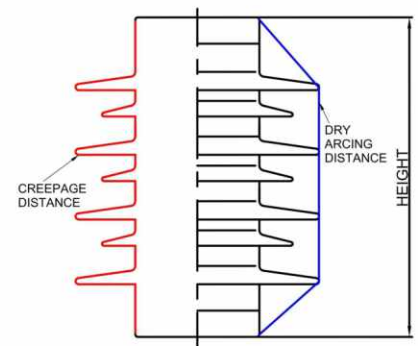


## Product Naming Convention For Polymer DM/DH/SL Design-B Polymer Tube Type Surge Arrester

EL-PI-	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Marking</b>	Mould Creepage	Rated Voltage			Line Discharge Class	Line Lead Accessories	Earth Lead Accessories	Mounting Bracket	Mounting Beacket Options	Disconnector	Insulating Base	Surge Counter	Surge Arrester to Counter Connecting Cable

### 1. Mould Creepage

CODE	CREEPAGE DISTANCE
A	390mm
B	750mm
C	900mm
D	1200mm



### 2, 3, 4. Rated Voltage (For Eg. Use 009 for 9kV, Use 030 for 30kV and so on)

Volatges (kV)	Power Frequency (kVrms)	Lightning Impulse (kVp)
≤12	28	75
≤24	50	150
≤36	70	170

### 5. Line Discharge Class

CODE	OLD CLASSIFICATION	NEW CLASSIFICATION
A	5kA Distribution Class	DM
B	10kA Distribution Class	DH
C	10kA Station Class 1	SL
D	10kA Station Class 2	SL

## 6. Line Lead Accessories



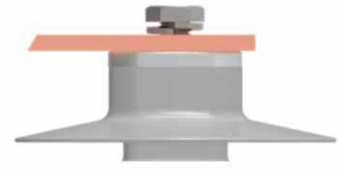
**CODE : A**

No stud. No accessories



**CODE : B**

Exposed stud for lug connection



**CODE : C**

M12 Cap screw & spring washer

## 7. Earth Lead Accessories



**CODE : A**

No stud. No accessories



**CODE : B**

Exposed stud for lug connection



**CODE : C**

M12 Cap screw & spring washer

## 8. Mounting Pad



**CODE : A**

No mounting accessory



**CODE : B**

Straight 2 hole mounting bracket



**CODE : C**

Insulating bracket

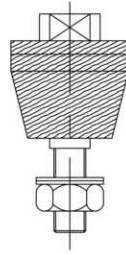
## 9. Mounting Bracket Options

**CODE : A**  
No Option

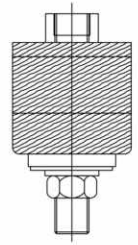


**CODE : B**  
NEMA Cross arm bracket

## 10. Disconnecter



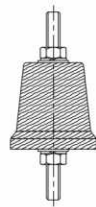
**CODE : B**  
5kA Disconnecter



**CODE : C**  
10kA Disconnecter

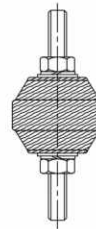
**CODE : A**  
Not Required

## 11. Insulating Base

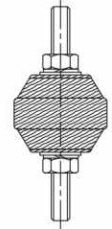


**CODE : A**  
Not Required

**CODE : B**  
Bolt Size : 10mm  
Material : Polycrete



**CODE : C**  
Bolt Size : 12mm  
Material : Polycarbonate

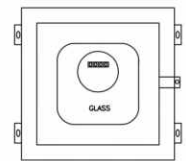


**CODE : D**  
Bolt Size : 12mm  
Material : Porcelain

## 12. Surge Counter



**CODE : B**  
Analog Surge Counter



**CODE : C**  
SCADA Surge Counter

**CODE : A**  
Not Required

## 13. Surge Arrester To Counter Connecting Cable

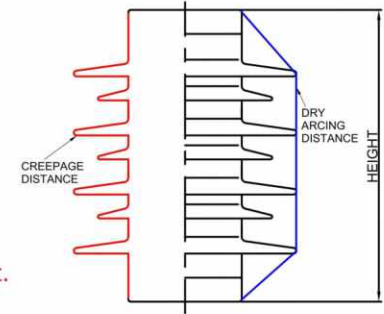
CODE	A	B	C	D	E	F
<b>CABLE TYPE</b>	Not Required	Aluminium 35 Sq. mm	Aluminium 50 Sq. mm	Copper 35 Sq. mm	Copper 50 Sq. mm	Copper Flat

## Product Naming Convention For Polymer SL/SM Design-B Polymer Cage Type Surge Arrester

EL-PC-	1	2	3	4	5	6	7	8	9
<b>Marking</b>	Mould Creepage	Rated Voltage			Line Discharge Class	Mounting Bracket	Insulating Base	Surge Counter	Surge Arrester to Counter Connecting Cable

### 1. Mould Creepage

CODE	CREEPAGE DISTANCE
A	1600 mm
B	2250 mm



For rating above than 72.5kV, we will stack the above mould as per the requirement.

### 2, 3, 4. Rated Voltage (For Eg. Use 009 for 9kV, Use 030 for 30kV and so on)

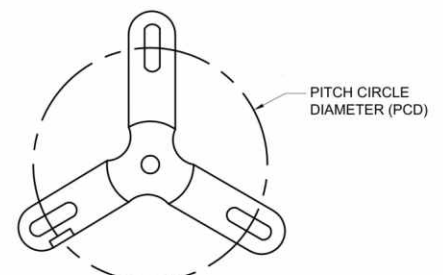
Volatges (kV)	Power Frequency (kVrms)	Lightning Impulse (kVp)
≤12	28	75
≤24	50	150
≤36	70	170
≤52	95	250
≤72.5	140	325
≤123	230	550
≤145	275	650
≤245	460	1020
≤420	435	1125

### 5. Line Discharge Class

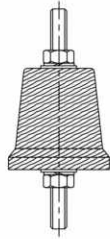
CODE	OLD CLASSIFICATION	NEW CLASSIFICATION
A	10kA Station Class 2	SL
B	10kA Station Class 3	SM

### 6. Mounting Base

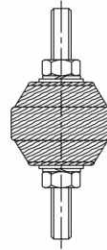
CODE	CLASS
A	Not Required
B	148mm PCD Pedestal Mounting
C	222mm PCD Pedestal Mounting
D	254mm PCD Pedestal Mounting
E	274mm PCD Pedestal Mounting
F	305mm PCD Pedestal Mounting



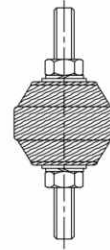
## 7. Insulating Base



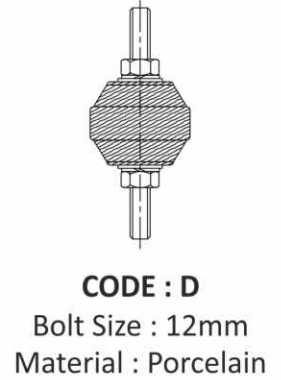
**CODE : A**  
Not Required



**CODE : B**  
Bolt Size : 10mm  
Material : Polycrrete



**CODE : C**  
Bolt Size : 12mm  
Material : Polycarbonate



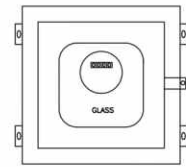
**CODE : D**  
Bolt Size : 12mm  
Material : Porcelain

## 8. Surge Counter



**CODE : A**  
Not Required

**CODE : B**  
Analog Surge Counter



**CODE : C**  
SCADA Surge Counter

## 9. Surge Arrester To Counter Connecting Cable

CODE	CABLE TYPE
A	Aluminium 35 Sq. mm
B	Aluminium 50 Sq. mm
C	Copper 35 Sq. mm
D	Copper 50 Sq. mm
E	Copper Flat
F	Not Required

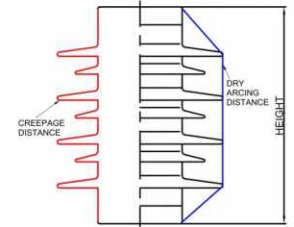
## Product Naming Convention For Polymer SM/SH Design-A Polymer Tube Type Surge Arrester

EL-PT-	1	2	3	4	5	6	7	8
<b>Marking</b>	Mould Creepage	Rated Voltage			Line Discharge Class	Insulating Base	Surge Counter	Surge Arrester to Counter Connecting Cable

### 1. Mould Creepage

CODE	A	B	C	D
<b>CREEPAGE DISTANCE</b>	2250 mm	2500 mm	3815 mm	4495 mm

For rating above than 145kV, we will stack the above mould as per the requirement



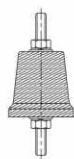
### 2, 3, 4. Rated Voltage (For Eg. Use 060 for 60kV, Use 120 for 120kV and so on)

Volatges (kV)	≤72.5	≤123	≤145	≤245	≤420
<b>Power Frequency (kVrms)</b>	140	230	275	460	435
<b>Lightning Impulse (kVp)</b>	325	550	650	1020	1125

### 5. Line Discharge Class

CODE	A	B
<b>CLASS</b>	SM - 10kA Station Class 3	SH - 10kA Station Class 4

### 6. Insulating Base



**CODE : A**  
Not Required



**CODE : B**  
Bolt Size : 10mm  
Material : Polycrete



**CODE : C**  
Bolt Size : 12mm  
Material : Polycarbonate

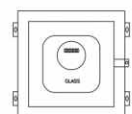
**CODE : D**  
Bolt Size : 12mm  
Material : Porcelain

### 7. Surge Counter



**CODE : A**  
Not Required

**CODE : B**  
Analog Surge Counter



**CODE : C**  
SCADA Surge Counter

### 8. Surge Arrester To Counter Connecting Cable

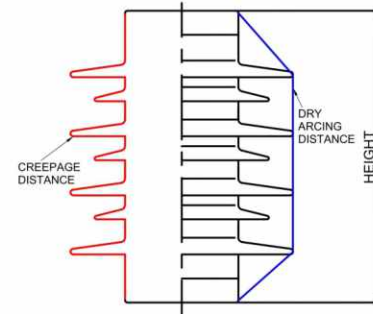
CODE	A	B	C	D	E	F
<b>CABLE TYPE</b>	Not Required	Aluminium 35 Sq. mm	Aluminium 50 Sq. mm	Copper 35 Sq. mm	Copper 50 Sq. mm	Copper Flat

## Product Naming Convention For Porcelain Design-A Porcelain Type Surge Arrester

EL-PR-	1	2	3	4	5	6	7	8	9
<b>Marking</b>	Mould Creepage	Rated Voltage			Line Discharge Class	Mounting Bracket	Insulating Base	Surge Counter	Surge Arrester to Counter Connecting Cable

### 1. Mould Creepage

CODE	CREEPAGE DISTANCE
A	300 mm
B	900 mm
C	1116 mm
D	1813 mm
E	2250mm
F	2500mm



For rating above than 72.5kV, we will stack the above mould as per the requirement.

### 2, 3, 4. RATED VOLTAGE (For Eg. Use 245 for 245kV, Use 360 for 360kV and so on)

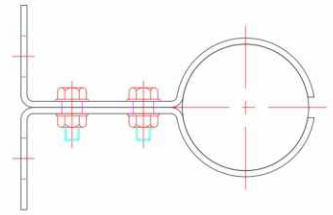
Volatges (kV)	Power Frequency (kVrms)	Lightning Impulse (kVp)
≤12	28	75
≤24	50	150
≤36	70	170
≤52	95	250
≤72.5	140	325
≤123	230	550
≤145	275	650
≤245	460	1020
≤420	435	1125

### 5. LINE DISCHARGE CLASS

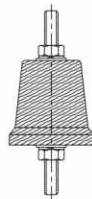
CODE	OLD CLASSIFICATION	NEW CLASSIFICATION
A	5kA Distribution Class	DM
B	10kA Distribution Class	DH
C	10kA Station Class 1	SL
D	10kA Station Class 2	SL
E	10kA Station Class 3	SM
F	20kA Station Class 4	SH

## 6. Mounting Type

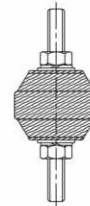
CODE	PCD
A	Mounting Bracket for Distribution Class
B	148mm PCD Pedestal Mounting
C	254mm PCD Pedestal Mounting
D	274mm PCD Pedestal Mounting



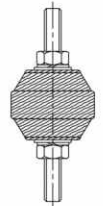
## 7. Insulating Base



**CODE : A**  
Not Required



**CODE : B**  
Bolt Size : 10mm  
Material : Polycrcrete



**CODE : C**  
Bolt Size : 12mm  
Material : Polycarbonate

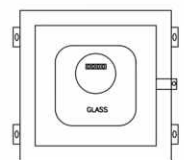
**CODE : D**  
Bolt Size : 12mm  
Material : Porcelain

## 8. Surge Counter



**CODE : A**  
Not Required

**CODE : B**  
Analog Surge Counter



**CODE : C**  
SCADA Surge Counter

## 9. Surge Arrester To Counter Connecting Cable

CODE	A	B	C	D	E	F
<b>CABLE TYPE</b>	Not Required	Aluminium 35 Sq. mm	Aluminium 50 Sq. mm	Copper 35 Sq. mm	Copper 50 Sq. mm	Copper Flat

## Electrical Values For ZnO Block

Description	Distribution Class (DM)	Distribution Class (DH)	Station Class-1 (SL)	Station Class-2 (SL)	Station Class-3 (SM)	Station Class-4 (SH)
<b>Rated Voltage</b>	4.5 kV	4.5 kV	4.5 kV	4.5 kV	3 kV	3 kV
<b>Nominal Discharge Current (In)</b>	5 kA	10 kA	10 kA	10 kA	10 kA	20 kA
<b>Impulse Residual voltage 8/20 micro sec (kVp)</b>						
<b>50% of In</b>	10.98	10.98	10.98	11.31	7.22	7.06
<b>100% of In</b>	11.6	12.00	12.00	12.29	7.73	7.67
<b>200% of In</b>	13.34	13.48	13.48	13.63	8.43	8.50
<b>TOV (Temporary Over Voltage) (kVrms)</b>						
<b>0.1 sec</b>	NA	NA	NA	NA	NA	3.60
<b>1 sec</b>	5.40	5.40	5.40	5.40	3.60	3.45
<b>10 sec</b>	5.18	5.18	5.18	5.18	3.45	3.30
<b>100 sec</b>	4.95	4.95	4.95	4.95	3.26	3.15

For all rating arrester, the values are multiplied by these values with number of Blocks.

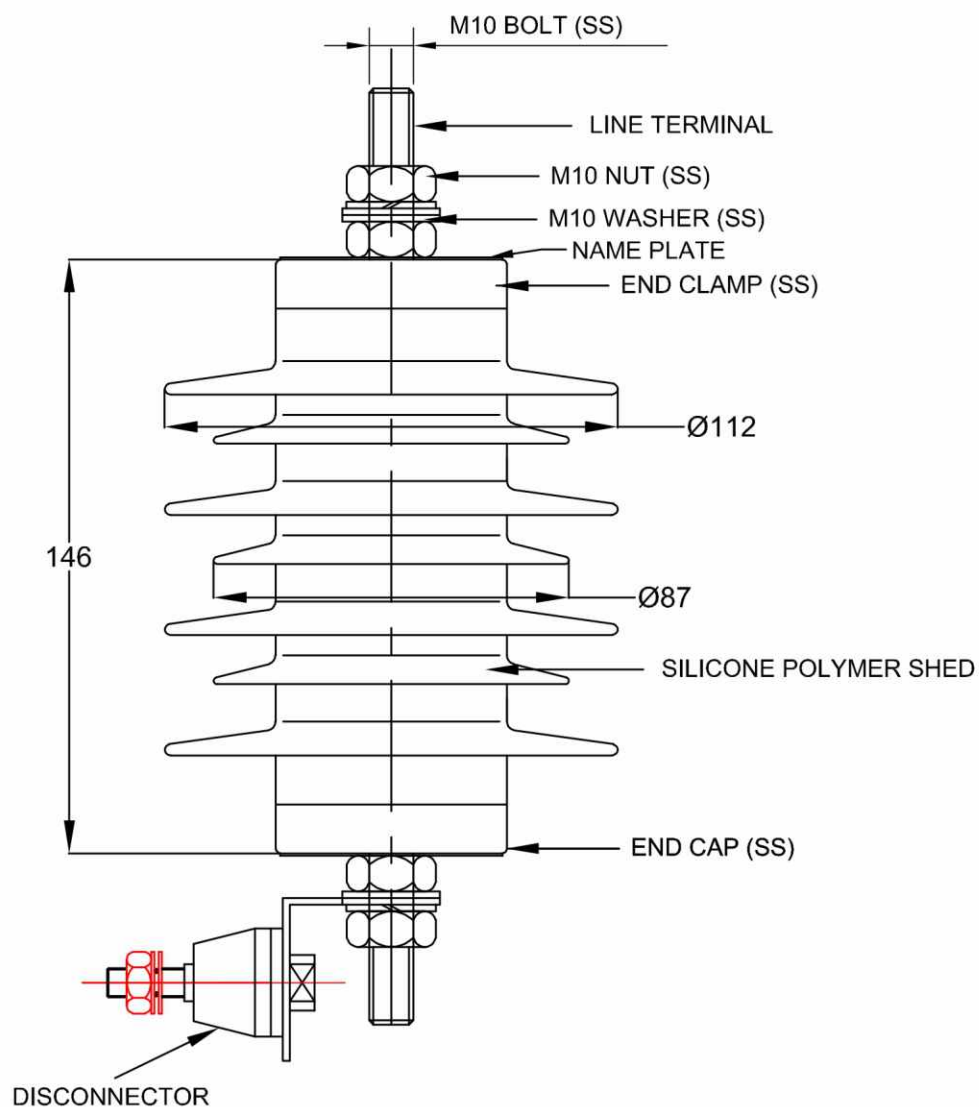
## For Example

Description	9kV 10kA Station Class-2 (SL)	120kV 10kA Station Class-3 (SM)	360kV 20kA Station Class-4 (SH)
<b>No. of Blocks</b>	2 Nos. 4.5 kV Each	40 Nos. 3 kV Each	120 Nos. 3 kV Each
<b>Nominal Discharge Current (In)</b>	10 kA	10 kA	20 kA
<b>Impulse Residual voltage 8/20 micro sec (kVp)</b>			
<b>50% of In</b>	21.96	288.8	847.2
<b>100% of In</b>	24.00	309.2	920.4
<b>200% of In</b>	26.96	337.2	1020
<b>TOV (Temporary Over Voltage) (kVrms)</b>			
<b>0.1 sec</b>	NA	NA	432
<b>1 sec</b>	10.80	144	414
<b>10 sec</b>	10.35	138	396
<b>100 sec</b>	9.90	130.4	378

# How To Choose Your Surge Arrester Using This Catalogue

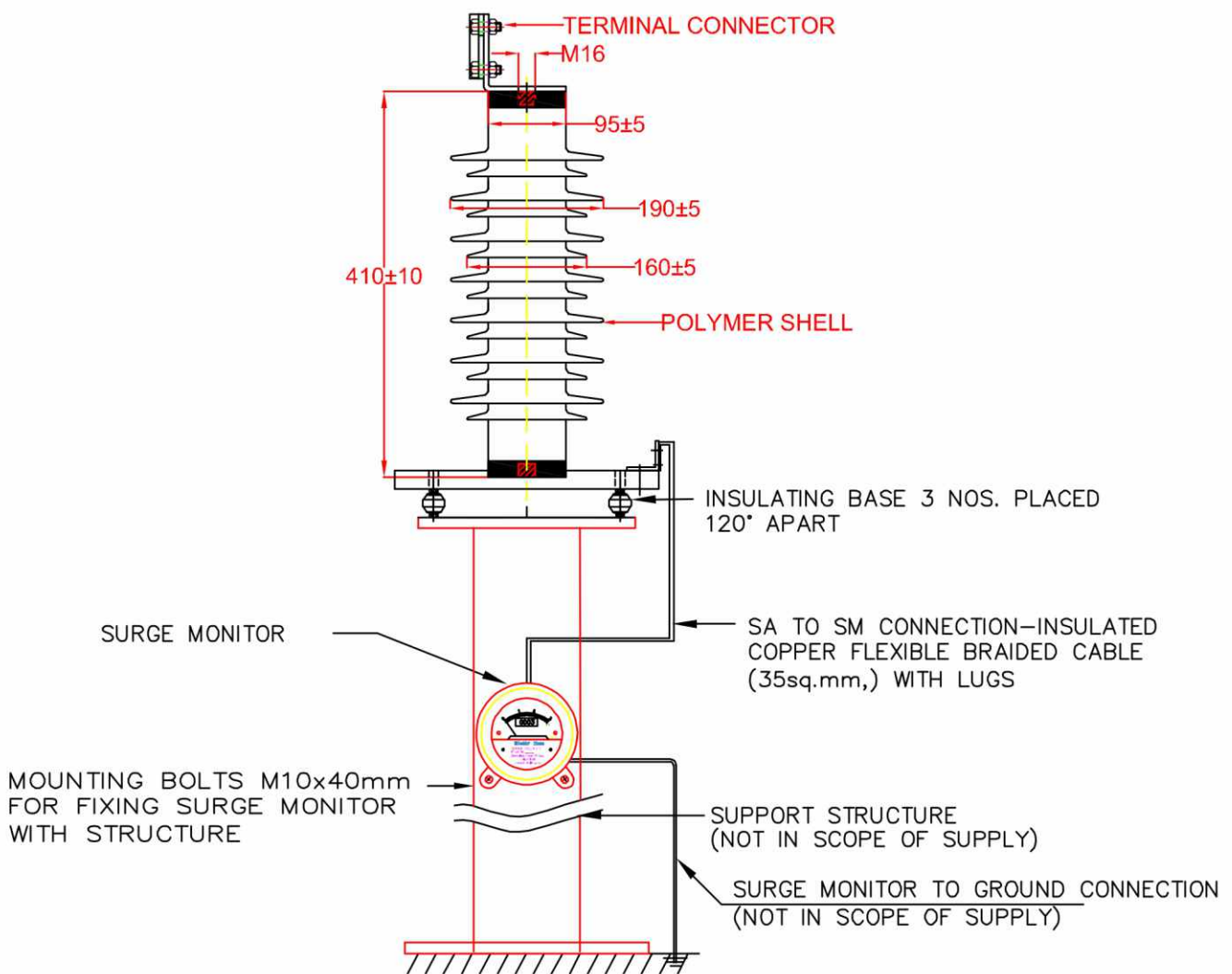
1. If client requirement is for 9kV 10kA-I Polymer Surge Arrester with creepage 350mm, with 10kA Disconnecter and No accessories.

Model Number is : **EL-PI-A009CAAAAAAAAA**



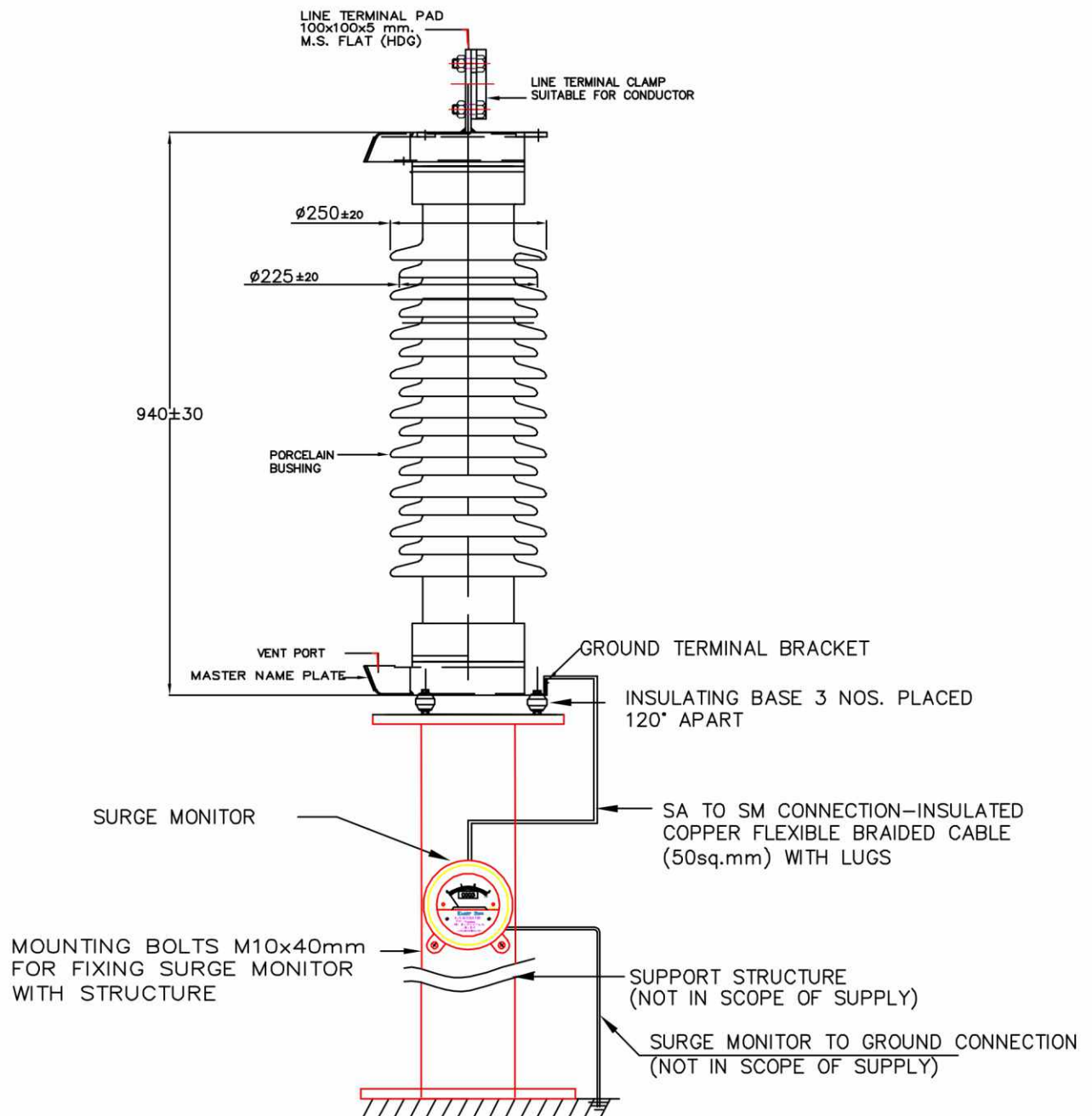
2. If client requirement is for 30kV 10kA-III Polymer Surge Arrester with creepage 1116mm, with 148mm PCD, Porcelain 12mm Insulating Base, SCADA Surge Counter with 35Sq.mm Copper Cable.

Model Number is : **EL-PR-E060ECCBE**



3. If client requirement is for 60kV 10kA-III Porcelain Surge Arrester with creepage 2250mm, with 254mm PCD, Polycarbonate 12mm Insulating Base, Surge Counter with 50 Sq.mm Copper Cable.

Model Number is : **EL-PR-E060ECCBE**



# Infrastructure

Bagru Industrial Area, Jaipur (Area: 172,500 sq ft.)

We are an ISO 9001:2008 company. Through stringent incoming and in-process tests, we ensure that every single piece out of our works meets our strict quality standard to surpass customer's expectations.



**Polymer Arrester Moulding - DESMA**



**Manufacturing Area for Design-A Arresters**



**120kV Impulse Voltage Generator**



**Partial Discharge Test**



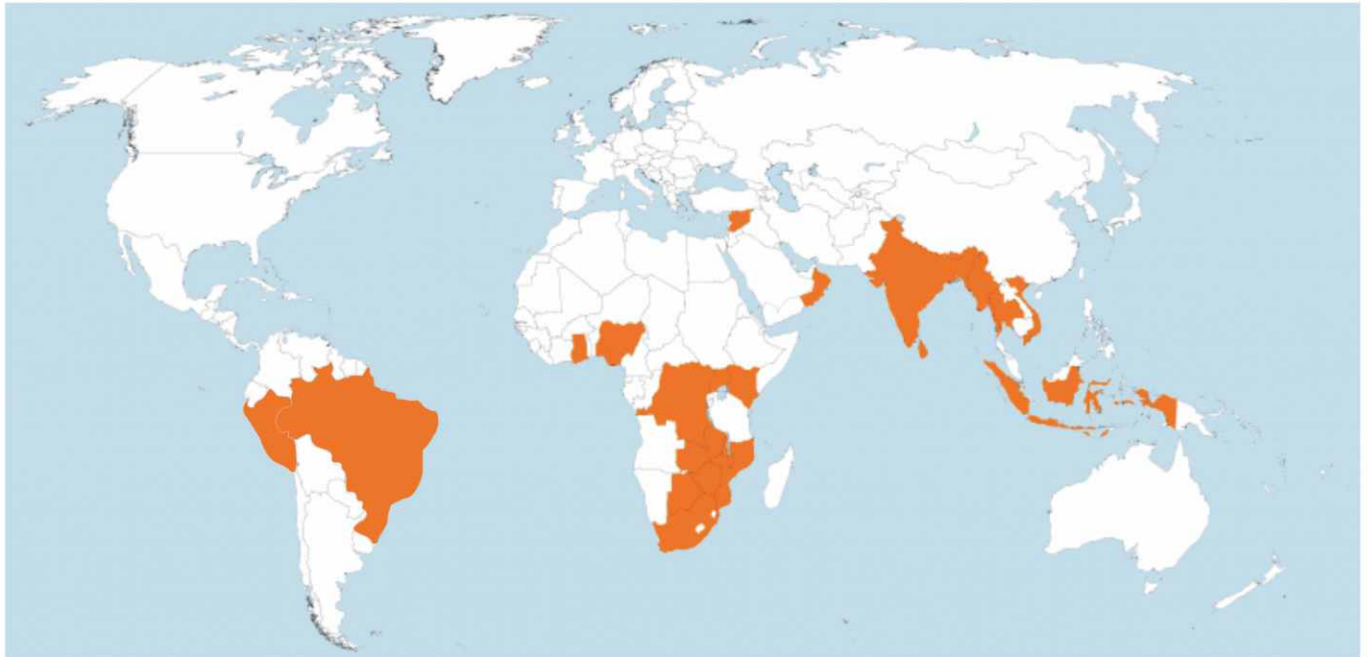
**150kA Current Generator**



**Watt Loss & 1000hrs Test**

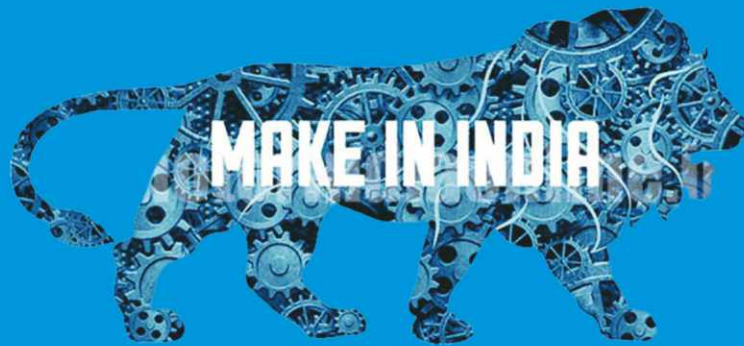
# Our Clients

## Our Reach



## Our Clientele





## Main Offices

### Registered Office

S 758 (A & B), Road No 9F, VKI Area  
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### Delhi NCR Branch Office

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