



# Medium & High Voltage Surge Capacitors



## Advantages

- World Class Raw Materials
- Mfgd in State of art infrastructure
- Low Loss
- Highly Reliable
- Long Life Performance
- Environmental Friendly

*For Suppression of Voltage Surges & Switching Transients*



An ISO 9001 : 2008 Certified Company

**Magnewin**  
Enhancing Power

## Medium & High Voltage Surge Capacitors

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Surge capacitors are designed taking into consideration its application to operate under severe stringent system conditions.

Lightning arrestor takes no current from the line during normal operation. When a surge occurs, the arrestor turns on to provide a discharge path. When the surge is gone, the arrestor turns off. The arrestor will handle unlimited amount of current, although amounts exceeding 100 Kilo amps will generally damage the arrestor.

The main advantage of a capacitor is that there is no time delay in turning on as it always conducts.

The disadvantage is that the amount of current it can handle is limited to a few amps, depending on the surge voltage. For this reason, an arrestor should always be installed with a capacitor to protect it from intense surges.

Surge capacitors offer the user high transient voltage withstand, long design life, low dielectric loss and rugged construction.

Steep fronted waves (lightning or switching) can cause inter turn insulation failure of rotary machines and transformers. These capacitors provide premium surge protection to high voltage motors, transformers and generators.

Connecting surge capacitors line to ground at the motor terminals prevents this damage. For a more comprehensive protection scheme, surge capacitors may be used in conjunction with surge arrester. This surge pack modifies both the wave shape and magnitude.

These capacitors are virtually maintenance free, needing only occasional cleaning of bushings and paint surface and ensuring adequate tightening of electrical connections.

Surge Capacitors are never protected with any type of fuse or any protection as itself is a protective device.

### Scope

Single Phase capacitors units from 1.1 kV up to maximum 40 kV, 50 or 60 Hz. for indoor or outdoor use.

- with dead casing, open terminal (2 bushings).
- with live casing, open terminal (1 bushing).

The standard microfarad ranges from 0.1 to 0.5

### Standards

BIS 11548 (Indian Standards). When installing the equipment, relevant IEC or VDE recommendations shall be observed.

Safety Regulations : Quality management system ISO 9001, BS 5750

### Qualifications

EDF (HN 54-S-05), CSA.

### Dielectric

An imported all film dielectric is used and consists of polypropylene in the form of bi-axially oriented film, hazy on both sides, and in 2 or 3 layers with end and edge folded aluminum foil as electrodes.

### Impregnant

The capacitors are impregnated with a NON-PCB based fluid is Jarylec C-101. This dielectric fluid is environmentally acceptable, eliminates health and environment hazards.

### Temperature range

Capacitors are designed for operation between  $-40^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$ .

### Dielectric loss

Dielectric losses in fresh condition are approx. 0.00005 which reduces after 500 operating hours to a stable state of approx. 0.00003.

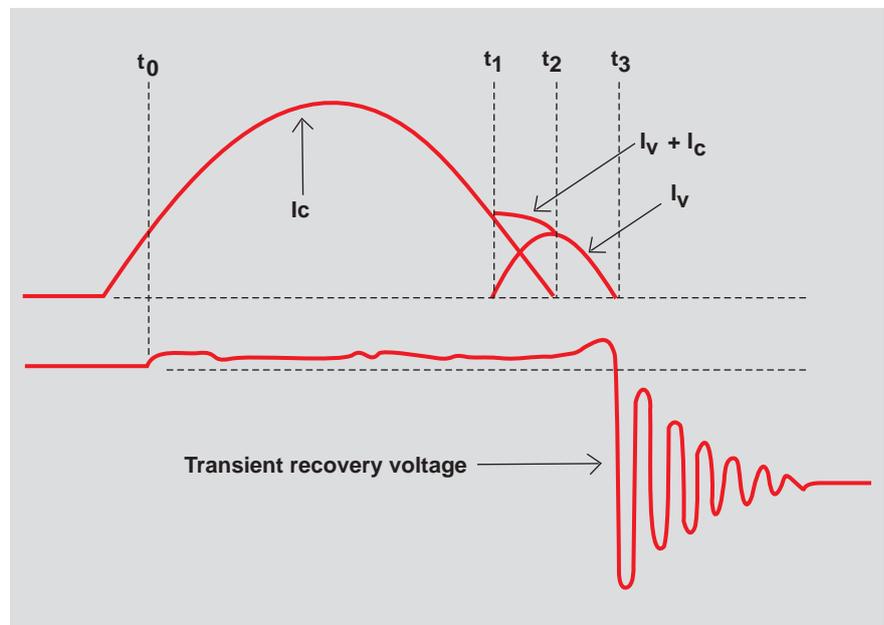
The dielectric losses, depending on capacitor design, shall be added to losses caused by:

- internal discharge resistors (if fitted).
- internal connections

Manufacturing and Quality Control Imported bi-axially oriented double hazy Polypropylene film and 99.9% pure aluminum foil are used as dielectric and electrode. Wrinkle free winding of the elements is carried in a Class 100 environment on a Semi-Automatic winding machine with edge and end folding of the aluminum foil. This is to eliminate overvoltage stress at the edges of the buried area of the foil.

Each wound element is tested for DC Overvoltage with stand and adequacy of margins between Al foils and pin holes.

Numbers of elements are interconnected in series – parallel to achieve the desired capacitance and designed voltage rating of the Capacitor.



## Standard Preferred ratings

Highest System Voltage (Kv)	Surge Capacitor Voltage Rating (Single Phase)	Capacitance per Phase (mfd)
3.6	6	0.25 and 0.5
7.2	12	0.25 and 0.5
12	18	0.25 and 0.5
24	28	0.25
36	40	0.125 and 0.25
Capacitors in accordance to client specifications, available upon request		

The dry pack is wrapped with several layers of high quality insulating paper before inserting it into a pretreated / sheet metal container grade SS 409 L and the top lid is welded by semi-automatic Pulsed TIG welding machine.

Porcelain bushings of desired BIL are leak proof fitted on the lid as required.

The capacitors are then processed in a PLC controlled autoclave for drying and under heat @ 85°C and vacuum of 0.001 torr for a given period. After confirming the quality of drying by precision online monitoring instruments, the capacitors are then impregnated under vacuum with highly purified and degassed Jarylec C-101.

Then the capacitors are subjected to all electrical tests.

### Electrical tests

Each and every capacitor is subjected to Routine tests in accordance to BIS 11548. (Indian Standards). Surge Capacitors have also been type tested successfully. "Magnewin" MV & HV Shunt capacitors have been subjected to Endurance tests in accordance to IEC 60871-2 at Govt. of India Laboratory, CPRI Bangalore and the same has passed the test successfully.

### Painting

After completion of electrical tests, the capacitors are then loaded on a overhead conveyerised painting system. The capacitors are first subjected to sand blasting which ensure removal of welding burrs, minor scratches etc. making the surface perfect compatible for painting.

Thermal spray is also done against specific orders. The capacitors are then painted in a painting booth with semi-automatic painting gun with two coats of epoxy primer followed by two coats of epoxy air drying paint. The paint layers are tested at random for adhesion to the surface of the capacitor.

### Mounting

Surge Capacitors may be mounted vertically or horizontally as required.

### Life Expectancy

Based on the state of art plant & machinery, quality of raw materials used, manufacturing under strict quality control and process using precision on line instruments, and elevated over voltage test results under extreme temperatures, capacitors are assured of minimum 20 years life.



Product Range

- Low Voltage Shunt capacitors
- Medium Voltage Shunt capacitors in Internal / External fuse
- Medium & High Voltage Surge Capacitors
- Medium / High Frequency Water Cooled Capacitors
- Energy storage Capacitors
- Pulse Discharge capacitors
- Low Inductance Capacitors
- Voltage Dividers up to 1200 KV.
- Any Special capacitor in accordance to client specs

Engineering Services

- Harmonics Measurement, Analysis and mitigation & Power Quality
- Turnkey projects / consultancy in Reactive Power Compensation engineering



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