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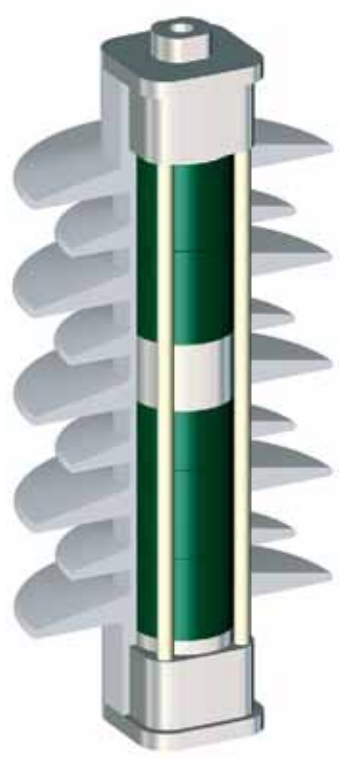
Surge arresters

- Bowthorpe
- Raychem
- Station Class
- Distribution Class
- AC and DC Traction
- Cable Sheath
- Airfield Lighting

Distribution Class - Open Cage Polymeric 'OCP'



OCP is the latest gapless, zinc oxide arrester family from Bowthorpe.

The OCP development was based on 25 years of internal experience in arrester design and manufacture within the TYCO Energy division.

BOWTHORPE OCP BENEFITS:

Tested in accordance with IEC60099-4 at independent accredited laboratories.

Superior protection margins.

Direct molded housing to prevent moisture ingress.

Low residual voltages.

High-energy handling.

Superior TOV performance.

Safe non-shattering short circuit behavior to higher current levels.

Maintenance free.

Hydrophobic silicone housing, tracking and erosion resistant.

Excellent cantilever and tensile performance.

Excellent vibration and impact withstand capability.

Quality design and manufacturing, ISO 9001 and 14001 compliant.

Refer Brochure: Bowthorpe MV arresters OCP EPP-1098 for details

Distribution Class - Polymeric 'OCP1'

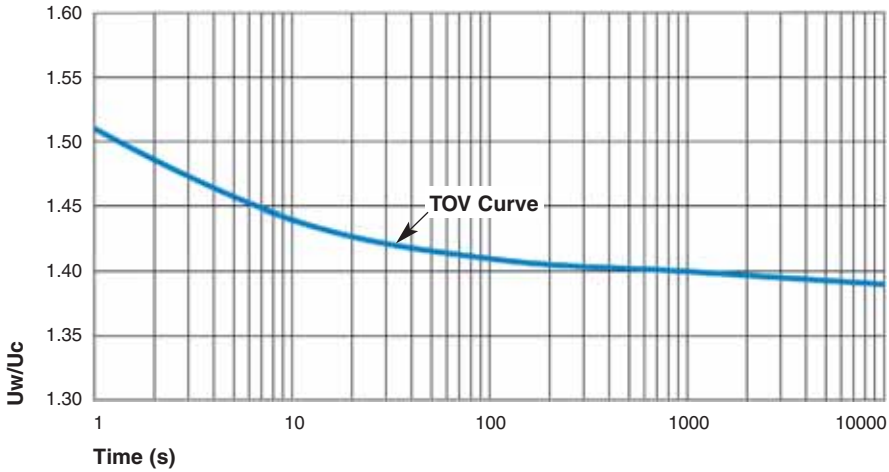
Application:

Protection of MV networks and equipment from lightning and switching surge related over-voltages in areas with relatively high iso-keraunic levels. Suitable for both outdoor and indoor use to protect transformers and cable end terminations.

Generic technical data:

OCP1 series	3-24kV Uc
Rated discharge current (8/20µs):	10kA
Line discharge class 1 according to	IEC 60099-4
Operating duty impulse withstand current (4/10µs):	100kA
Long duration current impulse (2000µs):	350A
High current short circuit: (pre-failing method)	25kA
(Safe non-shattering failure mode)	
Energy 2 Long duration impulses:	4.1kJ/kVUc
Cantilever strength	350 Nm

TOV of OCP1 with 100kA single shot high current prior energy



Temperature of samples(pre-heated): 60 degrees C according to IEC 60099-4, Ed 2.0 2004. TOV Curve applies to an arrester which has a pre-stress applied prior to TOV verification. This pre-stress is equivalent to one high current impulse of 100kA, 4/10 as per the switching surge operating duty test.

Uw = TOV withstand voltage; Uc = continuous operating voltage.

Distribution Class - Polymeric 'OCP1'

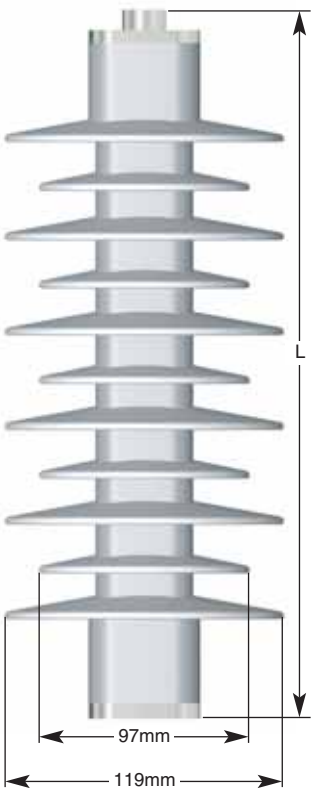
OCP1-	Uc kV (rms)	Ur kV (rms)	Residual Voltage in kV when tested to the following impulse waveforms					
			Lightning				Switching	
			8/20µS			1/20µS	1/20µS	
			5kA	10kA	20kA	10kA	125A	500A
4	4	5	13.03	13.83	15.31	15.04	10.42	10.77
5	5	6.2	16.29	17.29	19.14	18.80	13.02	13.46
6	6	7.5	19.55	20.75	22.97	22.56	15.62	16.15
8	8	10	26.06	27.66	30.62	30.08	20.83	21.54
9	9	11.2	29.32	31.12	34.45	33.84	23.44	24.23
10	10	12.5	32.58	34.58	38.28	37.60	26.04	26.92
12	12	15	39.10	41.50	45.94	45.12	31.25	32.30
15	15	18.7	48.87	51.87	57.42	56.40	39.06	40.38
18	18	22.5	58.64	62.24	68.90	67.68	46.87	48.46
20	20	25	65.16	69.16	76.56	75.20	52.08	53.84
21	21	26.2	68.42	72.62	80.39	78.96	54.68	56.53
22	22	27.5	71.68	76.08	84.22	82.72	57.29	59.22
24	24	30	78.19	82.99	91.87	90.24	62.50	64.61

OCP-xxS; Standard housing parameters

OCP1-	Impulse SW kV	PF Wet WS kV	FO Dist mm	Creepage mm	Height L mm
4	106	47	176	379	183
5	106	47	176	379	183
6	106	47	176	379	183
8	106	47	176	379	183
9	106	47	176	379	183
10	106	47	176	379	183
12	106	47	176	379	183
15	128	57	214	503	220
18	154	68	254	629	260
20	154	68	254	629	260
21	180	80	293	755	299
22	180	80	293	755	299
24	180	80	293	755	299

OCP-xxL; Extended housing parameters

OCP1-	Impulse SW kV	PF Wet WS kV	FO Dist mm	Creepage mm	Height L mm
4	128	57	214	503	214
5	128	57	214	503	214
6	128	57	214	503	214
8	128	57	214	503	214
9	128	57	214	503	214
10	128	57	214	503	214
12	128	57	214	503	214
15	154	68	254	629	254
18	180	80	293	755	293
20	180	80	293	755	293
21	205	91	334	882	334
22	205	91	334	882	334
24	205	91	334	882	334



OCP Series naming and order query description

Example: OCP = 'Open Cage Polymeric'

OCP0 - 12S - ABC

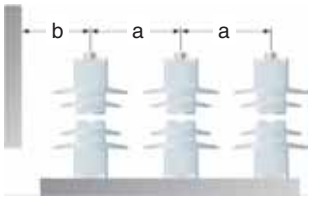
Line discharge class:
0 = 5kA, 65kA high current
1 = 10kA, 100kA high current, class 1
2 = 10kA, 100kA high current, class 2

Uc

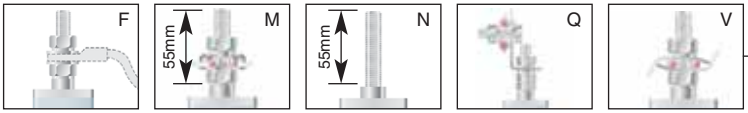
Housing creepage:
S = standard creepage
L = extended creepage

Accessory selection:
M = Mounting bracket
E = Earth connection
L = Line connection

System Voltage Um	ph/ph (a)	ph/ground (b)
12	185	165
24	315	295
36	445	425



Line lead accessories



Arrester Type = Continuous Operating Voltage U_C in kV

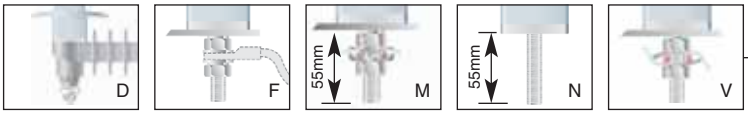
OCP□-

03	04	05	06
08	09	10	12
15	18	20	21
22	24		

OCP□- 12□- □□□

Mounting accessories

Ground lead accessories



Additional accessory options available on request.
Please contact: surgearresters@tycoelectronics.com with your specific requirements.

Station Class - Porcelain

- Conventional design
- High voltage porcelain
- Glazed externally and internally
- Varistors in single column, spring loaded with air cavity
- Up to 400kV
- Pressure relief performance 40kA
- Grey or Brown

Cat No.	Voltage Rating kV	Duty kA	Line Discharge Class	Pressure Relief Class kA
MAA	3 - 220	10	2	40
MBA	3 - 156	10	2	25
MCA	3 - 360	10	3	40
MDA	3 - 360	20	4	40

Refer brochure: Transmission Surge Arresters BOW-EPP-0001 for details.

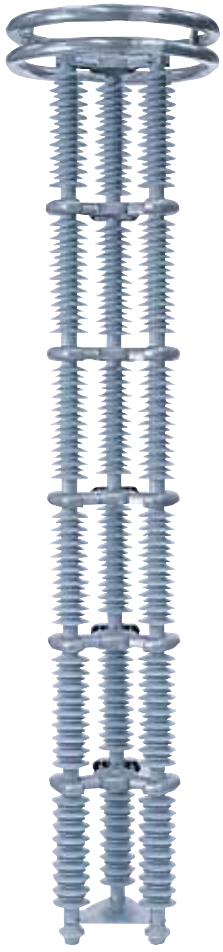
Station Class - Polymeric

- Patented design
- Void free construction
- High cantilever strength which maintains electrical continuity
- Non shattering
- 25 kA Short Circuit performance
- Up to 3 units high
- Extended Creepage available

Cat No.	Voltage Rating kV	Duty kA	Line Discharge Class
HSR	6 - 48	10	2
2HSR	48 - 84	10	2
3HSR	96 - 132	10	2

Refer brochure: Transmission Surge Arresters BOW-EPP-0001 for details.

Station Class - Polymeric



- Patented Series Parallel design provides the best solution for higher voltage systems
- Line Discharge Class 2,3,4 & 5 high energy levels
- 3KV to 800KV rated systems
- Series Parallel design is the number one seismic arrester which meets the requirements of BPA in USA
- NGC Approval at 132, 275 & 400kV
- Easy Installation in Remote Locations

Cat No.	Voltage Rating kV	Duty kA	Line Discharge Class
2P	30 - 168	10	3
3P, 4P, 5P	96 - 525	10/20	3, 4 & 5

Refer brochure: Transmission Surge Arresters BOW-EPP-0001 for details.

Surge Counters

- SC12
- SC13 (With Leakage Current Display)
- & AC (With Auxiliary Contacts)

- Arrester base must be insulated
- Insulated bases are available for all Tyco arresters
- Same robust design for over twenty years
- Leading supplier to OEMs

Sheath Voltage Limiter

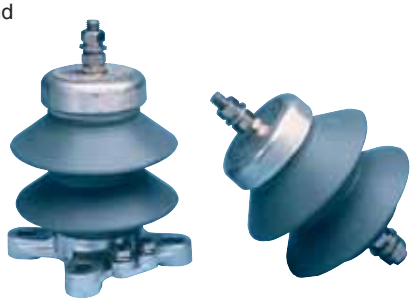
- Protection of single bond and cross bonded HV cables.
- Protects against short circuit induced over voltage

Cat No.	Voltage Rating kV	Line Discharge Class
CPA	1, 3, 6 & 9	1
CSPA2	1, 3, 6 & 9	2
CSPA3	1, 3, 6 & 9	3

DC Traction

Main Features

The arrester has a 10kA nominal discharge current and 100kA duty cycle performance to EN 50123-5-2003.



The patented void free construction of this arrester design results in a unit with strength which is impervious to the ingress of moisture.

The arrester has the following features:

- No internal airspace so no moisture ingress
- Vandal proof
- High cantilever and torsional strength
- Non-explosive failure mode
- Low weight and small size
- Resistant to transport damage and careless handling
- Easy to install

Electrical Performance

Classification (8/20 µs nominal discharge current)	– 10,000 Amps
Voltage Rating	– 1kV to 4.9kV DC
High Current Operation Duty	– 100kA 4/10µs
High Current Single Impulse Energy	– 2.3kJ/kV at Ur

Operating Duty Cycle – 2 shots hi-current followed by the voltage profile Ur (300s) then Uc- (1800s) as per EN50123-5 2003 clause 4.7.5.4 and figure 4.1 to prove thermal stability.

Refer brochure: DC Traction BOW-EPP-0005 for details

Airfield Lighting

Technical Data

Arrester Type 2DCAFL4 is housed in a die-cast aluminium box finished in grey paint and complies with IP65. The box is fitted with four aluminium cable glands to BS6121 to accommodate supply cables with diameter 11.00mm to 13.5mm. The box has a stainless steel M12 earth terminal stud with two lock nuts and clamp washers.

The box lid is removed for connections and the internal screw-type terminals will accommodate wires up to 6mm diameter. (Hexagon Key provided.)

Box size: 260mm x 160mm x 90mm

The Arrester Type 2DCAFL4 has the following electrical performance -

Nominal a.c. rating	4.0kv rms
Maximum continuous operating d.c. voltage	5.2kv
Arrester Classifcation	5000A
High Current	65kA
Energy handling capability equivalent	1 (IEC 60099-4 Clause 7.4.2 table 4 & 7.5.5.5)
Withstand based on 2000ms rectangular wave	250A
Operating temperature	-40°C to +40°C
Standard	IEC 60099-4 2001

Transmission Line Arrester

Key Features

- HV arrester suspended from a transmission line giving enhanced transmission line performance.
- Increasing system line voltage on standard insulated transmission lines.

Benefits of TLA Applications

- Minimising circuit breaker operation with possible system outage resulting from back flashover on the transmission line.
- Switching overvoltages are absorbed over the length of the line reducing the severity of surge at the substation.
- Transmission systems can be operated even where sub-soil gives poor tower footing resistance.
- Eliminating interrupted power supply for sensitive industrial processes.
- Installing Transmission Line Arresters on a standard 3 phase voltage system along the line, at calculated intervals, allows for optimum performance of the TLA, to give an increased system line voltage.
- Therefore eliminating the need to increase the standard insulation level required on conventional system upgrade.

Cat No.	Voltage Rating kV	Duty kA	Line Discharge Class
TLA1	16 - 45	10	2
TLA2	48 - 96	10	2
TLA3	108 - 144	10	2
TLA4	150 - 192	10	2