PDE™

Distribution Class Elbow Arresters

(U.S. Patent No. 6,014,306)

ANSI/IEEE C62.11 TESTED

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Warranty - Application

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NOTE:
Because Hubbell has a policy of continuous product improvement, we reserve the right to change design and specifications without notice.

PDE™ ELBOW ARRESTERS

Rated 3-30 kV

General

Hubbell PDE elbow arresters are gapless metal oxide varistor (MOV) type surge arresters. PDE arresters are designed to provide shielded deadfront arrester protection for underground systems (15 kV - 35 kV class). PDE arresters limit overvoltages to acceptable levels, protecting equipment and extend life.

Design Tests

PDE elbow arresters reliably withstand the following design tests:

- Operating Duty Cycle: 20 - 5 kA discharges
- High Current short duration: 2 - 65 kA discharges
- Low current long duration: 20 - 75A x 2000 usec.

Production Tests

Polymer Housing Only: All tests performed per ANSI/IEEE Standard 386

PDE elbow arresters reliably withstand the following design tests:

- Partial Discharge Voltage Level
- AC 60 Hz 1 Minute Withstand
- BIL and Full Wave Impulse Withstand

Complete PDE: All tests performed per ANSI/IEEE Standard 386

PDE elbow arresters reliably withstand the following design tests:

- Partial Discharge Voltage Level
- Reference Voltage per ANSI C62.11
- Power Frequency per ANSI C62.11
- Periodic Fluoroscopic Analysis

Application

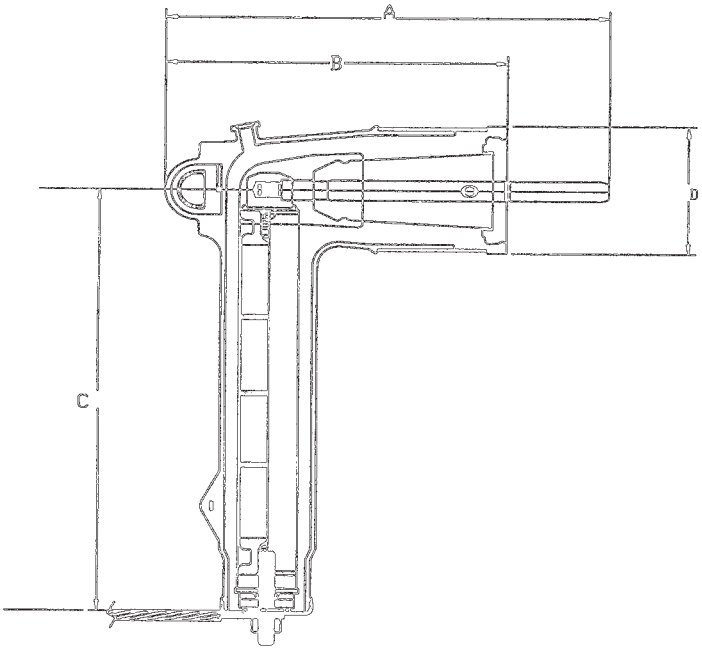
PDE arresters are designed for use with 200 Amp loadbreak bushings and interfaces with other 200 Amp loadbreak accessories that conform with ANSI/IEEE Standard 386. A PDE arrester installed at the end of a radial system or at both ends of an open point on a loop system will provide excellent protection against high voltage surges resulting from lightning or switching. When combined with an Ohio Brass PVR (Riser Pole) arrester installed at the end of a radial system or at the next piece of apparatus downstream, optimum protection can be achieved. Consult your Hubbell Power Systems account representative.

PDE Physical and Electrical Characteristics

The critical electrical values for elbow arresters are the discharge voltage (IR) and the IEEE 386 interface class. In general, the lower the discharge voltage, the better the protective margin. Hubbell PDE elbow arresters are non-fragmenting and possess excellent fault close characteristics to minimize damage to equipment and personnel.

BENEFITS

- Operating eye provides positive hotstick operation. The pulling eye strength exceeds 500 pounds of pull out force.
- Insulation consists of peroxide cured EPDM rubber that offers proven uncompromised reliability and dimensional stability.
- Molded shield of conductive peroxide cured EPDM rubber meets IEEE 592 standard.
- Grounding eye provides a convenient contact point to attach a grounding wire to maintain the shield at ground potential.
- Flexible lead is a No. 4 AWG bare copper rope lay. Available in several standard lengths to suit your application.
- The probe is manufactured of tin plated copper with an arc-follower made of an arc-quenching material.
- Interface fit provides optimal radial pressure on the IEEE 386 standard interface.
- The PDE arrester uses the same proven MOV technology utilized in all Ohio Brass arrester products.
- End cap is manufactured from high strength stainless steel.



Surge Arrester Selection Chart

ANSI/IEEE Standard 386 Interface	MCOV Rating (kV)	Rated Voltage (kV)	Dimensions in. (mm)				Elbow Interface	Approximate Shipping Weight		Catalog Number
			A	B	C	D		(lb.)	(gm.)	
15 kV Class	2.55	3	8.1 (206)	7.4 (188)	6.6 (168)	2.9 (168)	15kV	3.7	1676	611503
	5.1	6	8.1 (206)	7.4 (188)	6.6 (168)	2.9 (168)	15kV	3.7	1676	611505
	7.65	9	8.1 (206)	7.4 (188)	6.6 (168)	2.9 (168)	15kV	3.7	1676	611508
	8.4	10	8.1 (206)	7.4 (188)	6.6 (168)	2.9 (168)	15kV	3.7	1676	611509
	10.2	12	8.1 (206)	7.4 (188)	10.2 (259)	2.9 (168)	15kV	5.2	2360	621510
	12.7	15	8.1 (206)	7.4 (188)	10.2 (259)	2.9 (168)	15kV	5.2	2360	621513
	15.3	18	8.1 (206)	7.4 (188)	10.2 (259)	2.9 (168)	15kV	5.2	2360	621515
25 kV Class	7.65	9	10.3 (262)	7.9 (201)	6.6 (168)	3.1 (79)	25/35kV	3.7	1676	612508
	8.4	10	10.3 (262)	7.9 (201)	6.6 (168)	3.1 (79)	25/35kV	3.7	1676	612509
	10.2	12	10.3 (262)	7.9 (201)	10.2 (259)	3.1 (79)	25/35kV	5.2	2360	622510
	12.7	15	10.3 (262)	7.9 (201)	10.2 (259)	3.1 (79)	25/35kV	5.2	2360	622513
	15.3	18	10.3 (262)	7.9 (201)	10.2 (259)	3.1 (79)	25/35kV	5.2	2360	622515
	17	21	10.3 (262)	7.9 (201)	10.2 (259)	3.1 (79)	25/35kV	5.2	2360	622517
35 kV Class	15.3	18	10.3 (262)	7.9 (201)	10.2 (259)	3.1 (79)	25/35kV	5.2	2360	623515
	17	21	10.3 (262)	7.9 (201)	10.2 (259)	3.1 (79)	25/35kV	5.2	2360	623517
	19.5	24	10.3 (262)	7.9 (201)	13.7 (348)	3.1 (79)	25/35kV	6.5	2951	633520
	22	27	10.3 (262)	7.9 (201)	13.7 (348)	3.1 (79)	25/35kV	6.5	2951	633522
	24.4	30	10.3 (262)	7.9 (201)	13.7 (348)	3.1 (79)	25/35kV	6.5	2951	633525

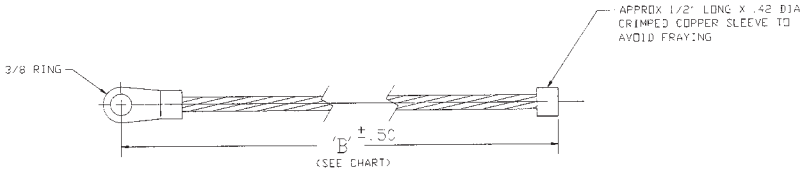
Hubbell PDE Elbow Arresters

NORMALLY RECOMMENDED MCOV FOR VARIOUS SYSTEM VOLTAGES			
System L-L Voltage kV		Arrester MCOV-kV	
Nominal	Maximum	Effectively Grounded Neutral Circuits	Impedance Grounded and Ungrounded Circuits
2.4	2.54	—	2.55
4.16	4.4	2.55	5.1
4.8	5.08	—	5.1
6.9	7.26	—	7.65
12.0	12.7	7.65	12.7
12.47	13.2	7.65	—
13.2	13.97	8.4	—
13.8	14.52	8.4	15.3
20.78	22.0	12.7	22.0
22.86	24.2	15.3	22.0
23.0	24.34	—	22.0
24.94	26.4	15.3	—
34.5	36.5	22.0	—

Selection of arrester size is based upon the maximum continuous operating voltage (MCOV) that is applied across the arrester in service (line-to-ground). For arresters on effectively grounded systems, this is normally the maximum line-to-ground voltage — e.g., 7.65 kV on a 12.47 kV multi-grounded system. For ungrounded or impedance-grounded systems, the MCOV should be at least 90 percent of maximum phase-to-phase voltage. Smaller arresters than shown may be used; contact your Hubbell Power Systems account representative for details.

Lead Wires

- #4 AWG Copper Rope Lay Conductor [595 Strand (7 x 85)]
- All End Fittings are Tinned Copper (Crimped Type)
- Ultimate Tensile Strength - 300 lbs.
- Standard length is 36"

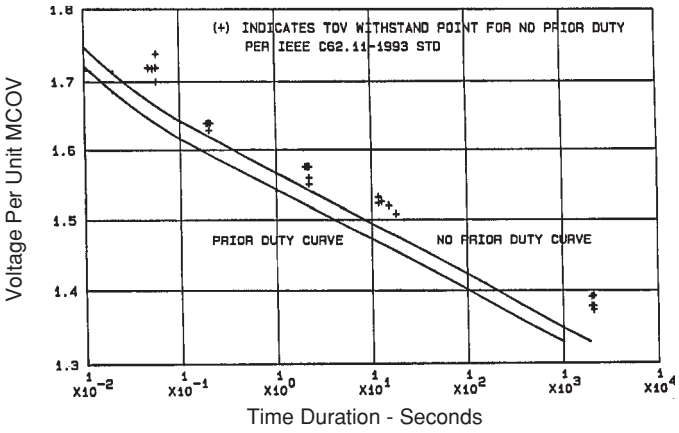


Performance Characteristics*

Description	Characteristics
High Current Short Duration Low Current Long Duration Duty Cycle	2 discharges of 65 kA crest 20 surges of 75 A-2000 microsecond duration 20 operations of 5 kA crest 8 x 20 microsecond duration
Thermal Recovery at MCOV	

Tests were performed in accordance with applicable sections of ANSI C62-11-1993 (Metal Oxide Surge Arresters for Alternating Current Power Circuits) with test levels chosen in accordance with levels found in underground distribution systems.

60 Hz Temporary Overvoltage Capability With and Without Prior Duty (60°)



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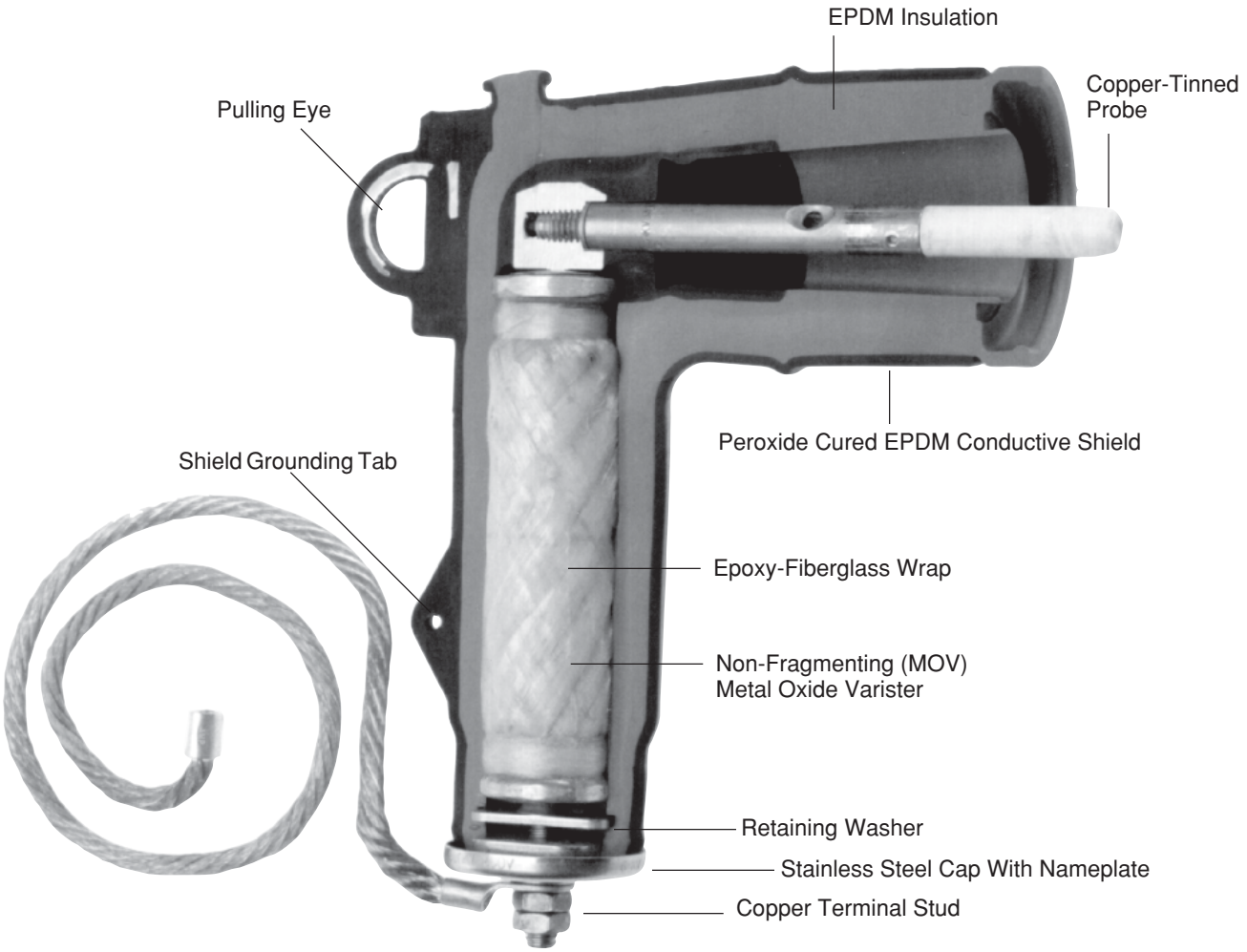
Code	Length "B"
3001	24"
3002	36"
3003	48"
3004	60"
3005	72"

Installation

The PDE arrester is applied on a 200 Amp interface via a hotstick. Reference the Installation Instruction Sheet.

Typical Cross Sections
PDE Arresters



COMMON TERMS

- **Discharge Voltage —** The voltage the arrester develops while discharging a surge to ground. This is a measure of the amount of protection; lower discharge voltage yields better protection.
- **MCOV —** Maximum Continuous Operating Voltage. The maximum 60 cycle voltage the arrester can support for its lifetime. The arrester MCOV must be equal to or greater than the system continuous line-to-ground voltage.
- **TOV —** Temporary Over-voltage. A situation in which the temporary line-to-ground 60 Hz voltage exceeds the nominal system voltage. (This is a common cause of failure of MOV type surge arresters.)
- **Thermal runaway —** When an MOV arrester fails due to excesss heat causing the arrester to conduct too much current. This will only happen if the arrester has absorbed more than its rated energy.
- **200 Amps —** This is the rated operating current of the system.
- **15, 25 & 35 kV class —** These are the levels of cable insulation available in the system.
- **EPDM —** Peroxide Cured Rubber

PDE Arrester — Ordering Information

15 kV Class (15 kV Elbow Interface)

Catalog Number	MCOV kV	Rated Voltage kV	0.5 μsec 5 kA Maximum IR-kV	500 A Switching Surge Maximum IR-kV	1.5 kA	3.0 kA	5.0 kA	10 kA	20 kA	40 kA
611503	2.55	3	12.5	8.5	9.8	10.3	11.0	12.3	14.3	18.5
611505	5.1	6	25.0	17.0	19.5	20.5	22.0	24.5	28.5	37.0
611508	7.65	9	33.5	23.0	26.0	28.0	30.0	33.0	39.0	50.5
611509	8.4	10	36.0	24.0	27.0	29.5	31.5	36.0	41.5	53.0
621510	10.2	12	50.0	34.0	39.0	41.0	44.0	49.0	57.0	74.0
621513	12.7	15	58.5	40.0	45.5	48.5	52.0	57.5	67.5	87.5
621515	15.3	18	67.0	46.0	52.0	56.0	60.0	66.0	78.0	101.0

25 kV Class (25/35 kV Elbow Interface)

612508	7.65	9	33.5	23.0	26.0	28.0	30.0	33.0	39.0	50.5
612509	8.4	10	36.0	24.0	27.0	29.5	31.5	36.0	41.5	53.0
622510	10.2	12	50.0	34.0	39.0	41.0	44.0	49.0	57.0	74.0
622513	12.7	15	58.5	40.0	45.5	48.5	52.0	57.5	67.5	87.5
622515	15.3	18	67.0	46.0	52.0	56.0	60.0	66.0	78.0	101.0
622517	17.0	21	73.0	49.0	55.0	60.0	64.0	73.0	84.0	107.0

35 kV Class (25/35 kV Elbow Interface)

623515	15.3	18	67.0	46.0	52.0	56.0	60.0	66.0	78.0	101.0
623517	17.0	21	73.0	49.0	55.0	60.0	64.0	73.0	84.0	107.0
633520	19.5	24	92.0	63.0	71.5	76.5	82.0	90.5	106.5	138.0
633522	22.0	27	100.5	69.0	78.0	84.0	90.0	99.0	117.0	151.5
633524	24.4	30	108.0	74.0	81.0	88.5	94.5	108.0	124.5	159.0

PDE Distribution Class Elbow Arresters
Key to the Catalog Numbers

6 X X X X X - 0 0 X X

15 = 15 kV Class
25 = 25 kV Class
35 = 35 kV Class

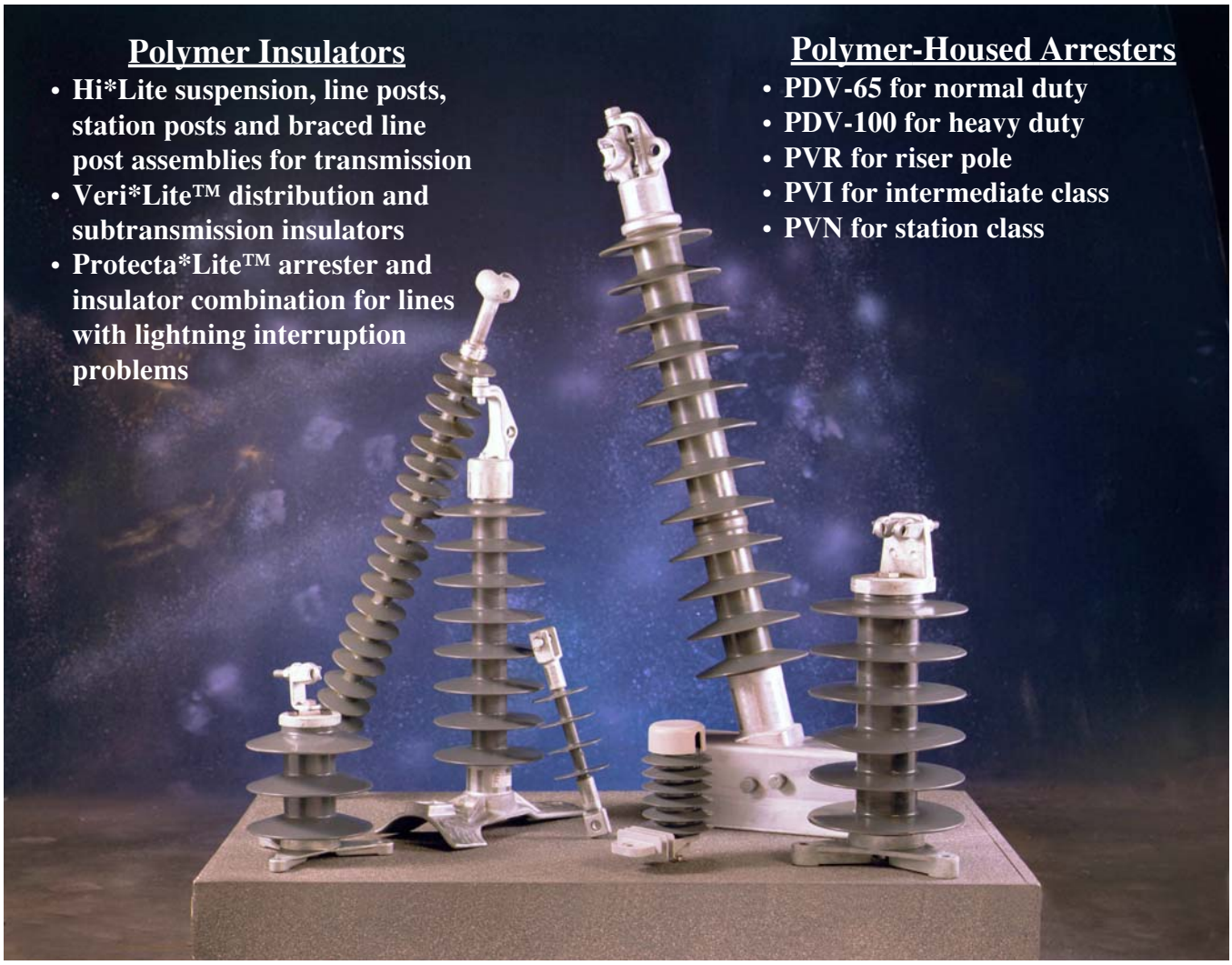
MCOV from above
2.55 = 03
5.1 = 05
7.65 = 08
8.4 = 09
10.2 = 10
12.7 = 13
15.3 = 15
17.0 = 17
19.5 = 20
22.0 = 22
24.4 = 24

No LEAD 00
24" LEAD 24
36" LEAD 36
48" LEAD 48
60" LEAD 60
72" LEAD 72

For more information, contact your Hubbell account representative or fax (573) 682-8714.

Quality Products for over 100 years

Hubbell/Ohio Brass manufactures a complete line of transmission and distribution arresters and insulators. Over seven million PDV/PVR arresters protect distribution lines and over 6,000 miles of transmission line have been built with Hi*Lite® insulators worldwide.



Quality, Experience, Service, Dependability.