

Hi*Lite® XL Suspension Insulators



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ANSI C29.12/IEC 1109 TESTED



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

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Hi*Lite® XL Insulators

Hi*Lite XL suspension insulators in this publication embody the latest features available in polymer insulator design and manufacture.

From the early prototypes in 1971, through full scale introduction in 1976, and through the succeeding years, Hi*Lite insulators have featured conservative design and high-quality manufacture.

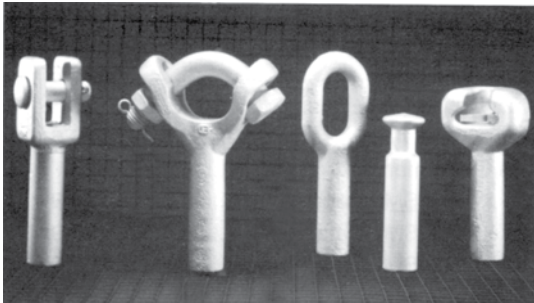
Today's Hi*Lite insulators will add to the over 1,000,000 Hi*Lite transmission insulators already in service worldwide.

Design

The structural design of the Hi*Lite XL consists of these basic parts:

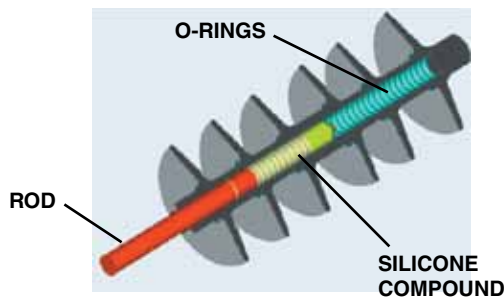
Rod - Hi*Lite insulator fiberglass rod is produced from the highest quality materials. Strands are aligned for maximum tensile strength. The rod is more than 50 percent glass fibers in cross section.

End Fittings - End fittings are steel or ductile iron. They are crimped directly to the rod by a special process originated by Ohio Brass, and later adopted by many other producers. The crimp develops a high percentage of the rod's inherent tensile strength. It requires no inter-movement of the parts to achieve high strength, nor does it introduce potting compounds or adhesives.



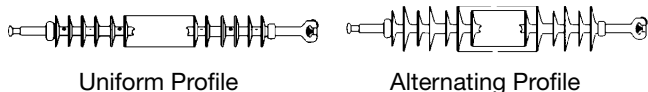
Weathersheds - Weathersheds are high pressure injection molded by Ohio Brass, from the proprietary compound ESP™. Housings manufactured with ESP silicone alloy rubber exhibit long-term hydrophobicity, high mechanical strength, excellent corona resistance and low permeability to moisture.

Interface - Hi*Lite insulators use Ohio Brass' live silicone interface. This feature prevents intrusion of moisture and contaminating elements. In the unlikely event the exterior seal is damaged, redundant o-ring seals within the live silicone interface will prohibit the lengthwise migration of intrusive elements between shed and rod.



Leakage Distance

Hi*Lite XL insulators feature high leakage distance for maximum resistance to contamination and leakage currents. Specific leakage distance (leakage divided by dry arcing distance) is higher than that of porcelain. Hi*Lite XL insulators are offered in standard uniform weathershed configuration and alternating (major/minor) weathershed configuration for applications requiring increased specified leakage distances.



Washability

Hi*Lite XL insulators listed in this catalog are suitable for flood washing up to 1,380 kPa (200 psi) at the ground pump level at a distance not less than 4.6 meters (15 ft.). The design incorporates positive, labyrinth seals to ensure long-term security against water entry. Conventional dry-particle, air-pressure cleaning methods may be employed.

High Pressure wash designs are also available. Washing is permissible for up to 6,900 kPa (1,000 psi) ground pump pressure at a distance no less than 1.8 meters (6 feet).

Cleaning guidelines (Ohio Brass publication #EU1272-H for flood and #EU1273-H for high pressure wash) are available from your representative.

Mechanical Ratings

Hi*Lite XL suspension insulators are rated and tested in accordance with IEC 1109-1992 and ANSI C29.12-1997. Certified test reports in detail are available.

SML ratings are 120 kN, 160 kN and 210 kN for insulators furnished with IEC fittings. For insulators furnished with ANSI fittings, SML ratings available are 111 kN (25K lbs.), 133 kN (30K lbs.), 160 kN (36K lbs.) and 222 kN (50K lbs.) RTL ratings are consistent with the IEC and ANSI standard. Actual factory routine tests are conducted at loads equal to or greater than the RTL rating.

Markings for XL insulator design are permanently embossed into the ground end corona shielding rings (CSR). Markings include SML and RTL, part number, assembly date code, and Ohio Brass identification. These marks are consistent with the IEC and ANSI standard.

Lengths Available

Hi*Lite XL suspension insulators are available in lengths appropriate for 69 kV through 765 kV. Longer lengths can be produced for special projects. Intermediate lengths (utilizing an additional 2 sheds) are also available (those that fall in between the catalog numbers listed in the tables). Length increments are approximately 76 mm (3 inches).

Testing

The Hi*Lite XL suspension insulator has been successfully "Design" tested to IEC 1109 at an independent laboratory. In addition, the Hi*Lite XL suspension insulator has successfully completed the 5,000 hour accelerated aging test detailed in Annex C of IEC 1109. A certified test report is available by contacting your Ohio Brass representative and requesting bulletin EU1348-H.

Since the ANSI "Prototype" and IEC "Design" testing requirements are virtually identical, the "Design" test report per IEC 1109 can serve as verification of compliance to ANSI.

Packaging

Hi*Lite suspension insulators are packaged in appropriate quantities in wooden crates 111.7 cm (44 inches) wide with the length of the crate determined by the length of the insulator. The height of the crate is normally less than 114.3 cm (45 inches). The gross weight will not exceed 909 kg (2,000 lbs.). Crates are available for both domestic and export transportation.



Export Crate

Corona Performance

Hi*Lite XL suspension insulators are RIV and corona free through 161 kV, by the use of integral Corona Shield Rings (CSR). Corona shielding is necessary at 220/230 kV and above. The table below details the rings necessary for voltages equal to or less than that listed in the column header.

Normal Applications: Top Grounded, Bottom Energized

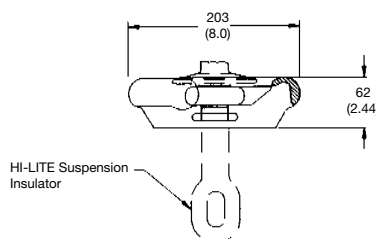
Insulator	Orientation	220/230 kV	330/345 kV	400 kV	500 kV
120 & 111 kN (25K lbs.)	Top Bottom	NONE 2717613001*	NONE 2717053001	2717613001 2717053001	2717613001 2717513001
160/210 kN & 133-222 kN (30-50K lbs.)	Top Bottom	NONE 2717613002*	NONE 2717053002	2717613002 2717053002	2717613002 2717513002

*For 96 mm (3.8") S.L. ratio designs, 271705 rings must be used in lieu of 271761 at the bottom end (energized) of insulator at 220/230 kV operating system voltage.

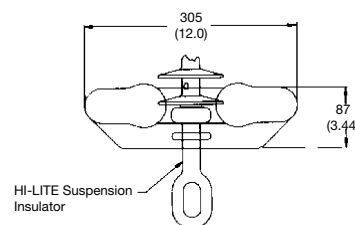
The physical and electrical values for the insulators on pages 5 through 8 are shown without corona protection. The table below yields the physical and electrical changes to the insulator when rings from table are installed for voltages above 161 kV.

Physical & Electrical Change Table

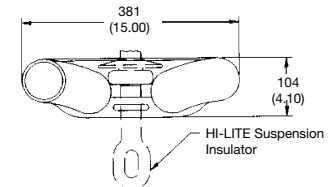
Physical & Electrical Characteristics	220/230 kV Ring	330/345 kV Ring	400 kV Rings	500 kV Rings
Dry Arc Distance mm (inches)	-20.3 (-1.2)	-50.8 (-2.0)	63.5 (2.5)	-127.0 (-5.0)
Leakage Distance mm (inches)	0	0	0	0
60 Hz Flashover Dry - kV (ANSI)	-10	-15	-20	-30
60 Hz Flashover Wet - kV (ANSI)	0	0	0	0
Critical Impulse Flashover Positive - kV (ANSI)	-15	-25	-35	-65
Critical Impulse Flashover Negative - kV (ANSI)	-20	-30	-35	-65
Power Frequency 1 minute Wet Withstand - kV (IEC)	0	0	0	0
Lightning Impulse Withstand Positive - kV (IEC)	-20	-25	-30	-60
Lightning Impulse Withstand Negative - kV (IEC)	-15	-25	-35	-65
Net Weight kg (pounds)	+0.9 (2.0)	+1.4 (3.0)	+ 2.3 (5.0)	+ 3.6 (8.0)



Part Number 271761

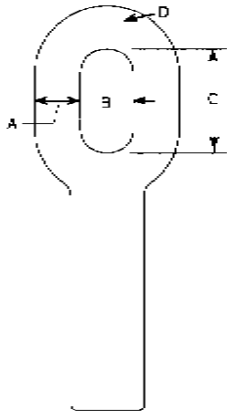


Part Number 271705

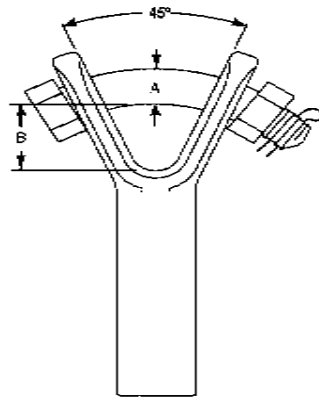


Part Number 271751

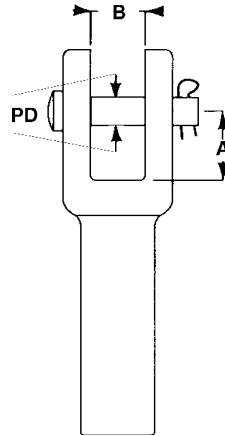
Most Common End Fittings



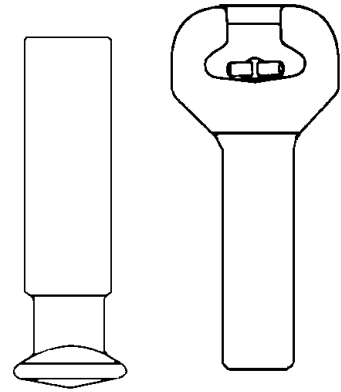
Chain Eye



Y-Clevis



Straight Clevis



Ball/Socket

SML	Dimensions mm (in.)			
	A	B	C	D
111 kN (25K lbs.)	15.74 (0.62)	25.4 (1.00)	50.8 (2.00)	15.74 (0.62)
120 kN	15.74 (0.62)	25.4 (1.00)	50.8 (2.00)	15.74 (0.62)
133 kN (30K lbs.)	19.05 (0.75)	25.4 (1.00)	50.8 (2.00)	21.59 (0.85)
160 kN (36K lbs.)	19.05 (0.75)	25.4 (1.00)	50.8 (2.00)	21.59 (0.85)
210 kN	19.05 (0.75)	25.4 (1.00)	50.8 (2.00)	21.59 (0.85)
222 kN (50K lbs.)	19.05 (0.75)	25.4 (1.00)	50.8 (2.00)	21.59 (0.85)

SML	Dimensions mm (in.)		
	A	B	Bolt Dia.
111 kN (25K lbs.)	19.05 (0.75)	38.86 (1.53)	19 (0.75)
120 kN	19.05 (0.75)	38.86 (1.53)	19 (0.75)
133 kN (30K lbs.)	22.35 (0.88)	40.39 (1.59)	22 (0.88)
160 kN (36K lbs.)	22.35 (0.88)	40.39 (1.59)	22 (0.88)
210 kN	22.35 (0.88)	40.39 (1.59)	22 (0.88)
222 kN (50K lbs.)	22.35 (0.88)	40.39 (1.59)	22 (0.88)

SML	Dimensions mm (in.)			
	Class	A	B	PD
111 kN (25K lbs.)	ANSI 52-6	36 (1.41)	19 (0.75)	16 (0.62)
120 kN	IEC 16C	36 (1.41)	19 (0.75)	16 (0.62)
133 kN (30K lbs.)	ANSI 52-6	36 (1.41)	19 (0.75)	16 (0.62)
160 kN (36K lbs.)	IEC 19L	46 (1.81)	21 (0.83)	19 (0.75)
210 kN	IEC 19L	46 (1.81)	21 (0.83)	19 (0.75)
222 kN (50K lbs.)	N/A			

SML	Class
111 kN (25K lbs.)	ANSI 52-5
120 kN	IEC 16 mm
133 kN (30K lbs.)	ANSI 52-5
160 kN (36K lbs.)	IEC 20 mm (ANSI 52-8)
210 kN	IEC 20 mm
222 kN (50K lbs.)	ANSI 52-11

Hi*Lite XL Suspension Insulators: Key to the Catalog Numbers

D 1 0 0 0 8 2 A 0 7

AA = Hi*Lite XL
 51 = 63 mm (2.5" S.L.)
 A1 = 73 mm (2.9" S.L.)
 D1 = 83 mm (3.3" S.L.)
 G1 = 96 mm (3.8" S.L.)
 S.L. = Specified Leak
 (approx. leak/dry arc)
 +These codes apply to our ESP
 silicone alloy compound. For other
 polymer materials contact Ohio Brass

B = Strength
 0 = 120 kN SML
 1 = 111 kN (25K lbs.) SML
 2 = 160 kN (36K lbs.), 133 kN (30K lbs.) SML
 3 = 210 kN, 222 kN (50K lbs.) SML

C = Construction
 0 = Standard Hardware/0 Added Sheds
 2 = Standard Hardware/2 Added Sheds

DD = Weathershed Configuration
 To determine the number of sheds in your insulator,
 multiply this number by four, then add any additional
 sheds as listed in the Construction digit.

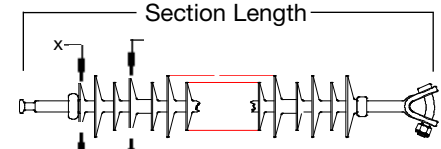
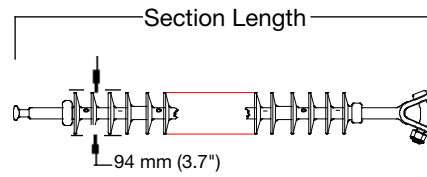
E = Labeling
 1 = English
 2 = Metric

GG = Line End Fittings
 Chain Eye00
 ANSI Ball01
 Y-Clevis02
 ANSI Straight Clevis04
 IEC Ball07*
 IEC Straight Clevis.....08
 *For 160 kN, 20 mm ball, use "09" code.

F = Ground End Fittings
 Chain Eye0
 Y-Clevis2
 ANSI Socket3
 ANSI Straight Clevis4
 IEC Straight Clevis.....8
 IEC Socket..... A

16 mm (5/8") Rod Diameter Suspension Insulators

Mechanical Ratings
SML = 111 kN (25,000 lbs.)
RTL = 55 kN (12,500 lbs.)



Type	x mm (in.)	y mm (in.)
A11..	97 (3.8)	114 (4.5)
D11..	109 (4.3)	140 (5.5)
G11..	130 (5.1)	160 (6.3)

Selection Guide Typical Line Voltage, kV ⁽¹⁾								Leakage Distance mm (in.) XX =				Catalog Number with ANSI 52-5 ball and Y-Clevis	Section Length mm (in.)	No. of Sheds	Dry Arc Distance mm (in.)	⁽²⁾ IEC Wet Switching Impulse Withstand (ANSI 60 Hz. Dry F.O.) kV	⁽²⁾ IEC Power Freq. Wet Withstand (ANSI 60 Hz. Wet F.O.) kV	⁽²⁾ IEC Light- ning Impulse Withstand (ANSI Critical Impulse F.O.) kV	
																		Pos-kV	Neg-kV
70	110	132	161	220	330	400	51	A1	D1	G1	XX10032201	725 (28.6)	12	470 (18.5)	260 (180)	135 (180)	275 (310)	255 (285)	
							1160 (45)	1340 (53)	1530 (60)	1760 (69)	XX10042201	881 (34.7)	16	625 (24.6)	345 (245)	180 (240)	365 (410)	350 (390)	
							1940 (76)	2230 (88)	2540 (100)	2920 (115)	XX10052201	1033 (40.7)	20	775 (30.6)	420 (310)	220 (295)	450 (505)	440 (490)	
							2320 (91)	2680 (105)	3060 (120)	3520 (138)	XX10062201	1189 (46.8)	24	930 (36.8)	500 (370)	260 (350)	540 (605)	530 (595)	
							2710 (107)	3130 (122)	3570 (140)	4110 (162)	XX10072201	1345 (53.0)	28	1090 (42.9)	570 (430)	305 (405)	630 (700)	620 (695)	
							3100 (122)	3580 (141)	4080 (160)	4700 (185)	XX10082201	1501 (59.1)	32	1245 (49.0)	650 (490)	340 (455)	715 (795)	710 (795)	
							3490 (137)	4020 (158)	4580 (180)	5280 (207)	XX10092201	1654 (65.1)	36	1395 (55.0)	720 (545)	380 (505)	800 (890)	800 (890)	
							3880 (152)	4480 (176)	5100 (200)	5870 (231)	XX10102201	1810 (71.3)	40	1555 (61.2)	790 (600)	420 (555)	885 (985)	890 (990)	
							4270 (168)	4930 (194)	5610 (221)	6460 (254)	XX10112201	1966 (77.4)	44	1710 (67.3)	860 (655)	455 (605)	970 (1080)	975 (1090)	
							4660 (183)	5370 (211)	6120 (241)	7050 (277)	XX10122201	2121 (83.5)	48	1865 (73.5)	930 (710)	490 (655)	1050 (1170)	1065 (1185)	
							5040 (198)	5820 (229)	6620 (261)	7630 (300)	XX10132201	2274 (89.5)	52	2015 (79.5)	995 (760)	525 (700)	1135 (1260)	1145 (1280)	
							5430 (214)	6270 (247)	7140 (281)	8220 (323)	XX10142201	2430 (95.7)	56	2175 (85.6)	1060 (810)	560 (750)	1215 (1350)	1230 (1370)	
							5820 (229)	6720 (264)	7650 (301)	8810 (347)	XX10152201	2586 (101.8)	60	2330 (91.7)	1120 (855)	595 (790)	1295 (1440)	1315 (1465)	
							6210 (244)	7170 (282)	8160 (321)	9400 (370)	XX10162201	2742 (108.0)	64	2485 (97.9)	1185 (905)	625 (835)	1375 (1530)	1400 (1560)	
							6600 (260)	7610 (299)	8670 (341)	9980 (393)	XX10172201	2894 (114.0)	68	2635 (103.9)	1240 (945)	655 (880)	1455 (1615)	1480 (1650)	
							6990 (275)	8060 (317)	9180 (361)	10570 (416)	XX10182201	3050 (120.1)	72	2795 (110.0)	1300 (990)	690 (920)	1530 (1705)	1565 (1740)	
							7380 (290)	8510 (335)	9700 (381)	11170 (439)	XX10192201	3206 (126.2)	76	2950 (116.2)	1355 (1030)	720 (960)	1610 (1790)	1645 (1830)	
							7770 (306)	8960 (353)	10210 (402)	11760 (463)	XX10202201	3362 (132.4)	80	3105 (122.3)	1410 (1070)	745 (1000)	1685 (1875)	1725 (1920)	
							8150 (321)	9400 (370)	10710 (421)	12330 (485)	XX10212201	3514 (138.4)	84	3260 (128.3)	1460 (1110)	775 (1040)	1760 (1960)	1800 (2005)	
							8540 (336)	9860 (388)	11220 (442)	12930 (509)	XX10222201	3670 (144.5)	88	3415 (134.4)	1510 (1145)	800 (1075)	1835 (2040)	1880 (2090)	
							8930 (351)	10310 (406)	11740 (462)	13520 (532)	XX10232201	3826 (150.7)	92	3570 (140.6)	1560 (1180)	830 (1110)	1910 (2125)	1955 (2175)	

Notes: (1) For voltages above 400 kV, and other section lengths, contact your Ohio Brass representative.
 (2) Electrical values are without corona ring. For voltages above 161 kV refer to Page 3 for Corona Rings, and associated physical/electrical changes to above data. Dimensions are within allowable tolerances as specified by IEC 1109 and ANSI C29.12.

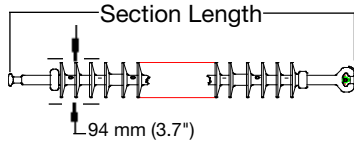
End Fitting Example

You need the electrical and mechanical characteristics of Catalog #5110102201. But chain eye is needed at the ground end instead of a Y-clevis. From the table at the right, find the code for the chain eye/ANSI ball configuration 2001. You should order catalog number 5110102001. The same process is used for other strength Hi*Lite XL insulators.

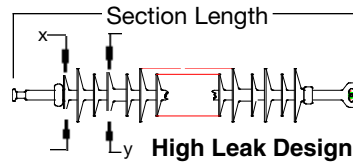
Ground Fitting	Line Fitting	Suffix Code	Length Change	
			mm	Inches
Eye	Eye	2000	+39	+1.5
Eye	ANSI 52-5 Ball	2001	+1	+0.0
ANSI 52-5 Socket	ANSI 52-5 Ball	2301	-25	-0.9
Y-Clevis	Eye	2200	+37	+1.4
ANSI 52-6 Clevis	Eye	2400	+11	+0.4

16 mm (5/8") Rod Diameter Suspension Insulators

Mechanical Ratings
SML = 120 kN
RTL = 60 kN



Standard Design



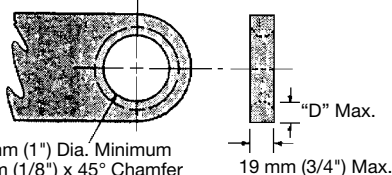
High Leak Design

Type	x mm (in.)	y mm (in.)
A10..	97 (3.8)	114 (4.5)
D10..	109 (4.3)	140 (5.5)
G10..	130 (5.1)	160 (6.3)

Selection Guide Typical Line Voltage, kV ⁽¹⁾								Leakage Distance mm (in.) XX =				Catalog Number with IEC 16 mm ball - socket	Section Length mm (in.)	No. of Sheds	Dry Arc Distance mm (in.)	⁽²⁾ IEC Wet Switching Impulse Withstand (ANSI 60 Hz. Dry F.O.) kV	⁽²⁾ IEC Power Freq. Wet Withstand (ANSI 60 Hz. Wet F.O.) kV	⁽²⁾ IEC Light- ning Impulse Withstand (ANSI Critical Impulse F.O.) kV	
70	110	132	161	220	330	400	51	A1	D1	G1	Pos-kV							Neg-kV	
							1160 (45)	1340 (53)	1530 (60)	1760 (69)	XX00032A07	731 (28.8)	12	470 (18.5)	260 (180)	135 (180)	275 (310)	255 (285)	
							1550 (61)	1790 (70)	2040 (80)	2350 (92)	XX00042A07	886 (34.9)	16	625 (24.6)	345 (245)	180 (240)	365 (410)	350 (390)	
							1940 (76)	2230 (88)	2540 (100)	2920 (115)	XX00052A07	1039 (40.9)	20	775 (30.6)	420 (310)	220 (295)	450 (505)	440 (490)	
							2320 (91)	2680 (105)	3060 (120)	3520 (138)	XX00062A07	1195 (47.1)	24	930 (36.8)	500 (370)	260 (350)	540 (605)	530 (595)	
							2710 (107)	3130 (122)	3570 (140)	4110 (162)	XX00072A07	1351 (53.2)	28	1090 (42.9)	570 (430)	305 (405)	630 (700)	620 (695)	
							3100 (122)	3580 (141)	4080 (160)	4700 (185)	XX00082A07	1507 (59.3)	32	1245 (49.0)	650 (490)	340 (455)	715 (795)	710 (795)	
							3490 (137)	4020 (158)	4580 (180)	5280 (207)	XX00092A07	1659 (65.3)	36	1395 (55.0)	720 (545)	380 (505)	800 (890)	800 (890)	
							3880 (152)	4480 (176)	5100 (200)	5870 (231)	XX00102A07	1815 (71.5)	40	1555 (61.2)	790 (600)	420 (555)	885 (985)	890 (990)	
							4270 (168)	4930 (194)	5610 (221)	6460 (254)	XX00112A07	1971 (77.6)	44	1710 (67.3)	860 (655)	455 (605)	970 (1080)	975 (1090)	
							4660 (183)	5370 (211)	6120 (241)	7050 (277)	XX00122A07	2127 (83.8)	48	1865 (73.5)	930 (710)	490 (655)	1050 (1170)	1065 (1185)	
							5040 (198)	5820 (229)	6620 (261)	7630 (300)	XX00132A07	2279 (89.8)	52	2015 (79.5)	995 (760)	525 (700)	1135 (1260)	1145 (1280)	
							5430 (214)	6270 (247)	7140 (281)	8220 (323)	XX00142A07	2435 (95.9)	56	2175 (85.6)	1060 (810)	560 (750)	1215 (1350)	1230 (1370)	
							5820 (229)	6720 (264)	7650 (301)	8810 (347)	XX00152A07	2591 (102.1)	60	2330 (91.7)	1120 (855)	595 (790)	1295 (1440)	1315 (1465)	
							6210 (244)	7170 (282)	8160 (321)	9400 (370)	XX00162A07	2747 (108.2)	64	2485 (97.9)	1185 (905)	625 (835)	1375 (1530)	1400 (1560)	
							6600 (260)	7610 (299)	8670 (341)	9980 (393)	XX00172A07	2900 (114.2)	68	2635 (103.9)	1240 (945)	655 (880)	1455 (1615)	1480 (1650)	
							6990 (275)	8060 (317)	9180 (361)	10570 (416)	XX00182A07	3056 (120.3)	72	2795 (110.0)	1300 (990)	690 (920)	1530 (1705)	1565 (1740)	
							7380 (290)	8510 (335)	9700 (381)	11170 (439)	XX00192A07	3212 (126.5)	76	2950 (116.2)	1355 (1030)	720 (960)	1610 (1790)	1645 (1830)	
							7770 (306)	8960 (353)	10210 (402)	11760 (463)	XX00202A07	3368 (132.6)	80	3105 (122.3)	1410 (1070)	745 (1000)	1685 (1875)	1725 (1920)	
							8150 (321)	9400 (370)	10710 (421)	12330 (485)	XX00212A07	3520 (138.6)	84	3260 (128.3)	1460 (1110)	775 (1040)	1760 (1960)	1800 (2005)	
							8540 (336)	9860 (388)	11220 (442)	12930 (509)	XX00222A07	3676 (144.8)	88	3415 (134.4)	1510 (1145)	800 (1075)	1835 (2040)	1880 (2090)	
							8930 (351)	10310 (406)	11740 (462)	13520 (532)	XX00232A07	3832 (150.9)	92	3570 (140.6)	1560 (1180)	830 (1110)	1910 (2125)	1955 (2175)	

Notes: (1) For voltages above 400 kV, and other section lengths, contact your Ohio Brass representative.
 (2) Electrical values are without corona ring. For voltages above 161 kV refer to Page 3 for Corona Rings, and associated physical/electrical changes to above data. Dimensions are within allowable tolerances as specified by IEC 1109 and ANSI C29.12.

Y-Clevis Tower Attachment Detail for all Hi*Lite XL Insulators



Rod Dia. mm (in.)	"D" Max. mm (in.)
16 (5/8")	13 (.53)
22 (7/8")	25 (1.0)

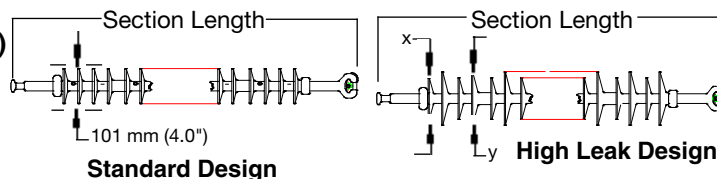
To achieve insulator SML value, proper grade steel should be used

Ground Fitting	Line Fitting	Suffix Code	Length Change	
			mm	Inches
Eye	Eye	2000	+59	+2.3
Eye	IEC 16 mm Ball	2007	+26	+1.0
Y-Clevis	IEC 16 mm Ball	2207	+24	+0.9
Y-Clevis	Eye	2200	+57	+2.2
IEC 16C Clevis	Eye	2800	+31	+1.2

22 mm (7/8") Rod Diameter Suspension Insulators

Mechanical Ratings
SML = 160 kN (36,000 lbs.)
RTL = 80 kN (18,000 lbs.)

Insulators with either ANSI ball and/or socket end-fittings will be rated 133 kN (30,000 lbs.) SML and 66 kN (15,000 lbs.) RTL.



Type	x mm (in.)	y mm (in.)
A12..	97 (3.8)	114 (4.5)
D12..	109 (4.3)	140 (5.5)
G12..	130 (5.1)	160 (6.3)

Selection Guide Typical Line Voltage, kV ⁽¹⁾								Leakage Distance mm (in.) XX =				Catalog Number with IEC 20 mm ball and socket	Section Length mm (in.)	No. of Sheds	Dry Arc Distance mm (in.)	⁽²⁾ IEC Wet Switching Impulse Withstand (ANSI 60 Hz. Dry F.O.) kV	⁽²⁾ IEC Power Freq. Wet Withstand (ANSI 60 Hz. Wet F.O.) kV	⁽²⁾ IEC Light- ning Impulse Withstand (ANSI Critical Impulse F.O.) kV	
70	110	132	161	220	330	400	51	A1	D1	G1	Pos-kV							Neg-kV	
							1150 (45)	1340 (53)	1530 (60)	1760 (69)	XX20032A09	795 (30.8)	12	470 (18.5)	260 (180)	135 (180)	275 (310)	255 (285)	
							1540 (60)	1790 (70)	2040 (80)	2350 (92)	XX20042A09	951 (37.0)	16	625 (24.6)	345 (245)	180 (240)	365 (410)	350 (390)	
							1920 (75)	2230 (88)	2540 (100)	2920 (115)	XX20052A09	1104 (43.5)	20	775 (30.6)	420 (310)	220 (295)	450 (505)	440 (490)	
							2310 (91)	2680 (105)	3060 (120)	3520 (138)	XX20062A09	1260 (49.6)	24	930 (36.8)	500 (370)	260 (350)	540 (605)	530 (595)	
							2700 (106)	3130 (123)	3570 (140)	4110 (162)	XX20072A09	1416 (55.8)	28	1090 (42.9)	570 (430)	305 (405)	630 (700)	620 (695)	
							3080 (121)	3580 (141)	4080 (160)	4700 (185)	XX20082A09	1572 (61.9)	32	1245 (49.0)	650 (490)	340 (455)	715 (795)	710 (795)	
							3470 (136)	4020 (158)	4580 (180)	5280 (207)	XX20092A09	1724 (67.9)	36	1395 (55.0)	720 (545)	380 (505)	800 (890)	800 (890)	
							3850 (151)	4480 (176)	5100 (200)	5870 (231)	XX20102A09	1880 (74.0)	40	1555 (61.2)	790 (600)	420 (555)	885 (985)	890 (990)	
							4240 (167)	4930 (194)	5610 (221)	6460 (254)	XX20112A09	2036 (80.2)	44	1710 (67.3)	860 (655)	455 (605)	970 (1080)	975 (1090)	
							4630 (182)	5370 (211)	6120 (241)	7050 (277)	XX20122A09	2192 (86.3)	48	1865 (73.5)	930 (710)	490 (655)	1050 (1170)	1065 (1185)	
							5010 (197)	5820 (229)	6620 (261)	7630 (300)	XX20132A09	2344 (92.3)	52	2015 (79.5)	995 (760)	525 (700)	1135 (1260)	1145 (1280)	
							5400 (212)	6270 (247)	7140 (281)	8220 (323)	XX20142A09	2500 (98.5)	56	2175 (85.6)	1060 (810)	560 (750)	1215 (1350)	1230 (1370)	
							5790 (228)	6720 (264)	7650 (301)	8810 (347)	XX20152A09	2656 (104.6)	60	2330 (91.7)	1120 (855)	595 (790)	1295 (1440)	1315 (1465)	
							6170 (243)	7170 (282)	8160 (321)	9400 (370)	XX20162A09	2812 (110.7)	64	2485 (97.9)	1185 (905)	625 (835)	1375 (1530)	1400 (1560)	
							6560 (258)	7610 (299)	8670 (341)	9980 (393)	XX20172A09	2965 (116.7)	68	2635 (103.9)	1240 (945)	655 (880)	1455 (1615)	1480 (1650)	
							6940 (273)	8060 (317)	9180 (361)	10570 (416)	XX20182A09	3120 (122.9)	72	2795 (110.0)	1300 (990)	690 (920)	1530 (1705)	1565 (1740)	
							7330 (288)	8510 (335)	9700 (381)	11170 (439)	XX20192A09	3276 (128.9)	76	2950 (116.2)	1355 (1030)	720 (960)	1610 (1790)	1645 (1830)	
							7720 (304)	8960 (353)	10210 (402)	11760 (463)	XX20202A09	3432 (135.2)	80	3105 (122.3)	1410 (1070)	745 (1000)	1685 (1875)	1725 (1920)	
							8100 (319)	9400 (370)	10710 (421)	12330 (485)	XX20212A09	3585 (141.2)	84	3260 (128.3)	1460 (1110)	775 (1040)	1760 (1960)	1800 (2005)	
							8490 (334)	9860 (388)	11220 (442)	12930 (509)	XX20222A09	3741 (147.3)	88	3415 (134.4)	1510 (1145)	800 (1075)	1835 (2040)	1880 (2090)	
							8870 (349)	10310 (406)	11740 (462)	13520 (532)	XX20232A09	3897 (153.4)	92	3570 (140.6)	1560 (1180)	830 (1110)	1910 (2125)	1955 (2175)	

Notes: (1) For voltages above 400 kV, and other section lengths, contact your Ohio Brass representative.
 (2) Electrical values are without corona ring. For voltages above 161 kV refer to Page 3 for Corona Rings, and associated physical/electrical changes to above data. Dimensions are within allowable tolerances as specified by IEC 1109 and ANSI C29.12.

Corona Ring Example

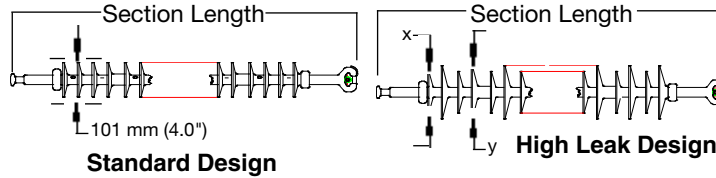
You have selected Catalog #D120122A09, the typical application is 220kV. From page 3, you would select ring 2717613002 on the bottom end. The physical/electrical characteristics would change per the table on page 3.

Ground Fitting	Line Fitting	SML kN (lbs.)	Suffix Code	Length Change	
				mm	In.
Eye	Eye	160 kN (36K)	2000	+40	+1.5
Eye	IEC 20 mm Ball	160 kN (36K)	2009	+21	+0.8
Y-Clevis	Eye	160 kN (36K)	2200	+27	+1.0
Eye	ANSI 52-5 Ball	133 kN (30K)	2001	+2	+0.1
Y-Clevis	IEC 20 mm Ball	160 kN (36K)	2209	+8	+0.3
Y-Clevis	ANSI 52-5 Ball	133 kN (30K)	2201	-11	-0.4
ANSI 52-5 Socket	ANSI 52-5 Ball	133 kN (30K)	2301	-35	-1.3

22 mm (7/8") Rod Diameter Suspension Insulators

Mechanical Ratings
SML = 210 kN
RTL = 55 kN

ANSI fittings are capable of 222 kN SML (50K lbs.)

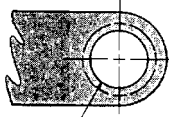


Type	x mm (in.)	y mm (in.)
A13..	97 (3.8)	114 (4.5)
D13..	109 (4.3)	140 (5.5)
G13..	130 (5.1)	160 (6.3)

Selection Guide Typical Line Voltage, kV ⁽¹⁾							Leakage Distance mm (in.) XX =				Catalog Number with IEC 20 mm ball and socket	Section Length mm (in.)	No. of Sheds	Dry Arc Distance mm (in.)	⁽²⁾ IEC Wet Switching Impulse Withstand (ANSI 60 Hz. Dry F.O.) kV	⁽²⁾ IEC Power Freq. Wet Withstand (ANSI 60 Hz. Wet F.O.) kV	⁽²⁾ IEC Light- ning Impulse Withstand (ANSI Critical Impulse F.O.) kV	
69	115	138	161	220	330	400	51	A1	D1	G1							Pos-kV	Neg-kV
							1150 (45)	1340 (53)	1530 (60)	1760 (69)	XX30032A07	795 (30.8)	12	470 (18.5)	260 (180)	135 (180)	275 (310)	255 (285)
							1540 (60)	1790 (70)	2040 (80)	2350 (92)	XX30042A07	951 (37.0)	16	625 (24.6)	345 (245)	180 (240)	365 (410)	350 (390)
							1920 (75)	2230 (88)	2540 (100)	2920 (115)	XX30052A07	1104 (43.5)	20	775 (30.6)	420 (310)	220 (295)	450 (505)	440 (490)
							2310 (91)	2680 (105)	3060 (120)	3520 (138)	XX30062A07	1260 (49.6)	24	930 (36.8)	500 (370)	260 (350)	540 (605)	530 (595)
							2700 (106)	3130 (123)	3570 (140)	4110 (162)	XX30072A07	1416 (55.8)	28	1090 (42.9)	570 (430)	305 (405)	630 (700)	620 (695)
							3080 (121)	3580 (141)	4080 (160)	4700 (185)	XX30082A07	1572 (61.9)	32	1245 (49.0)	650 (490)	340 (455)	715 (795)	710 (795)
							3470 (136)	4020 (158)	4580 (180)	5280 (207)	XX30092A07	1724 (67.9)	36	1395 (55.0)	720 (545)	380 (505)	800 (890)	800 (890)
							3850 (151)	4480 (176)	5100 (200)	5870 (231)	XX30102A07	1880 (74.0)	40	1555 (61.2)	790 (600)	420 (555)	885 (985)	890 (990)
							4240 (167)	4930 (194)	5610 (221)	6460 (254)	XX30112A07	2036 (80.2)	44	1710 (67.3)	860 (655)	455 (605)	970 (1080)	975 (1090)
							4630 (182)	5370 (211)	6120 (241)	7050 (277)	XX30122A07	2192 (86.3)	48	1865 (73.5)	930 (710)	490 (655)	1050 (1170)	1065 (1185)
							5010 (197)	5820 (229)	6620 (261)	7630 (300)	XX30132A07	2344 (92.3)	52	2015 (79.5)	995 (760)	525 (700)	1135 (1260)	1145 (1280)
							5400 (212)	6270 (247)	7140 (281)	8220 (323)	XX30142A07	2500 (98.5)	56	2175 (85.6)	1060 (810)	560 (750)	1215 (1350)	1230 (1370)
							5790 (228)	6720 (264)	7650 (301)	8810 (347)	XX30152A07	2656 (104.6)	60	2330 (91.7)	1120 (855)	595 (790)	1295 (1440)	1315 (1465)
							6170 (243)	7170 (282)	8160 (321)	9400 (370)	XX30162A07	2812 (110.7)	64	2485 (97.9)	1185 (905)	625 (835)	1375 (1530)	1400 (1560)
							6560 (258)	7610 (299)	8670 (341)	9980 (393)	XX30172A07	2965 (116.7)	68	2635 (103.9)	1240 (945)	655 (880)	1455 (1615)	1480 (1650)
							6940 (273)	8060 (317)	9180 (361)	10570 (416)	XX30182A07	3120 (122.9)	72	2795 (110.0)	1300 (990)	690 (920)	1530 (1705)	1565 (1740)
							7330 (288)	8510 (335)	9700 (381)	11170 (439)	XX30192A07	3276 (128.9)	76	2950 (116.2)	1355 (1030)	720 (960)	1610 (1790)	1645 (1830)
							7720 (304)	8960 (353)	10210 (402)	11760 (463)	XX30202A07	3432 (135.2)	80	3105 (122.3)	1410 (1070)	745 (1000)	1685 (1875)	1725 (1920)
							8100 (319)	9400 (370)	10710 (421)	12330 (485)	XX30212A07	3585 (141.2)	84	3260 (128.3)	1460 (1110)	775 (1040)	1760 (1960)	1800 (2005)
							8490 (334)	9860 (388)	11220 (442)	12930 (509)	XX30222A07	3741 (147.3)	88	3415 (134.4)	1510 (1145)	800 (1075)	1835 (2040)	1880 (2090)
							8870 (349)	10310 (406)	11740 (462)	13520 (532)	XX30232A07	3897 (153.4)	92	3570 (140.6)	1560 (1180)	830 (1110)	1910 (2125)	1955 (2175)

Notes: (1) For voltages above 400 kV, and other section lengths, contact your Ohio Brass representative.
 (2) Electrical values are without corona ring. For voltages above 161 kV refer to Page 3 for Corona Rings, and associated physical/electrical changes to above data. Dimensions are within allowable tolerances as specified by IEC 1109 and ANSI C29.12.

Y-Clevis Tower Attachment Detail for all Hi*Lite XL Insulators



25 mm (1") Dia. Minimum
 3 mm (1/8") x 45° Chamfer

"D" Max.
 19 mm (3/4") Max.

Rod Dia. mm (in.)	"D" Max. mm (in.)
16 (5/8")	13 (.53)
22 (7/8")	25 (1.0)

To achieve insulator SML value, proper grade steel should be used.

Ground Fitting	Line Fitting	Suffix Code	Length Change	
			mm	Inches
Eye	Eye	2000	+40	+1.5
Eye	IEC 20mm Ball	2007	+18	+0.7
ANSI 52-11 Socket	ANSI 52-11 Ball	2301	-16	-0.6
Eye	ANSI 52-11 Ball	2001	+2	+0.1
Y-Clevis	Eye	2200	+19	+0.7
Y-Clevis	ANSI 52-11 Ball	2201	-13	-0.5
Y-Clevis	IEC 20 mm Ball	2207	+4	+0.1
Eye	IEC 19L Clevis	2800	+31	+1.2