INTRODUCTION

When Locke Insulators introduced stackable cap & pin apparatus insulators in 1911, all insulator porcelain was manufactured by the same process. Thin porcelain shells that could be dried and fired uniformly were either set on pins (pin type insulators) or assembled with a pin and a cap (suspension insulators). The cap & pin apparatus insulator was a natural extension of the technology of the times and allowed higher voltages to be accommodated by stacking insulators to increase their BIL.

THE CAP & PIN INSULATOR

Cap & pin insulators have served the industry well since their introduction in 1911. They have provided strong, rigid mechanical support for bus runs, switches and other energized apparatus. Both their mechanical and electrical strength are derived by nesting porcelain shells between the metal cap and pin. Cap & pin insulators have excellent electrical performance under icing and polluted conditions. Their large, staggered diameters and large spacing between shells deter ice bridging. Their porcelain shell design also means that a large percentage of their leakage distance is protected, therefore providing a high contamination withstand voltage.

Unfortunately, the cap & pin insulator has a basic design flaw. There is metal and cement internal to the porcelain. Changes in these components over a long period of time caused by chemical and electrolytic reactions with the environment can induce hoop stress in the porcelain. This can lead to cracking of the porcelain shell and eventual electrical or mechanical failure.

THE SOLID-CORE STATION POST INSULATOR REPLACEMENTS

Today's sensitive electronics and complex automated manufacturing requires a high degree of reliability in the power delivery system. That degree of reliability can only be provided by modern solid-core station post insulators.

Solid-core station post insulators have many advantages over cap & pin insulators. Some of these are:

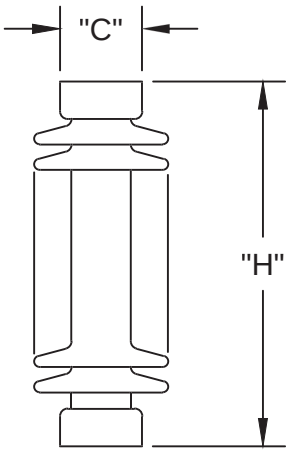
- No internal hardware or cement – Porcelain is many times stronger in compression than in tension. Cement expansion due to chemical reaction or ice formation and hardware expansion due to electrolytic corrosion can cause porcelain to crack under hoop stress if these components are internal to the porcelain. Solid-core post insulators do not have any cement or hardware internal to the porcelain.

- Puncture proof - Unlike cap & pin insulators, the shortest electrical arc path through the solid dielectric (porcelain) is almost the same as that through the air around the solid-core post insulator. This ensures that the post insulator can never be punctured.

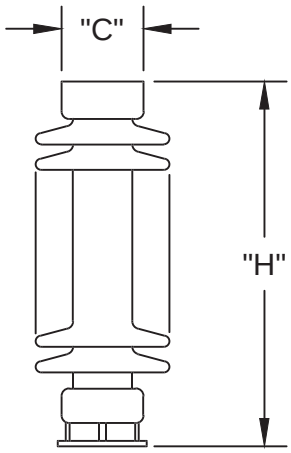
- Less susceptible to damage from vandalism-Cap & pin insulators derive their mechanical strength from nesting thin porcelain shells between the cap and the pin. Damage to the shell can compromise the mechanical integrity of the insulator. Solid-core post insulators derive their mechanical strength from a solid cylinder of high strength porcelain. Damage to the weathersheds generally does not penetrate to this solid porcelain core.

- Electrical characteristics derived from separation of hardware - Cap & pin insulators depend on their wide flung porcelain shells to provide the arcing and leakage distances from which their electrical characteristics are derived. Damage to the porcelain shell severely reduces these distances. On the contrary, if one or more of the weathersheds on a solid-core post insulator is damaged, only a slight reduction in these distances results.

BIL 150 - 250 KV Cap & Pin Replacements



Tapped base



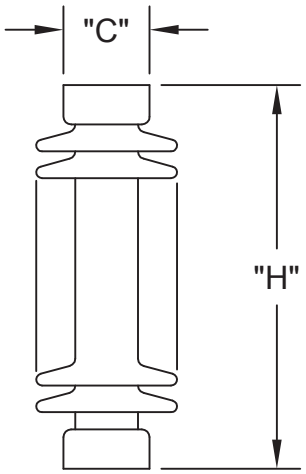
Pedestal base

BIL 150 - 250 kV

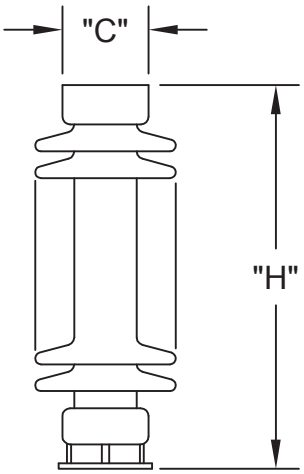
Basic Impulse Insulation Level (kV)		150		200		250		
Catalog number		SS01210	SH01210	SS02010	SH02010	SS02510	SH02510	SH02513
Technical Reference number		7	46	10	49	13	53	53
Leakage distance (in.)		20	18	28	28	37	52	45
Cantilever Strength (lb.)		2,000	4,000	2,000	4,000	2,000	4,000	4,000
Tensile Strength (lb.)		10,000	20,000	10,000	20,000	8,000	25,000	25,000
Torsional Strength (in-lb.)		8,000	16,000	10,000	20,000	12,000	20,000	40,000
Compression Strength (lb.)		10,000	20,000	15,000	30,000	15,000	30,000	60,000
Critical Impulse Flashover Voltage, Positive (kV)		165	165	215	215	280	280	280
Withstand Voltage	Low Frequency, Wet (kV)	60	60	80	80	100	100	100
	Impulse (kV)	150	150	200	200	250	250	250
Radio-Influence Voltage Data	Test Voltage to Ground (kV)	15	15	22	22	30	30	30
	Maximum RIV at 1,000kHz (μV)	100	100	100	200	200	200	200
Height (in.) - "H"		12	12	15	15	18	20	20
Bolt circle diameter (in.)		3	5	3	5	3	5	5
(4) Tapped holes, size (in.)		1/2-13	5/8-11	1/2-13	5/8-11	1/2-13	5/8-11	5/8-11
Cap diameter (in.) - "C"		4 1/4	6 1/4	4 1/4	6 1/4	4 1/4	6 1/4	6 1/4
Base type		Tapped	Tapped	Tapped	Tapped	Tapped	Tapped	Pedestal
Pedestal base - slotted hole size (in.)		---	---	---	---	---	---	11/16

Notes: 1. These units are not furnished with mounting bolts. State size at time of inquiry if mounting bolts are required.
2. Light gray, chocolate brown or semiconducting glaze is available.

BIL 350 KV Cap & Pin Replacements



Tapped base



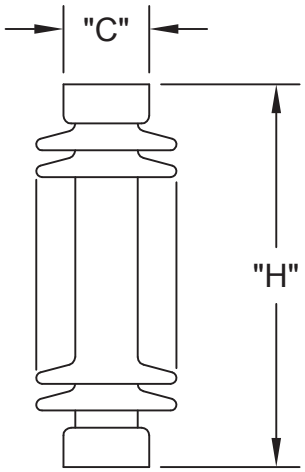
Pedestal base

BIL 350 kV

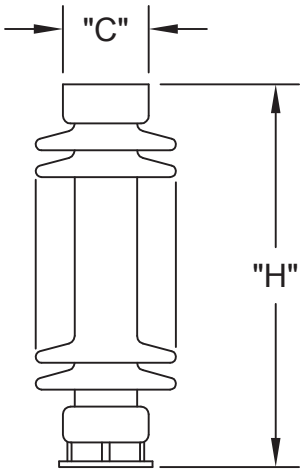
Basic Impulse Insulation Level (kV)		350				
Catalog number		SB03510	SB03513	SS03510	SS03513	SH03510
Technical Reference number		16	16	56	56	---
Leakage distance (in.)		72	52	71 1/2	66	66
Cantilever Strength (lb.)		1,500	1,500	3,000	3,000	4,500
Tensile Strength (lb.)		12,000	12,000	20,000	20,000	25,000
Torsional Strength (in-lb.)		15,000	15,000	40,000	40,000	90,000
Compression Strength (lb.)		25,000	25,000	60,000	60,000	75,000
Critical Impulse Flashover Voltage, Positive (kV)		390	390	390	390	390
Withstand Voltage	Low Frequency, Wet (kV)	145	145	145	145	145
	Impulse (kV)	350	350	350	350	350
Radio-Influence Voltage Data	Test Voltage to Ground (kV)	44	44	44	44	44
	Maximum RIV at 1,000kHz (μV)	200	200	200	200	200
Height (in.) - "H"		29	29	29	29	29
Bolt circle diameter (in.)		3	3	5	5	5
(4) Tapped holes, size (in.)		1/2-13	1/2-13	5/8-11	5/8-11	5/8-11
Cap diameter (in.) - "C"		4 1/4	4 1/4	6 1/4	6 1/4	6 1/4
Base type		Tapped	Pedestal	Tapped	Pedestal	Tapped
Pedestal base - slotted hole size (in.)		---	19/32	---	11/16	---

Notes: 1. These units are not furnished with mounting bolts. State size at time of inquiry if mounting bolts are required.
2. Light gray, chocolate brown or semiconducting glaze is available.

BIL 550 KV Cap & Pin Replacements



Tapped base



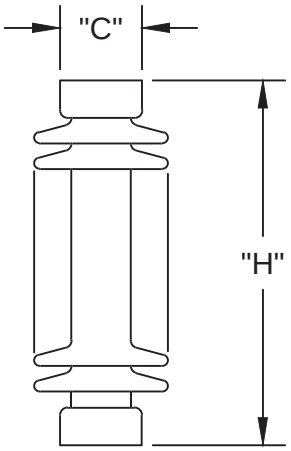
Pedestal base

BIL 550 kV

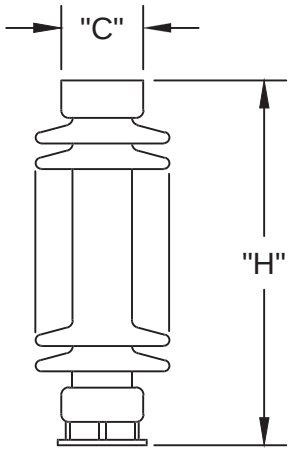
Basic Impulse Insulation Level (kV)		550			
Catalog number		SS05510	SS05513	SH05510	SH05513
Technical Reference number		19	19	173	173
Leakage distance (in.)		99	99	99	110
Cantilever Strength (lb.)		1,700	1,700	2,900	2,900
Tensile Strength (lb.)		20,000	20,000	25,000	20,000
Torsional Strength (in-lb.)		60,000	40,000	90,000	40,000
Compression Strength (lb.)		60,000	60,000	90,000	60,000
Critical Impulse Flashover Voltage, Positive (kV)		610	610	610	610
Withstand Voltage	Low Frequency, Wet (kV)	230	230	230	230
	Impulse (kV)	550	550	550	550
Radio-Influence Voltage Data	Test Voltage to Ground (kV)	73	73	73	73
	Maximum RIV at 1,000kHz (μV)	200	200	200	200
Height (in.) - "H"		43 1/2	43 1/2	43 1/2	43 1/2
Bolt circle diameter (in.)		5	5	5	5
(4) Tapped holes, size (in.)		5/8-11	5/8-11	5/8-11	5/8-11
Cap diameter (in.) - "C"		6 1/4	6 1/4	6 1/4	6 1/4
Base type		Tapped	Pedestal	Tapped	Pedestal
Pedestal base - slotted hole size (in.)		---	11/16	---	11/16

Notes: 1. These units are not furnished with mounting bolts. State size at time of inquiry if mounting bolts are required.
2. Light gray, chocolate brown or semiconducting glaze is available.

BIL 650 - 750 KV Cap & Pin Replacements



Tapped base



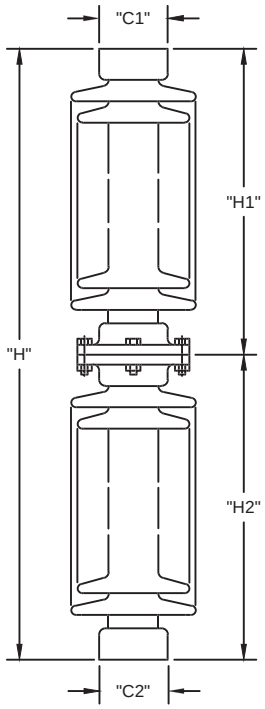
Pedestal base

BIL 650 - 750 kV

Basic Impulse Insulation Level (kV)		650		750			
Catalog number		SS06510	SH06510	SS07510	SS07513	SH07510	SH07513
Technical Reference number		22	180	25	25	174	174
Leakage distance (in.)		106	106	132	132	132	132
Cantilever Strength (lb.)		1,450	2,350	1,200	1,200	2,000	2,000
Tensile Strength (lb.)		15,000	15,000	20,000	20,000	25,000	25,000
Torsional Strength (in-lb.)		20,000	20,000	40,000	40,000	90,000	90,000
Compression Strength (lb.)		30,000	30,000	60,000	60,000	75,000	75,000
Critical Impulse Flashover Voltage, Positive (kV)		680	680	810	810	810	810
Withstand Voltage	Low Frequency, Wet (kV)	275	275	315	315	315	315
	Impulse (kV)	650	650	750	750	750	750
Radio-Influence Voltage Data	Test Voltage to Ground (kV)	88	88	103	103	103	103
	Maximum RIV at 1,000kHz (μV)	200	200	500	500	500	500
Height (in.) - "H"		49	49	58	58	58	58
Bolt circle diameter (in.)		5	5	5	5	5	5
(4) Tapped holes, size (in.)		5/8-11	5/8-11	5/8-11	5/8-11	5/8-11	5/8-11
Cap diameter (in.) - "C"		6 1/4	6 1/4	6 1/4	6 1/4	6 1/4	6 1/4
Base type		Tapped	Tapped	Tapped	Pedestal	Tapped	Pedestal
Pedestal base - slotted hole size (in.)		---	---	---	11/16	---	11/16

Notes: 1. These units are not furnished with mounting bolts. State size at time of inquiry if mounting bolts are required.
2. Light gray, chocolate brown or semiconducting glaze is available.

BIL 900 - 1300 kV Cap & Pin Replacements

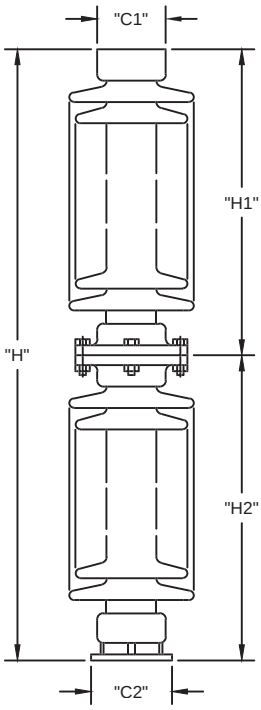


TAPPED BASE

Catalog number		SH090201	SH105201	SH130201
Components		SH0902Y SH0902X	SH1052Y SH0902X	SH1302Y SH0902X
Technical Reference number		175	176	177
Leakage distance (in.)		165	198	231
Cantilever Strength (lb.)		1,450	1,170	1,000
Tensile Strength (lb.)		25,000	25,000	25,000
Torsional Strength (in-lb.)		90,000	90,000	90,000
Compression Strength (lb.)		75,000	75,000	75,000
Critical Impulse Flashover Voltage, Positive (kV)		1,010	1,210	1,410
Withstand Voltage	Low Frequency, Wet (kV)	385	455	525
	Impulse (kV)	900	1050	1300
Radio-Influence Voltage Data	Test Voltage to Ground (kV)	125	146	180
	Maximum RIV at 1,000kHz (μV)	500	500	1000
Total height (in.) - "H"		72 1/2	87	101 1/2
Top section: Height - "H1"		28	42 1/2	57
	(4) Tapped holes, size (in.)	5/8-11	5/8-11	5/8-11
	Bolt circle diameter (in.)	5	5	5
	Cap diameter (in.) - "C1"	6 1/4	6 1/4	6 1/4
Base section: Height (in) - "H2"		44 1/2	44 1/2	44 1/2
	(4) Tapped holes, size (in.)	5/8-11	5/8-11	5/8-11
	Bolt circle diameter (in.)	5	5	5
	Cap diameter (in.) - "C2"	6 1/4	6 1/4	6 1/4

Notes: 1. These stacks are furnished with bolts, nuts and washers necessary for intermediate connection, and are not furnished with end mounting fastners. State size at time of inquiry if mounting bolts are required.
2. Light gray, chocolate brown or semiconducting glaze is available.

BIL 900 - 1300 kV Cap & Pin Replacements



PEDESTAL BASE

Catalog number		SH090231	SH105231	SH130231
Components		SH0902Y SH0902S	SH1052Y SH0902S	SH1302Y SH0902S
Technical Reference number		175	176	177
Leakage distance (in.)		165	198	231
Cantilever Strength (lb.)		1,450	1,170	1,000
Tensile Strength (lb.)		25,000	25,000	25,000
Torsional Strength (in-lb.)		90,000	90,000	90,000
Compression Strength (lb.)		75,000	75,000	75,000
Critical Impulse Flashover Voltage, Positive (kV)		1,010	1,210	1,410
Withstand Voltage	Low Frequency, Wet (kV)	385	455	525
	Impulse (kV)	900	1050	1300
Radio-Influence Voltage Data	Test Voltage to Ground (kV)	125	146	180
	Maximum RIV at 1,000kHz (μV)	500	500	1000
Total height (in.) - "H"		72 1/2	87	101 1/2
Top section: Height - "H1"		28	42 1/2	57
	(4) Tapped holes, size (in.)	5/8-11	5/8-11	5/8-11
	Bolt circle diameter (in.)	5	5	5
	Cap diameter (in.) - "C1"	6 1/4	6 1/4	6 1/4
Base section: Height (in) - "H2"		44 1/2	44 1/2	44 1/2
	(4) Slotted holes, size (in.)	11/16	11/16	11/16
	Bolt circle diameter (in.)	5	5	5
	Flange diameter (in.) - "C2"	6 1/4	6 1/4	6 1/4

Notes: 1. These stacks are furnished with bolts, nuts and washers necessary for intermediate connection, and are not furnished with end mounting fastners. State size at time of inquiry if mounting bolts are required.
2. Light gray, chocolate brown or semiconducting glaze is available.

BIL 1470 kV Cap & Pin Replacements

CHARACTERISTICS

Catalog number		SH147301	SH147331
Components		SH0902Y SH1473W SH0902X	SH0902Y SH1473W SH0902S
Leakage distance (in.)		264	264
Cantilever Strength (lb.)		900	900
Tensile Strength (lb.)		25,000	25,000
Torsional Strength (in-lb.)		90,000	90,000
Compression Strength (lb.)		75,000	75,000
Critical Impulse Flashover Voltage, Positive (kV)		1,610	1,610
Withstand Voltage	Low Frequency, Wet (kV)	590	590
	Impulse (kV)	1,470	1,470
Radio-Influence Voltage Data	Test Voltage to Ground (kV)	210	210
	Maximum RIV at 1,000kHz (μV)	2,000	2,000
Total Height (in.) - "H"		116	116
Top section:	Height (in.) - "H1"	28	28
	Tapped hole size (in.)	5/8-11	5/8-11
	Bolt circle diameter (in.)	5	5
	Cap diameter (in.) - "C1"	6 1/4	6 1/4
Center section:	Height (in.) - "H2"	43 1/2	43 1/2
Base section:	Height (in.) - "H3"	44 1/2	44 1/2
	Tapped/slotted hole size (in.)	5/8-11	11/16
	Bolt circle diameter (in.)	5	5
	Base type	Tapped	Pedestal
	Cap diameter (in.) - "C2"	6 1/4	6 1/4

Notes: 1. These stacks are furnished with bolts, nuts and washers necessary for intermediate connection, and are not furnished with end mounting fastners. State size at time of inquiry if mounting bolts are required.
2. Light gray, chocolate brown or semiconducting glaze is available.