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Polymer Insulators

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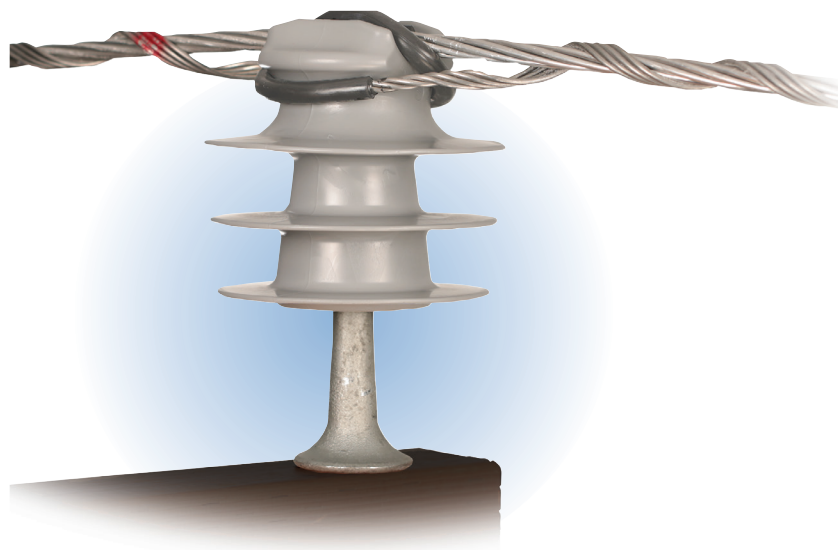


SOLAR

October 2016

LET'S CONNECT

POLYMER INSULATORS



- Design derived from PLP's many years of worldwide experience and tested to adhere to ANSI C29.5 and ANSI 29.6 insulator standards
- Usable for any application that calls for porcelain or polymer pin insulators, and suitable for use with all types of jacketed or bare conductors.
- Currently available in a line of 15, 25 and 35kV Tie Top and Vise Top designs for 1" or 1-3/8" pins
- Specifically designed for use with PLP formed wire ties, plastic ties and hand tie wire
- Unique descending skirt design and polyethylene surface provide superior moisture and contamination shedding properties



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Polymer Insulators

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Additional Polymer Insulator Information Available from PLP:

SP3245 – Polymer Insulator: Tie Top Application Procedure

SP3032 – Polymer Insulator: Vise Top (VT) Application Procedure

EN-SS-1162 – Polymer Insulator: Vise Top Sell Sheet

EN-SS-1132 – Polymer Insulator: Tie Top Sell Sheet



Polymer Insulators

The **PLP Polymer Insulators** are for use in overhead distribution lines using bare or covered conductors. They are particularly suited for use with Spacer Cable and Tree Wire as a better electrical alternative to porcelain insulators.

PLP Polymer Insulators are manufactured from a proprietary, high-density polyethylene-based compound having a dielectric constant that is compatible with polyethylene-covered conductors.

These insulators are designed to meet the applicable dimensional, electrical, and mechanical requirements of the ANSI C29.5 and C29.6 pin-type insulator standards, even though these standards apply only to Wet-Process Porcelain Insulators. These insulators can be used in any application that calls for porcelain insulators requiring adherence to these ANSI standards.

Two basic designs are offered: Tie Top and Vise Top Insulators, both available for application on 1" or 1-3/8" pins depending upon the specific ANSI class or voltage application.

The Tie Top Insulators are designed to meet pertinent ANSI C29.5 and C29.6 insulator head dimensional standards for appropriate insulator classes with "C", "F" or "J" necks. Therefore, they are compatible with all PLP Formed Wire and Plastic Ties, and covered or bare tie wire.

The Vise Top Insulators employ a unique clamp style head. While they are also designed to meet certain ANSI standards, the clamp style head design is not applicable to ANSI tie top insulator head dimensional standards.



BENEFITS

- ANSI compliant tie top head design facilitates the use of factory-formed ties for exceptional fit and performance matching.
- The Polymer Insulators closely match the dielectric properties of the covered conductor jacket.
- The polyethylene surface, coupled with the multiple skirt design with descending skirt diameters and long leakage distances, provides superior moisture and contamination shedding properties.
- UV-stabilized for long-term service.
- High impact resistance – designed to reduce breakage and vandal/gun shot damage, particularly at cold temperatures.
- The lightweight design reduces shipping costs and lineman handling requirements.
- Polyethylene material eliminates abrasion of the conductor at the insulator/conductor interface.
- Polymer Insulators can be used with jacketed jumper wires, eliminating skinning, and providing additional wildlife protection at equipment locations.



Polymer Insulators – Tie Top

ANSI Class:

55-3, 55-4, 55-5, 55-6, 55-7, 56-1

The PLP Tie Top Polymer Insulators are designed to match the head, neck and mounting pin requirements of ANSI C29.5, Class 55-3, 55-4, 55-5, 55-6, and 55-7 as well as ANSI C29.6, Class 56-1 pin-type insulator standards. "C" (2 -1/4" nominal), "F" (2-7/8" nominal) and "J" (3-1/2") neck sizes are available.

By using ANSI head and neck dimensional standards, PLP metal or plastic factory formed ties will install easily and provide superior holding and electrical performance on PLP Tie Top Polymer Insulators. Consult PLP for the suitability of other factory formed tie brands with these insulators.

Covered or bare hand tie wire is also suitable for use with PLP Tie Top Polymer Insulators depending on conductor type.



FEATURES

- Tie top designs are perfect for use with all PLP ties
- Matched dielectric properties
- Superior moisture and contamination shedding
- UV stabilized material
- High impact resistance
- Lightweight design
- Head dimensions - ANSI compliant
- Dramatically reduces abrasion
- Ideal for jumpers and stinger wires
- 100% recyclable
- 1" or 1-3/8" pins

Polymer Insulators – Tie Top

ANSI Class:

55-3, 55-4, 55-5, 55-6, 55-7, 56-1



Polymer Insulators Tie Top – Pin-Type			
PLP Catalog Number	ANSI Class*	Description	Mounting Pin Application
15kV Applications			
IP-15-C**	55-3	C Neck	1"
IP-15-F**	55-4	F Neck	1"
25kV Applications			
IP-25-F1	55-5	F Neck	1"
IP-25-F2	55-5†		1-3/8"
IP-25-J1	56-1†	J Neck	1"
IP-25-J2**	56-1		1-3/8"
35kV Applications			
IP-35-F1	55-6†	F Neck	1"
IP-35-F2	55-7†		1-3/8"
IP-35-J1	55-6	J Neck	1"
IP-35-J2	55-7		1-3/8"

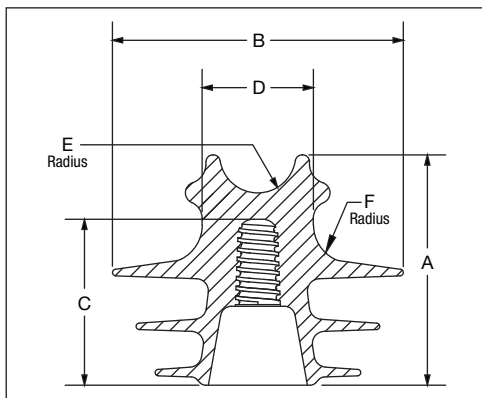
* Nominal ANSI C29.5 or C29.6 Class designation

** RUS Accepted

† Meets the electrical requirements of the ANSI Class designation, but there are differences in the physical characteristics.

Polymer Insulators – Tie Top

Nominal Dimensions & PLP Formed Tie Applications



Nominal Insulator Dimensions						
Insulator Type Catalog Number	Tie Top IP-15-C	Tie Top IP-15-F	Tie Top IP-25-F1/2	Tie Top IP-25-J1/2	Tie Top IP-35-F1/2	Vise Top IP-35-J1/2
Dimensions (in)						
A	5.0	5.25	5.7	6.7	7.5	7.5
B	5.5	5.5	6.1	7.0	7.5	7.5
C	3.75	3.75	4.35	4.9	5.5	5.5
D	2.25	2.875	2.875	3.5	2.875	3.5
E (Radius)	0.75	1.0	1.0	1.0	1.0	1.0
F (Radius)	0.65	0.65	0.65	1.0	0.75	1.0
Number of Skirts	3	4	3	3	4	4
Maximum Conductor OD, Top Groove	1.50	1.875	2.0	2.00	2.00	2.00
Maximum Conductor OD, Side Groove	1.30	1.30	1.30	2.00	1.50	2.00
PLP Tie	Maximum Conductor Outer Diameter (in) with PLP Factory Formed Ties*					
Distribution Tie	1.25	1.75	1.75	1.75	1.75	1.75
WRAPLOCK® Tie	1.25	1.75	1.75	1.75	1.75	1.75
EZ-WRAP® Twin Tie	1.25	1.75	1.75	1.75	1.75	1.75
Double Support Tie	1.25	1.75	1.75	1.75	1.75	1.75
Side Tie	1.05	1.05	1.25	1.75	1.25	1.75
EZ-WRAP® Side Tie	1.05	1.05	1.25	1.75	1.25	1.75
Double Side Tie	1.05	1.05	1.25	1.75	1.25	1.75
Plastic Top Tie; Jacketed Cond.	1.50	2.00	2.00	2.00	2.00	2.00
Plastic Side Tie; Jacketed Cond.	1.30	1.30	1.30	2.00	1.50	2.00
*For some Formed Ties it is necessary to reduce Max Conductor OD that can fit into the insulator groove because allowance needs to be made for tie tube thickness &/or wires of the tie may take up space in the groove.						

Polymer Insulators – Tie Top

Test Results Based on ANSI C29 Standards

Insulator Data	15kV Applications				25kV Applications				35kV Applications			
	PLP PI	ANSI C29.5 55-3 Standards	PLP PI	ANSI C29.5 55-4 Standards	PLP PI	ANSI C29.5 55-5 Standards	PLP PI	ANSI C29.5 56-1 Standards	PLP PI	ANSI C29.5 55-6 Standards	PLP PI	ANSI C29.5 55-7 Standards
Catalog Number & Application	IP-15-C Tie Top	NA	IP-15-F Tie Top	NA	IP-25-F1 Tie Top	IP-25-F2 Tie Top	IP-25-J1 Tie Top	IP-25-J2 Tie Top	IP-35-F1	IP-35-J1	IP-35-F2	IP-35-J2
"Nominal" ANSI Class	55-3	55-3	55-4	55-4	55-5	55-5	56-1	56-1	55-6	55-6	55-7	55-7
Neck Size/Style	C	C	F	F	F	F	J	J	F	J	F	J
Typical Operating Voltage Application, kV (L-L)												
Leakage	15	15	15	15	25	25	25	25	35	35	35	35
Distance (in)	12.7	7	14.5	9	14.1	14.1	17.4	17.2	20.9	21.1	20.9	20.8
Dry Arcing Distance (in)	6.2	4.5	6.3	5	7.5	7.5	8.7	8.5	9.5	9.6	9.5	9.3
Pin Hole	1	1	1	1	1	1.375	1	1.375	1	1	1.375	1.375
Diameter (in)												
Suggested Minimum Pin Length (in)	6	5	6	5	6	6	6	6	7.5	7.5	7.5	7.5
60Hz Dry Flashover (kV)	77	55	93	65	89	85	107 (1)	107	126 (1)	113 (1)	126	113
60 Hz Wet Flashover (kV)	45	30	50	35	55 (1)	45	71 (1)	71	82 (1)	75 (1)	82	75
Positive Impulse Flashover (kV)	124	90	114	105	142 (1)	142	152 (1)	152	175 (1)	157 (1)	175	157
Negative Impulse Flashover (kV)	-160	-110	-144	-130	-223 (1)	-223	-222 (1)	-222	-238 (1)	-254 (1)	-238	-254
Low Frequency Puncture (kV)	208	90	160	95	218	201	179	184	223	202	235	194
RIV @ 1 MHz												
10kV to grd, μ V	<5	<50 μ V @10kV	<5	<50 μ V @10kV	NA	NA	NA	NA	NA	NA	NA	NA
15kV to grd, μ V	NA	NA	NA	NA	<2 (1)	<2	<29 (1)	<29	NA	NA	NA	NA
22kV to grd, μ V	NA	NA	NA	NA	NA	NA	NA	NA	<39 (1)	<26 (1)	<39	100 μ V @22kV
Antilever	3000	2500	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Strength (lbs)												
Approximate Weight (lbs)	0.9	NA	1.3	NA	1.3	1.3	2	2	2.8	2.5	2.8	2.5
Maximum Operating Temperature (Degree C)	120	NA	120	NA	120	120	120	120	120	120	120	120

(1) Electrical test data extrapolated from similar design polymer insulator with 1-3/8" pin hole



Polymer Insulators – Vise Top

ANSI Class:

55-3, 55-4, 55-5, 55-6, 55-7

The PLP Vise Top Insulator utilizes a unique plastic clamp mechanism and nylon torque bolts to secure the conductor. The nylon torque bolt with break-away ring is designed to ensure that the optimal holding force is applied while providing for a fast conductor clamping.

Compatible conductor inserts for either jacketed or bare conductor are available. Nylon inserts are offered for use with jacketed conductors. Bronze inserts are offered for bare copper conductors, and aluminum inserts are offered for bare aluminum conductors.

PLP also offers a Universal Insert design* which is compatible with all conductors. It is recommended that the utility determine the suitability of the PLP Vise Top Polymer Insulators on bare conductor before installation.



FEATURES

- Superior moisture and contamination shedding
- UV stabilized material
- High impact resistance
- Lightweight design
- Ideal for jumpers and stinger wires
- 100% recyclable
- 1" or 1-3/8" pins
- Performance matched inserts for bare conductor
- Universal Insert design* to reduce the number of different insulators required
- Ideal for use with shot gun sticks
- Vise Top Stringing Tool available

***Patent Pending**

Polymer Insulators – Vise Top

ANSI Class:

55-3, 55-4, 55-5, 55-6, 55-7



Universal Vise Top Insulators† – Pin Type

Universal Vise Top Insulators† – Pin Type				
PLP Catalog Number	ANSI Class*	Insert	Application	Mounting Pin Diameter
15kV				
IP-15-VTU	55-3, 55-4	Universal	All Conductor Applications	1"
25kV				
IP-25-VTU1	55-5	Universal	All Conductor Applications	1"
IP-25-VTU2				1-3/8"
35kV				
IP-35 -VTU1	55-6	Universal	All Conductor Applications	1"
IP-35 -VTU2	55-7			1-3/8"

Vise Top Insulators – Pin Type

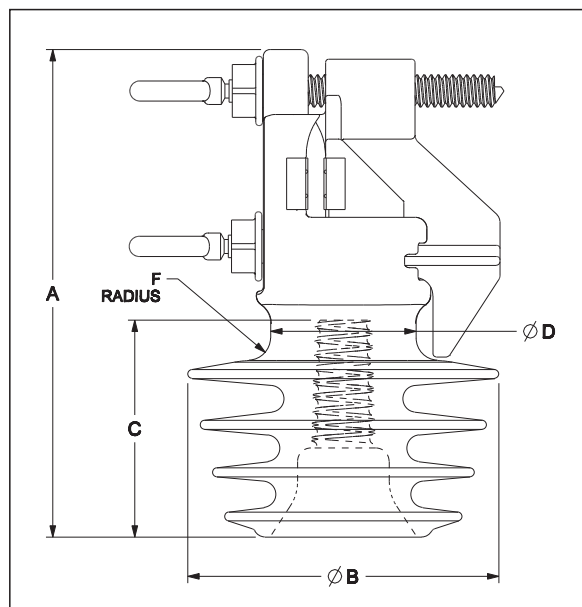
Vise Top Insulators – Pin Type				
PLP Catalog Number	ANSI Class*	Insert	Application	Mounting Pin Diameter
15kV				
IP-15-VTN	55-3, 55-4	Nylon	Jacketed Conductors	1"
IP-15-VTM		Aluminum	Bare Aluminum Conductors	
IP-15-VTM-B		Bronze	Bare Copper Conductors	
25kV				
IP-25-VTN1	55-5	Nylon	Jacketed Conductors	1"
IP-25-VTN2				1-3/8"
IP-25-VTM1		Aluminum	Bare Aluminum Conductors	1"
IP-25-VTM2				1-3/8"
IP-25-VTM1-B		Bronze	Bare Copper Conductors	1"
IP-25-VTM2-B				1-3/8"
35kV				
IP-35 -VTN1	55-6	Nylon	Jacketed Conductors	1"
IP-35 -VTN2	55-7			1-3/8"
IP-35 -VTM1	55-6	Aluminum	Bare Aluminum Conductors	1"
IP-35 -VTM2	55-7			1-3/8"
IP-35 -VTM1-B	55-6	Bronze	Bare Copper Conductors	1"
IP-35 -VTM2-B	55-7			1-3/8"

*Nominal ANSI C29.5 Class Specifications

†Patent Pending

Polymer Insulators – Vise Top

Nominal Dimensions



Nominal Insulator Dimensions			
Insulator Type Catalog Number	Vise Top IP-15-VT (all)	Vise Top IP-25-VT (all)	Vise Top IP-35-VT (all)
Dimensions (in)			
A	8.5	8.4	10.125
B	5.5	7.3	8.0
C	3.75	4.5	5.375
D	2.50	2.50	2.50
F (Radius)	0.5	0.5	0.5
Number of Skirts	4	3	3
Tangent Vise Attachment, Maximum Conductor OD	1.875	1.875	1.875
Side Groove, Maximum Conductor OD	1.0	1.0	1.0

Polymer Insulators – Vise Top

Test Results Based on ANSI C29 Standards

Insulator Data	15kV Applications		25kV Applications			35kV Applications			
	PLP PI	ANSI C29.5 55-3/55-4 Standards	PLP PI	PLP PI	ANSI C29.5 55-5 Standards	PLP PI	ANSI C29.5 55-6 Standards	PLP PI	ANSI C29.5 55-7 Standards
Catalog Number & Application	IP-15-VTN/M/U Vise Top	NA	IP-25-VTN/M/U-1 Vise Top	IP-25-VTN/M/U-2 Vise Top	NA	IP-35-VTN/M/U-1 Vise Top	NA	IP-35-VTN/M/U-2 Vise Top	NA
"Nominal" ANSI Class	55-3	55-3/55-4	55-5	55-5	55-5	55-6	55-6	55-7	55-7
Neck Size/Style	NA	C/F	NA	NA	F	NA	F/J	NA	F/J
Typical Operating Voltage Application, kV (L-L)	15	15	25	25	25	35	35	35	35
Leakage Distance (in)	16.1	7/9	18.1	17.9	12	23.5	15	23.3	15
Dry Arcing Distance (in)	7	4.5/5	8.7	8.5	6.25	10.6	8	10.4	8
Pin Hole Diameter (in)	1	1	1	1 3/8	1	1	1	1 3/8	1 3/8
Suggested Minimum Pin Length (in)	6	5	6	6	6	7.5	7.5	7.5	7.5
60Hz Dry Flashover (kV)	101(N) 95(M)	55/65	88(N) (1) 94(M) (1)	88(N) 94(M)	85	128(N) (1) 115(M) (1)	100	128(N) 115(M)	100
60 Hz Wet Flashover (kV)	50 (N) 64(M)	30/35	55(N) (1) 55(M) (1)	55(N) 55(M)	45	72 (N) (1) 80(M) (1)	50	72 (N) 80(M)	50
Positive Impulse Flashover (kV)	147(N) 154(M)	90/105	150(N) (1) 152(M) (1)	150(N) 152(M)	140	188(N) (1) 196(M) (1)	150	188(N) 196(M)	150
Negative Impulse Flashover (kV)	-201(N) -200(M)	-110/-130	-219(N) (1) -216(M) (1)	-219(N) -216(M)	-170	-272(N) (1) -261(M) (1)	-170	-272(N) -261(M)	-170
Low Frequency Puncture (kV)	174(N) 163(M)	90/95	228(N) 218(M)	191(N) 184(M)	115	-206(N) -207(M)	135	-219(N) -209(M)	135
RIV @ 1 MHz									
10kV to grd, μ V	<4	<50 μ V @10kV	NA	NA	NA	NA	NA	NA	NA
15kV to grd, μ V	NA	NA	<0.5 (1)	<0.5	<100 μ V @15kV	NA	NA	NA	NA
22kV to grd, μ V	NA	NA	NA	NA	NA	<6 (1)	<100 μ V @22kV	<6	<100 μ V @22kV
Cantilever Strength (lbs)	3000	3000	3000	3000	3000	3000	3000	3000	3000
Approximate Weight (lbs)	2	NA	2.3	2.3	NA	3	NA	3.2	NA
Maximum Operating Temperature (Degree C)	120	NA	120	120	NA	120	NA	120	NA

(1) Electrical test data extrapolated from similar design polymer insulator with 1-3/8" pin hole

Polymer Insulators – Vise Top Accessories

Torque Bolts:

Two torque bolts are supplied with each Vise Top insulator. The breakaway torque ring is designed to ensure the proper torque and optimum holding force to the conductor will be applied during initial installation. All Vise Top insulators use the same torque bolt.

New torque bolts should be used whenever conductors are removed from the Vise Top Insulator or any time the bolts are unscrewed and initial torque is lost. Individual torque bolts are available for replacement as needed.



PT-01

Torque Bolt Hook Tool:

An aluminum hook tool accessory is offered for use with hydraulic or power wrenches for easy installation of torque bolts. However the tool should be operated at low speeds. A standard shotgun stick is ideal for the installation of the torque bolts.



VTHT-01

Vise Top Stringing Tool:

The polyurethane Vise Top String Tool (VLST) is offered to aid jacketed conductor installation. The VLST temporarily installs in the Vise Top clamp, by hand or with hot sticks, and is designed to permit short span, low tension jacketed conductor stringing without the need for stringing wheels.

The tool is not recommended for use with bare conductors, long spans, or line, or sag angles over approximately 10°. A proper size stringing block should be used at the 1st and last pole, at large line or sag angles, or long spans throughout the pull, rather than the tool.

It is recommended that harsh material pulling ropes, such as nylon, be avoided to minimize excessive wear to the inner surface of the tool. It is also suggested low pulling speeds be used when pulling rope or cable through the tool to avoid excessive wear.

The tool can be reused, however, it is recommended the tool be inspected after each pull to insure it is suitable for further use. Areas of wear on the tool from previous pulls can be rotated away from where the rope and conductors will rest in the bore during subsequent pulls. Do not reuse the tool if there has been excessive wear throughout all areas of the inner bore.



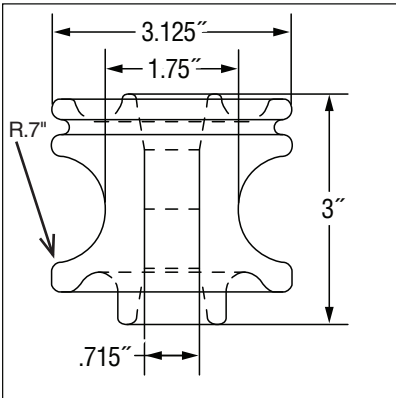
IP-VLST-01



Polymer Insulators – Spool Insulators

PLP Polymer Spool Insulators are used to insulate and support primary neutral and secondary (bare or covered) conductors at the pole or house using various clevis mounting configurations. They are compatible with all clevis manufacturers' hardware designs that are to be used with the ANSI C29.3 Class 53-2 spool insulators. They are designed to be used with PLP Spool Ties and EZ-WRAP™ Spool Ties. It is a direct replacement for porcelain spool insulators.

The IP-53-2 spool insulator is manufactured in the USA of a proprietary polyethylene material. This material is UV stabilized and is very resistant to breaking, chipping and cracking. The insulators are lightweight, at 0.34 lbs., and, like all the PLP Polymer Insulators, are fully recyclable.



RUS ACCEPTED

BENEFITS

- Exceeds ANSI Class 53-2 electrical requirements
- Made in the USA
- Lightweight
- Resistant to cracking, chipping and vandals
- Fully UV stabilized
- 100% recyclable
- Long service life without deterioration
- Compatible with all manufacturers' pole hardware
- Compatible with all PLP factory formed spool ties

Catalog Number	Description	Carton	
		Qty.	Weight (lbs)
IP-53-2	Polymer Spool Insulator 1-3/1" Neck Diameter – A Neck	48	20



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