



## **PREFORMED** LINE PRODUCTS

### **Section 11 – INSULIGN® Polymer Insulators**

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# INSULIGN® Polymer Insulators

## NOMENCLATURE



## GENERAL RECOMMENDATIONS

INSULIGN 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.

The insulators are made from a proprietary, high-density polyethylene-based compound with a dielectric constant compatible with polyethylene covered conductors.

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

Two basic Pin Top 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. PLP also offers a Polymer Spool Insulator, ANSI Class 53.2 for neutral applications.

The Tie Top Insulators are designed to meet the appropriate ANSI C29.5 and C29.6 insulator head dimensional standards for appropriate insulator classes with "C", "F" and "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 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 light weight 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.
- Vise Top Polymer Insulator designs provide a unique clamping mechanism for quick installation for a greater range of conductors.
- The same clamp and head design is used for all Vise Top Polymer Insulators. The skirt design varies by voltage application.
- A Vise Top Stringing Tool is offered to aid jacketed conductor installation and reduce stringing equipment.

# INSULIGN® Polymer Insulators

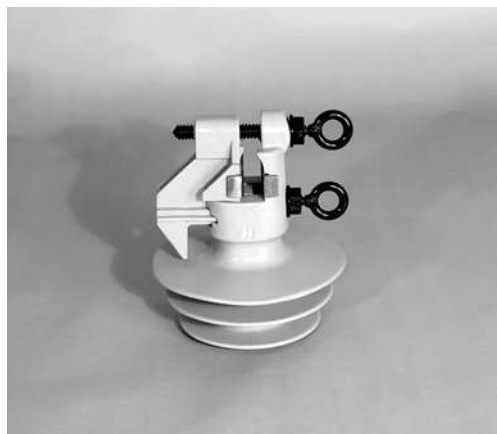


## INSULIGN Tie Top Polymer Insulators:

INSULIGN 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 INSULIGN 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 INSULIGN Tie Top Polymer Insulators depending on conductor type.



## INSULIGN Vise Top Polymer Insulators:

INSULIGN Vise Top Polymer Insulator utilizes a unique plastic clamp mechanism and nylon torque bolts to secure the conductor. Nylon Torque bolts with break away heads are designed to provide a method to ensure that proper torque is applied to the mechanism for fast and proper conductor clamping force.



## Conductor Inserts:

Compatible conductor inserts for either jacketed or bare conductors are available. Nylon inserts are offered for use with jacketed conductors. Bronze inserts are offered for bare copper conductors. Aluminum inserts are offered for bare aluminum conductors. PLP also offers a universal insert which is compatible with all conductors. It is recommended that the utility determine the suitability of PLP INSULIGN Vise Top Polymer Insulators on bare conductor before installation.



## Torque Bolts:

Two Torque Bolts are supplied with each vise top insulator. The breakaway torque ring is designed to ensure the proper torque, and subsequent holding force, will be applied to the conductor 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.



## 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 also ideal for the installation of the torque bolts.



# INSULIGN® Polymer Insulators – Tie Top

## Tie Top Pin Style

### ANSI Class

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



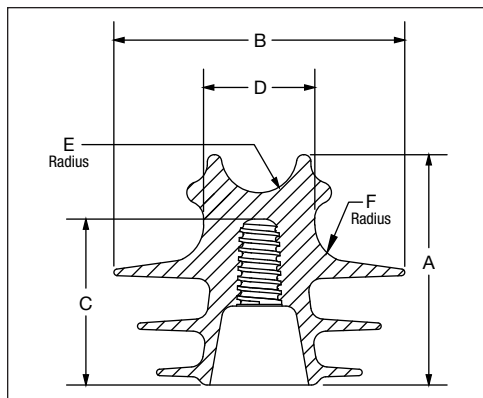
Catalog Number	ANSI Class*	Application	Mounting Pin Diameter	Approx. Unit Weight Lbs.	Carton Quantity	Carton Weight
<b>15kV</b>						
IP-15-C	55-3	C Neck Tie Top <b>RUS Accepted</b>	1"	0.9	18	24
IP-15-F	55-4	F Neck Tie Top <b>RUS Accepted</b>	1"	1.2	18	22
<b>25kV</b>						
IP-25-F1	55-5	F Neck Tie Top	1"	1.3	18	35
IP-25-F2	55-5†	F Neck Tie Top	1-3/8"	1.3	18	35.5
IP-25-J1	56-1†	J Neck Tie Top	1"	2	18	37
IP-25-J2	56-1	J Neck Tie Top <b>RUS Accepted</b>	1-3/8"	1.96	18	36
<b>35kV</b>						
IP-35-F1	55-6†	F Neck Tie Top	1"	2.8	12	37
IP-35-F2	55-7†	F Neck Tie Top	1-3/8"	2.8	12	36
IP-35-J1	55-6	J Neck Tie Top	1"	2.42	12	33
IP-35-J2	55-7	J Neck Tie Top	1-3/8"	2.46	12	32

\*Nominal ANSI C29.5 or C29.6 Class designation - These ANSI specifications are for Wet Processed Porcelain

†Meets the electrical requirements of the ANSI Class designation but a physical characteristic differs from the specification

# INSULIGN® Polymer Insulators – Tie Top

## Nominal Dimensions & PLP Formed Tie Applications



Insulator Type Catalog Number	Nominal Insulator Dimensions					
	IP-15-C	IP-15-F	IP-25-F 1/2	IP-25-J 1/2	IP-35-F 1/2	IP-35-J 1/2
A	5.0	5.3	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	5.0	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	0.813	1.0	0.813	1.0
Number of Skirts	3	4	3	3	4	4
Maximum Conductor O.D. Top Groove	1.5"	2"	2"	2"	2"	2"
Maximum Conductor O.D. Side Groove	1.30"	1.30"	1.625"	2"	2"	2"

PLP Tie	Maximum Conductor Outer Diameter (in) with 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	1.375	1.75	1.375	1.75
EZ-WRAP® Spool Tie	1.05	1.05	1.375	1.75	1.375	1.75
Double Side Tie	1.05	1.05	1.375	1.75	1.375	1.75
Jacketed Conductor Top Tie	1.5	2	2	2	2	2
Jacketed Conductor Side Tie	1.3	1.3	1.625	2	1.625	2

\*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.



# INSULIGN® Polymer Insulators - Neutral Identification

## POLYMER INSULATORS for Neutral Conductor - White

### ANSI Class

**53-2, 55-3, 55-4, and 55-5**

The PLP Polymer Insulators for Neutral Pin Top applications are ideal for identifying overhead neutral conductors. The bright white is easily seen from the ground and in low light.



Catalog Number	ANSI Class	Mounting Pin Diameter	Approx. Unit Weight Lbs.	Carton Quantity	Carton Weight
<b>NEUTRAL SPOOL</b>					
IP-53-2W	53-2	N/A	0.6	18	20
<b>15kV</b>					
IP-15-CW	55-3*	1"	0.9	18	24
IP-15-FW	55-4*		1.2		22
<b>25kV</b>					
IP-25-F1W	55-5*	1"	1.3	18	35
IP-25-F2W		1-3/8"	1.3		35.5

\*Nominal ANSI C29.3, C29.5 or 29.6 Class designation - These ANSI specifications are for Wet Processed Porcelain.

# INSULIGN® Polymer Insulators – Vise Top

## Vise Top Pin Style

### ANSI Class

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



## Vise Top Insulators

Catalog Number	ANSI Class*	Insert	Application	Mounting Pin Diameter	Approx. Unit Weight Lbs.	Carton Quantity	Carton Weight
<b>15kV</b>							
IP-15-VTN	55-3, 55-4	Nylon	Jacketed Conductors	1"	2	18	39
IP-15-VTM		Aluminum	Bare Aluminum Conductors				
IP-15-VTM-B		Bronze	Bare Copper Conductors				
<b>25kV</b>							
IP-25-VTN1	55-5	Nylon	Jacketed Conductors	1"	2.3	12	32
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"			
<b>35kV</b>							
IP-35-VTN1	55-6	Nylon	Jacketed Conductors	1"	3.2	12	43
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"			

## Universal Vise Top Insulators

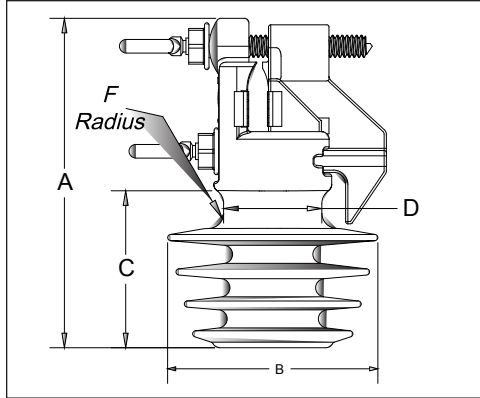
Catalog Number	ANSI Class*	Insert	Application	Mounting Pin Diameter	Approx. Unit Weight Lbs.	Carton Quantity	Carton Weight
<b>15kV</b>							
IP-15-VTU	55-3, 55-4	Universal	All Conductor Applications	1"	2	18	39
<b>25kV</b>							
IP-25-VTU1	55-5	Universal	All Conductor Applications	1"	2.2	12	31
IP-25-VTU2				1-3/8"			
<b>35kV</b>							
IP-35-VTU1	55-6	Universal	All Conductor Applications	1"	3.2	12	43
IP-35-VTU2	55-7			1-3/8"			

\*Nominal ANSI C29.5 Class designation - These ANSI specifications are for Wet Processed Porcelain Tie Top Insulators. The Vise Top Insulators meet the electrical criteria defined in the applicable specification.



# INSULIGN® Polymer Insulators – Vise Top

## Nominal Dimensions



Insulator Type Catalog Number	Nominal Insulator Dimensions		
	IP-15-VT (all)	IP-25-VT (all)	IP-35-VT (all)
A	8.4	8.4	10.125
B	5.5	7.5	8.0
C	4.5	4.5	5.375
D	2.5	2.5	2.5
F (Radius)	0.5	0.5	0.5
Number of Skirts	4	3	3
Tangent Vise Attachment, Maximum Conductor O.D.	1.875	1.875	1.875
Side Groove, Maximum Conductor O.D.	1.0	1.0	1.0



# INSULIGN® Polymer Insulator Accessories and Tools



## Vise Top Stringing Tool:

The polyurethane Vise Top String Tool (VTST) is offered to aid jacketed conductor installation. The VTST 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 cables, long spans, 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 ensure 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.

Consult PLP for additional recommendations.

## Vise Top Polymer Insulator Accessories and Tools

Optional Accessories					
Product	Catalog Number	Approx. Unit Weight Lbs	Carton Quantity	Pallet Quantity	General Appearance
Vise Top Torque Bolt Material: Black UV Resistant Nylon Length: 6" w/Ring, 5" installed	PT-01	0.1	As Ordered	As Ordered	
Vise Top Hook Tool Material: Aluminum Alloy Size: 7/16" Hex Length: 6.375"	VTHT-01	0.15	As Ordered	As Ordered	
Vise Top Stringing Tool Material: Polyurethane Bodies Steel Hot Stick Ring Length: 5" Conductor Opening Diameter: 1.75"	IP-VLST-01	0.55	As Ordered	As Ordered	



# INSULIGN® Polymer Spool Insulator

## NOMENCLATURE



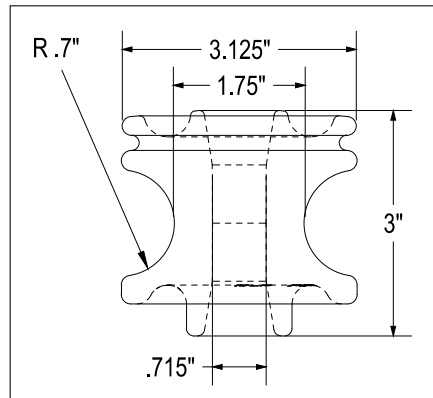
### Benefits:

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

## GENERAL RECOMMENDATIONS

INSULIGN 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 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 and are Class 53-2 compliant. The IP-53-2 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 INSULIGN polymer insulators, are fully recyclable.



Catalog Number	Description	Carton	
		Qty	Wt
IP-53-2	Polymer Spool Insulator 1-3/4" Neck Diameter – A-NECK	48	20 LBS

# INSULIGN® Polymer Insulators Technical Data

Catalog Number	Design/Application	ANSI Class	Test Results Based on ANSI C29 Standard														
			Low Frequency				Impulse Flashover				Low Frequency		RIV				
			Dry Flashover Test Value	Wet Flashover Test Value	ANSI C29 Test Value	ANSI C29 Test Value	Positive Test Value	ANSI C29 Test Value	Negative Test Value	ANSI C29 Test Value	Puncture Test Value	ANSI C29 Test Value	Test Value	ANSI C29 Value			
<b>Spool</b>			IP-53-2	Polymer Spool Insulator 1-3/4" Neck-A Neck	53-2	27	25	12.8/16	12/15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IP-15-C	ANSI 15kV, C Neck, 1" Pin	55-3	77	55	45	30	+124	+90	-160	-110	208	90	Pass (<40V)	mill			
IP-15-F	ANSI 15kV, F Neck, 1" Pin	55-4	93	65	50	35	+114	+105	-144	-130	160	95	Pass (<50V)	<500V@10kV			
IP-15-VTN	ANSI 15kV, VT Nylon Inserts, 1" Pin	101	55	50	30	+147	+90	-201	-110	174	90	Pass (<40V)	<500V@10kV				
IP-15-VTM	ANSI 15kV, VT Aluminum Inserts, 1" Pin	95	55	64	30	+154	+90	-200	-110	163	90	Pass (<40V)	<500V@10kV				
IP-15-VTM-B	ANSI 15kV, VT Bronze Inserts, 1" Pin	55-3	95(2)	55	64(2)	30	+154(2)	+90	-200(2)	-110	163(2)	90	Pass (2)	<500V@10kV			
IP-15-VTU	ANSI 15kV, VT Universal Inserts, 1" Pin	101	55	50	30	+147	+90	-201	-110	174	90	Pass (<40V)	<500V@10kV				
IP-25-F1	ANSI 25kV, F Neck, 1" Pin	89(1)	80	55(1)	45	142(1)	+130	-223(1)	-150	218	115	Pass (1)	<500V@15kV				
IP-25-F2	ANSI 25kV, F Neck, 1-3/8" Pin	89	80	55	45	142	+130	-223	-150	201	115	Pass (<20V)	<500V@15kV				
IP-25-J1	ANSI 25kV, J Neck, 1" Pin	90	107.4	54	71.8	138	152.5	175	222.7	130	180.2	Pass	<1000V@15kV				
IP-25-J2	ANSI 25kV, J Neck, 1-3/8" Pin	56-1	90	107.4	54	71.8	138	152.5	175	222.7	130	184.5	Pass	<1000V@15kV			
IP-25-VTN1	ANSI 25kV, VT Nylon Inserts, 1" Pin	88(1)	80	55(1)	45	150(1)	+130	-219(1)	-150	228	115	Pass (1) (<0.50V)	<500V@15kV				
IP-25-VTN2	ANSI 25kV, VT Nylon Inserts, 1-3/8" Pin	88	80	55	45	150	+130	-219	-150	191	115	Pass (<0.50V)	<500V@15kV				
IP-25-VTM1	ANSI 25kV, VT Aluminum Inserts, 1" Pin	94(1)	80	55(1)	45	152(1)	+130	-216(1)	-150	218	115	Pass (1) (<0.50V)	<500V@15kV				
IP-25-VTM2	ANSI 25kV, VT Aluminum Inserts, 1-3/8" Pin	94	80	55	45	152	+130	-216	-150	184	115	Pass (<0.50V)	<500V@15kV				
IP-25-VTM1-B	ANSI 25kV, VT Bronze Insert, 1" Pin	94(2)	80	55(2)	45	152(2)	+130	-216(2)	-150	218(2)	115	Pass (1), (2)	<500V@15kV				
IP-25-VTM2-B	ANSI 25kV, VT Bronze Insert, 1-3/8" Pin	94(2)	80	55(2)	45	152(2)	+130	-216(2)	-150	184(2)	115	Pass (2)	<500V@15kV				
IP-25-VTU1	ANSI 25kV, VT Universal Inserts, 1" Pin	88(1)	80	55(1)	45	150(1)	+130	-219(1)	-150	228	115	Pass (1) (<0.50V)	<500V@15kV				
IP-25-VTU2	ANSI 25kV, VT Universal Inserts, 1-3/8" Pin	88	80	55	45	150	+130	-219	-150	191	115	Pass (<0.50V)	<500V@15kV				
IP-35-F1	ANSI 35kV, F Neck, 1" Pin	55-6	126(1)	100	82(1)	50	+175(1)	+150	-238(1)	-170	223	135	Pass (1)	<1000V@22kV			
IP-35-F2	ANSI 35kV, F Neck, 1-3/8" Pin	55-7	126	100	82	50	+175	+150	-238	-170	235	135	Pass (<39uV)	<1000V@22kV			
IP-35-J1	ANSI 35kV, J Neck, 1" Pin	55-6	113	100	75.5	50	157.5	150	254	170	194.9	115	Pass (<29uV)	<1000V@15kV			
IP-35-J2	ANSI 35kV, J Neck, 1-3/8" Pin	55-7	113	133	60	75.5	157.5	150	222.7	190	180.2	130	Pass (<29uV)	<1000V@15kV			
IP-35-VTN1	ANSI 35kV, VT Nylon Inserts, 1" Pin	55-6	128(1)	100	72(1)	50	+188(1/2)	+150	-272(1)	-170	206	135	Pass (1)	<1000V@22kV			
IP-35-VTN2	ANSI 35kV, VT Nylon Inserts, 1-3/8" Pin	55-7	128	100	72	50	+188	+150	-272	-170	219	135	Pass (<60uV)	<1000V@22kV			
IP-35-VTM1	ANSI 35kV, VT Aluminum Inserts, 1" Pin	55-6	115(1)	100	80(1)	50	+196(1)	+150	-261(1)	-170	207	135	Pass (1)	<1000V@22kV			
IP-35-VTM2	ANSI 35kV, VT Aluminum Inserts, 1-3/8" Pin	55-7	115	100	80	50	+196	+150	-261	-170	209	135	Pass (<8uV)	<1000V@22kV			
IP-35-VTM1-B	ANSI 35kV, VT Bronze Insert, 1" Pin	55-6	115(2)	100	80(2)	50	+196(2)	+150	-261(2)	-170	207(2)	135	Pass (2)	<1000V@22kV			
IP-35-VTM2-B	ANSI 35kV, VT Bronze Insert, 1-3/8" Pin	55-7	115(2)	100	80(2)	50	+196(2)	+150	-261(2)	-170	209(2)	135	Pass (2)	<1000V@22kV			
IP-35-VTU1	ANSI 35kV, VT Universal Inserts, 1" Pin	55-6	128(1)	100	72(1)	50	+188(1/2)	+150	-272(1)	-170	206	135	Pass (1)	<1000V@22kV			
IP-35-VTU2	ANSI 35kV, VT Universal Inserts, 1-3/8" Pin	55-7	128	100	72	50	+188	+150	-272	-170	219	135	Pass (<60uV)	<1000V@22kV			