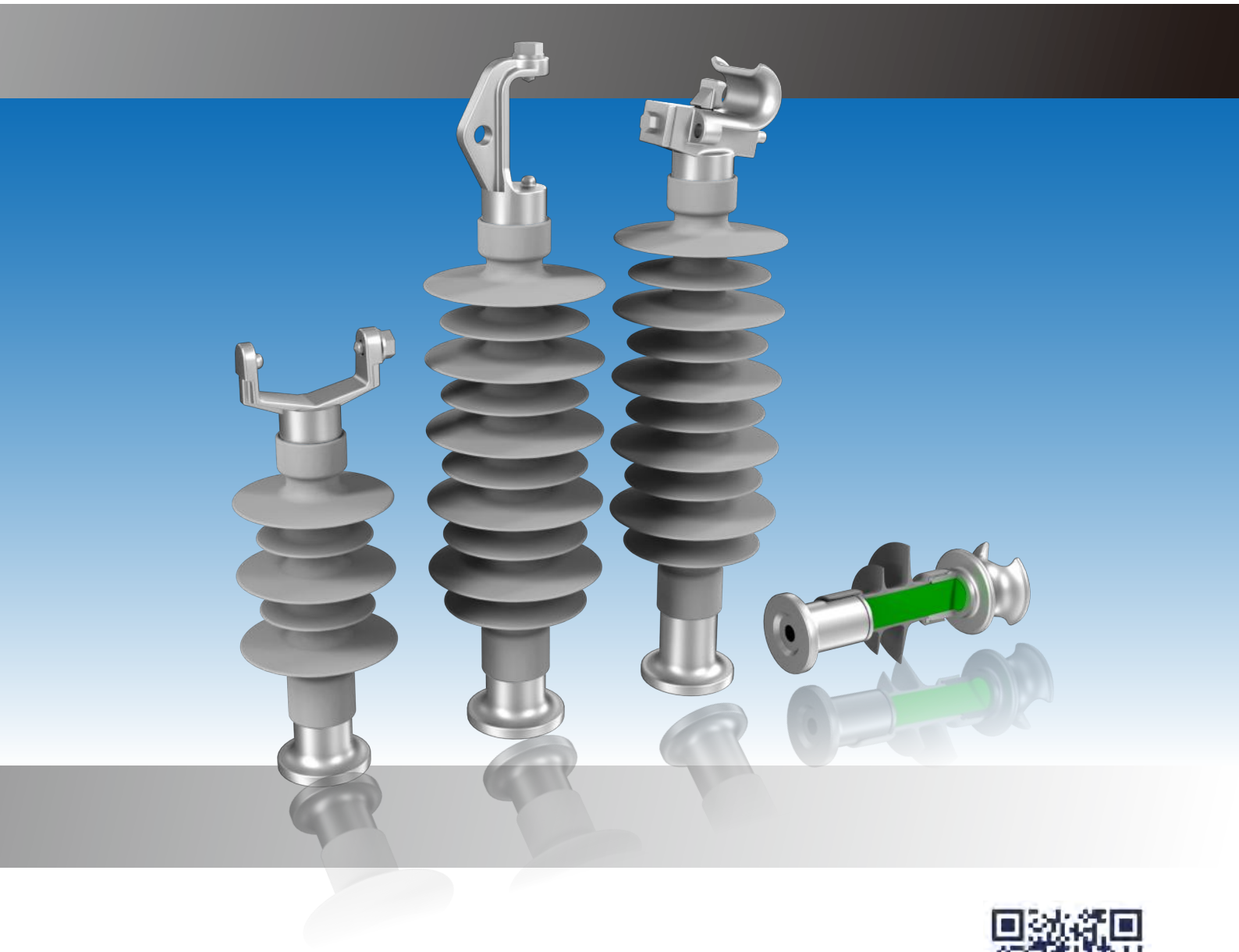
SHEMAR

T&D Solutions

Line Post Insulators Catalogue

15kV to 69kV



Leading Innovation in Composite Insulation Technology

CONTENT

SHEMAR Composite Insulators

Delivering Superior Ageing Resistance and Longevity in Reliability Performance

SHEMAR composite insulators embody the latest innovations in composite insulation technology combining world leading material science development, cutting edge design technology, state-of-the-art manufacturing and rigorously monitored quality control.

We understand the crucial impact that insulators can have on the long-term performance of transmission lines, which is why at SHEMAR we have prioritized creating composite insulator products and solutions that offer unparalleled, reliability, ageing resistance and exceptional performance.

Design Features and Manufacturing

One Piece Insulator without Joints

SHEMAR's composite distribution line post insulators are designed with advanced one-piece housing technology that eliminates internal interfaces, providing superior bonding performance and protection against erosion damage. The housing is directly vulcanized to the core, resulting in a single, seamless HTV silicone rubber housing (sheath and sheds) that is impenetrable to moisture ingress and provides ultimate defense against environmental factors.

During manufacturing a single-shot injection molding process is used, which applies high pressure and temperature to ensure a robust, one-piece housing that is chemically bonded to the core rod. This one-piece housing design features only one internal interface, i.e. the boundary interface between the housing and the FRP core rod, which significantly reduces sensitivity to tangential electrical field stress that can cause erosion damage.

Integrated molding

Excellent bonding performance

Excellent Bonding between Core and Housing

SHEMAR's injection molding manufacturing process also creates an unmatched quality of chemically bonded interface between the rod and housing, as well as the end fitting and housing, which eliminates the risk of internal tracking along the longitudinal interface of the composite insulator. The bond between the silicone rubber housing and fiberglass rod is also mechanically stronger than the intrinsic tear strength of the silicone rubber, ensuring an incredibly durable and reliable insulator.

Impenetrable Triple Point

SHEMAR's composite distribution line post insulators feature an innovative and unique impenetrable sealing system to prevent water and contamination from entering the insulator at its triple point. This is achieved by directly molding HTV silicone onto the triple point and overlapping part of the metal end fittings to ensure total enclose and protection of the sensitive triple junction zone (where metal end fitting/core rod/silicone housing meet).

The highest bonding and adherence of HTV silicone housing on to the end fittings safely protects the fiberglass rod against water or contamination attack and eliminates the needs for inherently weak traditional sealing devices.

Maximized Mechanical Integrity

To ensure uniform stress distribution and maximum mechanical integrity of the finished insulator a circumferential, multi-step crimping system is used for the attachment of metal end fittings to the FRP core. Each crimping process is monitored for acoustic emission, crimp pressure and travel distance of compression dies as control parameters.

In addition, SHEMAR insulators come with built-in redundancies that contribute to their higher torsional strength rating, which can make the installation and in-service operation of the insulators safer.

Cantilever strength verfication

Tensile strength verification

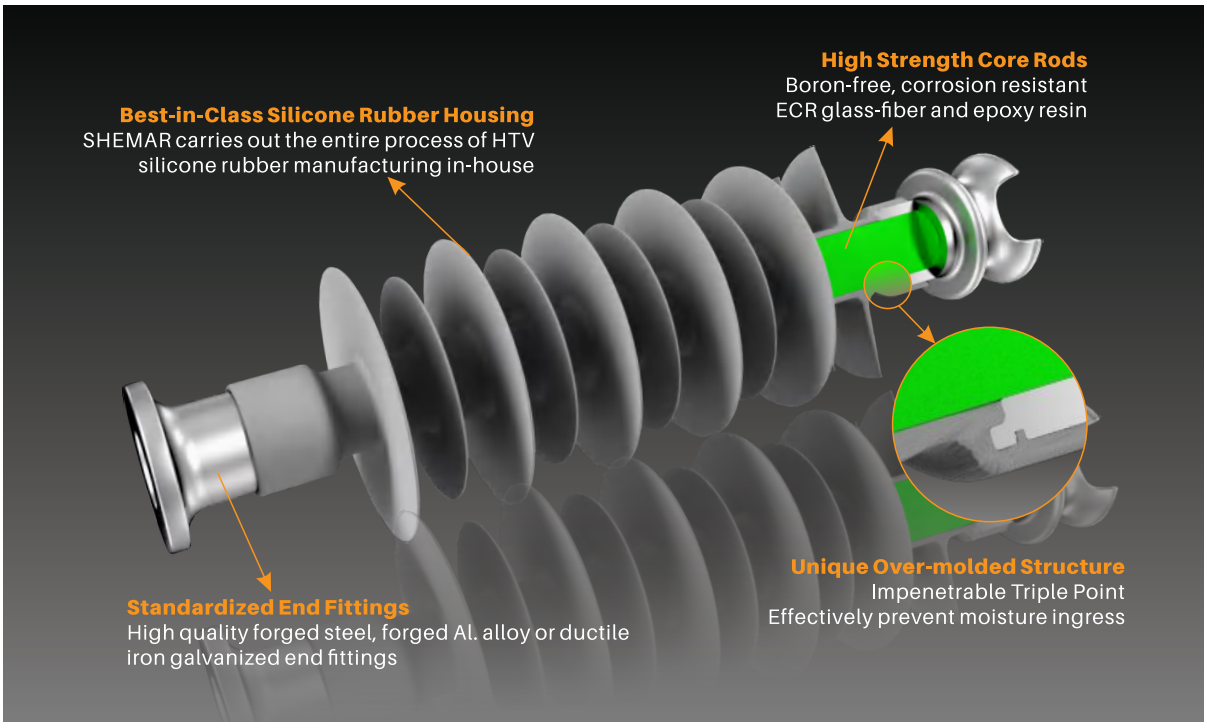
Designed to Endure Severe Environments

SHEMAR's composite distribution line post insulators are created to endure even the most severe service conditions, such as coastal salt fog, dust and industrial contamination without impairment in performance.

Superior hydrophobicity retention and short hydrophobicity transfer and recovery times prevents the formation of conductive layer and the excellent tracking and erosion performance of the housing provides an additional defense mechanism.

The insulator housing features alternating weather-shed profiles with both standard and high leakage distance designs, along with optimized shed spacing (S), overhang (P) and creepage factor (CF) parameters, to ensure maximum effectiveness, self-cleaning performance and resistance to contamination, ice and leakage currents in various environmental applications. All of our housing shed profile designs adhere to the recommendations given in IEC 60815-3 and have a minimum 3mm sheath thickness

Materials and Components



Best-in-Class Silicone Rubber Housing

The special HTV silicone rubber formulation used in SHEMAR's composite insulator housings has been scientifically engineered as a result of extensive R&D in order to overcome the various environmental, electrical and physical degradation mechanisms and deliver the best-in-class ageing resistance and long-term reliable performance.

SHEMAR carries out the entire process of HTV silicone rubber manufacturing in-house from raw material sourcing to mixing with special additives and fillers which achieves the best UV, tracking and erosion, weather ability and contamination resistance performance. SHEMAR HTV silicone rubber formulation has a long-term track record of successfully performing in some of the most extreme and demanding service conditions without degradation.

Fracture-Proof Core Rods

The fiberglass core rods for SHEMAR's composite distribution line post insulators are manufactured with boron-free, corrosion resistant ECR glass-fiber and epoxy resin. By using this E-CR boron-free formulation of fiberglass, the core rods have exceptional electrical integrity, and they are extremely resistant to hydrolysis and stress corrosion attack, which eliminates the risk of brittle fracture. Additionally, the core rods can withstand a 96-hour nitric acid resistance test as specified in IEC 62039. SHEMAR manufactures all of its fiberglass core rods in-house using a high-quality pultrusion process.

Standardized End Fittings

SHEMAR uses industry standard forged steel, forged Al. alloy or ductile iron galvanized end fittings. All end fittings are subjected to rigorous incoming quality control inspections.

Testing and Quality

Compliant with National and International Standards

SHEMAR takes pride in being a truly global composite insulator enterprise. We have customized quality control plans for each type of distribution line post insulator and work instructions for each production line. Every distribution line post insulator goes through rigorous process verification, internal testing and third party testing. All of our composite distribution line insulators meet ANSI C29.18, CSA C411.6-16 and IEC 61952, and we carry out routine and sample tests on each batch of insulators to ensure a reliable manufacturing process.

Additionally, SHEMAR's composite insulators also comply with the following tests:

- 5000 Hour Multi Stress Test as specified in IEC 62730
- Accelerated Weathering Test (1000 h UV test) as specified in IEC 61109
- Resistance to Weathering and UV (5000 h UV test) as per ISO 4892-3
- Resistance to Hydrolysis and Acid Attack on FRP Core as specified in IEC 62039
- Resistance to Acid Rain as per SHEMAR propriety test method

Continuous R&D and Improvement

SHEMAR is dedicated to advancing key technologies, enhancing technical support, and ensuring the success of key projects. We are also focused on improving our independent innovation capabilities and core competitiveness in the rapidly evolving energy industry. This commitment has resulted in significant advancements in technical innovation, exceptional performance, and influential demonstration initiatives. These achievements have also earned recognition from the National Energy Administration. As evidence of our success, the National Energy Administration granted SHEMAR approval to establish the "National Energy Power Insulation Composite Material Key Laboratory" on August 24, 2014.

(A) High low temperature humid-heat test box.

(B) Optical Contact Angle Measuring Device.

(C) Tensile Tester.

(D) Thermal Gravimetric Analyzer.

(E) Ultraviolet aging test chamber.

Currently, SHEMAR possesses robust and extensive in-house self-testing facilities that continually undergo refinement and enhancement. The company has established a comprehensive collection of material testing laboratories, structural mechanics testing laboratories, and electrical performance testing laboratories. These facilities are fully equipped to conduct physical and chemical property experiments on raw materials and samples, as well as structural mechanics and high-voltage electrical experiments on semi-finished and finished products. These resources enable SHEMAR to meet the research and development demands of high-quality external insulation products.

(A) Static contact angle

(B) Tearing strength test

(C) Tensile strength test

(D) Tracking and erosion resistance test

Static contact angle test

Our R&D team currently comprises 155 members, including 7 senior experts with doctorate degrees, 12 foreign technical experts, and 49 individuals with master's degrees. The team's research and development center is fortified by an interdisciplinary and cross-functional approach. With our team's continual expansion, more researchers from both domestic and international backgrounds are choosing to join SHEMAR's R&D efforts, contributing to the advancement of the green energy industry.

As of December 31, 2022, SHEMAR holds a total of 481 patents internationally.

Advantages and Reasons for Choosing SHEMAR Distribution Line Post Insulators

- Innovative and reliable design methods and advanced manufacturing technology
- Best-in-class composite materials and high quality components
- Rigorous production quality control plan and strict testing of products
- Fast delivery cycle and rapid after-sales service
- Effectively ensure the reliability and security of distribution lines
- Eliminates or reduces maintenance, more economical life cycle cost

How to Select the Right Distribution Line Post Insulator

Customized solutions

At SHEMAR, we can offer customized solutions tailored to our customers' specific requirements. We take into consideration the actual working conditions, such as the size of the support pole, connection method, required working load, and pollution level, as well as any unique applications that need to be addressed. By doing so, we guarantee that our products will meet 100% of our customers' needs.

Standard catalogue products

To simplify the promotion of distribution grid projects and to facilitate quick selection by our customers, we have developed a range of standardized catalog products to choose from. These products offer shorter delivery cycles and increased flexibility for future replacements. For ease of reference, our detailed standardized selection library is provided below..

SHEMAR Catalog Number Definition

S	D	F	G10	0076	A1	0
S=SHEMAR	D= Distribution Line Post T= Transmission Line Post	F= F-Neck V= Vertical Clamp-Top H= Horizontal Clamp-Top U= Universal Clamp D= Drop Tongue B= Bolt Circle	G10=3/4 Stud base G11=3/4 Gain base G20=7/8 Stud base G21=7/8 Gain base G30= Gain base - Steel G31= Gain base - Al. G40= Flat base - Steel G41= Flat base - Al. GBC= Bolt circle	0076=7.6"Dry Arc Distance 0111=11.1" Dry Arc Distance	A1=1.57" Alternating shed A2=1.77" Alternating shed A3=2.5" Alternating shed A4=3.0" Alternating shed A5=3.5" Alternating shed U3=2.5" Uniform shed U4=3.0" Uniform shed U5=3.5" Uniform shed	0= No Corona Ring 1=With Corona Ring

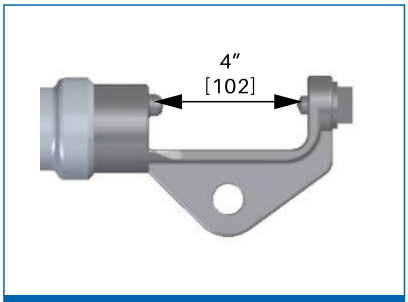
Distribution Line Post Insulators

LINE END FITTING

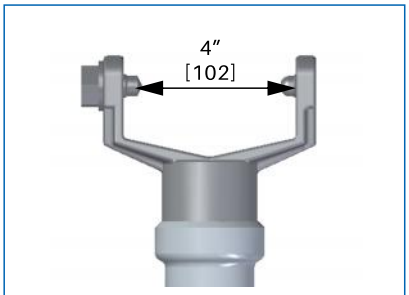
The line end fitting of Distribution Line Post Insulators are available in four different configurations: Horizontal Clamp-Top, Vertical Clamp-Top, F-Neck, Universal Clamp.

GROUND END FITTING

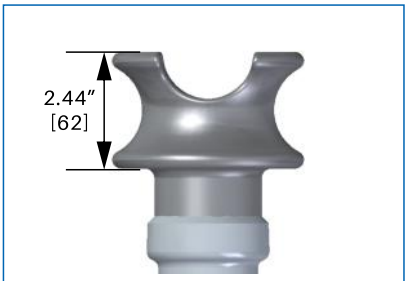
The standard base for Distribution Line Post Insulators is a round flat iron base with a threaded hole that accommodates a standard insulator stud or bolt.



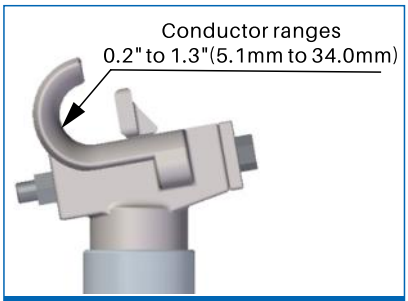
Horizontal Clamp-Top



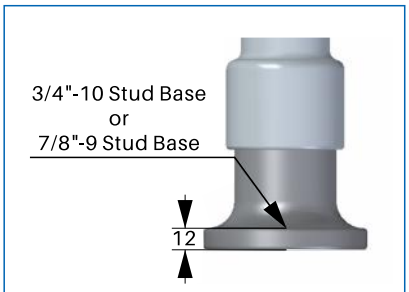
Vertical Clamp-Top



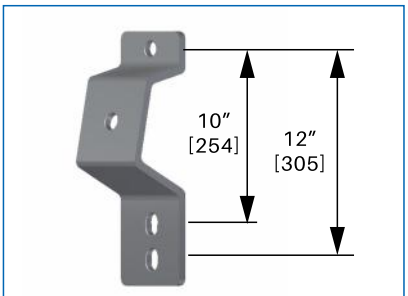
F-Neck



Universal Clamp



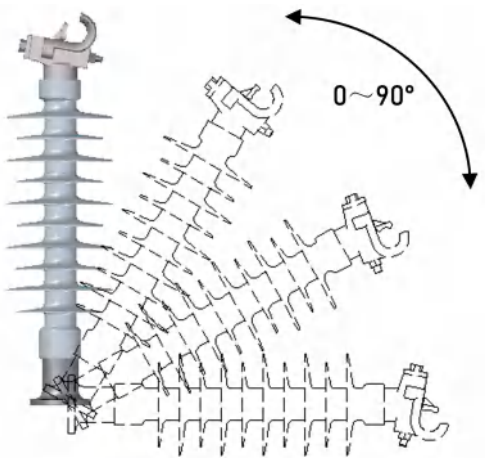
Stud Base



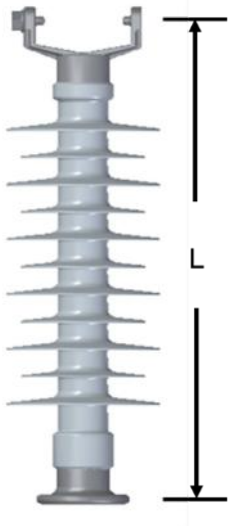
Gain Base

For other special type of bases or end fittings, please contact Shemar's Sales Representative.

The advantage of the universal clamp is its flexible installation, it flexibly can be adjusted according to specific working conditions, so that the wire installation can be installed at any angle based on the pole.
With equipped bolts, the universal clamp ensures the wire installation can flexibly adapt to different wires within the range of 0.2"~1.3".



Distribution Line Post
Vertical Clamp-Top with Stud Base



NOTES:

1) Specified Cantilever Load (SCL)=2800 lbs. [12.5 kN].

2) Max. Design Cantilever Load (MDCL) = 50% SCL = 1400 lbs. [6.3 kN].

3) Specified Tensile Load (STL)= 5000 lbs. [22.2 kN].

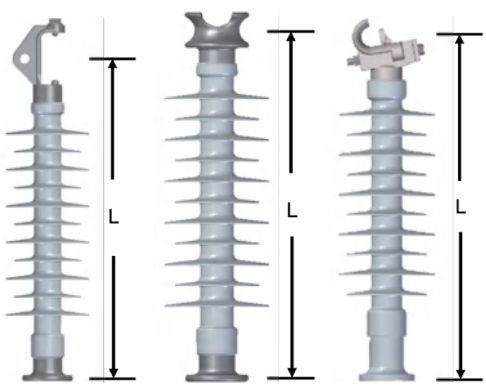
4) For other ratings or customized insulator designs, please contact your local SHEMAR Sales Representative.

TECHNICAL DATA

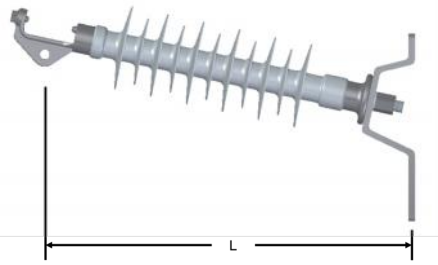
Line Voltage kV					Catalog No.	Section Length (L)	Dry Arc	Leakage	Electrical Flashover(kV)			
									60HZ		CIFO	
15	28	35	46	69		In [mm]	In [mm]	In [mm]	Dry	Wet	Pos.	Neg.
					SDVG100076A10	12.0 [305]	7.6 [192]	13.0 [331]	92	74	155	165
					SDVG100091A10	13.4 [341]	9.1 [231]	18.0 [457]	106	85	175	185
					SDVG100119A10	16.3 [413]	11.9 [303]	26.4 [671]	132	105	215	225
					SDVG100136A20	17.7 [449]	13.6 [345]	35.5 [902]	147	117	240	255
					SDVG100141A20	17.7 [449]	14.1 [358]	38.8 [985]	150	120	250	270
					SDVG100154A20	19.8 [503]	15.8 [401]	41.9 [1065]	162	130	280	296
					SDVG100193A20	23.3 [593]	19.3 [489]	56.0 [1423]	198	158	320	336
					SDVG100209A20	24.8 [629]	20.9 [530]	61.9 [1571]	213	170	355	370
					SDVG100222A20	26.3 [669]	22.2 [564]	63.4 [1611]	220	180	360	380

With different types of fittings, based on Vertical Clamp-Top & Stud Base type, the Section Length changes as follows:

Line Fitting	Ground Fitting	Combination	Length Change(mm)
V	G10/G20	V-G10/G20	L+0
F	G10/G20	F-G10/G20	L+7
H	G10/G20	H-G10/G20	L+6
U	G10/G20	U-G10/G20	L+8



Distribution Line Post
Horizontal Clamp-Top with Stud Base & Gain Base



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		■	■		SDHG110141A20	20.7 [525]	14.1 [358]	38.8 [985]	150	120	250	270
			■		SDHG110154A20	22.7 [577]	15.8 [401]	41.9 [1065]	162	130	280	296
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Notes

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