GUAM POWER AUTHORITY

Post Office Box 2977
Hagåtña, Guam 96932

TRANSMISSION AND DISTRIBUTION SPECIFICATION

Specification No. E-021

FOR

POLYMER COMPOSITE INSULATORS: 115 kV SUSPENSION, LINE POSTS, STATION POSTS

EFFECTIVE DATE: 3/26/25	ISSUED:	APPROVED:

POLYMER COMPOSITE INSULATORS: 115 kV SUSPENSION, LINE POSTS, STATION POSTS

Table of Contents

1.0 SCOPE:

This specification covers the design and technical features required for polymer type composite insulators used on Guam Power Authority's transmission system.

2.0 SERVICE CONDITIONS AND OPERATION:

The polymer type composite insulators are intended for use in an average ambient temperature of 21-32 deg. C (70-90 deg. F) with corrosive, salt air environment, sustained wind strengths of 170 MPH, and subject to IBC seismic zone 4 conditions.

3.0 CONFORMANCE TO SPECIFICATION REQUIREMENTS:

Polymer type composite insulators shall meet the requirements of the following standards and specifications, including latest revisions with respect to material, design and tests.

3.1 Applicable Standards

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI) / NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

C29.1	American National Standard for Electrical Power Insulators – Test Methods
C29.11	American National Standard for Composite Insulators – Test Methods
C29.12	American National Standard for Composite Insulators – Transmission Suspension Type
C29.17	American National Standard for Composite Insulators – Transmission Line Post Type

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 987	Guide for Application of Composite Insulators
IEEE 1898	Standard for High –Voltage Direct – Current (HVDC) Composite Post Insulators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

70	National Electrical Code
70B	Standard for Electrical Equipment Maintenance

3.2 Insulator Materials

3.2.1 Insulators shall be made of good commercial polymer composite insulators. The insulators shall be continuous weathershed material containing no joints or axial parting lines to eliminate discharge and erosion.

3.2.2 The assembly shall firmly unite the insulators component parts together eliminating the need for bonding or barrier materials so there is no possibility of discharge - producing voids at the interfaces.

3.2.3 The shed of insulators must be steeply sloped to reduce bridging and provide extensive protected leakage distance.

3.2.4 The insulators shall be protected against damaging moisture penetration.

3.3 Tests

The insulators shall receive an electrical and mechanical test to assure the soundness before shipment.

3.3.1 Insulators shall be tested in accordance with American National Standard Test Methods for Electrical Power Insulators (ANSI C29.1).

3.3.2 The manufacturer shall assure that the insulators being furnished meet each of the test requirements by furnishing certified test reports of previously performed tests on insulators of the same basic design and rating.

3.3.3 Electrical Tests

a. Low frequency withstand voltage tests
b. Impulse withstand voltage tests
c. Radio influence voltage tests
d. Impulse flashover voltage tests
e. Low frequency flashover voltage tests

3.3.4 Mechanical Tests

a. Ultimate mechanical - strength test

b. Thermal test

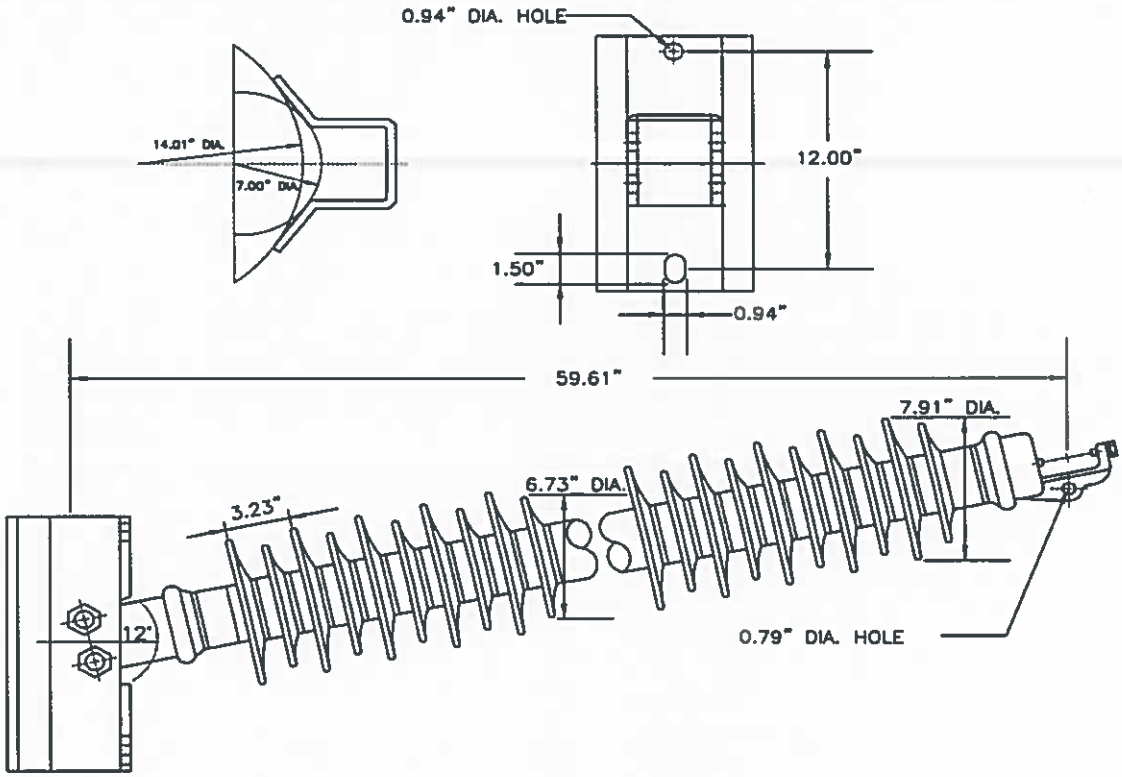
3.4 Deviations and Non - Conformance Requirements

3.4.1 Deviations from this specification or changes in the material or design after the purchase order has been placed must be approved by the GPA Engineering Department and acknowledged by a Purchase Order Amendment issued by Guam Power Authority.

3.4.2 Units received with deviations or non – conformances that are not acknowledged as specified in Section 3.4.1, are subject to rejection. The Supplier of rejected units is responsible for any corrective action including but not limited to materials, labor and transportation necessary to dispose of, or make the units conform to this specification.

3.4.3 Notification of defects discovered before or after installation that are believed to be inherent to manufacturing problems or workmanship shall be made and forwarded to the Supplier. The description of the item, documentation of the problem and the described information, disposition and/or follow-up (as appropriate) that Guam Power Authority expects from the Supplier will be specified. The Supplier's response shall be made within thirty (30) days unless an extension is acknowledged and approved in writing by the GPA Manager of Engineering.

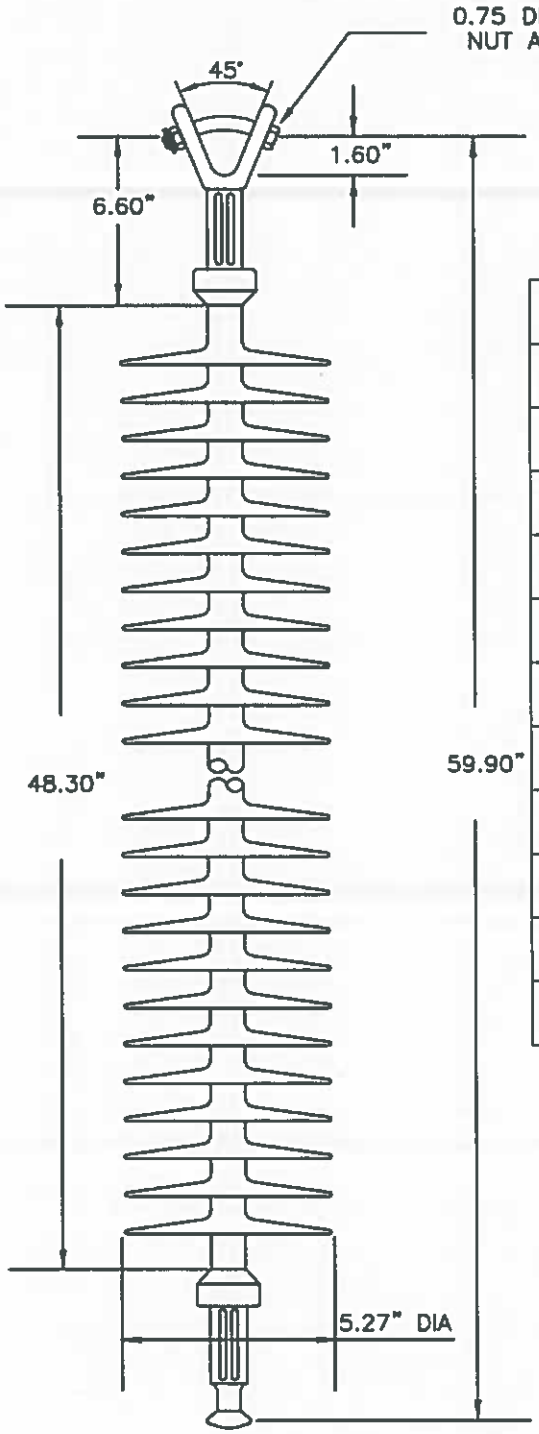
4.0 115 kV Line Post Insulator (Flat Mount)



INDEX NO. SSOI0716
(Victor Insulator HP-70DD-1514-3820-XX or equivalent)

a.	Phase to Phase Rating, kV	115
b.	Max Design Cantilever, lbs.	1500
c.	Max Design Tension Load, lbs.	5000
d.	Leakage Distance, in.	151
e.	Strike Distance, in.	51
f.	60 Hz. Dry Flashover, kV	515
g.	60 Hz. Wet Flashover, kV	450
h.	Critical Impulse Flashover Positive, kV	770
i.	Critical Impulse Flashover Negative, kV	880
j.	Net Weight, lbs.	88

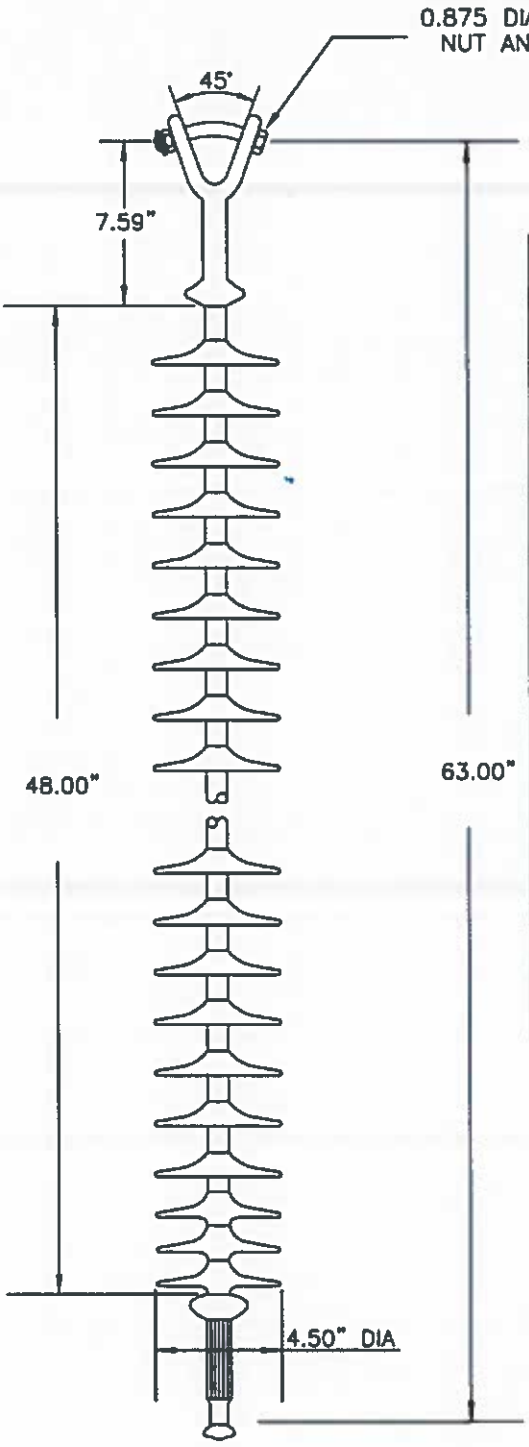
5.0 115 kV Suspension Insulator (Vertical Mounting)



INDEX NO. SSOI0779
(MacLean Cat. No. S1 40 80 048 MX SS 024 or equivalent

a.	Phase to Phase Rating, kV	115
b.	Specified Mechanical Load, lbs.	25000
c.	Routine Test Load, lbs.	12500
d.	Leakage Distance, in.	151
e.	Dry Arc Distance, in.	51
f.	60 Hz. Dry Flashover, kV	497
g.	60 Hz Wet Flashover, kV	443
h.	Critical Impulse Flashover Positive, kV	849
i.	Critical Impulse Flashover Negative, kV	899
j.	Number of Sheds	24
k.	Tower End Fitting	Y-Clevis
l.	Line End Fitting (Ball)	ANSI 52-5

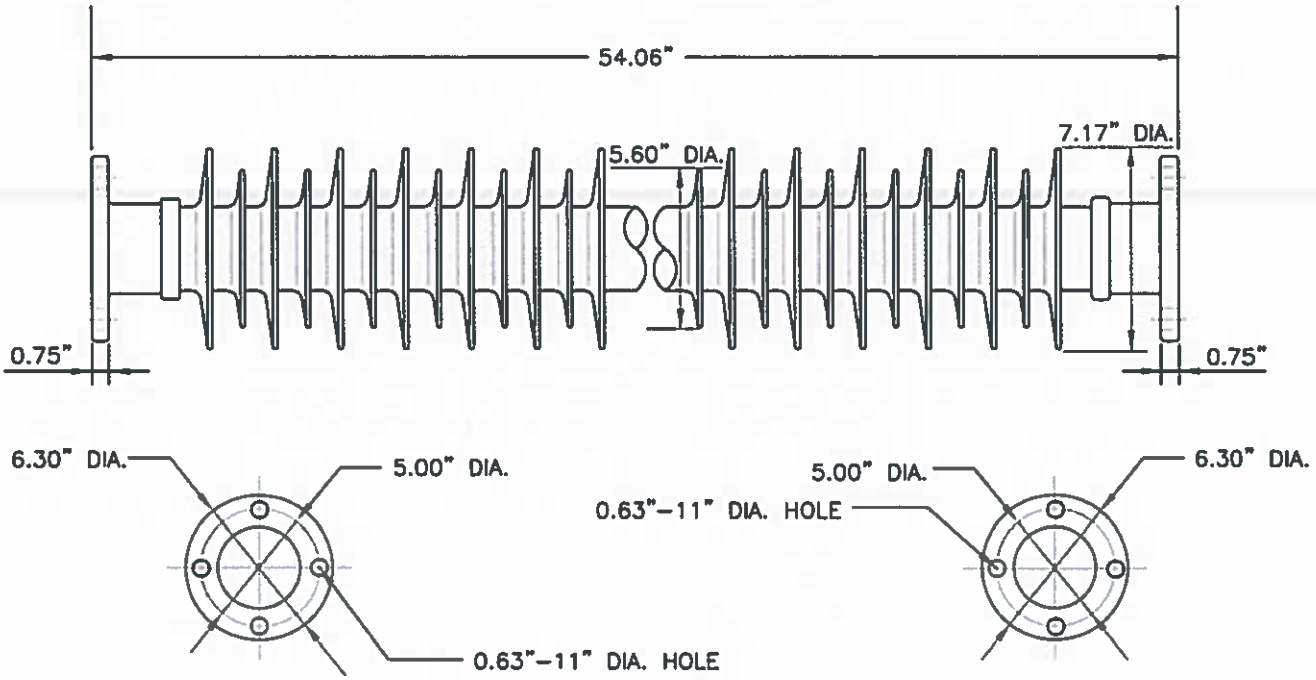
6.0 115 kV Suspension Insulator for Deadend Assembly



INDEX NO. SSOI0780
(MacLean Cat. No. S2 40 80 048 VX SS 020 or equivalent)

a.	Phase to Phase Rating, kV	115
b.	Specified Mechanical Load, lbs.	50000
c.	Routine Test Load, lbs.	25000
d.	Leakage Distance, in.	125
e.	Dry Arc Distance, in.	52
f.	60 Hz. Dry Flashover, kV	504
g.	60 Hz Wet Flashover, kV	449
h.	Critical Impulse Flashover Positive, kV	860
i.	Critical Impulse Flashover Negative, kV	910
j.	Line End Fitting (Ball)	ANSI 52-8/11
k	Tower End Fitting	Y-Clevis
l.	Net Weight, lbs.	16.4

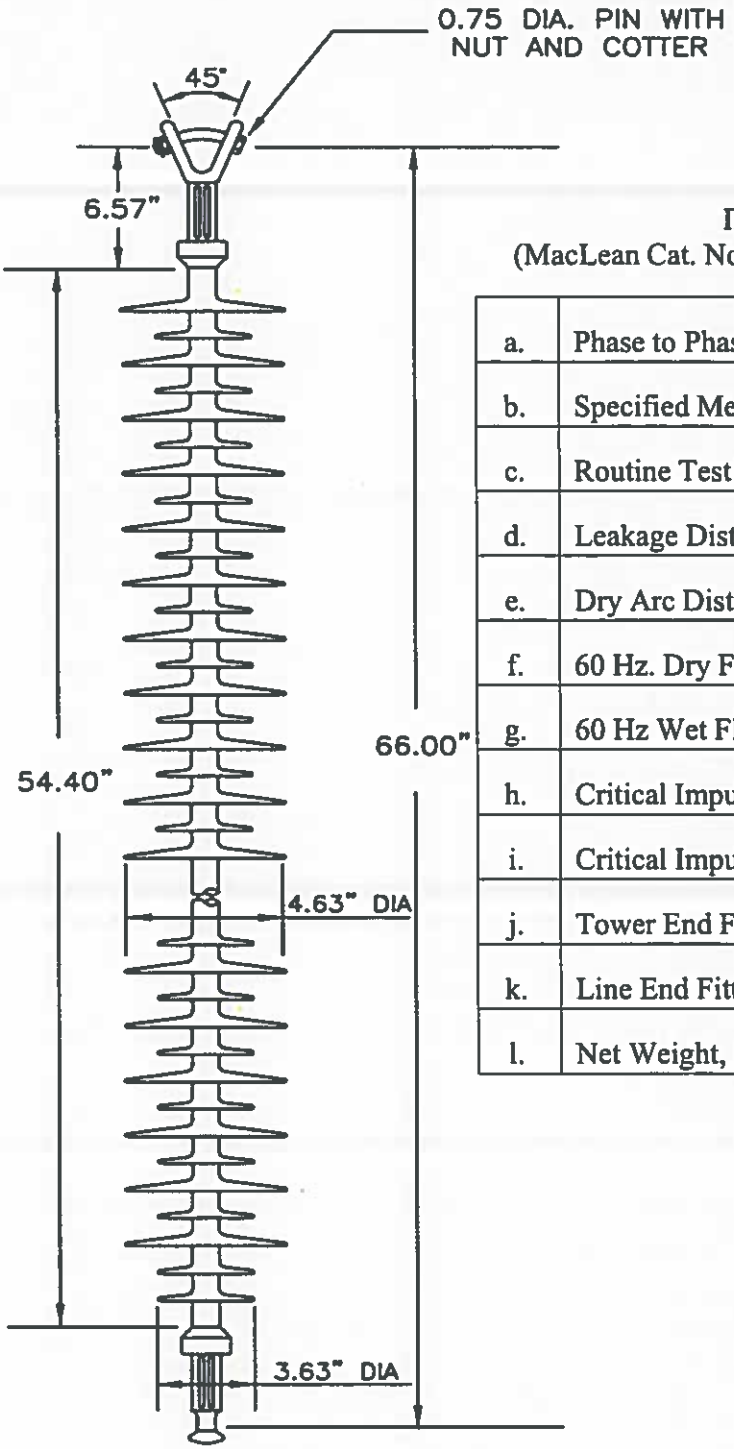
7.0 115 kV Station Post Insulator (Strut)



INDEX NO. SSOI0712
(Victor Insulator PSP – 289P or equivalent)

a.	Phase to Phase Rating, kV	115
b.	Max Design Cantilever Load, lbs.	2200
c.	Tension Strength, lbs.	17500
d.	Torsion Strength, in-lb	18000
e.	Leakage Distance, in.	116
f.	Compression Strength, lbs.	17500
g.	Positive Impulse Flashover, kV	710
h.	Impulse Withstand, kV	650
i.	60 Hz. Withstand-Wet, kV	275
j.	60 Hertz Test Voltage to Ground, kV	88
k.	Maximum Radio Influence Voltage at 1000 kHz, μV	200

8.0 115 kV Suspension Insulator for V - String Assembly



INDEX NO. SSOI0779
(MacLean Cat. No. S1 40 80 054 MX AL 035 or equivalent)

a.	Phase to Phase Rating, kV	115
b.	Specified Mechanical Load, lbs.	25000
c.	Routine Test Load, lbs.	12500
d.	Leakage Distance, in.	159
e.	Dry Arc Distance, in.	57
f.	60 Hz. Dry Flashover, kV	510
g.	60 Hz Wet Flashover, kV	427
h.	Critical Impulse Flashover Positive, kV	824
i.	Critical Impulse Flashover Negative, kV	875
j.	Tower End Fitting	Y-Clevis
k.	Line End Fitting (Ball)	ANSI 52-5
l.	Net Weight, lbs.	11.3

9.0 SHIPPING REQUIREMENTS

9.1 The Supplier shall prepare all materials and equipment for shipment in such a manner as to protect from damage in transit. All small parts and unit components shall be separately boxed or bundled to prevent galling due to rubbing of one part against another. Each item, box or bundle shall be plainly and individually identifiable for content according to item number, GPA P.O. Number, and Supplier's Identifying Number.

9.2 A complete itemized Bill of Lading, which clearly identifies and inventories each assembly, sub-assembly, carton, package, envelope, etc., shall be furnished and enclosed with each item or items at the time of shipment.

9.3 Delivery of polymer type composite insulators shall be to actual jobsite as identified by the Guam Power Authority Manager of Engineering.

10.0 STATEMENT OF COMPLIANCE

The Supplier shall provide a signed statement verifying that the products being supplied fully comply with the specification stated herewith. Items not in full compliance with this specification will be identified with a description of the deficiency and any proposed substitutions must be approved by the Guam Power Authority Engineering Department, as described in Section 3.4.1.