GUAM POWER AUTHORITY
P.O. BOX 2977
HAGATNA, GUAM 96910

TRANSMISSION & DISTRIBUTION SPECIFICATION

Specification No. E-006

FOR

34.5 KV STATION TYPE SURGE ARRESTER

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1.0 SCOPE

1.1. This specification describes the requirements for 34.5kV station class porcelain gapless Metal Oxide Varistor (MOV) surge arresters to be used on a 34.5kV/19.9kV Grounded Wye, 60 Hertz System Voltage.

1.2. The arrester is intended for use in tropical weather conditions with corrosive sea air atmosphere, sustained wind strengths of 155 mph with 3 second gusts to 170 mph, and subject to moderate and severe earthquakes. International Building Code Zone 4 seismic requirements shall apply.

2.0 CONFORMANCE TO STANDARDS AND SPECIFICATIONS

2.1. The station class lightning arresters shall meet the requirements of the following standards, including the latest revisions with respect to material, design and tests.

2.1.1. American National Standards Institute, Inc. (ANSI)

IEEE C62.11 Standard for Metal-Oxide Surge Arresters for AC Power Circuits

IEEE C62.22 Guide for the Application of Metal-Oxide Surge Arresters for Alternating-Current Systems

2.2. Deviations And Non-Conformance Requirements

2.2.1. Deviations from this specification or changes in materials or design after the Purchase Order has been placed must be approved by the GPA Engineering Department and acknowledged by a Purchase Order Amendment.

2.2.2. Units received with deviations or non-conformances which are not acknowledged as specified in Sub-Paragraph 2.2.1 are subject to rejection. The Supplier 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 the specification.

2.2.3. 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 GPA 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.

2.3. Warranty – the Supplier shall warrant the product to be free from defects in material and workmanship under normal use and service conditions. The term of the Warranty shall be the lesser of twelve (12) months from the date of initial installation or eighteen (18) months from date of manufacture.

2.4. Statement of Compliance - The Supplier shall provide a signed statement verifying that the products being supplied fully comply with the specifications and drawings. Items not in full compliance with the specification and drawings will be identified with a description of the deficiency and any proposed substitutions. Items not in full compliance with the specifications and drawings must be approved by the GPA Engineering Department, as described in Section 2.2.1.

3.0 SUBMITTALS

3.1. The bidder shall provide with their bid the following data:

a. Arrester type
b. Arrester ratings
c. Design test reports in accordance with the latest revision of ANSI/IEEE C62.11
d. Discharge voltage levels
e. Typical drawing showing dimensions and mounting details
f. Description data

3.2. After receipt of order, manufacturer shall submit within thirty (30) days, the following data:

3.2.1. Three (3) sets of certified drawings showing necessary dimensions for mounting and connecting arresters.

3.2.2. Certified copies of the test results.

3.3. All documentation shall be supplied in English.

4.0 QUALIFICATIONS

4.1. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of fifteen (15) years and have an installed base of at least 100,000 of this type arresters in service.

4.2. The manufacturer shall have a quality system that is ISO 9001 certified.

5.0 QUALITY ASSURANCE

5.1. The manufacturer shall have a formal Quality Assurance Program. The manufacturer's Quality Assurance Manual shall consist of systematic procedures that provide confidence that the work is in accordance with the manufacture's standard design, codes and standards referenced above, and these specifications for controlling activities affecting quality. Formal training of individuals performing the work shall be an element of the Quality Assurance Program. Inspections and audits shall be conducted to insure that the Quality Assurance Program is being followed.

5.1.1. The manufacturer's Quality Assurance Manual shall be available at GPA's request and shall include descriptive information and details of the program, including program organization, documentation requirements, and quality control procedures.

5.1.2. The Quality Assurance Program shall include testing procedures, acceptance criteria, repair methods and the quality control requirements of these specifications.

6.0 RATINGS

6.1. The arresters shall have a duty rating of 30 kV RMS, and a Maximum Continuous Operating Voltage (MCOV) rating of 24.4 kV RMS.

6.2. The maximum Front-Of-Wave (FOV) Protection Level shall be 90kV based upon a 10 kA impulse that results in a discharge voltage cresting in 0.5microseconds(μs).

6.3. The Temporary Overvoltage (TOV) withstand capability with prior duty energy surge shall be a maximum of 35.7 kV rms for 1 second and 34.0 kV rms for 10 seconds.

6.4. The Minimum Pressure Relief / Fault Current shall be 65,000 Amperes symmetrical tested per IEEE Standard C62.22.

6.5. The maximum discharge voltage (crest kV) at indicated impulse current of 8/20 μs shall be:

68 kV	@ 1.5 kA
74 kV	@ 5.0 kA
80 kV	@ 10.0 kA
90 kV	@ 20.0 kA

7.0 CONSTRUCTION

7.1. Arrester furnished shall be station-class, single piece, grey color, metal-top, porcelain housing, self-supporting, constructed to withstand sustained155 mph winds with 3 second gusts to 170 mph and severe earthquakes.

7.1.1. Housing – the housing shall be wet-process porcelain, ANSI grey color.

7.1.2. Sealing System – the hermetic sealing system shall be designed to open to allow the ionized gases to flow out the venting port located at the base of the arrester when the arrester is stressed in excess of its design.

7.1.3. Metal End Castings – the metal end casting shall be corrosion-resistant aluminum alloy.

7.1.4. Metal Oxide Varistors – the MOV disks shall be a single column stacked in series within the porcelain housing with the necessary spacers required for the electrical design of the arrester. The compressed MOV stack is to be cemented to the ends of the porcelain housing.

7.1.5. The arrester shall be capable of being mounted vertically. The three slotted mounting holes are to be spaced 120° from each other in a 10 inch diameter bolt circle pattern and designed to handle 0.5 inch diameter bolts.

7.2. Connections – the line terminal shall be aluminum pad type suitable for connection to a NEMA standard four-hole connector and will accommodate #4/0 AWG to 927.2 kcmil copper or aluminum conductors (0.528 inches to 1.108 inches).

7.3. The ground terminal shall be furnished suitable for connection to #4/0AWG stranded copper ground wire.

7.4. Leakage Distance – the leakage distance shall meet or exceed 33 inches.

7.5. Height – the overall height shall not exceed 29 inches.

7.6. Weight – the net weight shall not exceed 80 pounds.

7.7. Nameplate – a stainless steel nameplate shall be attached to the arrester with the following data:

a. Classification
b. Manufacturer's name or trademark
c. Manufacturer's catalog number or identification number
d. Serial number
e. Date of manufacturer

f. Duty-cycle voltage rating
g. MCOV rating
h. Pressure relief rating.

8.0 TESTS

8.1. Both the arrester components and finished arresters shall be subjected to a series of tests performed in compliance with the latest version of ANSI/IEEE C62.11.

8.1.1. Metal Oxide Varistor Tests – discharge voltage, rated energy, square-wave energy, high current, AC, and accelerated aging tests.

8.1.2. Finished Arrester Tests – starting (reference) voltage, partial discharge and power frequency tests. The tests are to be done on 100% of the arresters, certification that all arresters were tested must be supplied; it is not necessary that data be available for each individual arrester.

8.1.3. The end fitting and porcelain housing of each arrester unit is to be tested by means of a helium mass spectrometer prior to routine testing.

9.0 PACKAGING AND SHIPPING REQUIREMENTS

9.1. Each arrester shall be placed and crated in a manner to prevent damage and injury during shipment.

9.2. The arrester shall be properly secured with suitable material to provide physical protection and prevent shifting during transit.

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