

SECTION 16123

CONTACT RAIL INSULATOR ASSEMBLY FOR TRACTION POWER

PART 1 - GENERAL

1.01 SUMMARY

- A. This section specifies fabricating, testing and furnishing fiberglass contact rail insulator assemblies as shown.
- B. Related Sections:
 - 1. Section 16122 - Contact Rail Cable Connector Assemblies for Traction Power
 - 2. Section 16124 - Contact Rail Protection Cover Assemblies for Traction Power
 - 3. Section 16126 - Contact Rail Anchor Assembly for Traction Power
 - 4. Section 16127 - Contact Rail System Installation for Traction Power
 - 5. Section 16128 - Wire and Cable for Traction Power
- C. Payment and Measurement
 - 1. Compensation for work specified in this section will be made in the following manner:
 - a. Materials: Lump sum, no separate measurement.

1.02 REFERENCES

- A. Codes, regulations, references, standards and specifications.
 - 1. ASTM A47.
 - 2. ASTM A153.
 - 3. ASTM A164.
 - 4. ASTM D149.
 - 5. ASTM D229.
 - 6. ASTM D256.
 - 7. ASTM D495.
 - 8. ASTM D570.
 - 9. ASTM D638.
 - 10. ASTM D648.
 - 11. ASTM D695.
 - 12. ASTM D790.
 - 13. ASTM D2000
 - 14. ASTM D2303.
 - 15. ANSI B4.1.
 - 16. ANSI B18.2.1.
 - 17. ANSI B18.2.2.
 - 18. ANSI C29.1.
 - 19. ANSI C29.5.

ATTACHMENT C

20. NFPA 130-17

21. UL 94

1.03 QUALITY ASSURANCE

A. Testing

- 1. Perform the following testing by a nationally- recognized, independent testing laboratory at no additional cost to WMATA.
- 2. The Contractor shall notify the COTR fourteen (14) days in advance of the commencement of testing, including preparation of the test equipment for testing. Testing shall be performed in the presence of the COTR, unless otherwise approved by the COTR in writing.

B. General testing

- 1. Randomly select a minimum of one percent of each production lot of 500 insulators of each type as test specimens.
- 2. Subject specimens to the following tests:
 - a. Electrical resistance test:
 - 1) Procedure:
 - a) Immerse each specimen in water at room temperature.
 - b) After 70 hours, remove and dry thoroughly.
 - c) Provide complete contact by use of wet clay pads on top and bottom of specimen.
 - d) Measure resistance to each specimen with 1,000-volt dc megohm meter or other approved device.
 - 2) Acceptance criteria:
 - a) Electrical resistance: Not less than eight megohms.
 - b) If one insulator of a lot fails, entire lot will be rejected.
 - b. Impulse withstand voltage test.
 - 1) Procedure: In accordance with ANSI C29.1.
 - 2) Acceptance criteria:
 - a) Dry withstand voltage: 30 kV at 60 Hertz for one minute
 - b) Wet withstand voltage: 20 kV at 60 Hertz for ten seconds.
 - c) If one insulator of a lot fails, the entire lot will be rejected.
- 3. Insulators used as test specimens shall not be part of the quantity furnished.

C. Fiber-glass Insulators

1. Material testing

<u>TEST ITEM</u>	<u>PROCEDURE</u>	<u>ACCEPTANCE CRITERIA</u>
Arc resistance	ASTM D495	180 seconds
Dielectric strength	ASTM D149, short-time test	100 volts per mil
Water absorption	ASTM D570, 24 hours	Weight increase: 0.3 percent maximum

Flammability	UL 94	Class 94V-O
Flame and smoke	ASTM E84	Flame spread not exceeding UL rating of 25. Smoke developed index not exceeding UL rating of 50.
Flame resistance	ASTM D229, Method II	Ignition time: 80 seconds Minimum Burning time: 60 seconds Maximum
Heat distortion	ASTM D648	Deflection temperature 390F at 264 psi
Izod Impact	ASTM D256, Method A	Average impact strength: 16 foot-pounds per inch width of specimen
Flexural strength	ASTM D790	24,000 psi
Tensile strength	ASTM D638	12,000 psi
Compressive strength	ASTM D695	20,000 psi
Tracking resistance	ASTM D2303	Time to track: at 2,500 Volts ac 600 minutes

* Minimum unless otherwise specified.

2. Production testing:

a. General Requirements:

- 1) Production testing specified constitutes minimum requirements.
- 2) All insulators subject to full or partial testing at the discretion of the COTR.
- 3) Insulators used for testing are not to be included in quantities furnished.
- 4) All facets of production testing, particularly the location of the facility and repair, capacity and calibration of test equipment, subject to approval.
- 5) Notify COTR fourteen calendar days prior to scheduled testing dates.
- 6) If one insulator of a lot fails, the entire lot will be rejected.

b. Randomly select a minimum of one percent of each lot of 500 insulators as test specimens.

c. Load test:

1) Procedure:

- a) Mount 50% of the specimens on a rigid vertical support with centerline of holes on a horizontal plane.

- b) Vertically apply a steady, even, downward pressure on the insulator head until it fails.
 - c) Record pressure being exerted when first crack occurs in specimen.
 - d) Record pressure being exerted when specimen fails.
- 2) Acceptance criteria:
- a) Withstand:
 - (1) To first crack: 1,200 pounds minimum.
 - (2) To failure: 2,400 pounds minimum.
- d. Compressive load test:
- 1) Procedure:
 - a) Mount insulator on flat horizontal surface.
 - b) Mount steel plate one-inch thick by 4-1/2 inches diameter on top of insulator.
 - c) Conduct test in accordance with ASTM D695.
 - 2) Acceptance criteria:
 - a) Withstand:
 - (1) To first crack: 10,000 pounds minimum.
 - (2) To failure: 20,000 pounds minimum.
- e. Dielectric strength test:
- 1) Procedure:
 - a) ASTM D149, Short-time Test.
 - 2) Acceptance criteria:
 - a) Dielectric strength:
 - (1) Perpendicular chair 100 volts per mil.
 - (2) Perpendicular cap: 100 volts per mil.
- f. Insulators used for testing are not to be included in quantities furnished.

1.04 SUBMITTALS

- A. Shop Drawings:
- 1. The Contractor shall submit for approval shop drawings for fabrication of the component and assemblies of the contact rail insulators, showing tolerances for all dimensions. No fabrication or manufacturing shall be performed prior to drawing approval.
- B. Documentation:
- 1. Certification that all insulator assemblies furnished meet or exceed specified requirements.
 - 2. Detailed engineering data on materials used in the manufacture of insulator assemblies.
 - 3. Fabrication details.
 - 4. Name of proposed independent testing laboratory.

5. Detailed description of quality control program. Work performed prior to approval is undertaken at the Contractor's risk.
6. Calibration certificates for quality control testing equipment.
7. Certified test reports. Submit no later than seven days after completion of tests.
8. Method of packaging. Submit prior to packaging and shipping.

PART 2 - PRODUCT

2.01 MATERIALS

- A. Furnish contact rail insulator assemblies in accordance with the following requirements:
 1. General Requirements
 - a. New and undamaged.
 - b. Symmetrical
 - c. Free of cracks, voids, air pockets, lamination, metallic substances or other defects rendering them unsuitable for intended service.
 - d. Meeting or exceeding acceptance criteria of specified tests.
 - e. Indelibly marked on underside with model number and identification of manufacturer.
 - f. Rated for a nominal voltage of 750 volts dc.
 - g. Minimum creepage distance over external surface of insulator from energized metal components to ground or to insulator fasteners: Eight inches minimum.
 - h. Resistant to weathering and sudden changes in atmospheric temperature from plus 150F to minus 20F.
 - i. Impervious to moisture, acid and alkali.
 - j. Protective Coating: Coat all exposed surfaces of the insulator including edges and hole edges with minimum 4 ml. film of high gloss gray two part polyurethane coating containing an ultraviolet inhibitor, for example, Sherwin Williams Polane HS, or equivalent.
 - k. Suitable for use on wood ties and for direct fixation to concrete invert.
 - l. Color: Uniform gray matching sample available from the Engineer.
 - m. Designed for composite rail specified in Section 05661 with free-end-to-anchor distance of 500 feet and temperature range of plus 150F to minus 20F.
 - n. Compatible with protection cover assemblies specified in Section 16124, contact Rail Protection Cover Assembly.
 2. Fiber Glass Insulators
 - a. Polyester resin reinforced with fibrous glass and inert fillers.
 - b. Compression-molded.
 - c. Appearance: Smooth and uniform.
 - d. Dimensions: As shown.
 - e. Tolerance: Plus-or-minus 1/32-inch.

END OF SECTION