

December, 2003



SPECIFICATION
FOR

ALUMINUM CONDUCTOR, STEEL SUPPORTED CONDUCTOR
(ACSS or ACSS/TW)

December, 2003

1. SCOPE

- 1.1 This specification applies to bare concentric-lay-stranded aluminum conductor, coated-steel supported (ACSS) or bare shaped wire compact concentric-lay-stranded aluminum conductor, coated-steel supported (ACSS/TW) for use as electrical conductor in the overhead transmission and distribution systems and shall be capable of operating continuously at temperatures up to 250°C.

2. APPLICABLE STANDARDS

- 2.1 American Society for Testing and Materials (ASTM)
1916 Race Street
Philadelphia, PA 19103
- 2.1.1 ASTM Standard No. B 193, Standard Test Method for Resistivity of Electrical Conductor Material.
- 2.1.2 ASTM Standard No. B 500, Metallic Coated Stranded Steel Core for Aluminum Conductors, Steel Reinforced (ACSR).
- 2.1.3 ASTM Standard No. B 502, Aluminum-Clad Steel Core Wire for Aluminum Conductors, Aluminum-Clad Steel Reinforced.
- 2.1.4 ASTM Standard No. B609, Aluminum 1350 Round Wire, Annealed and Intermediate Tempers, for Electrical Purposes.
- 2.1.5 ASTM Standard No. B 802, Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR).
- 2.1.6 ASTM Standard No. B 803, High-Strength Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Aluminum and Aluminum-Alloy Conductors, Steel Reinforced.
- 2.1.7 ASTM Standard No. B 856, Concentric-Lay-Stranded Aluminum Conductors, Coated Steel Supported
- 2.1.8 ASTM Standard No. B 857, Shaped Wire Compact Concentric-Lay-Stranded Aluminum Conductors, Coated Steel Supported (ACSS/TW).

3. GENERAL REQUIREMENTS

- 3.1 Aluminum Temper – After stranding the round aluminum wires shall conform to the physical requirements of ASTM B 609 for 1350-O temper.

December, 2003

- 3.2 Aluminum Wire Conductivity – The average resistivity of aluminum wire samples shall not exceed $16.642 \Omega \cdot \text{cmil/ft}$ at 20°C (corresponds to 63% IACS min. conductivity) when tested in accordance with ASTM B 193.
- 3.3 Joints – No weld in the aluminum wire shall occur within 50 ft of a weld in the same wire or in any other wire of the completed conductor. There shall be no joints in the steel core.
- 3.4 Lay – The direction of lay of the outside layer of aluminum wire shall be right-hand. The direction of lay of the aluminum and steel wires shall be reversed in successive layers. Lay lengths shall conform to Lay Factors of ASTM B 856 for round wire “Concentric-Lay Stranded” ACSS and ASTM B 857 for “Shaped Wire Compact Concentric-Lay Stranded” ACSS/TW.
- 3.5 Rated Strength of the Conductor – The rated strength of the conductors shall be calculated in accordance with ASTM Standard.

4. DETAILED REQUIREMENTS

4.1 Steel Core:

- 4.1.1 The stranded steel core shall meet the requirements of ASTM B 500.
- 4.1.2 The steel core wire shall be Class A, Zinc-5% Aluminum-Mischmetal Alloy Coated conforming to ASTM B 802 or ASTM B 803 or Aluminum Clad Steel Coated conforming to ASTM B502 or an approved alternate material suitable for continuous operating temperatures up to 250°C .
- 4.1.3 Corrosion – Corrosion resistance of the coated steel core shall exceed the corrosion resistance of a Class C zinc galvanized material when subjected to the Salt Spray Corrosion test performed in accordance with ASTM B 117.

4.2 Aluminum Strands:

- 4.2.1 After stranding the aluminum wires shall conform to the requirements of ASTM B 609. In the case of trapezoidal conductor, after stranding the trapezoidal aluminum wires shall conform to the requirements of ASTM B 609 except for the shape and diameter tolerance.

4.3 Composite Conductor:

- 4.3.1 The composite aluminum conductor, steel supported conductor, ACSS or ACSS/TW, shall conform to ASTM B 856 or ASTM B

December, 2003

857 for Class AA. In the case of a trapezoidal construction, it shall have a diameter equivalent to standard round ACSS or ACSR size conductors.

- 4.3.2 The conductor shall be stranded prior to annealing to assure that the aluminum strands lay tightly around the steel core and the surrounding aluminum layers. The finished stranded conductor should exhibit a smooth, tight and uniform stranding. The surface of the conductor shall be free of points, sharp edges, abrasions, or other departures from smoothness or uniformity of surface contour that would tend to increase radio interference and corona loss. The conductor shall be free of metal particles, dirt, and excessive amounts of die grease.
- 4.3.3 The make-up and lay of conductor strands shall be such as to produce a conductor essentially free from a tendency to untwist or spring apart when cut or during tension stringing operations.

5. INSPECTION, TEST, AND DOCUMENTATION

- 5.1 Inspections and tests required by this specification, shall be made by the Supplier or his sub-supplier prior to shipment.
- 5.2 The timing, sample sizes, and frequency of inspections and tests shall be in accordance with industry standards unless otherwise specified.
- 5.3 Two sets of certified inspection and test reports containing the data needed to show conformance and other required documentation shall be forwarded to material shipment to:

Company Name
Attention:
Address

- 5.4 Suppliers certified documents and reports shall include, as a minimum:

- 5.4.1 Strand diameter and tolerances.
- 5.4.2 Strand rated breaking strength.
- 5.4.3 Strand elongation.
- 5.4.4 Strand conductivity.
- 5.4.5 For each layer, the values and tolerances of:

December, 2003

5.4.5.1 Diameter over layer in inches.

5.4.5.2 Length of lay in inches.

5.4.5.3 Lay in terms of Diameter.

5.4.5.4 Direction of lay.

5.4.6 Stress-strain data and curves shall be supplied upon request.

6. PACKAGING, MARKING AND SHIPPING

6.1 Electrical conductor shall be shipped on steel reels meeting the requirements of the Aluminum Association and NEMA.

6.1.1 Reels shall be supplied with nominal conductor lengths within a plus or minus tolerance of 5%.

6.2 Each reel or coil shall be marked clearly in weatherproof marking ink with the following information:

6.2.1 Shipping address and purchase order number.

6.2.2 Supplier's name.

6.2.3 Size, measured length in feet, description of conductor.

6.2.4 Net, gross, and tare weights in pounds.

6.3 Each reel of conductor shall be protected against physical damage such as nicks, scars, or abrasions during handling and movement.

6.3.1 The cable shall be tightly and uniformly spooled on the reel.

6.3.2 Any portion of the reel that comes in contact with the cable's surface shall be suitably covered.

6.3.3 Conductor shall be layer wound on reel to prevent excessive conductor movement.

6.3.4 Cable ends shall be suitably secured to the reel flange.

6.3.5 The outer cable layer shall be suitably cushioned and covered.