



Designation: B701/B701M – 22^{ε1}

Standard Specification for Concentric-Lay-Stranded Self-Damping Aluminum Conductors, Steel Reinforced (ACSR/SD)¹

This standard is issued under the fixed designation B701/B701M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—Added publication information to Footnote 1 editorially in January 2023.

1. Scope

1.1 This specification covers concentric-lay-stranded self-damping aluminum conductor, steel-reinforced (ACSR/SD), and its component wires for use as overhead electrical conductors (Explanatory [Notes 1 and 2](#)).

1.2 The values stated in inch-pound or SI units are to be regarded separately as standard. Each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the specification. For conductor sizes designated by AWG or kcmil, the requirements in SI units have been numerically converted from corresponding values stated or derived in inch-pound units. For conductor sizes designated by SI units only, the requirements are stated or derived in SI units.

1.2.1 For density, resistivity, and temperature, the values stated in SI units are to be regarded as standard.

NOTE 1—ACSR/SD is designed to control aeolian vibration by integral damping. The conductors consist of a central core of a round steel wire or wires surrounded by two layers of trapezoidal aluminum 1350-H19 wires or two layers of trapezoidal aluminum 1350-H19 wires and one layer of round aluminum 1350-H19 wires ([Fig. 1](#)). The trapezoidal-wire layers are separated from each other and from the steel core by two small annular gaps that provide the conductors self-damping characteristics. The round aluminum wires are in tight layer contact between themselves and the underlying trapezoidal wire layer. Different strandings of the same size of conductor are identified by type, which is the approximate ratio of steel area to aluminum area, expressed in percent ([Table 1](#) and [Table 2](#)).

NOTE 2—The aluminum and temper designations conform to ANSI Standard H 35.1. Aluminum 1350 corresponds to UNS A91350 in accordance with Practice [E527](#).

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

¹ This specification is under the jurisdiction of ASTM Committee B01 on Electrical Conductors and is the direct responsibility of Subcommittee B01.07 on Conductors of Light Metals.

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1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 The following documents of the issue in effect on date of material purchase form a part of this specification to the extent referenced herein.

2.2 ASTM Standards:²

[B230/B230M Specification for Aluminum 1350–H19 Wire for Electrical Purposes](#)

[B232/B232M Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced \(ACSR\)](#)
[B263/B263M Test Method for Determination of Cross-Sectional Area of Stranded Conductors](#)

[B354 Terminology Relating to Uninsulated Metallic Electrical Conductors](#)

[B498/B498M Specification for Zinc-Coated \(Galvanized\) Steel Core Wire for Use in Overhead Electrical Conductors](#)

[B500/B500M Specification for Metallic Coated or Aluminum Clad Stranded Steel Core for Use in Overhead Electrical Conductors](#)

[B502/B502M Specification for Aluminum-Clad Steel Core Wire for Use in Overhead Electrical Aluminum Conductors](#)

[B549 Specification for Concentric-Lay-Stranded Aluminum Conductors, Aluminum-Clad Steel Reinforced for Use in Overhead Electrical Conductors](#)

[B606/B606M Specification for High-Strength Zinc-Coated \(Galvanized\) Steel Core Wire for Aluminum and Aluminum-Alloy Conductors, Steel Reinforced](#)

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

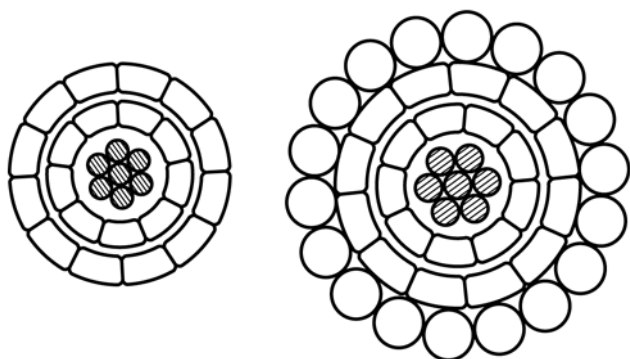


FIG. 1 Illustrations of Typical ACSR/SD Strandings

B802/B802M Specification for Zinc-5 % Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR)

B803/B803M Specification for High-Strength Zinc-5 % Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Use in Overhead Electrical Conductors

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

2.3 *ANSI Documents:*³

ANSI H35.1 American National Standard Alloy and Temper Designation Systems for Aluminum

2.4 *NIST Documents:*⁴

NBS Handbook 100—*Copper Wire Tables of the National Bureau of Standards*

2.5 *Aluminum Association Documents:*⁵

Publication 50, Code Words for Overhead Aluminum Electrical Conductors

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 ACSR/SD covered by this specification has five types of coated core wire and one type of aluminum-clad core wire which are designated by abbreviations as follows (Explanatory Notes 2 and 9):

3.1.2 *ACSR/SD/AW2*—ACSR/SD using aluminum-clad steel wire (Specification **B502/B502M**).

3.1.3 *ACSR/SD/GA2*—ACSR/SD using Class A zinc-coated steel wire (Specification **B498/B498M**).

3.1.4 *ACSR/SD/GC2*—ACSR/SD using Class C zinc-coated steel wire (Specification **B498/B498M**).

3.1.5 *ACSR/SD/GA3*—ACSR/SD using high-strength Class A zinc-coated steel wire (Specification **B606/B606M**).

3.1.6 *ACSR/SD/MA2*—ACSR/SD using Class A zinc-5 % aluminum-mischmetal alloy-coated steel core wire (Specification **B802/B802M**).

3.1.7 *ACSR/SD/MC2*—ACSR/SD using Class C zinc-5 % aluminum-mischmetal alloy-coated steel core wire (Specification **B802/B802M**).

3.1.8 *ACSR/SD/MA3*—ACSR/SD using high-strength Class A zinc-5 % Aluminum-mischmetal alloy-coated steel core wire (Specification **B803/B803M**).

3.2 For definitions of terms relating to conductors, refer to Terminology Standard **B354**.

4. Ordering Information

4.1 Orders for material under this specification shall include the following information:

4.1.1 Quantity of each size and type (**Note 1**),

4.1.2 Conductor size: kcmil area,

4.1.3 Conductor type and number of wires, aluminum and steel (**Table 1**),

4.1.4 Type of steel core wire and if zinc or Zn-5 % Al-MM alloy coated, area density (Classes A and C) of coating (see **5.2**),

4.1.5 Special tension test, if required (see **9.2**),

4.1.6 Place of inspection (Section **15**),

4.1.7 Package size (see **16.1**),

4.1.8 Special package marking, if required (Section **17**), and

4.1.9 Heavy wood lagging, if required (see **16.3**).

5. Requirement For Wires

5.1 Before stranding, the round and trapezoidal aluminum wires shall conform to the requirements of Specification **B230/B230M** except for shape and diameter tolerance of the trapezoidal wires. The tensile strength and elongation requirements of trapezoidal wires shall be the same as for round wires of equal area. The area tolerances shall be such that the finished conductor conforms to Section **12**.

5.2 Before stranding, the steel core wire shall meet the requirements of Specifications **B498/B498M**, **B502/B502M**, **B606/B606M**, **B802/B802M**, or **B803/B803M**, whichever is applicable.

6. Joints

6.1 Electric-butt welds, electric-butt, cold-upset welds, or cold-pressure welds may be made in the individual aluminum wires during the stranding process. No weld shall occur within 50 ft. [15 m] of any other weld in the completed conductor (Explanatory **Note 3**).

6.2 There shall be no joints made in the finished steel wires.

7. Lay

7.1 The nominal lay factors for the trapezoidal aluminum wires are shown in **Table 1** (Explanatory **Note 1** and **Note 4**).

7.2 The length of lay for the round aluminum wires shall not be less than 10 nor more than 13 times the outside diameter of that layer.

7.3 In a conductor having multiple layers of aluminum wires, the length of lay of any aluminum layer shall not be less than the length of lay of the aluminum layer immediately beneath it.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, <http://www.nist.gov>.

⁵ Available from Aluminum Association, Inc., 1525 Wilson Blvd., Suite 600, Arlington, VA 22209, <http://www.aluminum.org>.