



Designation: B711 – 22

Standard Specification for Concentric-Lay-Stranded Aluminum-Alloy Conductors, Steel Reinforced (AACSR) (6201)¹

This standard is issued under the fixed designation B711; 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.

1. Scope

1.1 This specification covers concentric-lay-stranded conductors made from round aluminum-alloy 6201-T81 hard: solution heat treated, cold worked, and then artificially aged wire and round zinc-coated, Zn-5Al-MM coated, aluminum-coated, or aluminum-clad steel core wire for use as overhead electric conductors (Explanatory [Note 1](#) and [Note 2](#)).

NOTE 1—The alloy and temper designations conform to ANSI H35.1. Aluminum alloy 6201 corresponds to Unified Numbering System alloy A96201 in accordance with Practice [E527](#).

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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.

1.4 *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

[B263/B263M](#) Test Method for Determination of Cross-

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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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.

Sectional Area of Stranded Conductors

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

[B398/B398M](#) Specification for Aluminum-Alloy 6201-T81 and 6201-T83 Wire for Electrical Purposes

[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

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

[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

[B957/B957M](#) Specification for Extra-High-Strength and Ultra-High-Strength Zinc-Coated (Galvanized) Steel Core Wire for Overhead Electrical Conductors

[B958/B958M](#) Specification for Extra-High-Strength and Ultra-High-Strength Class A 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 *American National Standards Institute Standard:*

[H35.1M](#) Alloy and Temper Designation Systems for Aluminum³

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

2.4 Other Standards:

NBS Handbook 100—Copper Wire Tables⁴

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 **AACSR**—covered by this specification has ten types of coated steel and two types of aluminum-clad steel core wire which are designated by abbreviations as follows (Explanatory **Note 1** and **Note 9**):

3.1.1.1 **AACSR/GA2-AACSR**—using Class A zinc-coated steel wire in accordance with Specification **B498/B498M**.

3.1.1.2 **AACSR/GC2-AACSR**—using Class C zinc-coated steel wire in accordance with Specification **B498/B498M**.

3.1.1.3 **AACSR/GA3-AACSR**—using high-strength Class A zinc-coated steel wire in accordance with Specification **B606/B606M**.

3.1.1.4 **AACSR/GA4-AACSR**—using extra-high-strength Class A zinc-coated steel wire in accordance with Specification **B957/B957M**.

3.1.1.5 **AACSR/GA5-AACSR**—using ultra-high-strength Class A zinc-coated steel wire in accordance with Specification **B957/B957M**.

3.1.1.6 **AACSR/AW2-AACSR**—using aluminum-clad steel wire, normal strength in accordance with Specification **B502/B502M**.

3.1.1.7 **AACSR/AW3-AACSR**—using aluminum-clad steel wire, high strength in accordance with Specification **B502/B502M**.

3.1.1.8 **AACSR/MA2**—using Zn-5Al-MM coated steel core wire, coating Class A in accordance with Specification **B802/B802M**.

3.1.1.9 **AACSR/MC2**—using Zn-5Al-MM coated steel core wire, coating Class C in accordance with Specification **B802/B802M**.

3.1.1.10 **AACSR/MA3**—using high-strength Zn-5Al-MM coated steel core wire, coating Class A in accordance with Specification **B803/B803M**.

3.1.1.11 **AACSR/MA4**—using extra-high-strength Zn-5Al-MM coated steel core wire, coating Class A in accordance with Specification **B958/B958M**.

3.1.1.12 **AACSR/MA5**—using ultra-high-strength Zn-5Al-MM coated steel core wire, coating Class A in accordance with Specification **B958/B958M**.

4. Ordering Information

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

4.1.1 Quantity of each size and stranding,

4.1.2 Conductor size, square millimetres (Section 8 and **Table 1**);

4.1.3 Number of wires, aluminum-alloy and steel;

4.1.4 Type of steel core wire and, if galvanized or Zn-5Al-MM coated, class (A or C) of coating (see **5.2**);

4.1.5 Direction of lay of outer layer of aluminum-alloy wires if other than right-hand (see **7.4**);

4.1.6 Special tension test, if required (see **9.2**);

4.1.7 Place of inspection (Section 15);

4.1.8 Special package marking, if required (Section 16);

4.1.9 Package size (see **17.1**); and

4.1.10 Heavy wood lagging, if required (see **17.3**).

5. Requirement for Wires

5.1 Before stranding, the aluminum-alloy wire shall meet the requirements of Specification **B398/B398M**.

5.2 Before stranding, the steel core wire shall meet the requirements of Specifications **B498/B498M**, **B502/B502M**, **B606/B606M**, **B802/B802M**, **B803/B803M**, **B957/B957M** or **B958/B958M**, whichever is applicable.

5.3 Steel core supplied in a stranded construction shall meet the requirements of Specification **B500/B500M**, if applicable.

6. Joints

6.1 Cold-pressure welds, electric-butt welds, and electric-butt, cold-upset welds in the finished individual aluminum alloy wires composing the conductor may be made during the stranding process. Following welding, electric-butt welds shall be annealed for a distance of at least 150 mm on each side of the weld. No weld shall occur within 15 m of a weld in the same wire or in any other wire of the completed conductor (Explanatory **Note 3**).

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

7. Lay

7.1 The length of lay of the various layers of aluminum-alloy wire in a conductor shall conform to **Table 2** (Explanatory **Note 4**).

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

7.3 The length of lay in the various layers of steel wire in a conductor shall conform to the requirements of Specification **B500/B500M**.

7.4 The direction of lay of the outside layer of aluminum-alloy wires shall be right-hand unless otherwise specified in the purchase order. The direction of lay of the aluminum-alloy and steel wires shall be reversed in successive layers.

8. Construction

8.1 The number and diameter of aluminum-alloy and steel wires and the areas of cross section of aluminum-alloy wires shall conform to the requirements prescribed in **Table 1**.

9. Rated Strength of Conductor

9.1 The rated strength of a conductor shall be taken as the sum of the strengths of the aluminum-alloy and steel components, calculated as follows:

⁴ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 3460, Gaithersburg, MD 20899-3460.