



# Standard Specification for Concentric-Lay-Stranded Conductors of 8000 Series Aluminum Alloy for Subsequent Covering or Insulation<sup>1</sup>

This standard is issued under the fixed designation B 801; 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 aluminum alloys in the 8000 series cited in B 800 in tempers “0” and H1X or H2X bare compact-round, compressed and conventional concentric-lay-stranded conductors made from round or shaped wires used as covered or insulated electrical conductors. These conductors shall be composed of a central core surrounded by one or more compacted, compressed or conventional layers of helically applied wires (Explanatory **Note 1** and **Note 2**).

1.2 The SI values for resistivity are regarded as standard. For all other properties, the inch-pound units are regarded as standard and the SI units may be approximate.

1.3 Sealed conductors that are intended to prevent longitudinal water propagation are also permitted within the guidelines of this specification.

## 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:<sup>2</sup>

**B 193** Test Method for Resistivity of Electrical Conductor Materials

**B 263** Test Method for Determination of Cross-Sectional Area of Stranded Conductors

**B 354** Terminology Relating to Uninsulated Metallic Electrical Conductors

**B 800** Specification for 8000 Series Aluminum Alloy Wire for Electrical Purposes—Annealed and Intermediate Tempers

**E 29** Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

### 2.3 ANSI Standard:<sup>3</sup>

ANSI H35.1 Alloy and Temper Designation Systems for Aluminum

### 2.4 National Bureau of Standards:<sup>4</sup>

NBS Handbook 100—Copper Wire Tables

## 3. Classification

3.1 For the purpose of this specification, conductors are classified as follows:

3.1.1 *Class A*—For conductors to be covered with weather/resistant materials.

3.1.2 *Class B*—For conductors to be insulated with various materials such as rubber, paper, varnished cloth, etc., and for the conductors indicated under Class A where greater flexibility is required.

3.1.3 *Class C and D*—For conductors where greater flexibility is required than is provided by Class B conductors.

## 4. Ordering Information

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

4.1.1 Quantity of each size and class (**Table 1**).

4.1.2 Conductor size; circular-mil area or Awg (**Section 7**),

4.1.3 Class (See **3.1**),

4.1.4 Temper (**Section 12**),

4.1.5 Lay direction if nonstandard (See **6.3** and **6.4**), reversed or unidirectional (See **6.3**) or special (See **6.4**),

4.1.6 Special tension test, if required (See **8.2**),

4.1.7 Packaging (**Section 19**),

4.1.8 Special package marking (**Section 19**), and

4.1.9 Place of inspection (**Section 18**).

## 5. Joints

5.1 Joints may be made in any of the wires of any stranding by electric-butt welding, cold-pressure welding, or electric-butt, cold-upset welding.

5.2 Joints in the individual wires in a finished conductor shall be not closer together than 1 ft (0.3 m) for conductors of

<sup>1</sup> This specification is under the jurisdiction of Committee B-1 on Electrical Conductors and is the direct responsibility of Subcommittee B01.07 on Conductors of Light Metals.

Current edition approved Oct. 1, 2007. Published October 2007. Originally approved in 1988. Last previous edition approved in 1999 as B 801 – 99.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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

<sup>4</sup> Available from National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161, <http://www.ntis.gov>.

19 wires or less, or closer than 1 ft (0.3 m) in a layer for conductors of more than 19 wires.

5.3 No joint or splice shall be made in a stranded conductor as a whole.

## 6. Lay

6.1 The length of lay for all classes shall be not less than 8 nor more than 16 times the outside diameter of that layer, except that for conductors composed of 37 wires or more, this requirement shall apply only to the two outer layers. The lay of the layers other than the two outer layers shall be at the option of the manufacturer, unless otherwise agreed upon.

6.1.1 For conductors to be used in covered or insulated wires or cables, the lay length of the wires shall be not less than 8 nor more than 16 times the outer diameter of the finished conductor. For conductors of 37 wires or more, this requirement shall apply to the wires in the outer two layers. The lay of the layers other than the two outer layers shall be at the option of the manufacturer, unless otherwise agreed upon.

6.2 The direction of lay for Class A conductors shall be right-hand.

**TABLE 1 Construction Requirements for Aluminum Conductors in the 8000 Series Alloys**

| Conductor Size |     |                 | Class | Number <sup>A</sup><br>of Wires | Nominal Conductor Diameter |      |                                     |      |                      |      | Compact |      | Nominal Mass   |       | Nominal d-c<br>resistance <sup>B</sup> at 20°C |        |
|----------------|-----|-----------------|-------|---------------------------------|----------------------------|------|-------------------------------------|------|----------------------|------|---------|------|----------------|-------|------------------------------------------------|--------|
|                |     |                 |       |                                 | Conventional               |      | Reverse<br>Concentric<br>Compressed |      | Unilay<br>Compressed |      |         |      |                |       |                                                |        |
| Cmil           | AWG | mm <sup>2</sup> |       |                                 | in.                        | mm   | in.                                 | mm   | in.                  | mm.  | in      | mm   | lbs/1000<br>ft | kg/km | Ω/1000 ft                                      | Ω/km   |
| 1000000        |     | 507             | D     | 127                             | 1.153                      | 29.3 | 1.119                               | 28.4 |                      |      | 1.060   | 26.9 | 941            | 1400  | 0.0173                                         | 0.0568 |
| 1000000        |     | 507             | C     | 91                              | 1.153                      | 29.3 | 1.118                               | 28.4 | 1.084                | 27.5 | 1.060   | 26.9 | 941            | 1400  | 0.0173                                         | 0.0568 |
| 1000000        |     | 507             | B, A  | 61                              | 1.152                      | 29.3 | 1.117                               | 28.4 |                      |      | 1.060   | 26.9 | 941            | 1400  | 0.0173                                         | 0.0568 |
| 900000         |     | 456             | D     | 127                             | 1.095                      | 27.8 | 1.062                               | 27.0 |                      |      | 0.999   | 25.4 | 847            | 1260  | 0.0193                                         | 0.0633 |
| 900000         |     | 456             | C     | 91                              | 1.093                      | 27.8 | 1.060                               | 26.9 | 1.028                | 26.1 | 0.999   | 25.4 | 847            | 1260  | 0.0193                                         | 0.0633 |
| 900000         |     | 456             | B, A  | 61                              | 1.093                      | 27.8 | 1.060                               | 26.9 |                      |      | 0.999   | 25.4 | 847            | 1260  | 0.0193                                         | 0.0633 |
| 800000         |     | 405             | D     | 127                             | 1.032                      | 26.2 | 1.001                               | 25.4 |                      |      | 0.938   | 23.8 | 753            | 1120  | 0.0217                                         | 0.0712 |
| 800000         |     | 405             | C     | 91                              | 1.032                      | 26.2 | 1.001                               | 25.4 | 0.969                | 24.6 | 0.938   | 23.8 | 753            | 1120  | 0.0217                                         | 0.0712 |
| 800000         |     | 405             | B, A  | 61                              | 1.031                      | 26.2 | 1.000                               | 25.4 |                      |      | 0.938   | 23.8 | 753            | 1120  | 0.0217                                         | 0.0712 |
| 750000         |     | 380             | D     | 127                             | 0.998                      | 25.3 | 0.968                               | 24.6 |                      |      | 0.908   | 23.1 | 706            | 1050  | 0.0231                                         | 0.0758 |
| 750000         |     | 380             | C     | 91                              | 0.999                      | 25.4 | 0.969                               | 24.6 | 0.939                | 23.9 | 0.908   | 23.1 | 706            | 1050  | 0.0231                                         | 0.0758 |
| 750000         |     | 380             | B, A  | 61                              | 0.998                      | 25.3 | 0.968                               | 24.6 |                      |      | 0.908   | 23.1 | 706            | 1050  | 0.0231                                         | 0.0758 |
| 700000         |     | 355             | D     | 127                             | 0.965                      | 24.5 | 0.936                               | 23.8 |                      |      | 0.877   | 22.3 | 659            | 981   | 0.0248                                         | 0.0814 |
| 700000         |     | 355             | C     | 91                              | 0.965                      | 24.5 | 0.936                               | 23.8 | 0.907                | 23.0 | 0.877   | 22.3 | 659            | 981   | 0.0248                                         | 0.0814 |
| 700000         |     | 355             | B, A  | 61                              | 0.964                      | 24.5 | 0.935                               | 23.7 |                      |      | 0.877   | 22.3 | 659            | 981   | 0.0248                                         | 0.0814 |
| 650000         |     | 329             | D     | 127                             | 0.930                      | 23.6 | 0.902                               | 22.9 |                      |      | 0.845   | 21.5 | 612            | 911   | 0.0267                                         | 0.0876 |
| 650000         |     | 329             | C     | 91                              | 0.930                      | 23.6 | 0.902                               | 22.9 | 0.874                | 22.2 | 0.845   | 21.5 | 612            | 911   | 0.0267                                         | 0.0876 |
| 650000         |     | 329             | B     | 61                              | 0.929                      | 23.6 | 0.901                               | 22.9 |                      |      | 0.845   | 21.5 | 612            | 911   | 0.0267                                         | 0.0876 |
| 650000         |     | 329             | A     | 37                              | 0.928                      | 23.6 | 0.900                               | 22.9 |                      |      | 0.845   | 21.5 | 612            | 911   | 0.0267                                         | 0.0876 |
| 600000         |     | 304             | D     | 127                             | 0.893                      | 22.7 | 0.866                               | 22.0 |                      |      | 0.813   | 20.7 | 565            | 841   | 0.0289                                         | 0.0948 |
| 600000         |     | 304             | C     | 91                              | 0.893                      | 22.7 | 0.866                               | 22.0 | 0.840                | 21.3 | 0.813   | 20.7 | 565            | 841   | 0.0289                                         | 0.0948 |
| 600000         |     | 304             | B     | 61                              | 0.893                      | 22.7 | 0.866                               | 22.0 |                      |      | 0.813   | 20.7 | 565            | 841   | 0.0289                                         | 0.0948 |
| 600000         |     | 304             | A     | 37                              | 0.891                      | 22.6 | 0.864                               | 21.9 |                      |      | 0.813   | 20.7 | 565            | 841   | 0.0289                                         | 0.0948 |
| 556500         |     | 282             | D     | 127                             | 0.861                      | 21.9 | 0.835                               | 21.2 |                      |      | 0.780   | 19.8 | 524            | 780   | 0.0312                                         | 0.1024 |
| 556500         |     | 282             | C     | 91                              | 0.860                      | 21.8 | 0.834                               | 21.2 |                      |      | 0.780   | 19.8 | 524            | 780   | 0.0312                                         | 0.1024 |
| 556500         |     | 282             | B     | 61                              | 0.860                      | 21.8 | 0.834                               | 21.2 |                      |      | 0.780   | 19.8 | 524            | 780   | 0.0312                                         | 0.1024 |
| 556500         |     | 282             | A     | 37                              | 0.858                      | 21.8 | 0.832                               | 21.1 |                      |      | 0.780   | 19.8 | 524            | 780   | 0.0312                                         | 0.1024 |
| 550000         |     | 279             | D     | 127                             | 0.855                      | 21.7 | 0.829                               | 21.1 |                      |      | 0.775   | 19.7 | 518            | 771   | 0.0315                                         | 0.1034 |
| 550000         |     | 279             | C     | 91                              | 0.855                      | 21.7 | 0.829                               | 21.1 |                      |      | 0.775   | 19.7 | 518            | 771   | 0.0315                                         | 0.1034 |
| 550000         |     | 279             | B     | 61                              | 0.855                      | 21.7 | 0.829                               | 21.1 | 0.804                | 20.4 | 0.775   | 19.7 | 518            | 771   | 0.0315                                         | 0.1034 |
| 550000         |     | 279             | A     | 37                              | 0.853                      | 21.7 | 0.827                               | 21.0 |                      |      | 0.775   | 19.7 | 518            | 771   | 0.0315                                         | 0.1034 |
| 500000         |     | 253             | D     | 91                              | 0.815                      | 20.7 | 0.791                               | 20.1 |                      |      | 0.736   | 18.7 | 471            | 701   | 0.0347                                         | 0.1139 |
| 500000         |     | 253             | C     | 61                              | 0.815                      | 20.7 | 0.791                               | 20.1 | 0.766                | 19.5 | 0.736   | 18.7 | 471            | 701   | 0.0347                                         | 0.1139 |
| 500000         |     | 253             | B, A  | 37                              | 0.813                      | 20.7 | 0.789                               | 20.0 |                      |      | 0.736   | 18.7 | 471            | 701   | 0.0347                                         | 0.1139 |
| 477000         |     | 242             | D     | 91                              | 0.796                      | 20.2 | 0.772                               | 19.6 |                      |      | 0.722   | 18.3 | 449            | 668   | 0.0364                                         | 0.1194 |
| 477000         |     | 242             | C     | 61                              | 0.796                      | 20.2 | 0.772                               | 19.6 |                      |      | 0.722   | 18.3 | 449            | 668   | 0.0364                                         | 0.1194 |
| 477000         |     | 242             | B, A  | 37                              | 0.795                      | 20.2 | 0.771                               | 19.6 |                      |      | 0.722   | 18.3 | 449            | 668   | 0.0364                                         | 0.1194 |
| 450000         |     | 228             | D     | 91                              | 0.773                      | 19.6 | 0.750                               | 19.0 |                      |      | 0.700   | 17.8 | 424            | 631   | 0.0385                                         | 0.1263 |
| 450000         |     | 228             | C     | 61                              | 0.773                      | 19.6 | 0.750                               | 19.0 | 0.727                | 18.5 | 0.700   | 17.8 | 424            | 631   | 0.0385                                         | 0.1263 |
| 450000         |     | 228             | B, A  | 37                              | 0.772                      | 19.6 | 0.749                               | 19.0 |                      |      | 0.700   | 17.8 | 424            | 631   | 0.0385                                         | 0.1263 |
| 400000         |     | 203             | D     | 91                              | 0.729                      | 18.5 | 0.707                               | 18.0 |                      |      | 0.659   | 16.7 | 376            | 559   | 0.0434                                         | 0.1424 |
| 400000         |     | 203             | C     | 61                              | 0.729                      | 18.5 | 0.707                               | 18.0 | 0.685                | 17.4 | 0.659   | 16.7 | 376            | 559   | 0.0434                                         | 0.1424 |
| 400000         |     | 203             | B, A  | 37                              | 0.728                      | 18.5 | 0.706                               | 17.9 |                      |      | 0.659   | 16.7 | 376            | 559   | 0.0434                                         | 0.1424 |
| 397500         |     | 201             | D     | 91                              | 0.727                      | 18.5 | 0.705                               | 17.9 |                      |      | 0.659   | 16.7 | 374            | 557   | 0.0436                                         | 0.1431 |
| 397500         |     | 201             | C     | 61                              | 0.726                      | 18.4 | 0.704                               | 17.9 |                      |      | 0.659   | 16.7 | 374            | 557   | 0.0436                                         | 0.1431 |
| 397500         |     | 201             | B     | 37                              | 0.725                      | 18.4 | 0.703                               | 17.9 |                      |      | 0.659   | 16.7 | 374            | 557   | 0.0436                                         | 0.1431 |
| 397500         |     | 201             | A     | 19                              | 0.724                      | 18.4 | 0.702                               | 17.8 |                      |      | 0.659   | 16.7 | 374            | 557   | 0.0436                                         | 0.1431 |
| 350000         |     | 177             | D     | 91                              | 0.682                      | 17.3 | 0.661                               | 16.8 |                      |      | 0.616   | 15.6 | 329            | 490   | 0.0495                                         | 0.1624 |
| 350000         |     | 177             | C     | 61                              | 0.681                      | 17.3 | 0.661                               | 16.8 | 0.641                | 16.3 | 0.616   | 15.6 | 329            | 490   | 0.0495                                         | 0.1624 |
| 350000         |     | 177             | B     | 37                              | 0.681                      | 17.3 | 0.661                               | 16.8 |                      |      | 0.616   | 15.6 | 329            | 490   | 0.0495                                         | 0.1624 |

**TABLE 1** *Continued*

| Conductor Size |      |                 | Class | Number <sup>A</sup><br>of Wires | Nominal Conductor Diameter |      |                                     |      |                      |      | Compact |      | Nominal Mass   |       | Nominal d-c<br>resistance <sup>B</sup> at 20°C |        |
|----------------|------|-----------------|-------|---------------------------------|----------------------------|------|-------------------------------------|------|----------------------|------|---------|------|----------------|-------|------------------------------------------------|--------|
|                |      |                 |       |                                 | Conventional               |      | Reverse<br>Concentric<br>Compressed |      | Unilay<br>Compressed |      |         |      |                |       |                                                |        |
| Cmil           | AWG  | mm <sup>2</sup> |       |                                 | in.                        | mm   | in.                                 | mm   | in.                  | mm.  | in      | mm   | lbs/1000<br>ft | kg/km | Ω/1000 ft                                      | Ω/km   |
| 350000         |      | 177             | A     | 19                              | 0.679                      | 17.2 | 0.659                               | 16.7 |                      |      | 0.616   | 15.6 | 329            | 490   | 0.0495                                         | 0.1624 |
| 336400         |      | 170             | C     | 61                              | 0.669                      | 17.0 | 0.649                               | 16.5 |                      |      | 0.603   | 15.3 | 317            | 472   | 0.0516                                         | 0.1693 |
| 336400         |      | 170             | B     | 37                              | 0.668                      | 17.0 | 0.648                               | 16.5 |                      |      | 0.603   | 15.3 | 317            | 472   | 0.0516                                         | 0.1693 |
| 336400         |      | 170             | A     | 19                              | 0.666                      | 16.9 | 0.646                               | 16.4 |                      |      | 0.603   | 15.3 | 317            | 472   | 0.0516                                         | 0.1693 |
| 300000         |      | 152             | C     | 61                              | 0.631                      | 16.0 | 0.612                               | 15.5 |                      |      | 0.570   | 14.5 | 282            | 420   | 0.0578                                         | 0.1896 |
| 300000         |      | 152             | B     | 37                              | 0.630                      | 16.0 | 0.611                               | 15.5 | 0.594                | 15.1 | 0.570   | 14.5 | 282            | 420   | 0.0578                                         | 0.1896 |
| 300000         |      | 152             | A     | 19                              | 0.629                      | 16.0 | 0.610                               | 15.5 |                      |      | 0.576   | 14.5 | 282            | 420   | 0.0578                                         | 0.1896 |
| 266800         |      | 135             | C     | 61                              | 0.595                      | 15.1 | 0.577                               | 14.7 |                      |      | 0.537   | 13.6 | 251            | 373   | 0.0650                                         | 0.2133 |
| 266800         |      | 135             | B     | 37                              | 0.594                      | 15.1 | 0.576                               | 14.6 |                      |      | 0.537   | 13.6 | 251            | 373   | 0.0650                                         | 0.2133 |
| 266800         |      | 135             | A     | 19                              | 0.593                      | 15.0 | 0.575                               | 14.6 |                      |      | 0.537   | 13.6 | 251            | 373   | 0.0650                                         | 0.2133 |
| 250000         |      | 127             | C     | 61                              | 0.576                      | 14.6 | 0.559                               | 14.2 |                      |      | 0.520   | 13.2 | 235            | 350   | 0.0694                                         | 0.2277 |
| 250000         |      | 127             | B     | 37                              | 0.575                      | 14.6 | 0.558                               | 14.2 | 0.542                | 13.8 | 0.520   | 13.2 | 235            | 350   | 0.0694                                         | 0.2277 |
| 250000         |      | 127             | A     | 19                              | 0.574                      | 14.6 | 0.557                               | 14.1 |                      |      | 0.520   | 13.2 | 235            | 350   | 0.0694                                         | 0.2277 |
| 211600         | 0000 | 107             | C     | 37                              | 0.529                      | 13.4 | 0.513                               | 13.0 |                      |      | 0.475   | 12.1 | 199            | 296   | 0.0820                                         | 0.2690 |
| 211600         | 0000 | 107             | B     | 19                              | 0.528                      | 13.4 | 0.512                               | 13.0 | 0.498                | 12.6 | 0.475   | 12.1 | 199            | 296   | 0.0820                                         | 0.2690 |
| 211600         | 0000 | 107             | A     | 7                               | 0.522                      | 13.3 | 0.506                               | 13.0 |                      |      | 0.475   | 12.1 | 199            | 296   | 0.0820                                         | 0.2690 |
| 167800         | 000  | 85.0            | C     | 37                              | 0.471                      | 12.0 | 0.457                               | 11.6 |                      |      | 0.423   | 10.7 | 158            | 235   | 0.1033                                         | 0.3389 |
| 167800         | 000  | 85.0            | B     | 19                              | 0.470                      | 11.9 | 0.456                               | 11.6 | 0.443                | 11.3 | 0.423   | 10.7 | 158            | 235   | 0.1033                                         | 0.3389 |
| 167800         | 000  | 85.0            | A     | 7                               | 0.464                      | 11.8 | 0.450                               | 11.4 |                      |      | 0.423   | 10.7 | 158            | 235   | 0.1033                                         | 0.3389 |
| 133100         | 00   | 67.4            | B     | 19                              | 0.419                      | 10.6 | 0.406                               | 10.3 | 0.395                | 10.0 | 0.376   | 9.55 | 125            | 186   | 0.1303                                         | 0.4275 |
| 133100         | 00   | 67.4            | A     | 7                               | 0.414                      | 10.5 | 0.402                               | 10.2 |                      |      | 0.376   | 9.55 | 125            | 186   | 0.1303                                         | 0.4275 |
| 105600         | 0    | 53.5            | B     | 19                              | 0.373                      | 9.46 | 0.362                               | 9.19 |                      |      | 0.336   | 8.53 | 99.4           | 148   | 0.1642                                         | 0.5387 |
| 105600         | 0    | 53.5            | A     | 7                               | 0.368                      | 9.36 | 0.357                               | 9.07 | 0.352                | 8.94 | 0.336   | 8.53 | 99.4           | 148   | 0.1642                                         | 0.5387 |
| 83690          | 1    | 42.4            | B     | 19                              | 0.332                      | 8.43 | 0.322                               | 8.18 | 0.313                | 7.95 | 0.299   | 7.59 | 78.8           | 117   | 0.2072                                         | 0.6798 |
| 66360          | 2    | 33.6            | B, A  | 7                               | 0.292                      | 7.42 | 0.283                               | 7.19 |                      |      | 0.268   | 6.81 | 62.5           | 93.0  | 0.2613                                         | 0.8573 |
| 52620          | 3    | 26.7            | B, A  | 7                               | 0.260                      | 6.61 | 0.252                               | 6.41 |                      |      | 0.238   | 6.05 | 49.5           | 73.7  | 0.3296                                         | 1.0814 |
| 41740          | 4    | 21.2            | B, A  | 7                               | 0.232                      | 5.88 | 0.225                               | 5.72 |                      |      | 0.213   | 5.41 | 39.3           | 58.5  | 0.4155                                         | 1.3633 |
| 26240          | 6    | 13.3            | B, A  | 7                               | 0.184                      | 4.66 | 0.178                               | 4.53 |                      |      | 0.169   | 4.29 | 24.7           | 36.8  | 0.6609                                         | 2.1684 |
| 16510          | 8    | 8.37            | B, A  | 7                               | 0.146                      | 3.70 | 0.142                               | 3.60 |                      |      | 0.134   | 3.40 | 15.5           | 23.1  | 1.0504                                         | 3.4464 |

<sup>A</sup> For compact-stranded constructions, the number of wires may be reduced as follows:

19-Wire Constructions—18 Wires Minimum  
 37-Wire Constructions—35 Wires Minimum  
 61-Wire Constructions—58 Wires Minimum  
 91-Wire Constructions—87 Wires Minimum  
 127-Wire Constructions—122 Wires Minimum

<sup>B</sup> Nominal d-c resistance is based on 61.0 % IACS conductivity (17.002 Ω/cmil/ft).  
 See Explanatory **Note 3**.

6.3 The direction of lay of the outer layer shall be left-hand for all other classes, unless the direction is specified otherwise by the purchaser.

6.4 The direction of lay shall be reversed in successive layers in conventional and compressed constructions. In compact constructions, the lay of the successive layers may be either reversed or unidirectional.

6.4.1 For conductors to be used in covered or insulated wires or cables, the direction of lay of the outer layer shall be left-hand and may be reversed or unidirectional or unilay in successive layers, unless otherwise agreed upon with the purchaser.

6.5 The maximum length of lay for compact conductors AWG 2 and smaller shall be 17.5 times the outside diameter of that layer.

6.6 Other lay requirements may be furnished by special agreement between the manufacturer and the purchaser.

## 7. Construction

7.1 The construction of the conductors shall be as shown in **Table 1** as to number of wires and cross-sectional area of the completed conductor, and the lay shall be in accordance with **Section 6**.

7.2 Wire used in the fabrication of conductor shall be of such dimensions as to produce a finished conductor having a nominal cross-sectional area and diameter as prescribed in **Table 1**.

7.3 Where compressed stranding is required in order to insulate the conductor properly, one or more layers of any stranded conductor consisting of seven wires or more may be slightly compressed, thereby reducing the outside diameter of

the conductor by not more than 3 %, provided that the area of cross-section after compressing is in accordance with Section 15.

## 8. Mechanical and Electrical Tests of Conductors in 8000 Series Alloys in “0” Temper, H1X or H2X Wire and Not Annealed After Stranding

8.1 Tests for the mechanical and electrical properties of wire composing the conductor shall be made before, but not after stranding, unless otherwise agreed upon between the manufacturer and the purchaser as provided in 8.2 (Explanatory Note 4).

8.2 At the option of the purchaser, at the time of placing the order, tension and elongation tests of wire before stranding may be waived, and the completed conductor may be tested as a unit. The minimum breaking strength of conductors so tested shall be not less than the minimum rated strength of 8000 Series Aluminum Alloys “0” Temper or H1X and H2X conductors, whichever is applicable. The minimum breaking strength of bare conductors shall be not less than minimum rated strength if failure occurs in the free length at least 1 in. (25 mm) beyond the end of either gripping device, or shall be not less than 95 % of the minimum rated strength if failure occurs inside, or within 1 in. of the end of either gripping device. The maximum breaking strength of 8000 Series Aluminum Alloys “0” Temper or H1X and H2X conductors, whichever is applicable, shall be not greater than their maximum rated strengths. The free length between grips of the test specimen shall be not less than 24 in. (600 mm) and care shall be taken to ensure that the wires in the conductor are evenly gripped during the test (Section 13 and Explanatory Note 5).

## 9. Mechanical and Electrical Tests of Conductors Fabricated from Wires Other Than 8000-H2X and Annealed After Stranding to Meet 8000 “0” Temper or H2X Requirements

9.1 At the option of the manufacturer, mechanical and electrical tests may be performed in accordance with either paragraph 9.1.1 or 9.1.2.

9.1.1 The completed conductor shall be tested as a unit. The minimum breaking strength of bare conductors shall be not less than minimum rated strength if failure occurs in the free length at least 1 in. (25 mm) beyond the end of either gripping device, or shall be not less than 95 % of the minimum rated strength if failure occurs inside, or within 1 in. of the end of either gripping device. The maximum breaking strength of 8000 “0” Temper, or H2X conductors shall be not greater than their maximum rated strengths. The free length between grips of the test specimen shall be not less than 24 in. (600 mm), and care shall be taken to ensure that the wires in the conductor are evenly gripped during the test (Section 13 and Explanatory Note 5).

9.1.1.1 The nominal d-c resistance of the completed conductor in  $\Omega/1000$  ft shall conform to Table 1. The maximum d-c resistance for any conductor shall be taken as nominal + 2 %.

9.1.2 When wires removed from the stranded conductor are tested, intermediate temper (–H2X) wire shall have tensile strengths not less than 95 % of the minimum tensile strength

nor more than 105 % of the maximum tensile strength prescribed in Specification B 800.

9.1.3 When electrical testing is conducted on wires removed from the stranded conductor, the resistivity shall conform to Specification B 800.

## 10. Mass and Electrical Resistance

10.1 The mass and electrical resistance of a unit length of stranded conductor are a function of the length of lay. The approximate mass and electrical resistance may be determined using an increment of 2 %. When greater accuracy is desired, the increment based on the specific lay of the conductor may be calculated (Explanatory Note 6).

10.2 The maximum electrical resistance of a unit length of stranded conductor shall not exceed the nominal d-c resistance (Table 1) + 2 %. (See Explanatory Note 6).

10.2.1 When the d-c resistance is measured at other than 20°C, it is to be corrected by using the multiplying factor given in Table 2.

10.3 For conductors to be used in covered or insulated wires or cables, direct current (D-C) resistance measurement may be used instead of the method outlined in Section 15 to determine compliance with this specification.

## 11. Workmanship, Finish, and Appearance

11.1 The conductor shall be clean and free from imperfections not consistent with good commercial practice.

## 12. Requirements of Wires

12.1 Wires annealed before stranding shall meet the requirements of Specification B 800.

12.2 Wires shaped before stranding are not required to meet a specific dimension or area tolerance. The area tolerances for shaped wire of all tempers shall be such that the finished conductor conforms to Section 15. The tensile requirements shall be the same as those for round wires of equal nominal area.

**TABLE 2 Temperature Correction Factors for Conductor Resistance**

| Temperature, ° C | Multiplying Factor for Conversion to 20°C |
|------------------|-------------------------------------------|
| 0                | 1.088                                     |
| 5                | 1.064                                     |
| 10               | 1.042                                     |
| 15               | 1.020                                     |
| 20               | 1.000                                     |
| 25               | 0.980                                     |
| 30               | 0.961                                     |
| 35               | 0.943                                     |
| 40               | 0.925                                     |
| 45               | 0.908                                     |
| 50               | 0.892                                     |
| 55               | 0.876                                     |
| 60               | 0.861                                     |
| 65               | 0.846                                     |
| 70               | 0.832                                     |
| 75               | 0.818                                     |
| 80               | 0.805                                     |
| 85               | 0.792                                     |
| 90               | 0.780                                     |

### 13. Rated Strength of Conductor

13.1 Calculations for rated strengths of 8000 “0” Temper, H1X, and H2X conductors shall be made on the basis of the strengths of the component wires using the nominal wire diameter for the noncompacted construction and the specified maximum and minimum tensile strengths for the appropriate temper of the respective component wires given in Specifica-

tion **B 800**. The minimum rated strengths of the conductors shall be taken as the sum of the calculated minimum strengths of the component wires multiplied by the rating factor given in **Table 3**. The maximum rated strength of the conductors shall be taken as the sum of the calculated maximum strengths of the component wires.

**TABLE 3 Rating Factors**

NOTE 1— For compact-stranded construction minimum see Footnotes A through E.

| Stranding                    |                  | Rating Factor, % |
|------------------------------|------------------|------------------|
| Number of Wires in Conductor | Number of Layers |                  |
| 7                            | 1                | 96               |
| 19 <sup>A</sup>              | 2                | 93               |
| 37 <sup>B</sup>              | 3                | 91               |
| 61 <sup>C</sup>              | 4                | 90               |
| 91 <sup>D</sup>              | 5                | 90               |
| 127 <sup>E</sup>             | 6                | 90               |

<sup>A</sup> 18 wires minimum.

<sup>B</sup> 35 wires minimum.

<sup>C</sup> 58 wires minimum.

<sup>D</sup> 87 wires minimum.

<sup>E</sup> 122 wires minimum.

**TABLE 4 Conductor Rated Strengths**

| Conductor Size |     |                 | Number <sup>A</sup> of Wires | 8000 Series Alloys – “0” Temper |       |       |       | 8000 Series Alloys H1X, H2X |       |       |       |
|----------------|-----|-----------------|------------------------------|---------------------------------|-------|-------|-------|-----------------------------|-------|-------|-------|
|                |     |                 |                              | min                             |       | max   |       | min                         |       | max   |       |
| Cmil           | AWG | mm <sup>2</sup> |                              | lbf                             | N     | lbf   | N     | lbf                         | N     | lbf   | N     |
| 1000000        |     | 507             | 127                          | 6010                            | 26700 | 12600 | 56000 | 10600                       | 47100 | 17300 | 77000 |
| 1000000        |     | 507             | 91                           | 6010                            | 26700 | 12600 | 56000 | 10600                       | 47100 | 17300 | 77000 |
| 1000000        |     | 507             | 61                           | 6010                            | 26700 | 12600 | 56000 | 10600                       | 47100 | 17300 | 77000 |
| 900000         |     | 456             | 127                          | 5400                            | 24000 | 11300 | 50300 | 9540                        | 42400 | 15500 | 68900 |
| 900000         |     | 456             | 91                           | 5400                            | 24000 | 11300 | 50300 | 9540                        | 42400 | 15500 | 68900 |
| 900000         |     | 456             | 61                           | 5400                            | 24000 | 11300 | 50300 | 9540                        | 42400 | 15500 | 68900 |
| 800000         |     | 405             | 127                          | 4800                            | 21400 | 10000 | 44500 | 8480                        | 37700 | 13800 | 61400 |
| 800000         |     | 405             | 91                           | 4800                            | 21400 | 10000 | 44500 | 8480                        | 37700 | 13800 | 61400 |
| 800000         |     | 405             | 61                           | 4800                            | 21400 | 10000 | 44500 | 8480                        | 37700 | 13800 | 61400 |
| 750000         |     | 380             | 127                          | 4500                            | 20000 | 9420  | 41900 | 7950                        | 35400 | 13000 | 57800 |
| 750000         |     | 380             | 91                           | 4500                            | 20000 | 9420  | 41900 | 7950                        | 35400 | 13000 | 57800 |
| 750000         |     | 380             | 61                           | 4500                            | 20000 | 9420  | 41900 | 7950                        | 35400 | 13000 | 57800 |
| 700000         |     | 355             | 127                          | 4200                            | 18700 | 8790  | 39100 | 7420                        | 33000 | 12100 | 53800 |
| 700000         |     | 355             | 91                           | 4200                            | 18700 | 8790  | 39100 | 7420                        | 33000 | 12100 | 53800 |
| 700000         |     | 355             | 61                           | 4200                            | 18700 | 8790  | 39100 | 7420                        | 33000 | 12100 | 53800 |
| 650000         |     | 329             | 127                          | 3900                            | 17300 | 8160  | 36300 | 6890                        | 30600 | 11200 | 49800 |
| 650000         |     | 329             | 91                           | 3900                            | 17300 | 8160  | 36300 | 6890                        | 30600 | 11200 | 49800 |
| 650000         |     | 329             | 61                           | 3900                            | 17300 | 8160  | 36300 | 6890                        | 30600 | 11200 | 49800 |
| 650000         |     | 329             | 37                           | 3950                            | 17600 | 8160  | 36300 | 6960                        | 31000 | 11200 | 49800 |
| 600000         |     | 304             | 127                          | 3600                            | 16000 | 7540  | 33500 | 6360                        | 28300 | 10400 | 46300 |
| 600000         |     | 304             | 91                           | 3600                            | 16000 | 7540  | 33500 | 6360                        | 28300 | 10400 | 46300 |
| 600000         |     | 304             | 61                           | 3600                            | 16000 | 7540  | 33500 | 6360                        | 28300 | 10400 | 46300 |
| 600000         |     | 304             | 37                           | 3640                            | 16200 | 7540  | 33500 | 6430                        | 28600 | 10400 | 46300 |
| 556500         |     | 282             | 127                          | 3340                            | 14900 | 6990  | 31100 | 5900                        | 26200 | 9610  | 42700 |
| 556500         |     | 282             | 91                           | 3340                            | 14900 | 6990  | 31100 | 5900                        | 26200 | 9610  | 42700 |
| 556500         |     | 282             | 61                           | 3340                            | 14900 | 6990  | 31100 | 5900                        | 26200 | 9610  | 42700 |
| 556500         |     | 282             | 37                           | 3380                            | 15000 | 6990  | 31100 | 5960                        | 26500 | 9610  | 42700 |
| 550000         |     | 279             | 127                          | 3300                            | 14700 | 6910  | 30700 | 5830                        | 25900 | 9500  | 42300 |
| 550000         |     | 279             | 91                           | 3300                            | 14700 | 6910  | 30700 | 5830                        | 25900 | 9500  | 42300 |
| 550000         |     | 279             | 61                           | 3300                            | 14700 | 6910  | 30700 | 5830                        | 25900 | 9500  | 42300 |
| 550000         |     | 279             | 37                           | 3340                            | 14900 | 6910  | 30700 | 5890                        | 26200 | 9500  | 42300 |
| 500000         |     | 253             | 91                           | 3000                            | 13300 | 6280  | 27900 | 5300                        | 23600 | 8640  | 38400 |
| 500000         |     | 253             | 61                           | 3000                            | 13300 | 6280  | 27900 | 5300                        | 23600 | 8640  | 38400 |
| 500000         |     | 253             | 37                           | 3040                            | 13500 | 6280  | 27900 | 5360                        | 23800 | 8640  | 38400 |
| 477000         |     | 242             | 91                           | 2860                            | 12700 | 5990  | 26600 | 5060                        | 22500 | 8240  | 36700 |
| 477000         |     | 242             | 61                           | 2860                            | 12700 | 5990  | 26600 | 5060                        | 22500 | 8240  | 36700 |
| 477000         |     | 242             | 37                           | 2900                            | 12900 | 5990  | 26600 | 5110                        | 22700 | 8240  | 36700 |
| 450000         |     | 228             | 91                           | 2700                            | 12000 | 5650  | 25100 | 4770                        | 21200 | 7770  | 34600 |

**TABLE 4** *Continued*

| Conductor Size |      |                 | Number <sup>A</sup> of Wires | 8000 Series Alloys – “0” Temper |       |      |       | 8000 Series Alloys H1X, H2X |       |      |       |
|----------------|------|-----------------|------------------------------|---------------------------------|-------|------|-------|-----------------------------|-------|------|-------|
|                |      |                 |                              | min                             |       | max  |       | min                         |       | max  |       |
| Cmil           | AWG  | mm <sup>2</sup> |                              | lbf                             | N     | lbf  | N     | lbf                         | N     | lbf  | N     |
| 450000         |      | 228             | 61                           | 2700                            | 12000 | 5650 | 25100 | 4770                        | 21200 | 7770 | 34600 |
| 450000         |      | 228             | 37                           | 2730                            | 12100 | 5650 | 25100 | 4820                        | 21400 | 7770 | 34600 |
| 400000         |      | 203             | 91                           | 2400                            | 10700 | 5020 | 22300 | 4240                        | 18900 | 6910 | 30700 |
| 400000         |      | 203             | 61                           | 2400                            | 10700 | 5020 | 22300 | 4240                        | 18900 | 6910 | 30700 |
| 400000         |      | 203             | 37                           | 2430                            | 10800 | 5020 | 22300 | 4290                        | 19100 | 6910 | 30700 |
| 397500         |      | 201             | 91                           | 2390                            | 10600 | 4990 | 22200 | 4210                        | 18700 | 6860 | 30500 |
| 397500         |      | 201             | 61                           | 2390                            | 10600 | 4990 | 22200 | 4210                        | 18700 | 6860 | 30500 |
| 397500         |      | 201             | 37                           | 2410                            | 10700 | 4990 | 22200 | 4260                        | 18900 | 6860 | 30500 |
| 397500         |      | 201             | 19                           | 2470                            | 11000 | 4990 | 22200 | 4350                        | 19300 | 6860 | 30500 |
| 350000         |      | 177             | 91                           | 2100                            | 9340  | 4400 | 19600 | 3710                        | 16500 | 6040 | 26900 |
| 350000         |      | 177             | 61                           | 2100                            | 9340  | 4400 | 19600 | 3710                        | 16500 | 6040 | 26900 |
| 350000         |      | 177             | 37                           | 2130                            | 9470  | 4400 | 19600 | 3750                        | 16700 | 6040 | 26900 |
| 350000         |      | 177             | 19                           | 2170                            | 9650  | 4400 | 19600 | 3830                        | 17000 | 6040 | 26900 |
| 336400         |      | 170             | 61                           | 2020                            | 8980  | 4230 | 18800 | 3560                        | 15800 | 5810 | 25800 |
| 336400         |      | 170             | 37                           | 2040                            | 9070  | 4230 | 18800 | 3600                        | 16000 | 5810 | 25800 |
| 336400         |      | 170             | 19                           | 2090                            | 9300  | 4230 | 18800 | 3680                        | 16400 | 5810 | 25800 |
| 300000         |      | 152             | 61                           | 1800                            | 8010  | 3770 | 16800 | 3180                        | 14100 | 5180 | 23000 |
| 300000         |      | 152             | 37                           | 1820                            | 8100  | 3770 | 16800 | 3210                        | 14300 | 5180 | 23000 |
| 300000         |      | 152             | 19                           | 1860                            | 8270  | 3770 | 16800 | 3290                        | 14600 | 5180 | 23000 |
| 266800         |      | 135             | 61                           | 1600                            | 7120  | 3350 | 14900 | 2830                        | 12600 | 4610 | 20500 |
| 266800         |      | 135             | 37                           | 1620                            | 7210  | 3350 | 14900 | 2860                        | 12700 | 4610 | 20500 |
| 266800         |      | 135             | 19                           | 1660                            | 7380  | 3350 | 14900 | 2920                        | 13000 | 4610 | 20500 |
| 250000         |      | 127             | 61                           | 1500                            | 6670  | 3140 | 14000 | 2650                        | 11800 | 4320 | 19200 |
| 250000         |      | 127             | 37                           | 1520                            | 6760  | 3140 | 14000 | 2680                        | 11900 | 4320 | 19200 |
| 250000         |      | 127             | 19                           | 1550                            | 6890  | 3140 | 14000 | 2740                        | 12200 | 4320 | 19200 |
| 211600         | 0000 | 107             | 37                           | 1280                            | 5690  | 2660 | 11800 | 2270                        | 10100 | 3650 | 16200 |
| 211600         | 0000 | 107             | 19                           | 1310                            | 5830  | 2660 | 11800 | 2320                        | 10300 | 3650 | 16200 |
| 211600         | 0000 | 107             | 7                            | 1360                            | 6050  | 2660 | 11800 | 2390                        | 10600 | 3650 | 16200 |
| 167800         | 000  | 85.0            | 37                           | 1020                            | 4540  | 2110 | 9390  | 1800                        | 8010  | 2900 | 12900 |
| 167800         | 000  | 85.0            | 19                           | 1040                            | 4630  | 2110 | 9390  | 1840                        | 8180  | 2900 | 12900 |
| 167800         | 000  | 85.0            | 7                            | 1070                            | 4760  | 2110 | 9390  | 1900                        | 8450  | 2900 | 12900 |
| 133100         | 00   | 67.4            | 19                           | 826                             | 3670  | 1670 | 7430  | 1460                        | 6490  | 2300 | 10200 |
| 133100         | 00   | 67.4            | 7                            | 853                             | 3790  | 1670 | 7430  | 1500                        | 6670  | 2300 | 10200 |
| 105600         | 0    | 53.5            | 19                           | 655                             | 2910  | 1330 | 5920  | 1160                        | 5160  | 1820 | 8100  |
| 105600         | 0    | 53.5            | 7                            | 676                             | 3010  | 1330 | 5920  | 1190                        | 5290  | 1820 | 8100  |
| 83690          | 1    | 42.4            | 19                           | 519                             | 2310  | 1050 | 4670  | 916                         | 4070  | 1450 | 6450  |
| 66360          | 2    | 33.6            | 7                            | 425                             | 1890  | 833  | 3710  | 750                         | 3340  | 1150 | 5120  |
| 52620          | 3    | 26.7            | 7                            | 337                             | 1500  | 661  | 2940  | 595                         | 2650  | 909  | 4040  |
| 41740          | 4    | 21.2            | 7                            | 267                             | 1190  | 524  | 2330  | 472                         | 2100  | 721  | 3210  |
| 26240          | 6    | 13.3            | 7                            | 168                             | 747   | 330  | 1470  | 297                         | 1320  | 453  | 2010  |
| 16510          | 8    | 8.37            | 7                            | 106                             | 471   | 207  | 921   | 187                         | 832   | 285  | 1270  |

<sup>A</sup> For Compact-stranded Constructions, the number of wires may be reduced as follows:

19-Wire Constructions— 18 Wires Minimum  
 37-Wire Constructions— 35 Wires Minimum  
 61-Wire Constructions— 58 Wires Minimum  
 91-Wire Constructions— 87 Wires Minimum  
 127-Wire Constructions—122 Wires Minimum

13.2 Rated-strength and breaking-strength values shall be rounded to three significant figures, in the final value only in accordance with the rounding method of Practice E 29.

13.3 Rated strengths of “0” Temper, H1X and H2X conductors are given in Table 4.

#### 14. Density

14.1 For the purpose of calculating mass, cross sections, etc., the density of 8000 series Aluminum Alloys shall be taken as 0.098 lb/in.<sup>3</sup> (2.710 g/cm<sup>3</sup>) at 20°C.

#### 15. Variation in Area

15.1 The cross-sectional area of the conductor shall be not less than 98 % of the cross-sectional area as specified in Column 1 of Table 1.

15.2 The manufacturer shall determine the cross-sectional area by Test Method B 263. In applying this method, the increment in mass resulting from stranding may be the applicable value specified in 10.1 or it may be calculated from the measured dimensions of the sample under test. In case of question regarding area compliance, the actual weight increment due to stranding shall be calculated.

#### 16. Variation in Diameter

16.1 The average diameter of compact conductors shall vary by not more than + 1 % or – 2 % from the diameter specified in Table 1 except that compact construction sizes No. 1/0 (53.5 mm<sup>2</sup>) through No. 4/0 (107 mm<sup>2</sup>) composed of 18 or 19 wires shall vary by not more than + 1.5 % or – 2.5 % from the average diameter specified in Table 1. The diameters for

conventional and compressed constructions are given for information purposes only.

## 17. Sampling

17.1 The aluminum cross-sectional area (Section 15) and the diameter (Section 16) shall be measured on a sample of the completed conductor. At least one sample shall be tested on each size of conductor on each order of quantities from 5000 to 100 000 ft (1500 to 30 000 m), and one additional sample tested from each 100 000 ft thereafter.

## 18. Inspection

18.1 All tests and inspection shall be made at the place of manufacture unless otherwise especially agreed upon between the manufacturer and the purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable access to the manufacturer's facilities as required to ensure the material is being furnished in accordance with this specification.

## 19. Packaging and Package Marking

19.1 Package sizes for conductors shall be agreed upon between the manufacturer and the purchaser in the placing of individual orders.

19.2 There shall be only one length of conductor on a reel unless otherwise agreed upon between the manufacturer and purchaser at time of placing order.

19.3 The net mass, length (and number of lengths, if more than one length is included in the package), size, kind of conductor, purchase order number, and any other marks required by the purchase order shall be marked on a tag attached to the end of the conductor inside of the package. The same information, together with the manufacturer's serial number (if any) and all shipping marks required by the purchaser, shall appear on the outside of each package.

## 20. Keywords

20.1 aluminum alloy conductors; aluminum conductors; electrical conductors; 8000-series aluminum alloy conductors; stranded aluminum conductors

## EXPLANATORY NOTES

NOTE 1—In this specification compact, compressed and conventional round concentric-lay-stranded conductor constructions are specifically designated. Constructions not included in this specification should be specifically agreed upon between the manufacturer and the purchaser when placing the order.

NOTE 2—For definitions of terms relating to conductors, reference should be made to Terminology B 354.

NOTE 3—The d-c resistance on a given construction shall be calculated using the following formula:

$$R = (k/100 + 1)\rho/A$$

where:

$R$  = conductor resistance in  $\Omega/1000$  ft,

$k$  = increment due to stranding of 2 % and Explanatory Note 6,

$\rho$  = volume resistivity in ohms-cmil/ft, determined in accordance with Test Method B 193, and

$A$  = cross-sectional area of conductor in kcmil determined in accordance with Section 15 of this specification.

NOTE 4—When wires are annealed before stranding, individual wires should not be unlaidd from compact round or compressed conductors for testing purposes. Some physical properties of the individual compacted or compressed wires may be altered by the deformation brought about by compacting, compressing, unlaying, and straightening for test.

NOTE 5—To test stranded conductors for breaking strength successfully as a unit requires adequate means of gripping the ends of the test specimen

without causing damage that may result in a failure below the actual strength of the conductor. Various means are available, such as compression sleeves, split sleeves, and preformed grips, but ordinary jaws or clamping devices usually are not suitable.

NOTE 6—The increment of mass or electrical resistance of a completed concentric-lay-stranded conductor ( $k$ ) in percent is as follows:

$$k = 100(m - 1)$$

where  $m$  is the stranding factor, and is also the ratio of the linear density or electrical resistance of a unit length of stranded conductor to that of a solid conductor of the same cross-sectional area or of a stranded conductor with infinite length of lay, that is, all wires parallel to the conductor axis. The stranding factor  $m$  for the completed stranded conductor is the numerical average of the stranding factors for each of the individual wires in the conductor, including the straight core wire, if any (for which the lay factor is unity). The stranding factor ( $M_{ind}$ ) for any given wire in a concentric-lay-stranded conductor is:

$$M_{ind} = \sqrt{1 + (9.8696/n^2)}$$

where:

$$n = \frac{\text{length of lay}}{\text{diameter of helical path of the wire}}$$

The derivation of the above as given in *NBS Handbook 100* is based on round wire constructions which are applicable to compacted and compressed wire constructions.

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).*