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# Standard Specification for Rope-Lay-Stranded Copper Conductors Having Bunch-Stranded Members, for Electrical Conductors[1]

This standard is issued under the fixed designation B172; 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.

*This standard has been approved for use by agencies of the Department of Defense.*

~~ε1 NOTE—Table1 was editorially corrected in March 2007.~~

## 1. Scope

1.1 This specification covers bare rope-lay-stranded conductors having bunch-stranded members made from round copper wires, either uncoated or coated with tin, lead, or lead-alloy for use as electrical conductors (Explanatory Notes 1 and 2).

1.2 Coated wires shall include only those wires with finished diameters and densities substantially equal to the respective diameters and densities of uncoated wires.

1.3 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 nonconformance 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.

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



## 2. Referenced Documents

2.1 The following documents of the issue in effect at the time of reference form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards:*[2]

B3 Specification for Soft or Annealed Copper Wire
B33 Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
B173 Specification for Rope-Lay-Stranded Copper Conductors Having Concentric-Stranded Members, for Electrical Conductors
B189 Specification for Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes
B193 Test Method for Resistivity of Electrical Conductor Materials
B263 Test Method for Determination of Cross-Sectional Area of Stranded Conductors
B354 Terminology Relating to Uninsulated Metallic Electrical Conductors

2.3 *American National Standard:*

ANSI C42.35 Definitions of Electrical Terms[3]

## 3. Classification

3.1 For the purpose of this specification rope-lay-stranded conductors having bunch-stranded members are classifed as follows:

3.1.1 *Class I*—Conductors consisting of wires 0.0201-in. (0.511-mm) diameter (No. 24 AWG) to produce rope-lay-stranded conductors up to 2 000 000 cmil (1013 $mm^2$) in total cross-sectional area. (Typical use is for special apparatus conductor.)

3.1.2 *Class K*—Conductors consisting of wires 0.0100-in. (0.254-mm) diameter (No. 30 AWG) to produce rope-lay-stranded conductors up to 1 000 000 cmil (507 $mm^2$) in total cross-sectional area. (Typical use is for special portable cord and conductors.)

[1] This specification is under the jurisdiction of ASTM Committee B01 on Electrical Conductors and is the direct responsibility of Subcommittee B01.04 on Conductors of Copper and Copper Alloys.

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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.

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

3.1.3 *Class M*—Conductors consisting of wires 0.0063-in. (0.160-mm) diameter (No. 34 AWG) to produce rope-lay-stranded conductors up to 1 000 000 cmil (507 mm$^2$) in total cross-sectional area. (Typical use is for welding 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,

4.1.2 Conductor size: circular-mil area or AWG (see 7.1),

4.1.3 Class (Section 4 and ~~Table 1~~Tables 1-3),

4.1.4 Whether coated or uncoated; if coated, designate type of coating (see 11.1),

4.1.5 Details of special-purpose lays, if required (see 6.2, 6.3~~, and Explanatory Note 3),~~ , and Explanatory Note 3),

4.1.6 Package size (see 15.1),

4.1.7 Special package marking, if required (Section 14),

4.1.8 Lagging, if required (see 15.2), and

4.1.9 Place of inspection (Section 13).

## 5. Joints

5.1 Necessary joints in wires or in groups of wires shall be made in accordance with accepted commercial practice, taking into account the size of the wire or group of wires as related to the size of the entire conductor.

5.2 Bunch-stranded members or rope-stranded members forming the completed conductor may be joined as a unit by soldering, brazing, or welding.

5.3 Joints shall be so constructed and so disposed throughout the conductor that the diameter or configuration of the completed conductor is not substantially affected, and so that the flexibility of the completed conductor is not adversely affected.

## 6. Lay ~~(Explanatory Note 3)~~ (Explanatory Note 3)

6.1 Conductors of the same size and description furnished on one order shall have the same lay.

6.2 The length of lay of the outer layer of the rope-lay-stranded conductor shall not be less than 8 nor more than 16 times the outside diameter of the completed conductor. The length of lay of the other layers shall be at the option of the manufacturer unless specifically agreed upon. The direction of lay of the outer layer shall be left-hand, unless the direction of lay is specified otherwise by the purchaser. The direction of lay of the other layers shall be reversed in successive layers, unless otherwise agreed upon by the manufacturer and the purchaser.

6.3 The length of lay of the bunch-stranded and rope-stranded members shall be not more than 30 times the outside diameter of the member. The direction of lay shall be at the option of the manufacturer unless specifically agreed upon.

6.4 In very flexible conductors, such as welding conductor, the direction of lay of the stranded members forming rope-lay-stranded conductor may be in the same, rather than in reversed, directions as prescribed above.



## 7. Construction

7.1 The area of cross section, and the number and diameter of wires for a variety of strand constructions in general use are shown in ~~Table 1~~Tables 1-3.

7.2 The number of individual wires may vary slightly from those shown in ~~Table 1~~Tables 1-3, provided the nominal cross-sectional area of the conductor at any point be not less than that specified.

## 8. Physical and Electrical Tests

8.1 Tests for the electrical properties of wires composing conductors made from soft or annealed copper wire, bare or coated, shall be made before stranding.

8.2 Tests for the physical properties of soft or annealed copper wire, bare or coated, may be made upon the wires before stranding or upon wires removed from the completed stranded conductors, but need not be made upon both. Care shall be taken to avoid mechanical injury and stretching when removing wires from the conductor for the purpose of testing.

8.3 The physical properties of wire when tested before stranding shall conform to the applicable requirements of 11.1.

8.4 The physical properties of wires removed from the completed stranded conductor shall be permitted to vary from the applicable requirements of 11.1 by the following amounts (Explanatory Note 4):

8.4.1 *Average of Results Obtained on All Wires Tested*—The percent minimum elongation may be reduced by the value of 5 % from the values required for unstranded wires as specified by Specifications B3, B33, or B189, as applicable. For example, where the unstranded wire specification requires minimum elongation of 30 %, wire of that material removed from Specification B172 stranded conductor shall meet a minimum elongation value of 25 %.

8.4.2 *Results Obtained on Individual Wires*—The percent minimum elongation may be reduced by the value of 15 % from the values required for unstranded wires as specified by Specifications B3, B33, or B189, as applicable. For example, where the unstranded wire specification requires minimum elongation of 30 %, wire of that material removed from Specification B172 stranded conductor shall meet a minimum elongation value of 15 %. If the reduction results in minimum elongation of less than 5 %, a minimum of 5 % shall apply.

**TABLE 1 Construction Requirements of Class I Rope-Lay Stranded Copper Conductors Having Bunch- Stranded Members[A]**

| Area of Cross Section: cmil | Area of Cross Section: mm² | Size AWG | Nominal Number of Wires | Strand Construction A by B by C[C] | Approximate Mass[B]: lb/1000 ft. | Approximate Mass[B]: kg/km | Uncoated Copper, Nominal dc resistance @ 20°C: Ohm / kft | Uncoated Copper, Nominal dc resistance @ 20°C: Ohm / km | Uncoated Copper, Maximum dc resistance @ 20°C: Ohm / kft | Uncoated Copper, Maximum dc resistance @ 20°C: Ohm / km | Coated Copper, Nominal dc resistance @ 20°C: Ohm / kft | Coated Copper, Nominal dc resistance @ 20°C: Ohm / km | Coated Copper, Maximum dc resistance @ 20°C: Ohm / kft |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~2 000 000~~ | ~~1013~~ | ~~. . .~~ | ~~4921~~ | ~~19 by 7 by 37~~ | ~~6439~~ | ~~9583~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 2 000 000 | 1013 | . . . | 4921 | 19 by 7 by 37 | 6439 | 9583 | 0.00555 | 0.0182 | 0.00566 | 0.0186 | 0.00577 | 0.0189 | 0.00589 |
| ~~1 900 000~~ | ~~963~~ | ~~. . .~~ | ~~4788~~ | ~~19 by 7 by 36~~ | ~~6265~~ | ~~9324~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 900 000 | 963 | . . . | 4788 | 19 by 7 by 36 | 6265 | 9324 | 0.00584 | 0.0192 | 0.00596 | 0.0196 | 0.00607 | 0.0199 | 0.00619 |
| ~~1 800 000~~ | ~~912~~ | ~~. . .~~ | ~~4522~~ | ~~19 by 7 by 34~~ | ~~5917~~ | ~~8806~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 800 000 | 912 | . . . | 4522 | 19 by 7 by 34 | 5917 | 8806 | 0.00616 | 0.0202 | 0.00628 | 0.0206 | 0.00641 | 0.0210 | 0.00654 |
| ~~1 750 000~~ | ~~887~~ | ~~. . .~~ | ~~4389~~ | ~~19 by 7 by 33~~ | ~~5743~~ | ~~8547~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 750 000 | 887 | . . . | 4389 | 19 by 7 by 33 | 5743 | 8547 | 0.00634 | 0.0208 | 0.00647 | 0.0212 | 0.00659 | 0.0216 | 0.00672 |
| ~~1 700 000~~ | ~~861~~ | ~~. . .~~ | ~~4256~~ | ~~19 by 7 by 32~~ | ~~5569~~ | ~~8288~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 700 000 | 861 | . . . | 4256 | 19 by 7 by 32 | 5569 | 8288 | 0.00653 | 0.0214 | 0.00666 | 0.0218 | 0.00679 | 0.0223 | 0.00693 |
| ~~1 600 000~~ | ~~811~~ | ~~. . .~~ | ~~3990~~ | ~~19 by 7 by 30~~ | ~~5221~~ | ~~7770~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 600 000 | 811 | . . . | 3990 | 19 by 7 by 30 | 5221 | 7770 | 0.00694 | 0.0228 | 0.00708 | 0.0233 | 0.00721 | 0.0237 | 0.00735 |
| ~~1 500 000~~ | ~~760~~ | ~~. . .~~ | ~~3724~~ | ~~19 by 7 by 28~~ | ~~4873~~ | ~~7252~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 500 000 | 760 | . . . | 3724 | 19 by 7 by 28 | 4873 | 7252 | 0.00740 | 0.0243 | 0.00755 | 0.0248 | 0.00769 | 0.0252 | 0.00784 |
| ~~1 400 000~~ | ~~709~~ | ~~. . .~~ | ~~3458~~ | ~~19 by 7 by 26~~ | ~~4525~~ | ~~6734~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 400 000 | 709 | . . . | 3458 | 19 by 7 by 26 | 4525 | 6734 | 0.00793 | 0.0260 | 0.00809 | 0.0265 | 0.00824 | 0.0270 | 0.00840 |
| ~~1 300 000~~ | ~~659~~ | ~~. . .~~ | ~~3192~~ | ~~19 by 7 by 24~~ | ~~4177~~ | ~~6216~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 300 000 | 659 | . . . | 3192 | 19 by 7 by 24 | 4177 | 6216 | 0.00854 | 0.0280 | 0.00871 | 0.0286 | 0.00888 | 0.0291 | 0.00906 |
| ~~1 250 000~~ | ~~633~~ | ~~. . .~~ | ~~3059~~ | ~~19 by 7 by 23~~ | ~~4003~~ | ~~5957~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 250 000 | 633 | . . . | 3059 | 19 by 7 by 23 | 4003 | 5957 | 0.00888 | 0.0291 | 0.00906 | 0.0297 | 0.00923 | 0.0303 | 0.00941 |
| ~~1 200 000~~ | ~~608~~ | ~~. . .~~ | ~~2926~~ | ~~19 by 7 by 22~~ | ~~3829~~ | ~~5698~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 200 000 | 608 | . . . | 2926 | 19 by 7 by 22 | 3829 | 5698 | 0.00925 | 0.0303 | 0.00944 | 0.0309 | 0.00962 | 0.0316 | 0.00981 |
| ~~1 100 000~~ | ~~557~~ | ~~. . .~~ | ~~2793~~ | ~~19 by 7 by 21~~ | ~~3655~~ | ~~5439~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ | ~~. . .~~ |
| 1 100 000 | 557 | . . . | 2793 | 19 by 7 by 21 | 3655 | 5439 | 0.0101 | 0.0331 | 0.0103 | 0.0338 | 0.0105 | 0.0344 | 0.0107 |
| ~~1 000 000~~ | ~~507~~ | ~~. . .~~ | ~~2527~~ | ~~19 by 7 by 19~~ | ~~3307~~ | ~~4921~~ | ~~10 1037 by 7 by 39~~ | | ~~3272~~ | ~~4869~~ | ~~25 693 by 7 by 59~~ | | ~~3239~~ |
| 1 000 000 | 507 | . . . | 2527 | 19 by 7 by 19 | 3307 | 4921 | 0.0111 | 0.0364 | 0.0113 | 0.0371 | 0.0115 | 0.0379 | 0.0117 |
| ~~900 000~~ | ~~456~~ | ~~. . .~~ | ~~2261~~ | ~~19 by 7 by 17~~ | ~~2959~~ | ~~4403~~ | ~~9065 37 by 7 by 35~~ | | ~~2936~~ | ~~4369~~ | ~~22 631 by 7 by 53~~ | | ~~2909~~ |
| 900 000 | 456 | . . . | 2261 | 19 by 7 by 17 | 2959 | 4403 | 0.0123 | 0.0405 | 0.0125 | 0.0413 | 0.0128 | 0.0421 | 0.0131 |
| ~~800 000~~ | ~~405~~ | ~~. . .~~ | ~~1995~~ | ~~19 by 7 by 15~~ | ~~2611~~ | ~~3885~~ | ~~7980 19 by 7 by 60~~ | | ~~2585~~ | ~~3846~~ | ~~20 069 by 7 by 47~~ | | ~~2580~~ |
| 800 000 | 405 | . . . | 1995 | 19 by 7 by 15 | 2611 | 3885 | 0.0139 | 0.0455 | 0.0142 | 0.0464 | 0.0144 | 0.0473 | 0.0147 |
| ~~× 750 000~~ | ~~380~~ | ~~. . .~~ | ~~1862~~ | ~~19 by 7 by 14~~ | ~~2436~~ | ~~3626~~ | ~~7581 19 by 7 by 57~~ | | ~~2455~~ | ~~3654~~ | ~~18 788 by 7 by 44~~ | | ~~2415~~ |
| 750 000 | 380 | . . . | 1862 | 19 by 7 by 14 | 2436 | 3626 | 0.0148 | 0.0485 | 0.0151 | 0.0495 | 0.0154 | 0.0505 | 0.0157 |
| ~~700 000~~ | ~~355~~ | ~~. . .~~ | ~~1729~~ | ~~19 by 7 by 13~~ | ~~2262~~ | ~~3367~~ | ~~6916 19 by 7 by 52~~ | | ~~2240~~ | ~~3333~~ | ~~17 507 by 7 by 41~~ | | ~~2251~~ |
| 700 000 | 355 | . . . | 1729 | 19 by 7 by 13 | 2262 | 3367 | 0.0159 | 0.0520 | 0.0162 | 0.0530 | 0.0165 | 0.0541 | 0.0168 |
| ~~650 000~~ | ~~329~~ | ~~. . .~~ | ~~1596~~ | ~~19 by 7 by 12~~ | ~~2088~~ | ~~3108~~ | ~~6517 19 by 7 by 49~~ | | ~~2111~~ | ~~3141~~ | ~~16 226 by 7 by 38~~ | | ~~2086~~ |
| 650 000 | 329 | . . . | 1596 | 19 by 7 by 12 | 2088 | 3108 | 0.0171 | 0.0560 | 0.0174 | 0.0571 | 0.0178 | 0.0583 | 0.0182 |
| ~~600 000~~ | ~~304~~ | ~~. . .~~ | ~~1470~~ | ~~7 by 7 by 30~~ | ~~1906~~ | ~~2836~~ | ~~5985 19 by 7 by 45~~ | | ~~1938~~ | ~~2885~~ | ~~14 945 by 7 by 35~~ | | ~~1921~~ |
| 600 000 | 304 | . . . | 1470 | 7 by 7 by 30 | 1906 | 2836 | 0.0183 | 0.0601 | 0.0187 | 0.0613 | 0.0191 | 0.0625 | 0.0195 |
| ~~550 000~~ | ~~279~~ | ~~. . .~~ | ~~1372~~ | ~~7 by 7 by 28~~ | ~~1779~~ | ~~2647~~ | ~~5453 19 by 7 by 41~~ | | ~~1766~~ | ~~2628~~ | ~~13 664 by 7 by 32~~ | | ~~1757~~ |
| 550 000 | 279 | . . . | 1372 | 7 by 7 by 28 | 1779 | 2647 | 0.0200 | 0.0656 | 0.0204 | 0.0669 | 0.0208 | 0.0682 | 0.0212 |
| ~~500 000~~ | ~~253~~ | ~~. . .~~ | ~~1225~~ | ~~7 by 7 by 25~~ | ~~1588~~ | ~~2363~~ | ~~5054 9 by 7 by 38~~ | | ~~1637~~ | ~~2436~~ | ~~12 671 by 7 by 49~~ | | ~~1631~~ |
| 500 000 | 253 | . . . | 1225 | 7 by 7 by 25 | 1588 | 2363 | 0.0220 | 0.0721 | 0.0224 | 0.0735 | 0.0229 | 0.0750 | 0.0234 |
| ~~450 000~~ | ~~228~~ | ~~. . .~~ | ~~1127~~ | ~~7 by 7 by 23~~ | ~~1461~~ | ~~2174~~ | ~~4522 19 by 7 by 34~~ | | ~~1465~~ | ~~2180~~ | ~~11 376 by 7 by 44~~ | | ~~1465~~ |
| 450 000 | 228 | . . . | 1127 | 7 by 7 by 23 | 1461 | 2174 | 0.0244 | 0.0802 | 0.0249 | 0.0817 | 0.0254 | 0.0834 | 0.0259 |
| ~~400 000~~ | ~~203~~ | ~~. . .~~ | ~~980~~ | ~~7 by 7 by 20~~ | ~~1270~~ | ~~1891~~ | ~~3990 19 by 7 by 30~~ | | ~~1292~~ | ~~1923~~ | ~~10 301 by 7 by 39~~ | | ~~1298~~ |
| 400 000 | 203 | . . . | 980 | 7 by 7 by 20 | 1270 | 1891 | 0.0275 | 0.0902 | 0.0281 | 0.0920 | 0.0286 | 0.0938 | 0.0292 |
| ~~350 000~~ | ~~177~~ | ~~. . .~~ | ~~882~~ | ~~7 by 7 by 18~~ | ~~1143~~ | ~~1701~~ | ~~3458 19 by 7 by 26~~ | | ~~1120~~ | ~~1667~~ | ~~8836 by 7 by 34~~ | | ~~1132~~ |
| 350 000 | 177 | . . . | 882 | 7 by 7 by 18 | 1143 | 1701 | 0.0314 | 0.103 | 0.0320 | 0.105 | 0.0327 | 0.107 | 0.0334 |
| ~~300 000~~ | ~~152~~ | ~~. . .~~ | ~~735~~ | ~~7 by 7 by 15~~ | ~~953~~ | ~~1418~~ | ~~2989 7 by 7 by 61~~ | | ~~959~~ | ~~1427~~ | ~~7589 by 7 by 57~~ | | ~~975~~ |
| 300 000 | 152 | . . . | 735 | 7 by 7 by 15 | 953 | 1418 | 0.0366 | 0.120 | 0.0373 | 0.122 | 0.0381 | 0.125 | 0.0389 |
| ~~250 000~~ | ~~127~~ | ~~. . .~~ | ~~637~~ | ~~7 by 7 by 13~~ | ~~826~~ | ~~1229~~ | ~~2499 7 by 7 by 51~~ | | ~~802~~ | ~~1193~~ | ~~6384 by 7 by 48~~ | | ~~821~~ |
| 250 000 | 127 | . . . | 637 | 7 by 7 by 13 | 826 | 1229 | 0.0440 | 0.144 | 0.0449 | 0.147 | 0.0457 | 0.150 | 0.0466 |
| ~~211 600~~ | ~~107~~ | ~~0000~~ | ~~532~~ | ~~19 by 28~~ | ~~683~~ | ~~1017~~ | ~~2107 7 by 7 by 43~~ | | ~~676~~ | ~~1006~~ | ~~5320 by 7 by 40~~ | | ~~684~~ |
| 211 600 | 107 | 0000 | 532 | 19 by 28 | 683 | 1017 | 0.0515 | 0.169 | 0.0525 | 0.172 | 0.0536 | 0.176 | 0.0546 |
| ~~167 800~~ | ~~85.0~~ | ~~000~~ | ~~418~~ | ~~19 by 22~~ | ~~537~~ | ~~799~~ | ~~1666 7 by 7 by 34~~ | | ~~535~~ | ~~795~~ | ~~4256 by 7 by 32~~ | | ~~547~~ |
| 167 800 | 85 | 000 | 418 | 19 by 22 | 537 | 799 | 0.0649 | 0.213 | 0.0662 | 0.217 | 0.0675 | 0.221 | 0.0689 |
| ~~133 100~~ | ~~67.4~~ | ~~00~~ | ~~342~~ | ~~19 by 18~~ | ~~439~~ | ~~654~~ | ~~1323 7 by 7 by 27~~ | | ~~424~~ | ~~632~~ | ~~3325 by 7 by 25~~ | | ~~427~~ |
| 133 100 | 67.4 | 00 | 342 | 19 by 18 | 439 | 654 | 0.0818 | 0.268 | 0.0834 | 0.273 | 0.0851 | 0.279 | 0.0868 |
| ~~105 600~~ | ~~53.5~~ | ~~0~~ | ~~266~~ | ~~19 by 14~~ | ~~342~~ | ~~508~~ | ~~1064~~ | ~~19 by 56~~ | ~~338~~ | ~~503~~ | ~~2646 by 7 by 54~~ | | ~~337~~ |
| 105 600 | 53.5 | 0 | 266 | 19 by 14 | 342 | 508 | 0.103 | 0.338 | 0.105 | 0.345 | 0.107 | 0.352 | 0.109 |
| ~~83 690~~ | ~~42.4~~ | ~~1~~ | ~~210~~ | ~~7 by 30~~ | ~~267~~ | ~~397~~ | ~~836~~ | ~~19 by 44~~ | ~~266~~ | ~~395~~ | ~~2107 by 7 by 43~~ | | ~~268~~ |
| 83 690 | 42.4 | 1 | 210 | 7 by 30 | 267 | 397 | 0.129 | 0.423 | 0.132 | 0.431 | 0.134 | 0.440 | 0.137 |

**TABLE 2 Construction Requirements of Class K Rope-Lay Stranded Copper Conductors Having Bunch Stranded Members**[A]

| Area of Cross Section | | | Wire Diameter 0.0100 In. (0.254 mm) | | Approximate Mass[B] | | Uncoated Copper | | | | Coated Copper | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cmil | mm² | Size AWG | Nominal Number of Wires | Strand Construction A by B by C[C] | Lb/1000 ft | Kg/km | Nominal dc resistance @ 20°C | | Maximum dc resistance @ 20°C | | Nominal dc resistance @ 20°C | | Maximum dc resistance @ 20°C | |
| 1,000,000 | 507 | ..... | 10101 | 37 by 7 by 39 | 3272 | 4869 | 0.0111 | 0.0364 | 0.0113 | 0.0371 | 0.0119 | 0.0391 | 0.0121 | 0.0399 |
| 900,000 | 456 | ..... | 9065 | 37 by 7 by 35 | 2936 | 4369 | 0.0123 | 0.0405 | 0.0125 | 0.0413 | 0.0132 | 0.0434 | 0.0135 | 0.0443 |
| 800,000 | 405 | ..... | 7980 | 19 by 7 by 60 | 2585 | 3846 | 0.0139 | 0.0455 | 0.0142 | 0.0464 | 0.0149 | 0.0489 | 0.0152 | 0.0499 |
| 750,000 | 380 | ..... | 7581 | 19 by 7 by 57 | 2455 | 3654 | 0.0148 | 0.0485 | 0.0151 | 0.0495 | 0.0159 | 0.0521 | 0.0162 | 0.0531 |
| 700,000 | 355 | ..... | 6916 | 19 by 7 by 52 | 2240 | 3333 | 0.0159 | 0.0520 | 0.0162 | 0.0530 | 0.0170 | 0.0558 | 0.0173 | 0.0569 |
| 650,000 | 329 | ..... | 6517 | 19 by 7 by 49 | 2111 | 3141 | 0.0171 | 0.0560 | 0.0174 | 0.0571 | 0.0183 | 0.0601 | 0.0187 | 0.0613 |
| 600,000 | 304 | ..... | 5985 | 19 by 7 by 45 | 1938 | 2885 | 0.0185 | 0.0607 | 0.0189 | 0.0619 | 0.0199 | 0.0651 | 0.0203 | 0.0664 |
| 550,000 | 279 | ..... | 5453 | 19 by 7 by 41 | 1766 | 2628 | 0.0202 | 0.0662 | 0.0206 | 0.0675 | 0.0217 | 0.0711 | 0.0221 | 0.0725 |
| 500,000 | 253 | ..... | 5054 | 19 by 7 by 38 | 1637 | 2436 | 0.0222 | 0.0728 | 0.0226 | 0.0743 | 0.0238 | 0.0782 | 0.0243 | 0.0798 |
| 450,000 | 228 | ..... | 4522 | 19 by 7 by 34 | 1465 | 2180 | 0.0247 | 0.0809 | 0.0252 | 0.0825 | 0.0265 | 0.0869 | 0.0270 | 0.0886 |
| 400,000 | 203 | ..... | 3990 | 19 by 7 by 30 | 1292 | 1923 | 0.0277 | 0.0910 | 0.0283 | 0.0928 | 0.0298 | 0.0977 | 0.0304 | 0.0997 |
| 350,000 | 177 | ..... | 3458 | 19 by 7 by 26 | 1120 | 1667 | 0.0317 | 0.104 | 0.0323 | 0.106 | 0.0340 | 0.112 | 0.0347 | 0.114 |
| 300,000 | 152 | ..... | 2989 | 7 by 7 by 61 | 959 | 1427 | 0.0366 | 0.120 | 0.0373 | 0.122 | 0.0393 | 0.129 | 0.0401 | 0.132 |
| 250,000 | 127 | ..... | 2499 | 7 by 7 by 51 | 802 | 1193 | 0.0440 | 0.144 | 0.0449 | 0.147 | 0.0472 | 0.155 | 0.0481 | 0.158 |
| 211,600 | 107 | 0000 | 2107 | 7 by 7 by 43 | 676 | 1006 | 0.0520 | 0.171 | 0.0530 | 0.174 | 0.0558 | 0.183 | 0.0569 | 0.187 |
| 167,800 | 85 | 000 | 1666 | 7 by 7 by 34 | 535 | 795 | 0.0655 | 0.215 | 0.0668 | 0.219 | 0.0703 | 0.231 | 0.0717 | 0.236 |
| 133,100 | 67.4 | 00 | 1323 | 7 by 7 by 27 | 424 | 632 | 0.0826 | 0.271 | 0.0843 | 0.276 | 0.0887 | 0.291 | 0.0905 | 0.297 |
| 105,600 | 53.5 | 0 | 1064 | 19 by 56 | 338 | 503 | 0.103 | 0.338 | 0.105 | 0.345 | 0.111 | 0.363 | 0.113 | 0.370 |
| 83,690 | 42.4 | 1 | 836 | 19 by 44 | 266 | 395 | 0.130 | 0.427 | 0.133 | 0.435 | 0.140 | 0.458 | 0.142 | 0.467 |
| 66,360 | 33.6 | 2 | 665 | 19 by 35 | 211 | 315 | 0.164 | 0.538 | 0.167 | 0.549 | 0.176 | 0.578 | 0.180 | 0.590 |
| 52,620 | 26.7 | 3 | 532 | 19 by 28 | 169 | 252 | 0.207 | 0.679 | 0.211 | 0.693 | 0.222 | 0.729 | 0.227 | 0.744 |
| 41,740 | 21.1 | 4 | 420 | 7 by 60 | 132 | 197 | 0.258 | 0.848 | 0.264 | 0.865 | 0.277 | 0.910 | 0.283 | 0.928 |
| 33,090 | 16.8 | 5 | 336 | 7 by 48 | 106 | 157 | 0.326 | 1.07 | 0.333 | 1.09 | 0.350 | 1.15 | 0.357 | 1.17 |
| 26,240 | 13.3 | 6 | 266 | 7 by 38 | 84 | 125 | 0.411 | 1.35 | 0.419 | 1.38 | 0.441 | 1.45 | 0.450 | 1.48 |
| 20,820 | 10.5 | 7 | 210 | 7 by 30 | 66 | 98 | 0.518 | 1.70 | 0.528 | 1.73 | 0.556 | 1.82 | 0.567 | 1.86 |
| 16,510 | 8.37 | 8 | 168 | 7 by 24 | 53 | 79 | 0.653 | 2.14 | 0.666 | 2.19 | 0.701 | 2.30 | 0.715 | 2.35 |
| 13,090 | 6.63 | 9 | 133 | 7 by 19 | 42 | 62 | 0.824 | 2.70 | 0.840 | 2.76 | 0.885 | 2.90 | 0.902 | 2.96 |

[A] The constructions shown in this table are typical of those used in the industry. It is not intended that this table preclude other constructions which may be desirable for specific applications. The constructions shown provide for finished covered or non-covered stranded conductor approximately of the area indicated. When specified by the purchaser, the number of strands may be increased to provide additional area to compensate for draw-down during subsequent processing.

[B] Values for the mass of the completed conductor are approximate. The mass values are based upon the standard stranding increments listed in Explanatory Note 6.

[C] Strand construction – A by B by C where C is the number of wires in each bunch-stranded member, B is the number of bunch-stranded members which make up each rope stranded member, and A (where used) is the number of rope-stranded members in the conductor. Where A is not given, the conductor consists of one rope-stranded member. For example, 19 by 7 by 32 indicates a construction consisting of 19 rope-stranded members each of which consist of 7 bunch-stranded members with 32 wires each.