



C102/C110 Copper Alloy Conductor Wire

Introduction

Copper is the “standard” metal used for electrical conductors. Copper has extremely high electrical conductivity, surpassed only by pure silver. It has excellent tensile, solderability, and corrosion characteristics.

C102 is an oxygen free (OF copper that has better drawing and resistance to hydrogen embrittlement than C110 (ETP). OF copper contains less dissolved oxygen than ETP, which gives OF its performance advantage. In most applications, ETP is an acceptable conductor material and is more economical than OF copper.

Both OF and ETP copper conductors are available bare, or plated with silver, nickel, or tin. To learn more please contact our [sales department](#).

C102/C110 Copper Alloy Conductor Wire

Specifications

NEMA WC67

ASTM B8

ASTM B33

ASTM B286

ASTM B298

ASTM B355

Physical Properties

SOFT

| | |
|-----------------------------------|--------------------------|
| Available Platings | Ag, Ni |
| Elongation | 10-20% |
| Tensile | 32 ksi |
| Electrical Conductivity | 100% IACS @ 68 °F |
| Electrical Resistivity | 10.4 Ω-cmil/ft @ 68 °F |
| Density | 0.323 lb/in ³ |
| Coefficient of Thermal Resistance | 0.00218 per °F |
| Melting Point (Solidus) | 1,953 °F |
| Melting Point (Liquidus) | 1,980 °F |

HARD

| | |
|-------------------------|--------------------------|
| Available Platings | Ag, Ni, Sn |
| Elongation | 1% |
| Tensile | 60 ksi |
| Electrical Conductivity | 96% IACS @ 68 °F |
| Electrical Resistivity | 10.8 Ω-cmil/ft @ 68 °F |
| Density | 0.323 lb/in ³ |

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HARD

| | |
|-----------------------------------|----------------|
| Coefficient of Thermal Resistance | 0.00218 per °F |
| Melting Point (Solidus) | 1,953 °F |
| Melting Point (Liquidus) | 1,980 °F |

C102/C110 Copper Alloy Conductor Wire

19-Strand

| NICKEL PLATED COPPER - SOFT (50 MICRO-INCH NICKEL THICKNESS) | | | | | | | |
|--|-------|--------------------|-----------------|--------|--------|----------------|-----------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST | WEIGHT |
| | | | Nom | Min | Max | (Ω/mft) Max | (lb/mft) Max |
| 18 | 19/30 | 2 | 0.0472 | 0.0462 | 0.0482 | 5.97 | 5.94 |
| 20 | 19/32 | 4 | 0.0378 | 0.0368 | 0.0387 | 9.52 | 3.86 |
| 22 | 19/34 | 4 | 0.0298 | 0.0289 | 0.0307 | 15.4 | 2.43 |
| 24 | 19/36 | 4 | 0.0238 | 0.0228 | 0.0247 | 24.7 | 1.57 |
| 26 | 19/38 | 7 | 0.0191 | 0.0182 | 0.0200 | 40.0 | 1.03 |
| 28 | 19/40 | 7 | 0.0150 | 0.0140 | 0.0159 | 67.5 | 0.648 |

| SILVER PLATED COPPER - SOFT (40 MICRO-INCH SILVER THICKNESS) | | | | | | | |
|--|----------------------|--------------------|-----------------|---------|--------|----------------|-----------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST | WEIGHT |
| | | | Nom | Min | Max | (Ω/mft) Max | (lb/mft) Max |
| 18 | 19/30 | 2 | 0.0469 | 0.0462 | 0.0476 | 5.97 | 5.83 |
| 20 | 19/32 | 2.5 | 0.0378 | 0.0368 | 0.0387 | 9.52 | 3.75 |
| 22 | 19/34 | 3 | 0.0298 | 0.0289 | 0.0307 | 15.4 | 2.35 |
| 24 | 19/36 | 4 | 0.0238 | 0.0228 | 0.0247 | 24.7 | 1.49 |
| 26 | 19/38 | 5 | 0.0191 | 0.0182 | 0.0200 | 40.0 | 0.965 |
| 28 | 19/40 | 6.1 | 0.0150 | 0.0140 | 0.0159 | 67.5 | 0.589 |
| 30 | 19/42 | 8 | 0.0117 | 0.0112 | 0.0122 | 99.0 | 0.389 |
| 32 | 19/44 ⁽¹⁾ | 10 | 0.0100 | 0.00940 | 0.0105 | 154 | 0.266 |

(1) True Concentric

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7-Strand

| NICKEL PLATED COPPER - SOFT (50 MICRO-INCH NICKEL THICKNESS) | | | | | | | |
|--|-------|--------------------|-----------------|---------|---------|-------------------------|-----------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST | WEIGHT |
| | | | Nom | Min | Max | (Ω /mft) Max | (lb/mft) Max |
| 22 | 7/30 | 2 | 0.0300 | 0.0293 | 0.0306 | 16.0 | 2.28 |
| 24 | 7/32 | 4 | 0.0240 | 0.0234 | 0.0245 | 25.3 | 1.45 |
| 26 | 7/34 | 4 | 0.0188 | 0.0183 | 0.0193 | 41.1 | 0.891 |
| 28 | 7/36 | 4 | 0.0150 | 0.0145 | 0.0154 | 66.3 | 0.566 |
| 30 | 7/38 | 7 | 0.0120 | 0.0115 | 0.0124 | 106 | 0.368 |
| 32 | 7/40 | 7 | 0.00890 | 0.00825 | 0.00960 | 204 | 0.223 |

| SILVER PLATED COPPER - SOFT (40 MICRO-INCH SILVER THICKNESS) | | | | | | | |
|--|-------|--------------------|-----------------|---------|---------|-------------------------|-----------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST | WEIGHT |
| | | | Nom | Min | Max | (Ω /mft) Max | (lb/mft) Max |
| 22 | 7/30 | 2 | 0.0300 | 0.0297 | 0.0303 | 15.4 | 2.24 |
| 24 | 7/32 | 2.5 | 0.0240 | 0.0237 | 0.0243 | 24.0 | 1.44 |
| 26 | 7/34 | 3 | 0.0189 | 0.0186 | 0.0192 | 39.0 | 0.896 |
| 28 | 7/36 | 4 | 0.0150 | 0.0147 | 0.0153 | 62.4 | 0.570 |
| 30 | 7/38 | 5 | 0.0120 | 0.0117 | 0.0123 | 98.1 | 0.368 |
| 32 | 7/40 | 6.1 | 0.00930 | 0.00900 | 0.00960 | 167 | 0.226 |
| 34 | 7/42 | 8 | 0.00750 | 0.00720 | 0.00780 | 260 | 0.150 |
| 36 | 7/44 | 10 | 0.00600 | 0.00570 | 0.00630 | 414 | 0.0973 |
| 38 | 7/46 | 10 | 0.00470 | 0.00450 | 0.00492 | 666 | 0.0598 |

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Single End

| NICKEL PLATED COPPER - SOFT (50 MICRO-INCH NICKEL THICKNESS) | | | | | | | |
|--|-------|--------------------|-----------------|---------|---------|-------------------------|-----------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST | WEIGHT |
| | | | Nom | Min | Max | (Ω /mft) Max | (lb/mft) Max |
| 30 | SE | 2 | 0.0101 | 0.00990 | 0.0103 | 111 | 0.321 |
| 31 | SE | 4 | 0.00900 | 0.00880 | 0.00920 | 143 | 0.256 |
| 32 | SE | 4 | 0.00810 | 0.00785 | 0.00830 | 178 | 0.208 |
| 33 | SE | 4 | 0.00710 | 0.00690 | 0.00730 | 232 | 0.161 |
| 34 | SE | 4 | 0.00640 | 0.00620 | 0.00660 | 287 | 0.132 |
| 35 | SE | 4 | 0.00570 | 0.00550 | 0.00590 | 365 | 0.105 |
| 36 | SE | 4 | 0.00510 | 0.00490 | 0.00530 | 460 | 0.0850 |
| 37 | SE | 7 | 0.00460 | 0.00435 | 0.00480 | 590 | 0.0697 |
| 38 | SE | 7 | 0.00410 | 0.00390 | 0.00430 | 734 | 0.0560 |
| 39 | SE | 7 | 0.00360 | 0.00340 | 0.00380 | 986 | 0.0437 |
| 40 | SE | 7 | 0.00320 | 0.00300 | 0.00340 | 1,266 | 0.0350 |

| SILVER PLATED COPPER - SOFT (40 MICRO-INCH SILVER THICKNESS) | | | | | | | |
|--|-------|--------------------|-----------------|---------|---------|-------------------------|-----------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST | WEIGHT |
| | | | Nom | Min | Max | (Ω /mft) Max | (lb/mft) Max |
| 30 | SE | 2 | 0.0100 | 0.00990 | 0.0101 | 106 | 0.310 |
| 31 | SE | 2.5 | 0.00890 | 0.00880 | 0.00900 | 134 | 0.250 |
| 32 | SE | 2.5 | 0.00800 | 0.00790 | 0.00810 | 167 | 0.201 |
| 33 | SE | 3 | 0.00710 | 0.00690 | 0.00720 | 218 | 0.159 |
| 34 | SE | 3 | 0.00630 | 0.00620 | 0.00640 | 270 | 0.126 |
| 35 | SE | 4 | 0.00560 | 0.00550 | 0.00570 | 343 | 0.100 |
| 36 | SE | 4 | 0.00500 | 0.00490 | 0.00510 | 432 | 0.0800 |
| 37 | SE | 5 | 0.00450 | 0.00435 | 0.00460 | 549 | 0.0645 |

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| SILVER PLATED COPPER - SOFT (40 MICRO-INCH SILVER THICKNESS) | | | | | | | |
|--|-------|-----------------------|-----------------|----------|---------|-----------------------------------|---------------------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST (Ω /mft) Max | WEIGHT (lb/mft) Max |
| | | | Nom | Min | Max | | |
| 38 | SE | 5 | 0.00400 | 0.00390 | 0.00410 | 682 | 0.0520 |
| 39 | SE | 6.1 | 0.00350 | 0.00340 | 0.00360 | 898 | 0.0406 |
| 40 | SE | 6.1 | 0.00310 | 0.00300 | 0.00320 | 1,160 | 0.0316 |
| 41 | SE | 8 | 0.00280 | 0.00270 | 0.00290 | 1,430 | 0.0260 |
| 42 | SE | 8 | 0.00250 | 0.00240 | 0.00260 | 1,810 | 0.0209 |
| 43 | SE | 10 | 0.00220 | 0.00210 | 0.00230 | 2,352 | 0.0167 |
| 44 | SE | 10 | 0.00200 | 0.00190 | 0.00210 | 2,880 | 0.0137 |
| 45 ⁽¹⁾ | SE | 10 ⁽²⁾ | 0.00180 | 0.00166 | 0.00190 | 3,770 | 0.0108 |
| 46 ⁽¹⁾ | SE | 10 ⁽²⁾ | 0.00157 | 0.00147 | 0.00167 | 4,799 | 0.00860 |
| 47 ⁽¹⁾ | SE | 10 ⁽²⁾ | 0.00140 | 0.00130 | 0.00150 | 6,232 | 0.00690 |
| 48 ⁽¹⁾ | SE | 10 ⁽²⁾ | 0.00124 | 0.00114 | 0.00134 | 7,980 | 0.00560 |
| 49 ⁽¹⁾ | SE | 10 ⁽²⁾ | 0.00111 | 0.00101 | 0.00121 | 10,167 | 0.00450 |
| 50 ⁽¹⁾ | SE | 10 ⁽²⁾ | 0.000990 | 0.000890 | 0.00109 | 13,212 | 0.00370 |

(1) These single end sizes will be hard temper
(2) These single end sizes will not have 40 micro-inches of silver