



Copper Clad Steel (40%) Copper Alloy Conductor Wire

Introduction

Copper Clad Steel (CCS) is a composite conductor material containing a low carbon steel core surrounded by copper. The copper provides the electrical conductivity, and the steel contributes strength to the conductor. The most common grade of CCS used for electrical conductors has a nominal 40% IACS electrical conductivity. CCS is suitable for applications where high strength and medium conductivity are required. Copper Clad Steel is also suited for high frequency signal applications since high frequency currents travel mainly in the outer skin of a conductor.

CCS is available bare, or plated with silver, nickel, or tin. To learn more please contact our [sales department](#).

Copper Clad Steel (40%) Copper Alloy Conductor Wire

Specifications

ASTM B228

ASTM B452

Physical Properties

SOFT

| | |
|-----------------------------------|--------------------------|
| Available Platings | Ag, Ni |
| Elongation | 10% |
| Tensile | 45 ksi |
| Electrical Conductivity | 39% IACS @ 68 °F |
| Electrical Resistivity | 26.6 Ω-cmil/ft @ 68 °F |
| Density | 0.298 lb/in ³ |
| Coefficient of Thermal Resistance | 0.0021 per °F |
| Melting Point (Solidus) | 1,949 °F |
| Melting Point (Liquidus) | 1,981 °F |

HARD

| | |
|-----------------------------------|--------------------------|
| Available Platings | Ag, Ni, Sn |
| Elongation | 1% |
| Tensile | 110 ksi |
| Electrical Conductivity | 39% IACS @ 68 °F |
| Electrical Resistivity | 26.6 Ω-cmil/ft @ 68 °F |
| Density | 0.298 lb/in ³ |
| Coefficient of Thermal Resistance | 0.0021 per °F |
| Melting Point (Solidus) | 1,949 °F |
| Melting Point (Liquidus) | 1,981 °F |

Copper Clad Steel (40%) Copper Alloy Conductor Wire

19-Strand

| BARE CCS (40%) - HARD TEMPER | | | | | | | |
|------------------------------|-------|-----------------|--------|--------|-------------------------|-----------------|-------------|
| AWG | CONST | DIAMETER (inch) | | | RESIST | WEIGHT | BREAK STRG |
| | | Nom | Min | Max | (Ω /mft) Max | (lb/mft) Max | (lb) Min |
| 18 | 19/30 | 0.0472 | 0.0467 | 0.0477 | 14.5 | 5.47 | 160 |
| 20 | 19/32 | 0.0378 | 0.0372 | 0.0383 | 22.8 | 3.51 | 102 |
| 22 | 19/34 | 0.0298 | 0.0292 | 0.0303 | 37.1 | 2.20 | 63.0 |
| 24 | 19/36 | 0.0236 | 0.0231 | 0.0241 | 59.0 | 1.39 | 39.4 |
| 26 | 19/38 | 0.0189 | 0.0184 | 0.0194 | 93.3 | 0.899 | 24.9 |
| 28 | 19/40 | 0.0147 | 0.0141 | 0.0152 | 159 | 0.548 | 14.7 |

| BARE CCS (40%) - SOFT TEMPER | | | | | | | |
|------------------------------|-------|-----------------|--------|--------|-------------------------|-----------------|-------------|
| AWG | CONST | DIAMETER (inch) | | | RESIST | WEIGHT | BREAK STRG |
| | | Nom | Min | Max | (Ω /mft) Max | (lb/mft) Max | (lb) Min |
| 18 | 19/30 | 0.0472 | 0.0467 | 0.0477 | 14.5 | 5.47 | 65.8 |
| 20 | 19/32 | 0.0378 | 0.0372 | 0.0383 | 22.8 | 3.51 | 41.9 |
| 22 | 19/34 | 0.0298 | 0.0292 | 0.0303 | 37.1 | 2.20 | 25.8 |
| 24 | 19/36 | 0.0236 | 0.0231 | 0.0241 | 59.0 | 1.39 | 16.1 |
| 26 | 19/38 | 0.0189 | 0.0184 | 0.0194 | 93.3 | 0.899 | 10.2 |
| 28 | 19/40 | 0.0147 | 0.0141 | 0.0152 | 158 | 0.548 | 6.04 |

Copper Clad Steel (40%) Copper Alloy Conductor Wire

7-Strand

| BARE CCS (40%) - HARD TEMPER | | | | | | | |
|------------------------------|-------|-----------------|---------|---------|-------------------------|-----------------|-------------|
| AWG | CONST | DIAMETER (inch) | | | RESIST | WEIGHT | BREAK STRG |
| | | Nom | Min | Max | (Ω /mft) Max | (lb/mft) Max | (lb) Min |
| 22 | 7/30 | 0.0300 | 0.0297 | 0.0303 | 39.4 | 2.06 | 59.2 |
| 24 | 7/32 | 0.0240 | 0.0237 | 0.0243 | 61.5 | 1.32 | 37.7 |
| 26 | 7/34 | 0.0189 | 0.0186 | 0.0192 | 99.9 | 0.823 | 23.2 |
| 28 | 7/36 | 0.0150 | 0.0147 | 0.0153 | 160 | 0.522 | 14.5 |
| 30 | 7/38 | 0.0120 | 0.0117 | 0.0123 | 252 | 0.337 | 9.19 |
| 32 | 7/40 | 0.00930 | 0.00900 | 0.00960 | 427 | 0.206 | 5.44 |

| BARE CCS (40%) - SOFT TEMPER | | | | | | | |
|------------------------------|-------|-----------------|---------|---------|-------------------------|-----------------|-------------|
| AWG | CONST | DIAMETER (inch) | | | RESIST | WEIGHT | BREAK STRG |
| | | Nom | Min | Max | (Ω /mft) Max | (lb/mft) Max | (lb) Min |
| 22 | 7/30 | 0.0300 | 0.0297 | 0.0303 | 39.4 | 2.06 | 24.2 |
| 24 | 7/32 | 0.0240 | 0.0237 | 0.0243 | 61.5 | 1.32 | 15.4 |
| 26 | 7/34 | 0.0189 | 0.0186 | 0.0192 | 99.9 | 0.823 | 9.50 |
| 28 | 7/36 | 0.0150 | 0.0147 | 0.0153 | 160 | 0.522 | 5.94 |
| 30 | 7/38 | 0.0120 | 0.0117 | 0.0123 | 252 | 0.337 | 3.76 |
| 32 | 7/40 | 0.00930 | 0.00900 | 0.00960 | 427 | 0.206 | 2.22 |

Copper Clad Steel (40%) Copper Alloy Conductor Wire

Single End

| NICKEL PLATED CCS (40%) - HARD (50 MICRO-INCH NICKEL THICKNESS) | | | | | | | | |
|---|-------|--------------------|-----------------|---------|---------|--------------------|---------------------|---------------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST (Ω/mft) Max | WEIGHT (lb/mft) Max | BREAK STRG (lb) Min |
| | | | Nom | Min | Max | | | |
| 30 | SE | 2 | 0.0101 | 0.00990 | 0.0103 | 282 | 0.300 | 8.46 |
| 31 | SE | 4 | 0.00900 | 0.00880 | 0.00920 | 364 | 0.238 | 6.69 |
| 32 | SE | 4 | 0.00810 | 0.00785 | 0.00830 | 451 | 0.194 | 5.32 |
| 33 | SE | 4 | 0.00710 | 0.00690 | 0.00730 | 575 | 0.154 | 4.17 |
| 34 | SE | 4 | 0.00640 | 0.00620 | 0.00660 | 732 | 0.121 | 3.32 |
| 35 | SE | 4 | 0.00570 | 0.00550 | 0.00590 | 931 | 0.0966 | 2.61 |
| 36 | SE | 4 | 0.00510 | 0.00490 | 0.00530 | 1,172 | 0.0779 | 2.07 |
| 37 | SE | 7 | 0.00460 | 0.00435 | 0.00480 | 1,501 | 0.0639 | 1.63 |
| 38 | SE | 7 | 0.00410 | 0.00390 | 0.00430 | 1,911 | 0.0513 | 1.31 |
| 39 | SE | 7 | 0.00360 | 0.00340 | 0.00380 | 2,514 | 0.0401 | 0.0999 |
| 40 | SE | 7 | 0.00320 | 0.00300 | 0.00340 | 3,230 | 0.0321 | 0.0778 |

| NICKEL PLATED CCS (40%) - SOFT (50 MICRO-INCH NICKEL THICKNESS) | | | | | | | | |
|---|-------|--------------------|-----------------|---------|---------|--------------------|---------------------|---------------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST (Ω/mft) Max | WEIGHT (lb/mft) Max | BREAK STRG (lb) Min |
| | | | Nom | Min | Max | | | |
| 30 | SE | 2 | 0.0101 | 0.00990 | 0.0103 | 282 | 0.300 | 3.46 |
| 31 | SE | 4 | 0.00900 | 0.00880 | 0.00920 | 364 | 0.238 | 2.73 |
| 32 | SE | 4 | 0.00810 | 0.00785 | 0.00830 | 451 | 0.194 | 2.17 |
| 33 | SE | 4 | 0.00710 | 0.00690 | 0.00730 | 575 | 0.154 | 1.70 |
| 34 | SE | 4 | 0.00640 | 0.00620 | 0.00660 | 732 | 0.121 | 1.35 |
| 35 | SE | 4 | 0.00570 | 0.00550 | 0.00590 | 931 | 0.0966 | 1.06 |
| 36 | SE | 4 | 0.00510 | 0.00490 | 0.00530 | 1,240 | 0.0779 | 0.848 |
| 37 | SE | 7 | 0.00460 | 0.00435 | 0.00480 | 1,570 | 0.0639 | 0.668 |

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| NICKEL PLATED CCS (40%) - SOFT (50 MICRO-INCH NICKEL THICKNESS) | | | | | | | | |
|---|-------|--------------------|-----------------|---------|---------|--------------------|---------------------|---------------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST (Ω/mft) Max | WEIGHT (lb/mft) Max | BREAK STRG (lb) Min |
| | | | Nom | Min | Max | | | |
| 38 | SE | 7 | 0.00410 | 0.00390 | 0.00430 | 1,950 | 0.0513 | 0.537 |
| 39 | SE | 7 | 0.00360 | 0.00340 | 0.00380 | 2,520 | 0.0401 | 0.409 |
| 40 | SE | 7 | 0.00320 | 0.00300 | 0.00340 | 3,300 | 0.0321 | 0.318 |

| SILVER PLATED CCS (40%) - HARD (40 MICRO-INCH SILVER THICKNESS) | | | | | | | | |
|---|-------|--------------------|-----------------|---------|---------|--------------------|---------------------|---------------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST (Ω/mft) Max | WEIGHT (lb/mft) Max | BREAK STRG (lb) Min |
| | | | Nom | Min | Max | | | |
| 30 | SE | 2 | 0.0100 | 0.00990 | 0.0101 | 272 | 0.290 | 8.46 |
| 31 | SE | 2.5 | 0.00890 | 0.00880 | 0.00900 | 344 | 0.229 | 6.69 |
| 32 | SE | 2.5 | 0.00800 | 0.00790 | 0.00810 | 427 | 0.186 | 5.39 |
| 33 | SE | 3 | 0.00710 | 0.00690 | 0.00720 | 543 | 0.147 | 4.23 |
| 34 | SE | 3 | 0.00630 | 0.00620 | 0.00640 | 692 | 0.116 | 3.32 |
| 35 | SE | 4 | 0.00560 | 0.00550 | 0.00570 | 880 | 0.0921 | 2.61 |
| 36 | SE | 4 | 0.00500 | 0.00490 | 0.00510 | 1,110 | 0.0739 | 2.07 |
| 37 | SE | 5 | 0.00450 | 0.00435 | 0.00460 | 1,410 | 0.0602 | 1.63 |
| 38 | SE | 5 | 0.00400 | 0.00390 | 0.00410 | 1,750 | 0.0479 | 1.31 |
| 39 | SE | 6.1 | 0.00350 | 0.00340 | 0.00363 | 2,270 | 0.0375 | 0.0999 |
| 40 | SE | 6.1 | 0.00310 | 0.00300 | 0.00320 | 2,960 | 0.0293 | 0.0778 |

| SILVER PLATED CCS (40%) - SOFT (40 MICRO-INCH SILVER THICKNESS) | | | | | | | | |
|---|-------|--------------------|-----------------|---------|---------|--------------------|---------------------|---------------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST (Ω/mft) Max | WEIGHT (lb/mft) Max | BREAK STRG (lb) Min |
| | | | Nom | Min | Max | | | |
| 30 | SE | 2 | 0.0100 | 0.00990 | 0.0101 | 272 | 0.290 | 3.46 |
| 31 | SE | 2.5 | 0.00890 | 0.00880 | 0.00900 | 344 | 0.229 | 2.73 |

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| SILVER PLATED CCS (40%) - SOFT (40 MICRO-INCH SILVER THICKNESS) | | | | | | | | |
|---|-------|--------------------|-----------------|---------|---------|--------------------|---------------------|---------------------|
| AWG | CONST | STANDARD PLATE (%) | DIAMETER (inch) | | | RESIST (Ω/mft) Max | WEIGHT (lb/mft) Max | BREAK STRG (lb) Min |
| | | | Nom | Min | Max | | | |
| 32 | SE | 2.5 | 0.00800 | 0.00790 | 0.00810 | 427 | 0.186 | 2.20 |
| 33 | SE | 3 | 0.00710 | 0.00690 | 0.00720 | 543 | 0.147 | 1.73 |
| 34 | SE | 3 | 0.00630 | 0.00620 | 0.00640 | 692 | 0.116 | 1.35 |
| 35 | SE | 4 | 0.00560 | 0.00550 | 0.00570 | 880 | 0.0921 | 1.06 |
| 36 | SE | 4 | 0.00500 | 0.00490 | 0.00510 | 1,110 | 0.0739 | 0.848 |
| 37 | SE | 5 | 0.00450 | 0.00435 | 0.00460 | 1,410 | 0.0602 | 0.668 |
| 38 | SE | 5 | 0.00400 | 0.00390 | 0.00410 | 1,750 | 0.0479 | 0.537 |
| 39 | SE | 6.1 | 0.00350 | 0.00340 | 0.00363 | 2,270 | 0.0375 | 0.409 |
| 40 | SE | 6.1 | 0.00310 | 0.00300 | 0.00320 | 2,960 | 0.0293 | 0.318 |