
CN15 (CuNi10)

Copper Nickel No 15

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Alloys : CN15 (CuNi10 Copper Nickel)

[JIS C 2532]

It is heat resistant, oxidation resistant, and can be used up to 250°C.
It is non-magnetic and has better workability than copper for electrical applications.
It is used for low-temperature heating elements and heaters for circuit breakers.

| JIS | JIS Code | Electrical Resistivity [$\mu\Omega\text{m}$] | Average TCR [$\times 10^{-6}/^{\circ}\text{C}$] |
|-------|----------|---|--|
| GCN15 | C 2532 | 0.15 \pm 0.015 | * 490 |

(*)Reference value

| Thermal Expansion Coefficient $\times 10^{-6}/$ | Density g/cm ³ (20°C) | Melting Point °C | Max Operating Temperature °C |
|--|--|---------------------|---------------------------------|
| 17.5 | 8.90 | 1100 | 250 |

| Chemical Composition | Mn | Ni | Cu+Ni+Mn |
|----------------------|------------|------|-----------|
| (%) | ≤ 1.0 | 8~12 | ≥ 99 |

| Alloys | Type | Diameter (mm) | |
|--------|--------|-----------------------|--|
| CN15W | Wire | $\phi 6.00 \sim 0.06$ | |
| CN15R | Ribbon | $t=2.90 \sim 0.05$ | $w=40 \sim 0.4$ (Depends on thickness) |
| CN15P | Plate | Please consult | |
| CN15 | Foil | Please consult | |

CN15 (CuNi10 Copper Nickel)

Resistance·Length·Weight

Wire

Electrical Resistivity (23°CμΩm) 0.15±0.015

| Diameter (mm) | Tolerance (mm) | Cross section (mm ²) | Resistance Tolerance (%) | DC Resistance (Ω/m) | Length (m/Kg) | Weight (g/m) |
|---------------|----------------|----------------------------------|--------------------------|---------------------|---------------|--------------|
| 6.00 | ±0.080 | 28.27 | ±5 | 0.00531 | 3.97 | 252 |
| 5.50 | ±0.080 | 23.76 | ±5 | 0.00631 | 4.73 | 211 |
| 5.00 | ±0.080 | 19.64 | ±5 | 0.00764 | 5.72 | 175 |
| 4.50 | ±0.080 | 15.90 | ±5 | 0.00943 | 7.06 | 142 |
| 4.00 | ±0.080 | 12.57 | ±5 | 0.0119 | 8.94 | 112 |
| 3.50 | ±0.080 | 9.621 | ±5 | 0.0156 | 11.7 | 85.6 |
| 3.20 | ±0.060 | 8.042 | ±5 | 0.0187 | 14.0 | 71.6 |
| 2.90 | ±0.060 | 6.605 | ±5 | 0.0227 | 17.0 | 58.8 |
| 2.60 | ±0.060 | 5.309 | ±5 | 0.0283 | 21.2 | 47.3 |
| 2.30 | ±0.050 | 4.155 | ±5 | 0.0361 | 27.0 | 37.0 |
| 2.00 | ±0.050 | 3.142 | ±5 | 0.0477 | 35.8 | 28.0 |
| 1.80 | ±0.050 | 2.545 | ±5 | 0.0589 | 44.2 | 22.6 |
| 1.60 | ±0.040 | 2.011 | ±5 | 0.0746 | 55.9 | 17.9 |
| 1.50 | ±0.040 | 1.767 | ±5 | 0.0849 | 63.6 | 15.7 |
| 1.40 | ±0.040 | 1.539 | ±5 | 0.0974 | 73.0 | 13.7 |
| 1.30 | ±0.040 | 1.327 | ±5 | 0.113 | 84.7 | 11.8 |
| 1.20 | ±0.040 | 1.131 | ±5 | 0.133 | 99.3 | 10.1 |
| 1.10 | ±0.030 | 0.9503 | ±6 | 0.158 | 118 | 8.46 |
| 1.00 | ±0.030 | 0.7854 | ±6 | 0.191 | 143 | 6.99 |
| 0.90 | ±0.030 | 0.6362 | ±6 | 0.236 | 177 | 5.66 |
| 0.85 | ±0.030 | 0.5675 | ±6 | 0.264 | 198 | 5.05 |
| 0.80 | ±0.030 | 0.5027 | ±6 | 0.298 | 224 | 4.47 |
| 0.75 | ±0.025 | 0.4418 | ±6 | 0.340 | 254 | 3.93 |
| 0.70 | ±0.025 | 0.3848 | ±6 | 0.390 | 292 | 3.43 |
| 0.65 | ±0.025 | 0.3318 | ±6 | 0.452 | 339 | 2.95 |
| 0.60 | ±0.025 | 0.2827 | ±6 | 0.531 | 397 | 2.52 |
| 0.55 | ±0.020 | 0.2376 | ±7 | 0.631 | 473 | 2.11 |
| 0.50 | ±0.020 | 0.1964 | ±7 | 0.764 | 572 | 1.75 |
| 0.45 | ±0.020 | 0.1590 | ±7 | 0.943 | 706 | 1.42 |
| 0.40 | ±0.015 | 0.1257 | ±7 | 1.19 | 894 | 1.12 |
| 0.35 | ±0.015 | 0.09621 | ±7 | 1.56 | 1168 | 0.856 |
| 0.32 | ±0.015 | 0.08042 | ±7 | 1.87 | 1397 | 0.716 |
| 0.29 | ±0.012 | 0.06605 | ±7 | 2.27 | 1701 | 0.588 |
| 0.26 | ±0.012 | 0.05309 | ±8 | 2.83 | 2116 | 0.473 |
| 0.23 | ±0.012 | 0.04155 | ±8 | 3.61 | 2704 | 0.370 |
| 0.20 | ±0.010 | 0.03142 | ±8 | 4.77 | 3577 | 0.280 |
| 0.18 | ±0.010 | 0.02545 | ±8 | 5.89 | 4415 | 0.226 |
| 0.16 | ±0.010 | 0.02011 | ±8 | 7.46 | 5588 | 0.179 |
| 0.15 | ±0.008 | 0.01767 | ±8 | 8.49 | 6358 | 0.157 |
| 0.14 | ±0.008 | 0.01539 | ±8 | 9.74 | 7299 | 0.137 |
| 0.13 | ±0.008 | 0.01327 | ±9 | 11.3 | 8465 | 0.118 |
| 0.12 | ±0.008 | 0.01131 | ±9 | 13.3 | 9935 | 0.101 |
| 0.11 | ±0.006 | 0.009503 | ±9 | 15.8 | 11823 | 0.0846 |
| 0.10 | ±0.006 | 0.007854 | ±9 | 19.1 | 14306 | 0.0699 |
| 0.09 | ±0.005 | 0.006362 | ±10 | 23.6 | 17662 | 0.0566 |
| 0.08 | ±0.005 | 0.005027 | ±10 | 29.8 | 22353 | 0.0447 |
| 0.07 | ±0.005 | 0.003848 | ±10 | 39.0 | 29196 | 0.0343 |
| 0.06 | ±0.004 | 0.002827 | ±11 | 53.1 | 39739 | 0.0252 |

CN15 (CuNi10 Copper Nickel)

Temperature Current Characteristics · Diameter · Temperature · Current

Wire Electrical Resistivity (23°CμΩm) 0.15±0.015 [Unit: Ampere]

| Diameter (mm) | 50 (°C) | 100 (°C) | 150 (°C) | 200 (°C) | 250 (°C) | 300 (°C) | 350 (°C) | 400 (°C) |
|---------------|---------|----------|----------|----------|----------|----------|----------|----------|
| 6.00 | 75.0 | 108 | 194 | 245 | 294 | 346 | 394 | 450 |
| 5.50 | 67.2 | 124 | 171 | 215 | 259 | 304 | 349 | 398 |
| 5.00 | 58.0 | 107 | 148 | 187 | 225 | 264 | 303 | 342 |
| 4.50 | 49.9 | 91.9 | 127 | 160 | 193 | 227 | 259 | 295 |
| 4.00 | 43.4 | 80.2 | 111 | 140 | 167 | 196 | 224 | 254 |
| 3.50 | 35.9 | 66.2 | 91.6 | 115 | 138 | 161 | 185 | 209 |
| 3.20 | 31.3 | 57.7 | 79.9 | 101 | 121 | 141 | 161 | 183 |
| 2.90 | 27.2 | 51.5 | 69.8 | 87.4 | 104 | 123 | 140 | 159 |
| 2.60 | 24.3 | 44.7 | 61.3 | 77.3 | 91.9 | 108 | 123 | 139 |
| 2.30 | 20.3 | 37.2 | 51.8 | 64.5 | 77.3 | 90.0 | 103 | 116 |
| 2.00 | 16.6 | 30.5 | 42.1 | 52.8 | 62.9 | 73.7 | 84.1 | 94.9 |
| 1.80 | 15.2 | 27.6 | 37.8 | 47.3 | 56.4 | 65.5 | 74.7 | 84.4 |
| 1.60 | 12.8 | 23.4 | 32.2 | 40.1 | 47.6 | 55.7 | 63.2 | 71.1 |
| 1.50 | 11.7 | 21.3 | 29.3 | 36.5 | 43.4 | 50.9 | 57.4 | 64.9 |
| 1.40 | 10.6 | 19.3 | 26.5 | 33.3 | 39.4 | 46.0 | 52.5 | 58.7 |
| 1.30 | 9.98 | 18.2 | 25.0 | 31.3 | 36.8 | 43.0 | 48.9 | 54.4 |
| 1.20 | 8.87 | 16.3 | 22.2 | 27.8 | 32.9 | 38.1 | 43.4 | 48.6 |
| 1.10 | 8.15 | 14.4 | 19.7 | 24.5 | 29.1 | 33.9 | 38.1 | 43.0 |
| 1.00 | 6.91 | 12.6 | 17.3 | 21.6 | 25.6 | 29.6 | 33.6 | 37.8 |
| 0.90 | 5.87 | 10.8 | 15.0 | 18.4 | 21.7 | 25.2 | 28.6 | 32.0 |
| 0.80 | 5.31 | 9.78 | 13.3 | 16.6 | 19.7 | 22.6 | 25.6 | 27.9 |
| 0.70 | 4.40 | 8.12 | 11.0 | 13.8 | 16.3 | 18.8 | 21.2 | 23.1 |
| 0.65 | 3.94 | 7.30 | 9.94 | 12.4 | 14.7 | 16.9 | 19.1 | 20.8 |
| 0.60 | 3.72 | 6.91 | 9.42 | 11.7 | 13.8 | 15.8 | 17.9 | 19.8 |
| 0.55 | 3.33 | 6.13 | 8.35 | 10.4 | 12.3 | 14.1 | 15.9 | 17.5 |
| 0.50 | 2.90 | 5.41 | 7.34 | 9.10 | 10.8 | 12.9 | 14.0 | 15.4 |
| 0.45 | 2.39 | 4.66 | 6.36 | 7.95 | 9.36 | 10.7 | 12.1 | 13.4 |
| 0.40 | 2.29 | 4.24 | 5.77 | 7.14 | 8.41 | 9.62 | 10.8 | 12.0 |
| 0.35 | 1.91 | 3.55 | 4.86 | 5.97 | 7.07 | 8.05 | 9.10 | 10.1 |
| 0.32 | 1.70 | 3.16 | 4.30 | 5.35 | 6.29 | 7.17 | 8.05 | 8.97 |
| 0.29 | 1.50 | 2.77 | 3.78 | 4.66 | 5.51 | 6.32 | 7.07 | 7.82 |
| 0.26 | 1.39 | 2.56 | 3.49 | 4.30 | 5.05 | 5.77 | 6.42 | 7.14 |
| 0.23 | 1.19 | 2.19 | 2.98 | 3.68 | 4.34 | 4.92 | 5.54 | 6.10 |
| 0.20 | 0.988 | 1.82 | 2.47 | 3.07 | 3.59 | 4.08 | 4.56 | 4.89 |
| 0.18 | 0.887 | 1.64 | 2.23 | 2.75 | 3.22 | 3.68 | 4.11 | 4.63 |
| 0.16 | 0.750 | 1.39 | 1.87 | 2.33 | 2.81 | 3.12 | 3.49 | 3.91 |
| 0.15 | 0.698 | 1.29 | 1.75 | 2.16 | 2.53 | 2.89 | 3.22 | 3.62 |
| 0.14 | 0.636 | 1.17 | 1.60 | 1.97 | 2.30 | 2.63 | 2.93 | 3.29 |
| 0.13 | 0.603 | 1.10 | 1.50 | 1.85 | 2.16 | 2.49 | 2.74 | 3.02 |
| 0.12 | 0.531 | 0.985 | 1.35 | 1.66 | 1.94 | 2.21 | 2.45 | 2.71 |
| 0.11 | 0.473 | 0.880 | 1.20 | 1.50 | 1.72 | 1.96 | 2.18 | 2.41 |
| 0.10 | 0.411 | 0.760 | 1.03 | 1.28 | 1.49 | 1.70 | 1.90 | 2.10 |
| 0.09 | 0.365 | 0.675 | 0.916 | 1.13 | 1.32 | 1.51 | 1.68 | 1.85 |
| 0.08 | 0.318 | 0.590 | 0.805 | 0.994 | 1.15 | 1.31 | 1.47 | 1.59 |
| 0.07 | 0.265 | 0.492 | 0.717 | 0.835 | 0.949 | 1.10 | 1.23 | 1.34 |
| 0.06 | 0.223 | 0.414 | 0.561 | 0.655 | 0.802 | 0.919 | 1.02 | 1.12 |
| 0.05 | 0.174 | 0.224 | 0.437 | 0.535 | 0.626 | 0.714 | 0.795 | 0.874 |
| 0.04 | 0.130 | 0.242 | 0.326 | 0.401 | 0.469 | 0.535 | 0.593 | 0.655 |
| 0.03 | 0.0877 | 0.164 | 0.221 | 0.272 | 0.319 | 0.362 | 0.401 | 0.443 |
| 0.025 | 0.0707 | 0.131 | 0.177 | 0.218 | 0.255 | 0.289 | 0.320 | 0.352 |

CN15 (CuNi10 Copper Nickel)

Conductor resistance

Ribbon

Electrical Resistivity (23°CμΩm) 0.15±0.015

[Unit: Ω/m]

| Thickness (mm) | Width mm) | | | | | | | | | | | | | | |
|-------------------|-----------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|-------|-------|------|------|
| | 40.0 | 32.0 | 25.0 | 20.0 | 16.0 | 13.0 | 10.0 | 6.5 | 5.0 | 3.2 | 2.4 | 1.6 | 0.8 | 0.4 | |
| 2.90 | 0.00132 | 0.00165 | 0.00211 | 0.00264 | 0.00330 | 0.00406 | 0.00528 | | | | | | | | |
| 2.60 | 0.00147 | 0.00184 | 0.00235 | 0.00294 | 0.00368 | 0.00453 | 0.00589 | 0.00925 | | | | | | | |
| 2.30 | 0.00166 | 0.00208 | 0.00266 | 0.00333 | 0.00416 | 0.00512 | 0.00665 | 0.0105 | 0.0136 | | | | | | |
| 2.00 | 0.00191 | 0.00239 | 0.00306 | 0.00383 | 0.00478 | 0.00589 | 0.00765 | 0.0120 | 0.0156 | | | | | | |
| 1.80 | 0.00213 | 0.00266 | 0.00340 | 0.00425 | 0.00531 | 0.00654 | 0.00850 | 0.0134 | 0.0174 | | | | | | |
| 1.60 | 0.00239 | 0.00299 | 0.00383 | 0.00478 | 0.00598 | 0.00736 | 0.00957 | 0.0150 | 0.0195 | | | | | | |
| 1.40 | 0.00273 | 0.00342 | 0.00437 | 0.00547 | 0.00683 | 0.00841 | 0.0109 | 0.0172 | 0.0223 | | | | | | |
| 1.20 | 0.00319 | 0.00399 | 0.00510 | 0.00638 | 0.00797 | 0.00981 | 0.0128 | 0.0200 | 0.0260 | | | | | | |
| 1.00 | 0.00383 | 0.00478 | 0.00612 | 0.00765 | 0.00957 | 0.0118 | 0.0153 | 0.0240 | 0.0313 | | | | | | |
| 0.90 | | 0.00531 | 0.00680 | 0.00850 | 0.0106 | 0.0131 | 0.0170 | 0.0267 | 0.0347 | 0.0543 | 0.0723 | | | | |
| 0.80 | | 0.00598 | 0.00765 | 0.00957 | 0.0120 | 0.0147 | 0.0191 | 0.0300 | 0.0391 | 0.0610 | 0.0814 | | | | |
| 0.70 | | | 0.00875 | 0.0109 | 0.0137 | 0.0168 | 0.0219 | 0.0343 | 0.0446 | 0.0698 | 0.093 | | | | |
| 0.60 | | | 0.0102 | 0.0128 | 0.0159 | 0.0196 | 0.0255 | 0.0401 | 0.0521 | 0.0814 | 0.109 | | | | |
| 0.50 | | | 0.0122 | 0.0153 | 0.0191 | 0.0235 | 0.0306 | 0.0481 | 0.0625 | 0.0977 | 0.130 | | | | |
| 0.45 | | | 0.0136 | 0.0170 | 0.0213 | 0.0262 | 0.0340 | 0.0534 | 0.0694 | 0.109 | 0.145 | 0.217 | | | |
| 0.40 | | | | | 0.0239 | 0.0294 | 0.0383 | 0.0601 | 0.0781 | 0.122 | 0.163 | 0.244 | | | |
| 0.35 | | | | | | 0.0336 | 0.0437 | 0.0687 | 0.0893 | 0.140 | 0.186 | 0.279 | | | |
| 0.32 | | | | | | 0.0368 | 0.0478 | 0.0751 | 0.0977 | 0.153 | 0.203 | 0.305 | | | |
| 0.29 | | | | | | | 0.0528 | 0.0829 | 0.108 | 0.168 | 0.224 | 0.337 | 0.673 | | |
| 0.26 | | | | | | | 0.0589 | 0.0925 | 0.120 | 0.188 | 0.250 | 0.376 | 0.751 | 1.50 | |
| 0.23 | | | | | | | | 0.105 | 0.136 | 0.212 | 0.283 | 0.425 | 0.849 | 1.70 | |
| 0.20 | | | | | | | | 0.120 | 0.156 | 0.244 | 0.326 | 0.488 | 0.977 | 1.95 | |
| 0.18 | | | | | | | | 0.134 | 0.174 | 0.271 | 0.362 | 0.543 | 1.09 | 2.17 | |
| 0.16 | | | | | | | | | | 0.305 | 0.407 | 0.610 | 1.22 | 2.44 | |
| 0.14 | | | | | | | | | | 0.349 | 0.465 | 0.698 | 1.40 | 2.79 | |
| 0.12 | | | | | | | | | | | 0.543 | 0.814 | 1.63 | 3.26 | |
| 0.10 | | | | | | | | | | | | 0.977 | 1.95 | 3.91 | |
| 0.08 | | | | | | | | | | | | | 1.22 | 2.44 | 4.88 |

*Allowable tolerance of conductor resistance : Width 10mm or more ±7% , Width 10mm or less ±8%

Conductor Resistance Tolerance of Ribbon

| Thickness [mm] | Width [mm] | Resistance Tolerance [%] |
|---------------------|---------------|--------------------------------|
| 0.08above 3.15below | 10below | ±8 |
| | 10above | ±7 |

*We can manufacture products other than the standard (size and tolerance), so please contact us.