

HM Wire International, Inc.

Ph: 330-244-8501 Fax: 330-244-8561

www.litz-wire.com info@litz-wire.com www.hmwire.com



Alloy 30 - CuNi2

Description:

Alloy 30 is specially characterized by low resistivity. It is used for low-value resistors, for heating wires and mats in heating cords and in heating cables with low conductor temperatures as well as for the tube weldings "electrical-welding-fittings". It provides a relatively high corrosion resistance. Max working temp in air is 200°C, for short term applications, up to 300°C.

Chemical Composition

| Nominal Composition | Cu% | Ni% |
|---------------------|---------|-----|
| | Balance | 2 |

Electrical Resistance in Annealed Condition

| Temperature Coefficient of electrical resistance between 20°C and 105°C - 10 /K | 20°C | 100°C | 200°C | 300°C | 400°C | 500°C | Reference Values |
|---|-------------------|-------|-------|-------|-------|-------|--|
| | Tolerance +/- 10% | | | | | | |
| +1000 to +1600 | 5.0 | 5.7 | 6.4 | - | - | - | Electrical Resistivity in : $\mu\Omega \times \text{cm}$ |
| | 30 | 34 | 38 | - | - | - | Electrical Resistivity in : Ω/CMF |

Strength Properties at 20°C in Annealed Condition

| Density at 20°C | Melting Point | Specific Heat at 20°C | Thermal Conductivity at 20°C | Avg Linear Thermal Expansion coefficient between 20°C and | | Thermal EMF against Copper at 20°C |
|-----------------------------|---------------|-----------------------|------------------------------|---|----------------|------------------------------------|
| g/cm ³ lb/cu.in. | 20°C | J/g K | W/m K | 100 °C 400 °C | 10 /K 10 /K | |
| 8.9 0.32 | 1090 | 0.38 | 130 | 16.5 | 17.5 | -15 |

Physical Characteristics (Reference Values)

| Tensile Strength ² | | Elongation (L ₀ = 100 mm) % at nominal diameter in mm | | | | |
|-------------------------------|-------|--|----------------|--------------|-----------|------|
| MPa | PSI | .02 - .063 | > .063 - 0.125 | > .125 - 0.5 | > 0.5 - 1 | > 1 |
| 220 | 32000 | ≈ 8 | ≈ 15 | ≈ 18 | ≥ 18 | ≥ 25 |

1) The Number "30" indicates the resistivity, expressed in Ohms/cir.mil ft.

2) This value applies to wires of 2 mm diameter, For thinner wires the minimum value will substantially increase, depending on the dimensions.

*To be used as a guideline only.

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Electrical Resistances for CuNi2

The limits of electrical resistance are derived from the calculations made in IEC standard 317-0-1 Annex C.1 "Method for the calculation of linear resistance" for copper wire and are restricted by a factor of 2.

| Nominal Diameter (mm) | AWG | Min [Ω/m] | Nominal [Ω/m] | Max [Ω/m] |
|-----------------------|-----|--------------------|------------------------|--------------------|
| 0.0245 | 50 | 100.8 | 106.1 | 111.4 |
| 0.0275 | 49 | 79.97 | 84.18 | 88.39 |
| 0.0310 | 48 | 62.93 | 66.25 | 69.56 |
| 0.0350 | 47 | 49.45 | 51.97 | 54.49 |
| 0.0390 | 46 | 39.83 | 41.86 | 43.89 |
| 0.0440 | 45 | 31.29 | 32.88 | 34.48 |
| 0.0500 | 44 | 24.32 | 25.46 | 26.61 |
| 0.0550 | 43 | 20.10 | 21.05 | 21.99 |
| 0.0630 | 42 | 15.40 | 16.04 | 16.68 |
| 0.0700 | 41 | 12.42 | 12.99 | 13.65 |
| 0.0780 | 40 | 10.04 | 10.46 | 10.94 |
| 0.0880 | 39 | 7.921 | 8.221 | 8.554 |
| 0.101 | 38 | 6.038 | 6.241 | 6.463 |
| 0.113 | 37 | 4.838 | 4.986 | 5.146 |
| 0.126 | 36 | 3.901 | 4.010 | 4.127 |
| 0.141 | 35 | 3.123 | 3.202 | 3.287 |
| 0.159 | 34 | 2.462 | 2.518 | 2.578 |
| 0.179 | 33 | 1.946 | 1.987 | 2.030 |
| 0.202 | 32 | 1.531 | 1.560 | 1.591 |
| 0.225 | 31 | 1.231 | 1.258 | 1.286 |
| 0.253 | 30 | 0.9751 | 0.9946 | 1.015 |
| 0.286 | 29 | 0.7644 | 0.7783 | 0.7928 |
| 0.319 | 28 | 0.6153 | 0.6256 | 0.6363 |
| 0.360 | 27 | 0.4838 | 0.4912 | 0.4989 |
| 0.402 | 26 | 0.3875 | 0.3939 | 0.4007 |
| 0.453 | 25 | 0.3056 | 0.3102 | 0.3151 |
| 0.508 | 24 | 0.2428 | 0.2467 | 0.2507 |