# Wieland-B31

CuSn2Fe0.1P | C50715

C50715 is a well established alloy for signal connectors and was introduced by the Japanese industry. It provides good formability and a combination of functional properties similar to phosphor bronzes. However, this alloy contains less tin, which increases the electrical conductivity at the sacrifice of thermal stability.

| **Chemical composition** (Reference) | |
|---|---|
| Sn | 2 % |
| Fe | 0.1 % |
| P | 0.03 % |
| Cu | Remainder |

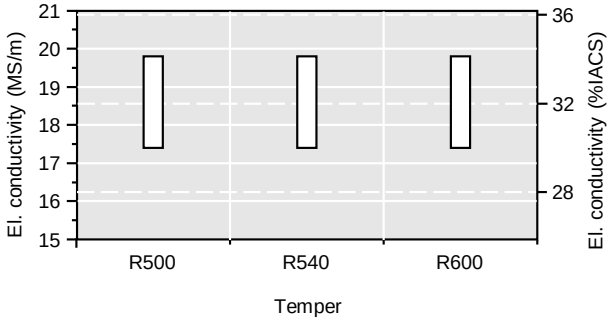
| **Physical properties** (Reference values at room temperature) | | | | |
|---|---|---|---|---|
| Electrical conductivity | 18 | MS/m | 30 | %IACS |
| Thermal conductivity | 150 | W/(m·K) | 87 | Btu·ft/(ft²·h·℉) |
| Coefficient of electrical resistance* | 1.4 | $10^{-3}$/K | 0.8 | $10^{-3}$/℉ |
| Coefficient of thermal expansion* | 17.6 | $10^{-6}$/K | 9.8 | $10^{-6}$/℉ |
| Density | 8.89 | g/cm³ | 0.321 | lb/in³ |
| Modulus of elasticity | 123 | GPa | 17,800 | ksi |
| Specific heat | 0.377 | J/(g·K) | 0.090 | Btu/(lb·℉) |
| Poisson´s ratio | 0.34 | | 0.34 | |

* Between 0 and 300 ℃

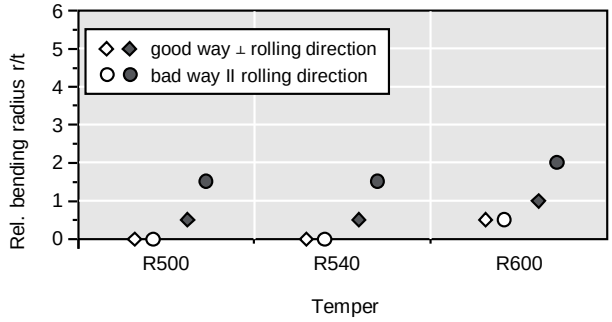
**Mechanical properties (values in brackets are for information only)**

| Temper | Tensile strength $R_m$ | | Yield strength $R_{p0.2}$ | | Elongation $A_{50}$ |
|---|---|---|---|---|---|
| | MPa | ksi | MPa | ksi | % |
| R500 | 500-580 | 73-84 | ≥ 460 | ≥ 67 | ≥ 6 |
| R540 | 540-620 | 78-90 | ≥ 500 | ≥ 73 | ≥ 5 |
| R600 | 600-680 | 87-99 | ≥ 560 | ≥ 81 | ≥ 3 |

**Electrical conductivity**




**Bendability (Strip thickness t ≤ 0.5 mm)** ◇○ 90° ◆● 180°



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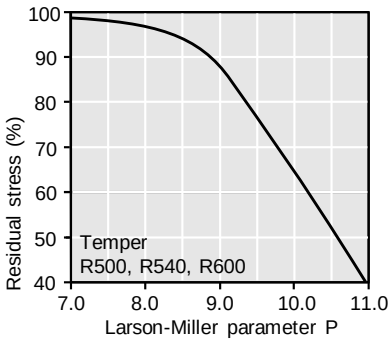
## Thermal stress relaxation




Stress remaining after thermal relaxation as a function of Larson-Miller parameter P
(F. R. Larson, J. Miller, Trans ASME74 (1952) 765–775) given by:
P = (20 + log(t))*(T + 273)*0.001.
Time t in hours, temperature T in ℃.
Example: P = 9 is equivalent to 1,000 h/118 ℃.
Measured on stress relief annealed specimens parallel to rolling direction.
Total stress relaxation depends on the applied stress level.
Furthermore, it is increased to some extent by cold deformation.

## Fatigue strength

The fatigue strength is defined as the maximum bending stress amplitude which a material withstands for $10^7$ load cycles under symmetrical alternate load without breaking. It is dependent on the temper tested and is about 1/3 of the tensile strength $R_m$.

## Types and formats available

- Standard coils with outside diameters up to 1,400 mm
- Traverse-wound coils with drum weights up to 1.5 t
- Multicoil up to 5 t
- Hot-dip tinned strip
- Contour-milled strip

## Dimensions available

- Strip thickness from 0.10 mm, thinner gauges on request
- Strip width from 3 mm, however min. 10 x strip thickness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