

Wieland-L49

CuNi9Sn2 | C72500

| Material designation | |
|----------------------|--------|
| EN | CW351H |
| UNS* | C72500 |

*Unified Numbering System (USA)

| Chemical composition (Reference) | |
|----------------------------------|---------|
| Ni | 9 % |
| Sn | 2 % |
| Cu | balance |

Typical applications

- Relay springs
- Connectors

| Physical properties* | | |
|--|---------------------|-------|
| Electrical conductivity | MS/m | 6.5 |
| | %IACS | 11 |
| Thermal conductivity | W/(m·K) | 48 |
| Coefficient of electrical resistance** | 10 ⁻³ /K | 0.6 |
| Coefficient of thermal expansion** | 10 ⁻⁶ /K | 17.6 |
| Density | g/cm ³ | 8.89 |
| Modulus of elasticity | GPa | 140 |
| Specific heat | J/(g·K) | 0.370 |
| Poisson's ratio | | 0.34 |

* Reference values at room temperature

** Between 0 and 300 °C

| Fabrication properties | |
|-----------------------------------|---------------|
| Capacity for being cold worked | excellent |
| Machinability | less suitable |
| Capacity for being electroplated | excellent |
| Capacity for being hot-dip tinned | excellent |
| Soft soldering | excellent |
| Resistance welding | good |
| Gas shielded arc welding | excellent |
| Laser welding | good |

Corrosion resistance

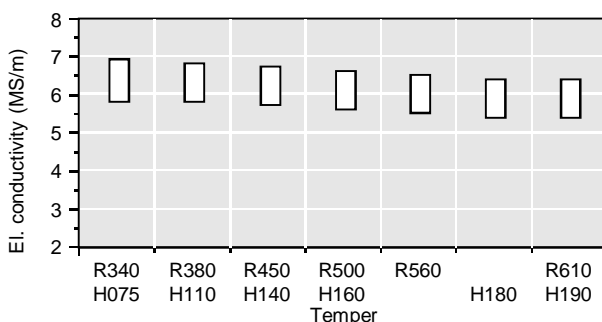
Wieland-L49 has good corrosion resistance in industrial atmosphere and resists very well to tarnishing even at prolonged storage. It also exhibits good resistance to different waters, humidity, non oxidizing acids, alkaline and saline solutions, organic acids, and dry gases. It is insensitive to stress corrosion cracking.

| Mechanical properties | | | | | | | |
|---------------------------|-----|---------|---------|---------|---------|---------|-------|
| Temper | | R340 | R380 | R450 | R500 | R560 | R610 |
| Tensile strength R_m | MPa | 340-410 | 380-470 | 450-530 | 500-580 | 560-650 | ≥ 610 |
| Yield strength $R_{p0.2}$ | MPa | ≤ 250 | ≥ 200 | ≥ 370 | ≥ 450 | ≥ 520 | ≥ 580 |
| Elongation A_{50mm} | % | ≥ 30 | ≥ 10 | ≥ 6 | ≥ 3 | ≥ 2 | - |

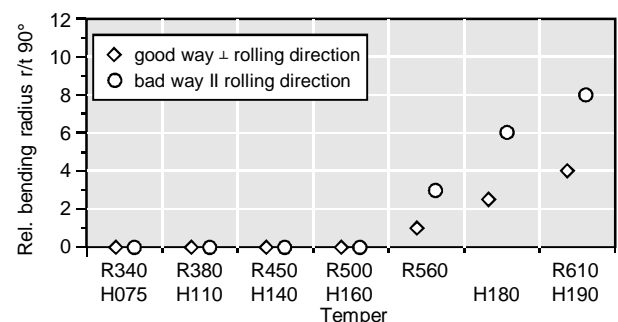
Intermediate tempers are feasible. Higher elongation values can be obtained by additional heat treatments.

| Temper | H075 | H110 | H140 | H160 | H180 | H190 |
|-------------|--------|---------|---------|---------|---------|-------|
| Hardness HV | 75-110 | 110-150 | 140-170 | 160-190 | 180-210 | ≥ 190 |

Electrical conductivity



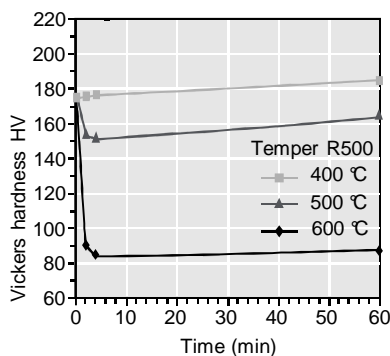
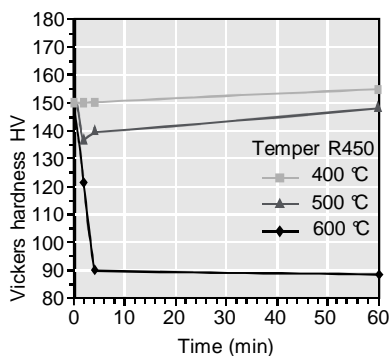
Bendability (Strip thickness $t \leq 0.5$ mm)



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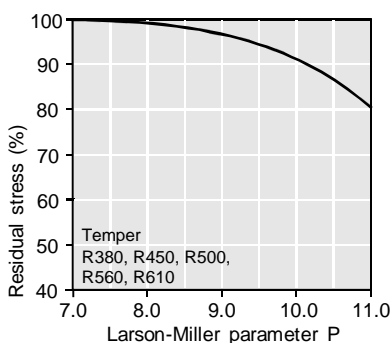
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Softening resistance



Vickers hardness after heat treatment (typical values)

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:
 $P = (20 + \log(t)) \cdot (T + 273) \cdot 0.001$

Time t in hours, temperature T in °C.

Example: P = 9 is equivalent to 1,000 h/118 °C.

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
- Sheet
- Strip and sheet with protective coating

Dimensions available

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