Wieland-B14 SUPRALLOY® is the fine-grain variant of the standard CuSn4 bronze with identical chemical composition and the same UNS designation. The fine-grained microstructure on one hand provides enhanced formability. This allows the designers to increase connector spring forces by maintaining the forming operations. In addition, the resistance against high cycle fatigue is considerably improved, which increases the safety of components in vibrating environments.

### Chemical composition (Reference)

<table>
<thead>
<tr>
<th>Element</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sn</td>
<td>4 %</td>
</tr>
<tr>
<td>Cu</td>
<td>remainder</td>
</tr>
</tbody>
</table>

### Physical properties (Reference values at room temperature)

<table>
<thead>
<tr>
<th>Property</th>
<th>R580</th>
<th>R660</th>
<th>R700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical conductivity (MS/m)</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Thermal conductivity (W/(m·K))</td>
<td>84</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>Coefficient of electrical resistance</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Coefficient of thermal expansion</td>
<td>17.8</td>
<td>17.8</td>
<td>17.8</td>
</tr>
<tr>
<td>Density (g/cm³)</td>
<td>8.85</td>
<td>8.85</td>
<td>8.85</td>
</tr>
<tr>
<td>Modulus of elasticity (GPa)</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Specific heat (J/(g·K))</td>
<td>0.377</td>
<td>0.377</td>
<td>0.377</td>
</tr>
<tr>
<td>Poisson’s ratio (10⁻⁶/K)</td>
<td>0.34</td>
<td>0.34</td>
<td>0.34</td>
</tr>
</tbody>
</table>

* Between 0 and 300 °C

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

<table>
<thead>
<tr>
<th>Temper</th>
<th>Tensile strength Rm (MPa/ksi)</th>
<th>Yield strength Rp0.2 (MPa/ksi)</th>
<th>Elongation A50 (%)</th>
<th>Hardness HV (170-230)</th>
<th>Preformability (Strip thickness t ≤ 0.5 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R580</td>
<td>580-680 84-99</td>
<td>≥ 530  ≥ 77</td>
<td>≥ 13</td>
<td>(170-230)</td>
<td>good way ⊥ rolling direction</td>
</tr>
<tr>
<td>R660</td>
<td>660-760 96-110</td>
<td>≥ 630  ≥ 91</td>
<td>≥ 7</td>
<td>(180-240)</td>
<td>bad way II rolling direction</td>
</tr>
<tr>
<td>R700</td>
<td>700-800 102-116</td>
<td>≥ 690  ≥ 100</td>
<td>≥ 3</td>
<td>(190-250)</td>
<td></td>
</tr>
</tbody>
</table>

### Electrical conductivity

<table>
<thead>
<tr>
<th>Temper</th>
<th>R580</th>
<th>R660</th>
<th>R700</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL conductivity (MS/m)</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>EL conductivity (%IACS)</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

### Bendability (Strip thickness t ≤ 0.5 mm)

- good way ⊥ rolling direction
- bad way II rolling direction
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:

$$P = (20 + \log(t)) \times (T + 273) \times 0.001.$$ 

Time $t$ in hours, temperature $T$ in °C.

Example: $P = 9$ is equivalent to $1,000 \text{ h/118 } ^\circ\text{ C}$. 

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.

---

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.

---

**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
- Strip thickness from 0.10-0.40 mm, R580: 0.10-0.64 mm, thinner gauges on request
- Strip width from 7 mm

---

**Dimensions available**

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**Chemical composition (Reference)**

| Sn | 4 % |
| Cu | remainder |

**Physical properties (Reference values at room temperature)**

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<tr>
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</tr>
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* Between 0 and 300 °C

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<th>Elongation $A_{50}$</th>
<th>Hardness HV</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>MPa</td>
<td>ksi</td>
<td>%</td>
<td></td>
</tr>
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<td>84-99</td>
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<td>≥ 3</td>
</tr>
<tr>
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<td>660-760</td>
<td>96-110</td>
<td>≥ 630</td>
<td>≥ 7</td>
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<td>R700</td>
<td>700-800</td>
<td>102-116</td>
<td>≥ 690</td>
<td>≥ 3</td>
</tr>
</tbody>
</table>

**Electrical conductivity**

![Electrical conductivity graph]

**Bendability (Strip thickness t ≤ 0.5 mm)**

![Bendability graph]
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