**Material Designation**

<table>
<thead>
<tr>
<th>EN</th>
<th>CW004A</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNS*</td>
<td>C11000</td>
</tr>
</tbody>
</table>

*Unified Numbering System (USA)*

**Chemical Composition (Reference)**

<table>
<thead>
<tr>
<th>Element</th>
<th>Mass Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu</td>
<td>≥ 99.90 %</td>
</tr>
<tr>
<td>O</td>
<td>≤ 0.040 %</td>
</tr>
</tbody>
</table>

**Physical Properties**

- Electrical Conductivity**: 58 MS/m % IACS 100
- Thermal Conductivity: 390 W/(m·K)
- Coefficient of Electrical Resistance**: 10⁻³/K 3.7
- Coefficient of Thermal Expansion**: 10⁻³/K 17.7
- Density: 8.94 g/cm³
- Modulus of Elasticity: 127 GPa
- Specific Heat: 0.386 J/(g·K)
- Poisson’s Ratio: 0.34

* Reference values at room temperature
** Between 0 and 300 °C
*** Minimum value in soft temper

**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: less suitable
- Gas Shielded Arc Welding: less suitable
- Laser Welding: less suitable

**Corrosion Resistance**

Resistant to: industrial atmosphere (formation of dark resp. green protective layers), industrial and drinking water, pure water vapour, non oxidizing acids, alcalis (except for ammonia and cyanide-containing compounds), neutral saline solutions.

Not resistant to: oxidizing acids, hydrous ammonia and halogenated gases, hydrogen sulfide, seawater.

**Mechanical Properties**

<table>
<thead>
<tr>
<th>Temper</th>
<th>R220</th>
<th>R240</th>
<th>R290</th>
<th>R360</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength Rm</td>
<td>220–260</td>
<td>240–300</td>
<td>290–360</td>
<td>≥ 360</td>
</tr>
<tr>
<td>Yield Strength Rp0.2</td>
<td>≤ 140</td>
<td>≥ 180</td>
<td>≥ 250</td>
<td>≥ 320</td>
</tr>
<tr>
<td>Elongation A50mm</td>
<td>≥ 33</td>
<td>≥ 8</td>
<td>≥ 4</td>
<td>≥ 2</td>
</tr>
</tbody>
</table>

**Temper**

<table>
<thead>
<tr>
<th></th>
<th>H040</th>
<th>H065</th>
<th>H090</th>
<th>H110</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness HV</td>
<td>45–65</td>
<td>65–95</td>
<td>90–110</td>
<td>≥ 110</td>
</tr>
</tbody>
</table>

**Electrical Conductivity**

![Electrical Conductivity Graph]

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

![Bendability Graph]
Resistance to Softening

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, TransASME74 (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 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 \(\frac{1}{3}\) 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