wieland

# Wieland-K12

## Cu-HCP | Oxygen free copper

### Material designation

| | |
|---|---|
| EN | Cu-HCP<br>CW021A |
| UNS | C10300 |

### Chemical composition*

| | |
|---|---|
| Cu | ≥ 99.95 % |
| P | 0.002–0.007 % |

*deoxidized, oxygen free*
**Reference values in % by weight*

### Material properties and typical applications

Wieland-K12 is an copper which is resistant during heat treatment in reducing atmosphere (resistant to hydrogen embrittlement according to EN ISO 2626). As the amount of phosphorus added for deoxidation is only limited, the material retains its high electrical and thermal conductivity. Joining operations such as soldering and welding are possible without restriction.

### Physical properties*

| | | |
|---|---|---|
| Electrical conductivity | MS/m<br>%IACS | ≥ 57<br>98 |
| Thermal conductivity | W/(m·K) | > 385 |
| Thermal expansion coefficient (0–300 °C) | $10^{-6}$/K | 17.7 |
| Density | g/cm³ | 8.94 |
| Moduls of elasticity | GPa | 127 |

**Reference values at room temperature*

### Types of delivery

The Extruded and Drawn Products Division supplies bars, wire, sections and tubes. Please get in touch with your contact person regarding the available delivery forms, dimensions and tempers.

### Fabrication properties

#### Forming

| | |
|---|---|
| Machinability (CuZn39Pb3 = 100 %) | 20 % |
| Capacity for being cold worked | excellent |
| Capacity for being hot worked | fair |

#### Surface treatment

| | |
|---|---|
| Polishing | |
| mechanical | good |
| electrolytic | excellent |
| Electroplating | excellent |

#### Joining

| | |
|---|---|
| Resistance welding (butt weld) | fair |
| Inert gas shielded arc welding | excellent |
| Gas welding | good |
| Hard soldering | excellent |
| Soft soldering | excellent |

#### Heat treatment

| | |
|---|---|
| Melting range | 1.083 °C |
| Hot working | 750–900 °C |
| Soft annealing | 250–500 °C<br>1–3 h |
| Thermal stress-relieving | 150–200 °C<br>1–3 h |

### Corrosion resistance

Pure copper and high-copper alloys generally exhibit good corrosion resistance due to their inert character and are practically insensitive to stress corrosion cracking.

### Product standards

| | |
|---|---|
| Rod | EN 13601 |
| Wire | EN 13601 |
| Section | EN 13605 |
| Tube | EN 13600 |

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### Dimensions and mechanical properties according to standards

**Rod and wire** — acc. to EN 13601

| Temper | Diameter/ across flats | | Thickness | | Width | | Tensile strength $R_m$ | Yield strength $R_{p0,2}$ | | Elongation % | | Hardness | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | round, square hexagonal | | rectangular | | | | MPa | MPa | | A100 | A | HB | | HV | |
| | mm | | mm | | mm | | | | | | | | | | |
| | from | up to | from | up to | from | up to | min. | min. | max. | min. | min. | min. | max. | min. | max. |
| D | 2 | 160 | 0,5 | 40 | 1 | 200 | cold drawn - without specified mechanical properties | | | | | | | | |
| H035 | 2 | 160 | 0,5 | 40 | 1 | 200 | – | – | – | – | – | 35 | 65 | 35 | 65 |
| R200 | 2 | 160 | 1 | 40 | 5 | 200 | 200 | – | 120 | 25 | 35 | – | – | – | – |
| H065 | 2 | 80 | 0,5 | 40 | 1 | 200 | – | – | – | – | – | 65 | 90 | 70 | 95 |
| R250 | 2 | 10 | 1 | 10 | 5 | 200 | 250 | 200 | – | 8 | 12 | – | – | – | – |
| R250 | > 10 | 140 | > 10 | 40 | > 10 | 200 | 250 | 180 | – | – | 15 | – | – | – | – |
| R230 | > 30 | 80 | > 10 | 40 | > 10 | 200 | 230 | 160 | – | – | 18 | – | – | – | – |
| H085 | 2 | 40 | 0,5 | 20 | 1 | 120 | – | – | – | – | – | 85 | 110 | 90 | 115 |
| H075 | > 40 | 80 | > 20 | 40 | > 20 | 160 | – | – | – | – | – | 75 | 100 | 80 | 105 |
| R300 | 2 | 20 | 1 | 10 | 5 | 120 | 300 | 260 | – | 5 | 8 | – | – | – | – |
| R280 | > 20 | 60 | > 10 | 20 | > 10 | 160 | 280 | 240 | – | – | 10 | – | – | – | – |
| R260 | > 40 | 60 | > 20 | 40 | > 20 | 160 | 260 | 220 | – | – | 12 | – | – | – | – |
| H100 | 2 | 10 | 0,5 | 5 | 1 | 120 | – | – | – | – | – | 100 | – | 110 | – |
| R350 | 2 | 10 | 1 | 5 | 5 | 120 | 350 | 320 | – | 3 | 5 | – | – | – | – |

**Profiles** — acc. to EN 13605

| Temper | Thickness | Width/Height | Tensile strength $R_m$ | Yield strength $R_{p0,2}$ | | Elongation % | | Hardness | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm | mm | MPa | MPa | | A100 | | HB | | HV | |
| | max. | max. | min. | min. | max. | min. | | min. | max. | min. | max. |
| D | 50 | 180 | cold drawn - without specified mechanical properties | | | | | | | | |
| H035 | 50 | 180 | – | – | – | – | – | 35 | 65 | 35 | 70 |
| R200 | 50 | 180 | 200 | – | 120 | 25 | 35 | – | – | – | – |
| H065 | 10 | 150 | – | – | – | – | – | 65 | 95 | 70 | 100 |
| R240 | 10 | 150 | 240 | 160 | – | – | 15 | – | – | – | – |
| H080 | 5 | 100 | – | – | – | – | – | 80 | 115 | 85 | 120 |
| R280 | 5 | 100 | 280 | 240 | – | – | 8 | – | – | – | – |

**Tubes** — acc. to EN 13600

| Temper | Thickness | | Tensile strength $R_m$ | | Yield strength $R_{p0,2}$ | | Elongation % | Hardness | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm | mm | MPa | | MPa | | A100 | HB | | HV | |
| | from | up to | min. | max. | min. | max. | min. | min. | max. | min. | max. |
| D | – | – | cold drawn - without specified mechanical properties | | | | | | | | |
| H035 | – | 40 | – | – | – | – | – | 35 | 60 | 35 | 65 |
| R200 | – | 40 | 200 | 250 | – | 120 | 35 | – | – | – | – |
| H065 | – | 20 | – | – | – | – | – | 60 | 90 | 65 | 95 |
| R250 | – | 20 | 250 | 300 | 150 | – | 15 | – | – | – | – |
| H090 | – | 10 | – | – | – | – | – | 85 | 105 | 90 | 110 |
| R290 | – | 10 | 290 | 360 | 250 | – | 5 | – | – | – | – |
| H100 | – | 5 | – | – | – | – | – | 95 | – | 100 | – |
| R360 | – | 5 | 360 | – | 320 | – | (3) | – | – | – | – |

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