# Wieland-K19

Cu-DHP | C12200 | CW024A

Cu-DHP is a copper that is deoxidized with phosphorus and is excellent for deep drawing and other applications requiring severe forming. Another advantage includes zero risk to hydrogen embrittlement when heated for brazing, welding, soldering or annealing. Cu-DHP is primarily used in pipe caps, brazed heat exchangers and other applications that require high temperature joining or severe forming. It can also be used in many electrical applications such as heating elements and wire connectors.

| **Chemical composition** (Reference) | |
|---|---|
| Cu | ≥ 99.90 % |
| P | 0.015-0.040 % |

| **Physical properties** (Reference values at room temperature) | | | | |
|---|---|---|---|---|
| Electrical conductivity | 46 | MS/m | 79 | %IACS |
| Thermal conductivity | 340 | W/(m·K) | 196 | Btu·ft/(ft²·h·℉) |
| Coefficient of electrical resistance* | 3.4 | $10^{-3}$/K | 1.9 | $10^{-3}$/℉ |
| Coefficient of thermal expansion* | 17.7 | $10^{-6}$/K | 9.8 | $10^{-6}$/℉ |
| Density | 8.94 | g/cm³ | 0.322 | lb/in³ |
| Modulus of elasticity | 115 | GPa | 17,000 | ksi |
| Specific heat | 0.386 | J/(g·K) | 0.092 | Btu/(lb·℉) |
| Poisson´s ratio | 0.34 | | 0.34 | |

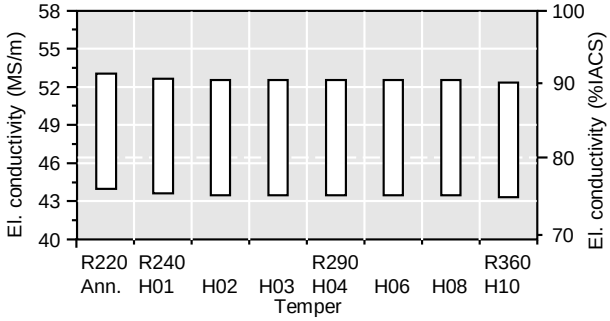
* Between 0 and 300 ℃

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

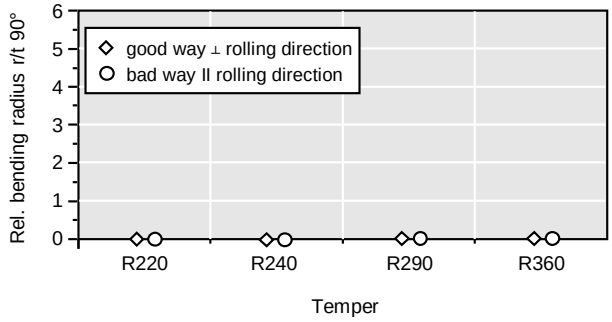
| Temper | Tensile strength $R_m$ | | Yield strength $R_{p0.2}$ | | Elongation $A_{50}$ | Hardness HV |
|---|---|---|---|---|---|---|
| | MPa | ksi | MPa | ksi | % | |
| R220 | 220-260 | 32-38 | ≤ 140 | ≤ 20 | ≥ 33 | (40-70) |
| R240 | 240-300 | 35-44 | ≥ 180 | ≥ 26 | ≥ 8 | (65-95) |
| R290 | 290-360 | 42-52 | ≥ 250 | ≥ 36 | ≥ 4 | (90-110) |
| R360 | ≥ 360 | ≥ 52 | ≥ 320 | ≥ 46 | ≥ 2 | (≥ 110) |
| Annealed | 180-260 | 26-38 | (70) | (10) | (35) | |
| H01* | 235-290 | 34-42 | (220) | (32) | (23) | |
| H02* | 255-315 | 37-46 | (255) | (37) | (20) | |
| H03* | 285-345 | 41-50 | (295) | (43) | (14) | |
| H04* | 295-360 | 43-52 | (310) | (45) | (9) | |
| H06* | 325-385 | 47-56 | (345) | (50) | (4) | |
| H08* | 345-400 | 50-58 | (360) | (52) | (3) | |
| H10* | ≥ 360 | ≥ 52 | (≥ 350) | (≥ 51) | (≤ 3) | |

* According to ASTM B152

**Electrical conductivity**




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



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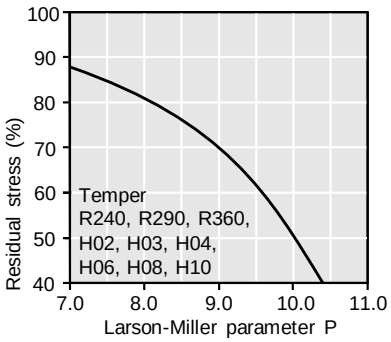
## Thermal stress relaxation

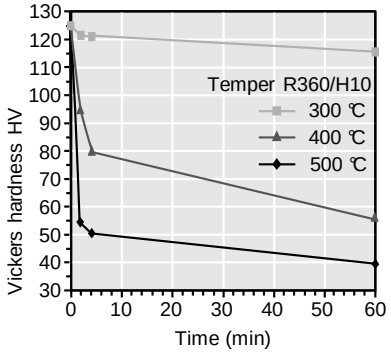



Stress remaining after thermal relaxation as a function of Larson-Miller parameter P
(F. R. Larson, J. Miller, Trans ASME74 (1952) 765–775) given by:
P = (20 + log(t))*(T + 273)*0.001.
Time t in hours, temperature T in ℃.
Example: P = 9 is equivalent to 1,000 h/118 ℃.
Measured on rolled to temper specimens 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 $R_m$.

## Resistance to softening




Vickers hardness after heat treatment (typical values)

## 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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06.21 | RP.TMA.UL/Bm