Wieland-K80

CuFeP | C19210

Wieland-K80, alloy C19210 is a micro-alloyed material belonging to the group of copper iron alloys. Its iron content of 0.1 % in combination with 0.03 % phosphorus makes it a good candidate for applications which require a high electrical conductivity and a certain mechanical stability as well as softening resistance at elevated temperatures. It is a popular alloy for leadframes for power transistors and ICs, connector tabs, automotive battery clamps and components for the electrical industry.

Chemical composition (Reference)	
Fe	0.1 %
P	0.03 %
Cu	balance

Physical properties (Reference values at room temperature)				
Electrical conductivity	53	MS/m	91	%IACS
Thermal conductivity	350	W/(m·K)	202	Btu·ft/(ft²·h·℉)
Coefficient of electrical resistance*	3.2	10^{-3}/K	1.8	10^{-3}/℉
Coefficient of thermal expansion*	17.0	10^{-6}/K	9.4	10^{-6}/℉
Density	8.89	g/cm³	0.321	lb/in³
Modulus of elasticity	125	GPa	18,000	ksi
Specific heat	0.385	J/(g·K)	0.092	Btu/(lb·℉)
Poisson´s ratio	0.34		0.34	

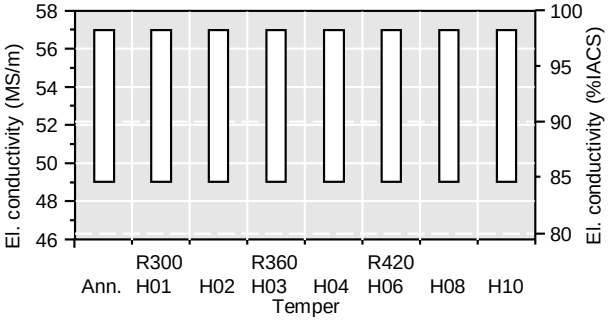
* Between 0 and 300 ℃

Mechanical properties (values in brackets are for information only)

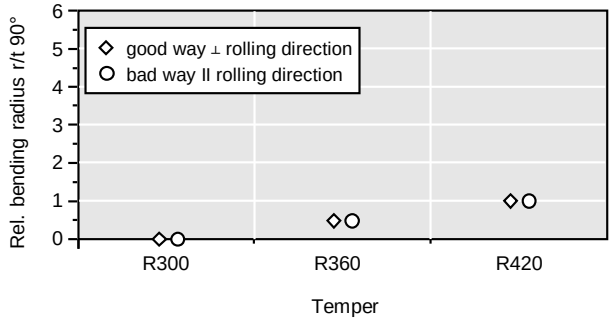
Temper	Tensile strength R_m		Yield strength $R_{p0.2}$		Elongation A_{50}	Hardness HV
	MPa	ksi	MPa	ksi	%	
R300	300-380	44-55	≥ 220	≥ 32	≥ 10	(80-110)
R360	360-440	52-64	≥ 260	≥ 38	≥ 3	(100-130)
R420	420-500	61-73	≥ 350	≥ 51	≥ 2	(120-150)
Annealed*	190-290	27-42	≥ 110	≥ 16	≥ 30	
H01*	300-365	43-53	≥ 135	≥ 20	≥ 20	
H02*	325-410	47-60	≥ 310	≥ 44	≥ 5	
H03*	355-425	52-62	≥ 345	≥ 50	≥ 4	
H04*	385-455	56-66	≥ 355	≥ 54	≥ 3	
H06*	410-480	60-70	≥ 400	≥ 58	≥ 2	
H08*	440-510	64-74	≥ 425	≥ 62	≥ 1	
H10*	≥ 455	≥ 66	≥ 440	≥ 64	≥ 1	

* According to ASTM B888

Electrical conductivity



Bendability (Strip thickness t ≤ 0.5 mm)



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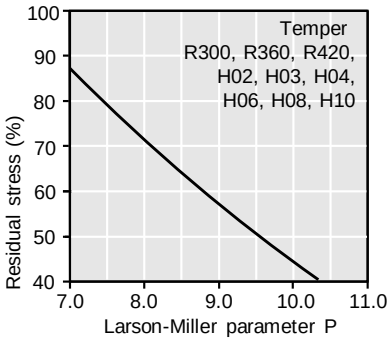
Thermal stress relaxation

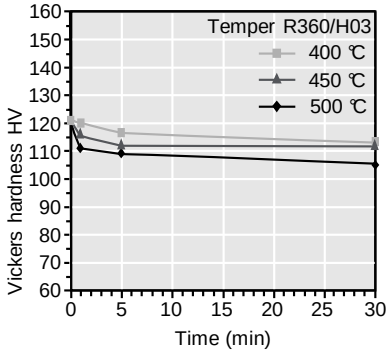


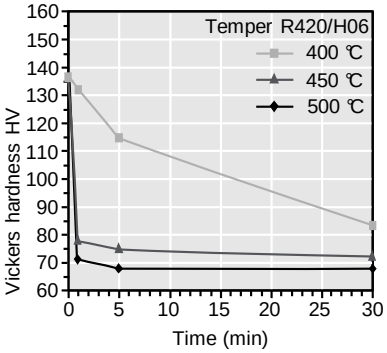
Stress remaining after thermal relaxation as a function of Larson-Miller parameter P
(F. R. Larson, J. Miller, Trans ASME74 (1952) 765–775) given by:
P = (20 + log(t))*(T + 273)*0.001.
Time t in hours, temperature T in ℃.
Example: P = 9 is equivalent to 1,000 h/118 ℃.
Measured on rolled to temper specimens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