C19020

CuNi2SnP

C19020 is the “sister” copper alloy to C19025 and is also one of the more versatile copper alloys in the Wieland product portfolio. Similar in all properties, but providing an increase of 10 %IACS conductivity with slightly lower strength and better formability. C19020 meets the high demands of automotive, electronics and electrical markets. The automotive terminal design engineers should consider this alloy in applications requiring slightly better electrical performance and more stringent formation of bends.

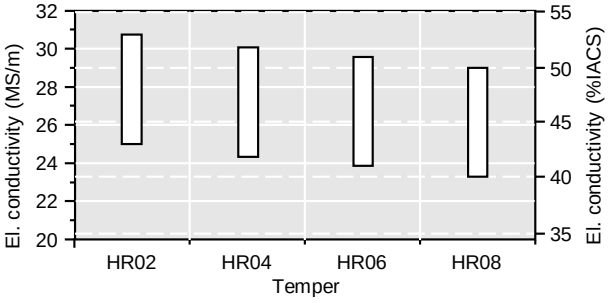
Chemical composition (Reference)	
Ni	2 %
Sn	0.6 %
P	0.1 %
Cu	balance

Physical properties (Reference values at room temperature)				
Electrical conductivity	29	MS/m	50	%IACS
Thermal conductivity	200	W/(m·K)	115	Btu·ft/(ft²·h·℉)
Coefficient of electrical resistance*	1.9	10^{-3}/K	1.1	10^{-3}/℉
Coefficient of thermal expansion*	16.9	10^{-6}/K	9.4	10^{-6}/℉
Density	8.91	g/cm³	0.322	lb/in³
Modulus of elasticity	129	GPa	18,800	ksi
Specific heat	0.377	J/(g·K)	0.090	Btu/(lb·℉)
Poisson´s ratio	0.34		0.34	

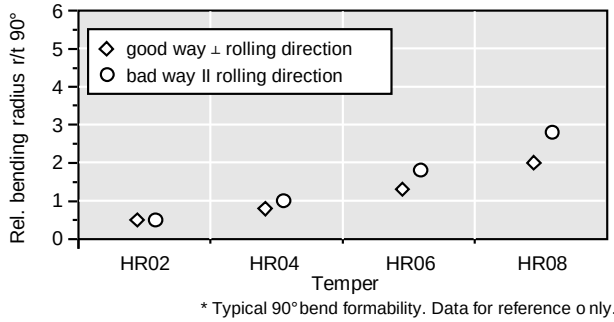
* Between 0 and 300 ℃

Mechanical properties (values in brackets are for information only)					
Temper	**Tensile strength R_m**		**Yield strength $R_{p0.2}$**		**Elongation A_{50} / $A_{2"}$**
	MPa	**ksi**	**MPa**	**ksi**	**%**
HR02	400-485	58-70	(435)	(63)	≥ 5
HR04	450-510	65-74	(460)	(67)	≥ 3
HR06	490-550	71-80	(505)	(73)	≥ 3
HR08	≥ 530	≥ 77	≥ 510	≥ 74	≥ 2

Electrical conductivity



Bendability* (Strip thickness t ≤ 0.4 mm)



* Typical 90° bend formability. Data for reference only.

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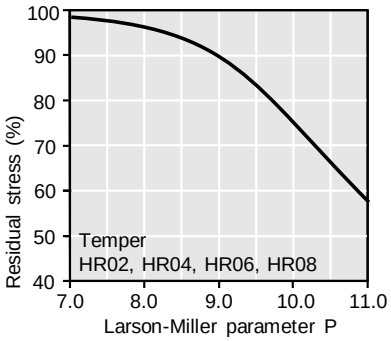
Thermal stress relaxation



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 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 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

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