Wieland-M05

CuZn5 | C21000 | CW500L

Known as Gilding Metal, C21000 is well known for its historic use in the “penny”. This versatile, low-cost alloy is often the choice of engineers for applications including deep drawn parts as bullet jackets and coined products. The combination of moderate conductivity and improved strength makes C21000 a valuable option for electrical applications where performance requirements preclude the use of standard copper.

Chemical composition (Reference)	
Cu	95 %
Zn	remainder

Physical properties (Reference values at room temperature)				
Electrical conductivity	33	MS/m	56	%IACS
Thermal conductivity	234	W/(m·K)	135	Btu·ft/(ft²·h·℉)
Coefficient of electrical resistance*	2.6	10^{-3}/K	1.4	10^{-3}/℉
Coefficient of thermal expansion*	18.0	10^{-6}/K	10.0	10^{-6}/℉
Density	8.86	g/cm³	0.320	lb/in³
Modulus of elasticity	117	GPa	17,000	ksi
Specific heat	0.380	J/(g·K)	0.091	Btu/(lb·℉)
Poisson´s ratio	0.34		0.34	

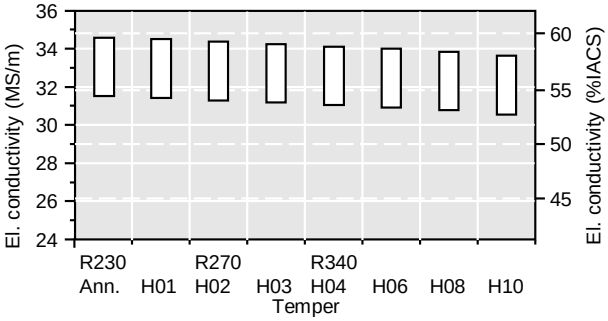
* Between 0 and 300 ℃

Mechanical properties (values in brackets are for information only)

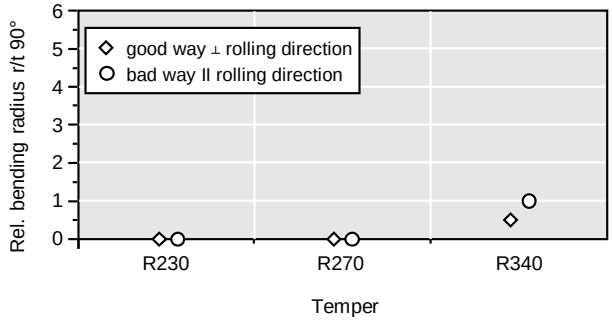
Temper	Tensile strength R_m		Yield strength $R_{p0.2}$		Elongation A_{50}	Hardness HV
	MPa	ksi	MPa	ksi	%	
R230	230-280	33-41	≤ 130	≤ 19	≥ 36	(45-75)
R270	270-350	39-51	≥ 200	≥ 29	≥ 12	(75-110)
R340	≥ 340	≥ 49	≥ 280	≥ 41	≥ 4	(105-140)
Annealed	235-275	34-40	(70)	(10)	(45)	
H01*	255-325	37-47	(205)	(30)	(30)	
H02*	290-360	42-52	(305)	(44)	(17)	
H03*	315-385	46-56	(345)	(50)	(9)	
H04*	345-405	50-59	(365)	(53)	(5)	
H06*	385-440	56-64	(405)	(59)	(≤ 2)	
H08*	415-470	60-68	(435)	(63)	(≤ 2)	
H10*	420-475	61-69	(440)	(64)	(≤ 2)	

* According to ASTM B36

Electrical conductivity



Bendability (Strip thickness t ≤ 0.5 mm)



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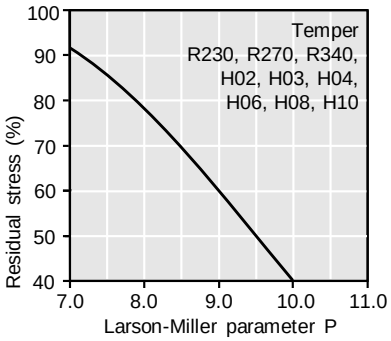
Thermal stress relaxation

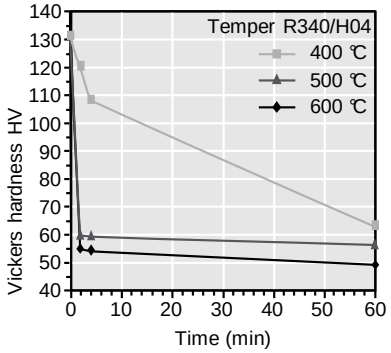


Stress remaining after thermal relaxation as a function of Larson-Miller parameter P
(F. R. Larson, J. Miller, Trans ASME74 (1952) 765–775) given by:
P = (20 + log(t))*(T + 273)*0.001.
Time t in hours, temperature T in ℃.
Example: P = 9 is equivalent to 1,000 h/118 ℃.
Measured on rolled to temper specimens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

Softening resistance



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
- Sheet
- Strip and sheet with protective coating

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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