wieland

Wieland-S12

CuSn3Zn9 | C42500 | CW454K

Originally this tin brass was developed as a “bearing bronze”. C42500 provides a low coefficient of friction in addition to a high work-hardening rate, which makes this alloy an excellent choice for use in bearing surfaces. Similar to other tin brasses, C42500 is an option for spring applications in automotive terminals and other electrical connectors.

Chemical composition (Reference)	
Sn	3 %
Zn	9 %
Cu	remainder

Physical properties (Reference values at room temperature)				
Electrical conductivity	16	MS/m	28	%IACS
Thermal conductivity	120	W/(m·K)	69	Btu·ft/(ft²·h·℉)
Coefficient of electrical resistance*	1.0	10^{-3}/K	0.6	10^{-3}/℉
Coefficient of thermal expansion*	18.4	10^{-6}/K	10.2	10^{-6}/℉
Density	8.78	g/cm³	0.317	lb/in³
Modulus of elasticity	110	GPa	16,000	ksi
Specific heat	0.380	J/(g·K)	0.091	Btu/(lb·℉)
Poisson´s ratio	0.34		0.34	

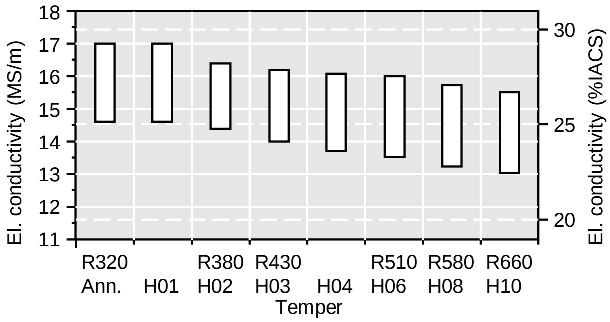
* Between 0 and 300 ℃

Mechanical properties (values in brackets are for information only)

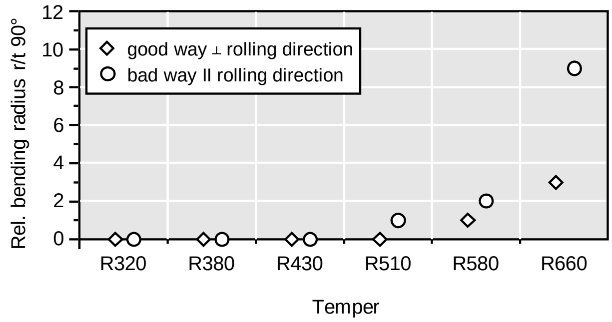
Temper	Tensile strength R_m MPa	Tensile strength R_m ksi	Yield strength $R_{p0.2}$ MPa	Yield strength $R_{p0.2}$ ksi	Elongation A_{50} %	Hardness HV
R320	320-380	46-55	≤ 230	≤ 33	≥ 25	(80-110)
R380	380-430	55-62	≥ 200	≥ 29	≥ 16	(110-140)
R430	430-520	62-75	≥ 330	≥ 48	≥ 6	(140-170)
R510	510-600	74-87	≥ 430	≥ 62	≥ 3	(160-190)
R580	580-690	84-100	≥ 520	≥ 75	-	(180-210)
R660	≥ 660	≥ 96	≥ 610	≥ 88	-	(≥ 200)
Annealed*	285-325	41-47	≥ 90	≥ 13	≥ 47	
H01*	340-405	49-59	≥ 140	≥ 20	≥ 24	
H02*	395-475	57-69	≥ 350	≥ 51	≥ 13	
H03*	425-510	62-74	≥ 375	≥ 54	≥ 10	
H04*	485-565	70-82	≥ 430	≥ 62	≥ 6	
H06*	525-605	76-88	≥ 480	≥ 70	≥ 5	
H08*	580-650	84-94	≥ 545	≥ 79	≥ 3	
H10*	≥ 635	≥ 92	≥ 585	≥ 85	-	

* According to ASTM B888

Electrical conductivity



Bendability (Strip thickness t ≤ 0.5 mm)



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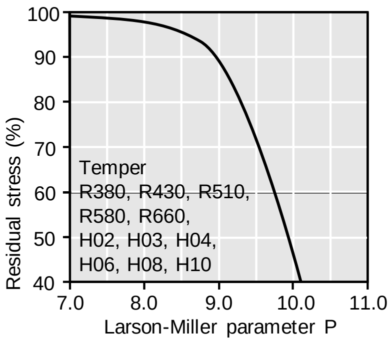
Thermal stress relaxation

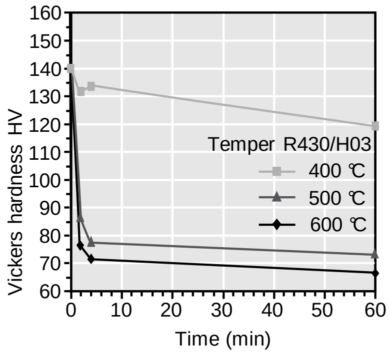


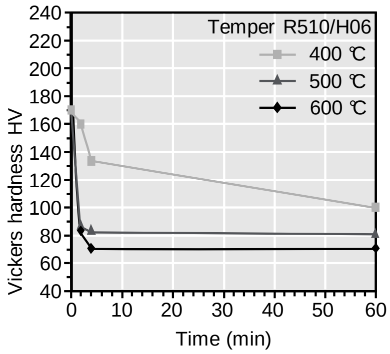
Stress remaining after thermal relaxation as a function of Larson-Miller parameter P
(F. R. Larson, J. Miller, Trans ASME74 (1952) 765–775) given by:
P = (20 + log(t))*(T + 273)*0.001.
Time t in hours, temperature T in ℃.
Example: P = 9 is equivalent to 1,000 h/118 ℃.
Measured on stress relief annealed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

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
- 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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