wieland

Wieland-K75

CuCrSiTi | C18070

Wieland-K75, alloy C18070, is a very popular alloy for high current connectors. Besides excellent formability it provides excellent electrical conductivity above 80 %IACS, high strength as well as an excellent thermal stability. This favorite property combination is achieved by the precipitation hardened microstructure. The precipitations contain titanium silicides and are the cause of the excellent resistance against thermal relaxation.

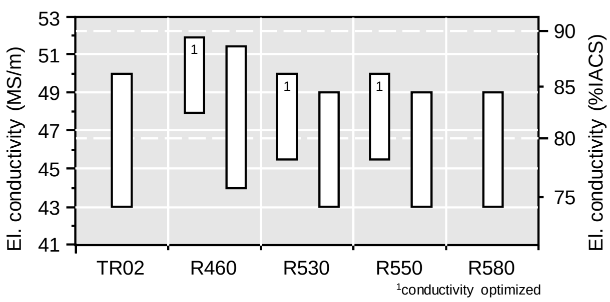
Chemical composition (Reference)	
Cr	0.3 %
Ti	0.1 %
Si	0.02 %
Cu	balance

Physical properties (Reference values at room temperature)				
Electrical conductivity	48	MS/m	83	%IACS
Thermal conductivity	330	W/(m·K)	190	Btu·ft/(ft²·h·℉)
Coefficient of electrical resistance*	3.0	10^{-3}/K	1.7	10^{-3}/℉
Coefficient of thermal expansion*	18.0	10^{-6}/K	10.0	10^{-6}/℉
Density	8.88	g/cm³	0.321	lb/in³
Modulus of elasticity	138	GPa	20,000	ksi
Specific heat	0.385	J/(g·K)	0.092	Btu/(lb·℉)
Poisson´s ratio	0.34		0.34	

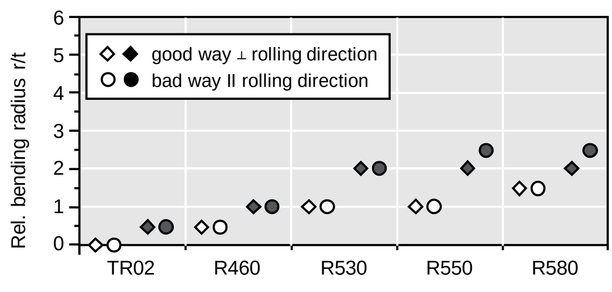
* Between 0 and 300 ℃

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**	**%**	
TR02	430-570	62-83	≥ 370	≥ 54	≥ 7	(130-150)
R460	460-560	67-81	≥ 400	≥ 58	≥ 9	(140-170)
R530	530-610	77-88	≥ 460	≥ 67	≥ 8	(150-190)
R550	550-630	80-91	≥ 520	≥ 75	≥ 7	(150-190)
R580	580-640	84-93	≥ 550	≥ 80	≥ 6	(160-200)

Electrical conductivity



Bendability (Strip thickness t ≤ 0.5 mm) ◇○90° ◆●180°



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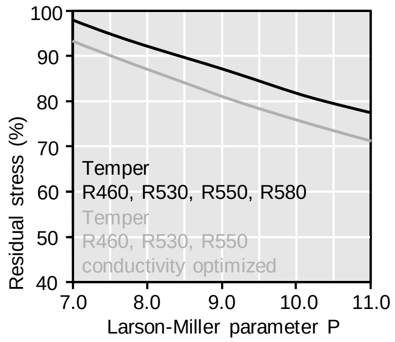
Thermal stress relaxation

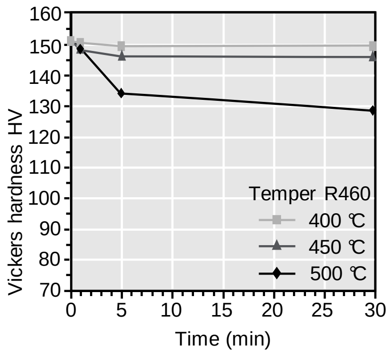


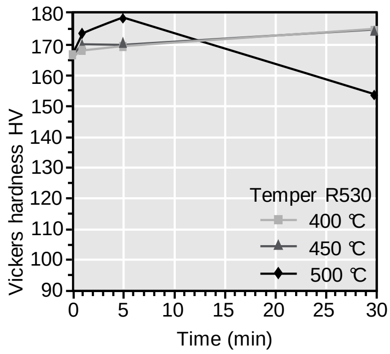
Stress remaining after thermal relaxation as a function of Larson-Miller parameter P
(F. R. Larson, J. Miller, Trans ASME74 (1952) 765–775) given by:
$P = (20 + \log(t)) \cdot (T + 273) \cdot 0.001$.
Time t in hours, temperature T in ℃.
Example: P = 9 is equivalent to 1,000 h/118 ℃.
Measured on stress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

Wieland-Werke AG | Graf-Arco-Straße 36 | 89079 Ulm | Germany
info@wieland.com | wieland.com
Wieland Rolled Products North America | 4803 Olympia Park Plaza, Suite 3000 | Louisville, Kentucky | USA
infona@wieland.com | wieland-rolledproductsna.com