

Data Sheet

GENERAL DESCRIPTION
– SUBJECT TO CHANGES OR DEVIATIONS

Chromium Zirconium Copper CuCrZr – Luvata Special Products KrK101

Alloy description

Luvata Special Products KrK101 alloy is a precipitation hardening alloy for high temperature applications where material need to have a combination of high electrical and thermal conductivity and mechanical properties. Mechanical and electrical properties of chromium zirconium copper are obtained through thermomechanical treatment which typically consists of following steps: solution annealing followed by rapid quenching to water bath, cold working, aging at 400-450°C and cold working to final dimensions. The final metallographical structure of zirconium copper consists of finely dispersed Cu_5Zr and pure chromium precipitates which develop during the aging treatment. Aging treatment is therefore essential to achieve high resistance against softening at elevated temperature and high electrical conductivity. KrK101 alloy can be supplied as aged temper or without heat treatment.

Typical applications:

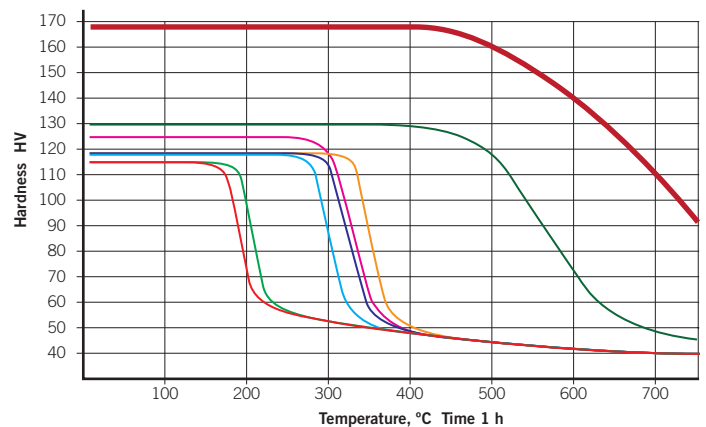
- Resistance welding electrodes
- Spot welding adaptor shanks
- Other applications where high conductivity and good resistance against softening are needed

Products / shapes:

Round rods, wire coils, rectangular bars and solid profiles in age-hardened temper.

Softening behaviour – resistance against softening:

Room temperature hardness is presented in the following figure as a function of annealing temperature. Material at hard or aged temper.



– Cu-ETP – CuAg0,05(OF) – Cu-DHP – CuZr
– Cu-OF – CuAg0,1(OF) – CuAg0,2(OF) – CuCrZr

Chemical composition and corresponding standards:

Luvata Pori Oy alloy	Composition %	EN – CEN/TS 13388:2008	ASTM / USA
KrK101	Cr 0,5 – 1,0 % Zr 0,05 – 0,15 %	CuCr ₁ Zr / CW106C	CDA C18150

Physical properties:

Density kg/dm ³	Coefficient of linear expansion 1/K	Specific heat J/(kg x K)	Melting temperature °C
8,89	0,0000176	385	1075

Mechanical properties – round rods:

	Round dia < 10 mm	Round dia 10 < x < 25 mm	Round dia > 25 mm
Hardness HV	150 – 180 HV	130 – 170 HV	Approx. 130 HV
Tensile strength	450 – 600 N/mm ²	400 – 600 N/mm ²	Approx. 450 N/mm ²
0,2% yield strength	400 – 550 N/mm ²	350 – 550 N/mm ²	Approx. 350 N/mm ²
Elongation	10 – 20 %	10 – 20 %	Approx. 15 %

Electrical and thermal properties – typical values:

Electrical conductivity	vol	% IACS *	approx 78,0
	mass	%IACS	approx 77,5
	MS/m		approx 45,0
Electrical resistivity	vol	Ω mm ² /m	approx 0,022
	mass	Ω g/m ²	approx 0,198
Thermal conductivity (20 °C)	W / Km		320

* % IACS = International Annealed Copper Standard. The % IACS values are calculated as percentages of the standard value for annealed high conductivity copper as laid down by the International Electrotechnical Commission.

Joining and machining:

Machinability rating (free cutting brass = 100)	Soldering	Brazing	TIG	MIG	EBW
20	Good	Good	NOT Recommended	NOT Recommended	NOT Recommended

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