

# Data Sheet

GENERAL DESCRIPTION  
– SUBJECT TO CHANGES OR DEVIATIONS

## Zirconium Copper CuZr – Luvata Special Products ZrK015

### Alloy description

Luvata Special Products ZrK015 alloy is a precipitation hardening alloy for high temperature applications where material needs to have a combination of high electrical and thermal conductivity and mechanical properties. Mechanical and electrical properties of zirconium copper are obtained through thermomechanical treatment which typically consists of the 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  $Cu_5Zr$  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. ZrK015 alloy can be supplied as aged temper or without heat treatment.

### Typical applications:

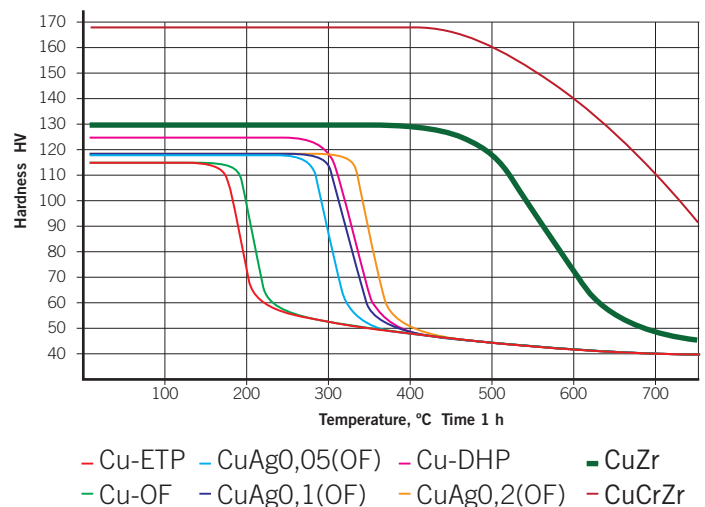
- Resistance welding electrodes
- Spot welding adaptor shanks
- Commutators
- Other applications where high conductivity and good resistance against softening are needed

### 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.



**Chemical composition and corresponding standards:**

Luvata Pori Oy alloy	Composition %	EN – CEN/TS 13388:2008	ASTM / USA
ZrK015	Cu + Ag min 99,8 % Zr 0,1 – 0,2 %	CuZr / CW120C	CDA C15000

**Physical properties:**

Density kg/dm <sup>3</sup>	Coefficient of linear expansion 1/K	Specific heat J/(kg x K)	Melting temperature °C
8,89	0,0000169	385	1080

**Mechanical properties – round rods:**

	Round dia < 25 mm	Round dia 25 < x < 50 mm	Round dia > 50 mm
Hardness HV	120 – 150 HV	120 – 140 HV	Approx. 120 HV
Tensile strength	350 – 450 N/mm <sup>2</sup>	350 – 430 N/mm <sup>2</sup>	Approx. 350 N/mm <sup>2</sup>
0,2% yield strength	300 – 400 N/mm <sup>2</sup>	300 – 360 N/mm <sup>2</sup>	Approx. 320 N/mm <sup>2</sup>
Elongation	8 – 25 %	10 – 25 %	10 - 25 %

**Electrical and thermal properties – typical values:**

Electrical conductivity	vol	% IACS *	approx 90,0
	mass	%IACS	approx 89,8
	MS/m		approx 52,0
Electrical resistivity	vol	Ω mm <sup>2</sup> /m	approx 0,019
	mass	Ω g/m <sup>2</sup>	approx 0,171
Thermal conductivity (20 °C)	W / Km		367

\* % 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

