Data Sheet

GENERAL DESCRIPTION
– SUBJECT TO CHANGES OR DEVIATIONS

High Conductivity Phosphorous Grade Copper Cu-HCP – Luvata Alloy HCP

Alloy description

HCP copper is alloyed with small amount 20 - 70 ppm of phosphorous. This small quantity of phosphorous will not reduce significantly the electrical and thermal conductivity of the alloy but help to obtain homogenous grain size in the product. This copper may be heat treated, welded and brazed without need for special precautions to avoid hydrogen embrittlement.

Typical applications:

- Cooling elements
- Zinc refinery water cooled intermediate bars

Products / shapes:

Corresponding EN- and ASTM norms for different products are as follows:

- EN13601 – Copper and copper alloys. Copper rod, bar, and wire for general electrical purposes.

Chemical composition and corresponding standards:

Luvata Pori Oy alloy	Composition * %	EN – CEN/TS 13388:2008	ASTM / USA
HCP	Cu 99,95 % P 0,002-0,007%	Cu-HCP / CW021A	CDA C10300

* Other elements as EN 13601 max %: Ag 0.015 , Bi 0.0002, Pb 0.0005, rest 0.03

Physical properties:

Density kg/dm^3	Coefficient of linear expansion 1/K	Specific heat J/(kg x K)	Melting temperature °C
8,94	0,0000177	385	1083

Mechanical properties – typical values:

	Soft temper	Half-hard temper	Hard temper
Hardness HV	35 – 65 HV	70 – 95 HV	85 – 115 HV
Tensile strength	200 – 220 N/mm^2	250 – 350 N/mm^2	260 – 400 N/mm^2
0,2% yield strength	35 – 65 N/mm^2	180 – 280 N/mm^2	220 – 380 N/mm^2
Elongation	min. 40 %	min. 12 %	min. 5 %

Electrical and thermal properties – typical values:

Electrical conductivity	vol	% IACS *	min 98,3
	mass	%IACS	min 97,7
	MS/m		min 57,0
Electrical resistivity	vol	Ω mm^2/m	max 0,0175
	mass	Ω g/m^2	max 0,1568
Thermal conductivity (20 °C)	W / Km		386

* % 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	Excellent	Excellent	Good	Good	Good

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