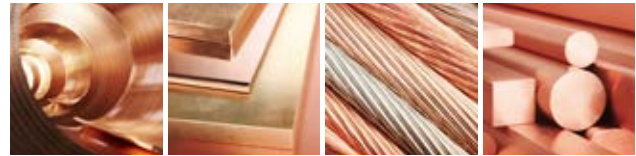


CuCr1Zr C18150



Description

CuCr1Zr is a precipitation hardening, low alloy copper, which is distinguished by high strength values, even at increased temperatures, with very good resistance to temper embrittlement as well as high softening temperatures. While its good cold workability remains restricted to the solution annealed state, CuCr1Zr is generally good for hot working.

In its hardened state it has a high thermal and electrical conductivity as well as a high temperature resistance.

Applications

This material is used in electrical equipment, in plant construction and as a material for mould plates. Amongst

other uses, it can be used as a contact, as a sprung conductor or in welding as an electrode holder and nozzle material, as well as in the field of busbars at high temperatures.

Examples:

- Rotor end rings, exciter rails
- Roller electrodes, spot welding electrodes
- Electrode hubs, jaws for flash butt welding systems
- Parts in accelerator systems subject to high electrical and thermal stress
- Ingot moulds for grey cast iron and cast steel
- Cast wheels and continuous casting moulds

Material designation

Country	Name of the standard	Material designation
Europe	EN	CW106C
International standard	ISO	CuCr1Zr
USA	ASTM	C18150
Great Britain	BS	CC102

Chemical composition

Cu	Remainder
Cr	0.5–1.2 %
Zr	0.03–0.3 %
Fe	0.08 %
Si	0.1 %
Other	0.2 %

Physical characteristics

Density

Temperature °C	Density g/m ³
20	8,91

Electrical conductivity

Electrical conductivity Ms/m	State
>/= 20	solution annealed
</= 44	hardened



Thermal conductivity

Solution annealed	170 W/mK
Hardened	≤ 330 W/mK
E-module solution annealed	90–110 kN/mm ²
E-module solution annealed	110-130 kN/mm ²

Structure

In a solution annealed state, CuCr1Zr has a homogeneous α -structure. While thermally hardening below the solubility line, chromium and Cr₂Zr separate out from the supersaturated matrix.

Processing characteristics

Cold working solution annealed	Good
Cold working hardened	Medium
Hot working 850 – 950 °C	Good
Resistance welding	Good
Gas welding	Poor
MIG welding	Avoid
TIG welding	Avoid
Brazing	Medium
Soft soldering	Medium
Soft annealing	600–800 °C
Hardening	425–500 °C
Stress-relief annealing	300-350°C
Solution annealing	950-1000 °C

Mechanical properties

Rods to DIN EN 12163:2011

State	Diameter (round rods)			Width across flats (rectangular and hexagonal rods)			Tensile strength R_m	0,2 % Yield strength $R_{p0,2}$	Elongation at break	Hard- ness
	mm			mm			N/mm ²	N/mm ²	A %	HB
	from	above	to	from	above	to	min.	min.	min.	min./max.
M	all dimensions						as manufactured			
H120	-	50	100	-	25	80	-	-	-	120/160
R370	-	-	-	-	25	50	370	250	16	-
H135	-	30	50	20	-	25	-	-	-	135/175
R430	-	30	50	20	-	25	430	350	10	-
H135	16	-	30	-	-	-	-	-	-	150/180

All states solution annealed, cold worked and precipitation hardened.

Rectangular rods to DIN EN 12167:2011

State	Cross-section (nominal dimension)					Tensile strength R_m	0,2 % Yield strength $R_{p0,2}$	Elongation at break	Hard- ness
	Width mm		Thickness mm			N/mm ²	N/mm ²	A %	HB
	from	to	from	above	to	min.	min.	min.	min./max.
M	all dimensions					as manufactured			
R370	35	80	30		50	370	250	16	-
H120	35	80	30		50	-	-	-	120/160
R430	40	60	10		30	430	350	10	-
H135	40	60	10		30	-	-	-	135/175
R430	30	40		20	25	430	350	10	-
H135	30	40		20	25	-	-	-	135/175

All states solution annealed, cold worked and precipitation hardened.

Profile: The mechanical properties of the profiles depend upon the shape and dimensions of the profiles and must be agreed between the buyer and the supplier.



Plates and hot rolled sheets (guide values)

Parameter	Solution annealed	Hardened
Tensile strength R_m	min. 230 N/mm ²	min. 370 N/mm ²
Yield point $R_{p0,2}$	min. 80 N/mm ²	min. 270 N/mm ²
Expansion A5	min. 40 %	min. 12 %

Resistance to corrosion:

Resistant to corrosion:

Compared to copper, CuCr1Zr in a solution annealed, homogeneous state, has an increased resistance to tarnishing. CuCr1Zr is resistant to industrial atmospheres, waste and drinking water (flow rates < 1.5 m/s) and pure water vapour, non-oxidising acids and neutral salt solutions.
When annealing in an atmosphere containing hydrogen, no damage to the material occurs (hydrogen embrittlement).

Not resistant to corrosion:

CuCr1Zr is not suitable for contact with solutions containing cyanide, ammonia or halogens.
Seawater, sulphur or moist gases containing ammonia are also unsuitable environments for the metal.

Products

- Hot rolled plates
- Cold rolled plates
- Rods and profiles

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