

Copper-tin casting alloy **GBz 12** alloy 3300

GBz 12 is a corrosion and seawater resistant copper-tin alloy with good wear resistance and good sliding properties. GBz 12 Pb and GBz 12 Ni were developed from this alloy, which are characterised by improved emergency running properties (Pb) and increased strength (Ni), respectively. For CuSn worm wheels, the material GBz12Ni should be used.

ZOLLERN brand	GBz 12
EN designation	CuSn12-C
EN material no:	CC483K
	EN 1982

// National designations

DIN	G-CuSn12
DIN	2.1052
USA	≈ C90800
GB	≈ PB 2
F	≈ U - E12P

≈ (substantial coherence)

// Composition (mass fraction in %) EN 1982

Cu	Ni	P	Sn	Pb	Zn
85.0 – 88.5	max. 2.0	max. 0.60	11.0 – 13.0	max. 0.7	max. 0.5

// Strength properties at room temperature

(minimum values)

[1] EN 1982	R _m N/mm ²	R _{p0.2} N/mm ²	A ₅ %	HB
[1] Sand casting	260	140	7	80
[1] Mask mould casting	260	140	7	80
[1] Centrifugal casting	280	150	5	90

// Strength properties

at elevated temperatures (reference values)

Temperature	°C	20	150	200	250	300
Tensile strength	R _m N/mm ²	260	279	271	229	185
0.2% limit	R _{p0.2} N/mm ²	140	120	112	105	99
Elongation	A ₅ %	12	14	13	10	9

// Physical properties

Density at 20 °C	8.6 kg/dm ³
Melting temperature range	830 – 1,000°C
Shrinkage	approx. 1.5 %
Coefficient of linear expansion in the range 20 – 200°C	18.5 x 10 ⁻⁶ °C ⁻¹
Electrical conductivity at 20°C	5 - 7 MS/m approx. 10 % IACS
Electrical resistance at 20°C	0.166 Ω mm ² /m
Young's modulus	90 – 110 KN/mm ²
Permeability	< 1.01

// Dynamic strength values

at room temperature (reference values)

Bending fatigue strength R _{bw} at 10 ⁸ load cycles	90 N/mm ²
Notched impact energy (ISO - V/KV)	20 joules

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Areas of application

- Pump housing
- Impellers and guide wheels
- Valve housings
- Manifolds and piping parts
- Worm wheels and bearing bushes for medium loads
- Domed and hinged blocks
- Spindle nuts
- Sliding strips

Machinability

GBz 12 is easy to machine. Turning, milling, drilling etc. is possible without problems. Relatively short rolling chips are formed.

Machinability index approx. 70 (CuZn39Pb3 = 100)

Relaxation annealing 400 – 600 °C

Soft soldering good

Brazing good

Welding TIG, MIG and manual electrode welding are possible. However, there is a danger of heat cracks in some cases. Suitable filler material CuSn8 = CF453 K or CuSn12 = CF461 K

Galvanisability good, but denser casting necessary

