

Copper-tin casting alloy **GBz 12 Pb** alloy 3290

GBz 12 Pb is a corrosion and seawater resistant copper-tin alloy developed from GBz 12. The addition of approx. 2 % Pb improved the sliding and emergency running properties. For CuSn worm wheels, the material GBz12Ni should be used.

ZOLLERN brand	GBz 12 Pb
EN designation	CuSn11Pb2-C
EN material no:	CC482K

EN 1982

// National designations

DIN	G-CuSn12Pb
DIN	2.1061
USA	≈ C92500

≈ (substantial coherence)

// Composition (mass fraction in %) EN 1982

Cu	Ni	P	Sn	Pb	Zn
83.5 – 87.0	max. 2.0	max. 0.40	10.5 – 12.5	0.7 – 2.5	max. 2.0

// 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	240	130	5	80
[1] Mask mould casting	240	130	5	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	238	230	223	214
0.2% limit	$R_{p0.2}$ N/mm ²	140	125	119	120	122
Elongation	A_5 %	10	10	12	10	8

// Physical properties

Density at 20°C	8.7 kg/dm ³
Melting temperature range	830 – 1000°C
Shrinkage	approx. 1.5 %
Coefficient of linear expansion in the range 20 – 200°C	$18.5 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$
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	130 N/mm ²
Notched impact energy (ISO - V/KV)	20 joules

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Areas of application

Plain bearings and sliding rails manufactured using the sand casting method can absorb shocks of up to 6,000 N/cm², for centrifugal castings this figure is approx. 12,000 N/cm². Preferred applications are

- Crank and knee lever bearings
- Piston pin bushings
- Spindle nuts and other highly loaded sliding elements

Machinability

GBz 12 Pb is easy to machine.

Turning, milling, drilling etc. are possible without problems. Relatively short rolling chips are formed.

Machinability index approx. 80 (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

