

Wrought copper-zinc alloy special brass **BZ 1** alloy 2140

BZ 1 is a construction and sliding material with high strength. It is resistant to atmospheric corrosion as well as to slightly aggressive water and gases. BZ 1 is well suited for medium sliding speeds and medium surface pressures. A hard counterpart material is recommended. BZ 2 has a higher strength and is more wear-resistant than BZ 1.

ZOLLERN brand	BZ 1
EN designation	CuZn39Mn1AlPbSi
EN material no:	CW718R

EN 12420:1999 Forgings
EN 12163:1998 Drawn bars

// National designations / ISO

DIN	CuZn40Al1
DIN	2.0561
ISO	≈ CuZn39AlFeMn
USA	≈ C 67400
GB	≈ CZ 114
F	≈ U - Z36N3

≈ (substantial coherence)

// Composition (weight by per cent in %)

Cu	Al	Fe	Mn	Ni
57.0 – 59.0	0.3 – 1.3	max. 0.5	0.8 – 1.8	max. 0.5
Pb	Si	Sn	Zn	Other
0.2 – 0.8	0.2 – 0.8	max. 0.5	Rest	max. 0.3

// Strength properties at room temperature

(minimum values)

	R _{p0.2} N/mm ²	R _m N/mm ²	A ₅ %	HB
[1] EN 12420:1999 [2] EN 12163:1998 min. 200 kg				
[1] Forgings and die-forged parts up to 80 mm thickness	180	440	15 ^(*)	110
[1] Forged pieces and Die pressed parts over 80 mm thickness	150	410	15 ^(*)	90
[2] Rods, drawn to 30 mm Ø thickness or SW	approx. 200	440	12	100

^(*) for long forgings, tensile test in longitudinal direction, for rings or discs, however, only A₅ min 10%

// Physical properties

Density at 20 °C	8.1 kg/dm ³
Melting temperature/range	875 – 910°C
Coefficient of linear expansion from 20° to 100°C	19 x 10 ⁻⁶ °C ⁻¹
Specific heat at 20°C	0.356 J/g x °C
Thermal conductivity at 20°C	0.63 W/cm x °C
Electr. conductivity at 20°C	approx. 7 - 9 MS/m approx. 12 - 16 % IACS
Electr. resistance at 20°C	approx. 0.11 - 0.14 Ω mm ² /m
Temperature coefficient of the electrical resistance (0 - 100°C)	0.0009 °C ⁻¹
Permeability	< 1.03
Young's modulus	85 KN/mm ²
Shear modulus G	35 KN/mm ²

// Dynamic strength values at room temperature (reference values)

Rotational bending fatigue strength R _{bw} at 20 x 10 ⁶ load cycles	170 N/mm ²
Notched impact energy (ISO - V/KV)	20 joules

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Areas of application

Due to the improved sliding properties resulting from the addition of Si and Pb, **BZ 1** is particularly suitable for sliding stresses.

For example

- for slide and guide rails in mechanical engineering
- for bearing bushes in plain bearings with medium load
- Valve guides
- worm wheels
- Spindle nuts
- Thrust pads

BZ 1 is somewhat softer than BZ 2 and thus has a better adaptability in case of misalignments shaft to bushing. BZ 1 is insensitive to oil corrosion.

Machinability

BZ 1 has good hot and limited cold forming properties. Machining is easily possible. The cutting index is 40 where CuZn39Pb3 = 100. The low Pb addition results in shorter spiral chips.

Relaxation annealing 350 – 450°C

Soft annealing 500 - 650°C

Soft soldering less suitable

Brazing less suitable

Welding Inert gas-shielded arc welding is possible. However, smoke is generated due to the evaporation of Zn (smoke extraction).

Surface treatment BZ 1 can be polished well, both mechanically and as well as chemically or electrochemically. Galvanic coatings are possible, care must be taken to ensure good pre-treatment

