

Copper-tin-zinc casting alloy **Rg 7** alloy 2970

Rg 7 is a medium-hard sliding material with good emergency running properties and can be used as a sliding partner with unhardened, quenched and tempered or surface-hardened steels. Due to the not-too-high strength values even slight edge pressures are evened out. Rg 7 is resistant to seawater and is also used for components in cooling water applications.

ZOLLERN brand	Rg 7
EN designation	CuSn7Zn4Pb7-C
EN material no:	CC493K

EN 1982

// National designations

DIN	G-CuSn7ZnPb
DIN	2.1090
USA	≈ C93200
F	≈ U – E 7Z5Pb4

≈ (substantial coherence)

// Composition (mass fraction in %)

Cu	Ni	P	Sn	Pb	Zn
81.0 – 85.0	max. 2.0	max. 0.10	6.0 – 8.0	5.0 – 8.0	2.0 – 5.0
Al	Fe	S	Sb	Si	
max. 0.01	max. 0.2	max. 0.10	max. 0.3	max. 0.01	

// 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	230	120	15	60
[1] Mask mould casting	230	120	15	60
[1] Centrifugal casting	260	120	12	70

// Strength properties

at elevated temperatures (reference values)

Temperature	°C	20	150	200	250	300
Tensile strength	R_m N/mm ²	240	217	208	200	181
0.2% limit	$R_{p0.2}$ N/mm ²	120	109	105	101	97
Elongation	A_5 %	15	15	14	14	14

// Physical properties (reference values)

Density at 20°C	8.8 kg/dm ³
Melting temperature/range	860 – 1020°C
Shrinkage	approx. 1.5 %
Coefficient of linear expansion in the range from 20°C to 200°C	$18.5 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$
Electrical conductivity at 20°C	5 – 7 MS/m 8 – 12 % IACS
Electrical resistance at 20°C	0.14 – 20 Ω mm ² /m
Young's modulus	105 KN/mm ²
Permeability	< 1.01
Thermal conductivity	0.64 W/cm °C

// Dynamic strength values

at room temperature (reference values)

Bending fatigue strength R_{bw} at 10^8 load cycles	110 N/mm ²
Notched impact energy (ISO - V/KV)	18 joules

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Areas of application

Rg 7 is a sliding material for general mechanical engineering.

- In addition to bearing shells and bushes, guide rails and other sliding elements are made of Rg 7. Load peaks of up to approx. 4000 N/mm² are permissible. In the case of dynamic stress, as in toggle lever or piston pin bushings, load peaks of up to approx. 3000 N/mm² are permissible.
- In addition, Rg 7 is used for parts in cooling water systems such as manifolds, flanges, covers, housings, parts for pumps also in contact with seawater, for example for cooling of large diesel engines for ships

Machinability

Rg 7 is easy to machine. Short chips are formed.

Machinability index	approx. 85 (CuZn39Pb3 = 100)
Relaxation annealing	400 – 600 °C
Soft soldering	good
Brazing	only suitable to a limited extent
Welding	Rg 7 can only be welded to a limited extent. The material has a tendency to hot cracking, welding filler material e.g. CuSn8 = CF453K
Galvanisability	good, but denser casting necessary
Surface treatment	blasting, grinding and polishing are easily possible

