

Copper-aluminium casting alloy **SMBG** alloy 1440

SMBG is a non-standard, wear-resistant sliding material, developed from the wrought material 2.0960 – CuAl9Mn2, which is identical under analysis. When used as a sliding material, a hard sliding partner with oil lubrication is advisable. Compared to CuAl10Fe5Ni5, SMBG is softer and therefore offers superior adaptability, e.g. in case of misalignment. In addition to good resistance to seawater and to acidic and neutral aqueous media, it also has good oxidation resistance. Due to its good toughness at sub-zero temperatures the material is also suitable for cryogenics.

// Composition (mass fraction in %), not standardised

Cu	Al	Fe	Ni	Mn
Rest	8.5 – 10.0	0.6 – 1.0	0.4 – 0.8	1.8 – 2.6
Pb	Si	Sn	Zn	
max. 0.03	max. 0.06	max. 0.06	max. 0.35	

// Strength properties at room temperature

(minimum values)				
Not standardised	R _m N/mm ²	R _{p0.2} N/mm ²	A ₅ %	HB
Sand casting	440	140	11	105
Centrifugal casting	540	180	12	110

// Strength properties at elevated temperatures (reference values)

Temperature	°C	20	150	200	250	300
Tensile strength	R _m N/mm ²	480	515	495	500	515
0.2% limit	R _{p0.2} N/mm ²	170	170	180	180	180
Elongation	A ₅ %	11	11	11	12	15

// Physical properties

Density at 20°C	7.6 kg/dm ³
Melting temperature/range	1030 – 1050°C
Specific heat capacity at 20°C	0.444 J/g × °C
Thermal conductivity at 20°C	0.88 W/cm °C
Electrical conductivity at 20°C	4 – 6 MS/m 7 – 10 % IACS
Electrical resistance at 20°C	0.16 - 0.25 Ω mm ² /m
Coefficient of linear expansion in the range 20 – 200°C	15 × 10 ⁻⁶ °C ⁻¹
Shrinkage	1.5 – 2 %
Young's modulus	95 KN/mm ²
Permeability	< 1.05

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

Bending fatigue strength R _{bw} at 10 ⁸ load cycles	165 N/mm ²
Notched impact energy (ISO - V/KV)	50 joules

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Areas of application

SMBG is suitable for

- stressed sliding parts in general mechanical engineering
- and due to its corrosion resistance against sea water, also for parts in shipbuilding
- Typical applications include spindle nuts, sliding blocks, sliding strips and guide rails
- It is also used in worm wheel rims for medium-speed worm gears
- Bearing bushes and bearing rings

Machinability

Carbide tools are needed for turning and milling and sharp drill bits are needed for drilling and thread cutting. This results in machinability that is better than that of austenitic steel.

Shorter rolling and flowing chips are formed.

Relaxation annealing approx. 550 - 580 °C

Soft soldering not recommendable

Brazing poor, fluoride and chloride containing and chloride-containing fluxes are necessary (type F – SH 1), silver solders are advantageous, e.g. L-Ag44 or L-Ag55Sn

Welding good, both TIG, MIG and also electrode manual welding are possible. Suitable filler material CuAl9Ni4Fe2Mn2 = CF310G or S-CuAl8Ni2

Surface treatment blasting, grinding and polishing are easily possible

Galvanisability possible, good cleaning and pretreatment necessary

