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Solid metals. Fine solutions.

Wrought copper-aluminium alloy **SMBm** alloy 1460 **/ SMBh** alloy 1450

Like **SMBh, SMBm** is also a wear-resistant sliding material and is also suitable as a construction material. It is resistant to acidic and neutral aqueous media, as well as to seawater. SMBm has good cold forming properties and is also suitable for the production of drawn bars and profiles.

ZOLLERN brand	SMBm / SMBh
EN designation	EN standard, none
EN material no:	EN standard, none

// National designations / ISO

DIN 17655	CuAl9Mn2
DIN 17655	2.0960

// Composition (weight by per cent in %)

Cu	Al	Fe	Mn	Ni
Rest	8.0 – 10.0	max 1.5	1.5 -3.0	max 0.8

Pb	Zn	Other
max. 0.05	max. 0.5	max. 0.3

// Strength properties at room temperature

	(minimum values)			
	$R_{p0.2}$ N/mm²	R_m N/mm²	A_5 %	HB
[1] DIN 17678:1983 [2] DIN 17672:1983 min. 250 kg				
[1] Forging SMBm up to 80 mm thickness SMBh	205 210	510 570	22 15	120 130
[1] Forging SMBm over 80 mm SMBh	195 205	490 570	25 15	110 125
[2] SMBh Rods, drawn up to 30 mm Ø,thickness or SW	250	590	15	~150

SMBh has a slightly higher strength than SMBm

// Strength properties at elevated temperatures (reference values)

Temperature	°C	20	200	300	400	500
0.2% limit	$R_{p0.2}$ N/mm²	240	230	225	225	100
Tensile strength	R_m N/mm²	580	530	450	280	130
Elongation	A_5 %	45	45	27	40	30

// Physical properties

Density at 20 °C	7.6 kg/dm³
Melting temperature/range	1045 – 1100 °C
Coefficient of linear expansion	
from 20° to 100°C	16 x 10^{-6} °C^{-1}
from 20° to 300°C	17 x 10^{-6} °C^{-1}
Specific heat at 20°C	0.44 J/g x °C
Thermal conductivity at 20°C	0.88 W/cm x°C
Electr. conductivity at 20°C	4 - 6 MS/m 7 - 10% IACS
Electr. resistance at 20°C	0.16 - 0.25 Ω mm²/m
Permeability	< 1.05
Young's modulus	107 KN/mm²

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

Rotational bending fatigue strength R_{bw} at 20 x 10^6 load cycles	180 N/mm²
Notched impact energy (ISO - V/KV)	70 joules

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Areas of application

SMBm is a medium-hard Cu-Al alloy with good sliding properties at medium sliding speeds. It is also a soft steel (not hardened or tempered) so it can be used as a counter part. Due to the lower hardness compared to other CuAl alloys, SMBm has an adaptability in case of misalignment of the shaft to bush.

SMBm is therefore suitable for
- worm wheels
- Bevel gears
- other drive elements

in use in mechanical engineering
- thrust pads and spindle nuts
- bearing bushes
- guide rails
- Sliding strips
- Wedge gibs with adjustable guides

SMBm is used as a sealing strip support on paper machines. SMBm has good cold forming properties and can, for example, be flanged. Mould inserts and cores for plastic injection moulds are made from SMBh, which is easy to machine and polish. The relatively high thermal conductivity for aluminium bronzes leads to a reduction in cycle time compared to pure steel moulds.

Machinability

Carbide tools are needed for turning and milling and sharp tools are needed for drilling and thread cutting. This results in a machinability that is better than that of austenitic stainless steel. Shorter rolling and flowing chips are formed.
Cutting and die-sinking is easily possible, as is polishing and chemical structuring of the surface.

Relaxation annealing	350 – 480°C
Soft annealing	700 - 720°C with subsequent cooling in air
Soft soldering	not recommendable
Brazing	poor, fluxes containing fluoride and chloride of type F - SH1 and silver solders are advantageous
Welding	good, TIG-welding is preferable, but MIG welding is also possible. Filler material e.g. CF309G = CuAl8 or S-CuAl8Ni2
Surface treatment	polishing, chemical structuring and galvanic treatments are possible. Undercoating is advisable for electroplated coatings

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