

Wrought copper-aluminium alloy **VB** Alloy 1580

VB belongs to the group of high-strength aluminium multi-components bronzes. The material has a high corrosion resistance with high strength properties at the same time. Through targeted heat treatment, a yield strength and tensile strength of approx. 700 and 1,000 N/mm² can be achieved for short forgings.

ZOLLERN brand	VB
EN designation	CuAl11Fe6Ni6
EN material no:	CW308G

EN 12420:1999 Forgings

// National designations / ISO

DIN	CuAl11Ni6Fe5
DIN	2.0978
ISO	≈ CuAl10Fe5Ni5
USA	≈ C63000
GB	≈ CA 104
F	≈ U - A11N

≈ (substantial coherence)

// Composition (weight by per cent in %)

Cu	Al	Fe	Mn	Ni
Rest	10.5 – 12.5	5.0 – 7.0	max. 1.5	5.0 – 7.0
Pb	Si	Sn	Zn	Other
max. 0.05	max. 0.2	max. 0.1	max. 0.4	max. 0.2

// Strength properties at room temperature

(minimum values)

[1] higher strength values than CW308G according to EN 12420:1999	R _{p0.2} N/mm ²	R _m N/mm ²	A ₅ %	HB
[1] Forgings and die-pressed parts	450	800	4	215

// Strength properties

at elevated temperatures (reference values)

Temperature	°C	20	200	300	400	500
0.2% limit	R _{p0.2} N/mm ²	600	510	430	260	80
Tensile strength	R _m N/mm ²	850	700	570	280	120
Elongation	A ₅ %	11	7	6	42	70

// Physical properties

Density at 20 °C	7.6 kg/dm ³
Melting temperature/range	1060 – 1075 °C
Coefficient of linear expansion	
from - 200° to 20°C	15 x 10 ⁻⁶ °C ⁻¹
from 20° to 100°C	15 x 10 ⁻⁶ °C ⁻¹
from 20° to 300°C	17 x 10 ⁻⁶ °C ⁻¹
Specific heat at 20°C	0.435 J/g x °C
Thermal conductivity at 20°C	0.38 W/cm x°C
Electr. conductivity at 20°C	4 - 6 MS/m 7 - 10% IACS
Electr. resistance at 20°C	0.167 - 0.25 Ω mm ² /m
Temperature coefficient of the electrical resistance (0 - 100°C)	0.0005°C ⁻¹
Permeability	< 1.8
Young's modulus	115 KN/mm ²

// Dynamic strength values

at room temperature (reference values)

Rotational bending fatigue strength R _{bw} at 20 x 10 ⁶ load cycles	310 N/mm ²
Notched impact energy (ISO - V/KV)	10 joules

Wrought copper-aluminium alloy **VB** Alloy 1580

VB belongs to the group of high-strength aluminium multi-components bronzes. The material has a high corrosion resistance with high strength properties at the same time. Through targeted heat treatment, a yield strength and tensile strength of approx. 700 and 1,000 N/mm² can be achieved for short forgings.

Areas of application

VB is a high-strength material with a high load capacity and high corrosion resistance to Cl-containing water, neutral and acidic aqueous media. It has good resistance to scaling, erosion and cavitation. Highly loaded bearings and worm wheels for sliding speeds < 1 m/s.

Surface pressures of up to approx. 25 KN/cm² are permissible under suitable conditions, e.g. with

- toggle lever bearings
- Sliding strips
- Thrust and plain bearing rings
- Wear and wedge gibs in machine and mould construction

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, and the surface can also be structured decoratively by etching.

Relaxation annealing	650 – 720°C
Soft annealing	800 - 850°C with subsequent furnace cooling down to 650°C, then air cooling
Soft soldering	not recommendable
Brazing	poor, fluxes containing fluoride and chloride of type F - SH1 and silver solders are advantageous
Welding	good, both TIG, MIG as well as manual electrode welding is possible, filler metal e.g. CuAl9Ni4Fe2Mn2 = CF310G or S-CuAl8Ni2
Surface treatment	polishing, chemical structuring and galvanic treatments are possible. Undercoating is advisable for electroplated coatings

