

Wrought copper-aluminium alloy **VB (QT)** alloy 1580

VB (QT) belongs to the group of high-strength aluminium multi-components bronzes. Tempering is possible up to a wall thickness of 100 mm and improves the strength. Bars should not be longer than 500 mm. The strength values are among the highest achievable with copper alloys. The material has a high corrosion resistance.

ZOLLERN brand	VB (QT)
EN designation	CuAl11Fe6Ni6
EN material no:	CW308G

// National designations / ISO	
DIN	CuAl11Ni6Fe5
DIN	2.0978
USA	≈ C63020
AMS	≈ 4590

(≈ similar to C63020, AMS4590 see also material VBw)

// 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)				
	R _{p0.2} N/mm ²	R _m N/mm ²	A ₅ %	HB 30
Forgings up to 100 mm thickness	700	950	2.5	280

If a higher elongation is desired, then the material VBw with a slightly lower strength is recommended

// 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	0.452 J/g x °C
Thermal conductivity at 20°C	0.38 W/cm x°C
Electr. conductivity at 20°C	4 – 6 MS/m
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	< 1.6
Young's modulus	117 KN/mm ²

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Areas of application

VB (QT) is a very high-strength, heavy-duty material. It is particularly suitable for

- bearings with sliding speeds <1m/s.
A hardened mating material is necessary.
- Surface pressures of up to more than 30 KN/mm² are possible under suitable conditions.
For example, for sliding and wear strips in the mechanical engineering; highly loaded bearings

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 max. 500°C

Soft annealing 800 - 900°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 TIG, MIG as well as manual electrode welding is possible. Suitable filler materials are e.g. CuAl9Ni4Fe2Mn2 = CF310G or S-CuAl8Ni2, material number 2.0922. However, the strength values of the base metal are not achieved in the weld metal and in the heat flow zone.

Surface treatment

polishing, chemical structuring and galvanic treatments are possible. With electroplated coatings, a copper backup bar is advisable

