wieland

Z31/Z41/Z48

CuZn40Pb2 | Machining / hot-stamping brass

Material designation

EN	CuZn40Pb2 CW617N
UNS	C38000

Chemical composition*

Cu	58 %
Pb**	2 %
Zn	balance

**Reference values in % by weight*

Physical properties*

Electrical conductivity	MS/m %IACS	14.9 25
Thermal conductivity	W/(m·K)	113
Thermal expansion coefficient (0–300 °C)	10^{-6}/K	21.1
Density	g/cm³	8.43
Moduls of elasticity	GPa	96

**Reference values at room temperature*

Corrosion resistance

Machining brass is generally quite resistant against organic substances as well as neutral or alkaline compounds.
Stress corrosion cracking should be taken into account, especially in an ammoniacal atmosphere and whilst under mechanical stress.
Dezincification in warm, acidic waters should also be taken into consideration.

Product standards

Rod	EN 12164 EN 12165
Wire	EN 12166
Section	EN 12167
Hollow rod	EN 12168
Tube	EN 12449

Material properties and typical applications

Z31/Z41/Z48 are the reference materials for hot working. The mean lead content provides good machinability of the drop-forged part. Because of its composition the alloy is also suited for the production of drawn, complex profile shapes.
Z48 has been specially optimised for hot working.
Z41 has been specially optimised for the manufacture of rods for machining purposes which are supplied in the proven W5000 quality.
Both types Z41 and Z48 are hygienically suitable for contact with drinking water according to the UBA (Federal Environment Agency) list.
Z31 can be used if the material is not required to comply with drinking water requirements. Z31 corresponds in its composition to UNS C38000 and UNS C37700.

Types of delivery

The BU Extruded Products supplies bars, wire, sections and tubes. Please get in touch with your contact person regarding the available delivery forms, dimensions and tempers.

Fabrication properties

Forming

Machinability (CuZn39Pb3 = 100 %)	95 %
Capacity for being cold worked	poor
Capacity for being hot worked	excellent

Surface treatment

Polishing	
mechanical electrolytic	good poor
Electroplating	excellent

Joining

Resistance welding (butt weld)	fair
Inert gas shielded arc welding	poor
Gas welding	poor
Hard soldering	fair
Soft soldering	excellent

Heat treatment

Melting range	880–895 °C
Hot working	650–800 °C
Soft annealing	450–600 °C 1–3 h
Thermal stress relieving	200–300 °C 1–3 h

Trademarks

W 5000

Wieland-PSR

Further information is provided in the brochures on W5000 and Wieland-PSR.

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Mechanical properties according to EN

Round rods/polygonal rods — acc. to EN 12164

Temper	Diameter		Width across flats		Tensile strength R_m	Yield strength $R_{p0.2}$		Elongation %			Hardness	
	mm		mm		MPa	MPa		A100	A11.3	A	HB	
	from	to	from	to	min.	min.	max.	min.	min.	min.	min.	max.
M	all		all		as manufactured – without specified mechanical properties							
R360	6	80	5	60	360	–	350	–	15	20	–	–
H090	6	80	5	60	–	–	–	–	–	–	90	125
R430	2	60	2	40	430	220	–	6	8	10	–	–
H110	2	60	2	40	–	–	–	–	–	–	110	160
R500	2	14	2	10	500	350	–	–	3	5	–	–
H135	2	14	2	10	–	–	–	–	–	–	135	–

Rectangular rods — acc. to EN 12167

Temper	Thickness		Tensile strength R_m	Yield strength $R_{p0.2}$		Elongation %			Hardness	
	mm		MPa	MPa		A100	A11.3	A	HB	
	from	to	min.	min.	max.	min.	min.	min.	min.	max.
M	all		as manufactured – without specified mechanical properties							
R360	6	40	360	–	320	–	15	20	–	–
H090	6	40	–	–	–	–	–	–	90	125
R430	3	20	430	220	–	6	8	10	–	–
H110	3	20	–	–	–	–	–	–	110	160
R500	3	10	500	350	–	2	5	8	–	–
H135	3	10	–	–	–	–	–	–	135	–

Tubes — acc. to EN 12449

Temper	Wall thickness		Tensile strength R_m	Yield strength $R_{p0.2}$		Elongation %	Hardness			
	mm		MPa	MPa		A	HV		HB	
	from	to	min.	min.	max.		min.	max.	min.	max.
M	–	20	as manufactured – without specified mechanical properties							
R360	–	10	360	–	250	25	–	–	–	–
H085	–	10	–	–	–	–	85	120	80	115
R430	–	10	430	250	–	12	–	–	–	–
H115	–	10	–	–	–	–	115	150	110	145
R500	–	5	500	370	–	8	–	–	–	–
H140	–	5	–	–	–	–	140	–	135	–

Round wires — acc. to EN 12166

Temper	Diameter		Tensile strength R_m	Yield strength $R_{p0.2}$		Elongation %			Härte	
	mm		MPa	MPa		A100	A11.3	A	HB	
	from	to	min.	min.	max.	min.	min.	min.	min.	max.
M	all		as manufactured – without specified mechanical properties							
R360	6	20	360	–	320	–	15	20	–	–
H095	6	20	–	–	–	–	–	–	95	130
R430	0.5	14	430	220	–	6	8	10	–	–
H115	1.5	14	–	–	–	–	–	–	115	170
R500	0.5	8	500	350	–	2	5	–	–	–
H145	1.5	8	–	–	–	–	–	–	145	–

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07.25 | GX.ZZS.UL/Er (CC.ED.UL)