wieland

Wieland-B09/B10

CuSn8 | Phosphor bronze

Material designation

EN	CuSn8 CW453K
UNS	C52100

Chemical composition*

Cu	balance
Sn	8 %
P	0.01–0.4 %
Pb	≤ 0.02 %

**Reference values in % by weight*

Physical properties*

Electrical conductivity	MS/m %IACS	6.5 11
Thermal conductivity	W/(m·K)	58
Thermal expansion coefficient (0–300 °C)	10^{-6}/K	18.5
Density	g/cm³	8.8
Moduls of elasticity	GPa	115

**Reference values at room temperature*

Corrosion resistance

In general excellent resistance to corrosion in seawater, industrial atmosphere and to stress corrosion cracking.

Product standards

Rod	EN 12163
Wire	EN 12166
Section	EN 12167
Tube	EN 12449

Material properties and typical applications

Wieland-B09/B10 is a phosphor bronze with a tin content of 8 % making it possible to achieve very high mechanical strength and good spring properties. It has excellent wear and corrosion resistance and is therefore also used for bearings. Phosphor bronzes exhibit good cold working properties and can be satisfactorily machined with adequate tooling parameters.

A very pure type of CuSn8 is Wieland-B10 meeting the highest demands, for example, of Bourdon tubes.

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 %)	25 %
Capacity for being cold worked	excellent
Capacity for being hot worked	poor

Joining

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

Surface treatment

Polishing	
mechanical electrolytic	good fair
Electroplating	good

Heat treatment

Melting range	960–1,020 °C
Hot working	700–800 °C
Soft annealing	500–700 °C 1–3 h
Thermal stress relieving	200–300 °C 1–3 h

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Mechanical properties according to EN

Round rods/polygonal rods — acc. to EN 12163

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							
R390	2	60	2	60	390	–	280	35	40	45	–	–
H085	2	60	2	60	–	–	–	–	–	–	85	125
R450	2	50	2	50	450	280	–	18	22	26	–	–
H135	2	50	2	50	–	–	–	–	–	–	135	165
R550	2	12	2	12	550	400	–	10	12	15	–	–
H160	2	12	2	12	–	–	–	–	–	–	160	190
R620	2	8	–	–	320	500	–	5	8	–	–	–
H180	2	8	–	–	–	–	–	–	–	–	180	–
R750	2	4	–	–	750	680	–	–	–	–	–	–
H210	2	4	–	–	–	–	–	–	–	–	210	–

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							
R390	3	50	390	–	280	35	40	45	–	–
H085	3	50	–	–	–	–	–	–	85	125
R450	3	6	450	280	–	18	22	–	–	–
H135	3	6	–	–	–	–	–	–	135	165
R550	3	6	550	400	–	10	12	–	–	–
H160	3	6	–	–	–	–	–	–	160	190

Tubes — acc. to EN 12449

Temper	Wall thickness	Tensile strength R_m	Yield strength $R_{p0.2}$		Elongation %	Hardness			
	mm	MPa	MPa		A100	HV		HB	
	max.	min.	min.	max.	min.	min.	max.	min.	max.
M	20	as manufactured – without specified mechanical properties							
R380	10	380	–	290	55	–	–	–	–
H080	10	–	–	–	–	80	110	75	105
R450	5	450	250	–	25	–	–	–	–
H115	5	–	–	–	–	115	160	110	155
R520	3	520	440	–	10	–	–	–	–
H155	3	–	–	–	–	155	190	150	185
R590	2	590	520	–	5	–	–	–	–
H180	2	–	–	–	–	180	–	175	–

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							
R390	0.1	12	390	–	280	35	40	45	–	–
H090	1.5	12	–	–	–	–	–	–	90	130
R450	0.1	12	450	280	–	18	22	26	–	–
H140	1.5	12	–	–	–	–	–	–	140	170
R550	0.1	12	550	400	–	10	12	15	–	–
H170	1.5	12	–	–	–	–	–	–	170	200
R620	0.1	8	620	500	–	4	6	–	–	–
H185	1.5	8	–	–	–	–	–	–	185	–
R750	0.1	4	750	680	–	–	–	–	–	–
H220	1.5	4	–	–	–	–	–	–	220	–
R920	0.1	1.5	920	800	–	–	–	–	–	–
H265	–	1.5	–	–	–	–	–	–	265	–

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