

Wieland-B12/B21

CuSn8P/CuSn8 | Phosphor bronze

Material designation

EN	CuSn8P - CW459K CuSn8 - CW453K
UNS	C52100

Chemical composition*

Cu	balance
Sn	8 %
P	0,25 %

*Reference values in % by weight

Physical properties*

Electrical conductivity	MS/m	6.5
	%IACS	11
Thermal conductivity	W/(m·K)	58
Thermal expansion coefficient (0–300 °C)	10 ⁻⁶ /K	18.5
Density	g/cm ³	8.8
Modulus 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

CW453K	
Rod	EN 12163
Wire	EN 12166
Section	EN 12167
Tube	EN 12449
CW459K	
Rod	EN 12163
Tube	EN 12449

Material properties and typical applications

Wieland-B12/B21 are tin bronzes with an 8% tin content, which allows very high strengths with corresponding spring properties to be set. The wear and corrosion properties are very good, so that these materials are used for structural parts such as bolts, nuts and screws, pinions, worm gears, in pumps and compressors and for slide bearing applications.

Tin bronzes have good cold working properties and can be machined with suitable tool parameters. The alloy B12-CuSn8P has an improved friction and wear behaviour due to its increased phosphorus content compared to B21 and is a proven material for thin-walled bearing bushes.

Types of delivery

The Business Unit 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

Surface treatment

Polishing	
mechanical	good
electrolytic	fair
Electroplating	good

Joining

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

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 standards

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								
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	-	-	620	-	500	5	8	-	-	-	
H180	2	8	-	-	-	-	-	-	-	-	180	-	
R750	2	4	-	-	750	-	680	-	-	-	-	-	
H120	2	4	-	-	-	-	-	-	-	-	210	-	

Tube - CW453K acc. to EN 12449

Temper	Thickness	Tensile strength R _m	Yield strength R _{p0.2}		Elongation %	Hardness					
	mm	MPa	MPa		A	HV		HB			
	max.	min.	min.	max.	min.	min.	max.	min.	max.		
M	20	as manufactured									
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	-		

Tube - CW459K 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									
R460	10	460	280	-	30	-	-	-	-		
H130	10	-	-	-	-	130	165	125	160		
R550	5	550	480	-	12	-	-	-	-		
H165	5	-	-	-	-	165	195	160	190		
R620	3	620	540	-	5	-	-	-	-		
H180	3	-	-	-	-	180	-	175	-		

Round wires - only CW453K 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									
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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