

**Wieland-SW1**  
CuZn21Si3P  
Lead-free special brass

**Extruded and drawn products**



**Material designation**

EN	CuZn21Si3P
UNS	C69300

**Chemical composition\***

Cu	76 %
Si	3 %
P	0,05 %
Zn	balance
Pb	max. 0,09 %

\* Reference values in % by weight

**Physical properties\***

Electrical conductivity	MS/m	4,5
	%IACS	7,8
Thermal conductivity	W/(m·K)	35
Density	g/cm <sup>3</sup>	8,25
Modulus of elasticity	GPa	ca. 100

\* Reference values at room temperature

**Korrosionsbeständigkeit**

Special brass generally exhibits good corrosion resistance due to alloying additions. The addition of silicon improves resistance to tarnishing and reduces the risk to stress corrosion cracking and dezincification. For operations at temperatures >600 °C we recommend a heat treatment at 550–580 °C for 2–3 hours to optimise corrosion resistance.

**Product standards**

Rod	EN 12163 EN 12164
Wire	EN 12166
Section	EN 12167

**Material properties and typical applications**

**Wieland-SW1** is according to ELV and RoHs a lead-free special brass resisting high load and exhibiting good corrosion resistance as well as excellent machinability. This alloy is suited to the production of machined and drop forged parts. ECOBRASS is available as machining brass as well as in hot stamping quality. This material is also marketed under the designation CUPHIN for sanitary applications. The material meets the requirements of ISO 6509 regarding the dezincification resistance. Material accepted for products in contact with drinking water as per 4 MS positive list.

**Types of delivery**

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

**Fabrication properties**

**Forming**

Machinability (CuZn39Pb3 = 100 %)	80 %
Capacity for being cold worked	good
Capacity for being hot worked	excellent

**Joining**

Resistance welding (butt weld)	fair*
Inert gas shielded arc welding	fair*
Gasschweißen	fair*
Hartlöten	fair*
Weichlöten	fair

\* see section „Corrosion resistance“

**Surface treatment**

**Polishing**

mechanical	good
electrolytic	poor
Electroplating	good*

\* For further fabrication properties, please contact our Technical Marketing.

**Heat treatment**

Melting range	860–925 °C
Hot working	680–750 °C
Soft annealing	530–650 °C 1–3 h

**Trademarks**



Further information is provided in the brochures on Ecobrass and Cuphin.

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## Mechanical properties according to EN

### Round rods/polygonal rods acc. to EN 12164

Temper	Diameter		Width across flats		Tensile strength		Yield strength		Elongation			Hardness	
	mm from	mm to	mm from	mm to	$R_m$	$R_{p0.2}$		A100	A11.3	A	HB		
					MPa min.	MPa min.	MPa max.	% min.	% min.	% min.	min.	max.	
M	all		all		as manufactured – without specified mechanical properties								
R500	2	80	2	80	500	–	450	12	13	15	–	–	
H110	2	80	2	80	–	–	–	–	–	–	110	170	
R600	2	40	2	40	600	300	–	10	11	12	–	–	
H130	2	40	2	40	–	–	–	–	–	–	130	190	
R670	2	15	2	15	670	400	–	8	9	10	–	–	
H160	2	15	2	15	–	–	–	–	–	–	160	220	

### Round rods/polygonal rods acc. to EN 12167

Temper	Diameter		Width across flats		Tensile strength		Yield strength		Elongation			Hardness	
	mm from	mm to	mm from	mm to	$R_m$	$R_{p0.2}$		A100	A11.3	A	HB		
					MPa min.	MPa min.	MPa max.	% min.	% min.	% min.	min.	max.	
M	all		all		as manufactured – without specified mechanical properties								
R500	35	80	35	80	500	–	450	–	–	15	–	–	
H110	35	80	35	80	–	–	–	–	–	–	110	170	
R600	20	40	15	40	600	300	–	–	–	12	–	–	
H130	20	40	15	40	–	–	–	–	–	–	130	190	
R670	2	15	2	15	670	400	–	8	9	10	–	–	
H160	2	15	2	15	–	–	–	–	–	–	160	220	

### Rectangular rods acc. to EN 12167

Temper	Width across flats		Tensile strength		Yield strength		Elongation			Hardness	
	mm from	mm to	$R_m$	$R_{p0.2}$		A100	A11.3	A	HB		
			MPa min.	MPa min.	MPa max.	% min.	% min.	% min.	min.	max.	
M	all		as manufactured – without specified mechanical properties								
R500	2	20	500	–	450	12	13	15	–	–	
H110	2	20	–	–	–	–	–	–	110	170	
R600	2	20	600	300	–	–	11	12	–	–	
H130	2	20	–	–	–	–	–	–	130	190	
R670	2	7	670	400	–	8	9	10	–	–	
H160	2	7	–	–	–	–	–	–	160	220	

### Round wires acc. to EN 12166

Temper	Width across flats		Tensile strength		Yield strength		Elongation			Hardness	
	mm from	mm to	$R_m$	$R_{p0.2}$		A100	A11.3	A	HB		
			MPa min.	MPa min.	MPa max.	% min.	% min.	% min.	min.	max.	
M	all		as manufactured – without specified mechanical properties								
R500	0.5	20	500	–	450	12	13	15	–	–	
H110	1.5	20	–	–	–	–	–	–	110	170	
R600	0.5	8	600	300	–	10	11	12	–	–	
H130	1.5	8	–	–	–	–	–	–	130	190	
R670	0.5	8	670	400	–	8	9	10	–	–	
H160	1.5	8	–	–	–	–	–	–	160	220	
R750	0.5	8	750	450	–	2	3	–	–	–	
H200	1.5	8	–	–	–	–	–	–	200	–	

Wieland-Werke AG

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