

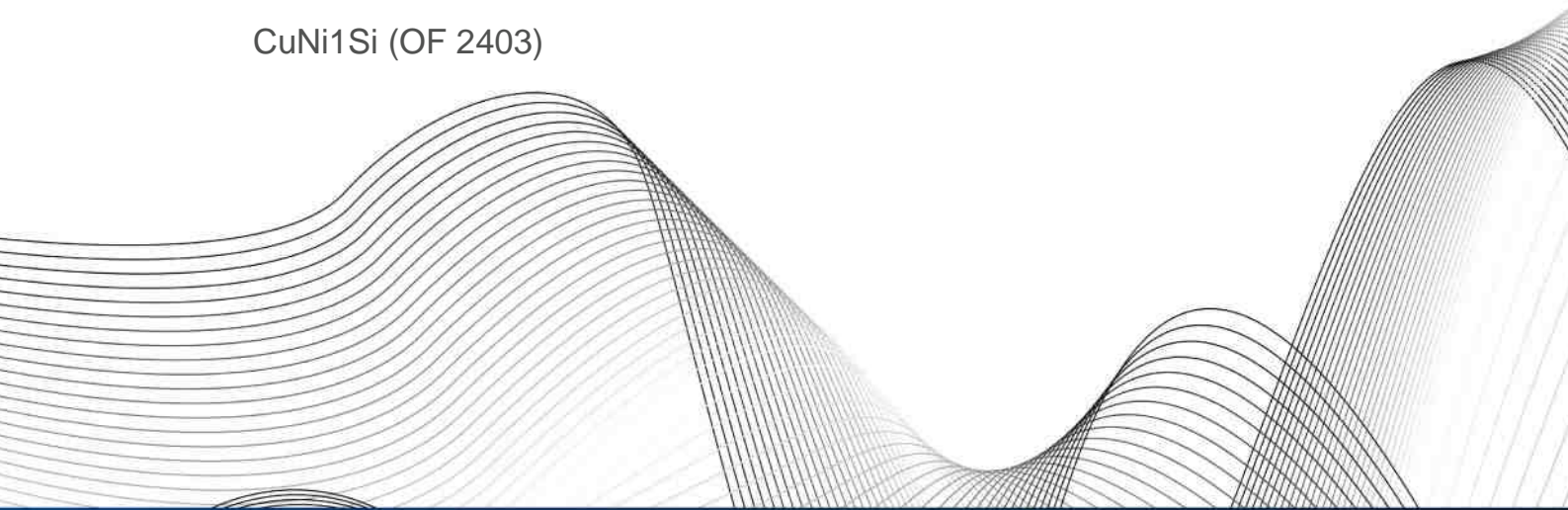


OTTO FUCHS  
Dülken GmbH & Co. KG



Copper and Copper Alloys

CuNi1Si (OF 2403)



	Cu	Zn	Pb	Sn	Fe	Mn	Ni	Al	Si	As	Co	Cr	Others
Min.	Rem.	-	-	-	-	-	1.0	-	0.4	-	-	-	-
Max.	-	-	0.02	-	0.2	0.1	1.6	-	0.7	-	-	-	0.3

## Applications

CuNi1Si is highly suitable for friction and wear applications. Parts which combine high static strength and fatigue strength even at elevated temperatures, e.g. in electronics or overhead traction line with reasonable electric and thermal conductivity are also made of CuNi1Si. CuNi1Si can be used for diamagnetic and paramagnetic applications. Another field of application is the use of parts made of CuNi2Si in corrosive environments.

Examples of application:

- Electronics, e.g. connectors
- Overhead traction lines: clamps, screw nuts and screws
- Electric parts for use in corrosive environment
- Bushings
- Sliding and friction applications
- Diamagnetic and paramagnetic applications
- Maritime applications

## Physical properties

At room temperature

Density	8.9	g/cm <sup>3</sup>
Electrical conductivity	≥ 18 (hardened)	MS/m
	≥ 31 (hardened)	% I.A.C.S
Heat conductivity	150-250 (hardened)	W/(m*K)
Heat capacity	377	J/(kg*K)
Coefficient of thermal expansion	16.8	10 <sup>-6</sup> /K
Young's modulus	140-155 (hardened)	GPa
Melting range	1050-1070	°C

## Structure

CuNi1Si provides a homogeneous microstructure with a matrix of α-brass. In solution-treated condition, the matrix is oversaturated with Ni and Si. After hardening at elevated temperatures fine Ni-silicides are present.





## Consignment and measurements

### Strength conditions

Norm/ DIN EN	Condition	Yield strength R <sub>p0.2</sub> [MPa]	Tensile strength R <sub>m</sub> [MPa]	Elongation A [%]	Brinell- Hardness HBW 2.5/62.5
12163/12165/ 12167/12420	M	**	**	**	**
12163/12167	R440	≥300	≥440	≥16	/
12163	R540	≥470	≥540	≥10	/
12167		≥470	≥540	≥12	/
12163	R590	≥540	≥590	≥12	/
12167		≥540	≥590	≥10	/
12165	H050	/	/	/	50-180
12163/12167	H120	/	/	/	120-180
12163/12167	H140	/	/	/	140-190
12163/12167	H160	/	/	/	160-210

DIN EN 12163:  
Bars, general purpose

DIN EN 12165:  
Pre-material for forgings

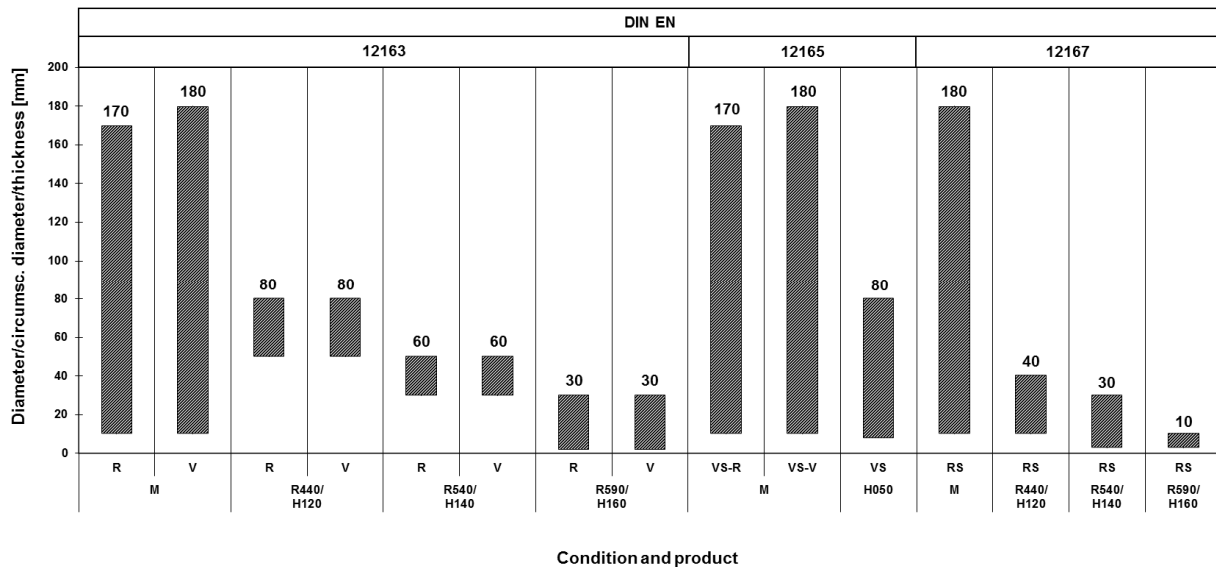
DIN EN 12167:  
Profiles, rectangular bars

DIN EN 12420:  
Forgings

\*\* Condition M = without specified properties - as manufactured

/ No requirements in standard or not applicable

### Specified dimensions for bars, pre-material for forging and forgings



R/V Rod/polygonal bar  
VS-R/V Pre-material for forging round/polygonal  
RS Rectangular bar

Profiles and rectangular bars can be delivered up to 180 mm in extruded and up to 130 mm in cold drawn condition. Pre-material for forging and forgings is dependent upon each individual case.



## Specified dimensions for hollow bars and round tubes

Round tubes can be delivered up to 180 mm in extruded and up to 130 mm in cold drawn condition.

## Other consignments

Rods and tubes in other strength and hardness conditions, and dimensions are available on request.

Processing		Heat treatment	
<b>Shaping</b>		Solution annealing	750-850°C
Machinability (hardened) (CuZn39Pb3=100%)	poor (30)	Soft annealing	650-725°C
Cold working (solution treated)	good	Hardening	425-490°C
Hot working	good	<b>Special notes and remarks</b>	
Hot working temperature	800-950°C	CuNi1Si provides good corrosion resistance in natural environment. Under atmospheric conditions CuNi1Si forms a protective oxide layer having a dark coloring.	
<b>Connecting</b>		CuNi1Si in fully hardened condition has a reasonable persistence against stress corrosion cracking (SCC, in particular ammoniac atmosphere).	
Resistance welding	good	There is a risk of corrosion cracking (SCC) in the presence of oxidising acids or wet sulphur.	
Shielded welding	average		
Brazing	average		
Soldering	good		
<b>Surface treatment</b>			
Mechanical polishing	good		
Electrolytic polishing	good		
Galvanisation	good		
Tin coated	good		



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