

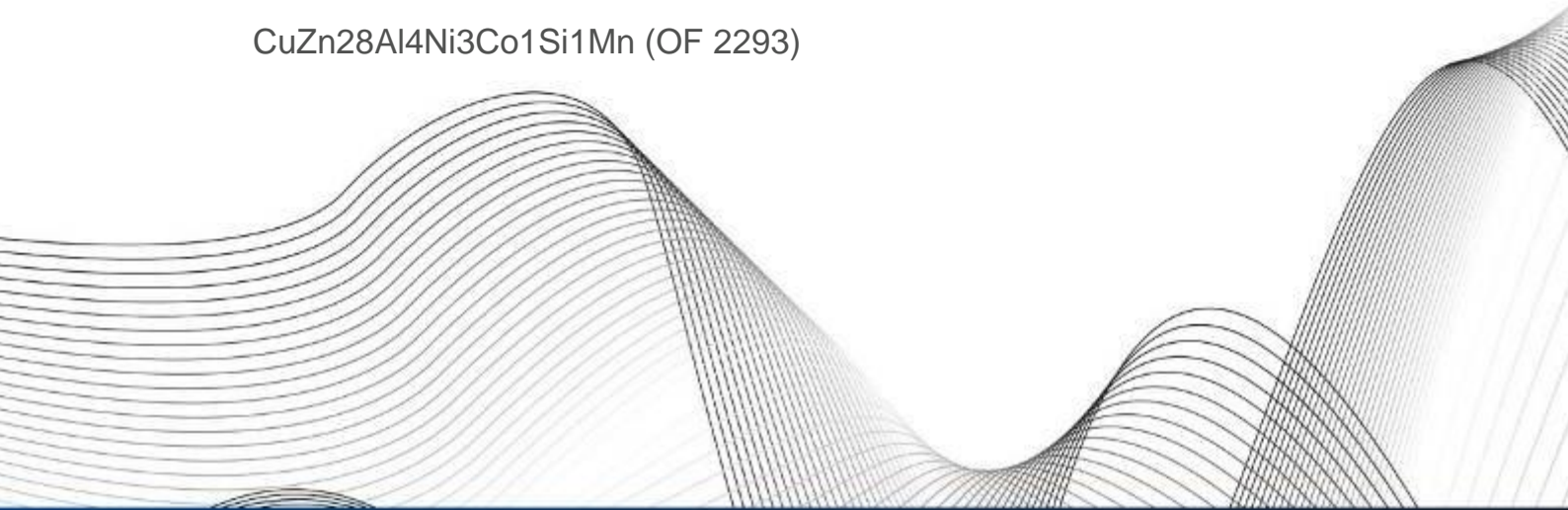


OTTO FUCHS
Dülken GmbH & Co. KG



Copper and Copper Alloys

CuZn28Al4Ni3Co1Si1Mn (OF 2293)





	Cu	Zn	Pb	Sn	Fe	Mn	Ni	Al	Si	As	Co	Cr	Others
min.	59.5	Rem.	-	-	0.5	0.5	2.5	3.5	1.0	-	0.9	-	-
max.	62.0	-	0.1	0.3	1.0	1.0	3.5	4.2	1.7	-	2.0	-	0.3

Applications

CuZn28Al4Ni3Co1Si1Mn is a special alloy providing excellent strength, wear resistance and good performance in application under dynamic friction. The friction coefficient and wear resistance depend on the oil which is used in the individual tribological system. Pb is confined to a maximum of 0.1 mass-% within this alloy.

Examples of application:

Gliding parts
Synchronisers
Bushings
Sliding block
Slide shoes

Physical properties

At room temperature

Density	8.0	g/cm ³
Electrical conductivity	9.5	MS/m
	16.4	% I.A.C.S
Heat conductivity	80	W/(m*K)
Heat capacity	377	J/(kg*K)
Coefficient of thermal expansion	20	10 ⁻⁶ /K
Young's modulus	105	GPa
Melting range	1020-1040	°C

Microstructures

For sliding devices the microstructures mainly consist of β -brass with some α -brass and particles against wear. The content of the α -phase depends on the application. The particles are Ni-Co- und Mn-Fe-silicides, the content of the particles amounts to about 7 Vol.-%.

Consignment and measurements

Strength conditions

Product	Condition	Yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation at break A [%]	Brinell- Hardness HBW 2.5/62.5
Bars	M	**	**	**	**
Pre-material for forging					
Rectangular bars					
Forgings					
Seamless tubes					
Bars	R600	(~430)	≥ 600	≥ 4	/
Rectangular bars		(~430)	≥ 600	(~5)	/
Seamless tubes		(~430)	≥ 600	≥ 4	/
Rectangular bars	R640	(~450)	≥ 640	(~4)	/
Seamless tubes					
Bars	R650	(~450)	≥ 650	≥ 5	/
Bars	H160	/	/	/	≥ 160
Pre-material for forging		(~400)	(~600)	(~5)	≥ 160
Rectangular bars		/	/	/	≥ 160
Seamless tubes		(≥ 380)	(≥ 600)	(≥ 5)	≥ 160
Bars	H175	/	/	/	≥ 175
Rectangular bars		/	/	/	≥ 175
Forgings	H180	(≥ 400)	(≥ 600)	(≥ 4)	≥ 180
Seamless tubes		(≥ 400)	(≥ 640)	(≥ 3)	≥ 180
Forgings	H190	(≥ 400)	(≥ 640)	(≥ 3)	190-240

- ** Condition M = without specified mechanical properties - as manufactured
 () The numbers are not requirements of the specification - they are for information only
 ~ Approximate values
 / No requirements in specification or not applicable
 { } The alloy is not listed in the standard - delivery on special terms
 Synchro Synchroniser



Other consignments

Rods and tubes in other strength and/or hardness conditions and dimensions are dependent upon each individual case.

Processing		Heat treatment	
Shaping		Soft annealing	500-650°C
Machinability (CuZn39Pb3=100%)	average (40)	Stress relieving	350-450°C
Cold working	not suitable	Special notes and remarks	
Hot working	good		
Hot working temperature	650-750°C	There is a risk of stress corrosion cracking (SCC) in case of presence both of mechanical stresses and corrosive environment (in particular an ammoniac atmosphere).	
Connecting			
Resistance welding	good		
Shielded welding	average		
Brazing	-		
Soldering	poor		
Surface treatment			
Mechanical polishing	very good		
Electrolytic polishing	poor		
Galvanisation	average		
Tin coating	average		

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