OTTO FUCHS
Dülken GmbH & Co. KG

Copper and Copper Alloys

CuZn30Al3Mn3Si1NiCr (OF 2261)

	Cu	Zn	Pb	Sn	Fe	Mn	Ni	Al	Si	As	Co	Cr	Others
min.	60	Rem.	-	-	-	2.9	0.25	2.9	1.0	-	-	0.10	
max.	64	-	0.1	0.15	0.15	3.4	0.50	3.3	1.3	-	-	0.25	

Applications

CuZn30Al3Mn3Si1NiCr is a very good alloy for sliding applications with strong demands on wear resistance, mechanical strength and friction properties. The friction values and degree of wear resistance depend on each wear system and the lubricant in use.

Examples of application:

Synchronisers
Bushings for bearings
Sliding shoes
Further applications in tribological systems

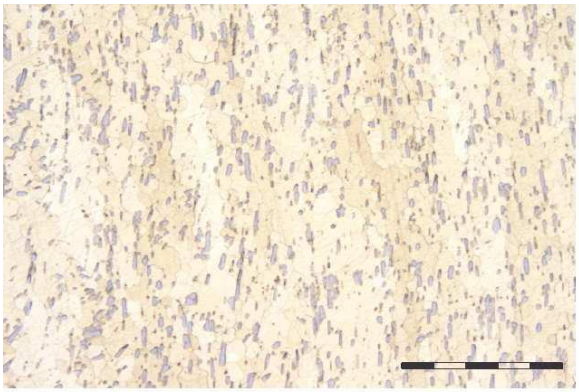
Physical properties

At room temperature

Density	8.0	g/cm^3
Electrical conductivity	8.7	MS/m
	15	% I.A.C.S
Heat conductivity	90	W/(m*K)
Heat capacity	410	J/(kg*K)
Coefficient of thermal expansion	20.2	$10^{-6}/K$
Young's modulus	103	GPa
Melting range	870-890	°C

Microstructures

The microstructures of CuZn30Al3Mn3Si1NiCr consist of a brass matrix with mainly β-phase. Depending on the history of forming or heat treatment different amounts of α-phase may be present. The α-phase is located within the grains and at the grain boundaries of the β-phase. Within the brass matrix about 5 % of Mn- und Cr-silicides are embedded for improvement of wear resistance.



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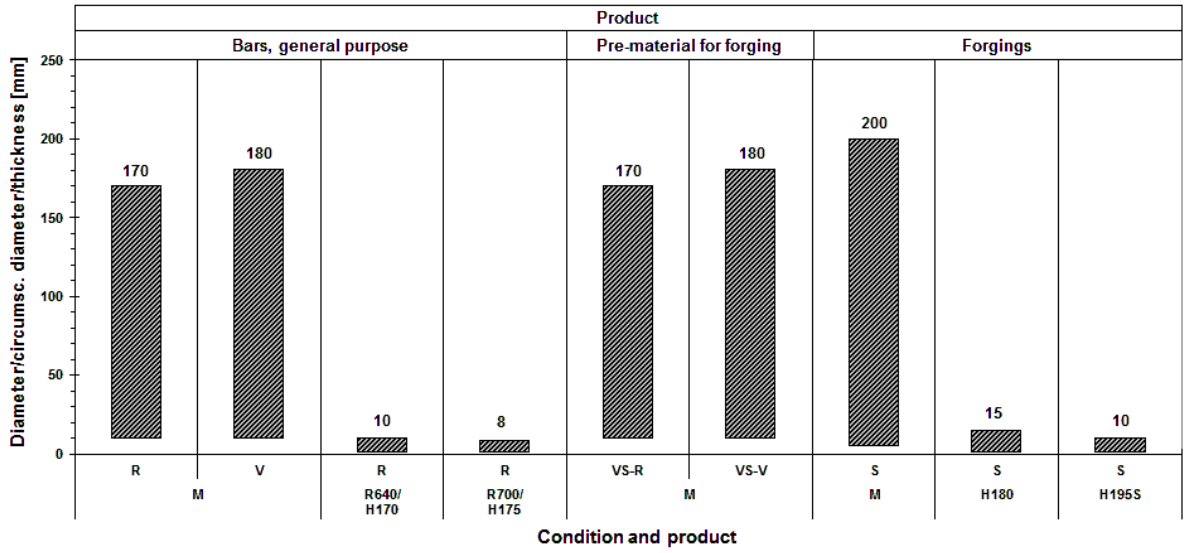
Consignment and measurements

Strength conditions

Spec./ DIN EN	Condition	Yield strength $R_{p_{0.2}}$ [MPa]	Tensile strength R_m [MPa]	Elongation at break A [%]	Brinell-Hardness HB 2.5/62.5
Bars, general purpose	M	**	**	**	**
Pre-material for forging					
Forgings					
Seamless tubes					
Bars, general purpose	R640	≥370	≥640	≥8	/
Seamless tubes					
Bars, general purpose	R700	≥450	≥700	≥8	/
Seamless tubes					
Seamless tubes	R730	≥500	≥700	≥7	/
Bars, general purpose	H170	/	/	/	≥170
Seamless tubes					
Bars, general purpose	H175	/	/	/	≥175
Seamless tubes					
Forgings	H180	(≥370)	(≥640)	(≥8)	≥180
Forgings	H195S	(≥500)	(≥730)	(≥7)	195-225
Seamless tubes		/	/	/	

** Condition M = without specified mechanical properties - as manufactured
( ) The numbers are not requirements of the standard - they are for information only
/ No requirements in standard or not applicable

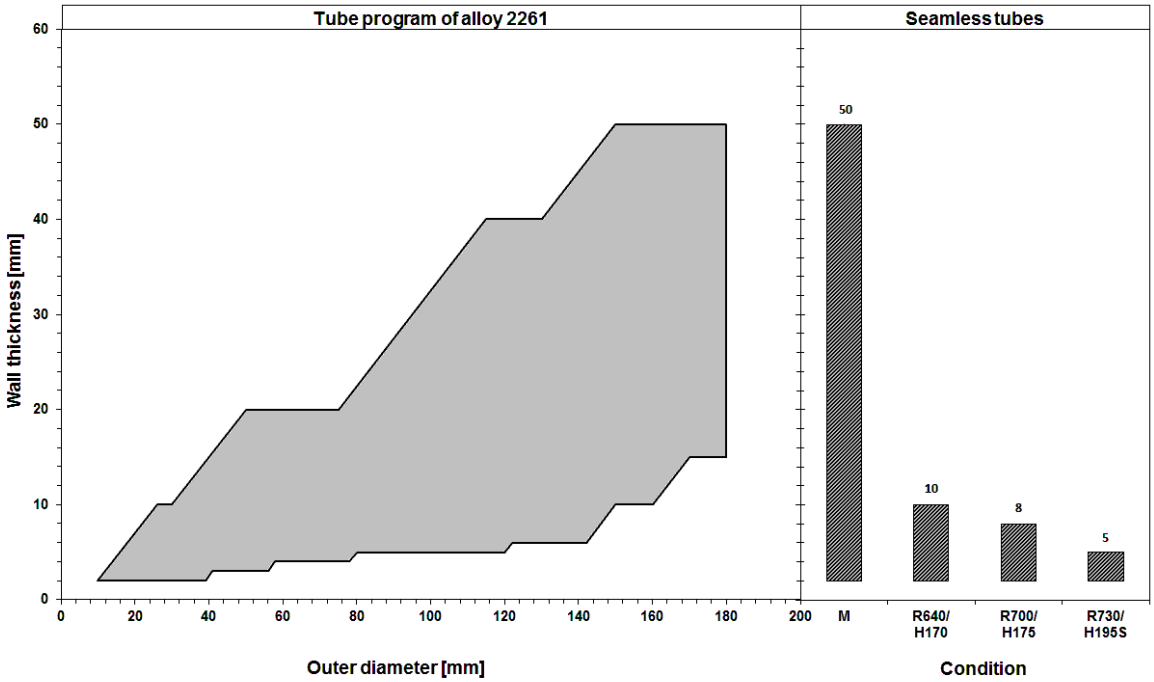
Specified dimensions for bars, pre-material for forging and forgings



VS-R Pre-material for forging round
VS-V Pre-material for forging polygonal
S Forgings

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



Further dimensions for hollow bars and round tubes are dependent upon each individual case.

Bushings and gliding bearings

Customer solutions can be offered for bushings and gliding bearings made of OF 2261 with specific strength conditions.

Other consignments

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

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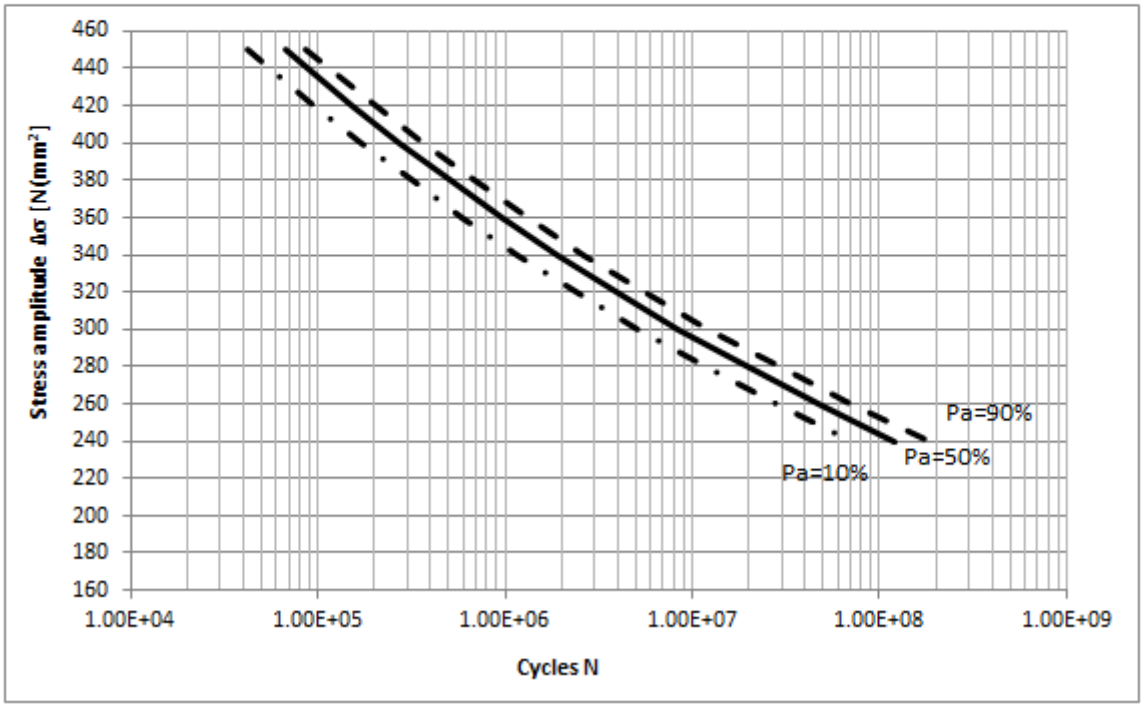
Bending fatigue strength

Bending fatigue strength tests were performed with a test frequency of 100 Hz (6000 rounds per minute). The diameter of the specimen amounted to 7.6 mm at the smallest site of the test length.

Rod material was used for the test in annealed condition.

Condition: annealed (.88)
Notch factor: 1
Rz<0,5 µm

	R m	Rp0,2	A5	Young's M.	Surface	Inside
Material	N/mm²	N/mm²	%	N/mm²	HBW 2,5/62,5	HBW 2,5/62,5
2261.88	710	440	17.2	100,000		170



Pa: Probability of failure

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Processing

Shaping

Machinability (CuZn39Pb3=100%)	average
Cold working	not suitable
Hot working	good
Hot working temperature	540-750°C

Connecting

Resistance welding	average
Shielded welding	average
Brazing	poor
Soldering	poor

Surface treatment

Mechanical polishing	very good
Electrolytic polishing	poor
Galvanisation	average
Tin coating	not suitable

Heat treatment

Soft annealing	500-600°C
Stress relieving	250-450°C

Special notes and remarks

There is a risk of stress corrosion cracking (SCC) in case of concurrent presence of mechanical stress and corrosive media (in particular an ammoniac atmosphere).

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