

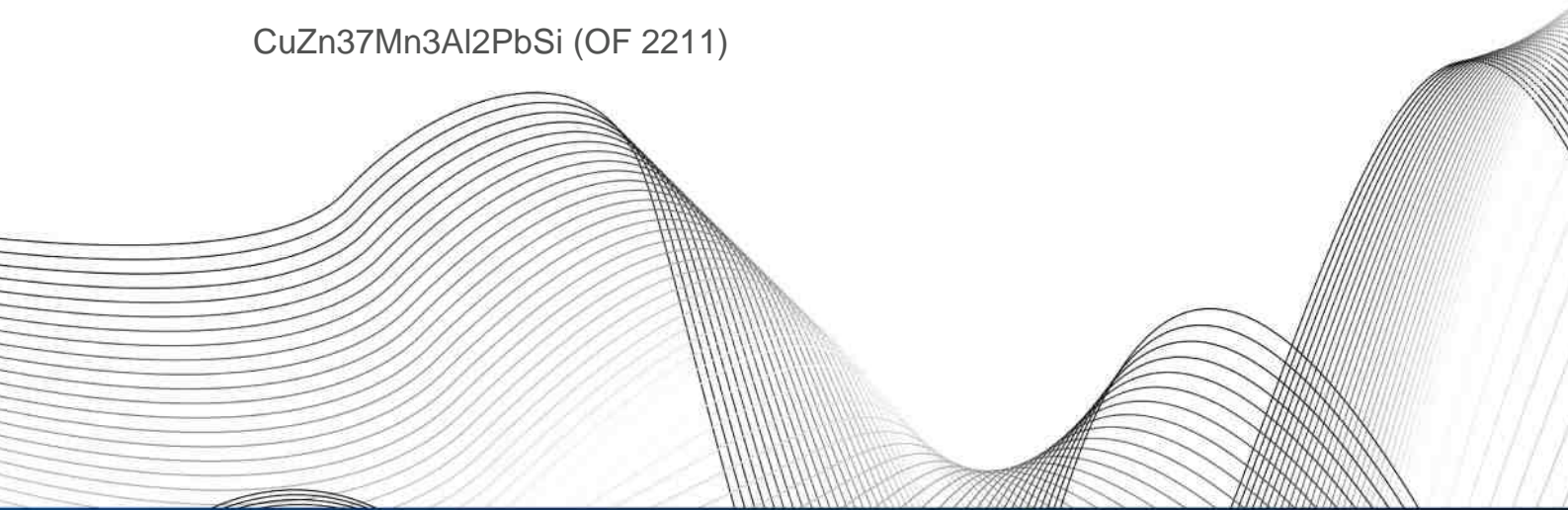


OTTO FUCHS
Dülken GmbH & Co. KG



Copper and Copper Alloys

CuZn37Mn3Al2PbSi (OF 2211)



	Cu	Zn	Pb	Sn	Fe	Mn	Ni	Al	Si	As	Co	Cr	Others
min.	58	Rem.	0.3	0.1	0.35	1.8	-	1.4	0.6	-	-	-	-
max.	59	-	0.6	0.4	0.65	2.2	0.2	1.7	0.9	-	-	-	0.3

Applications

CuZn37Mn3Al2PbSi is a special alloy providing reasonable strength as well as a high degree of toughness and good friction properties. CuZn37Mn3Al2PbSi is also highly suitable for use under atmospheric corrosion.

Examples of application:

Gliding parts
Synchronisers
Shifting forks
Disc rings
Bushings
Slide shoes
Valve guides

Physical properties

At room temperature

Density	8.1	g/cm ³
Electrical conductivity	7.8	MS/m
	13.4	% I.A.C.S
Heat conductivity	63	W/(m*K)
Heat capacity	377	J/(kg*K)
Coefficient of thermal expansion	20.4	10 ⁻⁶ /K
Young's modulus	93	GPa
Melting range	875-910	°C

Microstructures

The microstructures of CuZn37Mn3Al2PbSi 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. Within the brass matrix about 4 % of Mn- Fe-silicides are embedded for improvement of wear resistance.



Consignment and measurements

Strength conditions

Norm/ DIN EN	Condition	Yield strength R _{p0.2} [MPa]	Tensile strength R _m [MPa]	Elongation at break A [%]	Brinell- Hardness HB 2.5/62.5
{12164}/{12165}/ {12167}/{12168}/ {12420}/{12449}	M	**	**	**	**
{12164}/{12167}/ {12168}	R540	≥280	≥540	≥15	/
{12449}		≥250	≥540	≥10	/
{12164}	R590	≥370	≥590	≥10	/
{12168}		≥320	≥590	≥8	/
{12449}		≥320	≥590	≥8	/
{12449}	R640	≥350	≥640	/	/
{12420}	H125	(≥180)	(≥470)	(≥16)	≥125
{12164}	H130	/	/	/	130-170
{12165}		/	/	/	130-220
{12167}/{12168}		/	/	/	130-170
{12420}	H140	(≥230)	(≥510)	(≥12)	≥140
{12449}	H145	/	/	/	140-180
{12164}	H150	/	/	/	150-220
{12168}		/	/	/	150-190
{12449}	H155	/	/	/	150-190
{12449}	H165	/	/	/	≥160
Synchro	H150	/	/	/	150-190

DIN EN 12163:
Bars, general purpose

DIN EN 12164:
Bars for machining

DIN EN 12165:
Pre-material for forging

DIN EN 12167:
Profiles, rectangular bars

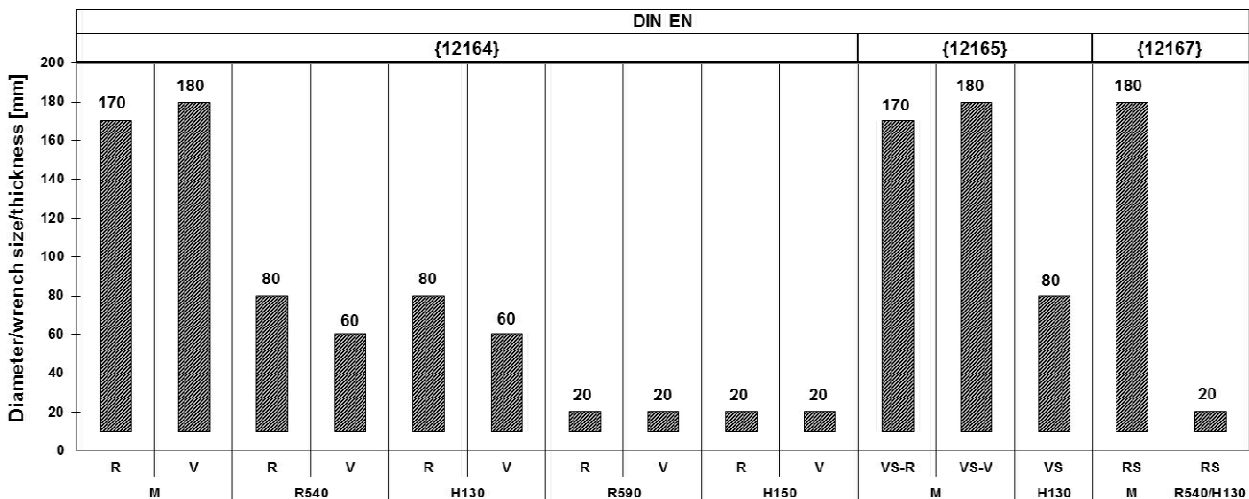
DIN EN 12168:
Hollow bars for machining

DIN EN 12449:
Seamless tubes

DIN EN 12420:
Forgings

- ** 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
- { } The alloy is not in this standard - delivery on special terms
- Synchro Synchroniser

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

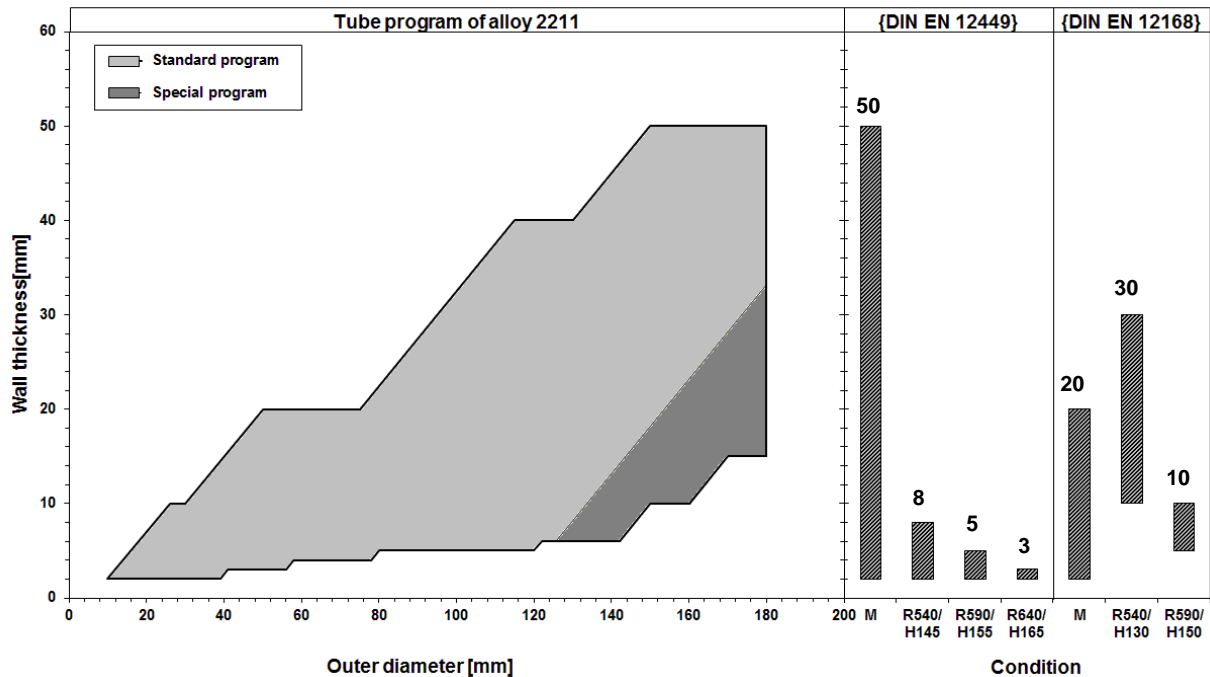


Condition and product

- R/V Round/polygonal bars
- VS-R/V Pre-material for forging round/polygonal
- RS Rectangular bars

Profiles and rectangular bars can be delivered up to 180 mm in extruded condition. Pre-material for forging 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.

Other consignments

Rods and tubes in other strength 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	poor	Special notes and remarks	
Hot working	very good		
Hot working temperature	650-750°C	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).	
Connecting			
Resistance welding	average		
Shielded welding	average		
Brazing	average		
Soldering	poor		
Surface treatment			
Mechanical polishing	very good		
Electrolytic polishing	poor		
Galvanisation	average		
Tin coating	not suitable		

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