

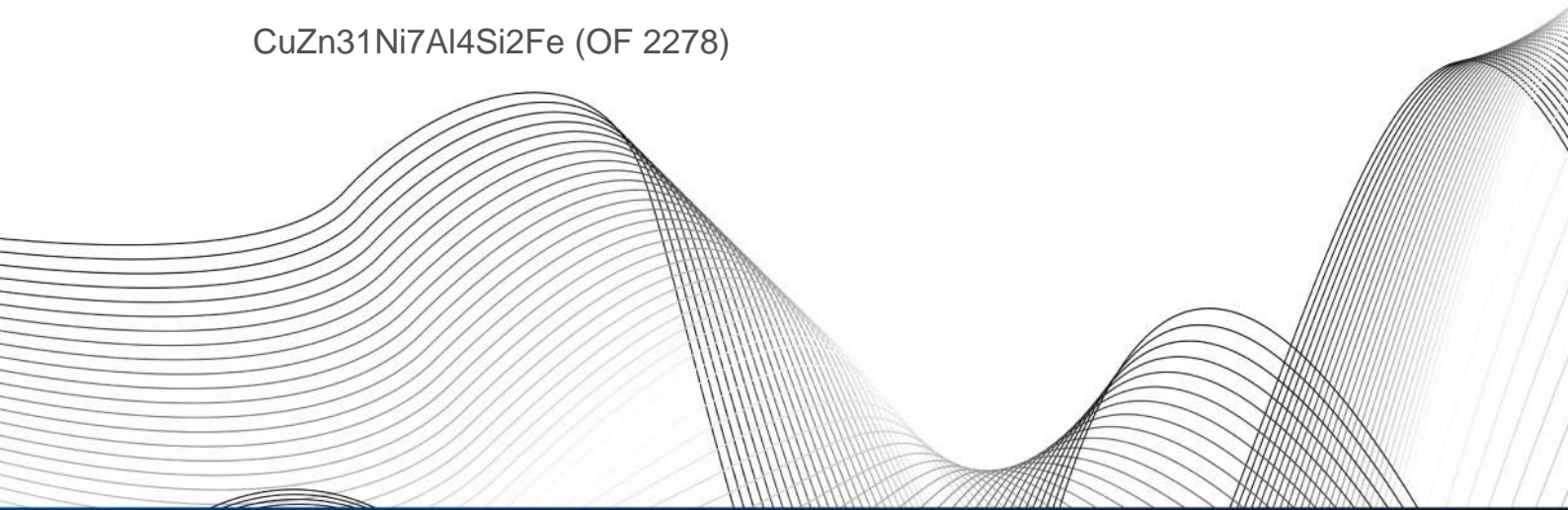


OTTO FUCHS  
Dülken GmbH & Co. KG



Copper and Copper Alloys

CuZn31Ni7Al4Si2Fe (OF 2278)



	Cu	Zn	Fe	Ni	Al	Si
min.	54	Rem.	0.5	6.0	3.0	2.0
max.	56	-	0.9	7.2	4.2	2.5

## Applications

CuZn31Ni7Al4Si2Fe provides a strong wear resistance and especially high strength. The sliding and friction properties of CuZn31Ni7Al4Si2Fe are good. OF 2278 is highly suitable for applications with lubrication under boundary conditions. The friction values and degree of wear resistance depend on each wear system and the lubricant in use.

Examples of application:

Sliding elements  
Wear resistant parts  
Synchronisers

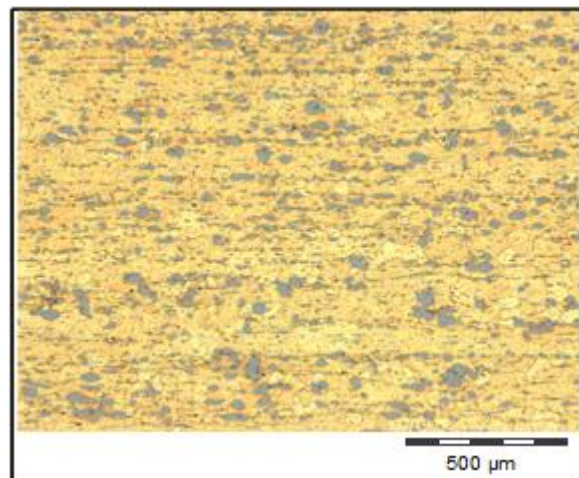
## Physical properties

At room temperature

Density	Without tempering: 7.9	g/cm <sup>3</sup>
	Tempered: 8.1	g/cm <sup>3</sup>
Electrical conductivity	9	MS/m
	15	% I.A.C.S
Heat conductivity	70-80	W/(m*K)
Heat capacity	360-380	J/(kg*K)
Coefficient of thermal expansion	20	10 <sup>-6</sup> /K
Young's modulus	110	GPa
Melting range	880-930	°C

## Microstructures

Microstructures consist of mainly  $\beta$ -phase with NiAl und NiAlSi embedded in the brass matrix for improvement of wear resistance. The content of the NiAl- and NiAlSi-phase amounts to approx. 14 %. Depending on the history of forming and heat treatment a different amount of  $\alpha$ -phase may be present.





## Consignment and measurements

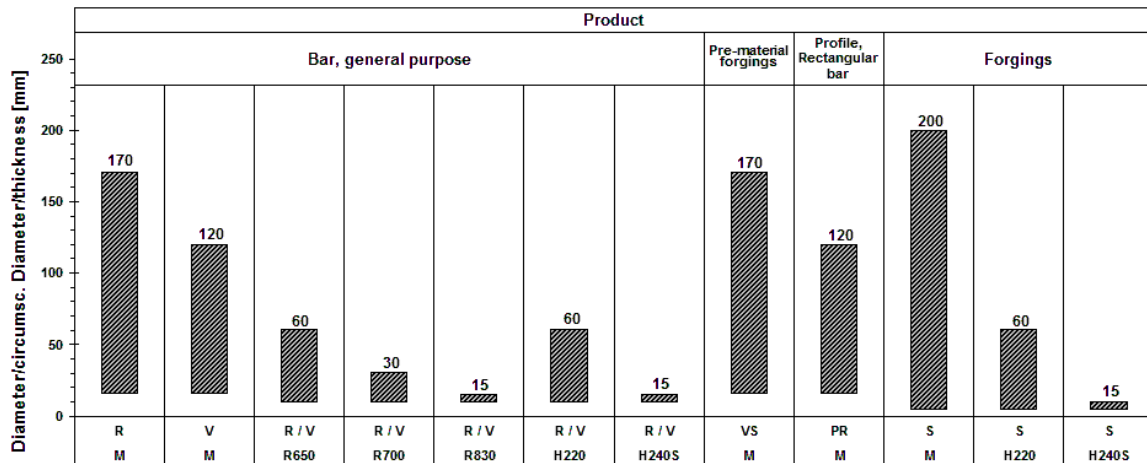
### Strength conditions

Product	Condition	Yield strength R <sub>p0.2</sub> [MPa]	Tensile strength R <sub>m</sub> [MPa]	Elongation at break A [%]	Brinell-Hardness HB 2.5/62.5
Bars, general purpose	M	**	**	**	**
Pre-material for forging					
Profiles, rectangular bars					
Forgings					
Seamless tubes					
Bars, general purpose	R650	≥500	≥650	≥5	/
Seamless tubes					
Bars, general purpose	R700	≥600	≥700	≥3	/
Seamless tubes					
Bars, general purpose	R830	≥720	≥830	≥3	/
Seamless tubes					
Bars, general purpose	H220	/	/	/	≥220
Forgings					
Seamless tubes					
Bars, general purpose	H240S	/	/	/	240-300
Forgings					
Seamless tubes					

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

/ No requirements in standard or not applicable

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



Condition and product

- R/V Round/polygonal bar
- VS Pre-material for forging round/polygonal
- PR Profiles
- S Forgings

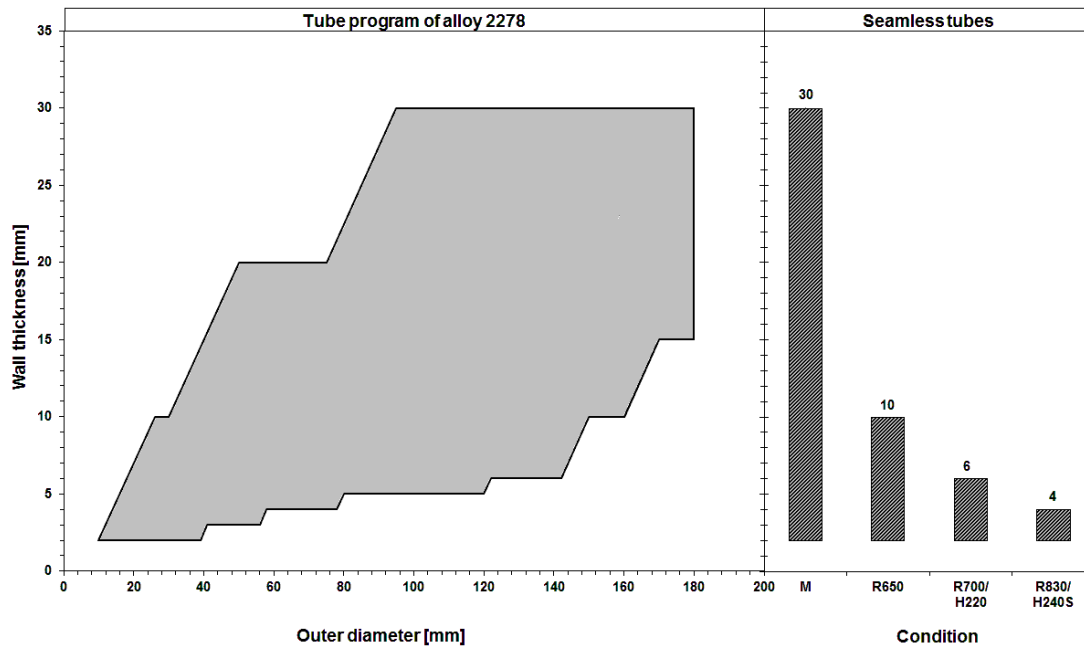
Profiles and rectangular bars can be delivered up to 180 mm in extruded condition. Possible dimensions for well-defined strength or hardness conditions are available on request.

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 available on request.

Possible dimensions for round tubes in well-defined strength or hardness conditions, and dimensions are available on request.

### Other conditions

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



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### Processing

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<b>Shaping</b>	
Machinability (CuZn39Pb3=100%)	average (40)
Cold working	bad
Hot working	good
Hot working temperature	650-750°C
<b>Connecting</b>	
Resistance welding	average
Shielded welding	average
Brazing	poor
Soldering	poor
<b>Surface treatment</b>	
Mechanical polishing	very good
Electrolytic polishing	poor
Galvanisation	poor
Tin coating	good-very good

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### Heat treatment

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Solution annealing	700-800°C
Soft annealing	500-650°C
Stress relieving	300-450°C

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### Special notes and remarks

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

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