

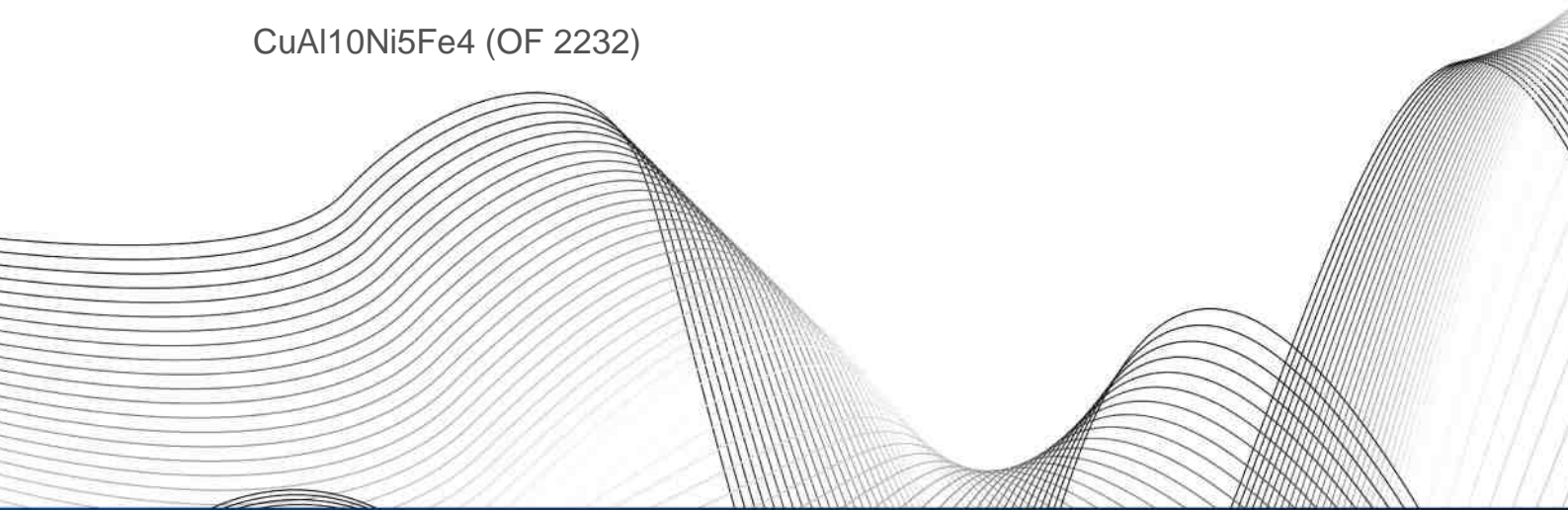


OTTO FUCHS
Dülken GmbH & Co. KG



Copper and Copper Alloys

CuAl10Ni5Fe4 (OF 2232)



	Cu	Zn	Pb	Sn	Fe	Mn	Ni	Al	Si	As	Co	Cr	Others
Min.	Rem.	-	-	-	3.0	-	4.0	8.5	-	-	-	-	-
Max.	-	0.4	0.05	0.1	5.0	1.0	6.0	11.0	0.2	-	-	-	0.2

Applications

CuAl10Ni5Fe4 combines high static and fatigue strength, also at elevated temperatures with good corrosion resistance. Due to its good scaling resistance and resistance against abrasion, erosion and cavitation OF 2232 is highly suitable for wear applications. OF 2232 can be used for maritime applications. Tool parts made of OF 2232 are resistant against sparking. OF 2232 is an alloy for bushings, sliding bearings and cages for ball and roll bearings.

Depending on the parameters of the processing and the dimensions, tailor-made customer solutions can be offered for parts made of OF 2232.

Examples of application:

Constructions parts for chemical industry and apparatus
Gears and wormwheels
Bushings and sliding bearings
Screw nuts and screws

Parts with scaling resistance
Non-sparkling tool parts
Resin moulds
Parts for heat exchanger

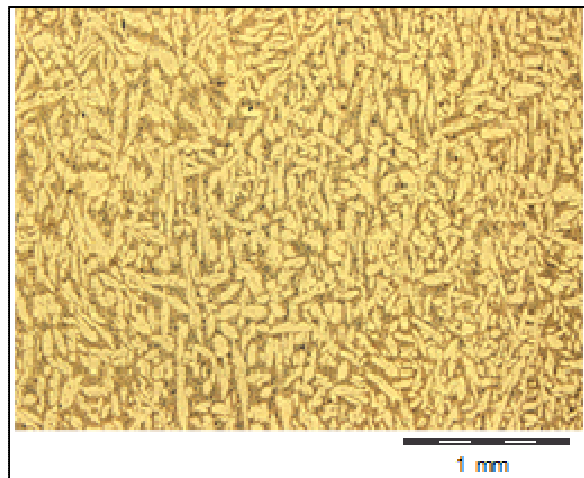
Physical properties

At room temperature

Density	7.6	g/cm ³
Electrical conductivity	4-7	MS/m
	10.3	% I.A.C.S
Heat conductivity	50-57	W/(m*K)
Heat capacity	420	J/(kg*K)
Coefficient of thermal expansion	17	10 ⁻⁶ /K
Young's modulus	120	GPa
Melting range	1050-1080	°C

Microstructures

CuAl10Ni5Fe4 provides a heterogeneous microstructure consisting of α -phase martensitic β'' -phase, NiAl and κ -phase. κ -phase has the stoichiometry of Fe₃Al and NiAl. Content and distribution of the phases depend on the parameters of the hot processing of the alloy. By use of high cooling rates after solution treatment formation of the β'' -phase is suppressed.





Consignment and measurements

Strength conditions

Spec./ 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
12163	M	**	**	**	**
12165					
12167					
12163	R680	≥320	≥680	≥10	/
12163	R740	≥400	≥740	≥8	/

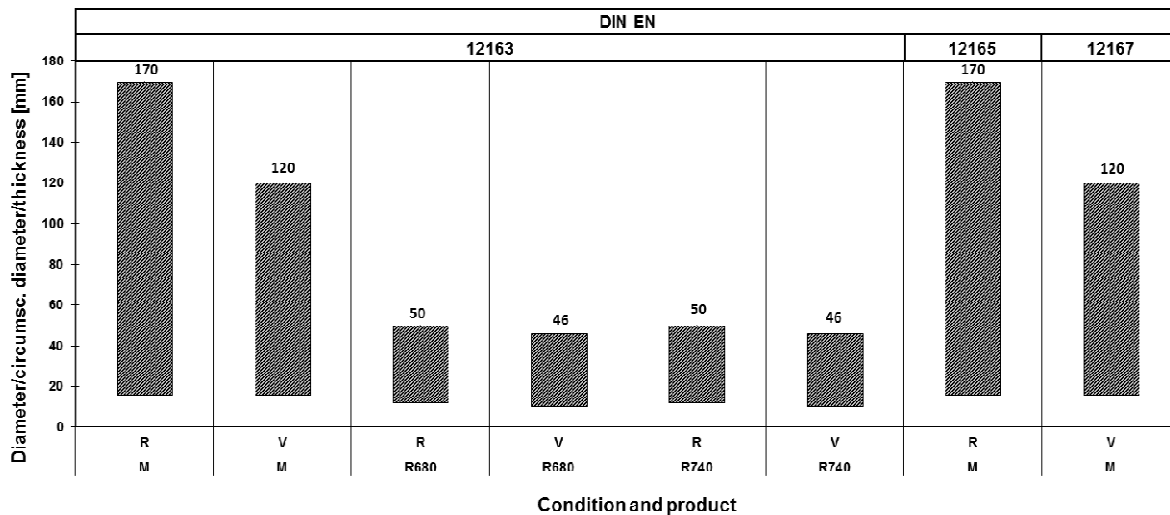
DIN EN 12163:
Bars, general purpose

DIN EN 12165:
Pre-material for forgings

DIN EN 12167:
Profiles, rectangular bars

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

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



R/V Rod/polygonal bar

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

Specified dimensions for hollow bars and round tubes

Specified dimensions for hollow bars and round tubes are available on request.

Bushings and gliding bearings

Customer solutions can be offered for bushings and gliding bearings made of OF 2232 with specific strength conditions.

Other consignments

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



Processing

Shaping	
Machinability (CuZn39Pb3=100%)	average (50)
Cold working	poor
Hot working	good
Hot working temperature	850-950°C

Connecting

Resistance welding	good
Shielded welding	very good
Brazing	average
Soldering	poor

Surface treatment

Mechanical polishing	good
Electrolytic polishing	average
Galvanisation	poor
Tin coating	poor

Heat treatment

Solution annealing	850-950°C
Soft annealing	350-600°C
Stress relieving	150-300°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 ammoniac atmosphere).

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