OTTO FUCHS
Dülken GmbH & Co. KG

Copper and Copper Alloys

Cu-HCP (OF 2003)

	Cu 1)	Bi	P	Pb	Others 2)
min.	99.95	-	-	0,002	-
max.	-	0.0005	-	0.007	0.03

1) Including Ag to a maximum of 0.015 %
2) Content of Oxygen has to be agreed with customer in a manner, that the material delivered is free from risk of Hydrogen embrittlement.

Applications

Cu-HCP is used in applications with demand for high electric and thermal conductivity. Further on use for parts to be brazed or welded. It is also used for plating.

Examples of application:

devices for electricity and electronics
platings
casting dies
bus bars
parts for brazing or welding

Physical properties

At room temperature

Density	8.9	g/cm^3
Electrical conductivity	58	MS/m
	99	% I.A.C.S
Heat conductivity	385	W/(m*K)
Heat capacity	385	J/(kg*K)
Coefficient of thermal expansion	17.6	$10^{-6}/K$
Young's modulus	115	GPa
Melting point	1083	°C

Microstructures

Cu-HCP provides a homogeneous microstructure of α-Phase.

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Consignment and measurements

Strength conditions

Product/spec.	Condition	Yield strength $R_{p_{0.2}}$ [MPa]	Tensile strength R_m [MPa]	Elongation at break A [%]	Brinell-Hardness HBW 2.5/62.5
13600/13601/ 13605/ extruded profiles	D	**	**	**	**
Forgings	M	**	**	**	**
13600	R200	≤120	200-250	≥40	/
13601/13605		≤120	≥200	≥35	/
13601	R230	≥160	≥230	≥18	/
13605 (2)	R240	≥160	≥240	≥15	/
13600	R250	≥150	250-300	≥15	/
13601 (1)		≥180 res. 200	≥250	≥15 res. 12	/
13601	R260	≥220	≥260	≥12	/
13601	R280	≥240	≥280	≥10	/
13605 (2)		≥240	≥280	≥8	/
13600	R290	≥250	290-360	≥6	/
13601	R300	≥260	≥300	≥8	/
13601	R350	≥320	≥350	≥5	/
13600	R360	≥320	≥360	(3)	/
13600	H035	/	/	/	35-60
13601/13605		/	/	/	35-65
Forgings	H040	/	/	/	≥40
13600	H065	/	/	/	60-90
13601		/	/	/	65-90
13605		/	/	/	65-95
13601	H075	/	/	/	75-100
13605 (2)	H080	/	/	/	80-115
13601	H085	/	/	/	85-110
13600	H090	/	/	/	85-105
13600	H100	/	/	/	≥95
13601		/	/	/	≥100

DIN EN 13600:
Seamless tubes, electrical engineering

DIN EN 13601:
Bars, electrical engineering

DIN EN 13605:
Profiles, electrical engineering

Condition M = without specified mechanical properties – as manufactured
Condition D = cold drawn, without specified mechanical properties

** Without specified mechanical properties
/ No requirements in standard or not applicable
(1) Values for yield strength/elongation at break defined dependent on dimension
(2) To bbe agreed with customer
() The numbers are not requirements of the standard - they are for information only

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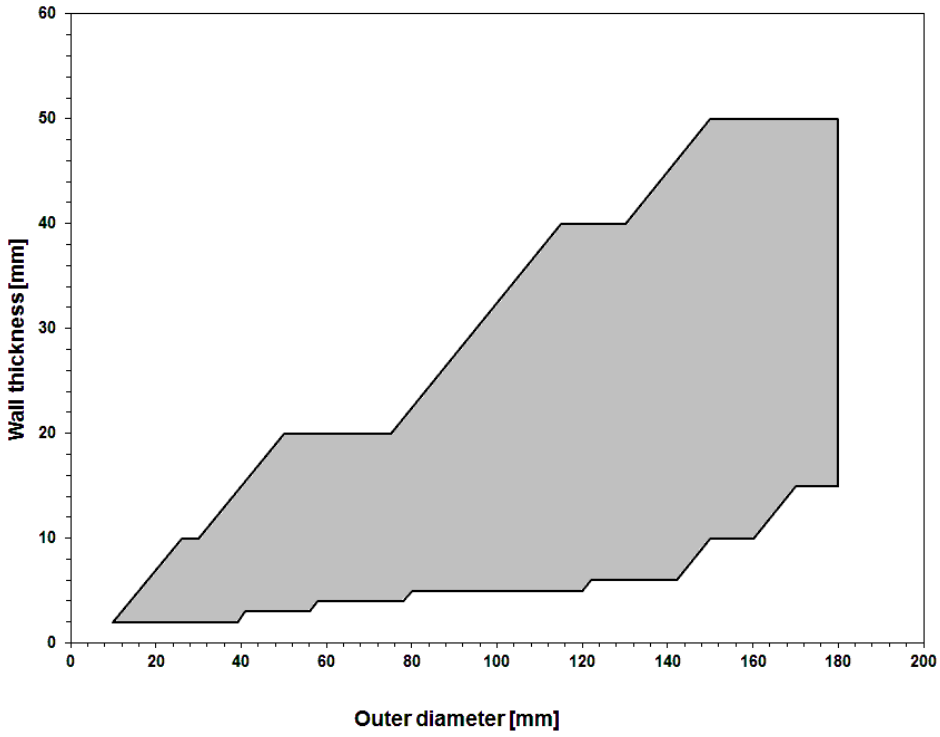
Specified dimensions for bars and profiles

Round and rectangular bars as well as profiles 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 seamless tubes



Dimensions in several strength and hardness conditions for seamless tubes are available on request.

Other consignments

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

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Processing

Shaping

Machinability (CuZn39Pb3=100%)	poor (20)
Cold working	very good
Hot working	good
Hot working temperature	750-950°C

Connecting

Resistance welding	poor
Shielded welding	poor
Brazing	good
Soldering	very good

Surface treatment

Mechanical polishing	good
Electrolytic polishing	very good
Galvanisation	very good
Tin coating	very good

Heat treatment

Soft annealing	250-500°C
Stress relieving	150-200°C

Special notes and remarks

Good persistence in natural atmosphere (also in marine air) and industrial atmosphere (dark res. green tarnishing on surface), drinking and tap water, aqueous and alkaline solutions (without oxidant), pure steam, non oxidising acids (so far as no Oxygen in solution) and neutral solutions of salts.

Cu-HCP can be tempered in hydrogen containing atmosphere without risk of embrittlement. Insensivity against stress corrosion cracking.

No persistance in Solutions of cyanides, halogenides and Ammonium, oxidising acids, liquid ammonia, halogen gas, hydrogen sulphide and see water.

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