CuNi10Fe1,6Mn
C70600

Industrial Rolled

Alloy Designation	
EN	CuNi10Fe1,6Mn CW352H
DIN CEN	2.0872
UNS	C70600
BS	CN102
JIS	C 7060T; CNP1
EEMUA	UNS 7060X

High Performance Alloys

We have developed a wide range of high performance alloys with excellent properties regarding conductivity, strength, corrosion behaviour, bend ability and relaxation properties. KME alloys are the first choice materials for high-end applications and products.

Chemical Composition Weight percentage		
Cu	86.0 .. 89.7	%
Ni	9.0 .. 11.0	%
Fe	1.0 .. 2.0	%
Mn	0.5 .. 1.0	%

This alloy is in accordance with RoHS 2002/96/CE for electric & electronic equipments and 2002/53/CE for automotive industry.

Characteristics

For many decades, copper-nickel alloy CuNi 90/10 has extensively been used as a piping material for seawater systems in shipbuilding, offshore, and desalination industries. Attractive characteristics of this alloy combine excellent resistance to uniform corrosion, remarkable resistance to localised corrosion in chlorinated seawater, and higher erosion resistance than other copper alloys and steel. Furthermore, CuNi 90/10 is resistant to biofouling providing various economic benefit.

Main Applications

Cladding for corrosion protection of steel structures, Sheathing on offshore structures, Piping systems, pipes, fittings, flanges, desalination plant, offshore wind structures, shipbuilding

Preferred Applications

Fire water systems	Seawater cooling systems	Deck steam pipes	Seawater feed lines to desalination and processing units	Hydraulic and pneumatic systems
xx	xx	xx	xx	xx

x = well suited   xx = particularly well suited

Physical Properties Typical values in annealed temper at 20 °C		
Density	8.94	g/cm^3
Thermal expansion coefficient -183 .. 10 °C	13.0	10^{-6}/K
20 .. 300 °C	17.0	10^{-6}/K
Specific heat capacity	0.38	J/(g·K)
Thermal conductivity	50.2	W/(m·K)
Electrical conductivity (1 MS/m = 1 m/(Ω mm^2))	5	MS/m
Electrical conductivity (IACS)	6.9	%
Thermal coefficient of electrical resistance (0 .. 100 °C)	7	10^{-4}/K
Modulus of elasticity (1 GPa = 1 kN/mm^2) cold formed	130	GPa
annealed	138	GPa

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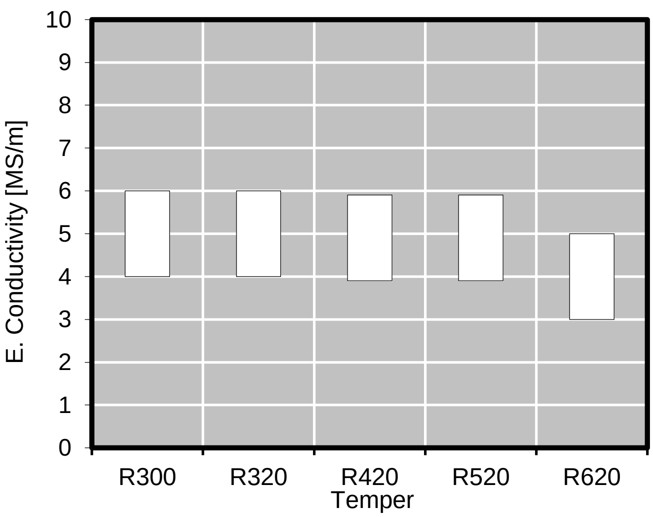
Mechanical Properties (EN 1652)				
Temper	**Tensile Strength** **Rm**	**Yield Strength Minimum** **$Rp_{0.2}$**	**Elongation Minimum** **A_{50mm}**	**Hardness** **HV ***
	MPa	MPa	%	HV
R300	>300	>100	20	70
R320	>320	>200	12	100
R420	420 .. 510	370	3	120
R520	520 .. 610	480	2	150
R620	> 620	590	-	170

*only for information ** additional effort in production

Electrical Conductivity



Electrical conductivity is strongly influenced by chemical composition. A high level of cold deformation and small grain size decrease the electrical conductivity moderately. Minimum conductivity level can be specified.

Fabrication Properties*	
Cold Forming Properties Max. 80% between annealings	Excellent
Hot Forming Properties at 850 .. 950°C	Good
Machinability (Rating 20)	Good
Electroplating Properties	Good
Soft Soldering, Brazing	Excellent
Resistance Welding	Excellent
Gas Shielded Arc Welding	Good
Laser Welding	Excellent
Soft Annealing	700 .. 825°C, 1 .. 3h
Stress Relieving Annealing	275 .. 400°C, 1 .. 3h

* For more details call our technical service

Corrosion Resistance*
Resistant to: CuNi10Fe1,6Mn belongs to the most corrosion resistant copper alloys. It is resistant to humidity, non oxidizing acids (without oxygen in solution), organic acids, dry gases like oxygen, chlorine, hydrogen chloride, hydrogen sulphide, sulphur dioxide, hydrogen fluoride and carbon dioxide. The resistance of this alloy has its cause in the formation of a stable coating layer. OSNA®-10 is resistant to cold and hot seawater at high flow velocity (1 .. 3.5m/s).
Practically resistant against stress corrosion cracking.
Selective corrosion is extremely low, pitting (localized corrosion) appears very seldom.

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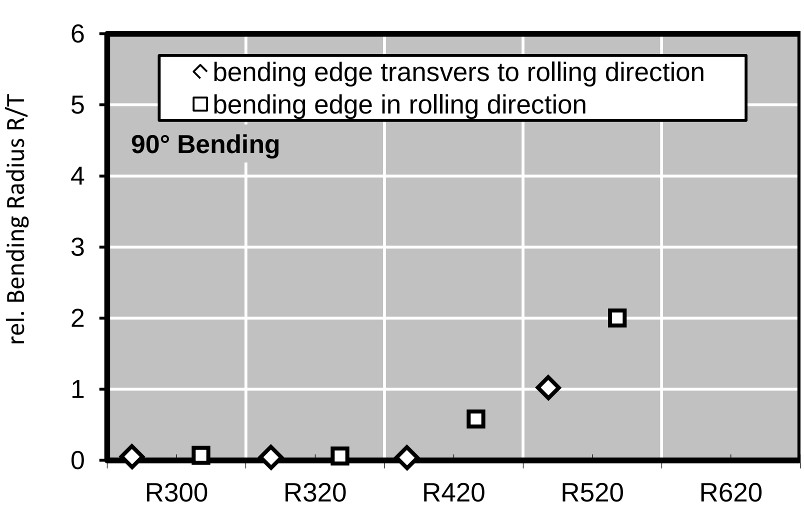
Bending Properties **Thickness: ≤ 0.5 mm**

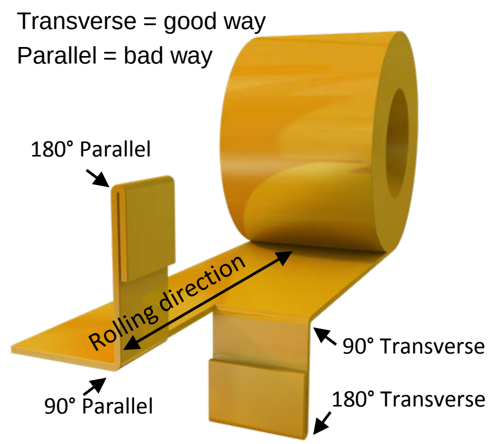


Bending test according to EN ISO 7438 is done with 10 mm wide samples. Smaller samples in general – as well as lower thickness – allow a lower bending radius without cracks. If needed we supply bending optimized temper classes that far exceed standard quality.

Please take care when comparing with ASTM E 290 results, there the bend definition direction is contradictory.

Bending Definition

Transverse = good way
Parallel = bad way



Bending Properties*

Temper	Thickness Range	Bending 90°		Bending 180°	
		Trans-vers	Parallel	Trans-vers	Parallel
	mm	R/T	R/T	R/T	R/T
R300	≤ 0.5	0	0		
R320	≤ 0.5	0	0		
R420	≤ 0.5	0	0.5		
R520	≤ 0.5	1	2		
R620	≤ 0.5	-	-		

* Measured at sample width 10 mm according to EN 1654
Possible bending radius = (R/T) x thickness

Minimum Bending Radius Calculation

To find out the minimum possible bending radius take the R/T value from the list.

Example: R/T = 0.5 and thickness 0.3 mm

Minimum radius = (R/T) x thickness
= 0.5 x 0.3 mm = 0.15 mm

Bend Fatigue (at room temperature)

The fatigue strength gives an indication about the resistance to variations in applied tension. It is measured under symmetrical alternating load. The maximum bending load for 10^7 load cycles without crack is measured. Dependent on the temper class it is approximately 1/3 of the tensile strength R_m.