

# CuNi10Fe1Mn (CuNi 90/10)

Mat. No. 2.0872 · Copper-nickel alloy for seawater and marine service

**Mat. No.:** 2.0872

**EN designation:** CuNi10Fe1Mn

**ASTM/ASME equiv.:** Pipes: SB-466 C70600 · Fittings: SB-467 C70600

**Key property:** Excellent seawater corrosion resistance – 90 % Cu, 10 % Ni + Fe + Mn

**Temperature range:** Up to +300 °C

**Standard:** EN 12449 · EN 12451

**Delivery forms:** Elbows · Tees · Reducers · Caps · Pipes

## 1 Material Equivalents & Comparable Grades

### International Equivalents

Standard / Region	Designation	Mat. No. / Grade	Note
EN	CuNi10Fe1Mn	2.0872	90/10 CuNi
ASTM/ASME (pipes)	SB-466 C70600	–	–
ASTM/ASME (fittings)	SB-467 C70600	–	–
MIL-spec	MIL-T-16420	–	Naval/defence applications
DIN (old)	CuNi10Fe1Mn	–	Same designation

### Alternative Materials

Material	Mat. No.	Relation to CuNi10Fe1Mn (CuNi 90/10)	When to use
CuNi 70/30 (2.0882)	2.0882	Higher Ni, better SCC resistance	For higher temperatures or more aggressive seawater
Duplex 2205 (1.4462)	1.4462	Higher strength, PREN ~35	When higher pressure rating required

## 2 Chemical Composition

Values in mass percent (%). Standard: EN 12449.

*Cu-Ni alloys rely on a protective oxide/hydroxide layer for corrosion resistance in seawater. Fe addition is critical for seawater resistance.*

Element	Sym.	Min. (Heat)	Max. (Heat)	Max. (Prod.)	Function
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<b>Copper</b>	Cu	≥82.0	–	–	Base element
<b>Nickel</b>	Ni	9.0	11.0	11.5	Seawater resistance
<b>Iron</b>	Fe	1.0	1.8	2.0	Critical for seawater resistance
<b>Manganese</b>	Mn	0.5	1.0	1.2	Deoxidation + corrosion resistance

### 3 Mechanical Properties

#### Room Temperature – Minimum Requirements

Annealed.

Property	Sym.	Unit	Min. Value	Note
<b>Yield strength</b>	Rp0.2	MPa	≥ 100	Annealed
<b>Tensile strength</b>	Rm	MPa	270–380	–
<b>Elongation</b>	A	%	≥ 30	–
<b>Hardness</b>	HV	–	max. 95	–

#### Elevated Temperature Yield Strength Rp0.2 in MPa (indicative values)

Temp.	50 °C	100 °C	200 °C	300 °C
<b>Rp0.2 (MPa)</b>	95	88	75	60

### 4 Physical Properties

Property	Sym.	20 °C	200 °C	400 °C	Unit
<b>Density</b>	ρ	8.90	8.82	8.72	g/cm <sup>3</sup>
<b>Modulus of elasticity</b>	E	135	130	123	GPa
<b>Thermal conductivity</b>	λ	40	41	44	W/(m·K)
<b>Thermal expansion</b>	α	17.0	17.3	17.8	10 <sup>-6</sup> /K

### 5 Corrosion Behaviour

Medium / Environment	Notes	Rating
Seawater (flowing)	Excellent resistance with Fe-containing protective layer	++
Brackish water	Good resistance	+
Marine atmosphere	Good, even in saltwater splash zone	+
Fresh water	Good resistance	+
Strong acids	Not suitable	–

Ammonia (moist)	Stress corrosion cracking risk	-
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++ excellent
+ good
o limited
- not suitable

*CuNi 90/10 is the global standard for seawater piping in ships and offshore. CRITICAL: Never allow direct iron contact (galvanic corrosion). Keep strictly separate from carbon steel.*

## 6 Typical Applications

Industry / Plant	Typical Application	Operating Conditions
Shipbuilding / marine	Seawater cooling systems	Global standard for ship piping
Offshore	Cooling water, utility piping	CuNi preferred over steel for seawater
Power plants (coastal)	Condenser water inlet/outlet	Seawater cooling
Desalination	MSF evaporator piping	Classic material for this service

## 7 Delivery Forms at Nirotec

Component	Standard (EN)	Standard (ASME/ASTM)	Note
Elbows	EN 10253 (custom)	ASME B16.9 · SB-467 C70600	LR/SR, on request
Tees	EN 10253 (custom)	ASME B16.9 · SB-467	Equal and reducing
Reducers	EN 10253 (custom)	ASME B16.9 · SB-467	Concentric and eccentric
Caps	EN 10253 (custom)	ASME B16.9 · SB-467	Ellipsoidal
Pipes	EN 12449	SB-466 C70600	Seamless

## 8 Standards, Approvals & Codes

Standard / Code	Title / Application
EN 12449	Copper and copper alloys – seamless round tubes
SB-466 / SB-467	ASME material standards for CuNi
MIL-T-16420	Naval specification CuNi 90/10
PED 2014/68/EU	Pressure Equipment Directive
ASME B31.3	Process Piping

## 9 Fabrication Notes

### Weldability

Parameter	Requirement / Recommendation	Note
<b>Preheat</b>	Not required	Cu alloy
<b>PWHT</b>	Not required	–
<b>Filler</b>	ERCuNi (AWS A5.7)	90/10 CuNi consumables
<b>Process</b>	GTAW, SMAW	GTAW preferred
<b>Iron contamination</b>	PREVENT – no contact with steel tools	Causes galvanic corrosion

- Delivery condition: Annealed
- Strict separation from iron/steel during fabrication and storage
- GTAW preferred for root passes
- Pickling recommended after welding to restore protective oxide layer

## 10 Enquiry & Contact

For a project-specific quotation, please provide:

- Standard and execution (e.g. LR 90° elbow per EN 10253-4)
- Dimensions: DN / NPS and wall thickness or schedule
- Quantity and requested delivery date
- Documentation: EN 10204 Type 3.1 / 3.2, NDT, third-party inspection
- Any project-specific specifications or special requirements

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*All information is provided without warranty. Applicable standards and project specifications at time of order are authoritative.*