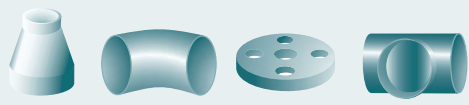


Specifications Alloy 400

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Alloy 400

Alloy 400 (UNS N04400) is a single-phase solid-solution nickel-copper alloy with excellent corrosion resistance to a wide range of media.

This alloy is characterised by:

- corrosion resistance in a wide range of marine and chemical environments
- freedom from chloride induced stress-corrosion cracking
- good mechanical properties from sub-zero temperatures up to about 550°C (1020°F)
- approval for pressure vessels with wall temperatures from -10 to 425°C (14 to 800°F) according to VdTÜV-Wbl.263 and up to 900°F (480°C) according to ASME Boiler and Pressure Vessel Code
- good workability and weldability

Designation and Standards

Country National Standards	Material Designation	Chem. composition	Specification						
			Tube and pipe seamless	Tube and pipe welded	Sheet and plate	Rod and bar	Strip	Wire	Forgings
France AFNOR	NU30								
Germany DIN VdTÜV-Wbl	W.-Nr.2.4360 NiCu30Fe	17743 263	17751 263		17750 263	17752 263	17750	17753	17754 263
United Kingdom BS	NA 13		3074		3072	3076	3073	3075	
USA ASTM ASME ASME Code case QQ-N-281	UNS N04400		B163/ 165 SB163/ 165 4574		B127 SB127 4544 Form 4,6	B164 SB164 4675 Form 1	B127 SB127 Form 5	Form 7	B564 SB564 4675 Form 2
ISO	NiCu30	9722	6207		6208	9723	6208	9724	9725

Chemical Composition(%)

Alloy 400	Ni	Fe	C	Mn	Si	Cu	Al	S					
min	63.0	1.0	-	-	-	28.0	-	-					
max	-	2.5	0.15	1.25	0.5	34.0	0.5	0.02					

Mechanical Properties

The following properties are applicable to Alloy 400 in the stated conditions and specifications. Specified properties of material outside these ranges are subject to special enquiry.

Condition	Specification	Tensile strength		0.2% Yield Strength		1.0% Yield Strength		Elong A5 %	Brinell hardness HB
		N/mm ²	ksi	N/mm ²	ksi	N/mm ²	ksi		
Annealed	DIN, VdTÜV - Wbl.	450	65	180	26	210	30	35	≤ 150
	ASTM, ASME, QQ-N, BS	480	70	195	28	220*		35	-
Stress Relieved	DIN	550	80	300	44			25	~170
Relieved	VdTÜV-Wbl.	580	84	400	58			18	-
	ASTM, ASME, BS	550 - 600	80 - 87	275 - 415	40 - 60			20	-
Hard	DIN	700	102	650	94			3	~210
	ASTM, ASME, QQ-N	690 - 760	100 - 110	620	90			2	-

Minimum mechanical properties at room temperature.

*BS only

Please Note: The figures quoted are intended for guidance only. For further information, please refer to the standards listed or contact our sales or QA Departments.

Metallurgical structure

Alloy 400 has a face-centred cubic structure.

Corrosion Resistance

Alloy 400 has outstanding resistance to neutral and alkaline salts. It has been a standard material for salt plants for many years.

This alloy is one of the few metallic materials which can be used in contact with fluorine, hydrofluoric acid, hydrogen fluoride or their derivatives. Alloy 400 shows very high resistance to caustic alkalis. Behaviour in seawater is also excellent, with improved resistance to cavitation corrosion compared with copper-base alloys. It can be used in contact with dilute solutions of mineral acids such as sulphuric and hydrochloric acids, particularly if they are air-free. However, as the alloy contains no chromium, corrosion rates may be increased significantly in oxidising conditions.

Whilst Alloy 400 can be considered immune to chloride-ion stress cracking, it can stress crack in the presence of mercury or in most aerated HF vapours. A stress relieving heat treatment is applied in such cases.

Applications

Typical applications include:

- feed-water and steam generator tubing in power plants
- brine heaters and evaporator bodies in salt plants
- sulphuric and hydrofluoric acid alkylation plants
- industrial heat exchangers
- cladding for crude oil distillation columns
- splash-zone sheathing in offshore structures
- propeller and pump shafts for seawater service
- plants for uranium refining and isotope separation in the production of nuclear fuel.
- pumps and valves used in the manufacture of chlorinated hydrocarbons
- monoethanolamine (MEA) reboiler tubes

Stock Size Range

Alloy 400 - Bar, Tube, Pipe and Fittings

Bar mm dia	Tube mm o/d	Pipe nb sch10 - sch80	Seamless fittings nb
6.35 - 160.0	10.0 - 12.0	1/2" - 8"	1/2" - 8"

Alloy 400 - Sheet and Plate

Size	2m x 1m	8' x 4'	2.5m x 1.25m	3m x 1.2m	3m x 1.5m
Thickness	2, 3mm	3, 4, 5, 6mm	2"	2, 3mm	2, 3, 6mm

Size	10' x 5'	4m x 2m	6m x 2m	6.096m x 2.438m
Thickness	1/2", 3/4", 1", 1 1/4", 1 1/2", 2"	3, 5, 6, 10, 12mm	3mm	3, 5, 6, 10, 12mm

The above tables represent our standard stock range.

Other sizes can be manufactured to order, often with short lead times.