



Quick Facts

- Nickel Copper Alloy
- Available in hot or cold worked and annealed condition
- Good strength and toughness combined with outstanding corrosion resistance
- Often used in marine applications
- Good weldability
- Commonly referred to as Monel® 400

Alloy 400 has a wide range of mechanical properties, depending on the supply condition, with excellent properties at sub-zero temperatures. It does not undergo a ductile-to-brittle transition even when cooled to the temperature in liquid hydrogen. It also has useful short-time high temperature properties in the hot rolled and annealed condition and toughness is maintained over a wide range of temperatures.

Due to Alloy 400's resistance to corrosion by many reducing media, it makes it suitable for service in a variety of environments and is widely used in marine applications due to its very low corrosion rates in flowing seawater. It is also resistant to stress corrosion cracking and pitting in most fresh and industrial waters.

Typical Applications

Used in steam generators, boiler feed water heaters and other heat exchangers, valves and pumps, pump and propeller shafts, marine fixtures and fasteners, process vessels and chemical processing equipment.

Stock Range

We stock a comprehensive range of round bar sizes between 10mm and 254mm diameter.

We can also supply flat bar, rings, blocks and slabs.

Primarily manufactured in Europe and USA



National Specifications

- ASTM B164/564
- BS 3076 NA13
- UNS NO4400
- NACE MR0175/ISO15156
- Werkstoff Nr. 2.4360

Material may also be supplied to Customer specifications, subject to enquiry

Chemical Analysis

	C	Mn	Si	S	Ni	Cu	Fe	-
Min	-	-	-	-	63.0	28.0	-	%
Max	0.3	2.0	0.5	0.024	-	34.0	2.5	%

Material Condition

The majority of our material is supplied in the hot worked and annealed condition, although we do hold some sizes in the cold worked and annealed condition.

Mechanical Properties

Typical properties:

Condition		Tensile (PSI (MPA))	Yield (0.2% offset), (PSI (MPA) Min)	Elongation in 2" or 4D min%	Elongation 5.65√S0 min%	Rockwell Hardness HRC Max
Hot worked and annealed		70,000 (483)	25,000 (172)	35	35	35
Cold worked and stress relieved	≤40mm dia	87,000 (600)	60,000 (415)	22	20	35
	>40mm ≤ 55mm dia	84,000 (580)	55,000 (380)			



Heat Treatment

Typical annealing cycle is 870-980°C (1600-1800°F)/ soak time dependant on section size/ water quench.

Machinability

Alloy 400 can be readily machined in the annealed condition. This alloy does experience some work hardening during machining and steady feed rates when drilling can help to avoid this.

Physical Properties

Typical properties at room temperature:

Melting Range	1300°C - 1350°C (2370°F- 2460°F)
Room Temp Density	8.80 g/cm ³ (0.318 lb/in ³)
Young's Modulus	179 x 10 ⁶ N/mm ²
Poisson's Ratio	0.32
Thermal Conductivity	22 W/m°C
Specific Heat	427 Joules/kg°C (0.102 Btu/lb°F)
Curie Temperature	21-49°C (70-120°F)
Mean Coefficient of thermal expansion Annealed 21-100°C	14.2 µm/m•°C
Magnetic Permeability	Could show magnetism as Curie temperature is close to room temperature

All material we supply has full traceability with inspection certification in accordance with BS EN 10402 3.1. We can supply material with BS EN 10402 3.2 inspection certification on request. We have onsite PCN and SNT Level III inspectors who can test material to your requirements. All information included in this sheet is intended as a guide only and is correct to the best of our knowledge.