



Monel 400 is a nickel-copper alloy (about 67% Ni – 23% Cu) that is resistant to sea water and steam at high temperatures as well as to salt and caustic solutions. Stronger than pure nickel, Monel is resistant to corrosion by many agents, including rapidly flowing seawater. The alloy can be fabricated readily by hot- and cold-working, machining, and welding. Monel is a solid-solution binary alloy. As nickel and copper are mutually soluble in all proportions, it is a single-phase alloy. It is resistant to corrosion and acids, and some alloys can withstand a fire in pure oxygen. It is commonly used in applications with highly corrosive conditions. Monel 400 has great mechanical properties at subzero temperatures, can be used in temperatures up to 1000° F, and its melting point is 2370-2460° F. However, alloy 400 is low in strength in the annealed condition so, a variety of tempers may be used to increase the strength. Monel 400 is used in aerospace, oil production and refining, marine, musical instrument and other applications requiring high corrosion resistance, good weldability and high strength.

CHEMICAL COMPOSITION

	Cu	Fe	C	Mn	Ni	S	Si
MIN / MAX	28.0-34.0	2.5	0.3	2.0	63.0	.024	0.5

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APPLICABLE SPECIFICATIONS

Pipe Welded	Pipe Seamless	Fitting	Bar	Sheet/Plate	Tube, Seamless
ASTM B725	ASTM B165	ASTM B564	ASTM B164	ASTM B395	ASTM B163

APPLICATIONS

Marine engineering	Industrial heat exchangers	Chlorinated solvents	Crude petroleum stills	De-aerating heaters
Valves, pumps, shafts, fittings, and fasteners	Chemical and hydrocarbon processing equipment	Gasoline and freshwater tanks	Crude oil distillation towers	Boiler feed water heaters and other heat exchangers

PHYSICAL PROPERTIES

Density	Tensile Strength – Annealed min.	Tensile Strength – Stress Relieved min.	Yield Strength – Annealed min.	Yield Strength – Stress Relieved min.	CTE, linear	Specific Heat Capacity	Thermal Conductivity	Melting Point
0.318 lb/in ³	70 ksi	85 ksi	28 ksi	55 ksi	7.7 in/in/°F x 10-6 @ 200°F	0.105 Btu/lb/°F @ 200°F	167 Btu-in/h/ft ² /°F @ 200°F	2370 – 2460 °F
8.80 g/cc	483 MPa	586 MPa	193 MPa	379 MPa	14.2 μm/m°C @ 100°C	445 J/kg°C @ 100°C	24.0 W/m°C @ 100°C	1300 – 1350 °C

MAXIMUM PRESSURE WORK

P = Maximum work pressure (psi)
 S = Minimum tensile strength of material for a specific temper (It is the value of the tensile strength in psi in Mechanical properties table)
 D = Exterior diameter of tube
 T = Wall thickness of tube

$$P = \frac{2T \times S}{5D}$$

NON DESTRUCTIVE TESTS

Eddy Current Testing
 Hydrostatic Testing
 Air Underwater Testing
 Ultrasonic Testing
 (PMI) Positive Material Identification

DESTRUCTIVE TESTS

Microstructure Test
 Tensile Test
 Expansion Test
 Optical Spectrometry Test