

# ALLOY 400 NICKEL TUBING



This nickel-copper chemistry features a high intensity single-phase solid solution metallurgical structure. Alloy 400 has greater corrosion resistance than nickel under reducing conditions and is more resistant than copper under oxidizing conditions. This grade has been widely used in applications requiring strong resistance to corrosive environments featuring acids, alkalis, and high temperature steam. It is all but immune to the stress corrosion cracking (SCC) induced by chlorides and most freshwater conditions. A very tough material (as measured by impact testing), Alloy 400 has excellent mechanical properties in sub-zero conditions. It does not undergo a ductile-to-brittle transformation even when cooled to the temperature of liquid hydrogen. On the opposite side of the temperature range, Alloy 400 performs well in temperatures up to 1000° F.

## PRODUCT SPECIFICATIONS

ASTM B163, B165 / ASME SB163 / NACE MR0175

## SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.125"-1.000"	.035"-.083"

## CHEMICAL REQUIREMENTS

ALLOY 400 (UNS N04400)  
COMPOSITION %

Element	Symbol	Requirement
Ni	Nickel	63.0 min
Cu	Copper	28.0-34.0
Fe	Iron	2.5 max
Mn	Manganese	2.0 max
C	Carbon	0.3 max
Si	Silicon	0.5 max
S	Sulfur	0.024 max

## DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
.094"-1.875" excl	+0.003"/-0.000"	± 10%
.1875"-1.500" excl	+0.004"/-0.000"	± 10%
.500"-1.250" incl	+0.005"/-0.000"	± 10%

## MECHANICAL PROPERTIES

Yield Strength	28 ksi min
Tensile Strength	70 ksi min
Elongation (min 2")	35%

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
<b>1/8"</b> <b>(.125")</b>	.035	.055	.0378	35,280	8,820
<b>1/4"</b> <b>(.250")</b>	.035	.180	.0902	17,640	4,410
	.049	.152	.1181	24,696	6,174
	.065	.120	.1442	9,500	2,375
<b>3/8"</b> <b>(.375")</b>	.035	.305	.1427	11,760	2,940
	.049	.277	.1915	16,464	4,116
	.065	.245	.2416	21,840	5,460
<b>1/2"</b> <b>(.500")</b>	.035	.430	.1951	8,820	2,205
	.049	.402	.2649	12,348	3,087
	.065	.370	.3390	16,380	4,095
<b>3/4"</b> <b>(.750)</b>	.049	.652	.4118	8,232	2,058
	.065	.620	.5338	10,920	2,730
<b>1"</b> <b>(1.000")</b>	.065	.870	.7286	9,100	2,275
	.083	.834	.9124	11,620	2,905

All pressure ratings are approximate and for illustration purposes only. Values are not guaranteed or warranted.

## TYPICAL APPLICATIONS

- Equipment in Sulfuric Acid Environments
- Chemical Processing - Organic/Inorganic Chlorides
- Sour Gas Well Environments
- Pulp & Paper Production - Digesters & Bleach Plants
- Waste Treatment - Evaporators
- Pollution Control - Sulfur Compounds in Flue Gas

## FABRICATION

Alloy 400 can be satisfactorily fabricated, welded, and joined by standard methodologies and rates of production. Usually, subsequent thermal treatment to effect re-balancing of the alloy is not required. Contact PAC Stainless for detailed fabrication and welding information.

