

# NICKEL ALLOYS

## *Nickel and Nickel Alloys* *Non-Ferrous metals with:*

- *High strength and toughness,*
- *Excellent corrosion resistance,*
- *Superior elevated temperature properties.*

## **NICKEL 200 (UNS N02200)**

### **Characteristics**

- Good resistance to corrosion in acids and alkalis and is most useful under reducing conditions.
- Outstanding resistance to caustic alkalis up to and including the molten state
- In acid, alkaline and neutral salt solutions the material shows good resistance, but in oxidizing salt solutions severe attack will occur.
- Resistant to all dry gases at room temperature and in dry chlorine and hydrogen chloride may be used in temperatures up to 550°C.
- Resistance to mineral acids varies according to temperature and concentration and whether the solution is aerated or not. Corrosion resistance is better in de-aerated acid.

### **Applications**

- Manufacture and handling of sodium hydroxide, particularly at temperature above 300°C.
- Production of viscose rayon. Manufacture of soap.
- Aniline hydrochloride production and in the chlorination of aliphatic hydrocarbons such as benzene, methane and ethane.
- Manufacture of vinyl chloride monomer.
- Storage and distribution systems for phenol immunity from any form of attack ensures absolute product purity.
- Reactors and vessels in which fluorine is generated and reacted with hydrocarbons.

### **Dimensions**

Dimensions of our normal product range: We are always trying to improve our range so please contact us if you are looking for other dimensions:

Ø 6.0 - 89.0 mm	wall 0.5 - 8.0 mm
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Strictly implements the standard specifications of:  
ASTM B161 / ASME SB161  
ASTM B163 / ASME SB163

# NICKEL 201 (UNS N02201)

## Characteristics

- Good resistance to corrosion in acids and alkalis and is most useful under reducing conditions.
- Outstanding resistance to caustic alkalis up to and including the molten state.
- Virtually immune to inter granular attack above 315°C, chlorates must be kept to a minimum.
- In acid, alkaline and neutral salt solutions the material shows good resistance, but in oxidizing salt solutions severe attack will occur.
- Resistant to all dry gases at room temperature and in dry chlorine and hydrogen chloride may be used in temperatures up to 550°C.
- Resistance to mineral acids varies according to temperature and concentration and whether the solution is aerated or not. Corrosion resistance is better in deaerated acid.

## Applications

- Manufacture and handling of sodium hydroxide, particularly at temperature above 300°C.
- Production of viscose rayon. Manufacture of soap.
- Aniline hydrochloride production and in the chlorination of aliphatic hydrocarbons such as benzene, methane and ethane.
- Manufacture of vinyl chloride monomer.
- Storage and distribution systems for phenol - immunity from any form of attack ensures absolute product purity.
- Reactors and vessels in which fluorine is generated and reacted with hydrocarbons.

## Dimensions

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# MONEL NICKEL ALLOY 400 (UNS N04400)

## Characteristics

- Excellent resistance to chloride ion stress corrosion cracking.
- Good mechanical properties from subzero temperatures up to about 480°C.
- Corrosion resistance in an extensive range of marine and chemical environments. From pure water to non-oxidizing mineral acids, salts and alkalis.
- This alloy is more resistant to nickel under reducing conditions and more resistant than copper under oxidizing conditions, it does show however better resistance to reducing media than oxidizing.
- Good resistance to sulphuric and hydrofluoric acids. Aeration however will result in increased corrosion rates. May be used to handle hydrochloric acid, but the presence of oxidising salts will greatly accelerate corrosive attack.
- Resistance to neutral, alkaline and acid salts is shown, but poor resistance is found with oxidizing acid salts such as ferric chloride.

## Applications

- Feed water and steam generator tubing.
- Brine heaters, sea water scrubbers in tanker inert gas systems.
- Sulphuric acid and hydrofluoric acid alkylation plants.
- Pickling bath heating coils.
- Heat exchangers in a variety of industries.
- Transfer piping from oil refinery crude columns.
- Propeller and pump shafts.
- Pumps and valves used in the manufacture of perchlorethylene, chlorinated plastics.
- Monoethanolamine (MEA) reboiling tube.
- Cladding for the upper areas of oil refinery crude columns.

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ASTM B163 / ASME SB163

# INCONEL ALLOY 600 (UNS N06600)

## Characteristics

- Resistant to a wide range of corrosive media. The chromium content gives better resistance than Alloy 200 and 201 under oxidizing conditions, at the same time the high nickel gives good resistance to reducing conditions.
- Virtually immune to chlorine ion stress corrosion cracking.
- Demonstrates adequate resistance to organic acids such as acetic, formic and stearic.
- Little or no attack occurs at room and elevated temperatures in dry gases, such as chlorine or hydrogen chloride. At temperatures up to 550°C in these media, this alloy has been shown to be one of the most resistant of the common alloys.
- At elevated temperatures the annealed and solution annealed alloy shows good resistance to scaling and has high strength.
- The alloy also resists ammonia bearing atmospheres, as well as nitrogen and carburising gases.
- Under alternating oxidizing and reducing conditions the alloy may suffer from selective oxidation.

## Applications

- Thermocouple sheaths.
- Ethylene dichloride (EDC) cracking tubes.
- Production of caustic alkalis particularly in the presence of sulphur compounds.
- Reactor vessels and heat exchanger tubing used in the production of vinyl chloride.
- Process equipment used in the production of chlorinated and fluorinated hydrocarbons.
- Furnace retort seals, fans and fixtures.
- Roller hearths and radiant tubes, in carbonitriding processes especially.

## Dimensions

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Strictly implements the standard specifications of:

ASTM B161 / ASME SB161

ASTM B163 / ASME SB163

ASTM B167 / ASME SB167