

# Nickel Alloys

Alloy C276 ● Alloy 80A ● Alloy 600 ● Alloy 825



**COLUMBIA  
METALS**

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Nickel alloys offer high strength and toughness, excellent performance at high temperature and outstanding corrosion resistance. Columbia Metals' range of nickel alloys includes all the grades described below.

## Alloy C276 / N10276

Alloy C276 is a wrought nickel-chromium-molybdenum-tungsten alloy which displays remarkable corrosion resistance in a very wide range of processing environments. It offers excellent resistance to stress corrosion cracking and oxidising atmospheres up to 1040°C, whilst the high molybdenum content gives the alloy its excellent resistance to pitting and crevice corrosion. The low carbon content prevents the formation of grain boundary precipitates during welding.



Applications of C276 include critical components in sewage treatment, chemical and petrochemical plants, waste incineration, sour gas production and organic acid processing.

## Alloy 80A / N07080 / NA20

Alloy 80A is a nickel-chromium alloy with additions of titanium and aluminium, which enable it to be strengthened by precipitation hardening. The grade is supplied in the solution treated condition for ease of machinability, but an aging treatment will give the material very high mechanical properties, an outstanding resistance to creep at service temperatures up to 815°C (1500°F) and a high resistance to fatigue under very arduous conditions.

Alloy 80A also offers excellent corrosion resistance in oxidising atmospheres including under cyclical conditions of heating and cooling. This corrosion resistance can be attributed to an adherent chromium oxide film (Cr<sub>2</sub>O<sub>3</sub>) that forms on the alloy surface, protecting it from progressive corrosion and giving a high scaling resistance at elevated temperatures.

## Alloy 600 / N06600 / NA14

Alloy 600 is a non-magnetic nickel-chromium-iron high temperature alloy with an excellent combination of high strength, hot and cold workability and high corrosion resistance. It has good high temperature strength up to 1150°C and displays freedom from stress corrosion. The high chromium content of Alloy 600 raises its oxidation resistance and the high nickel content provides good corrosion resistance.

Alloy 600 is selected for many chemical process plant applications requiring strength at high temperature and corrosion resistance. Other applications include furnace components to withstand oxidising, carburising and nitriding atmospheres, food processing, nuclear engineering and spark electrodes.

## Alloy 825 / N08825 / NA16

Alloy 825 is a titanium-stabilised nickel-chromium-iron-molybdenum-copper alloy for use in extremely corrosive environments. It has a very high resistance to oxidation and to stress corrosion cracking in chloride conditions. It is resistant to pitting corrosion in sulphuric and phosphoric acids and attack in strongly oxidising media such as nitrates, nitric acid and oxidising salts. It also withstands attack by most organic acids and alkali solutions. Alloy 825 is readily machinable.

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## Technical Data

### Nominal Composition (%)

	Ni	Cr	Fe	Mo	W	Ti	Al	Cu
<b>Alloy C276</b>	Rem	15.5	5.5	16.0	3.8	-	-	-
<b>Alloy 80A</b>	Rem	20.0	3.0	-	-	2.2	1.4	-
<b>Alloy 600</b>	Rem	15.5	8.0	-	-	-	-	-
<b>Alloy 825</b>	Rem	21.5	30.0	3.0	-	-	-	2.2

### Mechanical Properties (specification minima)

	Alloy C276	Alloy 80A	Alloy 600	Alloy 825
<b>Ultimate Tensile Strength (N/mm<sup>2</sup>)</b>	690	1000	550	590
<b>0.2% Proof Strength (N/mm<sup>2</sup>)</b>	283	620	240	220
<b>Elongation (%)</b>	40	20	30	30

### Stock Sizes

Round Bar						
10mm	16mm	25.4mm	38mm	50mm	60mm	120mm
12mm	20mm	30mm	40mm	51mm	70mm	125mm
12.7mm	25mm	35mm	45mm	55mm	90mm	130mm

### Other nickel alloys available from Columbia Metals

[Alloy 625](#)

[Alloy 718](#)

[Monel Alloy 400](#)

[Monel Alloy K500](#)

