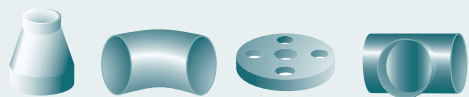
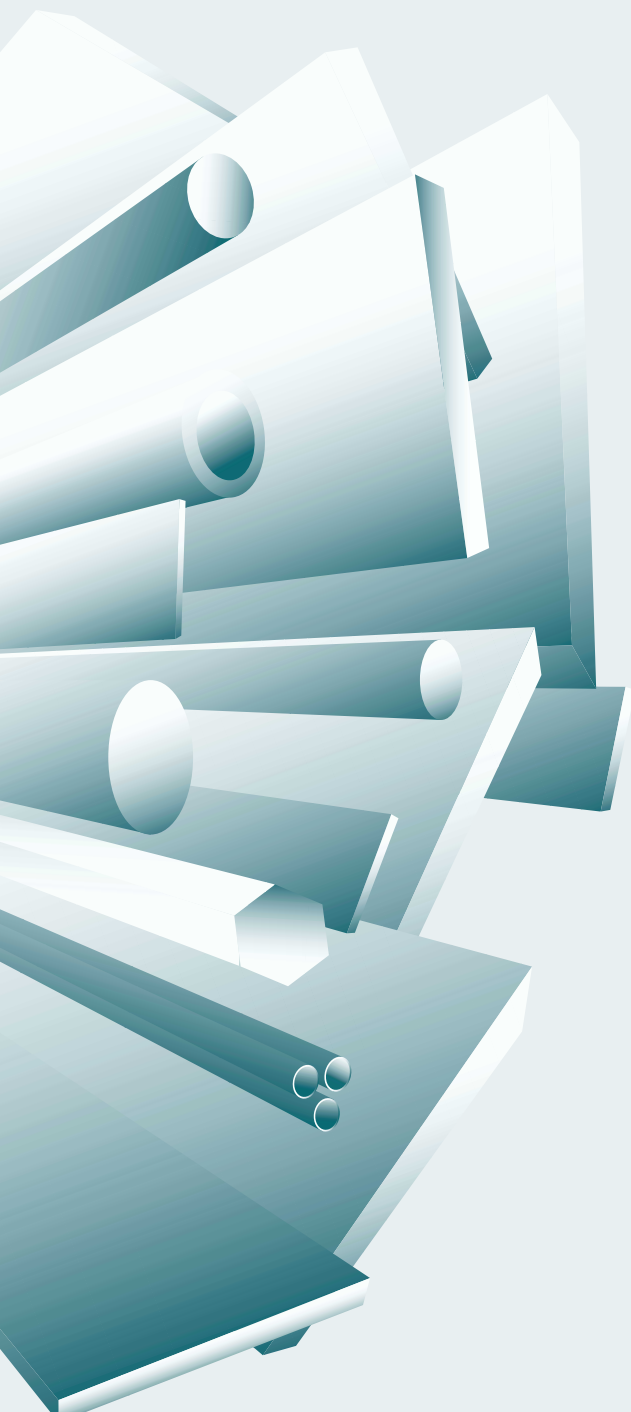


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# Alloy 625

**Alloy 625 (UNS N06625)** is a low-carbon nickel-chromium-molybdenum-niobium alloy which shows excellent resistance to a variety of corrosive media.

Due to its low carbon content and stabilising heat treatment, Alloy 625 shows little tendency to sensitisation even after 50 hours at temperatures in the range 650–900°C (1200–1650°F).

The alloy is supplied in the soft-annealed condition for applications involving wet corrosion, and is approved by TUV for pressure vessels in the temperature range –196 to 450°C (–321 to 840°F).

For high-temperature applications a modified version of Alloy 625 is available on request.

The mechanical properties of Alloy 625 can be increased by age-hardening.

## **This alloy is characterised by:**

- outstanding resistance to pitting, crevice corrosion, impingement corrosion and intergranular attack
- almost complete freedom from chloride-induced stress-corrosion cracking
- good resistance to mineral acids, such as nitric, phosphoric, sulphuric and hydrochloric acids
- good resistance to alkalis and organic acids
- good mechanical properties

In special high-temperature applications where very high strength and creep values are required, the high-carbon, solution treated version (Alloy 625, grade 2) should be used.

## Designation and Standards

Country National Standards	Material Designation	Specification							
		Chem. compo- sition	Tube and pipe		Sheet and plate	Rod and bar	Strip	Wire	Forgings
			seamless	welded					
France AFNOR	NC 22 DNb								
Germany  DIN VdTÜV	W.-Nr.2.4856 NiCr22Mo9Nb	17744 499	17751		17750 499	17752* 499	17750 499		
United Kingdom BS	NA 21				3072	3076			
USA  ASTM ASME AMS ASME Code case	UNS N06625 grade 1		B444 SB444 5581 1935	B704/705 5581	B443 SB443 5599 1935	B446 SB446 5666 1935	B443 SB443 5599 1935	5837	B564 5666
ISO	NiCr22Mo9Nb								

\*solution treated condition only

## Chemical Composition(%)

Alloy 625	Ni	Cr	Fe	C	Mn	Si	Mo	Al	Ti	Nb	P	S
min	bal	21.0	-	-	-	-	8.0	-	-	3.2	-	-
max	bal	23.0	4.0	0.025	0.40	0.40	10.0	0.40	0.40	3.8	0.010	0.010

## Mechanical Properties

The following properties are applicable to Alloy 625 in the hot or cold formed and soft-annealed condition and in the indicated ranges. Specified properties of material outside these ranges are subject to special enquiry.

Form	Dimensions		Tensile strength		0.2% Yield Strength		Elong A5 %	Brinell hardness HB
	mm	in	N/mm <sup>2</sup>	ksi	N/mm <sup>2</sup>	ksi		
Sheet, strip cr			830	120	415	60	30	150-220
Sheet, plate hr	≤ 75	≤ 3	760	110	380	55		
Rod, bar	≤ 100	≤ 4	830	120	415	60		
	> 100	> 4	760	110	345	50		
Tube, pipe			830	120	415	60		

Minimum mechanical properties at room temperature according to ASTM.

Please Note: The figures quoted are intended for guidance only. For further information, please refer to the standards listed or contact our sales or QA Departments.

## Metallurgical Structure

Alloy 625 has a face-centred cubic structure. After long exposures at a temperature of about 650°C (1200°F) the alloy precipitates some isolated carbides and a metastable tetragonal phase which later changes to a stable orthorhombic phase Ni<sub>3</sub> (Nb, Ti). The mechanical properties are enhanced by the molybdenum and niobium content through solid-solution hardening of the nickel-chromium matrix. There is, however, a loss in ductility.

## Corrosion Resistance

Alloy 625 shows excellent corrosion resistance in a wide range of media:

- outstanding resistance to pitting and crevice corrosion in chloride-bearing media and to impingement corrosion or intergranular attack.
- high resistance to corrosive attack by mineral acids, such as nitric phosphoric, sulphuric and hydrochloric acids, as well as to alkalis and organic acids in both oxidising and reducing conditions.

## **Corrosion Resistance continued:**

- virtual immunity to chloride-induced stress-corrosion cracking.
- practically no corrosive attack in marine and industrial atmospheres. High resistance to seawater and brackish water, even at high temperatures.
- no sensitisation during welding.
- good resistance to carburisation and to oxidation under static and cyclic conditions, and to chlorine containing gases.

## **Applications**

The soft annealed, low carbon Alloy 625 is widely used in chemical process technology, as its good corrosion resistance and high strength permit the use of thin structural parts. Alloy 625 is used for structures in contact with seawater and subject to high mechanical stresses.

### **Typical applications include:**

- flue gas scrubber components
- chimney linings
- superphosphoric acid production equipment
- nuclear waste reprocessing equipment
- sour gas production tubes
- product piping systems and sheathing of risers
- offshore industry, marine equipment

For high-temperature applications, up to about 1000°C (1830°F), the solution-annealed, high carbon version (Alloy 625, grade 2) is recommended, due to its excellent creep properties.

# Stock Size Range

## Alloy 625 - Bar, Tube, Pipe and Fittings

Bar mm dia	Tube mm o/d	Pipe nb sch10 - sch80	Seamless fittings nb
12.0 - 100.0	12.0 - 25.4	1/2" - 6"	1/2" - 6"

## Alloy 625 - Sheet and Plate

Size	2m x 1m	8' x 4'	2.5m x 1.25m	3m x 1.2m	3m x 1.5m
Thickness	-	-	-	2mm	3, 5, 6, 10, 12mm

Size	10' x 5'	4m x 2m	6m x 2m	6.096m x 2.438m
Thickness	3/4", 1"	5, 6, 8, 10, 12.7mm	3mm	3, 5, 6, 10, 12mm

The above tables represent our standard stock range.

Other sizes can be manufactured to order, often with short lead times.