

# Specifications Alloy 825

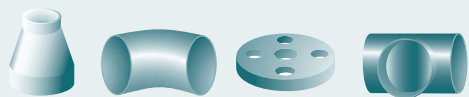
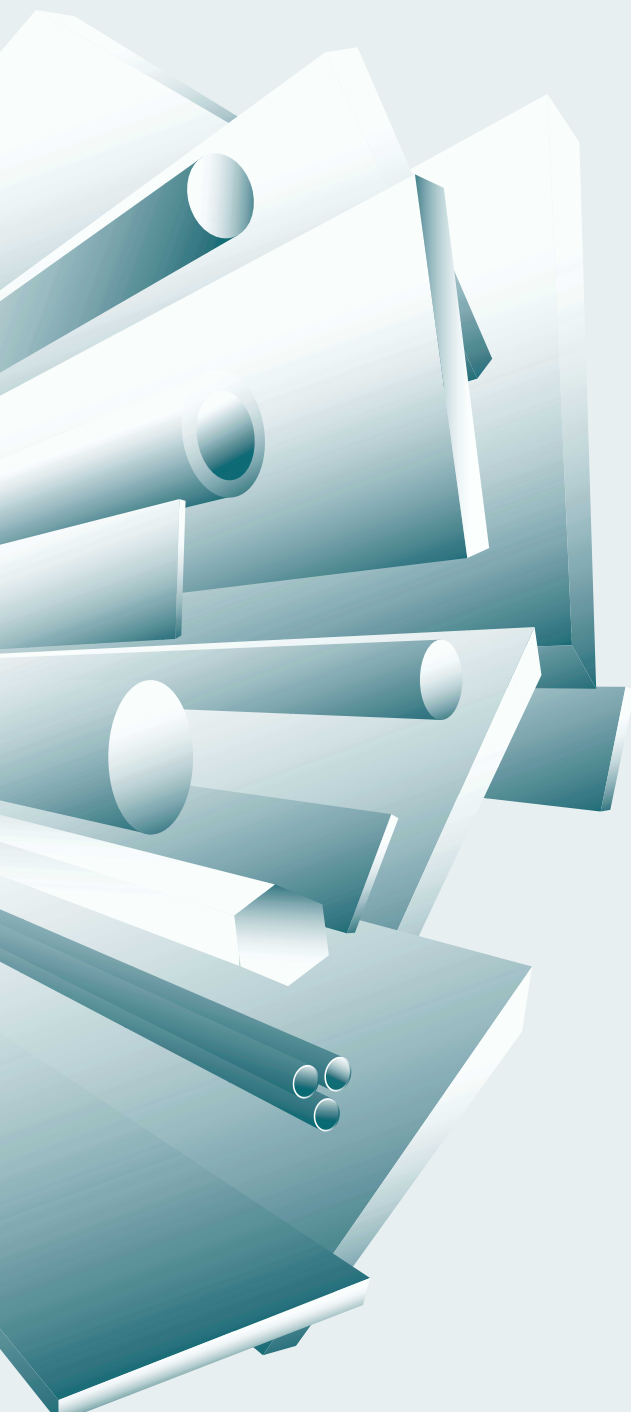
Page

Designation and Standards 1

Chemical Composition  
Mechanical Properties  
Conditional Stress Values 2

Metallurgical Structure  
Corrosion Resistance  
Applications 3-4

Stock Size Range 4



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# Alloy 825

**Alloy 825 (UNS N08825)** is a titanium-stabilised fully austenitic nickel-iron-chromium alloy with additions of copper and molybdenum.

This alloy is characterised by:

- good resistance to stress-corrosion cracking
- satisfactory resistance to pitting and crevice corrosion
- good resistance to oxidising and non-oxidising hot acids
- good mechanical properties at both room and elevated temperatures, up to approximately 550°C (1020°F)
- permission for pressure-vessel use at wall temperatures up to 425°C (800°F)

## Designation and Standards

Country National Standard	Material Designation	Chem. compo- sition	Specification						
			Tube and pipe seamless	Tube and pipe welded	Sheet and plate	Rod and bar	Strip	Wire	Forgings
France AFNOR	NC21FeDU								
Germany  DIN VdTÜV	W.-Nr. 2.4858  NiCr21Mo	17744  432	17751  432/2		17750  432/1	17752  432/3	17750  432/1		17754  432/3
United Kingdom BS	NA 16		3074		3072	3076	3073		
USA ASTM  ASME AMS	UNS N08825		B423  SB423	B163  B704/705  SB163	B424  SB424	B425  SB425	B424  SB424		B564  SB564
ISO	NiFe30Cr21Mo3								

## Chemical Composition (%)

Alloy 825	Ni	Cr	Fe	C	Mn	Si	Cu	Mo	Al	Ti	P	S	
min	38.0	19.5	bal.				1.5	2.5		0.6			
max	46.0	23.5	bal.	0.05	1.0	0.5	3.0	3.5	0.2	1.2	0.020	0.010	

## Mechanical Properties

The following properties are applicable to Alloy 825 in the soft-annealed (stabilising annealed) condition and indicated size ranges.

Specified properties of material outside these size ranges are subject to special enquiry.

Form	Dimensions		Tensile strength		0.2% Yield Strength		1.0% Yield Strength		Elong. A5 %	Brinell hardness HB	
	mm	in	N/mm <sup>2</sup>	ksi	N/mm <sup>2</sup>	ksi	N/mm <sup>2</sup>	ksi			
Sheet, strip cr	0.5-6.4	0.018-0.25	585	85	240	35	265	38	30	≤ 200	
Plate hr	5-100	<sup>3</sup> / <sub>16</sub> -4	585	85	240	35	265	38	30	135-165	
Rod, bar cf	1.6-64	<sup>1</sup> / <sub>16</sub> -2 <sup>1</sup> / <sub>2</sub>	585	85	240	35	265	38	30	-	
	hf	25-100	1-4	585	85	240	35	265	38	30	-
		>100-240	>4-9 <sup>1</sup> / <sub>2</sub>	550	80	220	32	250	36	35	-
Tube, pipe hf	64-240	2 <sup>1</sup> / <sub>2</sub> -9 <sup>1</sup> / <sub>2</sub>	530	75	180	25	-	-	30	-	
	cf	5-100	<sup>3</sup> / <sub>16</sub> -4	585	85	240	35	265	38	30	-
Condenser and heat exch. tube	16-76	<sup>5</sup> / <sub>8</sub> -3	585	85	240	35	265	38	30	- -	

Minimum mechanical properties at room temperature (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.

## Conditional Stress Values

The higher conditional stress values of up to 90% of the yield strength at temperature may be used for applications in which slightly greater deformation is acceptable. These stresses may result in dimensional changes due to permanent strain and are not recommended for flanges of gasketed joints.

## Metallurgical Structure

Alloy 825 has a stable face-centred cubic structure. The chemical composition and optimised annealing treatment ensure that corrosion resistance is not impaired by sensitisation.

## Corrosion Resistance

Alloy 825 is a versatile general engineering alloy with resistance to corrosion in acids and alkalis under both oxidising and reducing conditions.

High Nickel content gives the alloy virtual immunity to stress corrosion cracking.

Corrosion resistance is good in media as diverse as sulphuric, sulphurous, phosphoric, nitric and organic acids, alkalis such as sodium or potassium hydroxide, and aqueous chloride solutions.

The versatility of Alloy 825 is illustrated by its use in nuclear fuel element dissolvers where a variety of corrosive media, e.g. sulphuric and nitric acids and sodium hydroxide, are handled in the same equipment.

## Applications

Alloy 825 is used in a wide variety of applications up to a temperature of approximately 550°C (1020°F)

### Typical applications include:

- components such as heating coils, tanks, crates, baskets and chains in sulphuric acid pickling plants
- fuel element dissolvers
- sea-water-cooled heat exchangers; offshore product piping systems; tubes and components in sour gas service
- heat exchangers, evaporators, scrubbers, dip pipes etc. in phosphoric acid production

## Typical applications continued:

- air-cooled heat exchangers in petroleum refineries
- food processing and chemical plant

# Stock Size Range

## Alloy 825 - Bar, Tube, Pipe and Fittings

Bar mm dia	Tube mm o/d	Pipe nb sch10 - sch80	Seamless fittings nb
9.53 - 152.4	6.35 - 25.4	1/2" - 6"	1/2" - 6"

## Alloy 825 - Sheet and Plate

Size	2m x 1m	8' x 4'	2.5m x 1.25m	3m x 1.2m	3m x 1.5m
Thickness	-	3, 4, 5, 6mm	2"	2, 3mm	16mm

Size	10' x 5'	4m x 2m	6m x 2m	6.096m x 2.438m
Thickness	3/4", 1", 1 1/2"	4, 4.76, 6, 8, 10, 12, 19mm	3, 5, 6mm	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.