



alloy wire<sup>®</sup>  
international

# HASTELLOY

## ALLOY WIRE

A superior alloy family, resistant to an extensive range of corrosive chemicals including sulphuric, hydrochloric & hydrofluoric acids.

OVER 75 YEARS OF EXPERTISE

# 75

HASTELLOY B-3 | C-4 | C-22 | C-276 | C-2000 | X

HASTELLOY is a trade name of Haynes International

# HASTELLOY WIRE

## The alloy for high temperature resistance and exceptional corrosion resistance.

Hastelloy from Alloy Wire International is a high-performance nickel-based alloy that is known for its excellent resistance to high temperatures and corrosion. As well as nickel, Hastelloy alloys also feature various amounts of chromium, cobalt, iron, molybdenum, tungsten and other elements.

Because of its features, this alloy has found its uses in several sectors, such as petrochemical, marine, and aerospace.

**Tom Mander**  
Managing Director

# HASTELLOY<sup>™</sup> B-3

Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	ASTM B335 ASTM B619	Excellent corrosion resistance to hydrochloric acid at all concentrations and temperatures  Withstands sulphuric, acetic, formic and phosphoric acids and other non-oxidising media	Chemical processing
Ni	65.00	-			
Cr	1.00	3.00	<b>Designations</b>	Excellent resistance to pitting corrosion and stress corrosion cracking	
Mo	27.00	32.00			
Fe	1.00	3.00	W.Nr. 2.4600 UNS N10675 AWS 051		
W	-	3.00			
C	-	0.01			
Si	-	0.10			
Co	-	3.00			
Mn	-	3.00			
V	-	0.20			
P	-	0.030			
S	-	0.010			
Ti	-	0.20			
Cu	-	0.20			
Al	-	0.50			
Zr	-	0.10			
Nb/Cb	-	0.20			
Ta	-	0.20			
Ni+Mo	94.00	98.00			

<b>Density</b>	9.22 g/cm <sup>3</sup>	0.333 lb/in <sup>3</sup>
<b>Melting Point</b>	1418 °C	2585 °F
<b>Coefficient of Expansion</b>	10.6 µm/m °C (20 – 100 °C)	5.7 x 10 <sup>-6</sup> in/in °F (70 – 212 °F)
<b>Modulus of Rigidity</b>	83 kN/mm <sup>2</sup>	12038 ksi
<b>Modulus of Elasticity</b>	216 kN/mm <sup>2</sup>	31329 ksi

Heat Treatment of Finished Parts					
Condition as supplied by Alloy Wire	Type	Temperature		Time (Hr)	Cooling
		°C	°F		
Annealed or Spring Temper	Stress Relieve	400 – 450	750 – 840	2	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<1200	<174	-200 to +400	-330 to +750
Spring Temper	1600 – 2000	232 – 290	-200 to +400	-330 to +750

The above tensile strength ranges are typical. If you require different please ask.

# HASTELLOY<sup>™</sup> C-4



Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	ASTM B574 ASTM B575 ASTM B619	Excellent resistance to stress-corrosion cracking and to oxidizing atmospheres at high temperature  Exceptional resistance to a wide variety of chemical process environments including, hot contaminated mineral acids, solvents, chlorine, formic and acetic acids and salt waters	Chemical processing
Cr	14.00	18.00			
Mo	14.00	17.00	<b>Designations</b>  W.Nr. 2.4610 UNS N06455 AWS 052		
Fe	-	3.00			
C	-	0.015			
Si	-	0.08			
Co	-	2.00			
Mn	-	1.00			
P	-	0.04			
S	-	0.03			
Ti	-	0.70			
Ni	BAL				

<b>Density</b>	8.64 g/cm <sup>3</sup>	0.312 lb/in <sup>3</sup>
<b>Melting Point</b>	1399 °C	2550 °F
<b>Coefficient of Expansion</b>	10.8 µm/m °C (20 – 100 °C)	6.0 x 10 <sup>-6</sup> in/in °F (70 – 212 °F)
<b>Modulus of Rigidity</b>	81.2 kN/mm <sup>2</sup>	11777 ksi
<b>Modulus of Elasticity</b>	212.4 kN/mm <sup>2</sup>	30807 ksi

Heat Treatment of Finished Parts					
Condition as supplied by Alloy Wire	Type	Temperature		Time (Hr)	Cooling
		°C	°F		
Annealed or Spring Temper	Stress Relieve	400 – 450	750 – 840	2	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<1100	<159	-200 to +400	-330 to +750
Spring Temper	1300 – 1700	189 – 247	-200 to +400	-330 to +750

The above tensile strength ranges are typical. If you require different please ask.

Chemical Composition			Specifications	Key Features	Typical Applications	
Element	Min %	Max %	ASTM B574 ASTM B575 ASTM B619 ISO 15156-3 (NACE MR 0175)	Better overall corrosion resistance than Hastelloy C-4 and C-276 and Inconel 625  Outstanding resistance to pitting, crevice corrosion and stress corrosion cracking	Chlorination systems Nuclear fuel reprocessing Pickling systems	
Cr	20.00	22.50				
Mo	12.50	14.50				
Fe	2.00	6.00				
W	2.50	3.50				
<b>Designations</b>						
C	-	0.015				W.Nr. 2.4602 UNS N06022 AWS 053
Si	-	0.08				
Co	-	2.50				
Mn	-	0.50				
V	-	0.35				
P	-	0.02				
S	-	0.02				
Ni	BAL					

<b>Density</b>	8.69 g/cm <sup>3</sup>	0.314 lb/in <sup>3</sup>
<b>Melting Point</b>	1399 °C	2550 °F
<b>Coefficient of Expansion</b>	12.4 µm/m °C (20 – 100 °C)	6.9 x 10 <sup>-6</sup> in/in °F (70 – 212 °F)
<b>Modulus of Rigidity</b>	78.6 kN/mm <sup>2</sup>	11400 ksi
<b>Modulus of Elasticity</b>	205.5 kN/mm <sup>2</sup>	29806 ksi

Heat Treatment of Finished Parts					
Condition as supplied by Alloy Wire	Type	Temperature		Time (Hr)	Cooling
		°C	°F		
Annealed or Spring Temper	Stress Relieve	400 – 450	750 – 840	2	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<1100	<159	-200 to +400	-330 to +750
Spring Temper	1400 – 1700	203 – 247	-200 to +400	-330 to +750

The above tensile strength ranges are typical. If you require different please ask.

# HASTELLOY™ C-276

Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	ASTM B574 ASTM B575 ASTM B619 ISO 15156-3 (NACE MR 0175)  <b>Designations</b>  W.Nr. 2.4819 UNS N10276 AWS 054	Excellent corrosion resistance in a wide range of corrosive media including, sulphur compounds and chloride ions  Excellent resistance to pitting, crevice corrosion and stress corrosion cracking  Withstands the corrosive effects of wet chlorine gas, hypochlorite and chlorine dioxide  Good for sea water applications	Chlorination systems Nuclear fuel reprocessing Pickling systems Chemical processing Marine industries
Mo	15.00	17.00			
Cr	14.50	16.50			
Fe	4.00	7.00			
W	3.00	4.50			
Co	-	2.50			
C	-	0.010			
Si	-	0.08			
Mn	-	1.00			
V	-	0.35			
P	-	0.04			
S	-	0.03			
Ni	BAL				

<b>Density</b>	8.89 g/cm <sup>3</sup>	0.321 lb/in <sup>3</sup>
<b>Melting Point</b>	1370 °C	2500 °F
<b>Coefficient of Expansion</b>	11.2 µm/m °C (20 – 100°C)	6.2 x 10 <sup>-6</sup> in/in °F (70 – 212 °F)
<b>Modulus of Rigidity</b>	78.6 kN/mm <sup>2</sup>	11400 ksi
<b>Modulus of Elasticity</b>	205.5 kN/mm <sup>2</sup>	29806 ksi

Heat Treatment of Finished Parts					
Condition as supplied by Alloy Wire	Type	Temperature		Time (Hr)	Cooling
		°C	°F		
Annealed or Spring Temper	Stress Relieve	400 – 450	750 – 840	2	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<1050	<152	-200 to +400	-330 to +750
Spring Temper	1300 – 1700	189 – 247	-200 to +400	-330 to +750

The above tensile strength ranges are typical. If you require different please ask.

# HASTELLOY™ C-2000

Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	ASTM B574 ASTM B575 ASTM B619	Developed to resist corrosion in a wider range of media  Resistant to an extensive range of corrosive chemicals including sulphuric, hydrochloric & hydrofluoric acids	Chemical processing
Cr	22.00	24.00			
Mo	15.00	17.00	<b>Designations</b>	Superior pitting resistance and crevice corrosion resistance to Hastelloy C-276  Excellent corrosion resistance to reducing media  Good oxidising resistance	
Fe	-	3.00			
C	-	0.010	W.Nr. 2.4675 UNS N06200 AWS 055		
Si	-	0.080			
Co	-	2.00			
Mn	-	0.50			
P	-	0.025			
S	-	0.010			
Cu	1.30	1.90			
Al	-	0.50			
Ni	BAL				

<b>Density</b>	8.5 g/cm <sup>3</sup>	0.307 lb/in <sup>3</sup>
<b>Melting Point</b>	1399 °C	2550 °F
<b>Coefficient of Expansion</b>	12.4 µm/m °C (20 – 100 °C)	6.9 x 10 <sup>-6</sup> in/in °F (70 – 212 °F)
<b>Modulus of Rigidity</b>	79 kN/mm <sup>2</sup>	11458 ksi
<b>Modulus of Elasticity</b>	206 kN/mm <sup>2</sup>	29878 ksi

Heat Treatment of Finished Parts					
Condition as supplied by Alloy Wire	Type	Temperature		Time (Hr)	Cooling
		°C	°F		
Annealed or Spring Temper	Stress Relieve	400 – 450	750 – 840	2	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<1000	<145	-200 to +400	-330 to +750
Spring Temper	1300 – 1600	189 – 232	-200 to +400	-330 to +750

The above tensile strength ranges are typical. If you require different please ask.

Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	AMS 5754 AMS 5798 ASTM B619 GE B50A463 GE B50A655 ISO 15156-3 (NACE MR 0175)	Exceptional oxidation resistance  Highly resistant to stress corrosion cracking in petrochemical applications	Gas turbine engines Industrial furnaces Chemical processing Petrochemical processing
Cr	20.50	23.00			
Mo	8.00	10.00			
Fe	17.00	20.00			
W	0.20	1.00			
C	0.05	0.15			
Si	-	1.00			
Co	0.50	2.50			
Mn	-	1.00			
P	-	0.04			
S	-	0.03	<b>Designations</b>		
B	-	0.01			
Ni	BAL				
			W.Nr. 2.4665 UNS N06002 AWS 057		

<b>Density</b>	8.22 g/cm <sup>3</sup>	0.297 lb/in <sup>3</sup>
<b>Melting Point</b>	1355 °C	2470 °F
<b>Coefficient of Expansion</b>	13.9 µm/m °C (20 – 100 °C)	7.7 x 10 <sup>-6</sup> in/in °F (70 – 212 °F)
<b>Modulus of Rigidity</b>	77.6 kN/mm <sup>2</sup>	11255 ksi
<b>Modulus of Elasticity</b>	205 kN/mm <sup>2</sup>	29733 ksi

Heat Treatment of Finished Parts					
Condition as supplied by Alloy Wire	Type	Temperature		Time (Hr)	Cooling
		°C	°F		
Annealed or Spring Temper	Stress Relieve	400 – 450	750 – 840	2	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<1050	<152	-200 to +400	-330 to +750
Spring Temper	1350 – 1550	196 – 225	-200 to +400	-330 to +750

The above tensile strength ranges are typical. If you require different please ask.



# HASTELLOY WIRE



## The Spring industry

### Wire for critically demanding places

Spring manufacturers produce compression springs, tension springs, torsion springs and formed parts from our wire to perform in critically demanding places like aircraft engines, nuclear installations, valves and deep down oil wells – where other wire fails to perform.

We understand exactly what the spring maker needs for precision coiling and supply exactly how they want it, guaranteeing consistency in temper and a dead cast, whether that is wire in coils with a soap coating, or clean on spools. There is even the option of straight bars.



BAE SYSTEMS



DFARS COMPLIANT

ISI Member of IST



J SMA Japan Spring Manufacturers Association  
一般社団法人 日本ばね工業会



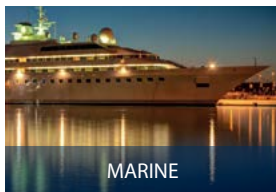
Key sectors are the primary industries that use Alloy Wire for their safety critical components to withstand high temperatures and corrosive environments.



MEDICAL



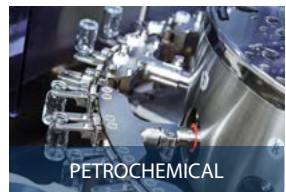
AEROSPACE



MARINE



OIL AND GAS



PETROCHEMICAL

## A global presence



### Worldwide offices

AUSTRALIA  
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BELGIUM  
BRAZIL  
BULGARIA  
CANADA  
CHINA  
CROATIA  
CZECH REPUBLIC  
FRANCE  
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SPAIN  
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TAIWAN  
THAILAND  
TURKEY  
UAE  
UKRAINE  
UNITED KINGDOM  
USA  
VIETNAM

## 6 Key Advantages we deliver to you

Our knowledge and experience, combined with continual investment in R&D and technology, keeps us at the forefront of the wire industry and you receive an expert solution for your individual order specification.

We can manufacture wire to customer precise specification often with properties unique to client. Servicing a wide range of sectors and a vast variety of applications, Alloy Wire is an integral supporter of numerous high tech applications for sectors such as aerospace, nuclear, motor sport, chemical processing, electronics and oil & gas.



Size: 0.025 mm (.001")  
to 21 mm (.827")



Order quantity:  
3 metres to 3 tonnes



Delivery:  
within 3 weeks



Wire, bars & rope  
in over 60 alloys



Manufactured to  
your specification



Emergency  
Manufacturing Service

# Manufacturers of wire, bars and wire rope in High Performance Exotic Alloys since 1946



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international

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AS 9100



Aerospace & Defence

ISO 13485



Medical

ISO 14001



Environmental

ISO 45001



Health & Safety