



alloy wire<sup>®</sup>  
international

# INCONEL<sup>®</sup> ALLOY FAMILY

For spring manufacturing, critical components and high tensile strength and temperature resistance.

OVER 75 YEARS OF EXPERTISE  
**75**

INCONEL<sup>®</sup> 600 | 601 | 617 | 625 | 686 | 718 | X750

## The perfect choice for high temperature strength and corrosion resistance.

INCONEL® is a family of nickel-based alloys known for their excellent resistance to corrosion, high temperatures, and mechanical stress. INCONEL® alloy wire has several advantages over other materials making it ideal for harsh environments.

- High resistance to fatigue and corrosion.
- Retains strength and toughness under high temperatures.
- Easy weldability, ideal for manufacturing.
- Resistance to oxidisation.

**Andrew Du Plessis**  
Technical Director

Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	AMS 5665 AMS 5687 ASTM B166 BS 3075 NA 14 BS 3076 NA 14 DTD 328A QQ-W-390  <b>Designations</b>  W.Nr. 2.4816 UNS N06600 AWS 010	Good Oxidation Resistance  Good Corrosion Resistance at high temperatures  **High temperature static applications	Furnace Components Chemical Processing Food Processing Nuclear Engineering
Ni	72.00	-			
Cr	14.00	17.00			
Fe	6.00	10.00			
Mn	-	1.00			
C	-	0.10			
Cu	-	0.50			
Si	-	0.50			
S	-	0.015			
P	-	0.04			
Co	-	1.00			
Nb/Cb	-	1.00			
Ti	-	0.50			
Ta	-	0.05			
Al	-	0.35			

<b>Density</b>	8.47 g/cm <sup>3</sup>	0.306 lb/in <sup>3</sup>
<b>Melting Point</b>	1413°C	2575 °F
<b>Coefficient of Expansion</b>	13.3 µm/m °C (20 – 100 °C)	7.4 x 10 <sup>-6</sup> in/in °F (70 – 212 °F)
<b>Modulus of Rigidity</b>	75.6 kN/mm <sup>2</sup>	10965 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	460	860	1	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature depending on load** and environment	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<800	<116	-200 to +1000	-330 to +1830
Spring Temper	900 – 1450	131 – 210	-200 to +1000	-330 to +1830

Slight magnetism may occur below 120 °C (184 °F)

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

Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	ASTM B166	Outstanding resistance to oxidation & other forms of high temperature corrosion Higher mechanical properties at elevated temperatures than Inconel 600 ***High temperature static applications	Petrochemical - Processing Industrial Furnaces Gas Turbine - Components Heat Treating - Equipment
Ni	58.00	63.00	<b>Designations</b> W.Nr. 2.4851 UNS N06601 AWS 011		
Cr	21.00	25.00			
S	-	0.015			
Mn	-	1.00			
Al	1.00	1.70			
C	-	0.10			
Cu	-	1.00			
Si	-	0.50			
Fe	BAL				

<b>Density</b>	8.11 g/cm <sup>3</sup>	0.293 lb/in <sup>3</sup>
<b>Melting Point</b>	1411 °C	2571 °F
<b>Coefficient of Expansion</b>	13.75 µm/m °C (20 – 100°C)	7.6 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>	206.5 kN/mm <sup>2</sup>	29951 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	480 – 870	900 – 1600	1	Air
Temperature depends on composition and amount of cold work					

Properties				
Condition	Approx. tensile strength		Approx. operating temperature depending on load** and environment	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<900	<131	-200 to +1000	-330 to +1830
Spring Temper	1200 – 1450	174 – 210	-200 to +1000	-330 to +1830

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

# INCONEL® 617

Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	ASTM B166 ASTM B168 AMS 5887 AMS 5889 ISO 9724 ISO 6208 DIN EN 17753  <b>Designations</b>  UNS N06617 W.Nr. 2.4663 NiCr22Co12Mo9	Similar high temperature resistance to INCONEL® 600/601 with improved strength, while offering comparable corrosion resistance to INCONEL® 625  Exceptional combination of elevated temperature strength and corrosion resistance in oxidising and reducing environments  **High temperature static applications	Aerospace Components Land Based Gas Turbines Power Generation Acid Processing Petro-Chemical Processing Springs
Ni	44.5	-			
Cr	20	24.00			
Co	10	15			
Mo	8	10			
Al	0.8	1.50			
C	0.05	0.15			
Fe	-	3			
Mn	-	1			
Si	-	1.00			
S	-	0.015			
Ti	-	0.6			
Cu	-	0.5			
B	-	0.006			

<b>Density</b>	8.36 g/cm <sup>3</sup>	0.302 lb/in <sup>3</sup>
<b>Melting Point</b>	1330 - 1380 °C	2430 - 2510 °F
<b>Coefficient of Expansion</b>	11.6 gm/m °C (20 - 100 °C)	7.0 x 10 <sup>-6</sup> in/in °F (70 - 212 °F)
<b>Modulus of Rigidity</b>	81 kN/mm <sup>2</sup>	11.8 ksi
<b>Modulus of Elasticity</b>	212.0 kN/mm <sup>2</sup>	30700 ksi

Properties				
Condition	Approx. tensile strength		Approx. operating temperature depending on load** and environment	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<1000	<145	Up to 1100	Up to 2012
Spring Temper	1300 – 1600	190 – 230	Contact Alloy Wire Technical Department	

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

Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	AMS 5666 ASTM B446 BS 3076 NA 21 ISO 15156-3 (NACE MR 0175)  <b>Designations</b>  W.Nr. 2.4856 UNS N06625 AWS 012	Excellent corrosion resistance in a wide range of corrosive media  Especially resistant to pitting and crevice corrosion  Good for sea water applications	Marine Industries Aerospace Industries Chemical Processing Nuclear Reactors Pollution Control
C	-	0.10			
Mn	-	0.50			
Si	-	0.50			
P	-	0.015			
S	-	0.015			
Cr	20.00	23.00			
Co	-	1.00			
Mo	8.00	10.00			
Fe	-	5.00			
Al	-	0.40			
Ti	-	0.40			
Ni	58.00	-			
Nb/Cb	3.15	4.15			
Ta	-	0.05			
Cu	-	0.50			

<b>Density</b>	8.44 g/cm <sup>3</sup>	0.305 lb/in <sup>3</sup>
<b>Melting Point</b>	1350 °C	2460 °F
<b>Coefficient of Expansion</b>	12.8 µm/m °C (20 – 100 °C)	7.1 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>	205.8 kN/mm <sup>2</sup>	29849 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	260 – 370	500 – 700	0.5 – 1	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	< 1050	< 152	-200 to + 340	-330 to + 645
Spring Temper	1300 – 1600	189 – 232	up to + 200	up to + 395

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

# INCONEL® 718



Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	AMS 5662 AMS 5663 AMS 5832 AMS 5962 ASTM B637 GE B5OTF14/15 GE B14H89 ISO 15156-3 (NACE MR 0175) API 6A718  <b>Designations</b>  W.Nr. 2.4668 UNS N07718 AWS 013	Good creep rupture strength at high temperatures  Higher strength than Inconel X-750  Better mechanical properties at lower temperatures than Nimonic 90 and Inconel X-750  Age hardenable  ^^High temperature dynamic applications	Gas Turbines  Rocket Motors  Space Craft  Nuclear Reactors  Pumps  Oil & Gas Equipment
C	-	0.08			
Mn	-	0.35			
Si	-	0.35			
P	-	0.015			
S	-	0.015			
Cr	17.00	21.00			
Ni	50.00	55.00			
Mo	2.80	3.30			
Nb/Cb	4.75	5.50			
Ti	0.65	1.15			
Al	0.20	0.80			
Co	-	1.00			
Ta	-	0.05			
B	-	0.006			
Cu	-	0.30			
Pb	-	0.0005			
Bi	-	0.00003			
Se	-	0.0003			
Fe	BAL				

<b>Density</b>	8.19 g/cm <sup>3</sup>	0.296 lb/in <sup>3</sup>
<b>Melting Point</b>	1336 °C	2437 °F
<b>Coefficient of Expansion</b>	13.0 µm/m °C (20 – 100 °C)	7.2 x 10 <sup>-6</sup> in/in °F (70 – 212 °F)
<b>Modulus of Rigidity</b>	77.2 kN/mm <sup>2</sup>	11197 ksi
<b>Modulus of Elasticity</b>	204.9 kN/mm <sup>2</sup>	29719 ksi

Heat Treatment of Finished Parts					
Condition as supplied by Alloy Wire	Type	Temperature		Time (Hr)	Cooling
		°C	°F		
No. 1 Temper or Spring Temper	Anneal	980	1800	1	Air
	Age Harden	720	1330	8	Furnace
	Total Age	620	1150	18	Air
No. 1 Temper or Spring Temper <i>(for ISO 15156-3 / NACE MR 0175)</i>	Anneal	1010	1850	2	Air
	Age Harden	790	1455	6	Air
No. 1 Temper or Spring Temper	Age Harden	720	1330	8	Furnace
	Total Age	620	1150	18	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature depending on load^^ and environment	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<1000	<145	-	-
No. 1 Temper	1000 – 1200	145 – 175	-	-
Spring Temper	1250 – 1550	180 – 225	-	-
No. 1 Temper + Annealed + Aged	1250 – 1450	181 – 210	-200 to +550	-330 to +1020
No. 1 Temper + Aged	1520 – 1720	220 – 250	Contact Alloy Wire Technical Dept.	
Spring Temper + Annealed + Aged	1250 – 1450	181 – 210	-200 to +550	-330 to +1020
Spring Temper + Aged	1700 – 1950	247 – 283	Contact Alloy Wire Technical Dept.	

The above tensile strength ranges are typical. If you require different please ask. ^^Dynamic applications = active/lively/changing

# INCONEL® X-750



Chemical Composition			Specifications	Key Features	Typical Applications
Element	Min %	Max %	AMS 5667 AMS 5671 AMS 5698 (No 1 Spring Temper) AMS 5699 (Spring Temper) ASTM B637 BS HR 505 GE B14H41 ISO 15156-3 (NACE MR 0175)	Good creep rupture strength at high temperatures Not as strong as Nimonic 90 Very good at cryogenic temperatures Age hardenable ^^High temperature dynamic applications	Nuclear reactors Gas turbines Rocket engines Pressure vessels Aircraft structures
C	-	0.08			
Mn	-	1.00			
Si	-	0.50			
S	-	0.01			
Cr	14.00	17.00			
Ni	70.00	-			
Nb/Cb	0.70	1.20			
Ti	2.25	2.75			
Al	0.40	1.00			
Fe	5.00	9.00			
Co	-	1.00			
Ta	-	0.05			
Cu	-	0.50			
			Designations		
			W.Nr. 2.4669		
			UNS N07750		
			AWS 014		

<b>Density</b>	8.28 g/cm <sup>3</sup>	0.299 lb/in <sup>3</sup>
<b>Melting Point</b>	1430 °C	2600 °F
<b>Coefficient of Expansion</b>	12.6 µm/m °C (20 – 100 °C)	7.0 x 10 <sup>-6</sup> in/in °F (70 – 212 °F)
<b>Modulus of Rigidity</b>	75.8 kN/mm <sup>2</sup>	10994 ksi
<b>Modulus of Elasticity (Spring Temper + Aged)</b>	218.0 kN/mm <sup>2</sup>	31619 ksi
<b>(Spring Temper + 3 Part Heat Treated)</b>	212.4 kN/mm <sup>2</sup>	30806 ksi
<b>(No.1 Spring Temper + Aged)</b>	213.7 kN/mm <sup>2</sup>	30995 ksi

Heat Treatment of Finished Parts					
Condition as supplied by Alloy Wire	Type	Temperature		Time (Hr)	Cooling
		°C	°F		
Spring Temper	Age Harden	650	1200	4	Air
Spring Temper (3 Part)	Anneal	1150	2100	2 ★★	Air
	Stabalize	843	1550	24	Air
	Age Harden	704	1300	20	Air
No. 1 Temper	Age Harden	730	1350	16	Air

Properties				
Condition	Approx. tensile strength		Approx. operating temperature depending on load^^ and environment	
	N/mm <sup>2</sup>	ksi	°C	°F
Annealed	<1000	<145	-	-
No. 1 Temper	900 – 1150	130 – 167	-	-
Spring Temper	1100 – 1500	160 – 218	-	-
No. 1 Temper + Aged	1150 – 1450	167 – 210	-200 to +550	-330 to +1020
Spring Temper + Aged	1350 – 1750	196 – 254	-200 to +370	-330 to +700
Spring Temper + 3 part heat treated	>1030	>149	-200 to +550	-330 to +1020

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

★★ for diameters below 1.00mm contact AWI Technical department ^^Dynamic applications = active/lively/changing



# INCONEL® WIRE



## The Spring industry

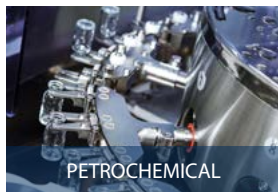
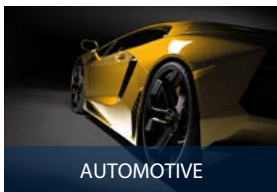
### Wire for critically demanding places

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.



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



## A global presence



### Worldwide offices

AUSTRALIA	HOLLAND	OMAN	SPAIN
AUSTRIA	HUNGARY	PHILIPPINES	SWITZERLAND
BANGLADESH	INDIA	POLAND	TAIWAN
BELGIUM	INDONESIA	PORTUGAL	THAILAND
BRAZIL	ISRAEL	QATAR	TURKEY
BULGARIA	ITALY	ROMANIA	UAE
CANADA	JAPAN	SAUDI ARABIA	UKRAINE
CHINA	LUXEMBOURG	SERBIA	UNITED KINGDOM
CROATIA	MALAYSIA	SINGAPORE	USA
CZECH REPUBLIC	MEXICO	SLOVAKIA	VIETNAM
FRANCE	MOLDOVA	SLOVENIA	
GERMANY	NEW ZEALAND	SOUTH KOREA	

## 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:  
from 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



alloy wire<sup>®</sup>  
international

t +44 (0)1384 262 022 e sales@alloywire.com w alloywire.com 

Narrowboat Way, Hurst Business Park, Brierley Hill, West Midlands, DY5 1UF, UK

AS 9100



Aerospace & Defence

ISO 13485



Medical

ISO 14001



Environmental

ISO 45001



Health & Safety