

« Helping manufacturers across the globe achieve sustainable leaner manufacturing processes »»

Nickel Alloys

CUT TO LENGTH
WIRE & COIL



Fast
Turnaround
Processing

Low Width
Thickness Ratio
3:1 unique to the
industry (normal
minimum is 8:1)

Over
75 years
Experience

WIDE
STOCK
RANGE

Commercially Pure
Nickel-Copper Alloys
Nickel-Chromium
Nickel-Chromium-Iron Alloys
Iron-Nickel-Chromium Alloys
Controlled Expansion Alloys



FM 02114



Nickel Alloys

Nickel is a very versatile metal, with ability to withstand a wide variety of severe operating conditions, including: corrosive environments, high temperatures, high stresses, and combinations of these factors. This has resulted in the extensive commercial use of both Nickel strip and Nickel-base alloy strip and although very useful in its commercially pure forms, it is its ability to alloy with a range of metals, which has brought it to the forefront of modern metallurgy. A range of highly alloyed materials has developed to provide high strength and excellent corrosion resistance, particularly at elevated temperatures, to meet specific requirements in many different types of environment.

Commercially Pure Nickels

These materials are characterised by high density, offering low electrical resistivity, high thermal conductivity and high magnetic properties. In addition, commercially pure Nickel strip offers excellent corrosion resistance in many chemical media, especially some strong alkalis. Commercially pure Nickel strip cannot be hardened by heat treatment. However, metal strip can be produced by cold rolling to a range of strengths.

Nickel-Copper Alloys

Nickel-Copper alloys have been found to possess excellent corrosion resistance in reducing chemical environments and also in seawater, i.e. marine environments, where they are commonly used. They have good ductility and can be readily fabricated.

Nickel-Chromium & Nickel-Chromium-Iron Alloys

This group of alloys led the way to higher strength and resistance to elevated temperatures. Initially developed for use in the chemical processing industry where carburising environments and elevated temperatures were too severe for Stainless Steels.

Iron-Nickel-Chromium Alloys (800 Series)

Offering good oxidation resistance, these alloys have found extensive use in the petrochemical processing industry. The 800 series offer excellent strength at high temperature.

Controlled Expansion Alloys

A range of alloys developed for use in conjunction with the lighting industry where glass to metal seals are very important, they exhibit good thermal conductivity.



Range



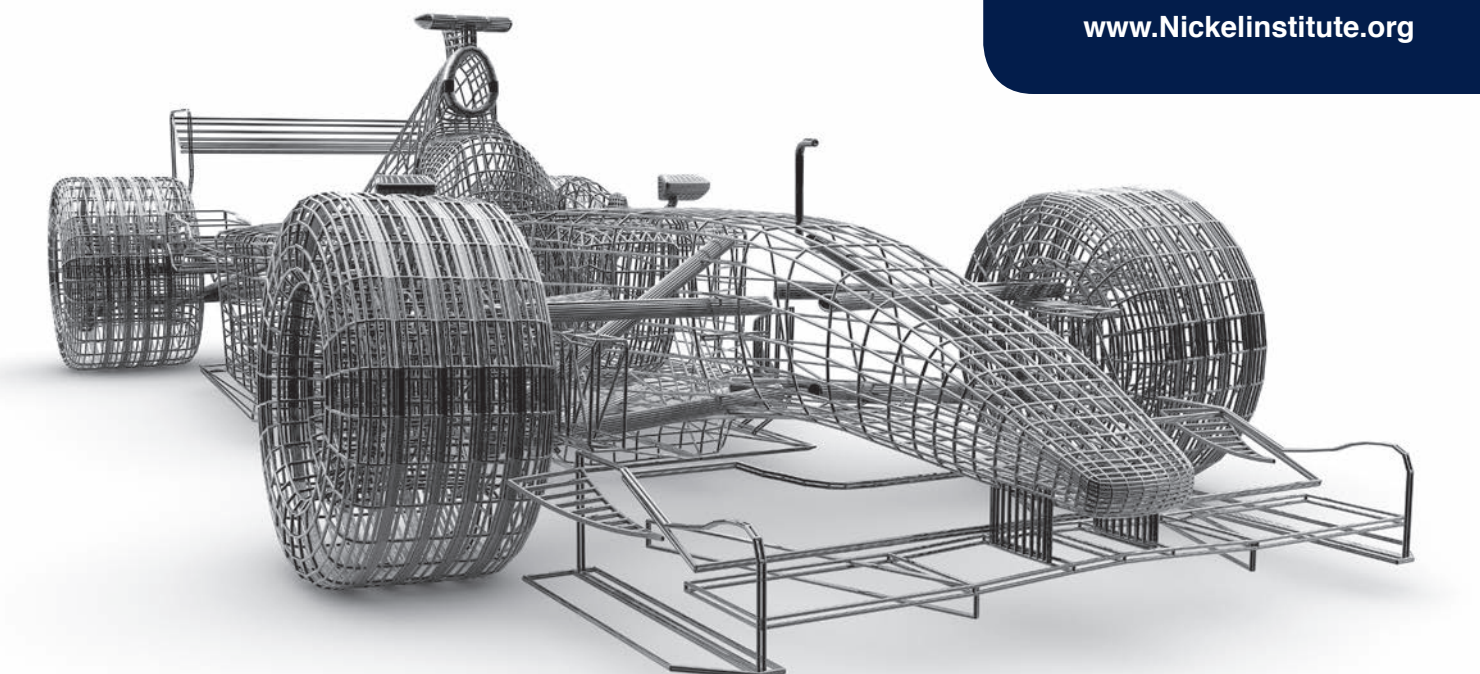
NICKEL ALLOYS STOCK RANGE			
COIL STOCK RANGE		WIRE STOCK RANGE	
Thickness (mm)	Width (mm)	Round	Shaped
COMMERCIALLY PURE NICKELS			
0.025 - 2.5	2 - 1000	0.1 – 10.00 mm dia	Upto 45 mm ² area
NICKEL-COPPER ALLOYS			
0.025 - 2.5	2 - 1000	0.1 – 10.00 mm dia	Upto 45 mm ² area
NICKEL-CHROMIUM & NICKEL-CHROMIUM-IRON ALLOYS			
0.025 - 2.5	2 - 1000	0.1 – 10.00 mm dia	Upto 45 mm ² area
IRON-NICKEL-CHROMIUM ALLOYS (800 SERIES)			
0.025 - 2.5	2 - 1000	0.1 – 10.00 mm dia	Upto 45 mm ² area
CONTROLLED EXPANSION ALLOYS			
0.025 - 2.5	3 - 610	0.1 – 10.00 mm dia	Upto 45 mm ² area

Other specifications supplied upon request, please contact us with your requirements



“Nickel is widely used in over 300,000 products for consumer, industrial, military, transport, aerospace, marine and architectural applications”

www.Nickelinstitute.org





Nickel Alloys

Features

NICKEL ALLOYS FEATURES

COMMON NAME	TRADE MARKED METALS	EUROPEAN NAME	ASTM NAME		AMS	Key Features	Key Markets	Applications
			AISI	UNS				
COMMERCIALLY PURE NICKELS								
alloy 200	-	NA 11	B 162	N02200		Commercially pure Nickel with excellent mechanical properties and excellent corrosion resistance, particularly to caustic alkalis and de-aerated acid. High thermal and electrical conductivity. Can be shaped through all hot and cold working practices.	Aerospace, Defence, Food and Beverage, Automotive, Chemical	Bursting Discs, Explosion Panels, Battery Contacts, Food Processing Equipment, Chemical Containers, Aerospace and Defence Components
alloy 201	-	NA12	B 162	N02201	5553	Low carbon version of commercially pure alloy 200. Generally specified for temperature above 315°C. It does not suffer embrittlement due to the low carbon content. It is particularly suited for spinning and cold forming.	Automotive, Chemical, Aerospace, Electronics	Electronic Components, Aerospace Components, Bursting Discs
NICKEL-COPPER ALLOY								
alloy 400	MONEL® alloy 400*	NA13	B 127	N04400	4544	A solid-solution alloy only hardenable through cold-working. High strength and toughness over a large temperature range. Excellent corrosion resistance, particularly in sea water.	Aerospace, Oil & Gas, Marine, Chemical	Bellows, Heat Exchangers, Propellers, Shafts, Fasteners, Pumps, Valves
NICKEL-CHROMIUM & NICKEL-CHROMIUM-IRON ALLOYS								
alloy K-500	MONEL® alloy K500*	NA18	-	N05500	4676	Precipitation hardened non-magnetic alloy. Greater strength and hardness than Monel 400, whilst maintaining excellent corrosion resistance. High fatigue strength in seawater.	Oil & Gas, Chemical, Power Generation, Marine, Medical, Electronics	Propellers, Fasteners, Gyroscopes, Medical blades, Pump Shafts, Drill Collars
alloy X	-	-	B 435	N06002	5536	Additional amounts of chromium and iron provide strength and resistance to corrosion and oxidation up to 1170°C	Aerospace, Automotive, Chemical,	Aerospace components, Honeycomb Seals, Combustion Liners, Turbine Engine Components
C22	HASTELLOY® C22®**	-	B 575	N06022	-	A versatile Nickel Alloy with superior corrosion resistance and weldability	Chemical, Nuclear, Environment & Energy Engineering, Oil & Gas, Waste Management	Expansion Bellows, Industrial equipment, Chemical Processing.
-	NIMONIC® alloy 75*	-	-	N06075	-	Medium strength at high operating temperatures. Good Weldability. Due to good ductility and malleability in the annealed condition it can be used in cold deformation, large reductions can be made without rupture.	Aerospace, Thermal Engineering	Turbine blades, Furnace Components, Heat treatment equipment
alloy C2000	HASTELLOY® alloy C 2000**	-	B 575	N06200	-	The addition of Copper enables resistance to an extensive range of corrosive chemicals, including many acids. Easy to form and weld. Excellent resistance to stress corrosion cracking.	Chemical	Heat Exchangers, Reactors
alloy 600	INCONEL® alloy 600*	NA14	B 168	N06600	5540	Resists oxidation up to 1200°C, good corrosion resistance. High Nickel content makes it highly resistant to chloride-ion stress corrosion cracking. It is not Precipitation Hardenable. Can be hardened and strengthened through cold work. Can operate from cryogenic temperatures to above 1095°C. Readily weldable by conventional processes.	Chemical, Nuclear, Aerospace, Heat Treating, Automotive, Oil & Gas, Environment & Energy Engineering	Flexible Tubing, Furnace equipment, Insulation blankets, Chemical and Food Processing, Seals

NICKEL-CHROMIUM & NICKEL-CHROMIUM-IRON ALLOYS CONTINUED

alloy 601	INCONEL® alloy 601*	-	B 168	N06601	5870	Lower Nickel content than alloy 600, with Aluminium and silicon additions for exceptional resistance to oxidation at high temperatures. Good mechanical strength, easily formed, machined and welded. It has high tensile strength at room temperature, and retains much of it at elevated temperatures. Alloy 601 is not embrittled by long exposures to elevated temperatures, retaining good impact strength. Good creep-rupture strength.	Chemical, Thermal Engineering, Aerospace, Power Generation, Petrochemical, Automotive	Petrochemical Processing Equipment, Furnace Equipment, Gas Turbine Components, Gaskets, Condenser Tubes, Insulating Cans
alloy 625	INCONEL® alloy 625*	NA21	B 443	N06625	5599	High temperature, high strength alloy, tougher than alloy 600 due to increased Molybdenum and Niobium content. Good Creep and Rupture strength. Higher oxidation resistance and excellent resistance to aqueous corrosion, chloride pitting and crevice corrosion cracking. It is resistant to caustics and seawater as well as being immune to chloride ion stress corrosion cracking. Excellent weldability.	Automotive, Chemical, Marine, Aerospace, Power Generation, Nuclear	Honeycomb, Seals, Bellows, Diaphragms, Springs, Heat Exchangers, Aircraft Exhausts, Marine Components, Compressor Vanes
-	HAYNES® 214®**	-	-	N07214	-	Excellent corrosion and oxidation resistance at high temperatures. Ideally suited to high temperature, low stress oxidizing environments.	Aerospace, Automotive, Industrial Heating	Honeycomb, Seals, Catalytic Converters, Flame Hoods, Rotary Calciners
alloy C 276	HASTELLOY® C 276®**	-	-	N10276	-	Outstanding universal corrosion resistance. High Chromium and Molybdenum contents protect against oxidising and non-oxidising acids.	Chemical, Marine, Aerospace, Oil & Gas, Environment & Energy Engineering, Pharmaceutical	Diaphragms, Marine Engineering, Chemical Processing, Pulp and Paper Production, Ducts, Heat Exchangers
alloy 718	INCONEL® alloy 718*	-	B 670	N07718	5596	Precipitation hardened, age hardenable, high strength alloy. Good corrosion resistance and highly resistant to chloride and sulfur stress corrosion cracking. Titanium and niobium additions overcome strain age cracking problems in welding to provide good weldability.	Oil & Gas, Nuclear, Aerospace, Defense, Automotive	High Temperature Springs, Bellows, Seals, Valves, Fasteners, Mandrels, Gaskets, Clamps
alloy X750	INCONEL® alloy X750*	-	B 637	N07750	5598	Precipitation hardenable, excellent strength and corrosion resistance up to 704°C and useful strength up to 982°C and excellent relaxation resistance. Ideal for springs operating at high temperatures.	Oil & Gas, Nuclear, Aerospace, Power Generation, Automotive	High Temperature Springs, Diaphragms, Gas Turbines, Jet Engines

IRON-NICKEL-CHROMIUM ALLOYS

-	INCOLOY® alloy 800*	NA15	B 409	N08800	5871	Excellent corrosion resistance, heat resistance, strength and stability at high temperatures. Resists stress corrosion cracking and oxidation at high temperatures. Used in applications in which resistance to Stress Corrosion Cracking is required. 800H and 800HT alloys are available with a greater resistance to stress rupture and creep.	Chemical, Thermal Engineering, Food and Beverage, Nuclear, Petrochemical	Electrical heating elements, Heat Exchangers, Furnace Equipment, Petrochemical Process Tubing, domestic appliances
-	INCOLOY® alloy 825*	NA16	-	N08825	-	Additional molybdenum for increased corrosion resistance over alloy 800. Resistant to oxidation and reducing acids, particularly sulphuric, stress corrosion cracking and pitting.	Chemical, Petrochemical, Oil & Gas, Nuclear, Pollution Control	Tubing, Pipework in Petrochemical, Industry, Seals, Gaskets, Heat Exchangers

GLASS SEALING ALLOY (CONTROLLED EXPANSION)

29/18		-	-	K94610	-	Controlled expansion alloy whose co-efficient of expansion decreases with rising temperature and matches the expansion rate of glass	Aerospace, Automotive, Electronics	Microwave Tubes, Transistors, Diodes, Hermetic Seals
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Other specifications supplied upon request, please contact us with your requirements

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Nickel Alloys

Chemical Properties

NICKEL ALLOYS CHEMICAL COMPOSITION

COMMON NAME	EURO NAME	ASTM NAME		AMS	TYPICAL CHEMICAL COMPOSITION %													
		AISI	UNS		Al	C	Co	Cr	Cu	Fe	Mn	Mo	Ni	P	Si	S	Ti	Others
COMMERCIALLY PURE NICKELS																		
alloy 200	NA 11	B 162	N02200		-	0.15	-	-	0.25	0.4	0.35	-	99.0 min	-	0.35	0.01	-	Mg 0.2 max
alloy 201	NA12	B 162	N02201	5553	-	0.02	-	-	0.25	0.4	0.35	-	99.0 min	-	0.35	0.01	-	-
NICKEL-COPPER ALLOY																		
alloy 400	NA13	B 127	N04400	4544	-	0.3	-	-	28.0 - 34.0	2.5	2.0	-	63.0 min	-	0.50	0.024	-	Pb 0.005 max
NICKEL-CHROMIUM & NICKEL-CHROMIUM-IRON ALLOYS																		
alloy K500	NA18		N05500	4676	2.30 - 3.15	0.18	-	-	27.0 - 33.0	2.0	1.50	-	63.0 min	-	0.50	0.01	0.35 - 0.85	-
alloy X		B 435	N06002	5536	-	0.05 - 0.15	0.5 - 2.5	20.5 - 23.0	0.5	17.0 - 20.0	1.00	8.0 - 10.0	Balance	0.04	1.00	0.03	0.15	W 0.2 - 1.0
C22		B 575	N06022		-	0.015	2.5	20.0 - 22.5	-	2.0 - 6.0	0.50	12.5 - 14.5	Balance	0.02	0.08	0.02	-	W 2.5-3.5 V 0.35 max
alloy C2000		B 575	N06200		0.50	0.01	2.0	22.0 - 24.0	1.30 - 1.90	3.0	0.50	15.0 - 17.0	Balance	0.025	0.08	0.01	-	
alloy 600	NA14	B 168	N06600	5540	-	0.15	-	14.0 - 17.0	0.50	6.0 - 10.0	1.00	-	72.0 min	-	0.50	0.015	-	-
alloy 601	-	B 168	N06601	5870	1.0 - 1.70	0.10	-	21.0 - 25.0	1.00 max	Balance	1.00	-	58.0 - 63.0		0.50	0.015	-	-
alloy 625	NA21	B 443	N06625	5599	0.40	0.10	1.00 max	20.0 - 23.0	-	5.0	0.50	8.0 - 10.0	58.0 min	0.015	0.50	0.015	0.40	Nb + Ta 3.15 - 4.15
alloy C 276			N10276		-	0.01	2.5	14.5 - 16.5	-	4.0 - 7.0	1.00	15.0 - 17.0	Balance	0.04	0.08	0.03	-	V 0.35 max W 3.0 - 4.5
alloy 718		B 670	N07718	5596	0.20 - 0.80	0.08	1.0	17.0 - 21.0	0.30 max	Balance	0.35	2.80 - 3.30	50.0 - 55.0	0.015	0.35	0.015	0.65 - 1.15	Nb + Ta 4.75 - 5.50; B 0.006
alloy X750	-	B 637	N07750	5598	0.40 - 1.00	0.08	1.00 max	14.0 - 17.0	0.50	5.0 - 9.0	1.00 max	-	70.0 min	-	0.50 max	0.01	2.25 - 2.75	Nb + Ta 0.70 - 1.20
IRON-NICKEL-CHROMIUM ALLOYS																		
alloy 800	NA15	B 409	N08800	5871	0.15 - 0.60	0.10	-	19.0 - 23.0	0.75	Balance	1.50	-	30.0 - 35.0	0.035	1.00	0.015	0.1 - 0.60	Al + Ti 0.30-1.20
alloy 825	NA16		N08825		0.20	0.05	-	19.5 - 23.5	1.50 - 3.00	Balance	1.00	2.5 - 3.5	38.0 - 46.0	-	0.50	0.03	0.60 - 1.20	-
GLASS SEALING ALLOY (CONTROLLED EXPANSION)																		
29/18			K94610		0.1	0.02	17.0	0.2	0.2	Balance	0.5	0.2	29.0	-	0.2	-	0.10	Zr 0.10 max

Other specifications supplied upon request, please contact us with your requirements

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Nickel Alloys

Mechanical Properties

NICKEL ALLOYS FEATURES TYPICAL MECHANICAL PROPERTIES

COMMON NAME	EURO NAME	ASTM NAME		AMS	Proof Strength 0.2% Min (N/mm ²)	Tensile Strength	Elong. % Min. (50mm Gauge Length)	Hardness Max (VPN)
		AISI	UNS					
COMMERCIALLY PURE NICKELS								
alloy 200	NA 11	B 162	N02200	-	105	380	40	125
alloy 201	NA12	B 162	N02201	5553	85	350	30	125
NICKEL-COPPER ALLOY								
alloy 400	NA13	B 127	N04400	4544	195	480	35	125
NICKEL-CHROMIUM & NICKEL-CHROMIUM-IRON ALLOYS								
alloy K500	NA18	-	N05500	Mechanical Properties available on request				
alloy X	-	B 435	N06002	5536	310	723	35	230
alloy C22	-	B 575	N06022	Mechanical Properties available on request				
NIMONIC® alloy 75*	-	-	N06075	Mechanical Properties available on request				
alloy C2000	-	B 575	N06200	Mechanical Properties available on request				
alloy 600	NA14	B 168	N06600	5540	241	552	30	230
alloy 601	-	B 168	N06601	5870	230	790	40	230
alloy 625	NA21	B 443	N06625	5599	414	827	30	250
HAYNES® 214®**	-	-	N07214	Mechanical Properties available on request				
C 276	-	-	N10276	5750	280	690	40	230
alloy 718	-	B 670	N07718	5596	552	965	30	270
alloy X750	-	B 637	N07750	5598	280	700	40	250
IRON-NICKEL-CHROMIUM ALLOYS								
alloy 800	NA15	B 409	N08800	5871	210	520	30	200
alloy 825	NA16	-	N08825	-	240	550	30	200
GLASS SEALING ALLOY (CONTROLLED EXPANSION)								
29/18	-	-	K94610	-	300	500	25	200

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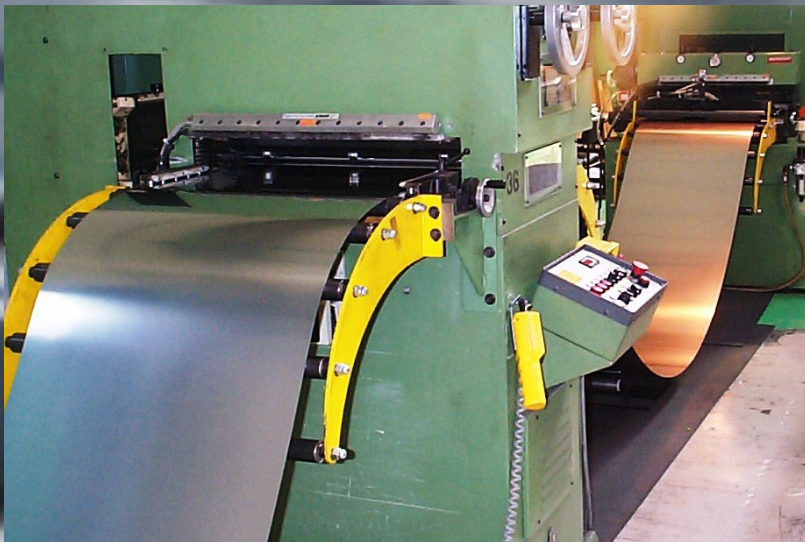


Processing

Your Material Your Way

The Knight Group are industry leaders in the supply and processing of strip, coil and wire, consistently exceeding expectations of quality, service and performance. With a number of accreditations, including BS EN ISO 9001 and BS EN AS 9120, we are the supplier of choice for global manufacturers where quality, reliability and lean manufacturing are at the heart of their priorities. Most manufacturers are facing increasing demands for goods to be delivered with tighter time frames and even tighter margins. By selecting the processing to meet your specific needs, your material can be prepared and delivered to the exact size, length and finish you need, saving valuable production time and costs. Our processing is offered at a comprehensive price and with a flexibility to select only the services you need and want, giving you maximum versatility and minimum cost.

We have invested heavily in our bespoke machinery and training our established team of operators, so that we can offer a truly comprehensive range of processing to complement our extensive range of stocked material.



**8 Cut To Length Lines
5 Edge Finishing Lines
27 Recoiling Lines
26 Slitting Lines
4 Traverse Winding Lines**

**Low Width Thickness Ratio 3:1
unique to the industry (normal
minimum is 8:1)**

**Ability to offer Ultrafine Width
Tolerances down to
+/- 0.025mm (0.001")**

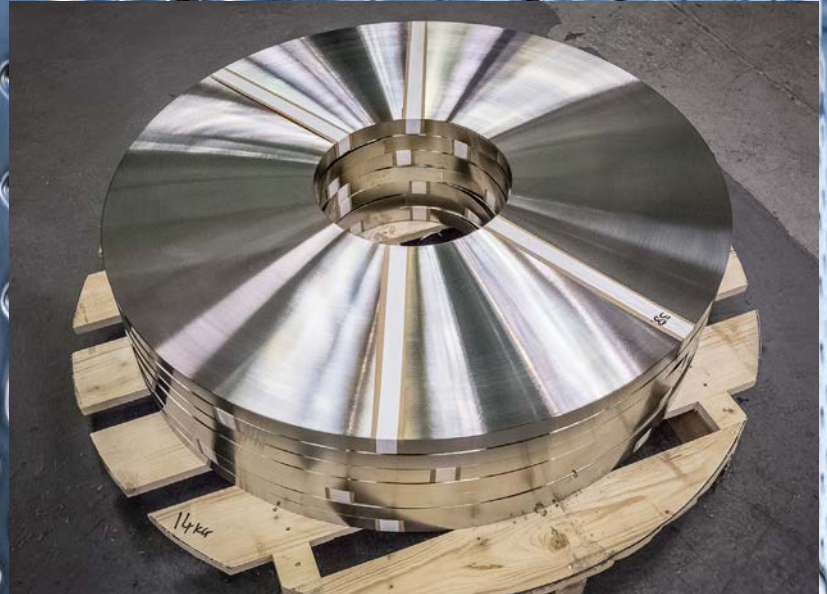
**Thicknesses -0.013mm to
6.5mm (0.0005" to 0.26")**

**Widths - 0.64mm to 1100mm
(0.025" to 43")**

Bespoke Packaging

If you need bespoke material sizes and processing, then you probably want bespoke packaging as well. Thanks to our in house packaging design team, we can offer bespoke packaging solutions to protect your materials in transit. Whatever processing and finishing options you have chosen, your products will be packaged to arrive safely and ready to use

You can choose to have strip material as pancake coils, traverse wound coil, flat blanks and sheets. Wire can be supplied as cut lengths, coils, formers or spools to suit your needs.



Choose From Our Trusted Partners Or Your Preferred Carrier

We firmly believe that all of our customers should be able to have your material, your way. Thanks to our global network of freight providers, you can choose from air, land or sea freight so you can have your material where you want, when you want.

There is also the option to arrange your own collection from our site in Birmingham, which can be organised through our sales team.



The information contained herein is given in good faith and is based on our present knowledge and experience. However, no liability will be accepted by The Knight Group and its subsidiaries in respect of any action taken by any third party in reliance thereon. Any advice given by the Company to any third party is given for that party's assistance only and without any liability on the part of the Company.

Any contract between the Company and a customer will be subject to the Company's Conditions of Sale. The extent of the Company's liabilities to any customer is clearly set out in those Conditions; a copy of which is available by request and can also be found at the back of this brochure and on our website.

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