

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

Titanium Alloys

CUT TO LENGTH
WIRE & COIL

alpha
alpha/beta
beta alloys

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



FM 02114

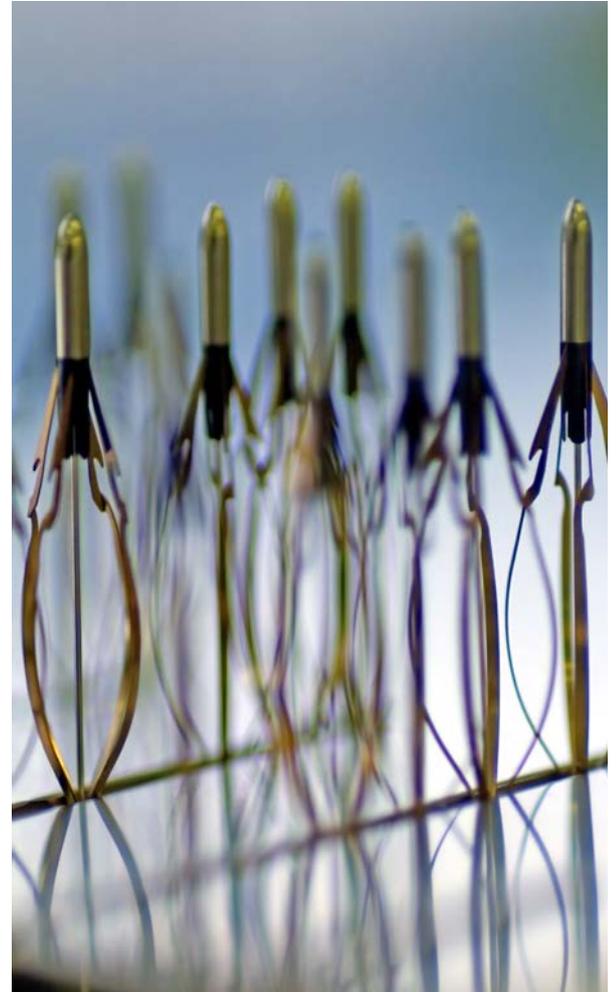


Titanium

Titanium has been a known element for many years but it is only in the last 50 years or so that it has gained importance. The rapid growth of the Titanium industry has been due to the versatility of the metal and its alloys and their outstanding strength to weight ratios. The mechanical properties of commercially pure Titanium grades vary considerably with small changes in oxygen, nitrogen, hydrogen and carbon. The properties of high strength, light weight and exceptional corrosion resistance have led to traditional applications in chemical process plant, aerospace structures, jet engine components and medical implants and prostheses, nuclear power plants, food processing plants, oil refinery heat exchangers. Commercially Pure Titanium grades have outstanding resistance to seawater and salt-water attack and are used in desalination plant, seawater cooled condensers and other marine related applications.

Titanium exists in two crystallographic forms and its alloys can be classified into three categories:

- alpha
- alpha/beta
- beta alloys



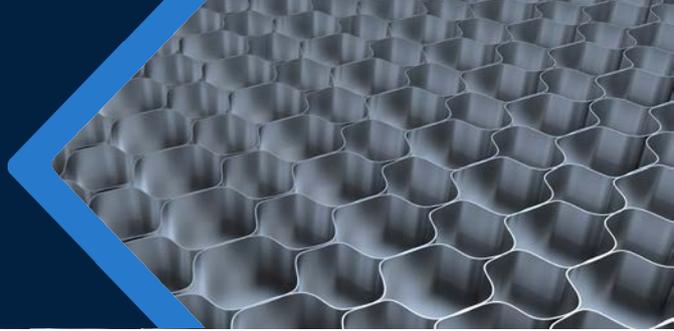
TITANIUM STOCK RANGE				
TYPE	COIL STOCK RANGE		WIRE STOCK RANGE	
	Thickness (mm)	Width (mm)	Round	Shaped
ALPHA				
Grade 1	0.025 - 3.00 mm	3 - 1000	0.1 – 10.00 mm dia	Upto 45 mm ² area
Grade 2				
Grade 3				
Grade 4				
ALPHA/BETA				
Ti 3Al 2.5V	0.025 - 3.00 mm	3 - 1000	0.1 – 10.00 mm dia	Upto 45 mm ² area
BETA				
21S	0.025 - 3.00 mm	3 - 1000	0.1 – 10.00 mm dia	Upto 45 mm ² area
Other specifications can be made available upon request, please contact us with your requirements				



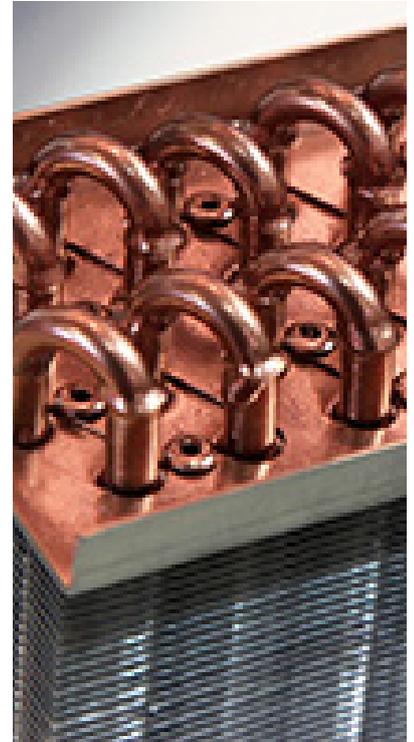
Pure Titanium has an alpha structure but transforms to a beta form when heated above 882°C. The addition of alloying elements influences this transformation and many alloys have been developed where beta phase is retained at room temperature, thus giving a material containing alpha and beta phases. The relative amounts of these phases give rise to variations in properties such as ductility, weldability and ease of forming

Titanium alloy strip is used for demanding applications such as static and rotating gas turbine engine components. Some of the most critical and highly stressed civilian and military airframe parts are also made of Titanium alloy strip. Commercially pure, or un-alloyed Titanium strip has outstanding corrosion resistance making it the preferred material for many applications in chemical process industries.

Properties

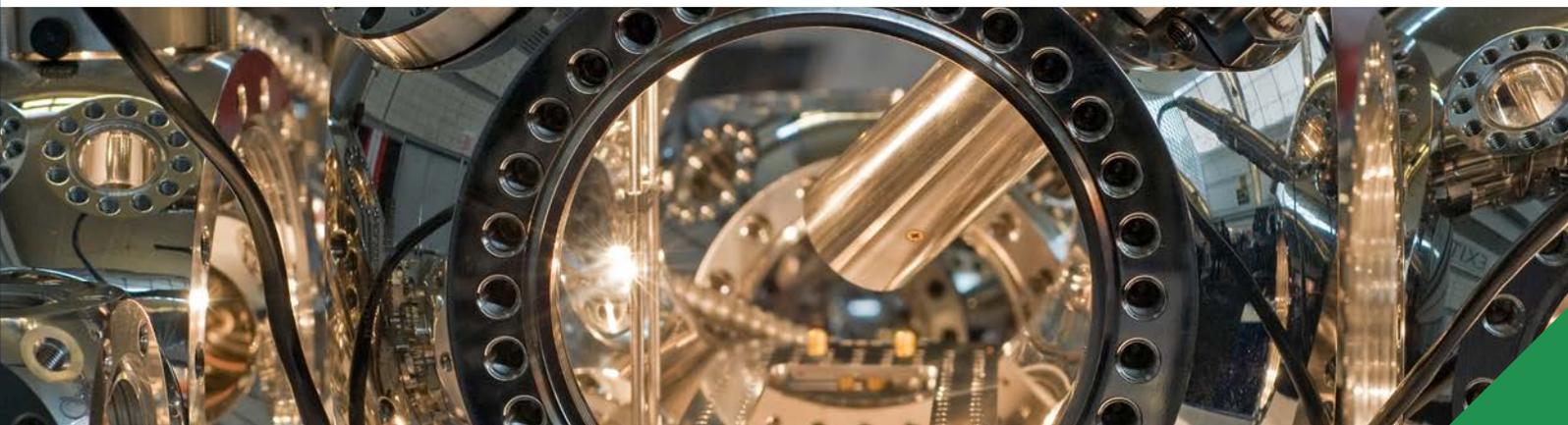


TITANIUM FEATURES				
TYPE	Key Features	Key Markets	Applications	
ALPHA				
Grade 1	Excellent corrosion resistance, maximum formability, limited strength	Not hardenable by heat treatment. Excellent weldability	Chemical and Marine Environments	Heat Exchangers, Condenser, Tubing, Valves, Pumps, Banding
Grade 2	Very Good formability, improved strength			
Grade 3	Good formability and increased strength over Grades 1 and 2			
Grade 4	Highest strength of commercially pure grades, but sufficient ductility for moderate forming.			
ALPHA/BETA				
Ti 3Al 2.5V	May be strengthened by cold working Hardenable by heat treatment. Good weldability	Aerospace	Honeycomb material for aircraft, seamless tubing, mechanical fasteners	
BETA				
21S	Substantial strength to weight ratios. Improved oxidation resistance, elevated temperature strength and creep strength. Good cold formability and weldability. Extremely resistant aircraft hydraulic fluid.	Aerospace	Engine exhaust plug, nozzle assemblies.	



TITANIUM CHEMICAL PROPERTIES							
TYPE	TYPICAL CHEMICAL COMPOSITION %						
	C	N	O	H	Fe	Ti	Others
ALPHA							
Grade 1	0.1	0.03	0.18	0.015	0.2	Balance	-
Grade 2	0.1	0.03	0.25	0.015	0.3	Balance	-
Grade 3	0.1	0.05	0.35	0.015	0.3	Balance	-
Grade 4	0.1	0.05	0.4	0.015	0.5	Balance	-
ALPHA/BETA							
Ti 3Al 2.5V	0.05	0.02	0.12	0.015	0.3	Balance	Al 2.5 - 3.5 V 2.0 - 3.0
BETA							
21S	0.05 max	0.050 max	0.11 - 0.17	0.02 max	0.400 max	Balance	Al 2.5 - 3.5 Si 0.15 - 0.25 Mo: 14.0 - 16.0 Nb: 2.4 - 3.2

TITANIUM MECHANICAL PROPERTIES			
TYPE	Proof Strength 0.2% Min (N/mm ²)	Tensile Strength	Elong. % Min. (50mm Gauge Length)
ALPHA			
Grade 1	170 - 240	240 - 330	24
Grade 2	275 - 345	345 - 430	20
Grade 3	380 - 450	450 - 520	18
Grade 4	480 - 580	550 - 660	15
ALPHA/BETA			
3Al 2.5V	520 - 585	620 - 690	15
BETA			
21S	Available on Request		





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 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")

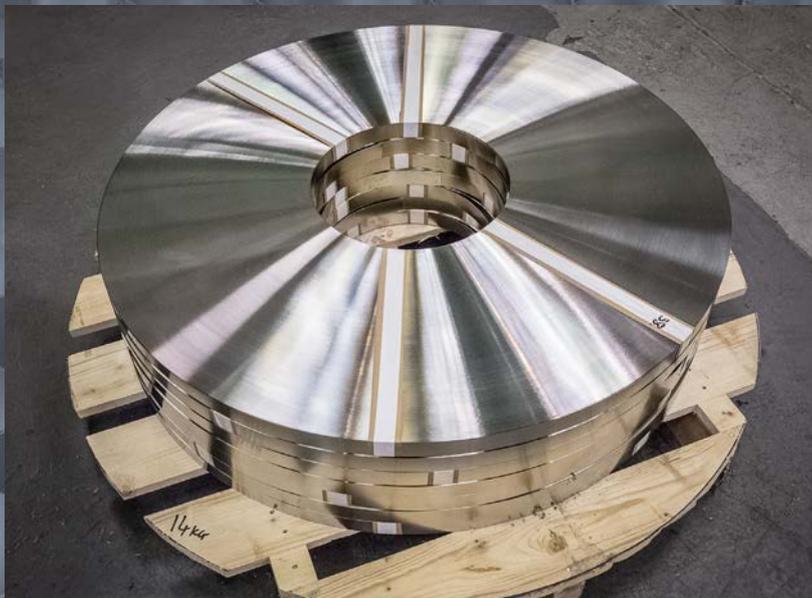
Thicknesses -0.013mm to 6.5mm
(0.0005" to 0.26")

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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