

Titanium Alloy for Aviation



Specification

Centerless Grinding Bar	Diameter: 2-30mm
	Length: 1000-3500mm
	Tolerance: h6,h7,h8,h9
Lathe Cutting Bar	Diameter: 30-100mm
	Length: 1000-3500mm
	Tolerance: h9,±0.1,±0.2,±0.4



Titanium Alloy Rod

Standard

AMS 4928

Element	Chemical Composition		
	min	max	
Aluminum	5.5	6.75	
Vanadium	3.5	4.5	
Iron	-	0.3	
Oxygen	-	0.2	
Carbon	-	0.08	
Nitrogen	-	0.05	500ppm
Hydrogen	-	0.0125	125ppm
Yttrium	-	0.005	50ppm
Other Element (each)	-	0.1	
Other Elements (total)	-	0.4	

Product

Nominal Diameter or Distance Between Parallel Sides Millimeters	Tensile Strength (MPa)	Yield Strength at 0.2% Offset (MPa)	Elongation 50.8mm Or 4D% Long	Elongation 50.8mm or 4D% L.T.	Elongation 50.8mm or 4D% S.T.	Reduction of Area% Long	Reduction of Area% L.T.	Reduction of Area% S.T.
Up to 50.80 incl	931	862	10	10	-	25	20	-
Over 50.80 to 101.6 incl	896	827	10	10	10	25	20	15
Over 101.6 to 152.40 incl	896	827	10	10	8	25	20	15

Note: Long. = Longitudinal

L.T. = Long-Transverse

S.T. = Short-Transverse

Feature

1. Very low oxygen content, less than 500 ppm.
2. Unique clean surface, no oil and impurities on the surface.
3. Large single weight, up to 100Kgs.

Titanium for Chemical Industry



Specification

Titanium Bar	Centerless Grinding Bar	Diameter: 2-20mm
		Length: 1000-3500mm
	Lathe cutting bar	Diameter: 3-26mm
		Length: 1000-3500mm
Titanium Wire	Bright surface	Diameter: 0.8-10mm
		Piece weight: 5-500Kgs
	Black surface	Diameter: 0.1-10mm
		Piece weight: 1-500Kgs



Titanium Bar

Standard

ASTM B348

Chemical Composition (%)											Tensile Requirements			
Gr	C	O	N	H	Fe	Al	V	Pd	Ni	Mo	Tensile Strength min MPa		Elongation in 4D, min %	Reduction of Area, min, %
1	0.08	0.18	0.03	0.015	0.20	-	-	-	-	-	240	138	24	30
2	0.08	0.25	0.03	0.015	0.30	-	-	-	-	-	345	275	20	30
3	0.08	0.35	0.05	0.015	0.30	-	-	-	-	-	450	380	18	30
4	0.08	0.40	0.05	0.015	0.50	-	-	-	-	-	550	483	15	25
5	0.08	0.20	0.05	0.015	0.40	5.5-6.75	3.5-4.5	-	-	-	895	828	10	25
7	0.08	0.25	0.03	0.015	0.30	-	-	0.12-0.25	-	-	345	275	20	30
9	0.08	0.15	0.03	0.015	0.25	2.5-3.5	2.0-3.0	-	-	-	620	483	15	25
12	0.08	0.25	0.03	0.015	0.30	-	-	-	0.6-0.9	0.2-0.4	483	345	18	25
17	0.08	0.18	0.03	0.015	0.20	-	-	0.04-0.08	-	-	240	138	24	30
23	0.08	0.13	0.03	0.015	0.25	5.5-6.5	3.5-4.5	-	-	-	828	759	10	15

Standard

ASTM B863

Chemical Composition (%)											Tensile Requirements			
Gr	C	O	N	H	Fe	Al	V	Pd	Ni	Mo	Tensile Strength min MPa		Elongation in 4D, min %	Reduction of Area, min, %
1	0.08	0.18	0.03	0.015	0.20	-	-	-	-	-	240	138	24	24
2	0.08	0.25	0.03	0.015	0.30	-	-	-	-	-	345	275	18	20
3	0.08	0.35	0.05	0.015	0.30	-	-	-	-	-	450	380	18	18
4	0.08	0.40	0.05	0.015	0.50	-	-	-	-	-	550	483	15	15
5	0.08	0.20	0.05	0.015	0.40	5.5-6.75	3.5-4.5	-	-	-	895	828	10	10
7	0.08	0.25	0.03	0.015	0.30	-	-	0.12-0.25	-	-	345	275	18	20
9	0.08	0.15	0.03	0.015	0.25	2.5-3.5	2.0-3.0	-	-	-	620	483	15	15
12	0.08	0.25	0.03	0.015	0.30	-	-	-	0.6-0.9	0.2-0.4	483	345	18	18
17	0.08	0.18	0.03	0.015	0.20	-	-	0.04-0.08	-	-	240	138	20	24
23	0.08	0.13	0.03	0.015	0.25	5.5-6.5	3.5-4.5	-	-	-	793	759	10	10

Titanium for Medical

Specification

Titanium Rod for Medical	Centerless Grinding Bar	Diameter: 3-26mm
		Length: 1000-3500mm
		Tolerance: h9
	High Precision Bar	Diameter: 3-26mm
		Length: 1000-3500mm
		Tolerance: h7
Titanium Wire for Medical	Polishing Wire	Diameter: 0.8-6mm
		Length: 1000-2000mm
		Tolerance: h7



Medical bone screw

Standard

Standard	ASTM F136	ASTM F1295	ASTM F67	ISO5832-2	ISO5832-3
Grade	Ti6Al4VELi	Ti6Al7Ni	Gr.2 Gr.3 Gr.4	Grade 1 ELi Grade 1 Grade 2 Grade 3 Grade 4A Grade 4B	wrough titanium 6- aluminum 4- vanadium alloy

ASTM F136

Element	N	C	H	Fe	O	Al	V
Composition	0.05	0.08	0.012	0.25	0.13	5.5-6.5	3.5-4.5

Nominal Diameter or Distance Between Parallel Sides Millimeters	Tensile Strength min (MPa)	Yield Strength at 0.2% Offset (MPa)	Elongation in 4D or 4W min, %L	Elongation in 4D or 4W min, % L.T.	Elongation In 4D or 4w min, % S.T.	Reduction of Area% min, %L	Reduction of Area% min, %L.T.	Reduction of Area% min, %S.T.
4.75 to under 44.45	860	795	10	-	-	25	-	-
44.45 to under 63.5	825	760	8	-	-	20	-	-
44.45 to under 101.60	825	760	8	8	8	15	15	15

ASTM F67

Chemical Composition Requirement					Mechanical Requirements : Annealed Bar,Billet,Wire and others				
Element	Compositin % (mass/mass_				Grade	Tensile Strength min (Mpa)	Yield Strength 0.2% offset, min (Mpa)	Elongation in 4D, min %	Reduction of Area, min %
	Grade1	Grade2	Grade3	Grade3					
	UNS R50250	UNS R50400	UNS R50550	UNS R50700					
Nitrogen (max)	0.03	0.03	0.05	0.05					
Carbon (max)	0.08	0.08	0.08	0.08	1	240	170	24	30
Hydrogen (max)	0.015	0.015	0.015	0.015	2	345	275	20	30
Iron (max)	0.20	0.30	0.30	0.50	3	450	380	18	30
Oxygen (max)	0.18	0.25	0.35	0.40	4	550	483	15	25

Titanium Wire for 3D Printing Powders



Standard

ASTM B348 and AMS 4928

Brand Name	Chemical Composition (%)															
	O	N	C	H	Fe	Al	V	Sn	Mo	Cu	Mn	Zr	Y	Zn	Cr	Pd
GR23 (Ti6Al4VELi)	0.05	0.01	0.03	0.005	0.18-0.25	6.30-6.50	3.85-4.50	0.08	0.08	0.08	0.08	0.08	0.002	0.005	-	-
GR5 (Ti6Al4V)	0.10-0.13	0.01	0.03	0.005	0.18-0.25	6.30-6.50	3.85-4.50	0.08	0.08	0.08	0.08	0.08	0.002	0.005	-	-
GR2	0.11-0.14	0.01	0.03	0.005	0.05	-	-	-	-	-	-	-	0.002	0.005	-	-
GR4	0.23-0.28	0.01-0.25	0.015-0.05	0.001-0.005	0.001-0.005	-	-	-	-	-	-	-	-	0.005	-	-
Ti-13.5Mo	0.06	0.01	0.01-0.03	0.005	0.1	0.08	0.08	-	13.0-14.0	-	-	-	-	-	2.50-3.50	-
Ti-5Al5V5Mo3Cr	0.07	0.01-2	0.03	0.005	0.30-0.50	4.40-5.70	4.00-5.50	-	4.00-5.50	-	-	-	-	-	-	-
TA9 (Ti-0.2Pd)	0.25	0.03	0.08	0.015	0.3	-	-	-	-	-	-	-	-	-	-	0.12-0.15

Product

Diameter	3.175mm x coil	30mm x 1000mm	60mm x 550mm
Surface	Acid pickling	Lathe turning	polishing

Feature

1. Very low oxygen content, less than 500 ppm.
2. Unique clean surface, no oil and impurities on the surface.
3. Large single weight, up to 100Kgs.

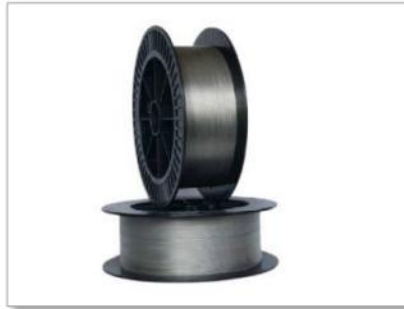
Titanium Wire for Welding



Standard

AWS A5.16

- ERTi-1, ERTi-2, ERTi-3, ERTi-4
- ERTi-5 (Ti6Al4V)
- ERTi-7 (TiPd0.2A)
- ERTi-9 (TiAl3V2.5A)
- ERTi-12 (TiNi0.7Mo0.3)
- ERTi-16 (TiPd0.06A)
- ERTi-17 (TiPd0.06)



ERTi-1,2,3 and 4

They're TIG, MIG and submerged arc filler metal used for welding pure titanium alloys commonly found in applications requiring high temperature resistance and resistance to chemical reagents.

NAME	C	O	N	H	Fe	Al	V	N	Other
ERTi-1	0.03	0.03-0.10	0.012	0.005	0.08	-	-	-	-
ERTi-2	0.03	0.08-0.16	0.015	0.008	0.12	-	-	-	-
ERTi-3	0.03	0.13-0.20	0.02	0.008	0.10	-	-	-	-
ERTi-4	0.03	0.18-0.32	0.025	0.008	0.25	-	-	-	-

ERTi-5

ERTi-5 (formerly 6AL/4V) is a TIG, MIG and submerged arc filler metal used for welding 6% Aluminum - 4% Vanadium alloys. Widely used in the cryogenic, petrochemical and aircraft industry. Aircraft uses would include the airframes; turbine engine parts such as the blades, discs, wheels and spacer rings. Other applications would include industrial fans, pressure vessels, compressor blades and rocket motor cases.

NAME	C	O	N	H	Fe	Al	V	N	Other
ERTi-5	0.05	0.12-0.20	0.030	0.015	0.22	5.5-6.7	3.5-4.5	-	-

ERTi-7

ERTi-7 has the same mechanical properties as ERTi-2. The 0.12% palladium addition improves corrosion performance under mildly reducing conditions or where crevice or under-deposit corrosion is a problem. ERTi-7 can be considered for welding Grade 2 or 16 where improved corrosion performance is desired.

NAME	C	O	N	H	Fe	Al	V	Pd	Other
ERTi-7	0.03	0.08-0.16	0.015	0.008	0.12	-	-	0.12-0.25	-

ERTi-9

ERTi-9 is used for applications where better ductility, formability, and weld ability are needed, it can be produced in welded or seamless tube and pipe. It is used in applications like oil production tubulars and bicycle frames.

NAME	C	O	N	H	Fe	Al	V	Pd	Other
ERTi-9	0.03	0.08-0.16	0.002	0.008	0.25	2.5-3.5	2.0-3.0	-	-

ERTi-12

ERTi-12 is an inter-mediate strength grade originally developed to provide enhanced crevice-corrosion resistance in high temperature brines, but at lower cost than Grade 7. The improved performance is believed to be the result of Ni++ and Mo++ ions that alter the surface electrochemistry of the material in the crevice or under a surface deposit. Grade 12 has better elevated temperature properties than Grade 2 or 3 and is sometimes specified for pressure vessels or piping for its superior strength alone.

NAME	C	O	N	H	Fe	Al	V	Ni	Other
ERTi-12	0.03	0.08-0.16	0.015	0.008	0.15	-	-	0.6-0.9	-