



EST METAL



American Welding Society

TITANIUM TITANIUM ALLOY WELDING WIRE



Website: www.tirods.com

Tel.: 86-917-3525660

E-mail: sales@bjdsti.com



EST METAL

TITANIUM & TITANIUM ALLOY WELDING WIRE

Titanium offers similar strength of steel but is two times lighter and offers a amazing corrosion resistance. Grade 1 is the most pure type and is mostly welded with Grade 2 filler metal. The weld ability of Titanium is excellent for most grades but extra care have to be taken for the gas protection on the weld pool, the weld pool needs to stay protected until it cooled down to at least 470°C. Often Titanium is welded in a gas chamber with pure argon gas to make sure that the weld pool gets proper protection.

Material: Titanium & Titanium Alloy.

Grade: Commercial Pure Ti: ERTi-1, ERTi-2, ERTi-3, ERTi-4
ERTi-5 Ti-6Al-4V / ERTi-7 Ti-0.2Pb / ERTi-9 Ti-3Al-2.5V
ERTi-12 Ti-0.3Mo-0.8Ni / ERTi-23 Ti-6Al-4V

Standard: AWS A5.16, ASTM B863, ASTM F67, ASTM F136, AMS 4951; AMS 4954

Shape: Straight: Length 300mm to 3000mm (12" - 118")

Spool : Dia.100mm to 300mm (3.9" - 12")

Coil: Weight 50kgs to 55kgs /coil (110.23 - 121.45 lbs)

Welding Technique

In addition to clean joints and weld wire, proper parameters, and proper inert gas shielding, welder technique requires attention when titanium is being welded. Improper technique can be a source of weld contamination. Before starting an arc in welding titanium, it is good practice to pre-purge torch, trailing shield and backup shield to be sure all air is removed. Whenever possible, high frequency arc starting should be used. Scratch starting with tungsten electrodes is a source of tungsten inclusions in titanium welds. On extinguishing the arc, the use of current downslope and a contactor, controlled by a single foot pedal, is encouraged. Torch shielding should be continued until the weld metal cools below 800 degrees F. Secondary and backup shielding should also be continued. A straw or blue color on the weld is indicative of premature removal of shielding gas. Pre-heating is not generally needed for titanium shop welds. However, if the presence of moisture is suspected, due to low temperature, high humidity, or wet work area, preheating may be necessary. Gas torch heating (slightly oxidizing flame) of weld surfaces to about 150 degrees F. is generally sufficient to remove moisture. The arc length for welding titanium without filler metal should be about equal to the electrode diameter. If filler metal is added, maximum arc length should be about 1-1/2 times the electrode diameter. Filler wire should be fed into the weld zone at the junction of the weld joint and arc cone. Wire should be fed smoothly and continuously into the puddle. An intermittent dipping technique causes turbulence and may result in contamination of the hot end of the wire on removal from the shield. The contaminants are then transferred to the weld puddle on the next dip. Whenever the weld wire is removed from the inert gas shielding, the end should be clipped back about 1/2- inch to remove contaminated metal. Interpass temperatures should be kept low enough, such that additional shielding is not required. Cleaning between passes is not necessary if the weld bead remains bright and silvery. Straw or light blue weld discoloration can be removed by wire brushing with a clean stainless steel wire brush. Contaminated weld beads, as evidenced by a dark blue, gray or white powdery color, must be completely removed by grinding. The joint must then be carefully prepared and cleaned before welding again.



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GRADE	SPECIFICATIONS		
	AWS A5.16	ASTM B863	AMS
Commercial Pure Titanium	ERTi-1,2,3,4	ASTM B863 Gr1,2,3,4 ASTM F67 Gr1,2,3,4	AMS 4951 AMS 4921
Ti 6Al-4V	ERTi-5	ASTM B863 Gr5	AMS 4954
Ti 6Al-4V Eli	ERTi-5 Eli	ASTM B863 Gr23 ASTM F136 Eli	AMS 4956
Ti (0.12~0.25)Pd	ERTi-7	ASTM B863 Gr7	----
Ti 3Al-2.5V	ERTi-9	ASTM B863 Gr9	----
Ti 0.3Mo-0.8Ni	ERTi-12	ASTM B863 Gr12	----
Al5.5-6.5, V3.5-5.5	ERTi- 23	ASTM B863 Gr23	----

Product Specification:

Diameter: Φ 0.15mm- Φ 8.0mm

Shape: Straight, in coil or spool

Surface: Polished, Pickled

Grade: ERTi-1, ERTi-2, ERTi-3, ERTi-4, ERTi-5 (Ti-6AL-4V), ERTi-7(Ti-0.2Pb), ERTi-9(Ti-3Al-2.5V), ERTi-12(Ti-0.3Mo-0.8Ni), ERTi-23(Ti-6Al-4V ELI)

Standard: AWS A5.16, ASTM B863, AMS 4951H,AMS 4954; AMS 4956,etc.

Status: Annealed(M)

Cold processing(Y)

Heat processing(R)

Application: Electrode materials, fasteners, welding materials, medical field, surgical implants, chemical industry, structural parts, glasses, jewelry, aerospace and marine, consumer and architectural, nuclear waste storage, etc.



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Mechanical Property

AWS Classification	Tensile Strength(min)		Yield Strength(min)		Elongation(%)
	ksi	MPa	ksi	MPa	
ERTi-1	35	240	20	138	20
ERTi-2	50	345	40	275	18
ERTi-3	65	450	55	380	18
ERTi-4	80	550	70	483	15
ERTi-5	130	895	120	828	10
ERTi-7	50	345	40	275	18
ERTi-9	90	620	70	483	15
ERTi-12	70	483	50	345	18
ERTi-23	120	828	110	759	10

Chemical Composition

AWS A5.16	N	C	H	Fe	O	Al	V	Pd	Mo	Ni	Ti
ERTi-1	0.012	0.03	0.005	0.08	0.03-0.10	/	/	/	/	/	Bal
ERTi-2	0.015	0.03	0.008	0.12	0.08-0.16	/	/	/	/	/	Bal
ERTi-3	0.02	0.03	0.008	0.16	0.13-0.20	/	/	/	/	/	Bal
ERTi-4	0.025	0.03	0.008	0.25	0.18-0.32	/	/	/	/	/	Bal
ERTi-5	0.03	0.05	0.015	0.22	0.12-0.20	5.5-6.75	3.5-4.5	/	/	/	Bal
ERTi-7	0.015	0.03	0.008	0.12	0.08-0.16	/	/	0.12-0.25	/	/	Bal
ERTi-9	0.012	0.03	0.005	0.20	0.06-0.12	2.5-3.5	2.0-3.0	/	/	/	Bal
ERTi-12	0.015	0.03	0.008	0.15	0.08-0.16	/	/	/	0.2-0.4	0.6-0.9	Bal
ERTi-23	0.012	0.03	0.005	0.20	0.03-0.11	5.5-6.50	3.5-4.5	/	/	/	Bal





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TITANIUM WELDING WIRE

ER Ti-1

- Type** Solid Titanium welding wire Grade 1 (purest grade)
- Applications** ERTi-1. Grade 1 is the lowest strength unalloyed (or Commercially Pure – CP) grade. Grade 1 is used in applications where ductility is paramount, such as explosive cladding, loose linings, expanded metal, and deep drawing applications. It is also used in electrolytic applications like coated anode substrates for production of chlorine and sodium chlorate.
- Properties** The weld deposit is ductile and offers excellent corrosion resistance in oxidizing environments. The purity and corrosion resistance makes the alloy a preferred choice in many applications to prevent or solve problems. The wire is cleaned in a very special way to obtain porosity free and a ductile weld deposits.
- Classification** AWS A 5.16: ER Ti 1
UNS: R50100
- Suitable for** ERTi-1 is the purest grade and is suitable for welding Titanium grade 1, 2, 3 and 4. With the restriction that the mechanical properties are much less than Grade 2, 3 and 4. The weld deposit is ductile and offers excellent corrosion resistance in oxidizing environments. This alloy finds his application in chemical industry and offers excellent Weldability.

Welding positions:



Weld deposit weight %

C	O	N	H	Fe	Al	V	Pd
< 0.03	0.03 - 0.10	< 0.012	< 0.005	< 0.08	--	--	--

Mechanical properties

Heat Treatment	RPO,2 (N/mm ²)	Rm (N/mm ²)	A5 (%)	Impact Energy (J) ISO-V			Hardness HRc / HV
				-20°C	-40°C	-60°C	
as welded	250	320	--	--	--	--	--

welding parameters / packing

Dia. (mm)	Welding Parameters			Packing kg / tube
	Length (mm)	Current (A)		
1.0	1000			5
1.2	1000			5
1.6	1000			5
2.0	1000			5
2.4	1000			5
3.0	1000			5
3.2	1000			5
3.5	1000			5
4.0	1000			5
4.5	1000			5
5.0	1000			5
6.0	1000			5

Note: Also available as spooled wire :0.8 mm, 1.0 mm and 1.2 mm (D-100 / D-200 / D-300)



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TITANIUM WELDING WIRE

ER Ti-2

Type Solid Titanium welding wire

Applications ER Ti-2 is developed for welding Titanium grade 1, 2, 3 and 4. This alloy finds his applications in chemical industry and offers excellent weldability.

Properties The weld deposit is ductile and offers excellent corrosion resistance in oxidizing environments. The unique combination of mechanical strength and corrosion resistance makes the alloy a prefer choice in many applications to prefer or solve problems. The wire is cleaned in a very special way to obtain porosity free and a ductile weld deposit.

Classification AWS A 5.16: ER Ti 2
EN ISO 24034: STi 0120 (Ti 99,6)

Suitable for Titanium grade 1, 2, 3 and 4.

Welding positions:



Weld deposit weight %

C	O	N	H	Fe	Ti
< 0.08	< 0.25	< 0.18	< 0.013	< 0.05	rem

Mechanical properties

Heat Treatment	RPO,2 (N/mm2)	Rm (N/mm2)	A5 (%)	Impact Energy (J) ISO-V			Hardness HRC / HV
				-20°C	-40°C	-60°C	
AW	275	395-540	20	--	--	--	--

Welding parameters / packing

Dia. (mm)	Welding Parameters		Packing kg / tube
	Length (mm)	Current (A)	
1.0	914-1000mm		5kgs
1.2	914-2000mm		5-10kgs
1.6	914-2000mm		5-10kgs
2.0	914-2000mm		5-10kgs
2.4	914-2000mm		5-15kgs
3.0	914-2000mm		5-15kgs
3.2	914-2000mm		5-15kgs
3.5	914-2000mm		5-15kgs
4.0	914-2000mm		5-15kgs
4.5	914-2000mm		5-15kgs
5.0	914-2000mm		5-15kgs
6.0	914-2000mm		5-15kgs

Note: Also available as spooled wire :0.8 mm, 1.0 mm and 1.2 mm (D-100 / D-200 / D-300)



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TITANIUM ALLOY WELDING WIRE

ER Ti-5

Type Solid Titanium based welding wire (Grade 5) with extreme high strength.

Applications Aerospace, marine, chemical plants, process plants, power generation, oil and gas extraction, medical and sports.

Properties Excelent weldability, and can be heat treated to a higher strength or toughness. Grade 5 is used in aircraft components such as landing gear, wing spars, and compressor blades. Its corrosion resistance is generally comparable to Grade 2 and it is often used in corrosion service where higher strength is required, particularly in shafts, high strength bolting, and keys. The weld deposit is ductile and offers excellent corrosion resistance in oxidizing environments. The unique combination of mechanical strength and corrosion resistance makes the alloy a prefer choice in many applications to prefer or solve problems. The wire is cleaned in a very special way to obtain porosity free and a ductile weld deposit.

Classification AWS A 5.16: ERTi 5

UNS: R56400

Suitable for Titanium grade 5, UNS R56400, AMS 4954

Welding positions:



Weld deposit weight %

C	O	N	H	Fe	Al	V	Pd
< 0.05	0.12 - 0.20	< 0.03	< 0.015	< 0.22	5.5 - 6.7	3.5 - 4.5	--

Mechanical properties

Heat Treatment	RPO,2 (N/mm ²)	Rm (N/mm ²)	A5 (%)	Impact Energy (J) ISO-V			Hardness HRc / HV
				-20°C	-40°C	-60°C	
	>890	>810	--	--	--	--	--

Welding parameters / packing

Welding Parameters			Packing
Dia. (mm)	Length (mm)	Current (A)	kg / tube
1.6	914 -1000mm		5
2.0	914 -1000mm		5
2.4	914 -1000mm		5
3.0	914 -1000mm		5
3.2	914 -1000mm		5
3.5	914 -1000mm		5
4.0	914 -1000mm		5

Note: Also available as spooled wire :0.8 mm, 1.0 mm and 1.2 mm (D-100 / D-200 / D-300)



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TITANIUM ALLOY WELDING WIRE

ER Ti-7

Type Solid drawn Titanium Grade 7 welding wire

Applications Grade 7 has the same mechanical properties as Grade 2. The 0.12 wt% 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.

Properties The weld deposit is ductile and offers excellent corrosion resistance in oxidizing environments. The unique combination of mechanical strength and corrosion resistance makes the alloy a prefer choice in many applications to prefer or solve problems. The wire is cleaned in a very special way to obtain porosity free and a ductile weld deposit.

Classification AWS A 5.16: ER Ti 7

UNS: R52401

Suitable for Titanium grade 7, Grade 2, Grade 16

Welding positions:



Weld deposit weight %

C	O	N	H	Fe	Al	V	Pd
< 0.03	0.08 - 0.16	< 0.015	< 0.008	< 0.12	-	-	0.12 - 0.25

Mechanical properties

Heat Treatment	RPO,2 (N/mm ²)	Rm (N/mm ²)	A5 (%)	Impact Energy (J) ISO-V			Hardness HRc / HV
				-20°C	-40°C	-60°C	
as welded	275	400	20	--	--	--	--

Redrying temperature not required

Welding parameters / packing

Welding Parameters			Packing kg / tube
Dia. (mm)	Length (mm)	Current (A)	
1.0	914 -1000mm		5
1.2	914 -1000mm		5
1.6	914 -1000mm		5
2.0	914 -1000mm		5
2.4	914 -1000mm		5
3.2	914 -1000mm		5
4.0	914 -1000mm		5

Note: Also available as spooled wire :0.8 mm, 1.0 mm and 1.2 mm (D-100 / D-200 / D-300)



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TITANIUM ALLOY WELDING WIRE

ER Ti-12

Type Solid drawn Titanium Grade 12 welding wire

Applications This alloy finds his applications in chemical industry and offers excellent Weldability. Often recommended for pressure vessels and piping for its superior strength alone.

Properties ER Ti-12. Grade 12 (Ti 0.8Ni0.3Mo) is an intermediate 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.

Classification AWS A 5.16: ER Ti - 12

UNS: R53401

Suitable for Titanium grade 12, Grade 7, Grade 2 and Grade 3

Welding positions:



Weld deposit weight %

C	O	N	H	Fe	Al	V	Pd	Mo	Ni
< 0.03	0.08 - 0.16	< 0.015	< 0.008	< 0.15	--	--	--	0.2 - 0.4	0.6 - 0.9

Mechanical properties

Heat Treatment	RP0,2 (N/mm ²)	Rm (N/mm ²)	A5 (%)	Impact Energy (J) ISO-V			Hardness HRC / HV
				-20°C	-40°C	-60°C	
as welded	345	483	--	--	--	--	--

Redrying temperature not required

welding parameters / packing

Welding Parameters			Packing
Dia. (mm)	Length (mm)	Current (A)	kg / tube
1.2	914 -1000mm		5
1.6	914 -1000mm		5
2.0	914 -1000mm		5
2.4	914 -1000mm		5
3.2	914 -1000mm		5
4.0	914 -1000mm		5

Note: Also available as spooled wire :0.8 mm, 1.0 mm and 1.2 mm (D-100 / D-200 / D-300)



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TITANIUM & TITANIUM ALLOY WELDING WIRE

Annual Capability: 600 Metric Tons

Package:

- ┌ **Straight:** sealed with plastic bag in plastic box + plywood case
- ┌ **In Coil:** protected by foam paper+ plywood case
- ┌ **In spool:** carton box + plywood case
- ┌ As per customer's requirement

Delivery Time: approx.5-15 days

Shipping: By International Express(TNT, FEDEX, DHL, UPS, etc.)
By Air, By Sea

Trade Terms: FOB Baoji, Door to Door, CIF

Payment Terms: T/T, PayPal, Western Union





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CONTACT US

LOCATION

We're based in Baoji, you can find us here:

No.9 Gaoya Industrial Park,High-tech Industrial Zone,Baoji,Shaanxi, 721013,P.R.China

Tel:86-917-3525660

Fax: 86-917-3331336

E-mail : sales@bjdsti.com
info@bjdsti.com

Website : www.tirods.com
www.estbolts.com

