



Mission Critical Metallics®

ATI Titanium 6Al-6V-2Sn Alloy

GENERAL

ATI Ti-6Al-6V-2Sn Alloy (UNS R56620) is a highly beta-stabilized, two-phase, alpha-beta titanium alloy which is a modification of the Ti-6Al-4V system. Because of the higher Beta stabilizing elements (additional V plus Fe and Cu), this alloy has a higher strength potential than ATI Ti-6Al-4V alloy, but at a sacrifice of weldability and toughness. In most cases, the welding of ATI Ti-6Al-6V-2Sn alloy is not recommended. It can be used in the annealed or solution treated and aged conditions.

Typical applications are airframe and jet engine parts (see ATI 6Al-4V alloy), rocket engine cases, and ordnance components.

SPECIFICATIONS - AMS

- AMS 4971 - Bars, Forgings (Annealed, Heat Treated)
- AMS 4978 - Bars, Forgings (Annealed)

PHYSICAL PROPERTIES

Melting Range: (data unavailable)

Density: 0.164 lbs/in³ (4.58 gms/cc)

Beta Transus Temperature: 1,735° F (946°C)

HEAT TREATMENT

The various recommended treatments for bars and forgings are:

1. Anneal: 1,300 - 1,400°F (704 - 760°C) - 2 to 4 hours - Air Cool
2. Stress Relief Anneal: 1,000 - 1,200°F (538 - 649°C) - 1 to 4 hours - Air or Furnace Cool
3. Solution Heat Treatment: 1,550 - 1,650°F (843 - 899°C) 1 hour - Water Quench
4. Aging Treatment: 950 - 1,100°F (510 - 593°C) - 4 to 12 hours - Air Cool

(The strength decreases, and ductility and toughness increase with increasing aging temperature.)

HARDNESS

The hardness is approximately Rockwell C 36 - 38.

OXIDATION RESISTANCE

See comments in the Technical Data Sheet for CP Titanium.

FORGEABILITY

ATI Ti-6Al-6V-2Sn alloy is readily finish-forged from 1,650°F (899°C) with a minimum finishing temperature of 1,400°F (760°C). Minimum reductions of about 35% in the alpha-beta range are recommended to obtain specification properties.

FORMABILITY

Cold forming of ATI Ti-6Al-6V-2Sn alloy is difficult because of its high strength and the large amount of springback. Annealed material may be hot-formed up to 1,500°F (816°C). Hot sizing or creep-forming is generally performed at 1,000 - 1,300°F (538 - 704°C). However, any heating above 1,100°F (593°C) results in surface contamination, and the contaminated layer must subsequently be removed by machining or proper pickling.

MACHINABILITY

See comments in the Technical Data Sheet for CP Titanium.

WELDABILITY

Although ATI Ti-6Al-6V-2Sn alloy can be successfully welded using the inert gas shielded, fusion-welding process, the heat affected zone will have considerably lower ductility and toughness than the parent metal. Some improvement in ductility can be obtained by using alpha (commercially pure titanium) filler wire to dilute the beta-stabilizing elements, and by using a post-weld treatment of 4 hours at 1,350 - 1,450°F (732 - 788°C).

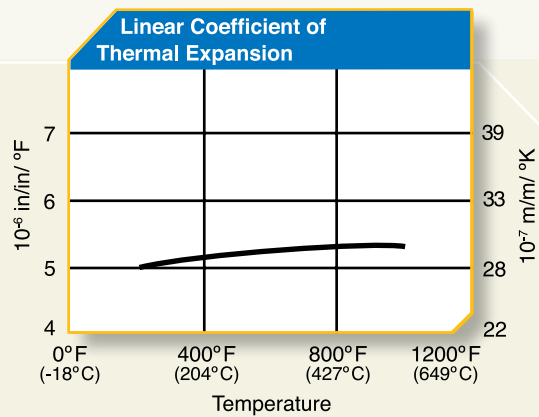
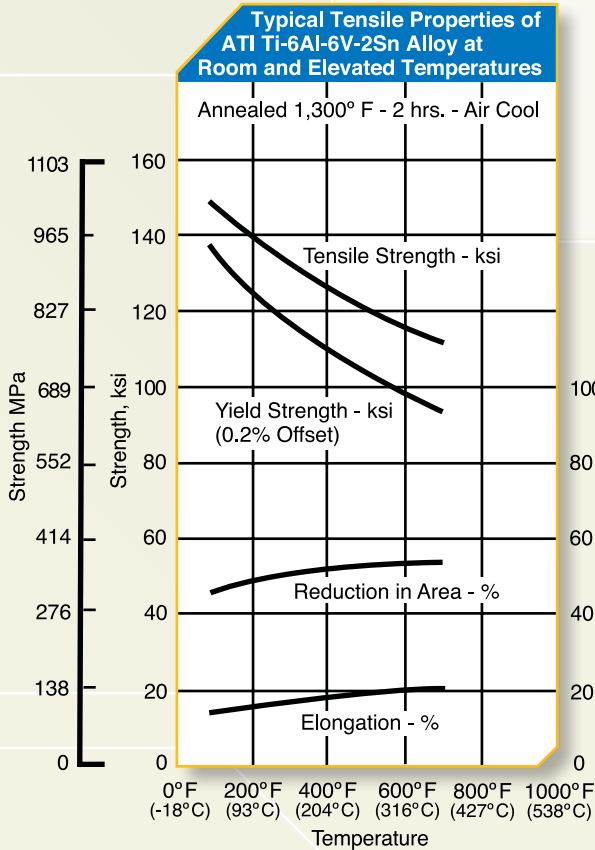
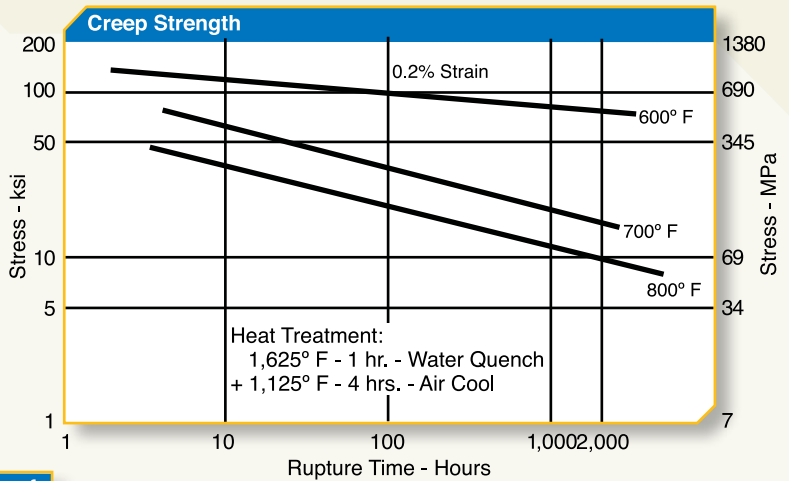
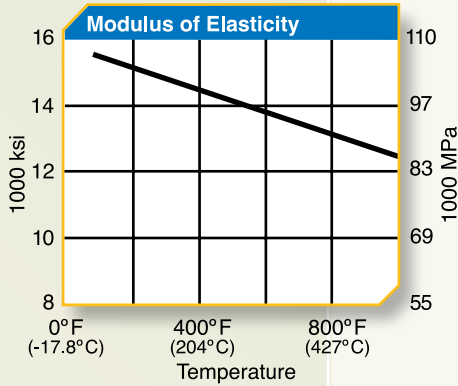
SPECIAL PRECAUTIONS

See comments in the Technical Data Sheet for CP Titanium.



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Chemical Composition										
	N	C	H	O	Fe	Al	V	Sn	Cu	Ti
wt %, min.	-	-	-	-	0.35	5.00	5.00	1.50	0.35	
wt %, max.	0.04	0.05	0.015	0.20	1.00	6.00	6.00	2.50	1.00	Bal.



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