DAXUN CP Grade 1, CP Grade 2, CP Grade 3, CP Grade 4

Commercially Pure Titanium

(UNS R50250, R50400, R50550, R50700)

INTRODUCTION

DAXUN, CP1, CP2, CP3, CP4 grades, or commercially pure titanium grades (R50250, R505050, R5050, R50700) have great ductility, excellent corrosion resistance, medium strength, and good weldability. The four grade numbers (Ti 30, 40, 55, 70) represent the approximate minimum yield strength for each grade. The oxygen levels vary between grades. These three titanium grades can be manufactured using either single melt EB (electron beam) processing or repeated melting techniques with a final VAR (vacuum arc remelting). Titanium plates, billets, rolled bars, rods, and tubes are common product forms for usage in fuselage shells and structural components, cryogenic containers, heat exchangers, chemical processing equipment, and medical and surgical equipment applications, among others.

SPECIFICATIONS

- ASTM Grades I, II, III, IV (ATI 30, 40, 55, 70)
- ASTM B 348 - Bars and Billets
- AMS 4921 - Bars, Wire, and Forgings
- ASTM F 67 - Unalloyed Titanium
- ISO 5832-2 - Unalloyed Titanium

PHYSICAL PROPERTIES

Melting Range: 3,000-3,040°F, (1,649 - 1,671°C)
Density: 0.163 lbs/in^3; 4.51 gm/cm^3
Beta Transus Temperature:
ATI 30 1,630°F ± 25F° (888°C ± 4C°)
ATI 40 1,675°F ± 25F° (913°C ± 4C°)
ATI 55 1,690°F ± 25F° (921°C ± 4C°)
ATI 70 1,740°F ± 25F° (949°C ± 4C°)

HEAT TREATMENT

Commercially pure titanium can be annealed by heating to 1,000 - 1,300°F (538 - 704°C) for 1/2 to 2 hours and air cooling. Stress relief annealing can be achieved by heating to 1,000 - 1,100°F (538 - 593°C) for 30 minutes followed by air cooling.

HARDNESS

Typical annealed hardness in the annealed condition for DAXUN CP Grade 2 titanium is approximately Rockwell B80 and for CP Grade 4 titanium about Rockwell B100.

FORGEABILITY/FORMABILITY

Commercially pure titanium is readily finish forged from 600 - 1,200°F (316 - 649°C). Reductions of 25-40% below the Beta

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transus are necessary to obtain optimum properties. At room temperature CP titanium has limited formability.

Temperatures from 400 to 1,000°F (204 - 538°C) are normally used for deep drawing, spinning and other forming operations.

MACHINABILITY

Commercially pure titanium can be machined using practices for austenitic stainless steels using slow speeds, heavy feeds, rigid tooling and large amounts of non-chlorinated cutting fluid.

WELDABILITY

Commercially pure titanium can be easily welded if sufficient precautions are taken to avoid contamination from oxygen, nitrogen, and hydrogen. Fusion welding can be done in an inert gas-filled chamber or with a back shield to protect the molten weld metal and the nearby heated region from inert gases. Spot welding, seam welding, and flash welding can all be done without a protective environment.

SPECIAL PRECAUTIONS

Commercially pure titanium can be subject to hydrogen contamination during improper pickling and by oxygen, nitrogen, and carbon pickup during forging, heat treating, brazing, etc. This contamination results in a deterioration in ductility which adversely effects notch sensitivity and forming characteristics.

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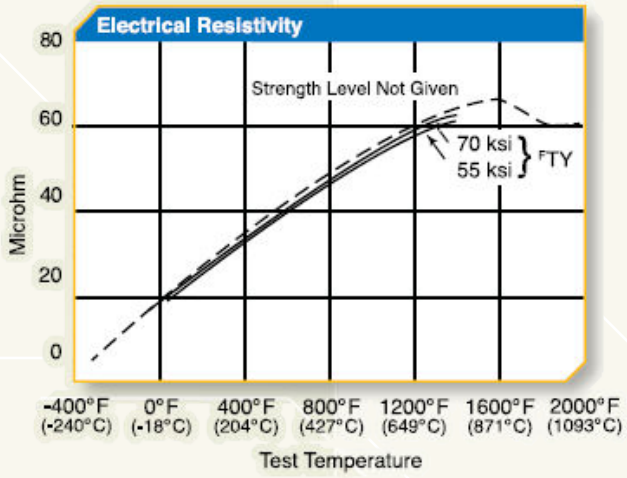
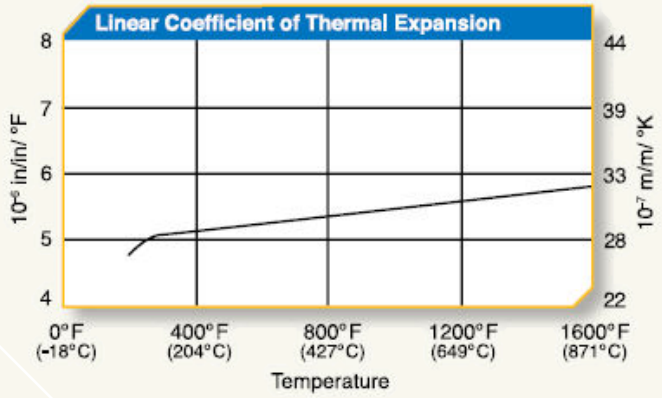
Technical Data Sheet

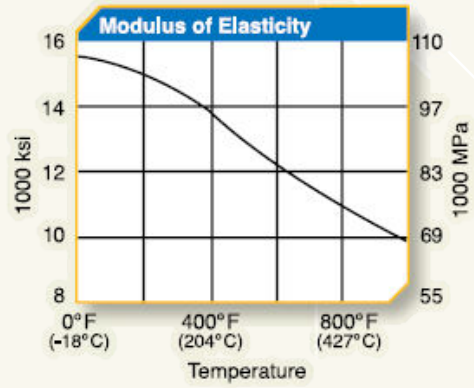
Chemical Composition

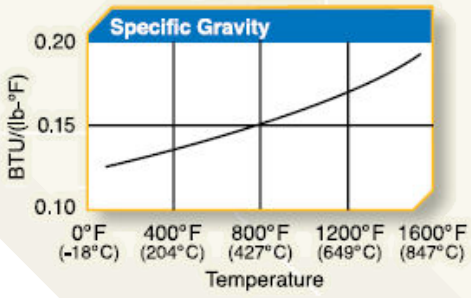
ATI vac Grade	ASTM B348 Grade #	Chemistry	N	C	H[A]	H[B]	O	Fe	Pd	Other Elements[C] Each	Other Elements[C] Total	Ti
30	1	Weight %, maximum	0.03	0.10	0.010	0.0125	0.18	0.20	-	0.05	0.30	Bal.
40	2		0.03	0.10	0.010	0.0125	0.25	0.30	-	0.05	0.30	Bal.
55	3		0.05	0.10	0.010	0.0125	0.35	0.30	-	0.05	0.30	Bal.
70	4		0.05	0.10	0.010	0.0125	0.40	0.50	-	0.05	0.30	Bal.

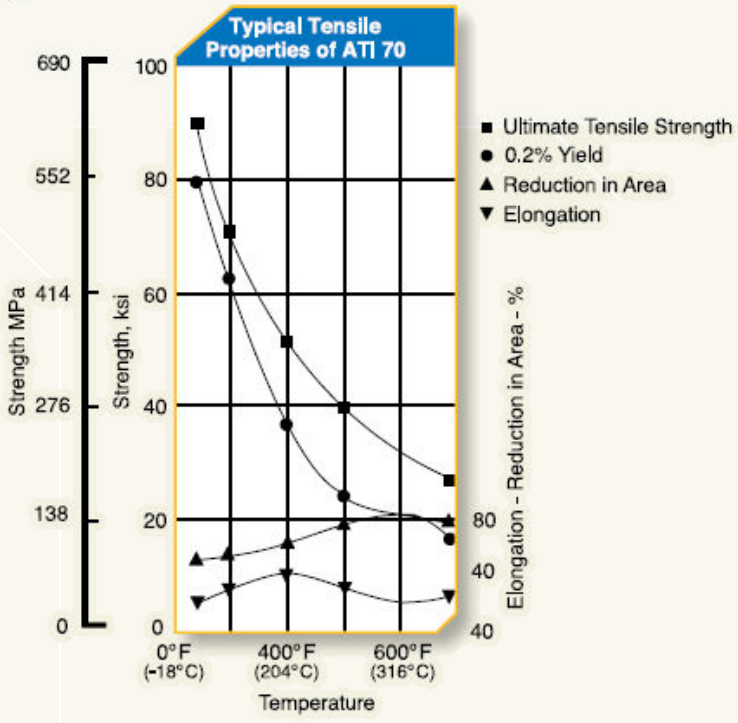
A - Billets only B - Bars only C - Need not be reported.











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Corrosion-Resistant

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