



# M/s. Chhaganlal Dharamchand Shah

## TITANIUM ALLOYS

Titanium, available in both the commercially pure or alloy form, is widely used in many critical and highly-stressed parts, thanks to its combination of a high strength-to-weight ratio (it's 40% lighter than steel), excellent mechanical properties and corrosion resistance. **Among its many applications are static and rotating gas turbine engine components, heat exchangers, nuclear power plants and medical implants and prostheses.** Available in all the usual product forms, it is also supplied in precision castings for near-net shape which reduce the amount of material loss.

GRADE	BRITISH SPECIFICATION	U.S. SPECIFICATION	ASTM SPECIFICATION	GERMAN SPECIFICATION	FRENCH SPECIFICATION
Grade 1		AMS-T-9046B CP4 AMS 4940 MIL-T-9046J CP4	ASTM B265 Gr1 Sheet/plate ASTM B337 Gr1 pipe (withdrawn) ASTM B338 Gr1 heat exchange tube ASTM B348 Gr1 bar ASTM B367 Gr1 castings ASTM B381 Gr1 forgings ASTM F67 Gr1 Surgical Implant ASTM F467 Gr1 nuts ASTM F468 Gr 1 bolts	WS 3.7024 CP Grade 1 WS 3.7025 CP Grade 1	T35- CP Grade 1
Grade 2	TA1 sheet/strip TA2 sheet/strip TA3 bar (obs) TA4 forging (obs) TA5 forging (obs) DTD 5073 IMI 125	AMS-T-9046B CP3 AMS 4902 MIL-T-9046J CP3 AMS 4941 AMS 4942 AMS 4951 Welding wire*	ASTM B265 Gr2 Sheet/plate ASTM B337 Gr2 pipe (withdrawn) ASTM B338 Gr2 heat exchange tube* ASTM B348 Gr2 bar ASTM B367 Gr2 castings ASTM B381 Gr2 forgings ASTM F67 Gr2 Surgical Implant ASTM F468 Gr2 bolts ASTM F467 Gr2 nuts	WS 3.7034 CP Grade 2 WS 3.7035 CP Grade 2	T40- CP Grade 2 T40- AIR 9182
Grade 3	MSRR 8608 DTD 5003 DTD 5023	AMS-T-9046B CP2 AMS 4900 MIL-T-9046J CP2	ASTM B265 Gr3 Sheet/plate ASTM B337 Gr3 pipe (withdrawn) ASTM B338 Gr3 heat exchange tube* ASTM B348 Gr3 bar ASTM B367 Gr3 castings ASTM B381 Gr3 forgings ASTM F67 Gr3 Surgical Implant ASTM F467 Gr3 nuts ASTM F468 Gr3 bolts	WS 3.7054 CP Grade 3 WS 3.7055 CP Grade 3	T50- CP Grade 3

Grade 4	TA6 TA8 TA9	TA7 AMS-T-9046B CP1 AMS-T-9047A CP70 AMS 4901 4921 MIL-T-9046J CP1 MIL-T-9047G CP70	AMS AMS AMS ASTM B348 Gr4 bar ASTM B367 Gr4 castings ASTM B381 Gr4 forgings ASTM F67 Gr4 Surgical Implant F467 Gr4 nuts F468 Gr4 bolts	WS 3.7064 CP Grade 4 WS 3.7065 CP Grade 4	T60- CP Grade 4
Grade 7			ASTM B265 Gr7 Sheet/plate ASTM B337 Gr7 pipe (withdrawn) ASTM B338 Gr7 heat exchange tube* ASTM B348 Gr7 bar ASTM B367 Gr7 castings ASTM B381 Gr7 forgings ASTM F467 Gr7 nuts ASTM F468 Gr7 bolts		
Grade 12			ASTM B265 Gr12 Sheet/plate ASTM B337 Gr12 pipe (withdrawn) ASTM B338 Gr12 heat exchange tube* ASTM B348 Gr12 bar ASTM B367 Gr12 castings ASTM B381 Gr12 forgings ASTM F467 Gr12 nuts ASTM F468 Gr12 bolts		
Grade 6 5Al-2.5Sn	DTD 5083 (w/drawn) TA15 (w/drawn) TA16 (w/drawn) TA17 (w/drawn)	TA14 AMS 4909 4910 AMS-T-9046B A-2 (ELI) AMS-T-9047A 5Al-2.5Sn AMS-T-9046B A-1 4966 AMS 4926 AMS 4924 AMS-T-9047A 5Al-2.5Sn (ELI) MIL-T-9046J A-1 MIL-T-9046J A-2 (ELI) MIL-T-9046H Type II Comp A MIL-T-9046H Type II Comp B MIL-T-9047G	AMS AMS AMS-T-9046B A-2 (ELI) AMS-T-9047A 5Al-2.5Sn AMS AMS AMS AMS-T-9047A 5Al-2.5Sn (ELI) MIL-T-9046J A-1 MIL-T-9046J A-2 (ELI) MIL-T-9046H Type II Comp A MIL-T-9046H Type II Comp B MIL-T-9047G	WS 3.7114	T-A5E
8Al-1Mo-1V		AMS 4915 4916 4972 AMS-T-9046B A-4 AMS-T-9047A 8Al-1Mo-1v MIL-T-9046J A-4 MIL-T-9046H Type II Comp F MIL-T-9047G 8Al-1Mo-1V	AMS AMS AMS AMS MIL-T-9046J A-4 MIL-T-9046H Type II Comp F MIL-T-9047G 8Al-1Mo-1V	WS 3.7134	T-A8D

Grade 5 6Al-4V	TA10 TA11 TA12 TA13 TA28 TA56 TA59MSRR 8614 MSRR 8652 AIMS 03/18/001 DTD 5163 DTD 5363	AMS 4907 ELI AMS 4911 AMS 4928 AMS 4930 ELI AMS 4931 ELI Duplex ann AMS 4963 AMS 4965 AMS 4967 AMS 4985 AMS 4991 AMS 6931 AMS 6932 MIL-T-9046J AB-1 MIL-T-9046J AB-2 (ELI) MIL-T-9046H Type 3 Comp C MIL-T-9046H Type 3 Comp D AMS-T-9046B AB-1 AMS-T-9046B AB-2 (ELI) MIL-T-9047G 6Al-4v MIL-T-9047G 6Al-4v (ELI) AMS-T-9047A 6Al-4v AMS-T-9047A 6Al-4v (ELI)	ASTM B265 Gr5 Sheet/plate ASTM B348 Gr5 bar ASTM B367 Gr5 castings ASTM B381 Gr5 forgings ASTM F136 Gr5 Implant Grade(*ground*) ASTM F467 Gr5 nuts ASTM F468 Gr5 bolts	WS 3.7164 (aerospace) WS 3.7165	T-A6V A6VE (6Al-4V ELI) T-
Grade 9 3Al-2.5V		AMS 4943 AMS 4944 AMS 4945 AMS-T-9046B AB-5 AMS-T-9047A 3Al-2.5V MIL-T-9046J AB-5 MIL-T-9047 3Al-2.5V	ASTM B265 Gr6 Sheet/plate ASTM B348 Gr6 bar ASTM B367 Gr6 castings ASTM B381 Gr6 forgings		
6Al-6V-2Sn		AMS 4918 AMS 4971 AMS 4978 AMS 4979 AMS 6935 AMS 6936 AMS-T-9046B AB-3 AMS-T-9047A 6Al-6V- 2Sn MIL- T-9046J AB-3 MIL-T- 9047G 6Al-6V-2Sn MIL-T-9046H Type III Comp E		WS 3.7174	T-A6V6E2
6Al-2Sn-4Zr- 2Mo	TA18 (w/drawn) TA19 (w/drawn) TA20 (w/drawn) TA25 (w/drawn) TA26 (w/drawn) TA27 (w/drawn)	AMS 4919 AMS 4975 AMS 4981 AMS 6905 AMS-T-9046B AB-4 AMS-T-9047A 6Al- 2Sn-4Zr-2Mo MIL- T-9046J AB-4 MIL-T- 9047G 6Al-2Sn-4Zr-2Mo MIL-T-9046H Type III Comp G	Since 1969	WS 3.7144	T-A6ZR4DE
6Al-7Nb			ASTM F-1295 ISO 5832-11		