

Chemical Requirements

Elements

Grade	1	2	3	4	5	7	9	11	12	16	17	23
N% (max)	.03	.03	.05	.05	.05	.03	.03	.03	.03	.03	.03	.03
C% (max)	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08
H% (max)	.015	.015	.015	.015	.015	.015	.015	.015	.015	.015	.015	.0125
Fe% (max)	.20	.30	.30	.50	.40	.30	.25	.20	.30	.30	.20	.25
O% (max)	.18	.25	.35	.40	.20	.25	.15	.18	.25	.25	.18	.13
Al%					5.5-6.75		2.5-3.5					5.5-6.5
V%					3.5-4.5		2.0-3.0					3.5-4.5
Pd%						.12-.25		.12-.25		.04-.08	.04-.08	
Mo%									.2-0.4			
Ni%									.6-9			

Mechanical Requirements

Tensile Strength

Grade	1	2	3	4	5	7	9	11	12	16	17	23
MPa (min)	240	345	450	550	895	345	620	240	483	345	240	828

Yield Strength (0.2% Offset)

Grade	1	2	3	4	5	7	9	11	12	16	17	23
MPa (min)	170	275	380	483	828	275	483	170	345	275	170	759
MPa (max)	310	450	550	655		450		310		450	310	

Elongation (in 50mm)

Grade	1	2	3	4	5	7	9	11	12	16	17	23
% (min)	24	20	18	15	10	20	15	24	18	20	24	10

Hardness Vickers

Grade	1	2	3	4	5	7	9	11	12	16	17	23
(approx.)	140	170	240	310	330	170	290	140	200	170	140	330

Notes

Grade 7 + Grade 2 + .12-.25 Pd, Grade 11 = Grade 1 + .12-.25 Pd, Grade 16 = Grade 2 + .04-.08 Pd, Grade 17 = Grade 1 + .04-.08 Pd, Grades 1, 2, 3 & 4 can be supplied at ASTM F67-95 and Grade 23 to ASTM F136-96 (Ti 6/4 Eli) both surgical implant applications, Grade 23 (Ti 6/4 Eli) is also used in corrosive environments such as offshore production equipment and piping, for severely corrosive environments, palladium and ruthenium can be added to the titanium alloys.

*Any data above is for reference only and should be confirmed by obtaining current ASTM or similar specifications.