

### Titanium and Titanium Alloys



Titanium is the element with symbol Ti and atomic number 22. Titanium is a highly corrosion resistant and durable metal which is stronger and almost 45% lighter than other high strength stainless steel grades. Even though Titanium is the fourth abundant metal, due to lack of availability in pure form and due to the extraction process involving different complex stages (Kroll process) is making Titanium and its alloys relatively expensive.

Unique properties like high strength to weight ratio, chemical resistance and mechanical properties made titanium a critical & preferential choice for aviation and aerospace industries. Titanium and its alloys are not brittle even at very extreme low temperatures making it preferred for cryogenic services and even for space projects. Titanium is also having a major use in heat exchangers, tanks, process vessels, valve for Chemical and Petro chemical industries for the non-corrosive characteristics. Extremely high corrosion resistance in saline sea water makes it popular for heat exchanger in desalination industry as well.

General categorisations of Titanium are as below

- Pure - Unalloyed
- Alpha & Near Alpha alloys
- Alpha Beta alloys
- Beta & Near Beta alloys

#### Physical properties of Titanium and Titanium Alloys

Light in weight	Low in heat conductivity
Low in thermal expansion	High in flexibility
High in electrical resistivity	Non magnetic

#### Chemical and Mechanical properties of Titanium grades

Grade	UNS	C %	N %	O %	H %	Fe	Pd	Ti
Titanium Gr1	R50250	0.08	0.03	0.18	0.015	0.20	-	Balance
Titanium Gr2	R50400	0.08	0.03	0.25	0.015	0.30	-	Balance
Titanium Gr3	R50550	0.08	0.05	0.35	0.015	0.50	-	Balance
Titanium Gr4	R56400	0.08	0.05	0.40	0.015	-	-	Balance
Titanium Gr7	R52400	0.08	0.03	0.25	0.020	0.30	0.12-0.25	Balance
Titanium Gr11	R52250	0.08	0.03	0.18	0.020	0.20	0.2	Balance
Titanium Gr12	R53400	0.08	0.03	0.25	0.020	0.20	-	Balance

#### Available size ranges in Titanium grades to ASME B36.10 / ASME B36.19 specifications

Category	Construction	Size Range (DN)	SCH/Ratings	Standard
Pipe	Seamless	015 - 150	10S - XXS	ASTM B861 ASTM B862
	Welded	NA		
BW Fittings	Seamless	015 - 150	10S - XXS	ASTM B363
	Welded	NA		
SW Fittings	Forged	015 - 050	CL 3000 - 6000	ASTM B381
	Flanges	015 - 100		

#### Stock Certifications, Testings and Reports



All stock available materials from Ferro FPF are coming with full traceability and necessary testing reports along with Material Test Certificates to EN 10204 3.1. Most of our process piping materials from stock is coming with dual certification. This is achieved according to the international standards by controlling the chemical composition and mechanical properties in the permissible ratio meeting different grades and standards. This is an optimal way of providing our customers with a comprehensive range of material grades in the most efficient way suiting the project requirements.

Any client and project requirements over and above the normal standards are achieved with possible additional testings, modifications and inspections using in-house and approved third party facilities. All project confirmed modifications are performed according to relevant international standards and backed with conformity reports.

Ferro Pipe and Fittings is having a demonstrated experience in managing project package supplies of Pipes, Fittings, Flanges and Valves for various national and international projects directly with end users and through international EPC's. [Contact us](#) to discuss on our capacities and custom solutions we can offer to your project piping requirements