DATA SHEET No 9
Titanium Valves

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Most likely you expect titanium valves to be expensive - why? A number of valve makers supply titanium valves at prices similar to or less than other highly corrosion resistant alloys. Titanium alloys are strong and highly corrosion resistant. Valve designs that take these factors fully into account are competitive. Valve designs that ignore these basic facts are always much more expensive than they should be.

Making titanium castings from patterns designed for copper based alloys or steel is inherently wasteful. New patterns will optimise the higher strength of titanium – using thinner sections and with no need for a corrosion allowance. For smaller sized valves, and simpler shapes, machining from bar or forgings offers an alternative low cost option. Take a look at the figures:

Alloy	Yield Strength at 20ºC min MPA	Density kg/1	Strength/ weight ratio at 20ºC	Strength/ weight ratio compared to Grade 5
Titanium Grade 5	830	4.42	188	100
Stainless Steel 316L	210	7.94	26	14
Zeron 100 super duplex	450	7.84	57	30
Stainless Steel 6%Mo-254SMO	300	8.00	38	20
Monel®400	200	8.83	23	12
Inconel®625	415	8.44	49	26
Hastelloy®C-276	355	8.89	40	21
Bronze AB2	250	7.95	31	17

And look at the comparative corrosion resistance in natural and polluted seawater:

Type of Corrosion	Copper alloys	Stainless Steel	Titanium
General Corrosion	Resistant/Susceptible	Resistant	Immune
Crevice Corrosion	Susceptible	Susceptible (>60℃)	R esistant (<90℃)
Pitting	Susceptible	Resistant	Immune
Stress Corrosion	Susceptible	Resistant	Resistant
Corrosion Fatigue	Susceptible	Susceptible	Resistant
Galvanic Attack	Susceptible	Resistant	Immune
Microbiological	Susceptible	Susceptible	Immune
Weld/HZ Corrosion	Susceptible	Susceptible	Highly Resistant
Erosion Corrosion	Susceptible	Resistant	Highly Resistant

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