

Seawater Applications with Stainless Steel

Stainless Steel Grade 316 is the **Most Cost-Effective** choice for normal seawater services and is probably the most common grade of stainless steel used in marine applications. It has more molybdenum than other austenitic stainless steels which helps it to resist pitting and other corrosive effects of salt water. However, stagnant conditions must be avoided and a minimum flow of 3 to 5 ft/sec. must be maintained.

Similarly, cast stainless steels such as CF8M should be considered as an alloy choice for large seawater valves.

Because stainless steel contains at least 10.5% chromium, the oxidation of iron is changed to produce a complex oxide that resists further oxidations and forms a passive layer on the surface. This is a very thin layer (microns in thickness) but very tenacious and will reform if it is removed by scratching or machining. The addition of 10% nickel to the structure (grade 316) broadens the range of passivity established by the chromium. Further addition of 2% molybdenum further expands the passivity range and improves corrosion resistance, notable in seawater.

More exotic higher alloys for critical seawater applications are available. However, the high cost requires a special reason for justification. Among other issues to be considered is the seawater temperature, chlorine content and compatibility with piping material.