

## Stainless Steel Applications – Marine

A short description of the various grades of stainless steel used in marine applications. It has been written primarily from a European perspective and may not fully reflect the practice in other regions.

Materials for marine applications are selected to maintain the integrity of the structure (i.e. to be sufficiently robust withstand their service environment) and to be corrosion resistant. Stainless steels are used in marine applications because they are resistant to corrosion, easily fabricated and offer good mechanical properties.

The following examples may serve to indicate the considerations made in selecting a suitable grade of stainless steel for marine applications. Austenitic stainless steel grades 1.4401 (AISI 316) and its derivatives are suitable for coastal service environments, splash zone applications and intermittent submersion in seawater. Although 1.4401 and its derivatives were once known as “marine grade” stainless steel, they are no longer recommended for permanent contact with seawater. Superaustenitic stainless steels containing 6% molybdenum are now recommended for permanent immersion in seawater. Duplex stainless steels (e.g. 1.4462/ASTM S31803) may be used in brackish waters (eg estuaries where the chloride content of the water is less than that of the open sea). Superduplex stainless steels (e.g. 1.4410/ASTM S32750) may also be used in direct and prolonged contact with seawater (e.g. in offshore oil platforms).

Typical applications for stainless steels in marine applications are shown in the table below.

### Marine Applications – Applications and Grades

Application/Use	Stainless Steel	
	Type	EN 10088 Grade
Coastal (land-based) handrails, housings for equipment, ladders, lamp posts, etc	Austenitic	1.4401 (AISI 316) 1.4404 (AISI 316L)



Application/Use	Stainless Steel	
	Type	EN 10088 Grade
Deck components for boats and ships eg deck eyes, brackets for anchor ropes, housings for equipment, shackles, handrails, etc	Austenitic  Precipitation Hardness	1.4401 (AISI 316) 1.4404 (AISI 316L)  1.4542 (17/4 PH)
Boat propeller shafts	Austenitic	1.3964 (Nitronic 50)
Submerged items - pipelines and grills for oil, sewage and water, risers for oil platforms, grills, heat exchangers for ships and coastal power plants, equipment attached to hulls of boats and ships	Austenitic with 6% Mo	1.4547 (ASTM S31254)[254 SMO] 1.4529
Prolonged contact items – pumps, winches, holding and storage vessels	Austenitic with 6% Mo	1.4547 (ASTM S31254) [254 SMO] 1.4529

*Footnote: The above information has been extracted from a document prepared by Tony Newson of Eurofer, Brussels, whose objective was to provide a summary of the basic grades of stainless steel commercially available and to indicate which grades are most commonly used in some of the principal application categories.*

*Broad categories of use (eg transport, consumer goods etc) are defined, along with the stainless steel grades most commonly used for those applications. Although this*



*extract deals only with boat-building/marine applications, similar summaries can be found under the following library headings:*

- *What can stainless steel do for - Transport*
  - *Automotive*
  - *Railway*
  - *Aerospace*
- *Home & Office*
  - *Consumer applications*