

Stainless Steel Material Properties

Stainless Steel

Stainless Steel falls into three basic material groups.

Austenitic (A)

Martensitic (M)

Ferritic (F)

Martensitic and Ferritic groups are rarely used for the production of commercial fasteners and are not included for that reason.

Austenitic or Chromium-nickel Steel is the most commonly used for fasteners and is subdivided into 3 steel grades each with its own specific properties.

A1 = *Free cutting quality, superior machinability due to higher Phosphorus and Sulphur content, the general corrosion resistance is lower. Seldom used in mass produced fasteners.*

Most commonly used grade of Stainless Steel also called 18/8.

A2 = *Outstanding corrosion resistance under normal atmospheric conditions, wet surroundings, oxidizing and organic acids and many alkalic and salt solutions.*

Highest level of corrosion resistance also called "Acid Proof". Increased nickel content and the addition of molybdenum. More resistant to aggressive climates such as seawater (chlorides) and industrial (sulphur dioxide) climate and oxidizing acids.

Chemical Composition

The wide limits for the percentages of the alloying elements in ISO3506 allow for a great choice of austenitic steel types. The following table lists some of the most popular types.

Grade	Chemical Composition % ¹⁾								Type			
	C	Si	Mn	P	S	Cr	Mo ⁸⁾	Ni	W.Nr	AISI	ISO	Notes
A1	0.12	1.0	2.0	0.20	0.15-0.35	17.0-19.0	0.60	8.0-10.0	1.4305	303	17	2,3
A2	0.08	1.0	2.0	0.05	0.03	17.0-20.0		8.0-13.0	1.4301	304	11	3,4,6,7
									1.4541	321	15	5
A4	0.08	1.0	2.0	0.05	0.03	16.0-18.5	2.0-3.0	10.0-14.0	1.4401	316	20	3,4,6
									1.4571	316Ti	21	5

Notes: - 1) Maximum values unless stated otherwise. 2) Sulphur may be substituted by Selenium
 3) May contain Titanium < 5 x C up to 0.8%. 4) May contain Niobium and/or Tantalum > 10 x C up to 1.0%. 5) Containing Titanium > 5 x C up to 0.8%. 6) May contain Copper up to 4.0%
 7) Molybdenum may also be present at manufacturers option. 8) Maximum Molybdenum content may be specified by customer in certain applications.