



## STAINLESS STEEL

In metallurgy, stainless steel, also known as inox steel or inox from French "inoxydable," is defined as a steel alloy with a minimum of 10.5% to 11% chromium.

**Stainless steel** is the universal name for a number of different steels used primarily for their anti-corrosive element. Stainless steel has been developed to resist a number of corrosive environments. It ensures that our workplaces are safe, that buildings last longer and that our food preparation surfaces are hygienic. It is also an earth friendly material; it can be melted down, recycled and made into something else.

The minimum stainless steel is always made using chromium. The minimum amount of chromium used to make stainless steel is 10.5%; it is chromium that makes the steel stainless. Chromium also improves the corrosion resistance by forming a chromium oxide film on the steel. This very thin layer, when placed under the right conditions, can also be self-repairing.

There are other elements used to make stainless steel as well, including nickel, nitrogen and molybdenum. Bringing these elements together forms different crystal structures that enable a variety of properties in machining, welding and forming.

There are four major types of stainless steel:

**Austenitic** is the most widely used type. It has a nickel content of at least 7%, which makes it very flexible. It is used in a range of houseware products, industrial piping and vessels, constructional structures and architectural facades. This is not hardenable by heat treating.

**Ferritic** stainless steel has similar properties to mild steel, but better corrosion resistance. This type of steel is commonly used in washing machines, boilers and indoor architecture.

**Martensitic** stainless steel is a very hard, strong steel. It contains around 13% chromium and is used to make knives and turbine blades. Duplex is both a austenitic and ferritic and primarily used in chemical plants and piping applications. They usually contain approx. 22-25% chrome and 5% nickel with moly and nitrogen. They have higher yield strength and greater stress corrosion cracking resistance to chloride than austenitic.

**Precipitation Hardening** stainless steels are chrome-nickel stainlesses which contain alloying additions such as aluminum, copper or titanium that allow them to be hardened by a solution and aging heat treatment. They can be either austenitic or martensitic in the aged condition.

**303** – 303 stainless is the most machinable of the austenitic grades of ss. With the addition of sulfur to this grade, the sulfur enhances the alloys machinability which is ordinarily difficult to machine. Applications for 303 is shafts, valve bodies, valve trim and food industry applications where 304 is normally used. 303 stainless is resistant to atmospheric corrosion, food products, sterilization solutions and many organic chemicals as well as a variety of inorganic chemicals.

**304** – 304 and 304L (low carbon version) is a low carbon austenitic alloy. By keeping the carbon at .03% max, it minimizes carbide precipitation during welding.

Applications are the same as 303