Stainless Steel Chemistry

In metallurgy, **stainless steel** is defined as a steel alloy with a minimum of 11.5% chromium content by mass. Stainless steel does not stain, corrode or rust as easily as ordinary steel (it "stains less"), but it is not stain-proof. As an example, mayonnaise left on a knife blade in the sink seems to stain the blade a darker color. There are different grades and surface finishes of stainless steel to suit the environment to which the material will be subjected in its lifetime. Common uses of stainless steel are cutlery and watch straps.

Stainless steel differs from carbon steel by amount of chromium present. Carbon steel rusts when exposed to air and moisture. This iron oxide film is active and accelerates corrosion by forming more iron oxide. Stainless steels have sufficient amount of chromium present so that a passive film of chromium oxide forms which prevents further corrosion.

Stainless steel's resistance to corrosion and staining, low maintenance, relative inexpense, and familiar luster make it an ideal base material for a host of commercial applications. There are over 150 grades of stainless steel, of which fifteen are most common.

There are different types of stainless steels: when nickel is added, for instance, the austenite structure of iron is stabilized. This crystal structure makes such steels non-magnetic and less brittle at low temperatures. For greater hardness and strength, carbon is added. When subjected to adequate heat treatment, these steels are used as razor blades, cutlery, tools, etc.

A typical composition of 18% chromium and 8% nickel, commonly known as **18/8 stainless**, is often used in flatware. 18/8 has approximately 18% chromium, and from 8-10 percent nickel. The nomenclature 18/8, and 18/10 are sometimes both used to represent the same type steel.

18/0 has 18 percent chromium, and no nickel. This common steel is often used in flatware sets as it combines the stain resistant elements of 18/8 at a lower cost. In recent years the price of nickel has increased by ten fold.

Whenever a fine cutting edge is required, as in the knife blades of your new stainless from GINKGO Int'l, Ltd., the blade is made from 13% chrome steel, and then tempered. The 13% chrome tempered blades can be re-sharpened, are flexible, and have a "memory" - they snap back into their original shape after being bent. However, they have less chromium, so are a bit more prone to oxidation (rust) and water spots.