

Why is stainless steel Stainless?

In 1913, English metallurgist Harry Breardly, working on a project to improve rifle barrels, accidentally discovered that adding chromium to low carbon steel gives it stain resistance. In addition to iron carbon, and chromium, modern stainless steel may also contain other elements, such as Nickel, niobium, molybdenum and titanium. Nickel molybdenum, niobium, and chromium enhance the corrosion resistance of stainless steel. It is the addition of a minimum of 12% chromium to steel that makes it resist rust, or stain "less" than other types of steel. The chromium in steel combines with oxygen in the atmosphere to form a thin, invisible layer of chrome-containing oxide, called the passive film. The sizes of chromium atoms and their oxides are similar, so they pack neatly together on the surface of the metal, forming a stable layer only a few atoms thick. If the metal is cut or scratched and the passive film is disturbed, more oxide will quickly form and recover the exposed surface, protecting it from oxidative corrosion. (Iron, on the other hand, rusts quickly because atomic iron is much smaller than its oxide, so the oxide forms a loose rather than tightly packed layer and flakes away.) The passive film requires oxygen to self-repair, so stainless steels have poor corrosion resistance in low-oxygen and poor circulation environments. In seawater, chlorides from the salt will attack and destroy the passive film more quickly than it can be repaired in a low oxygen environment.

Table Cutlery and flatware

Some cutlery and flatware is marked 18.8 and some 18.10, is there any difference and what does it mean?

These numbers refer to the additional elements that are in the stainless steel. The first number is chromium content and the second that of nickel. Both elements increase the corrosion (rust) resistance of the steel. So in theory the steel with 18% chromium and 10% nickel has a better corrosion than the one with only 8% nickel. However many specifications for stainless steel around the world have a manufacturers composition tolerance within this grade of 8% to 10% nickel, so often although the item is marked 18.10 it may legally only have, for example 8.1% nickel. So in practical terms there may be no difference in performance.