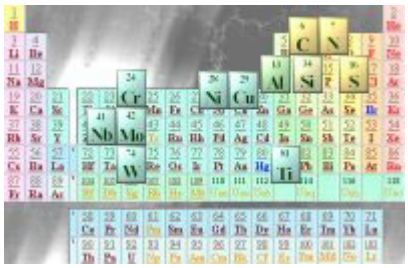
SALZGITTER MANNESMANN STAINLESS TUBES
A Member of the Salzgitter Group

Influence of Alloys



Chrome is the basic element in stainless steels because it is the one which confers passivity to the alloy. The higher the chromium content, the greater will be the chemical "resistance" of the passive protective layer

Reducing the **carbon** content reduces the possibility of the presence of chromium carbide and therefore increases the resistance to intergranular corrosion ("L" series C<0.03%).
On the other hand, a high carbon level improves the creep resistance ("H" series 0.04<C<0.10) and increases the mechanical properties at higher temperatures.

Nickel is essential for an austenitic structure. Its most important property is a very good ductility even at low temperatures.

High nickel contents (above 20%) provide a better resistance to stress corrosion.

Molybdenum reinforces the passivity of the metal and therefore its resistance to pitting and crevice attack. It is indispensable for grades resistant to sea water corrosion (DMV 904; DMV 954).

Titanium's strong affinity to carbon reduces the precipitation of chromium carbides and hence a susceptibility to intergranular attack.
Thus, the carbon content does not need to be reduced to avoid this type of corrosion and the addition of Titanium maintains better mechanical properties.
Furthermore, titanium stabilised austenitic stainless steels are weldable without heat treatment and are used in construction or for high temperature service (e.g. DMV 321).
When used in conjunction with aluminium, titanium can produce precipitates which improve hot strength (e.g.DMV 800).

Niobium acts and reacts similar to Titanium.

Copper improves corrosion resistance in certain acid environments (DMV 904).

Nitrogen improves mechanical properties and increases resistance to local attack, particularly in grades containing molybdenum (DMV 316N; DMV 22.5; DMV 25.7N).

Silicon increases resistance to oxygen and to hot oxidising gases. Therefore it is used in so-called "refractory" alloys (DMV 310Si).

A high **aluminium** content improves high temperature resistance to sulphidation. Hence, it is used in so-called "refractory" alloys.
On the other hand, its presence makes extrusion of these grades tricky, if not impossible. In conjunction with titanium it produces a hardening phase wich improves creep resistance (DMV 800HT).

Tungsten improves resistance to localised corrosion (DMV 25.7; DMV 25.7N).

Sulphur increases susceptibility to pitting corrosion and increases brittleness. Its sole beneficial effect is to improve machinability, not only in carbon steels but also in austenitic stainless steels (VALIMA grades).