INDEPENDENT NAIL STAINLESS STEEL FACT SHEET

Stainless steel is the name of a family of alloy steels that resist corrosion (rust). As a family, the stainless steels have an easily maintained, attractive appearance. They show remarkable strength and ductility and are unique in their general resistance to weather and to most corrosives. Most stainless steels used in the home are highly polished, with a silvery appearance, but they do not need this finish to resist corrosion.

Chromium is the chief metal alloyed with iron, carbon, manganese and silicon in making stainless steel. Chromium helps steel resist corrosion. However, the carbon in the steel reduces the ability of chromium to provide corrosion resistance. As a result, most stainless steels are improved by reducing the amount of carbon in them to very low levels. Nickel ranks as the second most important alloy in most stainless steels. One or more of the following elements also may be added to iron to make stainless steel: molybdenum, titanium, columbium, aluminum, nitrogen, phosphorus, sulfur and selenium. Each element modifies stainless steel so it can be used for a specific purpose.

TYPE 204Cu STAINLESS STEEL (ADDED COPPER AND REDUCED NICKEL FOR NON-CORROSIVE ENVIRONMENTS)

204Cu: Type 204Cu Stainless is a copper-containing, low-nickel, nitrogen-strengthened, austenitic stainless steel. The nitrogen addition results in higher annealed strength than Type 304; however, the copper addition reduces the work hardening rate to provide cold worked properties similar to Type 304. The alloy is nonmagnetic in the annealed condition and remains nonmagnetic after cold working. Cold forming characteristics are superior to the 200 series stainless steels and similar to Type 304.

Type 204Cu should be considered for applications where Type 304 has been previously used. These have included wire products such as spring, fence, rope, belt, nail, electropolished, pole-line, buttress screw and windshield wiper arms.

The stainless alloy resists most oxidizing acids and can withstand all ordinary rusting. **HOWEVER, IT WILL TARNISH OR SHOW RED RUST WHEN EXPOSED TO A SALT WATER OR COASTAL ENVIRONMENT. It is recommended that Type 316 Stainless Steel be used for exposed fasteners within 5 miles of a coastal salt water environment.**

Analysis of Stainless Type 204Cu:

Carbon 0.10% max.-Silicon 1.00% max.-Manganese 9.00% max.-Chromium 16.00-17.00%
Phosphorus 0.035% max.-Nickel 2.00-3.00%-Sulfur 0.010% max.-Copper 3-3.5%

TYPE 304 STAINLESS STEEL (MOST COMMONLY USED FOR NON-CORROSIVE ENVIRONMENTS)

304: The basic alloy. Type 304 (18-8) is an austenitic steel possessing a minimum of 18% chromium and 8% nickel, combined with a maximum of 0.08% carbon. It is a nonmagnetic steel which cannot be hardened by heat treatment, but instead must be cold worked to obtain higher tensile strengths.

The 18% minimum chromium content provides corrosion and oxidation resistance. The alloy's metallurgical characteristics are established primarily by the nickel content (8% min.), which also extends resistance to corrosion caused by reducing chemicals. Carbon, a necessity of mixed benefit, is held at a level (0.08% max.) that is satisfactory for most service applications.

The stainless alloy resists most oxidizing acids and can withstand all ordinary rusting. **HOWEVER, IT WILL TARNISH OR SHOW RED RUST WHEN EXPOSED TO A SALT WATER OR COASTAL ENVIRONMENT. It is recommended that Type 316 Stainless Steel be used for exposed fasteners within 5 miles of a coastal salt water environment.**

Analysis of Stainless Type 304:

Carbon 0.08% max. Silicon 1.00% max.
Manganese 2.00% max. Chromium 18.00-20.00%
Phosphorus 0.045% max. Nickel 8.00-10.50%
Sulfur 0.030% max.

TYPE 316 STAINLESS STEEL (MOST COMMONLY USED WITHIN 5 MILES OF A SALT WATER ENVIRONMENT)

316: For severe environments. Of course, there are many industrial processes that require a higher level of resistance to corrosion than Type 304 can offer. For these applications, Type 316 is the answer.

Type 316 is also austenitic, non-magnetic, and thermally nonhardenable stainless steel like Type 304. The carbon content is held to 0.08% maximum, while the nickel content is increased slightly. What distinguishes Type 316 from Type 304 is the addition of molybdenum (Moly) up to a maximum of 3%. Moly increases the corrosion resistance of this chromium-nickel alloy to withstand attack by many industrial chemicals and solvents, and, in particular, inhibits pitting caused by chlorides. As such, molybdenum is one of the single most useful alloying additives in the fight against corrosion and red rust.

By virtue of the molybdenum addition, Type 316 can withstand corrosive attack by sodium and calcium brines, hypochlorite solutions, phosphoric acid; and the sulfite liquors and sulfurous acids. This alloy, therefore, is specified for industrial equipment that handles corrosive process chemicals and for fasteners that are exposed to coastal salt water environments.

Analysis of Stainless Type 316:

Carbon 0.08% max. Silicon 1.00% max.
Manganese 2.00% max. Chromium 16.00-18.00%
Phosphorus 0.045% max. Nickel 10.00-14.00%
Sulfur 0.030% max. Molybdenum 2.00-3.00%