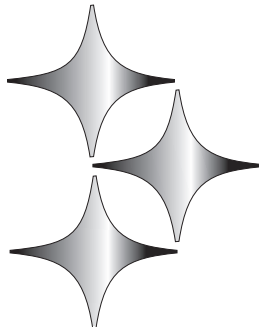


## 300 Series Stainless Steel

Stainless steel has found widespread use in virtually all types of wet cooling equipment due to its excellent mechanical properties combined with its superb corrosion resistance.

Selective substitution of stainless steel with galvanized steel often provides suitable life on marginal applications. Use of stainless steel cold and hot water basins on otherwise galvanized cooling towers is an excellent example of this type of application. When the environment warrants, complete substitution of galvanized steel with stainless steel is available on virtually all Recold and Marley galvanized products. 300 series (e.g. 301, 302, 303, 304, 305) stainless steel is commonly used, and in severe applications—such as chloride levels above 900 ppm—316 stainless is used. Cooling towers are excellent applications for stainless steel use because the clean aerated water flow maintains a protective layer of chromium oxide on the steel surfaces.



### 301L stainless steel.

301L has been used as a direct substitute for 304 stainless steel in many instances, for almost 20 years. The 301L is in the same “austenitic” family of stainless steels as the more common and well-known 304 alloy, and has just minor differences in composition.

### 301L stainless steel actually has some advantages over 304 stainless steel.

- higher tensile strength and yield strength
- lower carbon which results in less chromium carbide precipitation which means less corrosion at weld lines (a.k.a. “intergranular corrosion,” “sensitization” and “weld decay”).
- faster work hardening which minimizes thinning when forming.

### Corrosion resistance of 301L compared to 304.

“In fact, in 5 percent sulfuric acid at 86°F, 301 SS exhibited a corrosion rate of only 9 mils per year (mpy), while 304 SS showed a rate of 57 mpy”. (LaQue and Copson. *Corrosion Resistance of Metals and Alloys*. Reinhold Publishing).

“After a 15-year exposure 800 feet from the ocean: 301 SS showed *Light rust and rust stain on 20% of surface* and 1.6 mils average pit depth. 304 SS showed *Spotted with slight rust stain on 15% of surface* and 1.1 mils average pit depth.” (*Metals Handbook, Ninth Edition, Volume 13 Corrosion*. ASM International).

“Both 301 and 304 are listed as appropriate for the same environments - industrial and marine atmospheres, and mild or oxidizing chemical environments.” (*Design Guidelines for the Selection and Use of Stainless Steels*. AISI).

With equivalent corrosion resistance, 301L stainless steel has the same upper limit for chlorides in cooling tower circulation water as 304 stainless steel. This established limit, based on decades of SPX / Marley experience, is 900 ppm chlorides which far exceeds the typical range of 50 to 400 ppm found in most HVAC applications.

**SPX**

COOLING TECHNOLOGIES