

# Insist on: Proven Materials of Construction

- *New materials outperform stainless steels*
- *304 stainless steel is the benchmark for stainless steel applications*
- *Insist on a minimum of 10 years of field operating experience*

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BAC offers a variety of materials to meet the corrosion resistance, unit operating life and budgetary requirements of any project. Each of these materials have been proven through extensive testing in BAC's Corporate Technology Center and at least 10 years of successful field operating experience.

**TriArmor® Corrosion Protection System –** Proven to provide greater corrosion protection for cold water basins than stainless steel. It consists of a structural steel substrate fully encapsulated with a thermosetting hybrid polymer. After the basin is assembled, an industrial grade polyurethane barrier is applied in an environmentally controlled chamber to the water containing side of the basin.



TriArmor® is completely impervious to cooling system water chemistries and operating conditions as well as pitting, chloride stress and crevice crack corrosion (which attack stainless steels under certain conditions) and leaks. The TriArmor® Corrosion Protection System comes with a 5-year leak & corrosion protection warranty.

**Type 304 Stainless Steel –** BAC testing and experience confirms that Type 304 stainless steel provides the best value for owners and operators that prefer stainless steel in cooling tower service.

Some manufacturers have begun offering Type 301L stainless steel as an alternative to Type 304. The driver is to use a less expensive material with the claim that it is “almost as good” as 304. BAC evaluated this lower cost alternative several years ago and determined its reduced level of corrosion protection, combined with the absence of any field experience in evaporative cooling service, presented an unacceptable risk for owners and operators.

The reduced Chromium (Cr) and Nickel (Ni) concentrations as shown in the table below confirms BAC's findings regarding the suitability of Type 301L stainless steel (a “16/6” stainless steel versus the “18/8” of 304) for cooling tower service. The reduced content of nickel and chromium does provide a lower first cost, but at a high life-cycle cost to the owner with reduced corrosion protection. The owner should consider the cost of ownership when considering the reduced corrosion protection offered with Type 301 stainless steel.

| Stainless Steel Alloy |     | C    | Mn  | Si   | P     | S    | Cr   | Ni   |
|-----------------------|-----|------|-----|------|-------|------|------|------|
| 304                   | min | 0    | 0   | 0    | 0     | 0    | 18.0 | 8.0  |
|                       | max | 0.08 | 2.0 | 0.75 | 0.045 | 0.03 | 20.0 | 10.5 |
| 301L                  | min | 0    | 0   | 0    | 0     | 0    | 16.0 | 6.0  |
|                       | max | 0.03 | 2.0 | 1.0  | 0.045 | 0.03 | 20.0 | 8.0  |

Percentage by Weight

This is typical of the published literature regarding Type 301. According to the Allegheny Ludlum Technical Data Blue Sheet, "Type 301 is resistant to a variety of corrosive media. However, the corrosion properties are not as good as the 18-8 chromium-nickel steels. Its susceptibility to carbide precipitation during welding restricts its use in many applications in favor of types 304 or 304L."

From the Metals Handbook, Ninth Edition, "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 the surface and 1.1 mils average pit depth." Note more surface rust and 50% deeper pitting with Type 301 stainless steel.

It is important to note that all factory seams of stainless steel cold water basins must be welded to match the water tight integrity of the TriArmor® Corrosion Protection System. Bolted and sealed stainless steel basins can be prone to leaks over time and are less reliable than welded construction. Insist on welded seams for all stainless steel cold water basins.

EVERTOUGH™ Construction optimizes the corrosion resistance requirements of each component in a cooling tower to deliver the best value in corrosion protection for most water chemistries. It builds on the benefits of the TriArmor® Cold Water Basin with polymeric water distribution systems and all steel structural components protected by a thermosetting hybrid polymer. All these materials have been proven through at least 10 years of real world cooling tower service. All EVERTOUGH™ Cooling Towers are provided with a 5 year louver-to-louver warranty.



**Insist on the proven performance of TriArmor®, Type 304 SST or EVERTOUGH™ for all your evaporative cooling needs.**



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