

Alloy C-276 (UNS N10276) is an austenitic nickel-molybdenum-chromium alloy with a small addition of niobium. It is one of the premier corrosion-resistant materials available for process industries. Alloy C-276 has excellent corrosion resistance in both oxidizing and reducing environments.

The combination of the high molybdenum and chromium content, along with the addition of niobium, make Alloy C-276 highly resistant to chloride stress corrosion cracking, pitting, crevice corrosion and general corrosion.

Alloy C-276 can operate in oxidizing atmospheres up to 1900 F (1038 C), however, the alloy lacks sufficient chromium content to operate effectively in the more strongly oxidizing environments like hot, concentrated nitric acid.

The low carbon content of Alloy C-276 enables the alloy to be welded in the as-welded condition. It cannot be hardened by heat treatment, but can be hardened by cold working. The alloy has a higher

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Alloy C-276 is one of the premier corrosion resistant materials. It has performed exceptionally well in both oxidizing and reducing environments. It resists chloride stress corrosion cracking, pitting, crevice and general corrosion. The alloy is also resistant to carbide precipitation during welding enabling it to be welded in the as-welded condition.

In chemical processing applications, the alloy has exceptional resistance to hydrofluoric, hydrochloric, formic, acetic and phosphoric acids. Alloy C-276 performs well in environments containing acid chloride, sulfuric and acetic anhydride. The alloy is one of the few grades that resists both chlorine gas, hypochlorite and chlorine dioxide solutions.

Alloy C-276 has high resistance to concentrated solutions of oxidizing salts including iron and copper chloride. It also performs well in seawater, especially under crevice conditions. There are other frequently used alloys such as Inconel 600, Alloy 400 and Alloy 625 fail.

The operating conditions of the gas-dehydration process offer a challenging environment for corrosion resistant materials. Sulfuric acid and gas condensate of ethanethiol chloride. Alloy C-276 has been shown to resist higher chloride levels than other grades before the onset of localized corrosion in these environments.

Alloy C-276 is used extensively in the recovery and processing of natural gas which contains hydrogen sulfide along with carbon dioxide and chloride. Carbon and alloy steel cannot resist and will corrode in environments. They are subject to failure by stress corrosion cracking or stress corrosion cracking. The rich chemistry of Alloy C-276 makes it resistant to sulfur environments and a high temperature in deep wells.

Fabrication

Alloy C-276 can be easily welded and processed using standard shop fabrication practices for austenitic stainless steel and nickel based alloys.

Heat Treatment

The hot working temperature range for Alloy C-276 is 1600-2250 F (870-1230 C). The alloy should be air quenched after hot working. Heat treatment is recommended after hot working to ensure maximum corrosion resistance.

Cold Work

Alloy C-276 should be in the annealed condition for cold working. The alloy has a higher work-hardening rate than the austenitic stainless steel which should be taken in consideration. An in-process anneal may be necessary if a high degree of cold working. If the alloy undergoes greater than 15% deformation during cold working, a solution anneal may be necessary.

Alloy C-276 can be readily welded by most standard processes including GTAW (TIG), PLASMA, GMAW (MIG/MAG) and SMAW (MMA). A post weld heat treatment is not necessary. Brushing with stainless steel wire brush after welding will remove the heat in and produce a surface area that does not require additional pickling.

Machining

Alloy C-276 should preferably be machined in the annealed condition. Since Alloy C-276 is prone to work hardening, only low cutting speeds should be used and the cutting tool should be engaged at all times. Adequate chip removal is necessary to avoid contact with the previously formed work-hardened zone.

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