

Rolled Alloys' unwavering commitment to quality, supply and service has made them the Global Leader in Specialty Alloys. For over 55 years, Rolled Alloys has been servicing customers worldwide with heat and corrosion resistant alloys, aerospace alloys and stainless steels. Rolled Alloys' engineers and metallurgist are known as the go-to group for assistance on alloy performance. The metallurgical laboratories are positioned both in the US and Europe to service customers in technical investigations and performance analysis.

Rolled Alloys also offers a full technical library, stocked with data sheets, case histories and published technical papers from their knowledgeable staff. Rolled Alloys also continues to bring new alloys to market and contribute to the advancement of applied materials technology. Along with their proprietary alloys, RA330® and RA333®, Rolled Alloys brought AL-6XN® alloy to market. AL-6XN has been a choice alloy in many different industries, including power, chemical, desalination, pulp and paper as well as oil and gas.

AL-6XN alloy was designed to be a seawater resistant material and has since been demonstrated to be resistant to a broad range of very corrosive environments. As a result AL-6XN has been in use for more than 20 years. It is readily available from stock in a wide range of product forms, including thick plate that is suitable for multi-pass welding during field fabrication. The high strength and corrosion resistance of AL-6XN alloy make it a better choice than the conventional duplex stainless steels and a cost effective alternative to more expensive nickel-base alloys in applications where excellent formability, weldability, strength and corrosion resistance are essential. It is also a cost-effective alternative to less expensive alloys, such as Type 316, that do not have the strength or corrosion resistance required to minimize life cycle costs in certain applications.

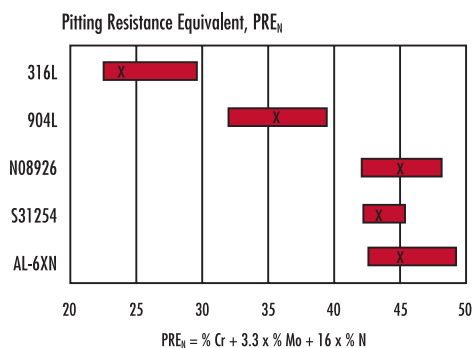
The 6% Mo alloys are utilized primarily for their enhanced corrosion resistance compared to 316L in acid and chloride bearing environments. This improved corrosion resistance results from raised levels of chromium, molybdenum, and the addition of nitrogen. These three elements are responsible for improving the resistance of stainless steels and nickel alloys to pitting. A formula, which calculates the pitting resistance equivalent number or PRE_N is useful for comparing an alloys resistance in chloride pitting situations.

Nominal Compositions

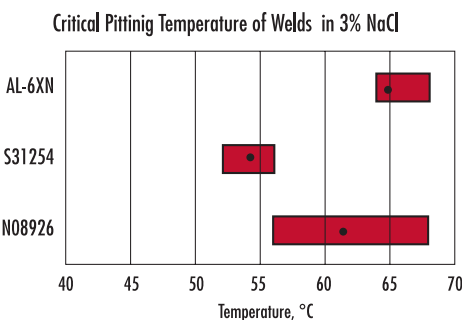
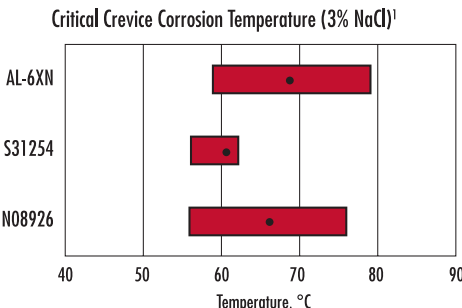
Alloy	UNS	Ni	Cr	Mo	Cu	N
AL-6XN	N08367	24	20.5	6.3	0.1	0.22
254SMO	S31254	18	20	6.1	0.7	0.20
1925hMo	N08926	25	21	6.5	0.9	0.2
904L	N08904	25	21	4.5	1.6	0.02

Using this formula you can see how AL-6XN compares to the other 6-Mo alloys and common lower alloys such as 316L and

904L. The bars show the range of PRE_N values possible based on each alloys chemistry. The "X" designates the nominal PRE_N value. AL-6XN chemistry is such that it provides the highest range of PRE_N values of the three common 6% Mo grades.



All formulas make assumptions and the PRE_N formula is no different. The formula does ignore the that some alloying additions have the potential to be detrimental to pitting resistance. Based on several studies it appears that copper is one of these detrimental additions when chloride service is concerned. Both S31254 and N08926 contain between 0.5 to 1.0% copper.



The preceding figures compare the critical crevice corrosion temperature (CCCT) for each 6% Mo alloy. These were determined by 3 tests run in 3% NaCl to compare each grade's suitability for use in seawater applications in the North Sea. The band shows the range of results, while the dot shows the average of the three tests. Also shown are the average values of four tests measuring the critical pitting temperatures on welded specimens in the same evaluation.

Each alloy was welded using overalloyed fillers per each manufacturer's recommendation and corrosion initiated in the fusion line. In both tests AL-6XN consistently outperformed the other 6% Mo grades.

Tests conducted at the LaQue Center² for Corrosion Studies confirms that copper can be detrimental to crevice corrosion resistance. Their study of various alloys in seawater showed AL-6XN to be the only 6% Mo alloy to withstand crevice corrosion under all eight test conditions.

AL-6XN also offers the highest design values of the 6% Mo type alloys. The table below compares the ASME design stresses in Section VIII, Division 1 for the various 6% Mo alloys. This strength advantage can often result in reduced wall thicknesses and weight savings when using AL-6XN alloy.

Alloy	100°F	200°F	400°F	600°F	700°F
AL-6XN	27.1 psi	26.2 psi	21.9 psi	19.4 psi	18.0 psi
S31254	26.9 psi	23.9 psi	19.8 psi	17.9 psi	—
N08926	26.9 psi	24.1 psi	19.7 psi	18.0 psi	—

AL-6XN not only offers consistently high performance, it is also available in a wide variety of product forms including plate, sheet, round bar, pipe, fittings, flanges, and billet from Rolled Alloys' inventory.

Rolled Alloys is the global leader in specialty alloys, offering an extensive inventory in nickel alloys and stainless steels worldwide. Our product line consists of plate, sheet, bar, pipe, fitting and flanges and welding consumables. Along with AL-6XN, Rolled Alloys offers a full line of duplex alloys, including lean duplex LDX 2101®, AL 2003™, 2205 and ZERON® 100. Rolled Alloys offers state-of-the-art processing to bring the highest quality of product, service and savings to customers. Complete cutting and processing services include waterjet, plasma, laser, saw, shear, gaver and rod and sheet coil levels.

Rolled Alloys is the go-to group for metals expertise, offering material performance analysis, comparative alloy data, sample coupon testing and evaluation, application case histories, online technical support and technical presentations and seminars. The metallurgical laboratory is located in house and is equipped with the latest technology for performance analysis and technical investigations.

Rolled Alloys new enhanced website offers customers the most up-to-date means of conducting internet business. Customers can receive quotations, place orders, track shipments and download technical data in a secure environment.

Rolled Alloys operates in North America with facilities in Michigan, Ohio, Texas, Connecticut, California, Illinois, Oklahoma and Canada. Internationally, Rolled Alloys operates from China, England, France, Germany, Italy, The Netherlands, Scotland, Singapore and Spain.