

Technical Information for 302

Alloy	UNS Number	SAI Number
302	S30200	30302

GENERAL PROPERTIES

Types 302, 304, 304L, and 305 stainless steels are variations of the 18 percent chromium - 8 percent nickel austenitic alloy, the most familiar and most frequently used alloy in the stainless steel family. These alloys may be considered for a wide variety of applications where one or more of the following properties are important:

1. Resistance to corrosion
2. Prevention of product contamination
3. Resistance to oxidation
4. Ease of fabrication
5. Excellent formability
6. Beauty of appearance
7. Ease of cleaning
8. High strength with low weight
9. Good strength and toughness at cryogenic temperatures
10. Ready availability of a wide range of product forms

Each alloy represents an excellent combination of corrosion resistance and fabricability. This combination of properties is the reason for the extensive use of these alloys which represent nearly one half of the total U.S. stainless steel production. Type 304 represents the largest volume followed by Type 304L. Types 302 and 305 are used in smaller quantities. These alloys are covered by a variety of construction or use of equipment manufactured from these alloys for specific conditions. Food and beverage, sanitary, cryogenic, and pressure-containing applications are examples. Past users of Type 302 are generally now using Type 304 since AOD technology has made lower carbon levels more easily attainable and economical. There are instances, such as in temper rolled products, when Type 302 is preferred over Type 304 since the higher carbon permits meeting of yield and tensile strength requirements while maintaining a higher level of ductility (elongation) versus that of the lower carbon Type 304. Type 304L is used for welded products which might be exposed to conditions which could cause intergranular corrosion in service. Type 305 is used for applications requiring a low rate of work hardening during severe cold forming operations such as deep drawing.

RESISTANCE TO CORROSION

General Corrosion

The Types 302, 304, 304L and 305 austenitic stainless steels provide useful resistance to corrosion on a wide range of moderately oxidizing to moderately reducing environments. The alloys are used widely in equipment and utensils for processing and handling of food, beverages and dairy products. Heat exchangers, piping, tanks and other process equipment in contact with fresh water also utilize these alloys. Building facades and other architectural and structural applications exposed to non-marine atmospheres also heavily utilize the 18-8 alloys. In addition, a large variety of applications involve household and industrial chemicals. The 18 to 19 percent of chromium which these alloys contain provides resistance to oxidizing environments such as dilute nitric acid. These alloys are also resistant to moderately aggressive organic acids such as acetic, and reducing acids such as phosphoric. The 9 to 11 percent of nickel contained by these 18-8 alloys assists in providing resistance to moderately reducing environments. The more highly reducing environments such as boiling dilute hydrochloric and sulfuric acids are shown to be too aggressive for these materials. Boiling 50 percent caustic is likewise too aggressive.