

ENGINEERING BULLETIN #106

Service Temperatures of Austenitic Steels & Other Materials

Most common reasons for using stainless steels are their corrosion resistance and their high temperature properties. Therefore, stainless steels can be found in applications where high temperature oxidation resistance is necessary and in applications where high temperature strength is required. The high chromium content which is so beneficial to the wet corrosion resistance of stainless steels is also highly beneficial to their high temperature strength.

Most austenitic steels, with chromium contents of at least 18%, can be used at temperatures up to 1500°F and Grade 310 (Cr content: up to 26%) even higher – up to 2000°F. Because of the problem of grain boundary carbide precipitation, discussed in Engineering Bulletin #103, prolonged exposure to the temperature in the 1100°F to 1400°F range should be avoided.

The table below shows the (approximate) maximum service temperatures of austenitic steels & other common materials.

Alloy	Temperature	
	°F	°C
Inconel 600	2150	1175
310	2100	1150
Inconel 625	1800	982
Hastelloy C276	800	427
304/304L	1500*	816
321	1500*	816
316L	1500*	816
AL6XN	1000	538
Monel 400	800	427
Bronze	450	232
Brass	450	232
Copper	400	204

Note: The temperature ratings in the table are general guidelines and could change if corrosives are present, such as sulfur, carbon, etc. In some cases, ASME codes will reduce temperature limits too.

*For applications where temperatures exceed 1000°F, contact [Engineering](#).