13-8 stainless is a martensitic precipitation hardening stainless steel that has excellent strength, high hardness, superior toughness and good corrosion resistance. Good transverse toughness properties are achieved by tight chemical composition control, low carbon content, and vacuum melting. Typical applications are large airframe structural components and injection molding equipment.

Specifications

UNS: S13800 **W. Nr./EN:** 1.4534 **AMS:** 5629 **ASTM:** A 564

Chemical Composition, %

	Ni	Cr	Mo	C	P	S	Si	Mn	N	Al	Fe
MIN	7.5	12.25	2.0	–	–	–	–	–	–	0.90	–
MAX	8.5	13.25	2.5	0.05	0.01	0.008	0.1	0.2	0.1	1.35	balance

Features

- Martensitic, precipitation hardening (maraging) stainless steel.

Applications

- Aerospace components
- Injection molding equipment
- Components in the petrochemical and nuclear industries

Physical Properties

Density: 0.279 lb/in^3 **Melting Range:** 2560-2680°F **Electrical Resistivity:** 613 Ohm-circ mil/ft

Temperature, °F	70	212	392	572
Coefficient of Thermal Expansion* in/in°F x 10^{-6}	–	7.2	7.5	7.8
Thermal Conductivity Btu • ft/ft^2 • hr • °F	8.6	9.2	9.8	10.4
Modulus of Elasticity Dynamic, psi x 10^6	29.0	28.1	27.0	26.1

** 70°F to indicated temperature.*

Heat Treatment

13-8 Stainless is available in the annealed condition, which is also called the solution heat treat condition or Condition A. Solution treat from 1675 - 1725°F for 15 to 30 minutes at temperature. Air cool or oil quench to below 60°F to effect complete transformation to martensite. Aging is normally carried out from 950 - 1150°F, depending on the desired final properties. Heat treatment is usually performed in air. Heat treatment of brazed components may be done in inert atmospheres. Reducing atmospheres should not be used because of the potential for nitrogen contamination.

Heat Treating Parameters

Condition	H950	H1000	H1025	H1050	H1100	H1150
Temperature, °F	950 ± 10	1000 ± 10	1025 ± 10	1050 ± 10	1100 ± 10	1150 ± 10
Time, hours	4 ± 0.25	4 ± 0.25	4 ± 0.25	4 ± 0.25	4 ± 0.25	4 ± 0.25

Mechanical Properties

Strength varies with heat treatment condition. The following table shows minimum mechanical properties for the various aged conditions, per AMS 5864.

	H950	H1000	H1025	H1050	H1100	H1150
0.2 Offset Yield Strength, ksi	205	190	175	165	135	90
Ultimate Tensile Strength, ksi	220	205	185	175	150	135
Elongation in 2", %	10	10	11	12	14	14
Reduction of Area, % (Longitudinal)	45	50	50	50	50	50
Reduction of Area, % (Transverse)	45	50	50	50	50	50
Reduction of Area, % (Short-Transverse)	35	40	45	45	50	50
Min Hardness, Rockwell	45	43	–	40	34	30