

Specification Sheet: Alloy 347/347H, A182 F347, A182 F347H (UNS S34700, S34709)

A Columbium Stabilized Austenitic Stainless Steel with Excellent Resistance to Intergranular Corrosion After Exposure to Temperatures in the Chromium Carbide Precipitation Range of 800–1500°F (427–816°C)

Alloy 347 (UNS S34700) is a columbium stabilized austenitic stainless steel with good general corrosion resistance and somewhat better resistance in strong oxidizing conditions than 321 (UNS S32100). It has excellent resistance to intergranular corrosion after exposure to temperatures in the chromium carbide precipitation range of 800–1500°F (427–816°C). The alloy has good oxidation resistance and creep strength to 1500°F (816°C). It also possesses good low temperature toughness.

Alloy 347H (UNS S3409) is the higher carbon (0.04–0.10) version of the alloy. It was developed for enhanced creep resistance and for higher strength at temperatures above 1000°F (537°C). In most instances, the carbon content of the plate enables dual certification.

Alloy 347 cannot be hardened by heat treatment, only by cold working. It can be easily welded and processed by standard shop fabrication practices.

Applications

- Chemical Processing
- Food Processing—equipment and storage
- Petroleum Refining—fluid catalytic cracking units, polythionic acid service
- Waste Heat Recovery—recuperators

Standards

ASTM A240
 ASME SA240
 AMS 5512
 ASTM A182

Chemical Analysis

Weight % (all values are maximum unless a range is otherwise indicated)

Element	347	347H
Chromium	17.00 min.–19.00 max.	17.00 min.–19.00 max.
Nickel	9.00 min.–13.00 max.	9.00 min.–13.00 max.
Carbon	0.08	0.04 min.–0.10 max.
Manganese	2.00	2.00
Phosphorus	0.045	0.045
Sulfur	0.03	0.03
Silicon	0.75	0.75
Columbium & Tantalum	10 x (C + N) min.–1.00 max.	8 x (C + N) min.–1.00 max.
Iron	Balance	Balance

Physical Properties

Density

0.288 lbs/in³
 7.96 g/cm³

Specific Heat

0.12 BTU/lb-°F (32–212°F)
 500 J/kg-°K (0–100°C)

Modulus of Elasticity

28.0 x 10⁶ psi
 193 GPa

Thermal Conductivity 212°F (100°C)

133 BTU/hr/ft²/ft-°F
 16.3 W/m-°K

Melting Range

2550–2635°F
 1398–1446°C

Electrical Resistivity

72 Microhm-cm at 20°C

Mean Coefficient of Thermal Expansion

Temperature Range			
°F	°C	in/in °F	cm/cm °C
68–212	20–100	9.2 x 10 ⁻⁶	16.0 x 10 ⁻⁶
68–1112	20–600	10.5 x 10 ⁻⁶	18.9 x 10 ⁻⁶
68–1832	20–1000	11.4 x 10 ⁻⁶	20.5 x 10 ⁻⁶

Mechanical Properties

Typical Values at 68°F (20°C)

Yield Strength 0.2% Offset		Ultimate Tensile Strength		Elongation in 2 in.	Hardness
psi (min.)	(MPa)	psi (min.)	(MPa)	% (min.)	(max.)
30,000	205	75,000	515	40	201 Brinell