

Type A286 alloy (S66286) is an iron-base superalloy useful for applications requiring high strength and corrosion resistance up to 1300°F (704°C) and for lower stress applications at higher temperatures. Type A286 alloy is a heat and corrosion resistant austenitic iron-base material which can be age hardened to a high strength level. The alloy is also used for low temperature applications requiring a ductile, non-magnetic high strength material at temperatures ranging from above room temperature down to at least -320°F (-196°C). The alloy may be used for moderate corrosion applications in aqueous solutions. Type A286 alloy can be produced by AOD refining or vacuum induction melting. Vacuum arc or electroslag remelting procedures may be used to further refine the material.

Specifications

AMS: 5525, 5858, 5726, 5731, 5732, 5734, 5737, 5804, 5853
 ASME: SA-638
 ASTM: A453, A638
 EN: 1.4980
 UNS: S66286

Chemical Composition, %

	C	Mn	P	S	Si	Cr	Ni	Mo	Ti	Al	Va	Fe	B
Min	--	--	--	--	--	13.50	24.00	1.00	1.90	--	0.10	Bal.	0.003
Max	0.08	2.00000	0.025	0.025	1.00	16.00	27.00	1.50	2.35	0.35	0.50	Bal.	0.010

Resistance to Corrosion: Type A286 alloy content is similar in chromium, nickel, and molybdenum to some of the austenitic stainless steels. Consequently, A286 alloy possesses a level of aqueous corrosion resistance comparable to that of the austenitic stainless steels. In elevated temperature service, the level of corrosion resistance to atmospheres such as those encountered in jet engine applications is excellent to at least 1300°F (704°C). Oxidation resistance is high for continuous service up to 1500°F (816°C) and intermittent service up to 1800°F (982°C).

Features

- Can be produced by AOD refining or vacuum induction melting
- Iron-base superalloy
- High strength and corrosion resistance up to 1300°F (704°C)

Applications

- Jet Engine Components
- Fasteners
- Springs
- After Burner Parts
- Industrial Gas Turbines
- Moderate Corrosion Applications in Aqueous Solutions
- Non-Magnetic Cryogenic Equipment

Physical Properties

Solution Treated	Solution Treated and Aged	
Density	0.286 lb./in ³ (7.92 g/cm ³)	0.287 lb./in ³ (7.94 g/cm ³)
Specific Gravity	7.92	7.94
Melting Range	2500 - 2600 °F	1370 - 1430 °C
Magnetic Permeability	1.01	1.007

Linear Coefficient of Thermal Expansion

Temperature Range		Linear Coefficients of Thermal Expansion · 10 ⁻⁶	
°C	°F	/°C	/°F
21 - 93	70 - 200	16.5	9.17
21 - 204	70 - 400	16.8	9.35
21 - 316	70 - 600	17	9.47
21 - 427	70 - 800	17.4	9.64
21 - 538	70 - 1000	17.6	9.78
21 - 649	70 - 1200	17.8	9.88
21 - 760	70 - 1400	18.6	10.32

Thermal Conductivity

Temperature Range		Coefficients	
°C	°F	W/m·K	Btu/(hr/ft ² /in/°F)
150	302	15.1	8.7
300	572	17.8	10.3
500	932	21.8	12.6
600	1112	23.9	13.8

Electrical Resistivity

Temperature		
°C	°F	microhm-cm
25	77	91
540	1004	115.6
650	1202	118.8
730	1346	120.1
815	1499	122.4

Specific Heat

Joules/kg-°K	Btu/lb/°F
420	0.10

Magnetic Permeability

Solution Treated: 1.010
Solution Treated and Aged: 1.007

Mechanical Properties

Typical Short Time Tensile Properties as a Function of Temperature

Type A286 alloy is formed most easily in the solution treated condition. Typical room temperature tensile properties of material solution treated at 1800°F (982°C) are shown below.

Yield Strength	Ultimate Tensile Strength	Elongation
40,000 psi (275 Mpa)	90,000 psi (620MPa)	0.4