



## Technical Data

Ferguson Metals, Inc. ♦ Hamilton, Ohio

### Iron-Base Superalloy

#### Type A286

(UNS Designation S66286)

#### GENERAL PROPERTIES

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.

Type A286 alloy is available in plate, sheet and strip.

#### CHEMICAL COMPOSITION

##### Typical Analysis

Element	Percent
Carbon	0.08 max
Manganese	2.00 max
Phosphorus	0.025 max
Sulfur	0.025 max
Silicon	1.00 max
Chromium	13.50 - 16.00
Nickel	24.00 - 27.00
Molybdenum	1.00 - 1.50
Titanium	1.90 - 2.35
Vanadium	0.10 - 0.50
Aluminum	0.35 max
Boron	0.003 - 0.010
Iron	Balance

#### RESISTANCE TO CORROSION AND OXIDATION

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).

#### PHYSICAL PROPERTIES

##### Typical Values

	Solution Treated	Solution Treated and Aged
Density	0.286lb./in <sup>3</sup> 7.92g/cm <sup>3</sup>	0.287lb./in <sup>3</sup> 7.94g/cm <sup>3</sup>
Specific Gravity	7.92	7.94
Melting Range	2500-2600°F	1370-1430°C

#### LINEAR COEFFICIENT OF THERMAL EXPANSION

Tests Conducted on Solution Treated and Aged Material

Temperature Range		Linear Coefficients of Thermal Expansion (Units of 10 <sup>-6</sup> )	
°C	°F	/°C	/°F
21-93	70-200	16.5	9.17
21-204	70-400	16.8	9.35
21-316	70-600	17.0	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		W/m <sup>2</sup> -K	Btu-ft/ft <sup>2</sup> -h-°F
°C	°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

#### SPECIFIC HEAT

Joules/kg-°K	Btu/lb-°F
420	0.10

#### MAGNETIC PERMEABILITY

Solution Treated	1.010
Solution Treated and Aged	1.007

#### ELECTRICAL RESISTIVITY

Temperature Range		microhm-cm
°C	°F	
25	77	91.0
540	1004	115.6
650	1202	118.8
730	1346	120.1
815	1499	122.4

#### 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 (620 MPa)	40%

Data shown are typical, and should not be construed as maximum or minimum values for specification or for final design. Data on any particular piece of material may vary from those shown herein.