



Technical Data Sheet

ATI A286™

(UNS S66286)

GENERAL

ATI A286™ alloy (UNS S66286) is a Ni-Cr austenitic precipitation-hardened iron-based steel that is one of the original superalloys. It has been used for applications requiring high strength and corrosion resistance up to 1,300°F (704°C), and for cryogenic applications. Its relatively low alloy content and low-cost formulation make it an excellent choice for many applications. ATI A286™ alloy is produced by vacuum induction melting (VIM), followed by vacuum arc (VAR) or electroslag (ESR) remelting. Applications include jet engine, supercharger, and missile components including: wheels and blades, casings, afterburner and sound suppressor parts, fuel nozzles, fasteners, extrusion tooling and miscellaneous hardware. This alloy is designated Grade or Type 660 in several specifications.

SPECIFICATIONS - AMS

- AMS 5525 - Sheet, Strip, and Plate
- AMS 5858 - Sheet, Strip, and Plate
- AMS 5731 - Bars, Rings, Forgings and Tubing (1,800°F Solution Treatment)
- AMS 5732 - Bars, Rings, Forgings and Tubing (1,800°F Solution Treatment + Age)
- AMS 5734 - Bars, Rings, Forgings and Tubing (1,650°F Solution Treatment)
- AMS 5737 - Bars, Rings, Forgings and Tubing (1,650°F Solution Treatment + Age)
- ASTM A453 - Bolting
- ASTM A638 - Forgings, forging stock and bar
- ASME SA-638 - Forgings, forging stock and bar

PHYSICAL PROPERTIES

Melting Range: 2,500-2,600°F (1,371 - 1,427°C)
Density: 0.287 lbs./cu. in. (7.94 g/cm³).

HEAT TREATMENT

Two solution treatments are used. 1,650°F (899°C) for 2 hours with water or oil quench is used where higher tensile and yield strengths are desired. 1,800°F (982°C) for 1 hour with water or oil quench is used where optimum creep and stress-rupture strengths are desired. Aging is 1,300-1,400°F (704 - 760°C) for 16 hours - air cool.

HARDNESS

In the solution treated condition, hardness is 140 - 180 Brinell. After aging the hardness increases to 248 - 321 Brinell. The hardness is affected by the titanium content and the aging temperature.

OXIDATION AND CORROSION RESISTANCE

ATI A286™ steel has excellent oxidation resistance up to 1,800°F (982°C). Its corrosion resistance is similar to austenitic stainless steels in many environments. It has superior corrosion resistance to nickel-base alloys when exposed to sulfurous atmospheres at elevated temperatures.

Technical Data Sheet

FORGEABILITY/FORMABILITY

ATI A286™ steel has forgeability similar to many austenitic stainless steels. Initial forging is usually performed from 2,000-2,150°F (1,093 - 1,177°C) with finishing temperatures from 1,650-1,700 F (899 - 927°C). A minimum of 15 to 20 percent reduction should be combined with a low finishing temperature to produce a fine, uniform grain size. The formability of ATI A286™ alloy in the solution annealed condition is similar to ATI 310 stainless steel.

MACHINABILITY

The machinability of ATI A286™ alloy is similar to that of the austenitic stainless steels. It is usually machined in the full aged or partially aged condition.

WELDABILITY

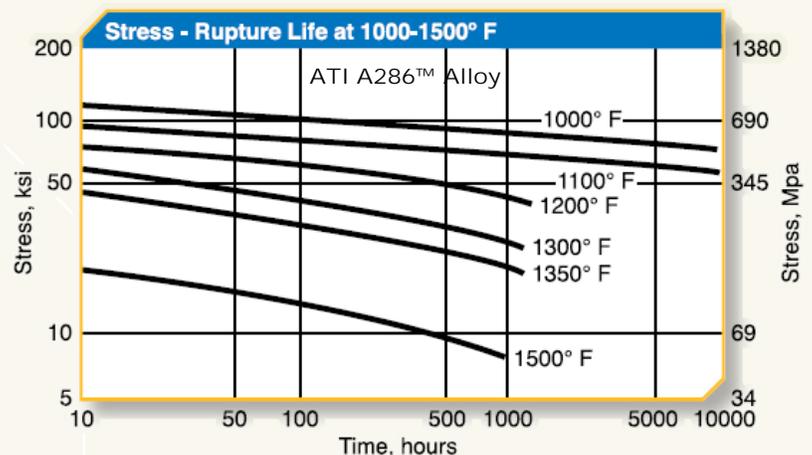
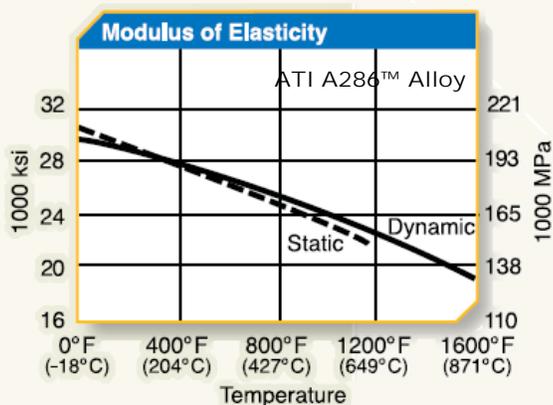
ATI A286™ steel can be welded in the solution treated condition in thin sections, and in large sections under conditions of low restraint. However, the alloy is subject to hot cracking, particularly in the aged condition. Sound welds can be produced by inert gas shielded arc, spot, resistance seam, ash butt, and electron beam welding techniques.

SPECIAL PRECAUTIONS

All lubricants and coolants, particularly those containing sulfur, should be removed prior to heat treating and pickling.

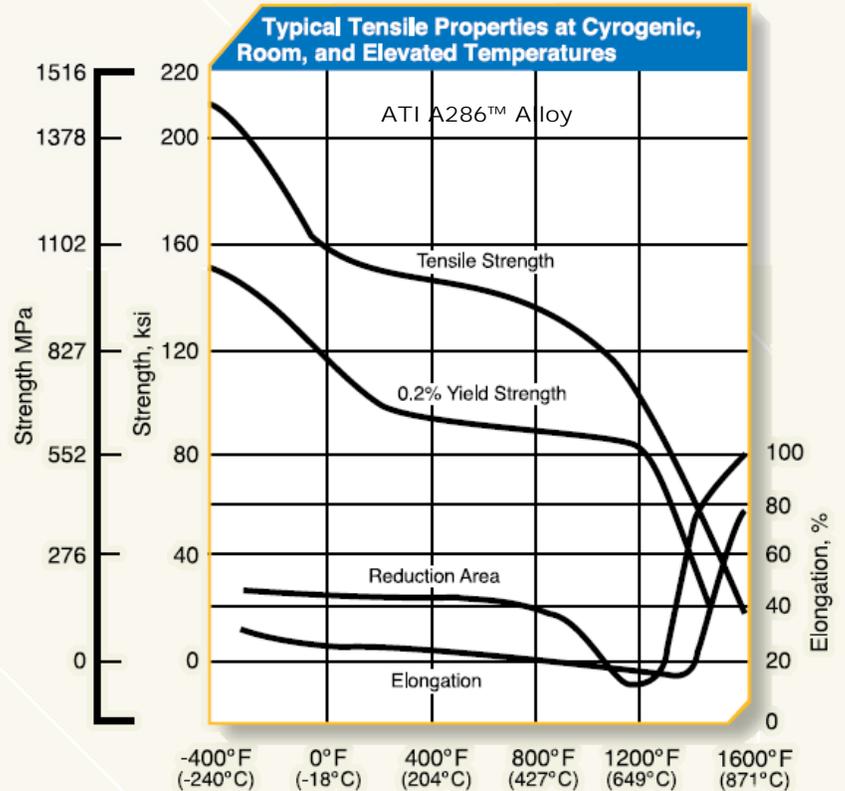
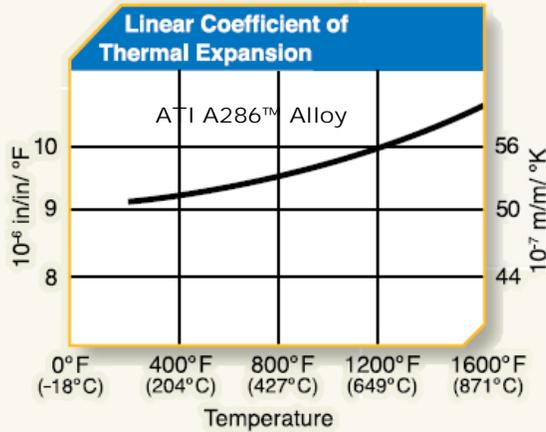
Chemical Composition of ATI A286™ Alloy

	C	Mn	Si	S	P	Cr	Ni	Fe	Mo	Ti	Al	B	V
wt. %, min.	-	1.0	-	-	-	13.5	24.0	Bal.	1.0	1.90	-	0.003	0.10
wt. %, max.	0.08	2.0	1.0	0.015	0.025	16.0	27.0	-	1.5	2.35	0.35	0.010	0.50





Technical Data Sheet



Heat Treatment

Solution Treat: 1800° F (982° C) for 1 Hour. Oil Quench.
 Age: 1325° F (718° C) for 16 hours. Air cool.

Data are typical, are provided for informational purposes, and should not be construed as maximum or minimum values for specification or for final design, or for a particular use or application. The data may be revised anytime without notice. We make no representation or warranty as to its accuracy and assume no duty to update. Actual data on any particular product or material may vary from those shown herein. TM is trademark of and ® is registered trademark of ATI Properties, Inc. or its affiliated companies.
 © 2012 ATI. All rights reserved.