

# **General Information**

ATI 617<sup>™</sup> alloy (UNS N06617) is a nickel-based superalloy with excellent creep-rupture strength and oxidation resistance at temperatures over 1800°F (980°C). Its high-temperature strength is realized by solid-solution strengthening from the molybdenum and cobalt additions, while chromium and aluminum additions impart its good cyclic oxidation and carburization resistance. ATI 617 alloy is resistant to a variety of both reducing and oxidizing media.

ATI 617<sup>™</sup> alloy is primarily used to manufacture combustion cans, inner housings, ducting, and transition liners for both aerospace and land-based gas turbines. The alloy has lower density than comparable high-temperature, tungstencontaining alloys of similar strength, resulting in an advantageous strength-to-weight ratio. Alloy 617 is also used in the chemical processing industry and as components in both fossil-fueled and nuclear power-generating plants. It is currently under evaluation for helium-cooled reactor components. Alloy 617 is one of the few materials covered by the ASME Boiler and Pressure Vessel Code with design stresses up to 1800°F.

## **Forms and Conditions Available**

The ATI 617<sup>™</sup> alloy is available as plate mill plate product. It is normally provided in the solution annealed condition.

AMS 5888 and 5889 Specification Limits for UNS N06617 Composition						
Element	Weight Percent					
Carbon	0.05 - 0.15					
Manganese	0.50 max					
Silicon Silicon	0.50 max					
Phosphorus	0.015 max					
Sulfur	0.015 max					
Chromium	20.00 - 24.00					
Cobalt	10.00 - 15.00					
Molybdenum	8.00 - 10.00					
Aluminum	0.80 - 1.50					
Titanium / / / / / / / /	0.60 max					
Boron	0.006 max					
lron	3.00 max					
Copper	0.5 max					
Nickel	Remainder					

The ATI 617<sup>™</sup> alloy is covered by the AMS 5888 and 5889 specifications for plate and coil, respectively.

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. © 2016 ATI AII rights reserved.

# Technical Data Sheet ATI 617™ Alloy



# **Physical Properties**

Density	0.302 lb/in <sup>3</sup> (8.32 g/cm <sup>3</sup> )					
Melting Range	2430 - 2510 °F (1330 - 1380 °C)					
Electrical Resistivity	48.1 μΩ·in (122 μΩ·cm)					
Thermal Conductivity	94 Btu·in/ft²·h·°F (13.4 W/m·K)					
Specific Heat	0.100 Btu/lb·°F (419 J/kg·°C)					
Coefficient of Thermal Expansion, RT – 200°F	7.0 × 10 <sup>-6</sup> in/in·°F (11.6 μm/m·°C)					

## **Mechanical Properties**

Typical room temperature mechanical properties of solution annealed ATI 617<sup>™</sup> alloy are listed in the table below.

Product Form Production Method	Production Method	Tensile Strength		Yield Strength (ksi) Elongation		Material
	ksi 🖌	MPa MPa	ksi	MPa	%	
Plate	Hot Rolling	118	810	60	410	54 🖉

#### Fabrication

#### Forming / Welding / Joining

ATI 617<sup>™</sup> alloy is readily formed and welded by conventional techniques used for nickel alloys. The alloy has good fabricability, though it has a relatively high work hardening rate. The hot-forming characteristics of ATI 617<sup>™</sup> alloy are similar to those of ATI 625<sup>™</sup> alloy.

#### Heat Treatment

Solution annealing of ATI 617<sup>™</sup> alloy is normally performed at a temperature of 2150°F (1175°C) for a time commensurate with section size. The solution annealed condition provides a coarse grain structure for very good creep-rupture strength.