Technical Data Sheet

ATI L-605™ Alloy

High Temperature, Cobalt-Based Alloy

(UNS R30605)

GENERAL INFORMATION

The ATI L-605™ alloy is a cobalt-based, solid-solution strengthened alloy that has excellent high temperature strength, good oxidation resistance up to 2000°F (1093°C), and excellent sulfidation resistance. This alloy also offers good resistance to wear and galling. The high temperature strength results from solid-solution strengthening by tungsten with second phase strengthening by precipitated carbides. ATI L-605 alloy is used in the hot sections of aircraft gas turbine engines (i.e., combustion liners), and for industrial furnace and other high temperature applications. Elsewhere, this grade is known as alloy 25.

FORMS AND CONDITIONS AVAILABLE

The ATI L-605™ alloy is available in sheet and strip product forms. It is normally provided in the solution annealed condition.

The ATI L-605™ alloy (UNS R30605) is covered by the AMS 5537 specification.

Limiting Chemical Composition of ATI L-605™ Alloy (AMS 5537 Specification Limits for UNS R30605)	
Element	**Weight Percent**
Carbon	0.05 – 0.15
Manganese	1.00 – 2.00
Silicon	0.40 max
Phosphorus	0.040 max
Sulfur	0.030 max
Chromium	19.00 - 21.00
Nickel	9.00 - 11.00
Tungsten	14.00 – 16.00
Iron	3.00 max
Cobalt	Remainder

PHYSICAL PROPERTIES

Density	0.335 lb/in^3 (9.27 g/cm^3)
Melting Range	2425 – 2570 °F (1330 – 1410 °C)
Electrical Resistivity	34.9 μΩ·in (88.6 μΩ·cm)
Magnetic Permeability at 200 oersteds	1.002
Thermal Conductivity	65 Btu·in/ft^2·h·°F (9.4 W/m·K)
Specific Heat	0.092 Btu/lb·°F (385 J/kg·°C)
Coefficient of Thermal Expansion, RT – 200°F	6.8 × 10^{-6} in/in·°F (12.3 μm/m·°C)

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MECHANICAL PROPERTIES

Typical room temperature mechanical properties of annealed ATI L-605™ alloy are listed in the table below.

Tensile Strength		0.2% Yield Strength		Elongation in 2 in. or 50 mm
ksi	MPa	ksi	MPa	%
154	1061	75	517	55

The ATI L-605™ alloy retains excellent strength and ductility at elevated temperatures. The following figure shows the short-term elevated temperature tensile properties of ATI L-605™ alloy cold-rolled and solution annealed sheet up to 2000°F.

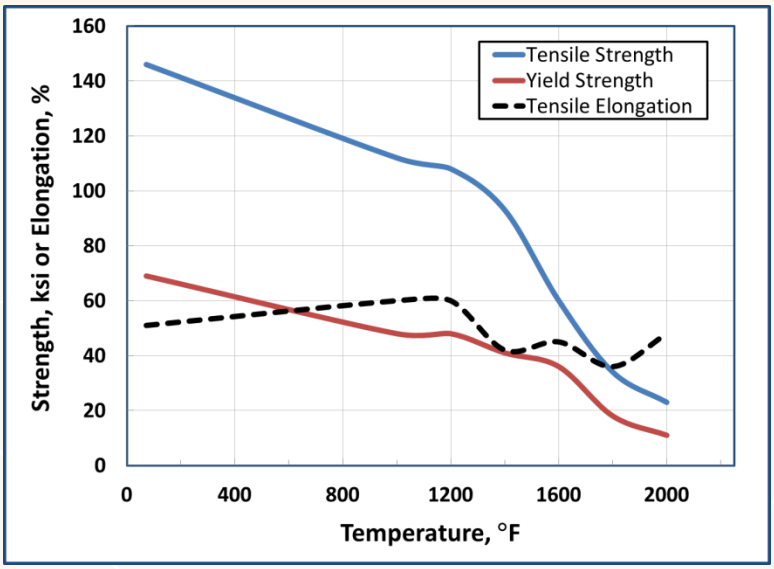

Figure 1. Elevated temperature tensile properties of ATI L-605™ alloy

FABRICATION

Forming / Welding / Joining

The ATI L-605™ alloy has good fabricability, though it work hardens rapidly. Forming, machining, and welding can all be accomplished by standard methods.

Heat Treatment

The ATI L-605™ alloy is normally solution annealed in the range of 2150-2250°F (1175-1230°C), and then rapid air-cooled or water-quenched. Annealing at lower temperatures may cause carbide precipitation, which is undesirable for many of the properties.

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