



## Technical Data Sheet

### ATI 36™

#### Nickel Alloy: Controlled Expansion Alloy

(UNS K93600 or K93603)

ATI 36™ alloy has the same UNS No. as Invar® 36\* alloy.

#### GENERAL PROPERTIES

ATI 36 alloy is a nickel-iron alloy combining low thermal expansion properties up to about 200°C (~400°F) along with moderately high strength and good toughness down to -253°C (-423°F), the temperature of liquid hydrogen. These properties combined with good weldability and desirable physical properties make this alloy attractive for many applications requiring precise dimensional stability. In applications such as in LNG tankers and in transportation and storage vessels for liquefied gas, ATI 36 alloy is of great advantage due to the minimization of any strains in the material resulting from thermal contraction. The composition of ATI 36 alloy for cryogenic application is adjusted to achieve very low thermal expansion coefficient at low temperature. This alloy is also used extensively in the manufacture of bimetallic components for electrical and electronic industries. It is the low expansion material used in the cladding of high expansion alloys, such as UNS K92510 to make bimetallic thermostats.

#### TYPICAL COMPOSITION

Element	Weight %
C	0.05
Mn	0.60
S	0.015
Si	0.40
Ni	38.00
Co	0.50
Al	0.10
Fe	Balance
Cr	0.25
Mg	0.10
P	0.015
Ti	0.10
Zr	0.10

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### SPECIFICATIONS

ASTM F-1684

### PRODUCT FORMS

#### Plate

**Strip** - Width: Up to 24" (609 mm)

Thickness: 0.010" - 0.140" (0.25 - 3.55 mm).

### MECHANICAL AND PHYSICAL PROPERTIES

Typical Annealed Properties			
<b>0.2% Yield Strength</b>	33.33-50.7* ksi (230-350* MPa)	<b>Density</b>	0.291 lb/in <sup>3</sup> (8.05 g/cm <sup>3</sup> )
<b>Tensile Strength</b>	58-72.5* ksi (400-500* MPa)	<b>Electrical Resistivity</b>	81 microhm cm
<b>Elongation</b>	•••	<b>Grain Size</b>	6 or finer
<b>Hardness</b>	60 min - 85 max HRB	<b>Elastic Modulus</b>	21.4 x 10 <sup>6</sup> psi (148 GPa)

\*min

Thermal Expansion Coefficient (Chemistry selected for application)	
-240 to -18°C	1.8 µm/m°C
-129 to -18°C	1.6 µm/m°C
25 to 93°C	0.5 - 1.1 µm/m°C
25 to 148°C	0.8 - 1.4 µm/m°C
25 to 260°C	2.0 - 2.7 µm/m°C
25 to 371°C	3.7 - 4.4 µm/m°C

\*Invar is a registered trademark of Aperam Alloys Imphy

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