

Alloy 36



DATUMALLOYS

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NOMINAL CHEMICAL COMPOSITION:

64% Fe

36% Ni

APPLICABLE SPECIFICATIONS:

ASTM F1684 (96)

DIN 1.3981

MECHANICAL PROPERTIES:

(typically annealed material):

Hardness	Tensile Strength	Yield Strength	Elongation	Modulus of Elasticity
125 HV	447 Nmm ⁻²	278 Nmm ⁻²	<45%	140 - 150 GPa

PHYSICAL PROPERTIES:

Density	Curie Temperature	Melting Point
8.0 gcm ⁻³	279°C	1427°C

THERMAL PROPERTIES:

Thermal Conductivity

13 Wm⁻¹K⁻¹

Coefficient of Expansion

(Typical for material to Mil-I-23011C Class 7):

Temperature Range				x 10 ⁻⁶ K ⁻¹	Temperature Range				x 10 ⁻⁶ K ⁻¹
25°C	to	100°C	1.18		25°C	to	500°C	9.72	
25°C	to	200°C	1.72		25°C	to	600°C	11.35	
25°C	to	300°C	4.92		25°C	to	700°C	12.70	
25°C	to	350°C	6.60		25°C	to	800°C	13.45	
25°C	to	400°C	7.82		25°C	to	900°C	13.85	
25°C	to	450°C	8.82						

ELECTRICAL PROPERTIES:

Electrical Resistivity

75 - 85 μOhm cm



WELDING

Conventional welding methods can be used with Alloy 36. Alloy 36 filler rod is recommended for those welds requiring filler rod.

BRAZING

First anneal the material as above. Avoid over stressing joints during brazing. Use silver and zinc free brazes for brazing Alloy 36.

WORKING AND FORMING

Alloy 36 may be worked using any conventional metal working method. Annealed material, that is material with an RB hardness of less than Rockwell B70, is desirable for material involving deep drawing, hydro-forming or spinning. For blanking, material between $\frac{1}{4}$ and $\frac{3}{4}$ hard will usually present a cleaner cut. Alloy 36 may be chemically etched. For operations where there is a large quantity of machining, Free Cutting Alloy 36 is available in round rod.

HEAT TREATMENT FOR ALLOY 36

Alloy 36 can be heat treated using one of the following methods. Heating and cooling rates shall be controlled to prevent damage to the parts (cracking, warpage, etc.).

Annealing: Method 1

Heat parts to $821^{\circ}\text{C} \pm 4^{\circ}\text{C}$ and hold at temperature one half hour per 25.4mm of thickness, then furnace cool at a rate not to exceed 92°C per hour to 312°C . No additional machining should be performed on these parts.

Annealing: Method 2 - Annealing plus stabilization

1. Rough Machine
2. Heat parts to $821^{\circ}\text{C} \pm 4^{\circ}\text{C}$ and hold at temperature one half hour per 25.4mm of thickness, then furnace cool at a rate not to exceed 92°C per hour to 312°C . Still air cool is acceptable below 312°C .
3. Semi finish machine.
4. Heat parts for one hour at $312^{\circ}\text{C} \pm 7^{\circ}\text{C}$ followed by air cooling.
5. Heat parts for 48 hours at 95°C followed by air cooling.
6. Finish machine.

Annealing: Method 3 - Annealing plus water quench and stabilization

1. Rough Machine
2. Heat parts to $821^{\circ}\text{C} \pm 4^{\circ}\text{C}$ and hold at temperature one half hour per 25.4mm of thickness, then water quench.
3. Semi finish machine.
4. Heat parts for one hour at $312^{\circ}\text{C} \pm 7^{\circ}\text{C}$ followed by air cooling.
6. Finish machine.