



OHMALLOY MATERIAL CO.,LTD
SHANGHAI,CHINA

Ohmalloy4J36(CommonName Invar,FeNi36,Invar-Standard,Vacodile36)

Ohmalloy4J36 also known generically as FeNi36 (64FeNi in the US), is a nickel-iron alloy notable for its uniquely low coefficient of thermal expansion (CTE or α).

OhmAlloy-4J36 (Invar) is used where high dimensional stability is required, such as precision instruments, clocks, seismic creep gauges, television shadow-mask frames, valves in motors, and antimagnetic watches. In land surveying, when first-order (high-precision) elevation leveling is to be performed, the Level staff (leveling rod) used is made of Invar, instead of wood, fiberglass, or other metals. Invar struts were used in some pistons to limit their thermal expansion inside their cylinders.

OhmAlloy-4J36 use oxyacetylene welding, electric arc welding, welding and other welding methods. Since the coefficient of expansion and chemical composition of the alloy is related should be avoided due to welding causes a change in the alloy composition, it is preferable to use Argon arc welding welding filler metals preferably contains 0.5% to 1.5% titanium, in order to reduce weld porosity and crack.

Normal Composition%

Ni	35.0~37	Fe	Bal.	p	≤0.02	Si	≤0.3
Mo	-	Cu	-	Cr	-	Mn	0.2~0.6

Co-efficient of expansion

20~400	5.1	20~800	10.2
20~450	5.3	20~900	11.4

Thermal Conductivity

$\theta / ^\circ\text{C}$	100	200	300	400	500
$\lambda / \text{W}/(\text{m}^\circ\text{C})$	20.6	21.5	22.7	23.7	25.4

The Heat Treatment Process

Annealing for stress relief	Heated to 470~540 $^\circ\text{C}$
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C	≤0.05	P	≤0.02	S	≤0.02		
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Typical Strength,Mpa

Tensile Strength	Elogation
Mpa	%
539	32
I	Hard

Typical Physical Properties

Density	8.1
Electrical resistivity at 20	0.78
Temperatrue factor of resisitivy (20 $^\circ\text{C}$ ~100 $^\circ\text{C}$) X10 ⁻⁵ / $^\circ\text{C}$	3.7~3.9
Curei Point	230
Elastic Modulus	144

Co-efficient of expansion

$\theta / ^\circ\text{C}$	$\alpha_1/10^{-6}^\circ\text{C}^{-1}$	$\theta / ^\circ\text{C}$	$\alpha_1/10^{-6}^\circ\text{C}^{-1}$
20~60	1.8	20~350	6.5
20~150	1.9	20~500	9.7
20~200	2.5	20~550	10.4
20~300	5.2	20~600	11.0

Style of Supply

	keep1~2 h.Cooling in the air
Annealing	Heating to 750~900 In the Medium Vacuum
Holding time	15min~1h
Cooling	In the air

Style of Supply

Alloys Name	Type	Dimension
Ohmalloy-4J33	Wire	D=0.1~8mm
Ohmalloy-4J33	Strip	W=5~250mm T=0.1

Ohmalloy-4J33	Foil	W=10~100mm T=0.01~0.1
Ohmalloy-4J33	Bar	Dia=8~100mm L=50~1000



Pay attention to Ohmalloy