

**Fe**  
55.845

Iron

28

**Ni**  
58.6934

Nickel

# Free-Cut Invar "36"® Alloy

## Controlled Expansion Alloys

**efi** ED FAGAN INC.  
Special Purpose Alloys  
THE MATERIALS YOU NEED, WHEN YOU NEED THEM

www.edfagan.com | sales@edfagan.com  
toll free 800.348.6268

### DESCRIPTION

Free-Cut Invar "36"® Alloy is a free-machining nickel-iron alloy developed and produced by Carpenter® Technology. This alloy variation provides a slight increase in thermal expansion properties when compared to Invar. The addition of selenium to the chemistry delivers improved machinability for applications where high part productivity and good surface finish is important.

### APPLICATIONS

For machined parts found in aircraft controls and electronic devices, whose dimensional changes due to temperature variation must be minimized.

### TYPICAL PHYSICAL PROPERTIES

Density	lb/in <sup>3</sup>	0.291
Specific Gravity		8.05
Curie Temp	°F	535
	°C	280
Melting Range	°F	2600
Electrical Resistivity (70°F)	ohm-cir mil/ft	495.0
Thermal Conductivity	BTU-in/sq.ft-hr °F	72.6
	W/m-°C	10
Mean Specific Heat	BTU/lb/°F	0.1230

Source: CarTech Free-Cut Invar "36" Alloy Data Sheet v.3/15/04

### FORMS | SIZES AVAILABLE

Round Bar | Rod 0.125" - 6.00"

Listed above are our standard stock items. Our inventory fluctuates based on market demands. If you do not see the size or form you require, please call us.

### TYPICAL MECHANICAL PROPERTIES

		ANNEALED BARS	COLD DRAWN BARS
Tensile Strength	ksi	65	90
	MPa	448	621
Yield Strength	ksi	40	70
	MPa	276	483
Reduction in Area	%	65	60
Elongation	% in 2"	35	20
Hardness	Rockwell B	70	90
Modulus of Elasticity	ksi	20.5	21.5

Source: CarTech Free-Cut Invar "36" Alloy Data Sheet v.3/15/04

### MEAN COEFFICIENT OF THERMAL EXPANSION

Temperature	Coefficient	Temperature	Coefficient
77°F to	x 10 <sup>-6</sup> /°F	25°C to	x 10 <sup>-6</sup> /°C
212	0.91	100	1.64
302	1.32	150	2.38
392	1.69	200	3.04
482	2.34	250	4.21
572	3.26	300	5.87

Source: CarTech Free-Cut Invar "36" Alloy Data Sheet v.3/15/04

### CHEMISTRY %

Nickel, 36 nom., Selenium, 0.20 nom., Iron balance

Source: CarTech Free-Cut Invar "36" Alloy Data Sheet v.3/15/04

### SPECIFICATIONS

ASTM F1684 • MIL S-16598B (chem only) • UNS K93050 • UNS K93602

769 Susquehanna Avenue, Franklin Lakes, NJ 07417  
PH: 201.891.4003 | Toll Free: 800.335.6827



10537 Humbolt Street, Los Alamitos, CA 90720  
PH: 562.431.2568 | Toll Free: 800.782.9657

# Special Purpose Alloys & Metals From Stock

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Special Purpose Alloys

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## Controlled Expansion | Glass Sealing

Ed Fagan Inc. supplies the highest quality metals and alloys including materials from Carpenter Technology Corp.

### Kovar® | ASTM F15 Alloy

Forms: Plate, Round Bar, Sheet, Strip/Coil, Wire  
Trade Names: Kovar®, Pernifer® 2918, NILO K®, DilverP1®

### Alloy 42/46/48/52

Forms: Plate, Round Bar, Sheet, Strip/Coil, Wire  
Trade Names: Pernifer®40, 46, 48, 50; NILO® 42, 46, 48, 50; Glass Seal 42, 46, 48, 50

### Free-Cut Invar "36"® Alloy

Forms: Round Bar, Wire

### Invar "36"® Alloy

Forms: Plate, Sheet  
Trade Names: Pernifer® 36, NILO® 36, Invar

### Super Invar 32-5®

Forms: Plate, Round Bar, Sheet

## Refractory Metals and Alloys

Ed Fagan Inc. is your leading source for quality refractory metals and alloys. We stock Tungsten, Molybdenum and its alloys in various forms and sizes manufactured from Plansee Group.

### Molybdenum

Forms: Plate, Precision Cut Wire, Round Bar, Sheet/Strip, Spooled Wire, Threaded Rod/Nuts

### Molybdenum Lanthanum Oxide (ML)

Forms: Sheet – Stress Relieved, Recrystallized

### Molybdenum TZM

Forms: Plate, Round Bar

### Niobium

Forms: Plate, Round Bar, Sheet, Strip/Coil, Wire

### Rhenium

Forms: Plate, Round Bar, Sheet, Strip/Coil

### Tantalum

Forms: Round Bar, Sheet

### Tungsten

Forms: Parts (To Specification), Plate, Precision Cut Wire, Round Bar, Sheet

### Tungsten Alloy

Blank Forms: Flats, Parts, Plate/Sheet, Rod, Shapes

## Soft Magnetic Alloys | EMI Shielding & Laminations

Ed Fagan Inc. is a distributor of "EMI shielding alloys" for VDM Metals GmbH the world's leading producer of these alloys.

### EFI Alloy 50

Forms: Round Bar, Square Bar, Strip/Coil, Wire  
Trade Names: Alloy 4750, High Permeability 49®, Magnifer® 50

### EFI Alloy 79

Forms: Rectangular Bar, Round Bar, Sheet, Strip/Coil, Wire  
Trade Names: Hipernom, HyMu80®, Magnifer® 7904, Molypermalloy, Permalloy 80®

### Hiperco® 50, Hiperco® 50A, Hiperco® 50 HS

Forms: Plate, Round Bar, Strip/Coil

### Carpenter VimVar Core Iron

Forms: Plate, Round Bar

## Electrical & Electronic Nickels

Ed Fagan Inc. supplies select, commercially pure grades of Nickel in various forms and sizes.

### Electronic Nickels

200/201/205/233/270

Forms: Round Bar, Sheet, Strip/Coil, Wire

## Alloys and Metals We Distribute

Corrosion Resistant Alloys • High-Temperature Alloys • Stainless Steel  
• Titanium – CP, 6 Al-4V

## Ed Fagan Inc. Services

Slitting, Shearing, Saw Cutting, Grinding, Water Jet Cutting, Laser Cutting,  
Custom Stocking and Consignment Programs

**JUST-IN-TIME DELIVERY:** All of our **standard stock** items can be **shipped within 24-hours** of your order confirmation and most are **shipped the same day**. All materials certified with shipment. For special orders and non-stock materials, contact our sales team for our competitive pricing and delivery lead times.

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