

26
<b>Fe</b>
55.845
Iron
28
<b>Ni</b>
58.6934
Nickel
27
<b>Co</b>
58.933194
Cobalt

# Super Invar 32-5 Alloy

## Controlled Expansion Alloys

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### DESCRIPTION

An austenitic, magnetic iron-nickel-cobalt alloy consisting of 32% nominal Nickel, 5% Cobalt and the balance iron. Super Invar 32-5 provides thermal expansion rates approximately less than half of Invar (36% nickel-iron) when used in the -67/203°F temperature range. The slightly narrower application temperature range is due to a lower Curie temperature.

### APPLICATIONS

In structural components, support and substrates requiring precision measurements such as optical and laser systems, telescopes, laser bench tops, and ring gyroscopes.

### TYPICAL PHYSICAL PROPERTIES

Density	lb/cu in	0.294
Specific Gravity		8.15
Curie Temp	°F	500
	°C	260
Poisson's Ratio		0.230
Electrical Resistivity (73°F)	ohm-cir mil/ft	481.3
	microhm-cm	80
Thermal Conductivity	BTU-in/sq.ft-hr°F	72.6
	W/m°C	10
Specific Heat	Cal/g°C	0.12

Source: ASTM F1684/CarTech Super Invar 32-5 data sheet v. 3/15/04/CarTech Low Expansion Alloys Brochure

### FORMS | SIZES AVAILABLE

Plate	0.38" - 2.00"
Round Bar   Rod	0.50" - 3.543"
Sheet	0.0394" - 0.1181"

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

Tensile Strength	ksi	70
	MPa	483
Yield Strength (0.2%)	ksi	40
	MPa	276
Elongation	% in 2"	40
Hardness - Annealed	Rockwell B	75
Modulus of Elasticity	ksi	21.0 x 10 <sup>3</sup>

Source: CarTech Super Invar 32-5 data sheet v. 3/15/04

### AVERAGE COEFFICIENT OF THERMAL EXPANSION-ANNEALED

Temperature Range, °C Heat Treatment 30°C to	UNS NO. K93500 871 °C, 1 h, Furnace Cool µm/m°C
100	0.84
150	1.17
200	1.72
250	2.53
300	4.16
350	5.74
400	7.03
500	8.99
600	10.56
700	11.56
800	12.21
900	12.96

Source: ASTM F1684 X2.1

### CHEMISTRY %

Nickel 32.0 Nom., Cobalt 5.0 Nom., Iron Balance Nom.  
Source: ASTM F1684

### SPECIFICATIONS

ASTM F1684 • UNS K93500

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# Special Purpose Alloys & Metals From Stock

## 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/Rod, Sheet, Strip/Coil  
Trade Names: Kovar®, Pernifer® 2918, NILO K®, DilverP1®

### Alloy 42/46/48/52

Forms: Plate, Round Bar/Rod, Sheet, Strip/Coil  
Trade Names: Pernifer®40, 46, 48, 50; NILO® 42, 46, 48, 50;  
Glass Sealing 42, 46, 48, 52

### Free-Cut Invar "36"® Alloy

Forms: Round Bar/Rod

### Invar "36"® Alloy

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

### Super Invar 32-5®

Forms: Plate, Round Bar/Rod, Sheet

## Refractory Metals and Alloys

Ed Fagan Inc. is your leading source for quality refractory metals & alloys. We stock DFARS Molybdenum, ML/MLS/MLR, Molybdenum TZM, Tantalum & Tungsten manufactured from Plansee.

### Molybdenum

Forms: Plate, Round Bar/Rod, Sheet/Coiled Sheet, Threaded Rod/Nuts, Wire

### Molybdenum Lanthanum Oxide (ML)

Forms: Sheet – Stress Relieved, Recrystallized

### Molybdenum TZM

Forms: Plate, Round Bar/Rod, Sheet

### Niobium

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

### Rhenium

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

### Tantalum

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

### Tungsten

Forms: Plate, Precision Cut Wire, Round Bar/Rod, Sheet

### Tungsten Alloys

Forms: Blanks, 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/Rod, Square Bar, Strip/Coil, Wire Rod  
Trade Names: High Permeability 49®, Magnifer® 50

### EFI Alloy 79

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

### Hiperco® 50

Forms: Strip/Coil

### Hiperco® 50A

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

### Hiperco® 50 HS

Forms: Strip/Coil

### Carpenter VimVar Core Iron

Forms: Round Bar/Rod

## 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/Rod, 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.