



ED FAGAN INC.

Alloy 46

Controlled Expansion Alloys



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DESCRIPTION

A controlled expansion alloy, consisting of 46% Nickel, balance Iron; used in a variety of electronic applications, especially for glass and ceramic seals.

APPLICATIONS

Glass to metal seals for electronic tubes and hermetic devices.

AKA: Pernifer 46², NILO 46, Glass Seal 46¹

Footnotes: 1. Trademark Carpenter Technology Corp., Reading PA,
2. Trademark VDM Metals GmbH, Germany

PHYSICAL PROPERTIES

Density	lb/cu in	0.295
Specific Gravity		8.17
Curie Temp	°F	860
	°C	460
Melting Point	°F	2600
	°C	1427
Electrical Resistivity	micro-ohm-cm	47
	ohm-cir mil/ft	277
Thermal Conductivity	W/cm °C	0.11
	BTU-in/sq. ft-hr-°F	79.2
Specific Heat	Cal/g-°C	0.12
	BTU-lbm-°F	0.12
Thermal Expansion	ppm/°F(75°F to 842°F)	4.4
	ppm/°C(25°C to 450°C)	7.9

SPECIFICATIONS

ASTM F-30 **MIL** I-23011 CI 4 **AMS** I-23011 CI 4

LINEAR COEFFICIENT OF THERMAL EXPANSION - (ppm per °C) Deg. °C Class 1

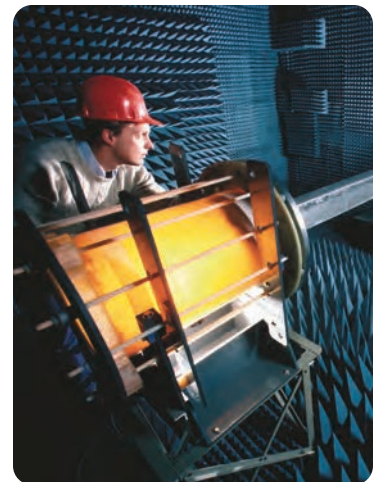
30-100	8.2	30-375	7.5	30-550	9.3
30-150	8.1	30-400	7.5	30-600	9.8
30-200	7.9	30-425	7.6	30-700	10.7
30-250	7.8	30-450	7.9	30-800	11.6
30-300	7.5	30-475	-	30-900	12.5
30-325	-	30-500	8.2-8.9	30-1000	13.4
30-350	7.1-7.8	30-525	-		

MECHANICAL PROPERTIES

Tensile Strength	ksi	80
	MPa	552
Yield Strength	ksi	35
	MPa	242
Elongation	% in 2 in.	30
Typical Hardness Ann.	Rockwell	HRB 80
Modulus of Elasticity	Mpsi	23
	kMPa	159

CHEMISTRY - maximum % unless noted

Iron	Bal	Silicon	0.30
Nominal Nickel	46	Sulfur	0.025
Nominal Cobalt	-	Chromium	0.025
Carbon	0.05		



FORMS

Alloy 46 is not a standard stock item; however, we may be able to supply you Alloy 46 in Rod, Sheet, Plate, Coil/Strip, or Photo-Etch. Please call us to check on availability.



Ed Fagan Inc also specializes in locating exotic materials. So, if you can't locate that hard-to-find material you need... Put EFi's material locator service to work for you!

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**THE MATERIALS YOU NEED,
WHEN YOU NEED THEM**



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www.edfagan.com
sales@edfagan.com

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ED FAGAN INC.

06/2020

Glass Sealing / Controlled Expansion Alloys / Electrical & Electronic Nickel

EFI provides the highest quality materials including materials from Carpenter Technology Corp.

ASTM F15 Alloy:

aka Kovar, Pernifer 2918, NILO K & Dilvar P1

Coil/Strip, Sheet, Plate, Round Bar

Invar 36:

aka Pernifer 36, NILO 36 & Invar Steel

Round Bar, Sheet, Plate

Super Invar 32-5:

Round bar, Sheet, Plate

42/*46/48/52 Alloy:

aka Pernifer 40, 46, 48 & 50;

NILO 42, 46, 48 & 50;

Glass Seal 42, 46, 48 & 50

Coil/Strip, Sheet, Plate, Round Bar

Electronic Nickel

200/201/233/270:

Coil/Strip, Round Bar, Sheet

**Products listed in Italics are special order and not standard stock items. Please call for availability.*

Soft Magnetic Alloys/ EMI Shielding & Laminations

EFI is a distributor of magnetic shielding alloys for the world's leading producer of these alloys – VDM Metals GmbH.

EFI Alloy 79:

aka Magnifer 7904, Moly-Permalloy,

HyMu 80, Hypernom & Permalloy 80

Round Bar, Sheet, Coil/Strip

EFI Alloy 50:

aka Magnifer 50, High Permeability 49 & Alloy 47-50

Round & Square Bar, Coil/Strip

Carpenter VimVar Core Iron:

Round Bar

Carpenter Hiperco 50:

Plate, Coil/Strip

Carpenter Hiperco 50A:

Round Bar

Radiometal 4550:

Round Bar, Coil/Strip

Refractory Metals/Alloys

EFI is a stocking distributor of Molybdenum & Tungsten products, as well as many other refractory metals and alloys, providing the highest quality materials available.

Molybdenum:

Round Bar, Sheet, Plate,

Threaded Rod & Nuts

**Foil/Coil/Strip, Wire*

TZM Molybdenum Alloy:

Round Bar, Sheet, Plate

Tungsten:

Round Bar, Plate, **Sheet, *Wire*

Tungsten Alloy:

Round Bar, **Sheet, *Plate,*

**Shapes, *Flat Blanks*

**Tantalum: Round Bar, Sheet*

**Niobium: Foil/Coil/Strip*

**Rhenium: Sheet*

**Products listed in Italics are special order and not standard stock items. Please call for availability.*

METALS WE DISTRIBUTE

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

JUST IN TIME DELIVERY: All **standard stock** items can be **shipped within 24 hours** – and are often **shipped the same day**. For **special order** materials, EFI has long relationships with the manufacturers of these materials, so please contact a sales rep to discuss price and delivery options. All materials can be certified with shipment.

SERVICES WE OFFER

Slitting, Shearing, Saw Cutting, Centerless Grinding, Water-jet Cutting, Laser Cutting, Custom Stocking Programs, Consignment Programs



Are you spending too much of your valuable time trying to locate specialty metals and materials? If you can't locate the hard-to-find materials you need, use EFI's Material Locator to source them for you.

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**THE MATERIALS YOU NEED,
WHEN YOU NEED THEM**



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