

# Goodfellow

Serving The Needs of Science and Industry Worldwide

Au service de la Science et de l'Industrie dans le monde entier

Weltweiter Lieferant für Wissenschaft und Industrie

Metals and Alloys  
Métaux et Alliages  
Metalle und Legierungen

Ceramics  
Céramiques  
Keramiken

Polymers  
Polymères  
Polymere

Composites  
Composites  
Verbundwerkstoffe



**Goodfellow Cambridge Limited**

Ermine Business Park  
HUNTINGDON  
PE29 6WR  
England

Tel: +44 1480 424 800  
or +44 1480 424 800  
Fax: +44 1480 424 900  
or +44 1480 424 900

**Goodfellow Corporation**

125 Hookstown Grade Road  
Coraopolis, PA 15108-9302  
USA

Tel: 1-800-821-2870 (USA and Canada)  
or +1 724 695 7060  
Fax: 1-800-283-2020 (USA and Canada)  
or +1 724 695 7063

**Goodfellow SARL**

229, rue Solférino  
F-59000 Lille  
France

Tel : 0800 917 241 (numéro vert)  
or +44 1480 424 813  
Fax : 0800 917 313 (numéro vert)  
or +44 1480 424 900

**Goodfellow GmbH**

Am Edelspfad 4  
D-61169 Friedberg  
Germany

Tel: 0800 1000 579 (freecall)  
or +44 1480 424 810  
Fax: 0800 1000 580 (freecall)  
or +44 1480 424 900

**Goodfellow (Shanghai) Trading Co., Ltd**

Room 803, Centro Build, No. 568 Hengfeng Road  
SHANGHAI  
200070

The People's Republic of China  
Tel: 00 86 21 6112 1560

# Standard Price List for Invar<sup>®</sup> - Controlled Expansion Alloy ( Fe64/Ni36 )

## CONTENTS

<b>Introduction</b>	4
<b>Product Descriptions</b>	5
<b>Hazards Information</b>	10
<b>General Information</b>	11
<b>Order information</b>	12
<b>Company Details</b>	15
<b>Conditions of Sale</b>	16
<b>Alloy</b>	20
<b>INDEX</b>	31

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## Introduction

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Goodfellow is well known as a specialist supplier of small to medium size quantities of metals, alloys, ceramics, polymers and other materials to meet the research, development and specialist production requirements of science and industry worldwide. We realise that "small" means different things to different people, but we consider small to mean any quantity from a few grammes to a few kilos.

Goodfellow offers two distinct services to meet the requirements of our customers:

- The first meets the needs of our customers who need small quantities of products from our standard range of materials within 24-48 hours.
- The second service is for those who require larger quantities or further processing of our standard products or who need an item which falls within our general area of supply expertise.

The range of materials offered by Goodfellow is extensive, as are the forms in which the various products are available. This Catalogue provides a detailed overview of our standard products which are available from stock. Full details of all of these items, including prices and technical information, can be found in our web Catalogue at [www.goodfellow.com](http://www.goodfellow.com).

### Materials

#### ***Metals and Alloys***

Goodfellow supplies virtually all of the pure metals from Aluminium to Zirconium as well as a comprehensive range of alloys. Most are available in a variety of forms, including rod, wire and foil. The Catalog details those materials which are available as standard products from stock. Custom-made items are also available, so please contact us if you are unable to identify the item you require.

#### ***Ceramics***

The ceramic materials offered by Goodfellow have been carefully chosen, and include both the established as well as more recently developed products. All are available as either standard or custom-made products in a variety of forms and sizes. The Catalog details those items which are

available from stock. For ceramic components made to customer drawings, our Ceramic and Glass Division would be delighted to help. Please visit [www.goodfellow-ceramics.com](http://www.goodfellow-ceramics.com) for further information.

#### ***Polymers***

The range of polymers supplied by Goodfellow is broad and includes both the familiar as well as some of the more unusual or recently developed materials. The Catalog details those items which are available from stock; please contact us if you are unable to find the item you specifically require.

#### ***Compounds & Intermetallics***

Goodfellow can supply aluminides, borides and silicides as well as other intermetallics and compounds. The majority of these items are made to order and the Catalog details those which are available. Please contact us with details of your requirements.

#### ***Composites***

Some examples of these materials are listed in the Catalog. As some of these are manufactured on a custom-made basis, please contact us with details of your requirements.

#### ***Glasses***

Goodfellow offers two distinct types of glass products. The first are generally silica-based and transparent. Generally, these products are made to order for customers, so we do not list them in our Catalog, however, they are available through the Goodfellow Ceramic and Glass Division. Please contact us with your requirements.

The second type of glass product is commonly referred to as "metallic glasses" or "glassy metals". In contrast to crystalline metals and alloys with highly ordered atomic structures, these are non-crystalline (amorphous) metals or, more usually, alloys. Our Catalogue details those glassy metals which are available from stock; please contact us if you are unable to find the item you specifically require.

**Product Descriptions**



**Bar**

A straight length of rectangular, square or oval section material.

**Tolerances**

Section dimensions:	≤ 10mm	± 10%
	> 10mm	± 1mm
Length:	< 100mm	± 1mm
	≥ 100mm	+ 5% / - 1%



**Bolt**

A threaded pin that can be screwed into a nut or a tapped hole to fasten items together. Bolts are available with different head styles and also in metric and inch-threaded sizes.

**Tolerances**

See item



**Chopped Fibre**

Fibres cut into short lengths called cut, staple or chopped fibre.

**Tolerances**

Fibre diameter:	± 25%
Number of strands:	± 10%
Tex number:	± 10%
Length:	+ 5% / - 1%



**Crucible**

A vessel in which other materials may be heated or melted, usually at high temperatures.

**Tolerances**

Height:	± 10%
Inside Dimensions:	± 10%
Outside Dimensions:	± 10%



**Fabric**

Woven fabrics are made by the regular interlacing of two arrays of yarns at right angles to each other, these being referred to as the warp and weft (see also Non-woven fabric).

**Tolerances**

Fabric thickness:	± 25%
Number of yarns:	± 10%
Tex number:	± 10%
Size (linear dimension):	< 100mm ± 5mm
	≥ 100mm ± 5%



**Fibre**

Yarns or tows consisting of several approximately parallel individual filaments, each filament usually being smaller in diameter than a monofilament. Yarns contain a defined number of filaments, typically three to several hundred; tows contain thousands of filaments whose number is only defined approximately. Both are primarily specified by their linear density measured in "tex", the weight in grams of a 1km length of material.

**Tolerances**

Fibre diameter:	± 25%
Number of strands:	± 10%
Tex number:	± 10%
Length:	+ 5% / - 1%



**Film**

A non-metallic sheet material with a thickness < 0.5mm.

**Tolerances**

Thickness:	± 20%
Size (linear dimension):	< 100mm ± 1mm
	≥ 100mm + 2% / - 1%



**Flake**

Flat, irregularly shaped pieces of material. A maximum flake size is indicated but individual flakes may vary greatly in size.

**Tolerances**

Dimensions shown are nominal

**Product Descriptions**



**Foam**

A low density, permeable structure of cells and continuous ligaments offering a high surface area to volume ratio, and also a high strength to weight ratio. Owing to the nature of this material, dimensions are nominal.



**Foil**

Thin sheets of pure metal and metal alloys. Due to their fragile nature, some foils are coated on one side with an acrylic or polyester support. Where foils are supported they are indicated in the detailed item description.

**Tolerances**

Thickness: < 0.010mm ± 25%  
 0.01-0.05mm ± 15%  
 > 0.050mm ± 10%  
 Size (linear dimension): < 100mm ± 1mm  
 ≥ 100mm + 2% / -1%



**Granule**

Pellets of an approximately regular shape. Granules may vary in size and, therefore, the dimensions stated are nominal. In addition, the shape of a granule may vary from item to item.

**Tolerances**

Dimensions shown are nominal



**Honeycomb**

A cellular structure similar in appearance to natural honeycomb. Owing to the nature of this material, dimensions are nominal.



**Insulated Wire**

A single or multiple flexible strand of metal or alloy with an insulating sheath.

**Tolerances**

Wire diameter: ± 10%  
 Length: + 5% / -1%  
 Insulation thickness: Nominal values only



**Laminate**

Layers of material which have been bonded together by the use of heat, pressure and, possibly, adhesive.

**Tolerances**

Thickness: ± 10%  
 Size (linear dimension): ≤ 100mm ± 1mm  
 > 100mm + 2% / -1%



**Lump**

A solid piece of material with no defined shape.

**Tolerances**

Dimensions shown are nominal



**Mesh**

Mesh is available as either a woven wire or electroformed product; in all cases, the quoted aperture sizes are nominal. Wire mesh: a material which is woven from metal wires to provide a thin grid with a regular series of holes. Electroformed mesh: a product made by electroplating the mesh geometry through a mask onto a substrate which is subsequently etched away.

**Tolerances**

Thickness: woven: ± 10%  
 electroformed: ± 20%  
 Wire diameter: ± 10%  
 Size (linear dimension): < 100mm ± 1mm  
 ≥ 100mm + 2% / -1%

**Product Descriptions**



**Metallised Film**

Film which is coated with a metal. The thickness of the metal is measured and described in terms of the material's specific electrical resistance in ohms per square.

**Tolerances**

Thickness:  $\pm 10\%$   
 Size (linear dimension):  $< 100\text{mm}$   $\pm 1\text{mm}$   
 $\geq 100\text{mm}$   $+2\% / -1\%$



**Microfoil**

An extremely thin sheet of metal or alloy mounted on a permanent support. This support **cannot** be removed without destroying the Microfoil.

**Tolerances**

Thickness:  $\pm 30\%$   
 Size:  $\pm 20\%$



**Microleaf**

An extremely thin sheet of metal mounted on a removable support. Microleaf is not available for metals which are too brittle to be free standing.

**Tolerances**

Thickness:  $\pm 30\%$   
 Size:  $\pm 20\%$



**Monofilament**

A single strand of a non-metallic material.

**Tolerances**

Diameter:  $\pm 20\%$   
 Length:  $+5\% / -1\%$



**Non-Woven Fabric**

Non-woven fabrics are made by methods other than weaving or knitting, the yarns and fibres being held together, often quite loosely, by means other than geometric interlacing. Due to the open and porous nature of this material, all other dimensions are nominal. conventional textile fabrics. Due to the open and porous nature of this material, all other dimensions are nominal.

**Tolerances**

Size (linear dimension):  $< 100\text{mm}$   $\pm 5\text{mm}$   
 $> 100\text{mm}$   $\pm 5\%$



**Nut**

Generally a flat piece of material with a threaded hole which can be screwed onto a bolt to fasten items together. Nuts typically have a hexagonal external shape. Nuts are available in metric and inch-threaded sizes.

**Tolerances**

See item



**Powder**

Small particles with an approximately defined size range. Those materials described as alloy precursors are not true alloys - they are made by sintering a blend of powders of the component metals to achieve alloying by diffusion. The resultant cake is ground and sieved to the required particle size range. Unless otherwise stated, the particle sizes shown are for guidance only. We do not guarantee either any particular size distribution between the quoted minimum and maximum sizes, or a specific particle shape.

**Tolerances**

Dimensions shown are nominal

**Product Descriptions**



**Rod**

A straight length of circular section material.

**Tolerances**

Diameter:	≤ 10mm	± 10%
	Polymer	+ 20%/-10%
	Ceramic	+ 20%/-10%
> 10mm	± 5%	
	Ceramic	+ 20%/-10%
	Polymer	+ 20%/-10%
Length:	< 100mm	± 1mm
	≥ 100mm	+ 5% / -1%



**Sheet**

Flat material with a thickness > 0.5mm.

**Tolerances**

Thickness:		± 10%
	Ceramic	± 20%
	Composite	± 20%
	Polymer	± 20%
Size (linear dimension):	< 100mm	± 1mm
	≥ 100mm	+ 2% / -1%



**Single Crystal**

A material grown as a monocrystal, generally to a specific orientation, dimension and surface finish. It may contain a dopant. Single crystals are usually made to order.

**Tolerances**

Orientation:	± 3°
Size:	Sizes shown are nominal



**Sphere**

A regular solid or hollow three-dimensional form in which every cross-section is a circle. Spheres are available with standard or precision tolerances, and can be supplied with different surface finishes depending on the material.

**Tolerances**

Diameter (standard):	± 5%
Diameter (precision):	see item



**Sputtering Target**

A high purity material used as a source for sputtering, a cold vapourisation process in which atoms are physically removed from the target surface by ion bombardment.

**Tolerances**

Thickness:	± 0.5mm
Size:	± 0.5mm



**Tube**

A hollow length of material normally circular in section. Most tubes are straight except those made of flexible polymer.

**Tolerances**

Outside diameter:	≤ 2mm	± 0.05mm
	Polymer	± 10%
	Ceramic	± 10%
≤ 5mm	± 0.1mm	
	Polymer	± 10%
	Ceramic	± 10%
> 5mm	± 5%	
	Polymer	± 10%
	Ceramic	± 10%
Wall thickness:		± 10%
	Polymer	± 20%
	Ceramic	± 20%
Length:	< 100mm	± 1mm
	≥ 100mm	+ 5% / -1%



**Washer**

A thin, flat piece of material with a hole in the middle, used in conjunction with bolts and nuts to distribute the load of a threaded fastener.

**Tolerances**

See item



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## Product Descriptions

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### Wire

A single or multiple flexible strand of pure metal or alloy.

#### Tolerances

Wire diameter:  $\pm 10\%$   
Length:  $+5\% / -1\%$

## Hazards Information

### HAZARDS

All materials listed in this catalogue, whatever the quantity supplied, are sold for research or development purposes. We make no warranty that the materials are fit for a particular purpose. In purchasing materials from this catalogue, customers should be aware that there may be hazards associated with their use and in the handling of them. Complete toxicological or hazard investigations are the responsibility of the customer. Ingestion or contact with the human body may be harmful. The responsibility for the safe use of our products rests with the customer. All materials should be handled by qualified personnel familiar with laboratory procedures and who are familiar with the nature of the material and any necessary precautions which should be taken in the handling, use and storage of the products. The customer shall be responsible for the control and use of the products offered in this catalogue whether alone or in combination with other articles or substances or in any other manner whatsoever.

### HAZARD SYMBOLS



C

#### Corrosive

Chemicals which may destroy living tissue when in contact with them.



D

#### Dangerous when wet

Chemicals which, in contact with water or damp air, evolve highly flammable or toxic gases and vapours in dangerous quantities.



E

#### Explosive

Chemicals which may react exothermically without atmospheric oxygen, quickly evolving gases, and which under defined test conditions detonate, quickly deflagrate or upon heating explode when partially confined.



F+

#### Extremely Flammable

Chemicals which when finely divided (small particle size) are liable to ignite spontaneously.



Xn

#### Harmful

Chemicals which may cause death or acute or chronic damage to health when inhaled, ingested or absorbed via the skin.



F

#### Highly flammable

Chemicals which will ignite after contact with flame, or which will evolve highly flammable gases in contact with water.



Xi

#### Irritant

Non-corrosive chemicals which, through immediate, prolonged or repeated contact with the skin or mucous membrane may cause inflammation.



R

#### Radioactive

Chemicals which will emit ionising radiation without being subject to irradiation. General precautions for Toxic chemicals apply to those of low activity. For chemicals of medium or high activity special regulations apply.



T

#### Toxic

Chemicals which may cause death or acute or chronic damage to health when inhaled, ingested or absorbed via the skin.



T+

#### Very Toxic

Chemicals which in low quantities cause death or acute or chronic damage to health when inhaled, ingested or absorbed via the skin.

## General Information

### Analyses

#### Typical Analysis :

Where appropriate a typical analysis is given. All figures are parts per million (ppm) by weight unless otherwise stated. It must be emphasised that this data is "typical" and no guarantee is given that the material supplied will conform to these analyses. The compositions shown under alloy headings are generally weight percent. Exceptions are the glassy alloys and the rare earth magnets where the convention of using atomic ratio is followed.

#### Purity

Purities listed are quoted with respect to total metallic impurities. Typical analyses may give additional information about likely non-metallic impurities.

#### High Purity

For materials described as High Purity, the actual analysis of metallic impurities will be supplied free of charge. For other items, an actual analysis can be supplied and a charge will be made for the analysis and for the sample used.

If you require an analysis please tell us whether you require analysis of metallic impurities only or metallic and gaseous. Where an analysis is required the shipment of your order may be delayed.

### Supports

Some items from our range of foils need to be supported on one side of the foil to enable both you and us to handle these very delicate materials. Two types of support can be used, the choice being governed by the material. Wherever possible we use a temporary support, a permanent support only being used when the material is brittle (for example Chromium or Manganese).

The temporary support is Acrylic, approximately 0.2mm thick. This may be removed by dissolving in 2-Propanone (Acetone).

Our permanent support is Polyester, thickness 0.125mm, which is hot-press laminated to one face of the foil. It **cannot** be removed without destroying the foil.

Microfoil is mounted on a permanent 3.5µm polyester support. This support **cannot** be removed without destroying the Microfoil.

Microleaf is mounted on a specially treated support which allows separation of the metal film from the support. Full instructions on the method of removal are issued with each Microleaf supplied.

### Light Tight (LT) & Not Light Tested (NLT)

Light tight (LT) foils are supplied without visible pinholes after examination without magnification. Foils 0.025mm or more in thickness are supplied LT unless otherwise stated.

Foils less than 0.025mm thick are normally supplied Not-Light Tested (NLT), and will normally contain pinholes but may occasionally be free from pinholes. Foils less than 0.025mm in thickness can often be supplied LT but may incur additional charges. Please specify if you require LT foils

### Vacuum tight

Vacuum tight foils show no detectable leakage when tested with a helium mass spectrometer with a sensitivity of  $10^{-9}$  atm-cm<sup>3</sup>.s<sup>-1</sup>.

### Continuous Lengths

If you require material in continuous lengths please tell us when you place your order. Unless otherwise specified, we reserve the right to supply in more than one length.

### Technical Data and Information

All information and technical data are given as a guide only. Although every effort has been made to ensure that the information is correct, no warranty is given as to its completeness or accuracy.

### Tolerances

For details of our standard tolerances, please refer to the Product Description section. In many cases, closer tolerances are available but may be subject to an extra charge. If you have any special requirements it is important that you tell us at the time of ordering. This includes special tolerances, dimensional uniformity or any other special requirement which you may have (for example edge finish, packaging, labelling etc.). Please indicate precisely what is required and we shall do our best to meet your specification.

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## Order information

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### General Information

There are over 70,000 stock packs listed and if you cannot find what you need amongst them, please ask for special sizes, thicknesses, tolerances, dimensions or larger quantities. We are also able to offer many other pure metals, alloys, polymers and ceramics to special order.

### Prices

All the prices listed are total (lot) prices for the sizes and quantities listed. Prices are subject to change without notice.

Prices shown include delivery except for those items marked as "special offer" or dangerous goods with transport restriction. They do not include value added tax, any import duties or local taxes.

### Transport Restriction

Some of the materials supplied by Goodfellow are subject to special transport restrictions. Additional shipment charges may apply which are dependent on destination. Please check the individual item on our website or contact us for details of the charges.

If you intend to have the material transported or sent onwards please ensure that you are aware of the relevant transport restrictions.

### Delivery

#### Split shipment

All orders are accepted for one shipment on one date to one address. A charge will be made for split shipments made at the customer's request.

#### Special Analysis, Supports or Tolerances

An extra charge is made for non-standard supports, alternative tolerances and certificates of analysis. The analysis is free of charge for items marked "High Purity".

#### Cancellations

A charge for cancellation of orders may be made. The amount will depend on the circumstances.

#### Express Service

An administration charge of £10 will be made for any order received for which same day shipment within the UK is requested.

### Shipment

We aim to have all items listed in this catalogue in stock in the quantities and sizes listed. We can only undertake to despatch an order on a particular date. The date of delivery at the customer's address is subject to the normal variations of the delivery service used.

### Despatch

Orders will normally be despatched within 48 hours of receipt.

### Non delivery

If we have notified you of despatch of goods and you have not received delivery within 7 days, please contact us.

### Insurance

All consignments will be insured by us against the usual risks unless we are instructed in writing to the contrary.

### Export Restrictions

A UK Government export licence may be required for some items to some destinations. If the item you require needs a special export licence or an end-use statement we will inform you at the time you order.

### Materials Handling

Many of our materials are extremely delicate and it is essential every care is taken when handling them. Special attention is drawn to the extreme fragility of Microfoil, Microleaf and thinner and finer materials.

All materials are carefully packed to ensure safe transport of goods to your address. We do not accept responsibility for damage caused by mishandling once the outer transit packaging has been removed.

### Terms of payment

Our normal terms of payment are net 30 days from date of invoice. Any alternative terms of payment are to be agreed with us in writing at the time of placing an order. Customers may be asked to pay cash with order or cash against pro-forma invoice with their first order. In order to establish a credit account we will require details of your bankers, along with two trade references.

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## Order information

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### Credit account

We endeavour to keep our costs down and customers are requested to pay our invoices on time. We reserve the right to delay delivery if there are overdue invoices on the account. Accounts which remain unpaid beyond the due date may incur an interest charge at a rate of 2% per month.

### Credit card payments

We also accept payment using the following credit and charge cards:

Mastercard, VISA, American Express, DELTA and Switch.

### VAT

VAT number: GB 212 8527 79

### UK

VAT will be added to the invoice at the rate ruling at the date of invoice. Where a customer is exempt, VAT will be charged unless we receive a copy of the exemption form at the time the order is placed.

### EU

Customers registered for VAT who provide their local registration number will not be charged UK VAT.

Customers who are exempt from VAT will not be charged UK VAT provided we are given a copy of their exemption form at the time the goods are ordered.

Customers not registered for VAT or who fail to give us their registration number will be charged UK VAT at the current rate.

### Export

All exports to countries outside the EU are zero-rated for UK VAT unless the invoice is being paid from within the EU.

### Return of goods

We will only accept return of goods provided we are contacted BEFORE the goods are returned. When we agree to the return we will issue a Goods Return Number and give instructions for the method of return of the goods. Goods will not be accepted for return without a valid Goods Return Number. Due to the nature of some of our materials, it is imperative that you check any possible transport restrictions with your proposed freight company.

### Claims

Great care is taken during manufacture and packing and all items are carefully inspected before shipment. Any claim in respect of short delivery, incorrect material or defective quality must be notified to us in writing within three days of delivery. Please retain ALL packaging for our inspection. Our liability for any such claim shall not exceed the cost of replacement of the goods free of charge, or crediting the customer with the invoice value thereof.

### Goods ordered in error

We do not accept responsibility for customers' errors in ordering. The amount of credit for returned goods will be at our discretion. Where we accept returned goods a restocking charge will be made.

### Conditions of sale

All orders, contracts and quotations are subject to our standard terms and conditions of sale.

Information and statements provided are indicative only and do not form part of any offer or contract.

### Exclusions

We supply materials according to our specification. All conditions warranties and representations regarding the quality, fitness for purpose or state, size, shape, capacity or colour of goods supplied whether expressed or implied by common law or statute or otherwise are hereby expressly excluded. We shall not be liable for any damage direct or consequential arising from the use of goods supplied by us however such damage is caused, nor for delay in delivery.

### Law

Customers in the USA: Contracts between Goodfellow Corporation and the customer shall be deemed to be subject in all respects to the laws of the Commonwealth of Pennsylvania, or the United States of America.

Customers in France: Contracts between Goodfellow SARL and the customer shall be deemed to be subject in all respects to French law unless otherwise agreed in writing

Customers in Germany: Contracts between Goodfellow GmbH and the customer shall be deemed to be subject in all respects to German law unless otherwise agreed in writing

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## Order information

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Customers in the UK and all other countries: Contracts between Goodfellow Cambridge Limited and the customer shall be deemed to be subject in all respects to English law unless otherwise agreed in writing.

Copies of our General Terms and Conditions are available upon request or can be downloaded from our websites at [www.goodfellow.com](http://www.goodfellow.com) or [www.goodfellowusa.com](http://www.goodfellowusa.com).

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## Company Details

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### Company Structure

The Goodfellow Group consists of five companies:

#### ***Goodfellow Cambridge Limited***

Goodfellow was established in the City of London in 1946. The Company now has subsidiary operations in France, Germany and North America with the Group's research laboratories, workshop facilities & central administration located in Huntingdon, England.

#### ***Goodfellow Corporation***

Established at the same time as our associate company in Germany, Goodfellow Corporation was set up to service the requirements of our customers in the USA.

#### ***Goodfellow GmbH***

Since 1989, this member of the Goodfellow group of companies has been serving the needs of our German speaking customers within Europe.

#### ***Goodfellow SARL***

Goodfellow established an operation in France in 1993 to meet the needs of our French-speaking customers in Europe.

#### ***Goodfellow (Shanghai) Trading Co., Ltd***

Goodfellow established a representative office in Shanghai in 2006, and in 2012 followed this with the creation of a fully-fledged trading company, servicing the research and specialist manufacturing requirements of the Chinese market.

### COMPANY DETAILS

#### **Goodfellow Cambridge Limited**

Ermine Business Park  
HUNTINGDON  
PE29 6WR  
England  
Registered in England and Wales no. 1188162  
VAT registration GB 212 8527 79

#### **Goodfellow Corporation**

125 Hookstown Grade Road  
Coraopolis, PA 15108-9302  
USA  
A Pennsylvania corporation  
EIN 23-2557381

#### **Goodfellow SARL**

229, rue Solférino  
F-59000 Lille  
France  
Registered in Lille : RCS : B 381 486 836  
Siren : 381486836  
Numéro de TVA Intracommunitaire :  
FR 06 381 486 836

#### **Goodfellow GmbH**

Am Edelspfad 4  
D-61169 Friedberg  
Germany  
Registered in Friedberg (Hessen) No. HRB 1309  
Import VAT number DE112610478

#### **Goodfellow (Shanghai) Trading Co., Ltd**

Room 803, Centro Build, No. 568 Hengfeng Road  
SHANGHAI  
200070  
The People's Republic of China

# Conditions of Sale

## 1 GENERAL

### 1.1 In these Conditions:

#### 1.1.1 the following expressions shall have the following meanings:-

- "Buyer" the individual firm company or other party from whom an order to supply Goods and/or Services is received by the Seller;
- "Conditions" the standard terms and conditions of sale of the Seller as set out herein and includes any additional terms and conditions of sale agreed in writing by the Seller;
- "Contract" a contract for the Supply of Goods and/or Services by the Seller to the Buyer;
- "Date of Delivery" the date on which delivery of the Goods or Services takes place pursuant to Condition 7;
- "Goods" the goods which the Seller is to supply (or, in relation to Condition 11, the goods in respect of which the Seller is to provide Services) under the Contract and includes any of them or any part of them and where the context so admits includes raw materials, processed materials and/or manufactured products whether processed or manufactured by the Seller or not;
- "Prepayment" a payment to be made by the Buyer pursuant to Condition 6.2 to be used at the Seller's discretion for the purchase of materials and/or towards the costs of labour and other costs relating to the supply of Goods;
- "Recommendations for Use" the recommendations (if any) relating to the storage, handling, application and/or use of the Goods contained in the published literature of the Seller (or, if relevant, a Supplier) or any recommendations made in Writing by an authorised representative of the Seller (or, if relevant, a Supplier);
- "Seller" Goodfellow Cambridge Limited and any subsidiary or holding company or associate (as such terms are defined in the Companies Act 1985 (as amended)) of the said company;
- "Services" the work or services or any of them to be provided by the Seller under the Contract;
- "Supplier" any person, firm or company who or which supplies materials to the Seller which make up the Goods which are to be supplied to the Buyer;

#### 1.1.2 words importing the singular number shall include the plural and vice versa, words importing one gender shall include all genders, and words importing persons shall include bodies corporate, unincorporated associations and partnerships

- 1.2 If satisfactory references and information on the Buyer are not provided within seven days of a request therefore by the Seller, or if, following the provision of such information, the Seller is unable to obtain satisfactory trade indemnity or similar cover in respect of its dealings with the Buyer, the Seller may terminate the Contract and the rights and liabilities of the parties shall be the same as if the Contract had been cancelled in accordance with the provisions of Condition 10.2
- 1.3 The seller reserves the right to assign, sub-contract the Contract or any part thereof. The Buyer shall not be entitled to assign the benefit or burden of the Contract without the consent in writing of the Seller
- 1.4 In relation to all obligations of the Buyer under these Conditions, the time of performance is of the essence
- 1.5 The legal construction of these Conditions shall not be effected by their headings which are for convenience of reference only

## 2 ORDERS

- 2.1 Notwithstanding that the Seller may have given a detailed quotation or estimate either verbally or in writing no order shall be binding on the Seller unless and until it has been acknowledged in writing by the Seller or the Goods are delivered or the Services are provided by the Seller to the Buyer pursuant to the order
- 2.2 In order to avoid duplication of orders the Buyer shall be responsible for ensuring that any confirmation of an order previously placed is prominently marked as being a confirmation and not a new order. The Buyer acknowledges that any order or confirmation of order which is not so marked may be treated and accepted by the Seller as a new order to create a Contract in addition to any Contract arising out of the previously placed order
- 2.3 These Conditions are incorporated in the Contract and together with any matter set out in the Seller's quotation or acceptance/acknowledgement of order contain the entire obligations between the Seller and the Buyer. In the case of any inconsistency between any letter or quotation incorporating or referring to these Conditions and any order, letter or form of contract sent by the Buyer to the Seller, whatever may be their respective dates, the provisions of these Conditions shall prevail. In the event of the Seller entering into the Contract without the Seller having submitted a written quotation or other letter or document incorporating or referring to these Conditions but in circumstances where the Buyer has had prior notice of these Conditions then all Goods or Services supplied shall be subject to these Conditions
- 2.4 No variation of the Contract by the Buyer shall be binding upon the Seller unless made in Writing and signed on behalf of the Seller. In the event of such variation the Buyer shall indemnify and keep indemnified the Seller in full against all loss, which term shall include (but without prejudice to the generality thereof) loss of profit, costs (including the cost of labour and materials), damages, charges and expenses incurred (directly or indirectly) by the Seller as a result of such variation

- 2.5 Any representations (except fraudulent misrepresentations) or warranties made by or on behalf of the Seller prior to the Contract (whether verbally or in writing) are hereby expressly excluded and shall be of no effect

## 3 DESCRIPTION

- 3.1 Any figures, statements, descriptions, illustrations, photographs, drawings, weights or any other matters contained in the Seller's catalogues, pamphlets, price lists or advertising literature are not guaranteed to be accurate and are intended merely to represent a general picture of the Seller's products and shall not form part of the Contract nor be regarded as a warranty or representation relating to the Goods or Services
- 3.2 The Seller reserves the right to amend the specification of its products and services from time to time so that the descriptions thereof as set out in its catalogues, pamphlets, price lists or advertising literature may not be identical with those set out in the Seller's quotation and the Buyer is advised to check the specification set out in the Seller's quotation before placing an order

## 4 SPECIFICATIONS AND INTELLECTUAL PROPERTY

- 4.1 Where goods are supplied to the Buyer's own specification, or where standard goods of the Seller are altered in accordance with the Buyer's instructions the Buyer warrants and undertakes full responsibility for the suitability and fitness of the specification, pattern or design but also that such specification, pattern or design does not infringe any patent, trade mark, registered design, copyright or any other proprietary right of any third party and the Buyer shall indemnify and keep the Seller indemnified in full against any loss, damage or expense whatsoever (including costs) which the Seller may incur in or arising from the performance of the Contract by reason of any infringement of any such patent, trade mark, registered design, copyright or any other proprietary right
- 4.2 The Seller reserves the right to change the Buyer's specification as required to ensure that the Goods comply with any health, safety or other statutory requirement or provision and no such change by the Seller will constitute a breach of contract or impose upon the Seller any liability whatsoever
- 4.3 Unless otherwise agreed in writing, the Seller will be the sole owner of all inventions, formulations, tools, patterns, designs or other similar items and the copyright in all documents and drawings made or produced by it in preparing a quotation for the Buyer or in the course of work on any Contract with the Buyer

## 5 QUOTATIONS

- 5.1 The Seller's quotations are provisional in so far as they are subject to alteration by reference to any changes in the price of raw materials, any item to be acquired by the Seller from a third party, rates of wages, other costs of production and any other circumstances beyond the Seller's control taking place between the date of the quotation and the Buyer's placing of an order in respect thereof

## 6 PRICE

- 6.1 The Seller shall be entitled to adjust the Contract price of the Goods or Services whether before or after the making of the Contract in the event of any variation in the cost to the Seller of supplying the same or any part thereof caused by:-
- 6.1.1 any increase in the cost of materials required by the Seller for the completion of the Contract; or
- 6.1.2 any increase in wages or production and manufacturing costs or other overheads; or
- 6.1.3 any other reason whatsoever beyond the control of the Seller including (but without prejudice to the generality of the foregoing) fluctuations in exchange rates between monetary currencies the action of any government or any other authority or any labour problems
- 6.2 In the Seller's absolute discretion, a Prepayment in respect of the Contract may be required to be paid by the Buyer to the Seller on the terms set out in this Condition. The Prepayment shall be applied as follows:-
- 6.2.1 in the event that the Contract is performed in full by both parties the Prepayment shall be retained by the Seller in reduction of the total price payable by the Buyer under the Contract;
- 6.2.2 in the event that the Buyer is either in default of any of its obligations under the Contract or cancels or suspends the Contract in accordance with Condition 10 the Prepayment shall be set off by the Seller against its proper costs losses or damages arising in connection with the default and/or cancellation or suspension
- 6.3 Unless otherwise stated, the price set out in the Seller's quotation includes the cost of packaging, carriage, and (save as provided in Condition 6.4) insurance. In respect of supplies of Goods in the United States of America, Canada and Japan the price also includes import duties and sales taxes (if any). In respect of supplies of Goods in other countries the price does not include import duties or VAT or sales taxes which will be extra charges based on prevailing rates
- 6.4 Where the Buyer requests a particular means of delivery, the price set out in the Seller's quotation does not include insurance, which is to be arranged at the responsibility of the Buyer.

## 7 DELIVERY

- 7.1 Delivery of Goods shall be deemed to be effected by the Seller at the following times:-
- 7.1.1 where Goods are collected by or on behalf of the Buyer by its servants or agents, or where Goods are collected in



## Conditions of Sale

- accordance with a means of delivery specifically requested by the Buyer, when the same are collected;
- 7.1.2 where delivery of the Goods is to be the responsibility of the Seller, when they arrive prior to unloading at the Buyer's premises;
- 7.1.3 where Goods are sold FOB or CIF, when they pass the ship's rail or are loaded onto the aircraft
- 7.2 Delivery of Services shall be deemed to be effected by the Seller at the time of completion by the Seller of the Services
- 7.3 Whilst the Seller will make every reasonable effort to complete the Contract by the date or dates therein specified for delivery of Goods or provision of Services such date or dates shall only constitute the times by which the Seller expects to effect such delivery and if no time is agreed delivery will be within a reasonable time but the performance of the Contract by the Seller shall not be the essence of the Contract, the Seller's failure to so deliver by the due date or dates shall not constitute a breach of Contract and the Seller shall not in any circumstances be responsible for any direct or consequential loss or damage of any kind whatsoever resulting therefrom. The Seller may wholly or partly suspend deliveries of Goods or provision of Services and the Buyer shall accept late delivery of such Goods or Services unless the Buyer has cancelled the Contract in accordance with the provisions of Condition 10.3
- 8 QUANTITIES INSTALMENTS AND STORAGE**
- 8.1 Where Goods are delivered or Services are by instalment each instalment shall be deemed to be sold under a separate Contract and the party in default in respect of any instalment shall be liable accordingly, but no default in respect of any one instalment shall effect due performance of the Contract as regards other instalments
- 8.2 The Seller will endeavour to deliver the quantity of Goods ordered and every delivery shall be deemed to comply with the order. If there is a surplus or shortage of Goods which is no more than 10% of the quantity specified in the order the Buyer shall be deemed to have accepted the Goods and shall pay for the actual quantity delivered
- 8.3 If Goods or Services are to be delivered by instalments, the Seller shall be entitled to invoice each instalment as and when delivery is made and payment for all delivered instalments shall be due notwithstanding the non-delivery of other instalments or other default by the Seller. Failure by the Buyer to make payment by the due date for any one instalment for whatever reason shall entitle the Seller to suspend deliveries of Goods or provision of Services under the Contract but without prejudice to any other right the Seller may have under any of the other provisions of these Conditions
- 8.4 Notwithstanding that risk shall have passed to the Buyer pursuant to Condition 15 the Seller may in its absolute discretion arrange for storage of the Goods either at the request of the Buyer or as a result of the failure by the Buyer to take delivery of the Goods under Condition 7. The Seller may insure the goods whilst in storage and the Buyer shall indemnify and keep indemnified the Seller in full against all costs, losses, damages and expenses whatsoever arising in connection with the storage provided for hereunder and such costs, losses, damages and expenses will be added to and form part of the price of the Goods
- 8.5 Unless otherwise agreed between the Buyer and the Seller, the Seller shall be entitled in its absolute discretion and without giving prior notice to the Buyer at the expiration of 3 months to sell or otherwise dispose of Goods kept in storage as provided in Condition 8.4
- 9 TERMS OF PAYMENT**
- 9.1 Unless otherwise agreed the price shall be due and payable at the Seller's offices 30 days after the date of the Seller's invoice
- 9.2 If the Buyer does not pay the whole or any part of the price on the required day then the Buyer shall pay to the Seller on request interest on the amount outstanding from the required day until the actual date of payment at the rate of 2% p.a. over the base rate of Barclays Bank plc from time to time in force which shall accrue on a daily basis
- 9.3 Condition 12 shall apply in the event of any alleged defect or failure in or of the Goods or Services and the Buyer shall not delay or refuse to make payment in any such event
- 9.4 The Buyer shall not be entitled to withhold payment of any amount due to the Seller by reason of any disputed claim by the Buyer in connection with the Contract nor shall the Buyer be entitled to set off against any amount payable under the Contract to the Seller any amount which is not then due and payable by the Seller or for which the Seller disputes liability
- 9.5 All payments payable to the Seller under the Contract shall become due immediately upon termination of the Contract despite any other provision.
- 10 SUSPENSION AND CANCELLATION**
- 10.1 If the Buyer shall commit any breach of the Contract and fail to remedy the same within 7 days of receiving the Seller's request in writing so to do or any distress or execution is levied upon any goods or property of the Buyer or the Buyer makes any voluntary arrangement with its creditors or becomes subject to an administration order or (being an individual or firm) becomes bankrupt or (being an incorporated company) passes a resolution for winding up (otherwise than for the purpose of amalgamation or reconstruction), or a Court makes an order to that effect, or an encumbrancer takes possession, or an administrative receiver or receiver is appointed, of any of the property or assets of the Buyer, or the Buyer ceases, or threatens to cease, to carry on business or is unable to pay its debts within the meaning of section 123 Insolvency Act, 1986, or the Seller reasonably apprehends that any of the events mentioned above is about to occur in relation to the Buyer and notifies the Buyer accordingly, the Seller may:-
- 10.1.1 stop any Goods in transit and suspend any further deliveries;

and/or

- 10.1.2 suspend work on the Contract; and/or
- 10.1.3 determine the Contract forthwith and if the Goods or Services, or any part of them have been delivered but not paid for, the price shall become immediately due and payable notwithstanding any previous agreement to the contrary but without prejudice to the Seller's right to any unpaid price for Goods or Services delivered under the Contract and to damages for loss (both direct and consequential) suffered in consequence of such determination
- 10.2 If the Buyer requires cancellation of the Contract this will only be accepted at the sole discretion of the Seller and unless otherwise agreed in writing only upon condition that any costs, charges or expenses (both direct and consequential) incurred by the Seller up to the date of cancellation and the value of all loss or damage (both direct and consequential) incurred by the Seller by reason of such cancellation will be reimbursed by the Buyer to the Seller forthwith. Acceptance by the Seller of any cancellation by the Buyer will only be binding upon the Seller if it is made in writing
- 10.3 In the event of the Seller other than in any of the circumstances set out in Condition 10.1 being prevented or hindered from completing the Contract either wholly or in part in accordance with the terms thereof for any reason whatsoever beyond its reasonable control which, for the avoidance of doubt and without prejudice to the generality of the foregoing, shall include governmental action, war, riot, civil commotion, fire, flood, epidemic, labour disputes (including labour disputes involving the work force or any part thereof of the Seller or Supplier), restraints or delays affecting shipping or carriers, licensing, exporting or importing restrictions, currency restrictions and Acts of God then further performance of the Contract shall be suspended for the period during which the Seller is so prevented provided that in the event of the Contract being suspended for a continuous period of more than 3 months then either party may give the other notice in writing to terminate the Contract forthwith and in such circumstances the Buyer shall pay for all Goods or Services supplied to the date of such termination such payment to be made on or before the last day following the month during which termination was effected. The Seller shall be under no liability whatsoever to the Buyer for any direct or consequential loss or damage suffered by the Buyer as a result of the Seller's inability to perform its obligations under the Contract in these circumstances
- 10.4 The Seller's rights contained in Condition 17 (but not the Buyer's rights) shall continue beyond the discharge of the parties' primary obligations under the Contract consequent upon its termination
- 10.5 The termination of the Contract for whatever reason will be without prejudice to the rights and duties of either party accrued prior to termination
- 11 INSPECTION AND CLAIMS FOR DEFECTS**
- 11.1 The Goods are of a highly specialised nature and must be treated with the utmost care. It is essential that the Buyer checks that they correspond in all respects with the Buyer's requirements. Any discrepancies should be notified to the Seller immediately. The Buyer undertakes to ensure that all Goods are unpacked and handled only by persons qualified to deal with such specialised products, to safeguard against injury to the Goods or to the Buyer's personnel
- 11.2 The Buyer shall inspect the Goods and carry out tests to ensure the Goods conform with the description of the Goods or Services in the Buyer's orders within 7 days of Delivery and whether or not the Buyer carries out such obligation to inspect and test no claims for non-delivery, shortages in quantity of units delivered, defective Goods or Services, non-conformity to description or partial loss or damage to Goods will be accepted by the Seller unless:-
- 11.2.1 they are notified in writing by the Buyer to the Seller within 10 days after the Date of Delivery (in the case of partial loss, damage, non-conforming or defective Goods or Services) or 14 days after the date of the invoice (in the case of non-delivery);
- 11.2.2 the Goods in respect of which a claim is made together with all the relevant packing are preserved intact as received for a period of 35 days from notification of any such claim and the Buyer permits the Seller or its servants or agents full and free right of access to inspect the Goods and investigate the claim; and
- 11.2.3 if the Buyer fails to give the appropriate notice as specified in Condition 11.2.1, the Buyer's claim will be deemed to have been waived and will be absolutely barred
- 11.3 It is in all cases the responsibility of the Buyer to ensure by testing or otherwise that the Goods are fit and suitable for the purposes for which the Buyer requires them in the conditions in which they will be used. The Buyer acknowledges that the Seller shall be under no liability of any description to the Buyer if the Goods prove to be unsuitable for whatever reason for application or use notwithstanding that the Seller may, at the request of the Buyer, have given in good faith technical or other advice in relation to the proposed application or use of the Goods and the Buyer shall indemnify and keep indemnified the Seller in full against any and all liability of any kind arising out of or connected with the application or use of the Goods
- 11.4 Section 3 Sale and Supply of Goods Act 1994 shall not apply
- 11.5 The Seller will not accept the return of Goods in any circumstances unless it has first issued a Goods return number and such number is quoted with the returned Goods
- 12 WARRANTY**
- 12.1 In substitution for all and any other rights which the Buyer might or would have had but for these Conditions and subject to Condition 11,

## Conditions of Sale

the Seller shall make good by replacement any failure in the Goods or Services which results from defects in the Seller's materials or workmanship and which appear not later than 2 months after the Date of Delivery and shall replace any Goods or Services which do not conform with the description in the Buyer's order

- 12.2 Notwithstanding the provisions of Condition 12.1, in the case of a claim falling within Condition 12.1, the Seller reserves the right at its sole discretion to credit the Buyer in full the price paid by the Buyer to the Seller
- 12.3 The Seller's liability under this Condition shall automatically cease if:
- 12.3.1 the Buyer has not paid for all Goods or Services supplied under any Contract by the due date or is otherwise in breach of this or any other Contract made with the Seller; or
- 12.3.2 the Seller or its servants or agents are denied full and free right of access to the allegedly defective Goods; or
- 12.3.3 the Buyer has not properly maintained the Goods or has not complied with any Recommendations for Use; or
- 12.3.4 the defect or failure is caused by a breach by the Buyer of its undertakings and warranties contained in Condition 17; or
- 12.3.5 the Buyer has failed to notify the Seller in writing of any defect or suspected defect within 14 days of the same coming to the knowledge of the Buyer
- 12.4 The warranty set out in Condition 12.1 shall be in lieu of any warranties conditions or undertakings whether express or implied by statute, common law or otherwise howsoever which warranties, conditions and undertakings are hereby expressly excluded, except that such exclusions will not apply to any implied condition that the Seller has or will have the right to sell the Goods when the property is to pass
- 12.5 Nothing in these Conditions excludes or limits the liability of the Seller for death or personal injury caused by the Seller's negligence or fraudulent misrepresentation
- 12.6 SUBJECT TO CONDITIONS 12.4 AND 12.5
- 12.6.1 the seller's total liability in contract, tort (including negligence or breach of statutory duty), misrepresentation or otherwise, arising in connection with the performance or contemplated performance of the contract shall be limited to the price paid for the goods or services under the contract; and
- 12.6.2 the seller shall not be liable to the buyer for any indirect or consequential loss or damage (whether for loss of profit, loss of business, depletion of goodwill or otherwise), costs, expenses or other claims for consequential compensation whatsoever (however caused) which arise out of or in connection with the contract

### 13 CONSUMER SALES

- 13.1 Where the Goods are sold under a consumer sale (as defined by the Sale of Goods Act 1979) the statutory rights of the Buyer are not affected by these conditions

### 14 TITLE TO GOODS

- 14.1 Full legal and beneficial ownership of the Goods shall be retained by the Seller notwithstanding that the risk in the same shall pass to the Buyer at the time of delivery until the Seller has received payment in full in respect of
- 14.1.1 The Goods; and
- 14.1.2 All other sums which become due and owing by the Buyer to the Seller on any account whatsoever
- 14.2 Until ownership of the Goods has passed to the Buyer the Buyer shall hold the Goods in a fiduciary capacity and as bailee of the Seller and shall at all times take proper care of the same and will not obliterate or obscure any identifying mark or their packaging and will keep the Goods separate from any other goods and in such manner that they may be clearly identified as belonging to the Seller and the Buyer hereby grants to the Seller the right to enter on the Buyer's premises at any time during the continuation of the Contract to check that the Buyer is complying with the obligation contained in this Condition. The Buyer will return the Goods to the Seller if it receives a request whether verbally or in Writing so to do prior to payment in full as aforesaid having been made and the Seller will then repay any part of the purchase price it has already received in respect of the Goods less a reasonable amount in respect of its costs and expenses in connection with the Contract
- 14.3 For the purposes of Condition 14.1, the expression "the Buyer" includes any subsidiary or holding company or associate of the Buyer (as such terms are defined in the Companies Act 1985 (as amended))
- 14.4 The Seller will have the right to maintain an action against the Buyer for the price of the Goods notwithstanding that property in the Goods has not been passed

### 15 RISK AND INSURANCE

- 15.1 The risk in the Goods shall pass to the Buyer at the time of delivery as provided for in Condition 7
- 15.2 Notwithstanding the reservation of title contained in Condition 14, the Buyer shall insure the Goods and/or any products made wholly or partly therefrom for the full amount of the price payable under the Contract with an insurance office of repute from the time of delivery of the Goods until the date title in the Goods passes to the Buyer pursuant to Condition 14.1

### 16 EXPORT TERMS

- 16.1 In these Conditions "Incoterms" means the international rules for the interpretation of trade terms of the International Chamber of Commerce

as in force at the date when the Contract is made. Unless the context otherwise requires, any term or expression which is defined in or given a particular meaning by the provisions of Incoterms has the same meaning in the Contract

- 16.2 Where the Goods are supplied for export from the United Kingdom then unless otherwise agreed in writing between the Buyer and the Seller

- 16.2.1 the provisions of Incoterms shall (subject to any special terms agreed in writing between the Buyer and the Seller) apply but if there is any conflict between the provisions of Incoterms and these Conditions, the latter shall prevail.
- 16.2.2 the Buyer shall be responsible for complying with any legislation or regulations governing the importation of the Goods into the country of destination and (save in respect of the United States of America, Canada and Japan) for the payment of any duties and taxes thereon unless payment for these is included in the Contract
- 16.2.3 the Buyer shall be deemed to have satisfied itself that such Goods comply with the safety regulations of any country or state in which the Goods are to be used outside the United Kingdom and the Buyer shall indemnify and keep indemnified the Seller in full for any loss or damage whatsoever which the Seller may incur if such Goods do not comply with such safety regulations

- 16.3 The Goods shall not be used in any country other than that for which the Seller was aware they were originally ordered without the Seller's consent in writing

- 16.4 The Buyer undertakes not to offer the Goods for resale in any country notified by the Seller at or before the time the Buyer's order is placed, or to sell the Goods to any person if the Buyer knows or has reason to believe that person intends to resell the Goods in any such country

### 17 BUYER'S WARRANTIES

- 17.1 The Buyer warrants to the Seller that:
- 17.1.1 the Buyer will install, operate or otherwise use or store the Goods strictly in accordance with the Recommendations for Use and with all relevant or applicable statutory or other regulations governing the installation, operation, use or storage of the Goods; and
- 17.1.2 any collection vehicle, container, ship or other means of transport provided by the Buyer or any agent of the Buyer will comply with all relevant legislation and regulations relating to health and safety requirements; and
- 17.1.3 the storage and transport facilities and all parts thereof and all equipment used in connection therewith is suitable for storage (both short term and long term) and transport of the Goods and complies with any statute, regulation, bye law or other rule having the force of law and relating to the storage of goods of the nature of the Goods; and
- 17.1.4 the Buyer will ensure that the Goods are stored in conditions appropriate to goods of that nature and will comply with any recommendations as to the storage of Goods notified to it by the Seller from time to time; and
- 17.2 The Buyer shall indemnify and keep indemnified the Seller in full against any claim, loss or damage (including, without limitation, damage to the reputation of the Seller) arising directly or indirectly from any breach of the warranty contained in Condition 17.1

### 18 SEVERANCE

- 18.1 If at any time any one or more of the provisions or part thereof of these Conditions becomes or is invalid, illegal or unenforceable in any respect under any law or is held by a court to be invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions hereof and the remainder of such provision shall not in any way be affected or impaired thereby

### 19 JURISDICTION

- 19.1 These Conditions and each and every Contract made pursuant to them shall be governed by and construed in all respects in accordance with the laws of England and the Seller and the Buyer hereby agree to submit to the non-exclusive jurisdiction of the English Courts

### 20 NOTICES

- 20.1 Any notice required or permitted to be given by either party to the other under these Conditions shall be in writing addressed to that other party at its registered office or principal place of business or such other address as may at the relevant time have been notified pursuant to this provision to the party giving notice
- 20.2 Any notice given pursuant to clause 20.1 shall be deemed to have been served:
- 20.2.1 if delivered by hand, on the first Business Day following delivery;
- 20.2.2 if sent by post, on the third Business Day after posting if the address of the recipient is in the country of despatch, otherwise on the seventh Business Day after posting;
- 20.2.3 if sent by facsimile transmission, on the first Business Day following successful transmission
- 20.3 In proving service it shall be sufficient proof in the case of a notice sent by post, that the envelope containing the same was properly stamped, addressed and placed in the post and, in the case of facsimile transmission, that it was properly addressed and successfully transmitted
- 20.4 In this Condition 20, "Business Day" shall mean any day other than Saturday, Sunday or any other day which is a public holiday in the place at which the notice is left or to which such notice is despatched

### 21 WAIVER

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## Conditions of Sale

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21.1 No waiver by the Seller of any breach of any provision of the Contract by the Buyer shall be considered as a waiver of any subsequent breach

of the same or any other provision and the Seller shall not be prejudiced by any forbearance or indulgence granted by it to the Buyer

## Invar<sup>®</sup> - Controlled Expansion Alloy

### Fe64/Ni36

**Common Brand Names :** Invar 36<sup>®</sup>, Nilo<sup>®</sup> alloy 36, Nilvar, NS 36, Permalloy D<sup>®</sup>, Radio metal 36<sup>®</sup>, Vacodil 36<sup>®</sup>

Low expansion alloy with the lowest thermal expansion coefficient of any of the iron-nickel alloys. Uses include balance wheels for clocks and watches, bi-metal strip, glass-to-metal seals and structural components in laser systems.

**Physical Properties**

Density 8.0 g cm<sup>-3</sup>  
 Melting point 1427 C

**Magnetic Properties**

Curie temperature 279 C

**Electrical Properties**

Electrical resistivity 75-85 μOhmcm

**Thermal Properties**

Coefficient of thermal expansion @20-90C 1.7-2.0 x10<sup>-6</sup> K<sup>-1</sup>  
 Specific heat @23C 515 J K<sup>-1</sup> kg<sup>-1</sup>  
 Thermal conductivity @23C 13 W m<sup>-1</sup> K<sup>-1</sup>

**Mechanical Properties**

Elongation at break < 45 %  
 Hardness - Brinell 160  
 Modulus of elasticity 140-150 GPa  
 Tensile strength 450-590 MPa



## Foil

**FE020210** Thickness ..... 0.008mm

**NLT Sizes**

Web Code	Size	Quantity		
		1pc	2pcs	5pcs
705-316-916	50 x 50 mm	YEN 28600	YEN 38000	
023-338-432	100 x 100 mm	YEN 38800		

**Sizes LT**

Web Code	Size	Quantity		
		1pc	2pcs	5pcs
776-055-888	25 x 25 mm	YEN 23600	YEN 30800	YEN 50500
588-777-574	50 x 50 mm	YEN 31400	YEN 41800	
929-300-146	100 x 100 mm	YEN 48400		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE020215** Thickness ..... 0.0125mm

**Size**

Web Code	Size	Quantity				
		1pc	2pcs	5pcs	10pcs	20pcs
217-143-978	25 x 25 mm	YEN 16400	YEN 18300	YEN 23200	YEN 30200	YEN 43200
668-917-853	50 x 50 mm	YEN 18500	YEN 21200	YEN 27800	YEN 36800	
671-890-459	100 x 100 mm	YEN 22600	YEN 27200	YEN 37000		
445-541-037	150 x 150 mm	YEN 26800	YEN 33000			

**Coil**

Web Code	Length	Quantity
		1 Reel
156-798-065	0.5 m	YEN 43800
671-124-125	1 m	YEN 55000
144-361-871	2 m	YEN 70500

**Discs**

Web Code	Diameter	Quantity		
		10 discs	20 discs	50 discs
284-101-403	4 mm	YEN 36800	YEN 49800	YEN 73000
536-044-357	6 mm	YEN 37400	YEN 50500	YEN 74500
144-347-367	8 mm	YEN 38200	YEN 51500	YEN 76000
363-428-287	10 mm	YEN 38800	YEN 52500	YEN 77500
997-976-412	15 mm	YEN 40400	YEN 54500	YEN 81000
864-879-028	25 mm	YEN 43600	YEN 59000	YEN 88000
424-434-785	50 mm	YEN 51500	YEN 70500	YEN 106000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE020220** Thickness ..... 0.02mm

Temper ..... As rolled

**Size**

Web Code	Size	Quantity				
		1pc	2pcs	5pcs	10pcs	20pcs
978-141-778	25 x 25 mm	YEN 14100	YEN 14900	YEN 16800	YEN 19300	YEN 23800
267-723-419	50 x 50 mm	YEN 15400	YEN 16700	YEN 19700	YEN 23400	YEN 29600
465-426-186	100 x 100 mm	YEN 18000	YEN 20400	YEN 25600	YEN 31800	YEN 50000
178-268-807	150 x 150 mm	YEN 20600	YEN 24200	YEN 31800	YEN 51500	
227-854-752	200 x 200 mm	YEN 23200	YEN 28000	YEN 46000	YEN 79500	

**Coil**

Web Code	Length	Quantity
		1 Reel
010-248-168	0.5 m	YEN 33400
451-378-194	1 m	YEN 48800
422-271-535	2 m	YEN 81000

**Discs**

Web Code	Diameter	Quantity		
		10 discs	20 discs	50 discs
326-084-690	4 mm	YEN 26200	YEN 29800	YEN 35200
760-586-792	6 mm	YEN 26600	YEN 30400	YEN 36200
073-345-801	8 mm	YEN 27000	YEN 31000	YEN 37000
168-236-391	10 mm	YEN 27400	YEN 31400	YEN 38000
029-544-374	15 mm	YEN 28400	YEN 32800	YEN 40200
693-043-728	25 mm	YEN 30400	YEN 35800	YEN 44800
630-468-184	50 mm	YEN 35400	YEN 43000	YEN 58000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

Alloy – Invar<sup>®</sup> - Controlled Expansion Alloy

**Invar® - Controlled Expansion Alloy**

**Fe64/Ni36**



**Foil**

FE020221

Thickness ..... 0.02mm

Temper ..... Annealed

**Size**

**Web Code**

669-388-336  
 587-345-808  
 736-576-263  
 122-641-285  
 939-640-347

**Size**

25 x 25 mm  
 50 x 50 mm  
 100 x 100 mm  
 150 x 150 mm  
 200 x 200 mm

**1pc**

**2pcs**

**5pcs**

**10pcs**

**20pcs**

Quantity					
1pc	2pcs	5pcs	10pcs	20pcs	
YEN 14100	YEN 14900	YEN 16800	YEN 19300	YEN 23800	
YEN 15400	YEN 16700	YEN 19700	YEN 23400	YEN 29600	
YEN 18000	YEN 20400	YEN 25600	YEN 31800	YEN 50000	
YEN 20600	YEN 24200	YEN 31800	YEN 51500		
YEN 23200	YEN 28000	YEN 46000	YEN 79500		

**Coil**

**Web Code**

383-475-666  
 717-510-786  
 764-133-151

**Width 200mm**

**Length**

0.5 m  
 1 m  
 2 m

**Quantity**

**1 Reel**

YEN 33400
YEN 48800
YEN 81000

**Discs**

**Web Code**

044-513-744  
 403-595-954  
 444-385-530  
 440-197-833  
 344-316-784  
 632-103-490  
 873-264-663

**Diameter**

4 mm  
 6 mm  
 8 mm  
 10 mm  
 15 mm  
 25 mm  
 50 mm

**Quantity**

Quantity		
10 discs	20 discs	50 discs
YEN 26200	YEN 29800	YEN 35200
YEN 26600	YEN 30400	YEN 36200
YEN 27000	YEN 31000	YEN 37000
YEN 27400	YEN 31400	YEN 38000
YEN 28400	YEN 32800	YEN 40200
YEN 30400	YEN 35800	YEN 44800
YEN 35400	YEN 43000	YEN 58000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

FE020225

Thickness ..... 0.025mm

**Size**

**Web Code**

449-022-896  
 723-039-483  
 307-680-930  
 743-131-328

**Size**

25 x 25 mm  
 50 x 50 mm  
 100 x 100 mm  
 200 x 200 mm

**Quantity**

Quantity					
1pc	2pcs	5pcs	10pcs	20pcs	
YEN 14200	YEN 15100	YEN 17100	YEN 19800	YEN 24400	
YEN 15700	YEN 17200	YEN 20400	YEN 24400	YEN 31000	
YEN 18600	YEN 21400	YEN 27000	YEN 35200		
YEN 24600	YEN 29600	YEN 54000			

**Coil**

**Web Code**

678-892-773  
 396-402-480

**Width 200mm**

**Length**

0.5 m  
 1 m

**Quantity**

**1 Reel**

YEN 36800
YEN 57000

**Discs**

**Web Code**

019-190-776  
 241-913-441  
 247-447-757  
 319-251-016  
 586-077-702  
 122-592-565  
 157-319-174

**Diameter**

4 mm  
 6 mm  
 8 mm  
 10 mm  
 15 mm  
 25 mm  
 50 mm

**Quantity**

Quantity		
10 discs	20 discs	50 discs
YEN 26400	YEN 30000	YEN 35400
YEN 26800	YEN 30600	YEN 36400
YEN 27200	YEN 31200	YEN 37400
YEN 27600	YEN 31800	YEN 38400
YEN 28800	YEN 33400	YEN 41000
YEN 31000	YEN 36600	YEN 46000
YEN 36600	YEN 44600	YEN 64000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

FE020300

Thickness ..... 0.03mm

Temper ..... Hard



**Size**

**Web Code**

032-698-429  
 398-163-110  
 003-029-934  
 746-902-641

**Size**

25 x 25 mm  
 50 x 50 mm  
 100 x 100 mm  
 200 x 200 mm

**Quantity**

Quantity			
1pc	2pcs	5pcs	10pcs
YEN 14400	YEN 15300	YEN 17400	YEN 20200
YEN 16000	YEN 17600	YEN 21000	
YEN 19200	YEN 22200		
YEN 25600			

**Coil**

**Web Code**

844-800-157  
 577-274-797

**Width 200mm**

**Length**

0.5 m  
 1 m

**Quantity**

**1 Reel**

YEN 40800
YEN 65000

**Discs**

**Web Code**

951-378-588  
 209-009-443  
 698-743-307  
 825-674-467  
 476-274-337  
 173-920-792  
 208-909-538

**Diameter**

4 mm  
 6 mm  
 8 mm  
 10 mm  
 15 mm  
 25 mm  
 50 mm

**Quantity**

Quantity		
10 discs	20 discs	50 discs
YEN 26400	YEN 30000	YEN 35600
YEN 27000	YEN 30800	YEN 36800
YEN 27400	YEN 31400	YEN 37800
YEN 27800	YEN 32200	YEN 39000
YEN 29200	YEN 33800	YEN 41800
YEN 31600	YEN 37400	YEN 47200
YEN 37800	YEN 46200	YEN 70000

**Invar® - Controlled Expansion Alloy**

**Fe64/Ni36**



**Foil**

**FE020240**

Thickness ..... **0.05mm**

Temper ..... **Annealed**

**Size**

**Web Code**  
 112-209-832  
 566-939-757  
 887-661-957  
 676-435-123

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 14300	YEN 15200	YEN 17200	YEN 20000	YEN 24600
50 x 50 mm	YEN 15800	YEN 17300	YEN 20600	YEN 24800	YEN 31600
100 x 100 mm	YEN 18900	YEN 21600	YEN 27600	YEN 36800	
200 x 200 mm	YEN 25000	YEN 30400	YEN 57000		

**Coil**

**Web Code**  
 410-750-524  
 498-166-935

Length	1 Reel
	0.5 m
1 m	YEN 60000

**Discs**

**Web Code**  
 598-616-945  
 734-898-875  
 128-283-607  
 175-121-301  
 014-747-709  
 194-481-633  
 823-967-385

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 26400	YEN 30000	YEN 35600
6 mm	YEN 26800	YEN 30600	YEN 36600
8 mm	YEN 27200	YEN 31200	YEN 37600
10 mm	YEN 27800	YEN 32000	YEN 38600
15 mm	YEN 29000	YEN 33600	YEN 41200
25 mm	YEN 31200	YEN 36800	YEN 46600
50 mm	YEN 37200	YEN 45200	

Typical Analysis : Ni 36%, Mn + Si + C <1%, Fe balance.

**FE020245**

Thickness ..... **0.08mm**

Temper ..... **Annealed**

**Size**

**Web Code**  
 271-328-586  
 809-241-609  
 198-578-536  
 482-021-966

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 14700	YEN 15800	YEN 18100	YEN 21200	YEN 26400
50 x 50 mm	YEN 16600	YEN 18500	YEN 22400	YEN 27400	YEN 35200
100 x 100 mm	YEN 20400	YEN 24000	YEN 31200	YEN 49800	
200 x 200 mm	YEN 28200	YEN 40600	YEN 83000		

**Coil**

**Web Code**  
 266-078-544  
 628-893-628

Length	1 Reel
	0.5 m
1 m	YEN 86000

**Discs**

**Web Code**  
 245-621-440  
 953-736-149  
 178-202-445  
 434-007-204  
 851-336-845  
 354-717-635  
 897-838-479

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 26600	YEN 30400	YEN 36000
6 mm	YEN 27200	YEN 31200	YEN 37400
8 mm	YEN 27800	YEN 32000	YEN 38800
10 mm	YEN 28400	YEN 32800	YEN 40000
15 mm	YEN 29800	YEN 35000	YEN 43400
25 mm	YEN 32800	YEN 39000	YEN 50000
50 mm	YEN 40200	YEN 49600	

Typical Analysis : Ni 36%, Mn + Si + C <1%, Fe balance.

**FE020260**

Thickness ..... **0.1mm**

Temper ..... **Annealed**

**Size**

**Web Code**  
 056-060-302  
 007-538-473  
 332-679-331

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 13500	YEN 14200	YEN 15900
50 x 50 mm	YEN 14600	YEN 15800	
50 x 100 mm	YEN 15500		

**Discs**

**Web Code**  
 790-449-478  
 152-995-786

Diameter	Quantity		
	1 discs	2 discs	5 discs
6 mm	YEN 22000	YEN 22400	YEN 23400
40 mm	YEN 23600	YEN 24600	

Typical Analysis : Ni 36%, Mn + Si + C <1%, Fe balance.

**Alloy – Invar® - Controlled Expansion Alloy**

**Invar® - Controlled Expansion Alloy**

**Fe64/Ni36**



**Foil**

**FE020265**

Thickness ..... **0.125mm**

Temper ..... **Half hard**

**Size**

**Web Code**

432-528-489  
 058-267-191  
 902-540-772  
 006-117-276

**Size**

25 x 25 mm  
 50 x 50 mm  
 100 x 100 mm  
 150 x 150 mm

**Quantity**

1pc	2pcs	5pcs	10pcs	20pcs
YEN 13700	YEN 14400	YEN 16200	YEN 18600	YEN 22600
YEN 14900	YEN 16100	YEN 18900	YEN 22400	YEN 28200
YEN 17300	YEN 19600	YEN 24400	YEN 30200	YEN 39000
YEN 19800	YEN 23000	YEN 29800	YEN 37800	

**Coil**

**Web Code**

394-045-616  
 980-242-167  
 461-295-306  
 445-015-763

**Width 152.4mm**

**Length**

1 m  
 2 m  
 5 m  
 10 m

**Quantity**

1 Reel
YEN 35600
YEN 43600
YEN 59500
YEN 84000

**Discs**

**Web Code**

836-392-017  
 071-913-675  
 033-761-558  
 912-414-563  
 509-347-752  
 268-068-550  
 272-899-635

**Diameter**

4 mm  
 6 mm  
 8 mm  
 10 mm  
 15 mm  
 25 mm  
 50 mm

**Quantity**

10 discs	20 discs	50 discs
YEN 24800	YEN 27800	YEN 35200
YEN 25200	YEN 28200	YEN 36000
YEN 25400	YEN 28800	YEN 36800
YEN 25800	YEN 29200	YEN 37600
YEN 26600	YEN 30400	YEN 39400
YEN 28400	YEN 32800	YEN 43200
YEN 32600	YEN 39000	YEN 53000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE020268**

Thickness ..... **0.20mm**

Temper ..... **Hard**

**Size**

**Web Code**

465-459-148  
 386-575-719  
 387-312-487  
 555-282-073

**Size**

25 x 25 mm  
 50 x 50 mm  
 100 x 100 mm  
 200 x 200 mm

**Quantity**

1pc	2pcs	5pcs	10pcs	20pcs
YEN 14000	YEN 14900	YEN 16900	YEN 19600	YEN 24000
YEN 15500	YEN 17100	YEN 20400	YEN 24400	YEN 31000
YEN 18600	YEN 21400	YEN 27200	YEN 34200	YEN 44800
YEN 24800	YEN 30200	YEN 41200	YEN 54000	

**Coil**

**Web Code**

046-142-967  
 609-987-324  
 261-735-939  
 397-357-718

**Width 200mm**

**Length**

0.5 m  
 1 m  
 2 m  
 5 m

**Quantity**

1 Reel
YEN 36000
YEN 44200
YEN 55500
YEN 87000

**Discs**

**Web Code**

510-533-526  
 599-154-928  
 081-819-077  
 128-144-880  
 855-218-987  
 961-253-398  
 342-760-577

**Diameter**

4 mm  
 6 mm  
 8 mm  
 10 mm  
 15 mm  
 25 mm  
 50 mm

**Quantity**

10 discs	20 discs	50 discs
YEN 25000	YEN 28000	YEN 35600
YEN 25400	YEN 28600	YEN 36600
YEN 25800	YEN 29200	YEN 37600
YEN 26200	YEN 29800	YEN 38600
YEN 27400	YEN 31400	YEN 41000
YEN 29400	YEN 34400	YEN 45800
YEN 34800	YEN 42200	YEN 58000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE020277**

Thickness ..... **0.25mm**

Coil width ..... **50mm**

Temper ..... **Annealed**

**Coil**

**Web Code**

207-351-530  
 039-443-926  
 102-058-733  
 160-989-366  
 141-518-220

**Width 50mm**

**Length**

0.5 m  
 1 m  
 2 m  
 5 m  
 10 m

**Quantity**

1 Reel
YEN 27400
YEN 32000
YEN 38400
YEN 51500
YEN 66000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE020276**

Thickness ..... **0.25mm**

Temper ..... **Annealed**

Condition ..... **Flattened**

**Size**

**Web Code**

717-555-336  
 625-737-441  
 103-458-013  
 535-913-731

**Size**

40 x 100 mm  
 40 x 200 mm  
 40 x 300 mm  
 150 x 300 mm

**Quantity**

1pc	2pcs	5pcs	10pcs	20pcs
YEN 18600	YEN 21400	YEN 27200	YEN 34200	YEN 44800
YEN 21200	YEN 25000	YEN 33000	YEN 42400	YEN 56500
YEN 23200	YEN 27800	YEN 37400	YEN 48600	
YEN 33200	YEN 42000	YEN 60000		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**Alloy – Invar® - Controlled Expansion Alloy**

**Invar® - Controlled Expansion Alloy**

**Fe64/Ni36**



**Foil**

**FE020275**

Thickness ..... **0.25mm**

Temper ..... **Annealed**

**Size**

**Web Code**

869-315-130  
 716-095-080  
 318-784-788  
 095-277-669

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 14200	YEN 15100	YEN 17300	YEN 20200	YEN 25000
50 x 50 mm	YEN 15900	YEN 17600	YEN 21200	YEN 25600	YEN 32600
100 x 100 mm	YEN 19400	YEN 22400	YEN 29000	YEN 36600	YEN 48200
200 x 200 mm	YEN 26200	YEN 32200	YEN 44400	YEN 58500	YEN 79000

**Coil**

**Web Code**

122-326-069  
 755-862-698  
 660-322-105  
 571-121-414

**Width 200mm**

**Length**

0.5 m  
 1 m  
 2 m  
 5 m

**Quantity**

**1 Reel**

YEN 38400  
 YEN 47400  
 YEN 60500  
 YEN 93500

**Discs**

**Web Code**

905-078-096  
 521-085-674  
 484-979-127  
 638-196-810  
 049-132-659  
 777-600-073  
 382-388-248

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 25000	YEN 28200	YEN 36000
6 mm	YEN 25600	YEN 28800	YEN 37000
8 mm	YEN 26000	YEN 29600	YEN 38000
10 mm	YEN 26600	YEN 30200	YEN 39200
15 mm	YEN 27800	YEN 32000	YEN 41800
25 mm	YEN 30200	YEN 35400	YEN 47200
50 mm	YEN 36200	YEN 44000	YEN 61000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE020350**

Thickness ..... **0.5mm**

Temper ..... **Annealed**



**Size**

**Web Code**

017-250-160  
 156-272-250  
 534-034-103  
 766-849-228  
 582-217-494  
 263-549-434

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 13400	YEN 15200	YEN 18800	YEN 23000	YEN 30600
50 x 50 mm	YEN 15200	YEN 17800	YEN 22800	YEN 28800	YEN 38600
100 x 100 mm	YEN 18800	YEN 22800	YEN 30800	YEN 40200	
200 x 200 mm	YEN 26000	YEN 33000	YEN 47000		
200 x 450 mm	YEN 33200	YEN 43200			
200 x 900 mm	YEN 42200				

**Discs**

**Web Code**

125-068-802  
 633-611-003  
 201-375-973  
 171-992-108  
 499-020-262  
 377-534-873  
 191-852-624

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 28000	YEN 34200	YEN 52000
6 mm	YEN 28600	YEN 35000	YEN 53500
8 mm	YEN 29000	YEN 35600	YEN 54500
10 mm	YEN 29600	YEN 36400	YEN 55500
15 mm	YEN 30800	YEN 38000	YEN 58500
25 mm	YEN 33400	YEN 41600	YEN 64000
50 mm	YEN 39600	YEN 50500	

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE020351**

Thickness ..... **0.5mm**

Temper ..... **Annealed**



**Size**

**Web Code**

697-904-946  
 073-629-968  
 247-355-393

Size	Quantity		
	1pc	2pcs	5pcs
300 x 300 mm	YEN 26400	YEN 32800	YEN 58500
300 x 450 mm	YEN 29400	YEN 39000	
600 x 900 mm	YEN 62500		

**Discs**

**Web Code**

765-319-235  
 664-907-027  
 113-377-358  
 172-164-891  
 520-612-062  
 076-507-386  
 563-415-150

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 33400	YEN 45000	YEN 52500
6 mm	YEN 33800	YEN 45400	YEN 53000
8 mm	YEN 34000	YEN 45800	YEN 53500
10 mm	YEN 34400	YEN 46400	YEN 54500
15 mm	YEN 35200	YEN 47400	YEN 56000
25 mm	YEN 36600	YEN 49600	YEN 59500
50 mm	YEN 40400	YEN 55000	YEN 68500

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE020375**

Thickness ..... **0.75mm**

Temper ..... **Annealed**



**Size**

**Web Code**

844-743-991  
 663-182-848  
 875-978-265  
 076-435-942

Size	Quantity			
	1pc	2pcs	5pcs	10pcs
50 x 50 mm	YEN 17000	YEN 19500	YEN 24600	YEN 30600
100 x 100 mm	YEN 20600	YEN 24600	YEN 32600	YEN 44600
150 x 150 mm	YEN 24200	YEN 29800	YEN 45200	
300 x 300 mm	YEN 36400	YEN 60500		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**Alloy – Invar® - Controlled Expansion Alloy**



**Invar® - Controlled Expansion Alloy**

**Fe64/Ni36**



**Foil**

**FE020400**

Thickness ..... **1.0mm**

Temper ..... **Annealed**



**Size**

**Web Code**

426-887-839  
 360-977-354  
 122-171-049  
 271-378-751

**Size**

50 x 50 mm  
 100 x 100 mm  
 150 x 150 mm  
 300 x 300 mm

**Quantity**

1pc	2pcs	5pcs	10pcs
YEN 17600	YEN 20400	YEN 25800	YEN 32400
YEN 21800	YEN 26200	YEN 35200	
YEN 26000	YEN 32200		
YEN 44000			

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE020450**

Thickness ..... **1.5mm**

Temper ..... **Annealed**



**Size**

**Web Code**

922-340-444  
 292-550-252  
 568-786-339  
 098-289-397

**Size**

50 x 50 mm  
 100 x 100 mm  
 150 x 150 mm  
 300 x 300 mm

**Quantity**

1pc	2pcs	5pcs
YEN 18500	YEN 21600	YEN 28000
YEN 23600	YEN 28800	YEN 42000
YEN 28800	YEN 37400	
YEN 59000		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.



**Sheet**

**FE023120**

Thickness ..... **2.5mm**

Temper ..... **Annealed**



**Size**

**Web Code**

898-292-427  
 384-326-391

**Size**

100 x 100 mm  
 150 x 150 mm

**Quantity**

1pc	2pcs	5pcs
YEN 25600	YEN 29600	YEN 45800
YEN 29800	YEN 41800	

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE023121**

Thickness ..... **2.5mm**

Temper ..... **Annealed**



**Discs**

**Web Code**

070-673-924  
 684-012-231

**Diameter**

25 mm  
 40 mm

**Quantity**

1 pcs	2 pcs	5 pcs	10 pcs	25 pcs
YEN 22000	YEN 23400	YEN 26800	YEN 31200	YEN 42600
YEN 23400	YEN 25400	YEN 30000	YEN 36000	YEN 55000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE023150**

Thickness ..... **3.2mm**

Temper ..... **Annealed**



**Size**

**Web Code**

155-368-080

**Size**

100 x 100 mm

**Quantity**

1pc	2pcs
YEN 29200	YEN 36800

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE023200**

Thickness ..... **6.35mm**

Temper ..... **Annealed**



**Size**

**Web Code**

454-596-142

**Size**

100 x 100 mm

**Quantity**

1pc	2pcs
YEN 33200	YEN 50500

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE023230**

Thickness ..... **9.5mm**

Temper ..... **Annealed**



**Size**

**Web Code**

676-644-143

**Size**

29 x 81 mm

**Quantity**

1pc	2pcs	5pcs
YEN 21600	YEN 26000	YEN 38200

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE023000**

Thickness ..... **12.7mm**

Temper ..... **Annealed**



**Size**

**Web Code**

286-169-809  
 771-231-560

**Size**

50 x 50 mm  
 100 x 100 mm

**Quantity**

1pc	2pcs
YEN 29000	YEN 36600
YEN 47000	YEN 78000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**FE023250**

Thickness ..... **16mm**

Temper ..... **Annealed**



**Size**

**Web Code**

401-727-561

**Size**

103 x 103 mm

**Quantity**

1pc
YEN 56500

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

**Alloy – Invar® - Controlled Expansion Alloy**

## Invar® - Controlled Expansion Alloy

### Fe64/Ni36



## Sheet

FE023280

Thickness ..... 25mm

Temper ..... Annealed



**Size**

**Web Code**  
 869-110-729  
 944-492-133

**Size**  
 52 x 52 mm  
 102 x 102 mm

**Quantity**

**1pc**      **2pcs**  
 YEN 22600    YEN 32600  
 YEN 49400

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.



## Wire

FE025010

Diameter ..... 0.01mm

Temper ..... Annealed



**Length**

**Web Code**  
 453-514-574  
 234-998-837

**Length**      **1 Reel**  
 5 m      YEN 42600  
 10 m      YEN 73000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 5m reels only.

FE025100

Diameter ..... 0.05mm

Temper ..... Annealed



**Length**

**Web Code**  
 403-944-930  
 493-115-148  
 639-390-993  
 923-873-573  
 484-194-110

**Length**      **1 Reel**  
 100 m      YEN 18100  
 200 m      YEN 20600  
 500 m      YEN 27200  
 1000 m      YEN 36800  
 2000 m      YEN 54500

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

FE025120

Diameter ..... 0.12mm

Temper ..... Annealed



**Length**

**Web Code**  
 524-262-786  
 532-840-464  
 605-053-323  
 631-669-018  
 958-636-072

**Length**      **1 Reel**  
 50 m      YEN 19700  
 100 m      YEN 24800  
 200 m      YEN 34000  
 500 m      YEN 59500  
 1000 m      YEN 74000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

FE025250

Diameter ..... 0.25mm

Temper ..... Annealed



**Length**

**Web Code**  
 901-890-078  
 829-506-221  
 688-287-211  
 035-911-986  
 488-989-170

**Length**      **1 Reel**  
 10 m      YEN 16800  
 20 m      YEN 18600  
 50 m      YEN 22800  
 100 m      YEN 28800  
 200 m      YEN 39400

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

FE025350

Diameter ..... 0.5mm

Temper ..... Annealed



**Length**

**Web Code**  
 117-277-059  
 455-869-962  
 983-747-203  
 968-405-796  
 050-715-975

**Length**      **1 Reel**  
 10 m      YEN 18100  
 20 m      YEN 20800  
 50 m      YEN 27000  
 100 m      YEN 35200  
 200 m      YEN 43600

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

FE025360

Diameter ..... 0.6mm

Temper ..... Annealed



**Length**

**Web Code**  
 032-115-571  
 067-464-633  
 502-652-559  
 911-803-241  
 522-506-557

**Length**      **1 Reel**  
 10 m      YEN 18700  
 20 m      YEN 21800  
 50 m      YEN 28600  
 100 m      YEN 37200  
 200 m      YEN 47200

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

Alloy – Invar® - Controlled Expansion Alloy

## Invar<sup>®</sup> - Controlled Expansion Alloy

### Fe64/Ni36



## Wire

FE025401

Diameter ..... 1mm  
 Condition ..... Straight wire

Temper ..... Annealed



### Size

Web Code

Length

1pc

2pcs

### Quantity

5pcs

10pcs

20pcs

2.2g #350 mm#  
 6.3g #1000 mm#

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

FE025402

Diameter ..... 1mm

Temper ..... Hard



### Length

Web Code

Length

### Quantity

1 Reel

545-438-658  
 502-606-095  
 284-309-843  
 944-975-195  
 169-896-430

5 m YEN 19200  
 10 m YEN 22400  
 20 m YEN 26800  
 50 m YEN 36600  
 100 m YEN 54000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

FE025400

Diameter ..... 1mm

Temper ..... Annealed



### Length

Web Code

Length

### Quantity

1 Reel

436-207-248  
 525-905-394  
 738-163-530  
 270-437-811  
 804-725-519

5 m YEN 19200  
 10 m YEN 22400  
 20 m YEN 26800  
 50 m YEN 36600  
 100 m YEN 54000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

FE025450

Diameter ..... 1.5mm

Temper ..... Annealed



### Length

Web Code

Length

### Quantity

1 Reel

060-678-295  
 905-963-025  
 357-860-650  
 599-086-523

5 m YEN 22200  
 10 m YEN 26600  
 20 m YEN 33000  
 50 m YEN 53000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.



## Rod

Invar rod may contain Selenium as a free machining additive.

FE027902

Diameter ..... 1.6mm

### Size

Web Code

Length

### Quantity

1pc

2pcs

5pcs

10pcs

20pcs

225-611-857  
 093-917-546  
 974-061-304  
 227-999-972

100 mm YEN 12400  
 200 mm YEN 13500  
 500 mm YEN 15500  
 1000 mm YEN 17800

YEN 14100  
 YEN 15600  
 YEN 18500  
 YEN 21800

YEN 17200  
 YEN 19500  
 YEN 24000

YEN 21000  
 YEN 24400

YEN 27600

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

Invar rod may contain Selenium as a free machining additive.

FE027903

Diameter ..... 2.0mm

### Size

Web Code

Length

### Quantity

1pc

2pcs

5pcs

10pcs

20pcs

315-559-206  
 143-835-604  
 347-045-582  
 094-038-822

100 mm YEN 13000  
 200 mm YEN 14300  
 500 mm YEN 16800  
 1000 mm YEN 19600

YEN 14900  
 YEN 16700  
 YEN 20200  
 YEN 24400

YEN 18400  
 YEN 21200  
 YEN 26800

YEN 22800  
 YEN 26800

YEN 30000

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.

Invar rod may contain Selenium as a free machining additive.

FE027904

Diameter ..... 3.0mm

### Size

Web Code

Length

### Quantity

1pc



382-189-564

349 mm YEN 16600

Invar rod may contain Selenium as a free machining additive.

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**Invar® - Controlled Expansion Alloy**

**Fe64/Ni36**



**Rod**

**FE027905**

Diameter ..... **3.2mm**



**Size**

**Web Code**  
 812-690-063  
 732-533-698  
 590-704-055  
 208-712-880

Length	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
100 mm	YEN 13500	YEN 15600	YEN 19500	YEN 24400	YEN 32200
200 mm	YEN 14900	YEN 17700	YEN 22800	YEN 29000	
500 mm	YEN 17800	YEN 21800	YEN 29200		
1000 mm	YEN 21200	YEN 26400			

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027909**

Diameter ..... **6.0mm**



**Size**

**Web Code**  
 559-682-169  
 745-531-612  
 468-006-159  
 070-482-787

Length	Quantity		
	1pc	2pcs	5pcs
100 mm	YEN 17300	YEN 21000	YEN 28000
200 mm	YEN 20000	YEN 24800	YEN 35200
500 mm	YEN 25400	YEN 33600	
1000 mm	YEN 32600		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027910**

Diameter ..... **6.35mm**



**Size**

**Web Code**  
 605-790-411  
 723-802-917  
 552-360-451  
 439-586-271

Length	Quantity		
	1pc	2pcs	5pcs
100 mm	YEN 17300	YEN 21000	YEN 28000
200 mm	YEN 20000	YEN 24800	YEN 35200
400 mm	YEN 23800	YEN 30200	
800 mm	YEN 29200		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027920**

Diameter ..... **10.0mm**



**Size**

**Web Code**  
 218-191-134  
 453-832-503  
 851-330-556  
 322-298-176

Length	Quantity		
	1pc	2pcs	5pcs
100 mm	YEN 18300	YEN 23000	YEN 31200
200 mm	YEN 21200	YEN 27000	YEN 41400
500 mm	YEN 26800	YEN 38800	
1000 mm	YEN 37000		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027925**

Diameter ..... **12.7mm**



**Size**

**Web Code**  
 650-549-659  
 318-711-453  
 838-935-174  
 866-894-451

Length	Quantity		
	1pc	2pcs	5pcs
100 mm	YEN 19800	YEN 25000	YEN 34400
200 mm	YEN 23200	YEN 29800	YEN 53000
500 mm	YEN 30200	YEN 50500	
1000 mm	YEN 48800		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027930**

Diameter ..... **16mm**



**Size**

**Web Code**  
 350-872-388  
 158-118-379  
 402-958-196

Length	Quantity		
	1pc	2pcs	5pcs
100 mm	YEN 22400	YEN 28800	YEN 48600
200 mm	YEN 27000	YEN 39400	
500 mm	YEN 44200		

Invar rod may contain Selenium as a free machining additive.

**FE027935**

Diameter ..... **19mm**



**Size**

**Web Code**  
 170-708-580  
 639-083-094  
 725-820-821

Length	Quantity		
	1pc	2pcs	5pcs
100 mm	YEN 22800	YEN 29200	YEN 50500
200 mm	YEN 27600	YEN 41200	
500 mm	YEN 46400		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027940**

Diameter ..... **21mm**



**Size**

**Web Code**  
 996-715-964

Length	Quantity
	1pc
58 mm	YEN 22000

Invar rod may contain Selenium as a free machining additive.

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**Invar® - Controlled Expansion Alloy**

**Fe64/Ni36**



**Rod**

**FE027950**

Diameter..... **25mm**



**Size**

**Web Code**  
 361-812-457  
 226-553-693  
 319-206-451

**Length**  
 100 mm  
 200 mm  
 500 mm

**Quantity**

1pc	2pcs	5pcs
YEN 34800	YEN 46400	POA
YEN 43800	POA	
POA		

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027953**

Diameter..... **30.0mm**



**Size**

**Web Code**  
 192-476-100  
 675-701-284  
 512-063-742  
 006-148-095

**Length**  
 100 mm  
 200 mm  
 500 mm  
 1000 mm

**Quantity**

**1pc**  
 POA  
 POA  
 POA  
 POA

Typical Analysis : Not applicable  
 Invar rod may contain Selenium as a free machining additive.

**FE027955**

Diameter..... **38.1mm**



**Size**

**Web Code**  
 120-148-287  
 469-086-927

**Length**  
 68 mm  
 100 mm

**Quantity**

**1pc**  
 POA  
 POA

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027956**

Diameter..... **40mm**



**Size**

**Web Code**  
 465-440-586  
 321-696-965  
 608-376-331  
 782-599-997  
 059-189-245

**Length**  
 50 mm  
 100 mm  
 200 mm  
 500 mm  
 1000 mm

**Quantity**

**1pc**  
 POA  
 POA  
 POA  
 POA  
 POA

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027960**

Diameter..... **50mm**



**Size**

**Web Code**  
 074-529-630  
 316-204-840  
 525-608-408  
 172-260-084

**Length**  
 100 mm  
 200 mm  
 500 mm  
 1000 mm

**Quantity**

**1pc**  
 POA  
 POA  
 POA  
 POA

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027970**

Diameter..... **63mm**



**Size**

**Web Code**  
 842-109-712  
 858-567-983  
 577-245-009  
 578-724-253  
 710-858-321

**Length**  
 50 mm  
 100 mm  
 200 mm  
 500 mm  
 1000 mm

**Quantity**

**1pc**  
 POA  
 POA  
 POA  
 POA  
 POA

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027980**

Diameter..... **75mm**



**Size**

**Web Code**  
 632-451-900  
 056-491-943  
 061-495-509

**Length**  
 50 mm  
 100 mm  
 200 mm

**Quantity**

**1pc**  
 POA  
 POA  
 POA

Typical Analysis : Ni 36%, Mn + Si + C < 1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

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**Invar® - Controlled Expansion Alloy**

**Fe64/Ni36**



**Rod**

**FE027990**

Diameter ..... **100mm**



**Size**

**Web Code**  
 080-316-421  
 307-000-666  
 017-599-451

Quantity	
<b>Length</b>	<b>1pc</b>
50 mm	POA
100 mm	POA
200 mm	POA

Typical Analysis : Ni 36%, Mn + Si + C <1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027995**

Diameter ..... **110mm**



**Size**

**Web Code**  
 645-111-860

Quantity	
<b>Length</b>	<b>1pc</b>
105 mm	POA

Typical Analysis : Ni 36%, Mn + Si + C <1%, Fe balance.  
 Invar rod may contain Selenium as a free machining additive.

**FE027998**

Diameter ..... **120mm**



**Size**

**Web Code**  
 622-561-137

Quantity	
<b>Length</b>	<b>1pc</b>
100 mm	POA

Invar rod may contain Selenium as a free machining additive.



**Tube**

**FE027200**

Outside Diameter ..... **2.2mm**  
 Inside Diameter ..... **1.88mm**

Wall Thickness ..... **0.16mm**



**Size**

**Web Code**  
 041-133-244  
 141-659-957  
 707-494-780  
 436-846-348

Length	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
100 mm	YEN 17400	YEN 21200	YEN 29800	YEN 41200	YEN 65500
200 mm	YEN 20200	YEN 25000	YEN 35800	YEN 60500	
500 mm	YEN 25400	YEN 32600			
1000 mm	YEN 31600	YEN 52000			

**FE027800**

Outside Diameter ..... **8.0mm**  
 Inside Diameter ..... **7mm**

Wall Thickness ..... **0.5mm**



**Size**

**Web Code**  
 682-118-061

Quantity	
<b>Length</b>	<b>1pc</b>
1198 mm	YEN 53500



**Powder**

**FE026011**

Max. Particle size ..... **45micron**  
 Condition ..... **Spherical**

Condition ..... **Atomised**



**Web Code**  
 921-665-984  
 691-241-471  
 985-483-858  
 291-727-421

Quantity	
<b>Weight</b>	<b>1 Pot</b>
50 g	YEN 21800
100 g	YEN 27400
200 g	YEN 36400
500 g	YEN 64000

Typical Analysis : Not applicable  
 Hazardous goods, additional shipment charges apply which are dependent on destination. Please check the individual item on our website or contact us for further details.

**FE026010**

Max. Particle size ..... **150micron**

Condition ..... **Alloy Pre-cursor**



**Web Code**  
 836-735-027  
 591-878-756  
 984-837-655  
 104-706-649

Quantity	
<b>Weight</b>	<b>1 Pot</b>
50 g	YEN 27800
100 g	YEN 34400
200 g	YEN 45000
500 g	YEN 78000

Hazardous goods, additional shipment charges apply which are dependent on destination. Please check the individual item on our website or contact us for further details.

**Alloy – Invar® - Controlled Expansion Alloy**

## INDEX

### F

Foil, Invar<sup>®</sup> - Controlled Expansion Alloy 20

### I

Invar 36<sup>®</sup> 20

Invar<sup>®</sup> - Controlled Expansion Alloy (Fe64/Ni36) 20

### N

Nilo<sup>®</sup> alloy 36 20

Nilvar 20

NS 36 20

### P

Permalloy D<sup>®</sup> 20

Powder, Invar<sup>®</sup> - Controlled Expansion Alloy 30

### R

Radio metal 36<sup>®</sup> 20

Rod, Invar<sup>®</sup> - Controlled Expansion Alloy 27

### S

Sheet, Invar<sup>®</sup> - Controlled Expansion Alloy 25

### T

Tube, Invar<sup>®</sup> - Controlled Expansion Alloy 30

### V

Vacodil 36<sup>®</sup> 20

### W

Wire

.. Invar<sup>®</sup> - Controlled Expansion Alloy 26