

# 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



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# Standard Price List for Zirconium

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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): < 100mm  $\pm 1\text{mm}$   
 $\geq 100\text{mm}$   $+2\% / -1\%$



**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): < 100mm  $\pm 5\text{mm}$   
 $> 100\text{mm}$   $\pm 5\%$



**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  
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# 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

## Zirconium

### Zr

Zirconium was discovered in Berlin, Germany, in 1789 by M.H. Klaproth, but was not isolated until 1824 by J.J. Berzelius in Stockholm, Sweden.

Zirconium is a hard, lustrous, silvery coloured metal which is extracted from its ores (the oxide or zircon,  $ZrSiO_4$ ) by conversion to the tetrahalide followed by reduction with magnesium. The metal is extremely corrosion resistant due to the formation of a stable oxide film and is unaffected by acids (with the exception of HF) and alkalis.

As a result of its corrosion resistance, zirconium is widely used in the chemical industry where corrosive agents are used. Also, due to its excellent high temperature properties, coupled with its low neutron absorption, it is used in the construction of nuclear reactors. The pure metal is also used as a lining in jet engines. Zirconium is used as an alloying element, the resultant alloys having improved mechanical properties.

Zirconium oxide, zirconia ( $ZrO_2$ ), is used as an opacifier in vitreous enamels as well as a pigment. However, the main applications of zirconia make use of its excellent strength and high temperature properties, and it is used to manufacture foundry crucibles, bricks, ceramics and abrasives. It has sufficient strength to enable it to be used to fabricate high precision knife blades.

#### Atomic Properties

Atomic number	40
Atomic radius - Goldschmidt	0.160 nm
Atomic weight	91.22 amu
Crystal structure	Hexagonal close packed
Electronic structure	Kr 4d <sup>2</sup> 5s <sup>2</sup>
Photo-electric work function	3.8 eV
Thermal neutron absorption cross-section	0.182 Barns
Valences shown	2, 3, 4

#### Natural isotope distribution

Mass No.	%
90	51.4
91	11.2
92	17.1
94	17.5
96	2.8

#### Ionisation potential

No.	eV
1	6.84
2	13.13
3	22.99
4	34.34
5	81.5
6	99

#### Physical Properties

Boiling point	4377 C
Density @20C	6.49 g cm <sup>-3</sup>
Melting point	1852 C

#### Electrical Properties

Electrical resistivity @20C	44 μOhmcm
Temperature coefficient @0-100C	0.0044 K <sup>-1</sup>
Superconductivity critical temperature	0.61 K
Thermal emf against Pt (cold 0C - hot 100C)	+ 1.17 mV

#### Thermal Properties

Coefficient of thermal expansion @0-100C	5.9 x10 <sup>-6</sup> K <sup>-1</sup>
Latent heat of evaporation	6360 J g <sup>-1</sup>
Latent heat of fusion	211 J g <sup>-1</sup>
Specific heat @25C	281 J K <sup>-1</sup> kg <sup>-1</sup>
Thermal conductivity @0-100C	22.7 W m <sup>-1</sup> K <sup>-1</sup>

#### Mechanical Properties

Material condition	Soft	Polycrystalline
Bulk modulus		89.8 GPa
Hardness - Vickers	85-100	
Poisson's ratio		0.38
Tensile modulus		98 GPa
Tensile strength	350-390 MPa	
Yield strength	250-310 MPa	

The purity listed includes the Hafnium content. Do NOT expose to concentrated Sulphuric Acid containing ferric or cupric ions, or to mixtures of hydrochloric & nitric acids, or to ferric chloride, or to copper chloride solutions as a pyrophoric film may be produced. Treating in hot air or steam for 20 to 60 minutes @ 250C can eliminate the pyrophoric film.



## Foil

ZR000070

Thickness ..... 0.001mm

Purity ..... 99.2%



#### Sizes LT

Web Code  
229-509-742  
104-051-233

#### Quantity

Size	1pc	2pcs
25 x 25 mm	YEN 82500	YEN 112000
50 x 50 mm	YEN 151000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000080

Thickness ..... 0.002mm

Purity ..... 99.2%



#### Sizes LT

Web Code  
577-277-059  
415-685-438

#### Quantity

Size	1pc	2pcs	5pcs
25 x 25 mm	YEN 56500	YEN 75500	YEN 114000
50 x 50 mm	YEN 99500	YEN 136000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000090

Thickness ..... 0.0025mm

Purity ..... 99.2%



#### Sizes LT

Web Code  
093-767-687  
862-228-084

#### Quantity

Size	1pc	2pcs	5pcs
25 x 25 mm	YEN 53000	YEN 70500	YEN 106000
50 x 50 mm	YEN 92500	YEN 127000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

## Zirconium

Zr



### Foil

ZR000100

Thickness ..... 0.003mm

Purity..... 99.2%



#### Sizes LT

Web Code  
 388-580-573  
 199-805-026  
 716-888-317

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 49600	YEN 65500	YEN 98500
50 x 50 mm	YEN 86000	YEN 117000	
100 x 100 mm	YEN 191000		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000110

Thickness ..... 0.004mm

Purity..... 99.2%



#### Sizes LT

Web Code  
 356-516-393  
 460-757-652  
 297-951-694

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 47000	YEN 62000	YEN 93000
50 x 50 mm	YEN 81000	YEN 110000	
100 x 100 mm	YEN 188000		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000120

Thickness ..... 0.005mm

Purity..... 99.2%



#### NLT Sizes

Web Code  
 004-371-616  
 683-660-876  
 978-435-399

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 45200	YEN 59500	YEN 88500
50 x 50 mm	YEN 77000	YEN 104000	
100 x 100 mm	YEN 180000		

#### Sizes LT

Web Code  
 483-922-538  
 248-078-322

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 49800	YEN 65500	YEN 97500
50 x 50 mm	YEN 92500	YEN 125000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000130

Thickness ..... 0.006mm

Purity..... 99.2%



#### NLT Sizes

Web Code  
 479-486-532  
 562-645-971  
 192-914-621  
 656-804-326

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 40400	YEN 53000	YEN 78000
50 x 50 mm	YEN 67500	YEN 91000	YEN 206000
100 x 100 mm	YEN 164000	YEN 316000	
150 x 150 mm	YEN 352000		

#### Sizes LT

Web Code  
 459-979-251  
 287-605-648

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 44600	YEN 58000	YEN 86000
50 x 50 mm	YEN 81000	YEN 109000	YEN 247000

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000140

Thickness ..... 0.007mm

Purity..... 99.2%



#### NLT Sizes

Web Code  
 682-738-045

Size	Quantity		
	1pc	2pcs	5pcs
150 x 150 mm	YEN 347000		

#### Sizes LT

Web Code  
 055-694-543  
 853-628-914  
 875-831-133  
 962-393-800

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 39200	YEN 51000	YEN 75500
50 x 50 mm	YEN 65000	YEN 88500	YEN 203000
100 x 100 mm	YEN 162000	YEN 311000	
150 x 150 mm	YEN 382000		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

Metal – Zirconium

## Zirconium

Zr



### Foil

ZR000150

Thickness ..... 0.008mm

Purity ..... 99.2%



#### NLT Sizes

Web Code  
080-112-574

Size	Quantity		
	1pc	2pcs	5pcs
150 x 150 mm	YEN 343000		

#### Sizes LT

Web Code  
049-471-724  
886-911-147  
563-855-468  
205-840-438

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 39000	YEN 51000	YEN 75000
50 x 50 mm	YEN 65000	YEN 87500	YEN 201000
100 x 100 mm	YEN 160000	YEN 307000	
150 x 150 mm	YEN 377000		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000160

Thickness ..... 0.009mm

Purity ..... 99.2%



#### NLT Sizes

Web Code  
322-550-964

Size	Quantity		
	1pc	2pcs	5pcs
150 x 150 mm	YEN 339000		

#### Sizes LT

Web Code  
216-080-522  
111-951-640  
336-980-653  
505-943-403

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 39000	YEN 50500	YEN 74500
50 x 50 mm	YEN 64500	YEN 86500	YEN 198000
100 x 100 mm	YEN 158000	YEN 304000	
150 x 150 mm	YEN 373000		

#### Discs

Web Code  
696-705-146  
088-142-369  
017-798-026  
224-758-081  
094-750-277  
843-784-266

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 43400	YEN 53500	YEN 77000
6 mm	YEN 50500	YEN 63500	YEN 93500
8 mm	YEN 58000	YEN 74000	YEN 110000
10 mm	YEN 65500	YEN 84500	YEN 128000
15 mm	YEN 83500	YEN 110000	YEN 228000
25 mm	YEN 130000		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000170

Thickness ..... 0.01mm

Purity ..... 99.2%



#### Size

Web Code  
278-216-393  
516-654-308  
405-791-841

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 37600	YEN 48600	YEN 71500
50 x 50 mm	YEN 62000	YEN 85000	
100 x 100 mm	YEN 154000		

#### Discs

Web Code  
504-971-518  
121-445-414  
180-675-301  
584-420-700  
052-591-357

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 42800	YEN 52000	YEN 75000
6 mm	YEN 49600	YEN 62000	YEN 91000
8 mm	YEN 56500	YEN 72000	YEN 107000
10 mm	YEN 63500	YEN 82000	YEN 125000
15 mm	YEN 80500	YEN 106000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

Metal – Zirconium

## Zirconium

Zr



### Foil

ZR000202

Thickness ..... 0.01mm

Purity ..... 99.2%



#### Size

**Web Code**  
 019-983-227  
 509-339-981  
 569-725-932  
 298-069-828

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 14700	YEN 16200	YEN 19500	YEN 23600	YEN 29800
50 x 50 mm	YEN 17900	YEN 20800	YEN 26800	YEN 33800	YEN 44200
100 x 100 mm	YEN 24400	YEN 30000	YEN 41200	YEN 54000	
200 x 200 mm	YEN 37400	YEN 48200	YEN 90000		

#### Coil

**Web Code**  
 403-979-244

Width 204mm	Quantity
Length	1 Reel
0.5 m	YEN 57000

#### Discs

**Web Code**  
 985-694-128  
 651-186-308  
 295-323-592  
 548-236-421  
 728-123-702  
 856-706-469  
 794-020-681

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 25200	YEN 28400	YEN 33800
6 mm	YEN 26200	YEN 29800	YEN 36000
8 mm	YEN 27200	YEN 31200	YEN 38200
10 mm	YEN 28200	YEN 32600	YEN 40400
15 mm	YEN 30600	YEN 36200	YEN 46000
25 mm	YEN 35600	YEN 43000	YEN 57000
50 mm	YEN 47800	YEN 60500	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000180

Thickness ..... 0.0125mm

Purity ..... 99.2%



#### NLT Sizes

**Web Code**  
 639-672-471

Size	Quantity		
	1pc	2pcs	5pcs
150 x 150 mm	YEN 314000		

#### Sizes LT

**Web Code**  
 777-491-616  
 400-118-378  
 719-872-263  
 749-625-253

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 36000	YEN 46400	YEN 68000
50 x 50 mm	YEN 58500	YEN 81000	YEN 185000
100 x 100 mm	YEN 147000	YEN 282000	
150 x 150 mm	YEN 345000		

#### Discs

**Web Code**  
 656-482-344  
 060-297-486  
 537-185-211  
 148-155-931  
 519-488-727  
 936-093-665

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 41800	YEN 51000	YEN 73000
6 mm	YEN 48200	YEN 60000	YEN 88000
8 mm	YEN 54500	YEN 69500	YEN 103000
10 mm	YEN 61000	YEN 78500	YEN 121000
15 mm	YEN 77000	YEN 101000	YEN 214000
25 mm	YEN 123000	YEN 220000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000190

Thickness ..... 0.015mm

Purity ..... 99.2%



#### Size

**Web Code**  
 482-294-098  
 670-025-990  
 982-014-268

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	YEN 33200	YEN 42400	YEN 61500
50 x 50 mm	YEN 53000	YEN 75500	
100 x 100 mm	YEN 136000		

#### Discs

**Web Code**  
 252-500-264  
 562-533-157  
 316-649-098  
 581-130-197  
 641-274-601

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 40200	YEN 48800	YEN 69500
6 mm	YEN 45800	YEN 56500	YEN 82500
8 mm	YEN 51500	YEN 65000	YEN 95500
10 mm	YEN 57000	YEN 73000	YEN 115000
15 mm	YEN 71000	YEN 95000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

Metal – Zirconium

## Zirconium

Zr



### Foil

ZR000205

Thickness ..... 0.016mm

Purity ..... 99.2%



#### Size

**Web Code**  
 641-278-648  
 784-704-330  
 406-905-824  
 913-759-607

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 14100	YEN 15100	YEN 17400	YEN 20400	YEN 25200
50 x 50 mm	YEN 16000	YEN 17700	YEN 21600	YEN 26200	YEN 34000
100 x 100 mm	YEN 19700	YEN 23000	YEN 30200	YEN 48400	
100 x 300 mm	YEN 25000	YEN 32800	YEN 64000		

#### Coil

**Web Code**  
 727-929-288  
 364-805-060

Width 110mm	Quantity	
Length	1 Reel	
0.5 m	YEN 34800	
1 m	YEN 53500	

#### Discs

**Web Code**  
 160-636-796  
 079-595-499  
 949-429-635  
 678-704-681  
 838-082-211  
 760-276-753  
 034-587-963

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 25800	YEN 29200	YEN 37600
6 mm	YEN 26400	YEN 30000	YEN 39000
8 mm	YEN 26800	YEN 30800	YEN 40200
10 mm	YEN 27400	YEN 31600	YEN 41400
15 mm	YEN 28800	YEN 33600	YEN 44600
25 mm	YEN 31600	YEN 37600	YEN 51000
50 mm	YEN 38600	YEN 48000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000200

Thickness ..... 0.02mm

Purity ..... 99.2%



#### NLT Sizes

**Web Code**  
 063-225-974

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
200 x 300 mm	YEN 38800	YEN 48600	YEN 68000		

#### Sizes LT

**Web Code**  
 182-966-794  
 167-804-285  
 897-951-328  
 794-390-351  
 008-805-128

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 18100	YEN 19300	YEN 22000	YEN 25400	YEN 31000
50 x 50 mm	YEN 20400	YEN 22600	YEN 27200	YEN 32800	YEN 41400
100 x 100 mm	YEN 25200	YEN 29200	YEN 37800	YEN 47600	YEN 62500
150 x 150 mm	YEN 29800	YEN 36000	YEN 48200	YEN 62500	YEN 83500
200 x 300 mm	YEN 42600	YEN 53500	YEN 75000		

#### Coil

**Web Code**  
 433-626-602  
 203-325-054  
 415-626-157  
 953-264-872

Width 200mm	Quantity	
Length	1 Reel	
1 m	YEN 61500	
2 m	YEN 79000	
5 m	YEN 114000	
10 m	YEN 153000	

#### Discs

**Web Code**  
 763-094-879  
 386-851-348  
 356-422-915  
 552-872-213  
 109-029-231  
 628-660-083  
 582-500-997

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 30200	YEN 33800	YEN 42600
6 mm	YEN 31000	YEN 34800	YEN 44200
8 mm	YEN 31800	YEN 35800	YEN 45800
10 mm	YEN 32400	YEN 36800	YEN 47400
15 mm	YEN 34200	YEN 39400	YEN 51500
25 mm	YEN 37800	YEN 44400	YEN 59500
50 mm	YEN 46600	YEN 57000	YEN 79500

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

Metal - Zirconium



## Zirconium

Zr



### Foil

ZR000210

Thickness ..... 0.025mm  
 Temper ..... Annealed

Purity ..... 99.2%



#### Size

**Web Code**  
 323-496-852  
 437-112-316  
 639-049-895  
 881-226-410  
 153-304-394

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 12700	YEN 13900	YEN 16500	YEN 19900	YEN 25400
50 x 50 mm	YEN 15000	YEN 17100	YEN 21600	YEN 27000	YEN 35600
100 x 100 mm	YEN 19500	YEN 23600	YEN 31800	YEN 41600	YEN 56000
150 x 150 mm	YEN 24200	YEN 30000	YEN 42000	YEN 56000	
200 x 300 mm	YEN 32800	YEN 42200	YEN 61500		

#### Coil

**Web Code**  
 886-080-112  
 163-040-042  
 380-002-816  
 500-351-376

Length	Quantity	
	1 Reel	
0.5 m	YEN 43600	
1 m	YEN 55500	
2 m	YEN 73000	
5 m	YEN 123000	

#### Discs

**Web Code**  
 990-145-973  
 768-240-303  
 030-045-021  
 755-628-697  
 453-576-880  
 697-108-567  
 138-567-997

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 23800	YEN 27400	YEN 36000
6 mm	YEN 24600	YEN 28400	YEN 37600
8 mm	YEN 25200	YEN 29400	YEN 39200
10 mm	YEN 26000	YEN 30400	YEN 40800
15 mm	YEN 27600	YEN 32800	YEN 44600
25 mm	YEN 31200	YEN 37600	YEN 52500
50 mm	YEN 39800	YEN 50000	YEN 72000

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000220

Thickness ..... 0.05mm  
 Temper ..... Annealed

Purity ..... 99.2%



#### Size

**Web Code**  
 971-833-561  
 479-198-759  
 899-844-576  
 480-567-331  
 505-390-912

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 16600	YEN 17900	YEN 20800	YEN 24400	YEN 30200
50 x 50 mm	YEN 19200	YEN 21600	YEN 26400	YEN 32400	YEN 41600
100 x 100 mm	YEN 24200	YEN 28800	YEN 37800	YEN 48600	YEN 64500
150 x 150 mm	YEN 29400	YEN 36000	YEN 49200	YEN 64500	YEN 87000
300 x 300 mm	YEN 44600	YEN 57500	YEN 83500	YEN 113000	

#### Coil

**Web Code**  
 894-795-912  
 865-593-841  
 199-225-862  
 903-234-895

Length	Quantity	
	1 Reel	
0.5 m	YEN 58000	
1 m	YEN 74500	
2 m	YEN 98000	
5 m	YEN 144000	

#### Discs

**Web Code**  
 568-309-909  
 038-744-394  
 843-040-763  
 380-090-449  
 511-303-708  
 912-965-131  
 120-648-675

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 28400	YEN 32000	YEN 40800
6 mm	YEN 29200	YEN 33200	YEN 42600
8 mm	YEN 30000	YEN 34200	YEN 44200
10 mm	YEN 30600	YEN 35200	YEN 46000
15 mm	YEN 32600	YEN 38000	YEN 50500
25 mm	YEN 36600	YEN 43600	YEN 59000
50 mm	YEN 46200	YEN 57000	YEN 80500

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

## Zirconium

Zr



### Foil

ZR000240

Thickness ..... **0.075mm**  
 Temper ..... **Annealed**

Purity ..... **99.2%**



#### Size

**Web Code**  
 081-076-028  
 134-502-055  
 812-754-634  
 594-331-615  
 291-458-870

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 16600	YEN 17900	YEN 20600	YEN 24200	YEN 30000
50 x 50 mm	YEN 19100	YEN 21400	YEN 26200	YEN 32200	YEN 41200
100 x 100 mm	YEN 24000	YEN 28400	YEN 37400	YEN 47800	YEN 63500
150 x 150 mm	YEN 29000	YEN 35600	YEN 48600	YEN 63500	YEN 86000
200 x 300 mm	YEN 38600	YEN 49000	YEN 70000		

#### Coil

**Web Code**  
 849-488-348  
 432-351-203  
 043-912-438  
 489-050-628

Length	Quantity	
	1 Reel	
0.5 m	YEN 49600	
1 m	YEN 63000	
2 m	YEN 81500	
5 m	YEN 141000	

#### Discs

**Web Code**  
 416-994-703  
 124-345-096  
 543-131-184  
 891-395-948  
 424-492-498  
 061-553-449  
 694-183-894

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 28400	YEN 32000	YEN 40800
6 mm	YEN 29200	YEN 33000	YEN 42400
8 mm	YEN 29800	YEN 34200	YEN 44200
10 mm	YEN 30600	YEN 35200	YEN 45800
15 mm	YEN 32600	YEN 37800	YEN 50000
25 mm	YEN 36400	YEN 43200	YEN 58500
50 mm	YEN 45800	YEN 56500	YEN 80000

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000260

Thickness ..... **0.1mm**  
 Temper ..... **Annealed**

Purity ..... **99.2%**



#### Size

**Web Code**  
 913-090-354  
 136-294-831  
 036-853-166  
 606-648-772  
 831-091-352

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 16800	YEN 18200	YEN 21200	YEN 25000	YEN 31000
50 x 50 mm	YEN 19500	YEN 22000	YEN 27200	YEN 33400	YEN 43000
100 x 100 mm	YEN 25000	YEN 29600	YEN 39400	YEN 50500	YEN 67500
150 x 150 mm	YEN 30400	YEN 37400	YEN 51500	YEN 68000	
200 x 300 mm	YEN 40600	YEN 52000			

#### Coil

**Web Code**  
 186-049-423  
 886-413-119  
 801-638-847

Length	Quantity	
	1 Reel	
0.5 m	YEN 52500	
1 m	YEN 66500	
2 m	YEN 87000	

#### Discs

**Web Code**  
 607-269-994  
 908-741-212  
 592-655-803  
 081-978-360  
 247-288-903  
 911-114-183  
 889-263-406

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 28400	YEN 32200	YEN 41000
6 mm	YEN 29400	YEN 33400	YEN 43000
8 mm	YEN 30200	YEN 34400	YEN 44800
10 mm	YEN 31000	YEN 35600	YEN 46600
15 mm	YEN 33000	YEN 38600	YEN 51000
25 mm	YEN 37200	YEN 44400	YEN 60500
50 mm	YEN 47400	YEN 59000	YEN 83500

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

## Zirconium

Zr



### Foil

ZR000270

Thickness ..... 0.125mm  
 Temper ..... Annealed

Purity ..... 99.2%



#### Size

**Web Code**  
 157-925-549  
 740-698-373  
 587-296-070  
 412-007-269  
 686-481-589

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 11300	YEN 12600	YEN 15500	YEN 19600	YEN 26600
50 x 50 mm	YEN 13300	YEN 15300	YEN 19800	YEN 25600	YEN 35200
100 x 100 mm	YEN 17100	YEN 20800	YEN 28400	YEN 37800	
150 x 150 mm	YEN 21000	YEN 26200	YEN 37000		
300 x 300 mm	YEN 32400	YEN 42400			

#### Coil

**Web Code**  
 256-179-882  
 613-792-752

Length	Quantity	
	1 Reel	
0.5 m	YEN 43200	
1 m	YEN 64500	

#### Discs

**Web Code**  
 348-552-304  
 569-038-013  
 129-760-615  
 220-075-950  
 509-492-321  
 686-542-013  
 817-758-957

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 24600	YEN 30600	YEN 39000
6 mm	YEN 25200	YEN 31400	YEN 40400
8 mm	YEN 25800	YEN 32200	YEN 41800
10 mm	YEN 26400	YEN 33000	YEN 43000
15 mm	YEN 27800	YEN 35200	YEN 46200
25 mm	YEN 30800	YEN 39200	YEN 53000
50 mm	YEN 38000	YEN 49600	YEN 69500

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000300

Thickness ..... 0.25mm  
 Temper ..... Annealed

Purity ..... 99.2%



#### Size

**Web Code**  
 294-964-269  
 870-534-741  
 816-849-172  
 106-141-709  
 694-514-875

Size	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 x 25 mm	YEN 14100	YEN 16100	YEN 20600	YEN 26800	YEN 37200
50 x 50 mm	YEN 17400	YEN 20800	YEN 28000	YEN 37200	YEN 52000
100 x 100 mm	YEN 24000	YEN 30200	YEN 43000	YEN 58500	
150 x 150 mm	YEN 30800	YEN 39600	YEN 58000		
300 x 300 mm	YEN 50500	YEN 69500			

#### Coil

**Web Code**  
 022-487-250  
 465-515-516

Length	Quantity	
	1 Reel	
0.5 m	YEN 66500	
1 m	YEN 113000	

#### Discs

**Web Code**  
 074-340-080  
 292-512-013  
 564-003-083  
 500-380-396  
 547-542-182  
 442-768-677  
 346-080-013

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 28800	YEN 37000	YEN 55000
6 mm	YEN 29800	YEN 38400	YEN 57500
8 mm	YEN 30800	YEN 39800	YEN 59500
10 mm	YEN 31800	YEN 41200	YEN 62000
15 mm	YEN 34400	YEN 44800	YEN 67500
25 mm	YEN 39400	YEN 52000	YEN 79000
50 mm	YEN 52000	YEN 70000	YEN 107000

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

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.

ZR000310

Thickness ..... 0.5mm  
 Temper ..... Annealed

Purity ..... 99.2%



#### Size

**Web Code**  
 046-688-359  
 836-039-093  
 504-885-778  
 110-716-516  
 275-044-026

Size	Quantity			
	1pc	2pcs	5pcs	10pcs
25 x 25 mm	YEN 14900	YEN 16800	YEN 20600	YEN 25600
50 x 50 mm	YEN 18800	YEN 22200	YEN 29400	YEN 37800
100 x 100 mm	YEN 26600	YEN 33200	YEN 46600	
150 x 150 mm	YEN 34200	YEN 44200		
300 x 300 mm	YEN 72500			

#### Coil

**Web Code**  
 946-377-283

Length	Quantity	
	1 Reel	
0.5 m	YEN 119000	

#### Discs

**Web Code**  
 132-356-662  
 544-578-478  
 072-310-923  
 038-864-435  
 858-061-081  
 257-636-547  
 204-564-565

Diameter	Quantity		
	10 discs	20 discs	50 discs
4 mm	YEN 25600	YEN 29400	YEN 39000
6 mm	YEN 26800	YEN 31200	YEN 41600
8 mm	YEN 27800	YEN 32800	YEN 44200
10 mm	YEN 29000	YEN 34600	YEN 47000
15 mm	YEN 32000	YEN 38600	YEN 53500
25 mm	YEN 38000	YEN 47000	YEN 67000
50 mm	YEN 53000	YEN 68000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

## Zirconium

Zr



### Foil

ZR000320

Thickness ..... **1.0mm**  
 Temper ..... **Annealed**

Purity ..... **99.2%**



**Discs**

**Web Code**  
 161-090-522

Diameter	Quantity	
	1 discs	2 discs
50 mm	YEN 23800	YEN 26000

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR000321

Thickness ..... **1.0mm**  
 Temper ..... **Annealed**

Purity ..... **99.2%**  
 Condition ..... **Hafnium > 0.2%**



**Size**

**Web Code**  
 138-822-264  
 188-679-321  
 635-664-336  
 003-423-803  
 982-117-205

Size	Quantity			
	1pc	2pcs	5pcs	10pcs
25 x 25 mm	YEN 16500	YEN 18500	YEN 22600	YEN 27600
50 x 50 mm	YEN 20600	YEN 24200	YEN 31800	YEN 40600
100 x 100 mm	YEN 28800	YEN 35800	YEN 62000	
150 x 150 mm	YEN 37000	YEN 56500		
300 x 300 mm	YEN 100000			

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR000350

Thickness ..... **2.0mm**  
 Temper ..... **Annealed**

Purity ..... **99.2%**



**Size**

**Web Code**  
 136-324-101  
 040-518-869  
 064-859-355  
 107-422-844

Size	Quantity			
	1pc	2pcs	5pcs	10pcs
25 x 25 mm	YEN 22000	YEN 25800	YEN 33800	YEN 43000
50 x 50 mm	YEN 30600	YEN 38200	YEN 53000	YEN 70500
100 x 100 mm	YEN 48000	YEN 63000		
150 x 150 mm	YEN 65500	YEN 87500		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR000370

Thickness ..... **3.6mm**  
 Temper ..... **Annealed**

Purity ..... **99.2%**



**Size**

**Web Code**  
 208-687-238  
 085-910-032

Size	Quantity
	1pc
150 x 150 mm	POA
300 x 300 mm	POA

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR000380

Thickness ..... **7.0mm**  
 Temper ..... **Annealed**

Purity ..... **99.2%**



**Size**

**Web Code**  
 408-203-520  
 360-002-126

Size	Quantity
	1pc
150 x 150 mm	POA
200 x 500 mm	POA

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.



### Sputtering Target

ZR009300

Thickness ..... **3.5mm**  
 Condition ..... **Hafnium > 0.2%**

Purity ..... **99.2%**



**Size**

**Web Code**  
 280-502-303  
 704-397-335

Disc diam.	Quantity
	1disc
25 mm	POA
50 mm	POA

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.  
 These targets are normally available for immediate shipment from stock. Other sizes are available to special order.

ZR009600

Thickness ..... **6.0mm**  
 Condition ..... **Hafnium > 0.2%**

Purity ..... **99.2%**



**Size**

**Web Code**  
 862-201-988  
 862-201-988

Disc diam.	Quantity
	1disc
50 mm	POA
75 mm	POA

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.  
 These targets are normally available for immediate shipment from stock. Other sizes are available to special order.

ZR009512

Thickness ..... **6.0mm**

Purity ..... **99.2%**



**Size**

**Web Code**  
 472-074-828

Disc diam.	Quantity
	1disc
120 mm	POA

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

Metal – Zirconium

## Zirconium

Zr



### Sputtering Target

**ZR009515** Thickness ..... **6.0mm** Purity..... **99.2%**  
**Size** **Quantity**  
**Web Code** **Disc diam.** **1disc**  
 009-351-204 152.4 mm POA  
 Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

**ZR009520** Thickness ..... **6.0mm** Purity..... **99.2%**  
**Size** **Quantity**  
**Web Code** **Disc diam.** **1disc**  
 168-906-554 203.2 mm POA  
 Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

**ZR009700** Thickness ..... **7.0mm** Purity..... **99.2%**  
**Size** **Quantity**  
**Web Code** **Disc diam.** **1disc**  
 021-186-537 50 mm POA  
 648-323-404 75 mm POA  
 Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.  
 These targets are normally available for immediate shipment from stock. Other sizes are available to special order.



### Wire

**ZR005110** Diameter..... **0.05mm** Purity..... **99.2%**  
 Temper..... **As drawn**  
**Length** **Quantity**  
**Web Code** **Length** **1 Reel**  
 696-666-106 0.5 m YEN 40800  
 083-269-755 1 m YEN 51500  
 408-713-146 2 m YEN 66500  
 089-146-644 5 m YEN 96000  
 Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.  
 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.

**ZR005120** Diameter..... **0.125mm** Purity..... **99.2%**  
 Condition..... **Stress relieved**  
**Length** **Quantity**  
**Web Code** **Length** **1 Reel**  
 482-325-156 1 m YEN 29000  
 330-293-228 5 m YEN 41000  
 286-657-263 10 m YEN 51000  
 832-162-463 20 m YEN 78000  
 Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.  
 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.

**ZR005130** Diameter..... **0.25mm** Purity..... **99.2%**  
 Temper..... **As drawn**  
**Length** **Quantity**  
**Web Code** **Length** **1 Reel**  
 537-503-581 1 m YEN 28200  
 187-942-011 5 m YEN 39000  
 492-750-746 10 m YEN 48200  
 593-838-177 20 m YEN 68500  
 Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.  
 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.

**ZR005134** Diameter..... **0.28mm** Purity..... **99.2%**  
 Temper..... **Annealed** Condition..... **Hafnium > 0.2%**  
**Length** **Quantity**  
**Web Code** **Length** **1 Reel**  
 292-697-494 1 m YEN 28200  
 589-457-314 5 m YEN 39000  
 007-857-527 10 m YEN 48200  
 825-117-825 20 m YEN 68500  
 Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

Metal – Zirconium

## Zirconium

Zr



### Wire

ZR005136

Diameter ..... **0.5mm**  
 Temper ..... **Annealed**

Purity ..... **99.2%**



**Length**  
**Web Code**  
 307-139-365

Quantity	
Length	1 Reel
0.5 m	YEN 16000

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR005135

Diameter ..... **0.5mm**  
 Temper ..... **As drawn**

Purity ..... **99.2%**



**Length**  
**Web Code**  
 434-145-567  
 268-189-715  
 523-719-412  
 468-891-288  
 611-400-803

Quantity	
Length	1 Reel
0.5 m	YEN 16000
1 m	YEN 18000
5 m	YEN 26600
10 m	YEN 33200
20 m	YEN 46600

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR005143

Diameter ..... **1.0mm**  
 Temper ..... **Annealed**

Purity ..... **99.2%**  
 Condition ..... **Hafnium > 0.2%**



**Length**  
**Web Code**  
 119-107-433  
 222-775-272  
 349-620-827  
 490-340-221  
 982-674-174

Quantity	
Length	1 Reel
0.5 m	YEN 16300
1 m	YEN 18400
5 m	YEN 27400
10 m	YEN 34400
20 m	YEN 50500

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.



### Rod

ZR007905

Diameter ..... **1.5mm**

Purity ..... **99.2%**



**Size**  
**Web Code**  
 662-720-811  
 840-104-961  
 013-119-503  
 473-337-187

Length	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
100 mm	YEN 13700	YEN 15700	YEN 20400	YEN 27200	YEN 32400
200 mm	YEN 14800	YEN 17200	YEN 22800	YEN 30600	YEN 37400
500 mm	YEN 17000	YEN 20400	YEN 27800	YEN 37600	YEN 51500
1000 mm	YEN 19500	YEN 23800	YEN 33200	YEN 49800	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007910

Diameter ..... **2.0mm**  
 Condition ..... **Centreless ground**

Purity ..... **99.2%**  
 Condition ..... **Hafnium > 0.2%**



**Size**  
**Web Code**  
 639-947-080  
 993-387-434  
 173-432-660  
 679-085-831

Length	Quantity			
	1pc	2pcs	5pcs	10pcs
100 mm	YEN 17400	YEN 21000	YEN 28800	YEN 39000
200 mm	YEN 20000	YEN 24600	YEN 34600	YEN 48800
500 mm	YEN 25400	YEN 32200		
1000 mm	YEN 31200	YEN 41800		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007915

Diameter ..... **3.0mm**  
 Condition ..... **Centreless ground**

Purity ..... **99.2%**  
 Condition ..... **Hafnium > 0.2%**



**Size**  
**Web Code**  
 902-460-561  
 925-889-673  
 490-238-621  
 484-597-740

Length	Quantity			
	1pc	2pcs	5pcs	10pcs
100 mm	YEN 19300	YEN 23600	YEN 33000	YEN 44800
200 mm	YEN 22800	YEN 28400	YEN 40600	YEN 68500
500 mm	YEN 29600	YEN 38000		
1000 mm	YEN 37200	YEN 62000		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007920

Diameter ..... **5.0mm**  
 Condition ..... **Centreless ground**

Purity ..... **99.2%**  
 Condition ..... **Hafnium > 0.2%**



**Size**  
**Web Code**  
 885-736-180  
 717-015-121  
 626-897-645  
 362-202-271

Length	Quantity			
	1pc	2pcs	5pcs	10pcs
100 mm	YEN 25200	YEN 31200	YEN 44400	YEN 60500
200 mm	YEN 30400	YEN 38600	YEN 56000	YEN 84500
500 mm	YEN 40600	YEN 53000		
1000 mm	YEN 52000	YEN 77000		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

Metal – Zirconium

## Zirconium

Zr



### Rod

ZR007924

Diameter ..... **6.0mm** Purity ..... **99.2%**  
 Condition ..... **Centreless ground**



Size	Web Code	Length	Quantity		
			1pc	2pcs	5pcs
	275-956-372	100 mm	YEN 27600	YEN 34800	YEN 49800
	177-093-411	200 mm	YEN 33800	YEN 43600	YEN 63500
	844-127-625	500 mm	YEN 46000	YEN 61000	
	701-244-426	1000 mm	YEN 60000		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007926

Diameter ..... **6.7mm** Purity ..... **99.2%**  
 Condition ..... **Centreless ground**



Size	Web Code	Length	Quantity		
			1pc	2pcs	5pcs
	203-693-471	100 mm	YEN 28200	YEN 35400	YEN 50500
	688-607-380	200 mm	YEN 34400	YEN 44200	YEN 64500
	832-130-072	500 mm	YEN 46800	YEN 61500	
	632-021-600	1000 mm	YEN 60500		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007930

Diameter ..... **9.5mm** Purity ..... **99.2%**  
 Condition ..... **Centreless ground** Condition ..... **Hafnium > 0.2%**



Size	Web Code	Length	Quantity			
			1pc	2pcs	5pcs	10pcs
	275-280-482	100 mm	YEN 29400	YEN 39400	YEN 71000	YEN 132000
	410-055-384	200 mm	YEN 36000	YEN 52000	YEN 115000	
	256-918-780	500 mm	YEN 57500	YEN 105000		
	114-844-688	1000 mm	YEN 102000			

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007931

Diameter ..... **10.0mm** Purity ..... **99.2%**  
 Condition ..... **Centreless ground** Condition ..... **Hafnium > 0.2%**



Size	Web Code	Length	Quantity			
			1pc	2pcs	5pcs	10pcs
	608-741-065	100 mm	YEN 29400	YEN 39600	YEN 71500	YEN 134000
	374-641-505	200 mm	YEN 36200	YEN 52500	YEN 117000	
	947-781-061	500 mm	YEN 58500	YEN 107000		
	356-468-020	1000 mm	YEN 103000			

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007935

Diameter ..... **12.7mm** Purity ..... **99.2%**  
 Condition ..... **Centreless ground** Condition ..... **Hafnium > 0.2%**



Size	Web Code	Length	Quantity			
			1pc	2pcs	5pcs	10pcs
	355-583-212	100 mm	YEN 30800	YEN 41600	YEN 87500	YEN 165000
	447-908-461	200 mm	YEN 38200	YEN 65500	YEN 149000	
	988-558-475	500 mm	YEN 75000	YEN 140000		
	569-801-657	1000 mm	YEN 137000			

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007938

Diameter ..... **16mm** Purity ..... **99.2%**  
 Condition ..... **Centreless ground** Condition ..... **Hafnium > 0.2%**



Size	Web Code	Length	Quantity			
			1pc	2pcs	5pcs	10pcs
	703-660-573	100 mm	YEN 33200	YEN 43800	YEN 90000	YEN 168000
	997-236-843	200 mm	YEN 40600	YEN 68000	YEN 152000	
	248-005-766	500 mm	YEN 77000	YEN 142000		
	522-955-640	1000 mm	YEN 139000			

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007940

Diameter ..... **19.0mm** Purity ..... **99.2%**  
 Condition ..... **Centreless ground** Condition ..... **Hafnium > 0.2%**



Size	Web Code	Length	Quantity		
			1pc	2pcs	5pcs
	225-202-581	50 mm	YEN 35200	YEN 45800	YEN 80000
	150-316-627	100 mm	YEN 43800	YEN 66000	
	789-587-159	200 mm	YEN 64000		
	315-496-426	300 mm	YEN 88500		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

Metal – Zirconium

## Zirconium

Zr



### Rod

ZR007950

Diameter ..... 25.4mm  
 Condition..... Centreless ground

Purity..... 99.2%  
 Condition..... Hafnium > 0.2%



**Size**

**Web Code**  
 298-322-401  
 814-482-852  
 422-181-973  
 910-704-349

Length	Quantity		
	1pc	2pcs	5pcs
25 mm	YEN 32200	YEN 41800	YEN 64000
50 mm	YEN 39600	YEN 53000	
100 mm	YEN 51000	YEN 89500	
200 mm	YEN 87500		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007955

Diameter ..... 38.1mm  
 Condition..... Centreless ground

Purity..... 99.2%  
 Condition..... Hafnium > 0.2%



**Size**

**Web Code**  
 102-970-988  
 400-132-775  
 662-743-752

Length	Quantity	
	1pc	2pcs
25 mm	YEN 36600	YEN 49800
50 mm	YEN 44600	YEN 76000
100 mm	YEN 71000	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007960

Diameter ..... 50mm  
 Condition..... Centreless ground

Purity..... 99.2%  
 Condition..... Hafnium > 0.2%



**Size**

**Web Code**  
 036-718-052  
 914-899-558  
 045-137-007

Length	Quantity	
	1pc	2pcs
25 mm	YEN 41400	YEN 63500
50 mm	YEN 58500	YEN 105000
100 mm	YEN 99500	

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.



### Tube

ZR007160

Outside Diameter..... 1.6mm  
 Inside Diameter..... 1.1mm  
 Temper..... Hard

Wall Thickness..... 0.25mm  
 Purity..... 99.2%



**Size**

**Web Code**  
 194-455-191  
 306-890-401  
 361-306-328  
 163-298-212

Length	Quantity			
	1pc	2pcs	5pcs	10pcs
100 mm	YEN 28600	YEN 38600	YEN 79500	POA
200 mm	YEN 37800	YEN 64000	POA	
500 mm	YEN 76000	POA		
1000 mm	POA			

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007200

Outside Diameter..... 2.0mm  
 Inside Diameter..... 1.6mm  
 Temper..... Annealed

Wall Thickness..... 0.2mm  
 Purity..... 99.2%



**Size**

**Web Code**  
 376-574-240  
 071-779-123  
 972-390-440  
 548-802-072

Length	Quantity			
	1pc	2pcs	5pcs	10pcs
100 mm	YEN 32000	YEN 45400	YEN 96500	POA
200 mm	YEN 44600	YEN 77500	POA	
500 mm	YEN 93000	POA		
1000 mm	POA			

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007400

Outside Diameter..... 6.35mm  
 Inside Diameter..... 4.55mm  
 Temper..... Annealed

Wall Thickness..... 0.9mm  
 Purity..... 99.2%



**Size**

**Web Code**  
 600-258-907  
 032-374-212  
 046-782-305  
 847-796-123

Length	Quantity		
	1pc	2pcs	5pcs
100 mm	YEN 25600	YEN 34200	YEN 61000
200 mm	YEN 32400	YEN 50500	YEN 102000
500 mm	YEN 57000	YEN 99000	
1000 mm	YEN 97500		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR007620

Outside Diameter..... 12.7mm  
 Inside Diameter..... 9.5mm  
 Temper..... Annealed

Wall Thickness..... 1.6mm  
 Purity..... 99.2%



**Size**

**Web Code**  
 888-517-307  
 064-674-189  
 084-266-408  
 533-301-720

Length	Quantity		
	1pc	2pcs	5pcs
100 mm	YEN 23000	YEN 30600	YEN 56000
200 mm	YEN 29400	YEN 46200	YEN 95000
500 mm	YEN 52500	YEN 93000	
1000 mm	YEN 91500		

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

Metal – Zirconium



## Zirconium

Zr



### Crucible

**ZR008605**

Shape ..... **Cylindrical**  
 Inside Diameter ..... **19mm**  
 Capacity ..... **5ml**

Outside Diameter..... **21mm**  
 Height ..... **19mm**

**Quantity**  
**Web Code**  
 857-974-000

**Quantity**  
**1 pack**  
 1 pcs YEN 17100

Typical Analysis : Not applicable

**ZR008610**

Shape ..... **Cylindrical**  
 Inside Diameter ..... **25mm**  
 Capacity ..... **10ml**

Outside Diameter..... **27mm**  
 Height ..... **22mm**

**Quantity**  
**Web Code**  
 797-862-767

**Quantity**  
**1 pack**  
 1 pcs YEN 17100

Typical Analysis : Not applicable

**ZR008615**

Shape ..... **Cylindrical**  
 Inside Diameter ..... **31mm**  
 Capacity ..... **15ml**

Outside Diameter..... **33mm**  
 Height ..... **22mm**

**Quantity**  
**Web Code**  
 985-689-503

**Quantity**  
**1 pack**  
 1 pcs YEN 17700

Typical Analysis : Not applicable

**ZR008620**

Shape ..... **Cylindrical**  
 Inside Diameter ..... **31mm**  
 Capacity ..... **20ml**

Outside Diameter..... **33mm**  
 Height ..... **29mm**

**Quantity**  
**Web Code**  
 343-460-448

**Quantity**  
**1 pack**  
 1 pcs YEN 17700

Typical Analysis : Not applicable

**ZR008625**

Shape ..... **Cylindrical**  
 Inside Diameter ..... **45mm**  
 Capacity ..... **25ml**

Outside Diameter..... **47mm**  
 Height ..... **22mm**

**Quantity**  
**Web Code**  
 752-874-256

**Quantity**  
**1 pack**  
 1 pcs YEN 17900

Typical Analysis : Not applicable

**ZR008635**

Shape ..... **Cylindrical**  
 Inside Diameter ..... **45mm**  
 Capacity ..... **35ml**

Outside Diameter..... **47mm**  
 Height ..... **29mm**

**Quantity**  
**Web Code**  
 215-348-369

**Quantity**  
**1 pack**  
 1 pcs YEN 18000

Typical Analysis : Not applicable

Metal – Zirconium

## Zirconium

Zr



### Crucible

ZR008645

Shape ..... **Cylindrical**  
 Inside Diameter ..... **45mm**  
 Capacity ..... **45ml**

Outside Diameter..... **47mm**  
 Height ..... **34mm**

**Quantity**  
**Web Code**  
 117-222-494

**Quantity**  
**1 pack**  
 1 pcs YEN 18200

Typical Analysis : Not applicable

ZR008655

Shape ..... **Cylindrical**  
 Inside Diameter ..... **45mm**  
 Capacity ..... **55ml**

Outside Diameter..... **47mm**  
 Height ..... **41mm**

**Quantity**  
**Web Code**  
 607-160-000

**Quantity**  
**1 pack**  
 1 pcs YEN 18400

Typical Analysis : Not applicable

ZR008675

Shape ..... **Cylindrical**  
 Inside Diameter ..... **49mm**  
 Capacity ..... **75ml**

Outside Diameter..... **51mm**  
 Height ..... **41mm**

**Quantity**  
**Web Code**  
 466-254-180

**Quantity**  
**1 pack**  
 1 pcs YEN 18700

Typical Analysis : Not applicable

ZR008680

Shape ..... **Cylindrical**  
 Inside Diameter ..... **57mm**  
 Capacity ..... **100ml**

Outside Diameter..... **59mm**  
 Height ..... **45mm**

**Quantity**  
**Web Code**  
 326-650-022

**Quantity**  
**1 pack**  
 1 pcs YEN 20400

Typical Analysis : Not applicable

ZR008685

Shape ..... **Cylindrical**  
 Inside Diameter ..... **81mm**  
 Capacity ..... **250ml**

Outside Diameter..... **83mm**  
 Height ..... **57mm**

**Quantity**  
**Web Code**  
 398-882-868

**Quantity**  
**1 pack**  
 1 pcs YEN 23000

Typical Analysis : Not applicable

ZR008690

Shape ..... **Cylindrical**  
 Inside Diameter ..... **102mm**  
 Capacity ..... **500ml**

Outside Diameter..... **104mm**  
 Height ..... **63mm**

**Quantity**  
**Web Code**  
 346-676-135

**Quantity**  
**1 pack**  
 1 pcs YEN 30200

Typical Analysis : Not applicable

Metal – Zirconium

## Zirconium

Zr



### Crucible

ZR008695

Shape ..... **Cylindrical**  
 Inside Diameter ..... **125mm**  
 Capacity ..... **1000ml**

Outside Diameter ..... **127mm**  
 Height ..... **89mm**

**Quantity**  
**Web Code**  
 762-237-297

**Quantity**  
**1 pack**  
 1 pcs YEN 40200

Typical Analysis : Not applicable

ZR008698

Shape ..... **Cylindrical**  
 Inside Diameter ..... **150mm**  
 Capacity ..... **1500ml**

Outside Diameter ..... **152mm**  
 Height ..... **99mm**

**Quantity**  
**Web Code**  
 888-686-159

**Quantity**  
**1 pack**  
 1 pcs YEN 59000

Typical Analysis : Not applicable



### Powder

ZR006015

Max. Particle size ..... **45micron**  
 Condition ..... **In aqueous suspension (min 30% water)**

Purity ..... **99.2%**



**Web Code**  
 479-388-217  
 858-447-405

**Quantity**  
**Weight** **1 Pot**  
 100 g YEN 62000  
 200 g YEN 110000

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.  
 Wet, dampened with minimum 25% water for safety in transport.  
 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.



### Lump

ZR006150

Max. Lump size ..... **4mm**  
 Condition ..... **Pellets - nominally 3mm diameter x 3mm length**

Purity ..... **99.2%**



**Web Code**  
 971-172-183  
 126-742-138  
 694-363-907

**Quantity**  
**Weight** **1 Pot**  
 20 g YEN 26200  
 50 g YEN 36200  
 100 g YEN 55000

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR006151

Max. Lump size ..... **8mm**  
 Condition ..... **Pellets - nominally 6.35mm diameter x 6.35mm length**

Purity ..... **99.2%**



**Web Code**  
 384-128-062  
 292-099-678  
 121-518-530  
 722-467-192

**Quantity**  
**Weight** **1 Pot**  
 20 g YEN 22400  
 50 g YEN 30000  
 100 g YEN 37000  
 200 g YEN 58000

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

ZR006100

Max. Lump size ..... **25mm**  
 Condition ..... **Sponge**

Purity ..... **99.2%**



**Web Code**  
 157-651-272  
 706-410-869  
 301-350-023  
 668-760-149  
 595-012-572

**Quantity**  
**Weight** **1 Pot**  
 20 g YEN 20000  
 50 g YEN 26000  
 100 g YEN 34200  
 200 g YEN 48000  
 500 g YEN 74500

Typical Analysis : C 250, Hf 2500, Fe 200, Cr 200, N 100, O 1000, H 10.

Metal - Zirconium

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