

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 Palladium

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Introduction

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 Catalog 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 Catalog at www.goodfellowusa.com.

Materials

Metals and Alloys

Goodfellow supplies virtually all of the pure metals from Aluminum 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 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 Catalog 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 Fiber

Fibers cut into short lengths called cut, staple or chopped fiber.

Tolerances

Fiber 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%



Fiber

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

Fiber 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%



Metallized 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: ± 10%
 Size (linear dimension): < 100mm ± 1mm
 ≥ 100mm + 2% / -1%

Product Descriptions



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 fibers 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.

Tolerances

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



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



Rod

A straight length of circular section material.

Tolerances

Diameter:	$\leq 10\text{mm}$	$\pm 10\%$
	Polymer	$+ 20\% / -10\%$
	Ceramic	$+ 20\% / -10\%$
$> 10\text{mm}$		$\pm 5\%$
	Ceramic	$+ 20\% / -10\%$
	Polymer	$+ 20\% / -10\%$
Length:	$< 100\text{mm}$	$\pm 1\text{mm}$
	$\geq 100\text{mm}$	$+ 5\% / -1\%$

Product Descriptions



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 vaporization 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%
Wall thickness:	> 5mm	± 5%
	Polymer	± 10%
	Ceramic	± 10%
Length:	≤ 2mm	± 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



Wire

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

Tolerances

Wire diameter:	± 10%
Length:	+ 5% / - 1%

Hazards Information

HAZARDS

All materials listed in this catalog, 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 catalog, 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 catalog 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 in the catalog 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-cm³.s⁻¹.

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.

Order information

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 shown are in US\$ and include free delivery by our standard 48 hour service except for those items marked as "special offer" or dangerous goods with transport restriction. Prices are subject to change without notice and orders will be invoiced at prices ruling on the date of despatch.

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

Delivery by UPS or Federal Express is included in the prices, although alternative methods may be used depending on the materials ordered.

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

Please inform us if you need to have your goods shipped urgently. An administrative charge will be made for this service, details can be found on our website.

Shipment

We aim to have all items listed in this catalog in stock in the quantities and sizes listed. We can only undertake to ship 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 shipped within 48 hours of receipt.

Non-delivery

If we have notified you of the shipment of goods and you have not received delivery within 5 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

Order information

invoice with their first order. In order to establish a credit account we will require details of your bankers, along with two trade references.

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 and American Express.

VAT

VAT number for Goodfellow Cambridge: 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 color 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

Order information

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

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 or www.goodfellowusa.com.

Company Details

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

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Registered in Hamburg No. HRB 152991
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Goodfellow (Shanghai) Trading Co., Ltd

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SHANGHAI
200070
The People's Republic of China

Conditions of Sale

1 GENERAL

1.1 In these Conditions:

1.1.1 the following expressions shall have the following meanings:-

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

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

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

2 ORDERS

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

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

3 DESCRIPTION

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

4 SPECIFICATIONS AND INTELLECTUAL PROPERTY

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

5 QUOTATIONS

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

6 PRICE

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

7 DELIVERY

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

Conditions of Sale

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

Conditions of Sale

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

Palladium

Pd

Discovered in 1803 by W.H. Woollaston in London, England.

Palladium is a member of the platinum group of metals. It is silvery white in color, is malleable and ductile, and is one of the most reactive in the group. It has an abundance of 6×10^{-6} in the earth's crust.

Palladium has good corrosion resistance but is soluble in oxidising acids and fused alkalis. It readily absorbs hydrogen gas (up to 900 times its own volume), but its main use is as a catalyst for hydrogenation. Palladium is also used within the electronics industry and in some dental applications.

Atomic Properties

Atomic number	46
Atomic radius - Goldschmidt	0.137 nm
Atomic weight	106.42 amu
Crystal structure	Face centred cubic
Electronic structure	Kr 4d ¹⁰
Photo-electric work function	5.0 eV
Thermal neutron absorption cross-section	6.0 Barns
Valences shown	2, 3, 4

Physical Properties

Boiling point	3140 C
Density @20C	12.0 g cm ⁻³
Melting point	1554 C

Electrical Properties

Electrical resistivity @20C	10.8 μOhmcm
Temperature coefficient @0-100C	0.0042 K ⁻¹
Thermal emf against Pt (cold 0C - hot 100C)	-0.57 mV

Natural isotope distribution

Mass No.	%
102	1.0
104	11.0
105	22.2
106	27.3
108	26.7
110	11.8

Thermal Properties

Coefficient of thermal expansion @0-100C	11.0 x 10 ⁻⁶ K ⁻¹
Latent heat of evaporation	3398 J g ⁻¹
Latent heat of fusion	157 J g ⁻¹
Specific heat @25C	244 J K ⁻¹ kg ⁻¹
Thermal conductivity @0-100C	71.8 W m ⁻¹ K ⁻¹

Ionization potential

No.	eV
1	8.3
2	19.4
3	32.9

Mechanical Properties

Material condition	Soft	Hard	Polycrystalline
Bulk modulus			187 GPa
Hardness - Vickers	40	100	
Poisson's ratio			0.39
Tensile modulus			121 GPa
Tensile strength	140-195	325	MPa
Yield strength	34.5	205	MPa



Microfoil

CONTRACT COATING of customers' own components or assemblies is available to special order.

PD004300 Thickness **0.05μm** Area density **63.6μg.cm⁻²**
 Purity **99.99%** Support **Permanent Mylar 3.5μm**

Quantity					
Web Code	Disk diam.	1 disk	2disks	5disks	10disks
752-519-096	10 mm	USD 403.00	USD 550.00	USD 992.00	USD 1581.00
110-015-645	25 mm	USD 599.00	USD 845.00	USD 1581.00	USD 2563.00
994-025-101	50 mm	USD 845.00	USD 1213.00	USD 2318.00	

Typical Analysis : Starting Material : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.
 This item is normally made to order for delivery within 4-5 weeks.

PD004500 Thickness **0.1μm** Area density **119.2μg.cm⁻²**
 Purity **99.99%** Support **Permanent Mylar 3.5μm**

Quantity					
Web Code	Disk diam.	1 disk	2disks	5disks	10disks
284-062-352	10 mm	USD 435.00	USD 599.00	USD 1090.00	USD 1745.00
474-245-283	25 mm	USD 654.00	USD 926.00	USD 1745.00	USD 2836.00
082-082-771	50 mm	USD 926.00	USD 1336.00	USD 2563.00	

Typical Analysis : Starting Material : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.
 This item is normally made to order for delivery within 4-5 weeks.

PD004600 Thickness **0.25μm** Area density **303.4μg.cm⁻²**
 Purity **99.99%** Support **Permanent Mylar 3.5μm**

Quantity					
Web Code	Disk diam.	1 disk	2disks	5disks	10disks
260-342-306	10 mm	USD 484.00	USD 672.00	USD 1237.00	USD 1989.00
848-882-979	25 mm	USD 735.00	USD 1049.00	USD 1989.00	USD 3243.00
795-806-384	50 mm	USD 1049.00	USD 1519.00	USD 2930.00	

Typical Analysis : Starting Material : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.
 This item is normally made to order for delivery within 4-5 weeks.

PD004700 Thickness **0.5μm** Area density **303.4μg.cm⁻²**
 Purity **99.99%** Support **Permanent Mylar 3.5μm**

Quantity					
Web Code	Disk diam.	1 disk	2disks	5disks	10disks
529-307-628	10 mm	USD 514.00	USD 702.00	USD 1266.00	USD 2019.00
159-007-137	25 mm	USD 765.00	USD 1078.00	USD 2019.00	USD 3273.00

Typical Analysis : Starting Material : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.
 This item is normally made to order for delivery within 4-5 weeks.

Palladium

Pd



Foil

PD000170	Thickness	0.0005mm	Purity	99.75%		
	Sizes LT			Quantity		
	Web Code					
			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 637.00	USD 846.00	USD 1275.00
			50 x 50 mm	USD 1112.00	USD 1519.00	

Typical Analysis : Ag 25, Al 40, Au 200, Bi 150, Ca 100, Cr 150, Cu 400, Fe 100, Mg 15, Mn 25, Ni 200, Pb 400, Pt 300, Rh 40, Si 40, Sn 30, Ti 10.

PD000180	Thickness	0.00075mm	Purity	99.75%		
	Support	0.125 mm Permanent Polyester				
	Sizes LT			Quantity		
Web Code			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 600.00	USD 795.00	USD 1193.00
			50 x 50 mm	USD 1040.00	USD 1416.00	

Typical Analysis : Ag 25, Al 40, Au 200, Bi 150, Ca 100, Cr 150, Cu 400, Fe 100, Mg 15, Mn 25, Ni 200, Pb 400, Pt 300, Rh 40, Si 40, Sn 30, Ti 10.
 The support for this foil cannot be removed without destroying the foil itself.

PD000190	Thickness	0.001mm	Purity	99.75%		
	Support	0.125 mm Permanent Polyester				
	Sizes LT			Quantity		
Web Code			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 578.00	USD 764.00	USD 1144.00
			50 x 50 mm	USD 995.00	USD 1353.00	

Typical Analysis : Ag 25, Al 40, Au 200, Bi 150, Ca 100, Cr 150, Cu 400, Fe 100, Mg 15, Mn 25, Ni 200, Pb 400, Pt 300, Rh 40, Si 40, Sn 30, Ti 10.
 The support for this foil cannot be removed without destroying the foil itself.

PD000201	Thickness	0.0015mm	Purity	99.95%		
	Sizes LT			Quantity		
	Web Code					
			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 684.00	USD 873.00	USD 1254.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000202	Thickness	0.002mm	Purity	99.95%		
	Sizes LT			Quantity		
	Web Code					
			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 673.00	USD 857.00	USD 1225.00
			50 x 50 mm	USD 1110.00	USD 1475.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000206	Thickness	0.0025mm	Purity	99.95%		
	Sizes LT			Quantity		
	Web Code					
			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 624.00	USD 788.00	USD 1117.00
			50 x 50 mm	USD 1013.00	USD 1338.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000203	Thickness	0.003mm	Purity	99.95%		
	Sizes LT			Quantity		
	Web Code					
			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 661.00	USD 841.00	USD 1200.00
			50 x 50 mm	USD 1088.00	USD 1443.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000204	Thickness	0.004mm	Purity	99.95%		
	NLT Sizes			Quantity		
	Web Code					
			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 637.00	USD 816.00	USD 1175.00
			50 x 50 mm	USD 1063.00	USD 1419.00	
			100 x 100 mm	USD 2200.00		
			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 891.00	USD 1142.00	USD 1645.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000205	Thickness	0.005mm	Purity	99.95%		
	Sizes LT			Quantity		
	Web Code					
			Size	1pc	2pcs	5pcs
			25 x 25 mm	USD 606.00	USD 772.00	USD 1106.00
			50 x 50 mm	USD 1001.00	USD 1331.00	
			100 x 100 mm	USD 1881.00		

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

Metal – Palladium

Palladium

Pd



Foil

PD000200

Thickness **0.006mm**

Purity..... **99.95%**

NLT Sizes

Web Code

575-288-162
 716-746-126
 520-791-716

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	USD 533.00	USD 670.00	USD 944.00
50 x 50 mm	USD 856.00	USD 1126.00	
100 x 100 mm	USD 1501.00		

Sizes LT

Web Code

857-524-458

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	USD 666.00	USD 837.00	USD 1180.00

Disks

Web Code

250-287-603
 285-952-787
 744-096-555
 012-068-525
 508-563-520

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 585.00	USD 703.00	USD 955.00
6 mm	USD 684.00	USD 842.00	USD 1176.00
8 mm	USD 782.00	USD 981.00	USD 1397.00
10 mm	USD 881.00	USD 1121.00	USD 1619.00
15 mm	USD 1126.00	USD 1468.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000240

Thickness **0.008mm**

Purity..... **99.95%**

Sizes LT

Web Code

583-317-749
 994-833-519
 101-064-573

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	USD 333.00	USD 414.00	USD 589.00
50 x 50 mm	USD 493.00	USD 639.00	USD 955.00
100 x 100 mm	USD 811.00	USD 1344.00	

Disks

Web Code

985-445-273
 180-657-850
 582-230-225
 778-782-546
 347-814-182
 476-770-128

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 507.00	USD 636.00	USD 980.00
6 mm	USD 556.00	USD 705.00	USD 1092.00
8 mm	USD 606.00	USD 776.00	USD 1205.00
10 mm	USD 655.00	USD 846.00	USD 1319.00
15 mm	USD 777.00	USD 1020.00	
25 mm	USD 1023.00		

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000241

Thickness **0.008mm**

Purity..... **99.95%**

Sizes LT

Web Code

661-665-772

Size	Quantity
	1pc
150 x 150 mm	USD 2110.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000250

Thickness **0.0125mm**

Purity..... **99.95%**

Sizes LT

Web Code

731-434-916
 593-436-888
 430-811-745

Size	Quantity	
	1pc	2pcs
25 x 25 mm	USD 396.00	USD 498.00
50 x 50 mm	USD 625.00	USD 823.00
100 x 100 mm	USD 1232.00	

Disks

Web Code

715-712-702
 464-087-548
 010-943-744
 367-971-147
 996-392-205

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 506.00	USD 608.00	USD 856.00
6 mm	USD 576.00	USD 708.00	USD 1014.00
8 mm	USD 647.00	USD 808.00	USD 1174.00
10 mm	USD 717.00	USD 908.00	USD 1336.00
15 mm	USD 893.00	USD 1157.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000251

Thickness **0.0125mm**

Purity..... **99.95%**

Sizes LT

Web Code

387-714-448

Size	Quantity
	1pc
150 x 150 mm	USD 2460.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

Metal – Palladium

Palladium

Pd



Foil

PD000255

Thickness **0.02mm**
 Temper **As Rolled**

Purity **99.95%**

Sizes LT

Web Code
 808-387-045
 212-224-475
 776-184-148

Size	Quantity			
	1pc	2pcs	5pcs	10pcs
25 x 25 mm	USD 417.00	USD 540.00	USD 768.00	USD 1051.00
50 x 50 mm	USD 636.00	USD 849.00	USD 1269.00	
100 x 100 mm	USD 1073.00	USD 1814.00		

Disks

Web Code
 322-716-566
 339-569-497
 446-176-196
 772-014-781
 501-845-580
 730-692-291

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 652.00	USD 901.00	USD 1592.00
6 mm	USD 719.00	USD 997.00	USD 1745.00
8 mm	USD 787.00	USD 1093.00	USD 1901.00
10 mm	USD 855.00	USD 1191.00	USD 2058.00
15 mm	USD 1023.00	USD 1429.00	
25 mm	USD 1361.00		

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000256

Thickness **0.02mm**
 Temper **As Rolled**

Purity **99.95%**

Sizes LT

Web Code
 755-164-971

Size	Quantity
	1pc
150 x 150 mm	USD 2246.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000260

Thickness **0.025mm**
 Temper **As Rolled**

Purity **99.95%**

NLT Sizes

Web Code
 882-128-982
 374-895-401

Size	Quantity		
	1pc	2pcs	5pcs
50 x 50 mm	USD 675.00	USD 891.00	
100 x 100 mm	USD 1472.00		

Sizes LT

Web Code
 037-818-636
 806-580-857
 904-278-664

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	USD 420.00	USD 531.00	USD 747.00
50 x 50 mm	USD 742.00	USD 980.00	
100 x 100 mm	USD 1840.00		

Disks

Web Code
 387-204-710
 400-590-081
 073-751-705
 218-974-895
 371-850-371

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 472.00	USD 567.00	USD 789.00
6 mm	USD 551.00	USD 681.00	USD 972.00
8 mm	USD 631.00	USD 796.00	USD 1159.00
10 mm	USD 712.00	USD 912.00	USD 1350.00
15 mm	USD 909.00	USD 1193.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000270

Thickness **0.025mm**
 Temper **As Rolled**

High Purity **99.99+%**

NLT Sizes

Web Code
 559-242-411
 482-301-979
 552-458-217

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	USD 518.00	USD 671.00	USD 982.00
50 x 50 mm	USD 870.00	USD 1313.00	
100 x 100 mm	USD 2444.00		

Sizes LT

Web Code
 509-883-582
 421-540-510
 600-844-245

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	USD 596.00	USD 772.00	USD 1130.00
50 x 50 mm	USD 1088.00	USD 1641.00	
100 x 100 mm	USD 3666.00		

Disks

Web Code
 971-725-568
 465-698-312
 212-288-254
 536-029-387
 003-674-229
 459-283-566

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 580.00	USD 713.00	USD 1022.00
6 mm	USD 687.00	USD 865.00	USD 1263.00
8 mm	USD 795.00	USD 1018.00	USD 1506.00
10 mm	USD 903.00	USD 1171.00	USD 1922.00
15 mm	USD 1171.00	USD 1647.00	
25 mm	USD 2081.00		

Typical Analysis : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.

PD000263

Thickness **0.025mm**
 Temper **As Rolled**

Purity **99.95%**

Sizes LT

Web Code
 470-814-373

Size	Quantity
	1pc
150 x 150 mm	USD 2507.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

Metal – Palladium

Palladium

Pd



Foil

PD000261

Thickness **0.03mm**
 Temper **As Rolled**

Purity **99.95%**

NLT Sizes

Web Code

389-671-930
 034-990-167
 359-168-684

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	USD 444.00	USD 565.00	USD 802.00
50 x 50 mm	USD 723.00	USD 960.00	
100 x 100 mm	USD 1733.00		

Sizes LT

Web Code
 775-613-439
 369-363-991

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	USD 489.00	USD 621.00	USD 882.00
50 x 50 mm	USD 904.00	USD 1199.00	

Disks

Web Code
 652-587-033
 573-387-144
 673-399-637
 174-950-840
 868-852-186

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 487.00	USD 589.00	USD 823.00
6 mm	USD 574.00	USD 713.00	USD 1025.00
8 mm	USD 662.00	USD 840.00	USD 1231.00
10 mm	USD 751.00	USD 969.00	USD 1443.00
15 mm	USD 967.00	USD 1277.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000264

Thickness **0.03mm**
 Temper **As Rolled**

Purity **99.95%**

Sizes LT

Web Code
 950-766-257

Size	Quantity	
	1pc	2pcs
150 x 150 mm	USD 1483.00	USD 2779.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000262

Thickness **0.047mm**
 Temper **As Rolled**

Purity **99.95%**

Size

Web Code
 863-580-774
 947-589-916
 448-749-957

Size	Quantity			
	1pc	2pcs	5pcs	10pcs
25 x 25 mm	USD 515.00	USD 664.00	USD 959.00	POA
50 x 50 mm	USD 864.00	USD 1399.00	POA	
100 x 100 mm	POA			

Disks

Web Code
 718-212-121
 776-520-183
 065-019-903
 127-494-638
 936-834-709

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 531.00	USD 651.00	USD 924.00
6 mm	USD 640.00	USD 809.00	USD 1180.00
8 mm	USD 752.00	USD 970.00	USD 1444.00
10 mm	USD 865.00	USD 1133.00	USD 2004.00
15 mm	USD 1136.00	USD 1724.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000272

Thickness **0.075mm**
 Temper **As Rolled**

Purity **99.95%**

Size

Web Code
 621-604-093
 898-382-203
 946-325-769

Size	Quantity		
	1pc	2pcs	5pcs
25 x 25 mm	USD 348.00	USD 535.00	POA
50 x 50 mm	USD 864.00	POA	
100 x 100 mm	POA		

Disks

Web Code
 389-188-297
 250-184-228
 791-370-072
 909-210-234
 540-308-881

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 445.00	USD 521.00	USD 748.00
6 mm	USD 501.00	USD 629.00	USD 1109.00
8 mm	USD 571.00	USD 832.00	USD 1615.00
10 mm	USD 701.00	USD 1092.00	USD 2265.00
15 mm	USD 1125.00	USD 1940.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000276

Thickness **0.1mm**
 Purity **99.95%**

Coil width **2mm**
 Temper **As Rolled**

Coil

Web Code
 620-677-206
 066-128-476
 431-482-803
 402-845-030

Length	Quantity	
	1 Reel	
0.05 m	USD 266.00	
0.1 m	USD 310.00	
0.2 m	USD 390.00	
0.5 m	USD 733.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

Metal – Palladium

Palladium

Pd



Foil

PD000275 Thickness **0.1mm** Purity..... **99.95%**
 Temper **As Rolled**

Size	Quantity		
	1pc	2pcs	5pcs
Web Code 671-051-111 958-638-216 515-484-184	25 x 25 mm 50 x 50 mm 100 x 100 mm	USD 405.00 USD 1178.00 POA	USD 675.00 POA POA

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000278 Thickness **0.1mm** High Purity **99.99+%**
 Temper **As Rolled**

Size	Quantity	
	1pc	2pcs
Web Code 487-983-761 625-712-364	25 x 25 mm 50 x 50 mm	USD 757.00 USD 1065.00 USD 1267.00

Typical Analysis : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.

PD000280 Thickness **0.125mm** Purity..... **99.99+%**
 Temper **As Rolled**

Size	Quantity	
	1pc	2pcs
Web Code 425-270-664 158-828-244	25 x 25 mm 50 x 50 mm	USD 817.00 USD 1150.00 USD 1387.00

Typical Analysis : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.

PD000290 Thickness **0.125mm** Purity..... **99.95%**
 Temper **As Rolled**

Size	Quantity			
	1pc	2pcs	5pcs	10pcs
Web Code 059-904-859 687-590-619 948-829-550 603-692-289	10 x 10 mm 25 x 25 mm 50 x 50 mm 100 x 100 mm	USD 291.00 USD 453.00 USD 1216.00 POA	USD 351.00 USD 715.00 POA POA	USD 488.00 POA POA POA

Diameter	Quantity		
	10 disks	20 disks	50 disks
Web Code 690-956-274 369-533-980 191-746-428 968-306-350 038-288-321	4 mm 6 mm 8 mm 10 mm 15 mm	USD 651.00 USD 742.00 USD 837.00 USD 1022.00 USD 1658.00	USD 920.00 USD 1063.00 USD 1366.00 USD 1757.00 USD 3028.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000300 Thickness **0.25mm** Purity..... **99.95%**
 Temper **As Rolled**

Size	Quantity	
	1pc	2pcs
Web Code 255-473-514 934-197-928 774-738-841	25 x 25 mm 50 x 50 mm 100 x 100 mm	USD 699.00 POA POA

Diameter	Quantity		
	10 disks	20 disks	50 disks
Web Code 842-351-926 293-991-580 748-941-364 617-666-571 208-316-000	4 mm 6 mm 8 mm 10 mm 15 mm	USD 727.00 USD 870.00 USD 1173.00 USD 1563.00 USD 2835.00	USD 1030.00 USD 1453.00 USD 2060.00 USD 2840.00 USD 5384.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000310 Thickness **0.25mm** High Purity **99.99+%**
 Temper **As Rolled**

Size	Quantity	
	1pc	2pcs
Web Code 938-482-605 310-331-124	25 x 25 mm 50 x 50 mm	USD 872.00 POA

Diameter	Quantity		
	10 disks	20 disks	50 disks
Web Code 791-398-523 924-818-790 602-345-331 293-174-394	4 mm 6 mm 8 mm 10 mm	USD 768.00 USD 1001.00 USD 1406.00 USD 1927.00	USD 1136.00 USD 1715.00 USD 2525.00 USD 1921.00

Typical Analysis : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.

Metal – Palladium

Palladium

Pd



Foil

PD000350 Thickness **0.50mm** Purity **99.95%**
 Temper **As Rolled**

Size

Web Code
 876-038-913
 849-235-561
 154-444-021

Size	Quantity	
	1pc	2pcs
10 x 10 mm	USD 399.00	POA
25 x 25 mm	POA	
50 x 50 mm	POA	

Disks

Web Code
 188-750-982
 593-869-998
 233-746-612
 218-327-474

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 837.00	USD 1366.00	USD 2498.00
6 mm	USD 1260.00	USD 2233.00	
8 mm	USD 1867.00	USD 3447.00	
10 mm	USD 2647.00		

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000351 Thickness **0.50mm** High Purity **99.99+%**
 Temper **As Rolled**

Size

Web Code
 353-735-516
 174-784-459

Size	Quantity	
	1pc	2pcs
10 x 10 mm	USD 476.00	POA
25 x 25 mm	POA	

Typical Analysis : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.

PD000360 Thickness **0.60mm** Purity **99.95%**
 Temper **As Rolled**

Size

Web Code
 884-188-854
 805-164-040
 010-350-329

Size	Quantity	
	1pc	2pcs
10 x 10 mm	USD 419.00	POA
25 x 25 mm	POA	
50 x 50 mm	POA	

Disks

Web Code
 063-657-417
 720-463-020
 093-507-829
 341-859-337

Diameter	Quantity		
	10 disks	20 disks	50 disks
4 mm	USD 896.00	USD 1505.00	USD 2844.00
6 mm	USD 1416.00	USD 2545.00	
8 mm	USD 2144.00	USD 4002.00	
10 mm	USD 3080.00		

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000375 Thickness **1.0mm** Purity **99.95%**
 Temper **As Rolled**

Size

Web Code
 116-490-902
 933-030-083
 190-955-984

Size	Quantity	
	1pc	
10 x 10 mm	POA	
25 x 25 mm	POA	
50 x 50 mm	POA	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD000376 Thickness **1.0mm** Purity **99.99+%**
 Temper **As Rolled**

Size

Web Code
 496-268-833
 605-971-200

Size	Quantity	
	1pc	
25 x 25 mm	POA	
50 x 50 mm	POA	

Typical Analysis : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.

PD000500 Thickness **2.0mm** Purity **99.95%**
 Temper **As Rolled**

Size

Web Code
 891-115-500
 389-444-916

Size	Quantity	
	1pc	
25 x 25 mm	POA	
50 x 50 mm	POA	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

Metal – Palladium

Palladium

Pd



Sputtering Target

PD009202	Thickness 0.25mm	Purity 99.95%
Size		Quantity
Web Code	Disk diam.	1disk
774-869-238	50 mm	POA
080-660-226	54 mm	POA
480-026-005	57 mm	POA
264-199-905	60 mm	POA

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.
 These targets are normally available for immediate shipment from stock. Other sizes are available to special order.

PD009205	Thickness 0.5mm	Purity 99.95%
Size		Quantity
Web Code	Disk diam.	1disk
122-219-748	25 mm	POA
997-568-487	50 mm	POA

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.
 These targets are normally available for immediate shipment from stock. Other sizes are available to special order.

PD009206	Thickness 1.0mm	Purity 99.95%
Size		Quantity
Web Code	Disk diam.	1disk
999-409-118	25 mm	POA
636-354-074	50 mm	POA

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.
 These targets are normally available for immediate shipment from stock. Other sizes are available to special order.

PD009300	Thickness 3mm	Purity 99.95%
Size		Quantity
Web Code	Disk diam.	1disk
570-186-071	10 mm	POA
786-146-796	25 mm	POA
324-785-761	50 mm	POA

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.
 These targets are normally available for immediate shipment from stock. Other sizes are available to special order.



Wire

PD005110	Diameter 0.02mm	Purity 99.95%
	Temper As Drawn	
Length		Quantity
Web Code	Length	1 Reel
063-232-954	0.5 m	USD 383.00
887-448-430	1 m	USD 465.00
931-055-471	2 m	USD 580.00
381-929-350	5 m	USD 843.00

Typical Analysis : Ag 5, Ca 30, Cu 10, Fe 30, Mg 30.

PD005113	Diameter 0.025mm	Purity 99.9%
	Temper As Drawn	
Length		Quantity
Web Code	Length	1 Reel
765-729-400	1 m	USD 287.00
021-787-611	2 m	USD 343.00
716-181-934	5 m	USD 454.00
522-738-520	10 m	USD 579.00
375-972-363	20 m	USD 757.00

Typical Analysis : Ag <10, Au <20, B <50, Cu <10, Fe <50, Mg <10, Pb <10, Pt <100.

PD005114	Diameter 0.04mm	Purity 99.95%
	Temper As Drawn	
Length		Quantity
Web Code	Length	1 Reel
659-414-215	1 m	USD 262.00

Typical Analysis : Ag 5, Ca 30, Cu 10, Fe 30, Mg 30.

Metal – Palladium

Palladium

Pd



Wire

PD005116	Diameter 0.05mm	Purity 99.9%
	Temper As Drawn	
	Length	Quantity
	Web Code	Length 1 Reel
	384-323-360	0.5 m USD 167.00
	040-414-039	1 m USD 197.00
	051-761-222	5 m USD 336.00
	470-157-937	10 m USD 455.00
	899-443-307	20 m USD 688.00

Typical Analysis : Ag <10, Au <20, B <50, Cu <10, Fe <50, Mg <10, Pb <10, Pt <100.

PD005120	Diameter 0.125mm	Purity 99.95%
	Temper Hard	
	Length	Quantity
	Web Code	Length 1 Reel
	217-576-190	0.1 m USD 163.00
	197-015-035	0.5 m USD 222.00
	626-877-956	1 m USD 266.00
	359-743-561	5 m USD 452.00
	967-944-098	25 m USD 921.00
	993-003-711	50 m USD 1727.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD005140	Diameter 0.25mm	High Purity 99.99+%
	Temper As Drawn	
	Length	Quantity
	Web Code	Length 1 Reel
	517-247-845	0.1 m USD 225.00
	655-981-712	0.2 m USD 276.00
	997-712-613	0.5 m USD 378.00
	714-076-507	1 m USD 493.00
	259-569-175	2 m USD 692.00

Typical Analysis : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.

PD005130	Diameter 0.25mm	Purity 99.95%
	Temper Hard	
	Length	Quantity
	Web Code	Length 1 Reel
	125-465-812	0.1 m USD 229.00
	807-132-128	0.2 m USD 268.00
	683-231-812	0.5 m USD 345.00
	403-983-523	1 m USD 432.00
	497-943-171	2 m USD 702.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD005146	Diameter 0.5mm	Purity 99.95%
	Temper As Drawn	
	Length	Quantity
	Web Code	Length 1 Reel
	226-602-649	0.1 m USD 241.00
	021-763-323	0.2 m USD 286.00
	070-757-735	0.5 m USD 377.00
	844-717-231	1 m USD 609.00
	589-660-379	2 m USD 1069.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD005150	Diameter 1.0mm	Purity 99.95%
	Temper Hard	
	Length	Quantity
	Web Code	Length 1 Reel
	613-981-973	0.05 m USD 315.00
	343-397-870	0.1 m USD 406.00
	924-726-883	0.2 m USD 660.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD005154	Diameter 1.0mm	High Purity 99.98%
	Temper As Drawn	
	Length	Quantity
	Web Code	Length 1 Reel
	560-928-007	0.05 m USD 395.00
	917-536-903	0.1 m USD 528.00
	772-671-559	0.2 m USD 888.00

Typical Analysis : Ag 20, Au 5, Ca 10, Cu 10, Ir 5, Pt 40, Rh 20, Si 10.

Metal – Palladium

Palladium

Pd



Wire

PD005155 Diameter **1.0mm** High Purity **99.99+%**
 Temper **As Drawn**

Length	Quantity
Web Code	Length 1 Reel
798-628-337	0.05 m USD 428.00

Typical Analysis : Ag 2, Ca < 1, Cu 1, Fe 2, Mg < 1, Pt 2, Si 2.



Rod

PD007920 Diameter **2.0mm** Purity **99.95%**

Size	Quantity
Web Code	Length 1pc 2pcs 5pcs
702-444-341	10 mm USD 316.00 USD 402.00 USD 651.00
948-838-228	25 mm USD 386.00 USD 585.00 USD 1179.00
894-514-892	50 mm USD 548.00 USD 937.00
814-351-465	100 mm USD 901.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD007925 Diameter **3.0mm** Purity **99.95%**

Size	Quantity
Web Code	Length 1pc
371-516-702	10 mm POA
840-367-315	25 mm POA
720-430-519	50 mm POA
740-633-035	100 mm POA

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD007940 Diameter **4.0mm** Purity **99.95%**

Size	Quantity
Web Code	Length 1pc
340-728-157	25 mm POA
198-451-203	50 mm POA
806-407-169	100 mm POA

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD007950 Diameter **6.0mm** Purity **99.95%**

Size	Quantity
Web Code	Length 1pc
731-526-485	10 mm POA
682-725-887	25 mm POA
900-546-590	50 mm POA

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.



Tube

PD007100 Outside Diameter **1.0mm** Wall Thickness **0.1mm**
 Inside Diameter **0.8mm** Purity **99.95%**
 Temper **As Drawn**

Size	Quantity
Web Code	Length 1pc 2pcs 5pcs
750-934-200	25 mm USD 497.00 USD 654.00 USD 951.00
390-949-045	50 mm USD 642.00 USD 859.00
865-332-307	100 mm USD 846.00 USD 1361.00
166-547-650	200 mm USD 1348.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD007130 Outside Diameter **1.59mm** Wall Thickness **0.45mm**
 Inside Diameter **0.69mm** Purity **99.95%**
 Temper **As Drawn**

Size	Quantity
Web Code	Length 1pc 2pcs 5pcs
765-326-765	25 mm USD 541.00 USD 715.00 USD 1109.00
577-597-997	50 mm USD 702.00 USD 943.00
219-832-502	100 mm USD 930.00 USD 1659.00
104-851-213	200 mm USD 1646.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

Metal – Palladium

Palladium

Pd



Tube

PD007150

Outside Diameter..... **2.0mm**
 Inside Diameter..... **1.6mm**
 Temper..... **As Drawn**

Wall Thickness..... **0.2mm**
 Purity..... **99.95%**

Size

Web Code
 100-172-894
 506-836-310
 351-963-303
 995-419-856

Length	Quantity		
	1pc	2pcs	5pcs
25 mm	USD 491.00	USD 645.00	USD 934.00
50 mm	USD 632.00	USD 844.00	
100 mm	USD 831.00	USD 1301.00	
200 mm	USD 1288.00		

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD007250

Outside Diameter..... **5.0mm**
 Inside Diameter..... **4.4mm**
 Temper..... **As Drawn**

Wall Thickness..... **0.3mm**
 Purity..... **99.95%**

Size

Web Code
 752-919-367
 414-906-599
 863-321-472

Length	Quantity				
	1pc	2pcs	5pcs	10pcs	20pcs
25 mm	USD 535.00	USD 792.00			
50 mm	USD 778.00	USD 1402.00			
100 mm	USD 1389.00				

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD007260

Outside Diameter..... **6mm**
 Inside Diameter..... **5mm**
 Temper..... **As Drawn**

Wall Thickness..... **0.5mm**
 Purity..... **99.95%**
 Condition..... **Half-round Closed At One End**

Size

Web Code
 064-243-989

Length	Quantity
1pc	
120 mm	USD 2383.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD007265

Outside Diameter..... **6.6mm**
 Inside Diameter..... **6.35mm**
 Temper..... **As Drawn**

Wall Thickness..... **0.125mm**
 Purity..... **99.95%**

Size

Web Code
 887-380-269
 856-631-092
 019-498-896

Length	Quantity	
	1pc	2pcs
50 mm	USD 493.00	USD 833.00
100 mm	USD 819.00	USD 1484.00
200 mm	USD 1470.00	

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.



Powder

PD006016

Max. Particle size **3micron**

Purity..... **99.95%**



Web Code
 617-922-293
 923-815-754

Weight	Quantity
	1 Pot
1 g	USD 458.00
2 g	USD 788.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD006015

Max. Particle size **10micron**

Purity..... **99.95%**



Web Code
 050-036-937
 310-341-356

Weight	Quantity
	1 Pot
1 g	USD 421.00
2 g	USD 715.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

PD006012

Max. Particle size **150micron**

Purity..... **99.95%**



Web Code
 360-230-158
 094-717-865

Weight	Quantity
	1 Pot
1 g	USD 421.00
2 g	USD 715.00

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.

Metal – Palladium

Palladium

Pd



Lump

PD006100 Max. Lump size **6mm** Purity **99.95%**

Web Code	Quantity	Weight	1 Pot
277-492-349		2 g	POA
084-342-349		4 g	POA
171-797-574		6 g	POA

Typical Analysis : Ag 50, Al 1, Ca 1, Cu 10, Fe 10, Mg 1, Na 1, Pb 10, Pt 40, Rh 20, Si 20.
 Nominally 6mm diameter x 6mm length pellets.

PD006101 Max. Lump size **6mm** High Purity **99.99+ %**

Web Code	Quantity	Weight	1 Pot
484-598-316		2 g	POA
536-592-330		4 g	POA
333-014-040		6 g	POA

Typical Analysis : Ag 2, Ca <1, Cu 1, Fe 2, Mg <1, Pt 2, Si 2.
 Nominally 6mm diameter x 6mm length pellets.



Single Crystal

PD002121 Oriented **(100)** Thickness **2mm**
 Diameter **10mm** Surface Finish **Polished On One Side To 1 Micron**

Web Code	Quantity	1pc
744-475-457		USD POA

PD002120 Oriented **(100)** Thickness **2mm**
 Diameter **10mm** Condition **Unpolished**

Web Code	Quantity	1pc
266-965-485		USD POA

PD002131 Oriented **(111)** Thickness **2mm**
 Diameter **10mm** Surface Finish **Polished On One Side To 1 Micron**

Web Code	Quantity	1pc
001-853-967		USD POA

PD002130 Oriented **(111)** Thickness **2mm**
 Diameter **10mm** Condition **Unpolished**

Web Code	Quantity	1pc
720-230-484		USD POA

Metal – Palladium

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