

Goodfellow

Serving The Needs of Science and Industry Worldwide

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

Weltweiter Lieferant für Wissenschaft und Industrie

Metals and Alloys
Métaux et Alliages
Metalle und Legierungen

Ceramics
Céramiques
Keramiken

Polymers
Polymères
Polymere

Composites
Composites
Verbundwerkstoffe



Goodfellow Cambridge Limited

Ermine Business Park
HUNTINGDON
PE29 6WR
England

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

Goodfellow Corporation

125 Hookstown Grade Road
Coraopolis, PA 15108-9302
USA

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

Goodfellow SARL

229, rue Solférino
F-59000 Lille
France

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

Goodfellow GmbH

Am Edelspfad 4
D-61169 Friedberg
Germany

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

Goodfellow (Shanghai) Trading Co., Ltd

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

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

Standard Price List for Polyimide

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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 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.

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 Catalogue 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 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

Product Descriptions



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-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 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.

Order information

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

Order information

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

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

Goodfellow Corporation

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

Goodfellow SARL

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

Goodfellow GmbH

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

Goodfellow (Shanghai) Trading Co., Ltd

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

Conditions of Sale

1 GENERAL

1.1 In these Conditions:

1.1.1 the following expressions shall have the following meanings:-

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

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

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

2 ORDERS

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

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

3 DESCRIPTION

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

4 SPECIFICATIONS AND INTELLECTUAL PROPERTY

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

5 QUOTATIONS

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

6 PRICE

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

7 DELIVERY

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

Conditions of Sale

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

and/or

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

Conditions of Sale

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

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

13 CONSUMER SALES

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

14 TITLE TO GOODS

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

15 RISK AND INSURANCE

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

16 EXPORT TERMS

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

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

- 16.2 Where the Goods are supplied for export from the United Kingdom then unless otherwise agreed in writing between the Buyer and the Seller
- 16.2.1 the provisions of Incoterms shall (subject to any special terms agreed in writing between the Buyer and the Seller) apply but if there is any conflict between the provisions of Incoterms and these Conditions, the latter shall prevail.
- 16.2.2 the Buyer shall be responsible for complying with any legislation or regulations governing the importation of the Goods into the country of destination and (save in respect of the United States of America, Canada and Japan) for the payment of any duties and taxes thereon unless payment for these is included in the Contract
- 16.2.3 the Buyer shall be deemed to have satisfied itself that such Goods comply with the safety regulations of any country or state in which the Goods are to be used outside the United Kingdom and the Buyer shall indemnify and keep indemnified the Seller in full for any loss or damage whatsoever which the Seller may incur if such Goods do not comply with such safety regulations
- 16.3 The Goods shall not be used in any country other than that for which the Seller was aware they were originally ordered without the Seller's consent in writing
- 16.4 The Buyer undertakes not to offer the Goods for resale in any country notified by the Seller at or before the time the Buyer's order is placed, or to sell the Goods to any person if the Buyer knows or has reason to believe that person intends to resell the Goods in any such country

17 BUYER'S WARRANTIES

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

18 SEVERANCE

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

19 JURISDICTION

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

20 NOTICES

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

21 WAIVER

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

Polyimide

PI

Common Brand Names : Kapton, Kinel, Upilex, Upimol, Vespel

Physical Properties

Density	1.42 g cm ⁻³
Flammability	V0
Limiting oxygen index	53 %
Radiation resistance	Good
Refractive index	1.66
Resistance to Ultra-violet	Poor
Water absorption - over 24 hours	0.2-2.9 %

Electrical Properties

Dielectric constant @1MHz	3.4
Dielectric strength	22 kV mm ⁻¹
Dissipation factor @ 1kHz	0.0018
Surface resistivity	10 ¹⁶ Ohm/sq
Volume resistivity	10 ¹⁸ Ohmcm

Thermal Properties

Coefficient of thermal expansion	30-60 x10 ⁻⁶ K ⁻¹
Heat-deflection temperature - 1.8MPa	360 C
Lower working temperature	-270 C
Specific heat	1090 J K ⁻¹ kg ⁻¹
Thermal conductivity @23C	0.10-0.35 W m ⁻¹ K ⁻¹
Upper working temperature	250-320 C

Mechanical Properties

Coefficient of friction	0.42
Elongation at break	8-70 %
Hardness - Rockwell	E52-99
Izod impact strength	80 J m ⁻¹
Tensile modulus	2.0-3.0 GPa
Tensile strength	70-150 MPa

Chemical Resistance

Acids - concentrated	Poor
Acids - dilute	Fair
Alcohols	Poor
Alkalis	Poor
Aromatic hydrocarbons	Good
Greases and Oils	Good
Halogenated Hydrocarbons	Good
Halogens	Fair
Ketones	Good



Film

Material		HN	CB	MT	MTB	CR	XC	KJ
Coefficient of thermal expansion	x10 ⁻⁶ K ⁻¹	20						60
Corona Resistance @ 20kV mm ⁻¹ 50 Hz	hr	200				> 100,000		
Density	g cm ⁻³	1.42	1.42	1.85	1.85	1.54	1.42	1.36
Dielectric Constant @ 1kHz		3.4	4.5	4.2	4.2	3.9		3.4
Dielectric Constant @ 1MHz		3.4						
Dielectric Strength @25µm thick	kV mm ⁻¹	300	80	165	70 @ 0.075mm	290		200
Dissipation Factor @1kHz		0.0018	0.19			0.003		0.0016
Dissipation Factor @1MHz		0.01						
Elongation at Break	%	70	45	50-60	50-60	45	20-30	150
Initial Tear Strength	g µm ⁻¹	20						
Moisture absorption	%	2.8		3	3			1
Permeability to Carbon Dioxide @25C	x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹	0.5						
Permeability to Hydrogen @25C	x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹	1						
Permeability to Nitrogen @25C	x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹	0.03						
Permeability to Oxygen @25C	x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹	0.1						
Permeability to Water @25C	x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹	400						
Permeability to Water @38C	x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹	500						
Shrinkage @400C	%	1.2-1.5	1	1	1	0.6		
Surface Resistivity	Ohm/sq					3.6x10 ¹⁶	50-1x10 ⁹	
Tensile modulus	GPa	2.5	2.7	4	4	3.2	3.3-3.6	2.7
Tensile strength	MPa	230	135	125	125	150	110-120	135
Thermal Conductivity @23C	W m ⁻¹ K ⁻¹	0.16		0.45	0.45	0.38	0.12	
Volume Resistivity	Ohmcm	1.5x10 ¹⁷	10 ¹³	10 ¹⁴	10 ¹⁴	2.3x10 ¹⁶		2.5x10 ¹⁷

IM301080 Thickness 0.008mm Grade DuPont™ Kapton® HN

Size

Web Code
 961-936-593
 242-074-656
 259-337-321

	Quantity			
Size	1pc	2pcs	5pcs	10pcs
100 x 100 mm	YEN 22200	YEN 26000	YEN 33600	YEN 42800
150 x 150 mm	YEN 26400	YEN 32000	YEN 44400	
300 x 300 mm	YEN 39200	YEN 61500		

Coil

Web Code
 417-174-269

Width 300mm	Quantity
Length	1 Reel
0.5 m	YEN 57000

IM301130 Thickness 0.013mm Grade DuPont™ Kapton® HN

Size

Web Code
 488-784-989
 098-121-233
 370-499-680

	Quantity				
Size	1pc	2pcs	5pcs	10pcs	20pcs
100 x 100 mm	YEN 19500	YEN 21800	YEN 26400	YEN 32000	YEN 40800
150 x 150 mm	YEN 21800	YEN 25200	YEN 31800	YEN 39600	YEN 51500
295 x 300 mm	YEN 29000	YEN 35200	YEN 47600	YEN 62000	

Coil

Web Code
 144-902-222
 112-776-595
 097-063-054
 132-881-695

Width 295mm	Quantity
Length	1 Reel
0.5 m	YEN 36200
1 m	YEN 44200
2 m	YEN 55500
3 m	YEN 64500

Polymer – Polyimide

Polyimide

PI



Film

IM301202

Thickness **0.025mm** Coil width **20mm**
 Adhesive coated tape **Total thickness : 0.06mm**

Coil	Width 20mm	Quantity
Web Code	Length	1 Reel
981-467-720	1 rolls	YEN 24600
683-465-793	2 rolls	YEN 35800
206-874-075	5 rolls	YEN 70000
822-301-172	10 rolls	YEN 127000
131-677-944	20 rolls	YEN 240000

Supplied in rolls of length 33m only.

IM301214

Thickness **0.025mm** Colour **Black**
 Grade **DuPont™ Kapton® CB**

Size	Quantity
Web Code	1pc 2pcs 5pcs 10pcs
585-298-740	100 x 100 mm YEN 21800 YEN 25600 YEN 33200 YEN 47400
162-338-367	150 x 150 mm YEN 26000 YEN 31600 YEN 50000
292-294-539	300 x 300 mm YEN 42000 YEN 71000

IM301212

Thickness **0.025mm** Grade **DuPont™ Kapton® CR**

Size	Quantity
Web Code	1pc 2pcs 5pcs 10pcs
869-726-970	100 x 100 mm YEN 17200 YEN 19000 YEN 22800 YEN 27400
061-163-296	250 x 250 mm YEN 22800 YEN 26800 YEN 35200

Coil	Width 500mm	Quantity
Web Code	Length	1 Reel
830-022-726	0.5 m	YEN 35000
752-839-152	1 m	YEN 43000
104-889-773	2 m	YEN 54500

IM301210

Thickness **0.025mm** Grade **DuPont™ Kapton® MT**

Size	Quantity
Web Code	1pc 2pcs 5pcs 10pcs
152-452-434	100 x 100 mm YEN 17400 YEN 19300 YEN 23400 YEN 28200
056-556-303	150 x 150 mm YEN 19400 YEN 22200 YEN 27800
069-542-173	300 x 300 mm YEN 25400 YEN 30600
692-770-123	600 x 600 mm YEN 37400

Coil	Width 600mm	Quantity
Web Code	Length	1 Reel
596-270-097	0.5 m	YEN 38200
533-751-602	1 m	YEN 47600
718-957-856	2 m	YEN 60500

IM301200

Thickness **0.025mm** Grade **DuPont™ Kapton® HN**

Size	Quantity
Web Code	1pc 2pcs 5pcs 10pcs 20pcs
424-896-921	100 x 100 mm YEN 16900 YEN 18600 YEN 22200 YEN 26600 YEN 33600
112-113-102	150 x 150 mm YEN 18600 YEN 21000 YEN 26000 YEN 32000 YEN 41200
014-138-182	300 x 300 mm YEN 23800 YEN 28200 YEN 37400 YEN 48200

Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
767-262-661	0.5 m	YEN 35400
907-825-786	1 m	YEN 43600
478-214-959	2 m	YEN 55000
776-865-210	5 m	YEN 78500

IM301215

Thickness **0.025mm** Colour **Black**
 Grade **DuPont™ Kapton® B**

Size	Quantity
Web Code	1pc 2pcs 5pcs 10pcs 20pcs
574-770-116	100 x 100 mm YEN 16900 YEN 18500 YEN 22000 YEN 26400 YEN 33200
533-631-343	150 x 150 mm YEN 18500 YEN 20800 YEN 25800 YEN 31600
565-637-134	300 x 300 mm YEN 23600 YEN 28000 YEN 44000

Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
074-952-180	0.5 m	YEN 36600
041-463-649	1 m	YEN 57000
421-516-432	2 m	YEN 97500
991-046-542	5 m	YEN 219000

Polymer – Polyimide

Polyimide

PI



Film

IM301301	Thickness 0.05mm	Grade Upilex S
Size	Quantity	
Web Code	Size	1pc 2pcs 5pcs 10pcs 20pcs
508-850-953	100 x 100 mm	YEN 15500 YEN 17000 YEN 20400 YEN 24600 YEN 31400
730-358-737	250 x 250 mm	YEN 20200 YEN 23800 YEN 31200 YEN 39800 YEN 53000
289-903-234	500 x 500 mm	YEN 28400 YEN 35200 YEN 49200 YEN 71000
Coil	Width 500mm	Quantity
Web Code	Length	1 Reel
179-135-287	0.5 m	YEN 30600
506-758-899	1 m	YEN 37400
307-216-097	2 m	YEN 47200
278-687-868	5 m	YEN 72500

IM301303	Thickness 0.05mm	Grade DuPont™ Kapton® 200RS100
Size	Quantity	
Web Code	Size	1pc 2pcs 5pcs 10pcs 20pcs
980-936-273	100 x 100 mm	YEN 17800 YEN 20400 YEN 31200 YEN 50500 YEN 89500
855-426-112	140 x 140 mm	YEN 20000 YEN 26600 YEN 48800 YEN 85500 YEN 159000
808-591-784	280 x 280 mm	YEN 40600 YEN 69500 YEN 155000 YEN 299000
Coil	Width 534mm	Quantity
Web Code	Length	1 Reel
661-731-264	0.5 m	YEN 111000
886-959-833	1 m	YEN 209000
521-339-817	2 m	YEN 403000

IM301300	Thickness 0.05mm	Grade DuPont™ Kapton® HN
Size	Quantity	
Web Code	Size	1pc 2pcs 5pcs 10pcs 20pcs
790-504-491	100 x 100 mm	YEN 15600 YEN 17200 YEN 20800 YEN 25200 YEN 32200
813-060-083	150 x 150 mm	YEN 17300 YEN 19600 YEN 24600 YEN 30600 YEN 39800
632-508-488	300 x 300 mm	YEN 22400 YEN 27000 YEN 36000 YEN 47000
Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
063-555-158	0.5 m	YEN 33400
944-389-292	1 m	YEN 41400
048-653-849	2 m	YEN 59500
081-729-419	5 m	YEN 127000

IM301305	Thickness 0.050mm	Grade DuPont™ Kapton® FPC
Size	Quantity	
Web Code	Size	1pc 2pcs 5pcs 10pcs 20pcs
404-034-276	100 x 100 mm	YEN 14500 YEN 16400 YEN 20400 YEN 25200 YEN 33000
477-666-280	150 x 150 mm	YEN 16500 YEN 19200 YEN 24800 YEN 31400 YEN 43400
584-677-965	300 x 300 mm	YEN 22400 YEN 27600 YEN 39600 YEN 69000
Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
905-235-931	0.5 m	YEN 35800
101-694-909	1 m	YEN 52500
739-559-206	2 m	YEN 91000

IM301304	Thickness 0.050mm	Grade DuPont™ Kapton® B	Colour Black
Size	Quantity		
Web Code	Size	1pc 2pcs 5pcs 10pcs 20pcs	
079-662-558	100 x 100 mm	YEN 18500 YEN 20800 YEN 25600 YEN 31400 YEN 47400	
192-871-532	150 x 150 mm	YEN 21000 YEN 24400 YEN 31200 YEN 48600	
341-903-008	300 x 300 mm	YEN 28400 YEN 40000 YEN 80000	
Coil	Width 610mm	Quantity	
Web Code	Length	1 Reel	
761-460-045	0.5 m	YEN 61000	
046-914-156	1 m	YEN 106000	
916-202-554	2 m	YEN 195000	
539-071-277	5 m	YEN 462000	

IM301402	Thickness 0.075mm	Grade DuPont™ Kapton® MT	
Size	Quantity		
Web Code	Size	1pc 2pcs 5pcs 10pcs 20pcs	
434-036-551	150 x 150 mm	YEN 18800 YEN 22200 YEN 29400 YEN 37800 YEN 50500	
215-398-082	300 x 300 mm	YEN 26600 YEN 33200 YEN 46800 YEN 74000	
Coil	Width 610mm	Quantity	
Web Code	Length	1 Reel	
125-227-328	0.5 m	YEN 42600	
515-809-867	1 m	YEN 55000	
240-866-062	2 m	YEN 96500	

Polymer – Polyimide

Polyimide

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Film

IM301400	Thickness	0.075mm	Grade	DuPont™ Kapton® HN				
	Size			Quantity				
	Web Code			1pc	2pcs	5pcs	10pcs	20pcs
	192-062-220	100 x 100 mm	YEN 14800	YEN 16600	YEN 20400	YEN 25200	YEN 32600	YEN 41000
	007-779-441	150 x 150 mm	YEN 16700	YEN 19300	YEN 24600	YEN 31200	YEN 39000	YEN 49000
	972-434-764	300 x 300 mm	YEN 22400	YEN 27200	YEN 37400	YEN 49000		
	Coil	Width 610mm		Quantity				
	Web Code	Length	1 Reel					
	554-345-394	0.5 m	YEN 34800					
	293-162-926	1 m	YEN 43600					
	645-363-309	2 m	YEN 57000					
	670-421-666	5 m	YEN 121000					

IM301403	Thickness	0.075mm	Grade	DuPont™ Kapton® FPC				
	Size			Quantity				
	Web Code			1pc	2pcs	5pcs	10pcs	20pcs
	817-548-474	100 x 100 mm	YEN 14500	YEN 16400	YEN 20400	YEN 25200	YEN 33000	YEN 43400
	842-849-166	150 x 150 mm	YEN 16500	YEN 19200	YEN 24800	YEN 31600	YEN 40000	YEN 51000
	401-826-891	300 x 300 mm	YEN 22400	YEN 27600	YEN 39600	YEN 50000		
	Coil	Width 610mm		Quantity				
	Web Code	Length	1 Reel					
	121-919-705	0.5 m	YEN 35800					
	564-423-155	1 m	YEN 52500					
	670-246-944	2 m	YEN 91000					

IM301404	Thickness	0.075mm	Grade	DuPont™ Kapton® B				
			Colour	Black				
	Size			Quantity				
	Web Code			1pc	2pcs	5pcs	10pcs	20pcs
	550-930-911	100 x 100 mm	YEN 19600	YEN 22400	YEN 28200	YEN 35000	YEN 45000	YEN 53500
	996-670-295	150 x 150 mm	YEN 22600	YEN 26600	YEN 35000	YEN 45000		
	586-950-704	300 x 300 mm	YEN 31800	YEN 45400	YEN 93500			
	Coil	Width 610mm		Quantity				
	Web Code	Length	1 Reel					
	653-794-485	0.5 m	YEN 70000					
	437-836-890	1 m	YEN 124000					
	433-710-646	2 m	YEN 231000					
	193-196-546	5 m	YEN 553000					

IM301414	Thickness	0.075mm	Grade	DuPont™ Kapton® KJ				
	Size			Quantity				
	Web Code			1pc	2pcs			
	999-236-863	100 x 100 mm	YEN 32200	YEN 40400				
	904-602-786	150 x 150 mm	YEN 41600	YEN 61500				
	685-742-688	200 x 200 mm	YEN 56000					

IM301449	Thickness	0.125mm	Grade	DuPont™ Kapton® HPP-ST				
	Size			Quantity				
	Web Code			1pc	2pcs	5pcs	10pcs	20pcs
	385-588-638	100 x 100 mm	YEN 15900	YEN 18200	YEN 23000	YEN 28600	YEN 37600	YEN 48000
	414-143-072	150 x 150 mm	YEN 18300	YEN 21600	YEN 28400	YEN 36400	YEN 46000	YEN 58500
	031-795-279	300 x 300 mm	YEN 25600	YEN 32000	YEN 55000	YEN 99000		
	Coil	Width 317.6mm		Quantity				
	Web Code	Length	1 Reel					
	838-545-470	0.5 m	YEN 33400					
	371-208-012	1 m	YEN 44400					
	883-853-161	2 m	YEN 75000					
	490-049-736	5 m	YEN 167000					

IM301450	Thickness	0.125mm	Grade	DuPont™ Kapton® HN				
	Size			Quantity				
	Web Code			1pc	2pcs	5pcs	10pcs	20pcs
	677-930-793	100 x 100 mm	YEN 15300	YEN 17600	YEN 22400	YEN 28400	YEN 37400	YEN 48000
	741-343-802	150 x 150 mm	YEN 17800	YEN 21200	YEN 28000	YEN 36200	YEN 48400	YEN 61000
	667-985-892	300 x 300 mm	YEN 25200	YEN 31800	YEN 44800	YEN 67500	YEN 125000	YEN 155000
	Coil	Width 610mm		Quantity				
	Web Code	Length	1 Reel					
	498-229-593	0.5 m	YEN 40400					
	278-695-415	1 m	YEN 52000					
	836-928-840	2 m	YEN 88000					
	616-107-904	5 m	YEN 201000					

Polymer – Polyimide

Polyimide

PI



Film

IM301451	Thickness 0.125mm	Grade DuPont™ Kapton® FPC
Size	Quantity	
Web Code	Size	1pc 2pcs 5pcs 10pcs 20pcs
969-772-112	100 x 100 mm	YEN 16300 YEN 18700 YEN 23800 YEN 29800 YEN 39200
853-676-380	150 x 150 mm	YEN 18900 YEN 22400 YEN 29600 YEN 38200 YEN 65500
810-776-436	300 x 300 mm	YEN 26800 YEN 33600 YEN 62000 YEN 113000
Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
826-214-692	0.5 m	YEN 47600
917-863-266	1 m	YEN 81500
778-199-018	2 m	YEN 149000

IM301448	Thickness 0.125mm	Colour Black
Grade DuPont™ Kapton® B	Quantity	
Size	Size	1pc 2pcs 5pcs 10pcs 20pcs
Web Code	100 x 100 mm	YEN 21800 YEN 25400 YEN 32800 YEN 47400 YEN 81500
348-157-535	150 x 150 mm	YEN 25800 YEN 31200 YEN 50000 YEN 87000
072-855-180	300 x 300 mm	YEN 42000 YEN 70500 YEN 156000
906-448-679		
Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
638-085-555	0.5 m	YEN 113000
776-317-120	1 m	YEN 209000
095-429-101	2 m	YEN 402000
904-977-732	5 m	YEN 981000

IM301452	Thickness 0.150mm	Grade Cirlex CL
Size	Quantity	
Web Code	Size	1pc 2pcs 5pcs
215-368-830	140 x 150 mm	YEN 66000 YEN 122000 YEN 289000
964-533-771	280 x 300 mm	YEN 229000 YEN 447000

IM301455	Thickness 0.23mm	Grade Cirlex CL
Size	Quantity	
Web Code	Size	1pc 2pcs 5pcs 10pcs
644-792-025	140 x 150 mm	YEN 25200 YEN 32400 YEN 62500 YEN 115000
459-168-033	280 x 300 mm	YEN 47800 YEN 86000 YEN 200000
901-070-297	597 x 597 mm	YEN 167000 YEN 324000

IM301470	Thickness 0.5mm	Grade Upilex
Size	Quantity	
Web Code	Size	1pc 2pcs 5pcs
512-552-330	50 x 50 mm	YEN 20800 YEN 26400 YEN 38000
559-567-189	100 x 100 mm	YEN 32600 YEN 51000
172-376-959	150 x 150 mm	YEN 55000

IM301465	Thickness 0.5mm	Grade Cirlex CL
Size	Quantity	
Web Code	Size	1pc 2pcs 5pcs 10pcs
297-956-860	70 x 100 mm	YEN 24000 YEN 30600 YEN 45200 YEN 74500
349-275-009	100 x 140 mm	YEN 29200 YEN 38200 YEN 67500
882-645-706	200 x 280 mm	YEN 52000 YEN 94500 YEN 221000
162-298-646	342 x 597 mm	YEN 160000 YEN 311000



Metallised Film

IM301825	Thickness 0.025mm	Condition Metallised on one side with 30 nm Aluminium
Grade DuPont™ Kapton® HN	Quantity	
Size	Size	1pc 2pcs 5pcs 10pcs 20pcs
Web Code	150 x 150 mm	YEN 23400 YEN 27800 YEN 36800 YEN 47200 YEN 62500
362-858-911	300 x 300 mm	YEN 33400 YEN 41800 YEN 59000 YEN 81000
338-480-624	610 x 610 mm	YEN 54000 YEN 71000 YEN 149000
734-690-656		
Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
639-501-152	0.5 m	YEN 53000
578-419-045	1 m	YEN 68500
080-946-748	2 m	YEN 106000
878-914-309	5 m	YEN 240000

Polymer – Polyimide

Polyimide

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Metallised Film

IM301830	Thickness 0.050mm	Condition. Metallised on one side with 30 nm Aluminium
	Grade DuPont™ Kapton® HN	
Size		Quantity
Web Code	Size	1pc
732-945-449	150 x 150 mm	YEN 24200
332-470-872	300 x 300 mm	YEN 28800
951-098-808	610 x 610 mm	YEN 38400
		YEN 44000
		YEN 62500
		YEN 91000
		YEN 66000
		YEN 170000
Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
579-303-180	0.5 m	YEN 56000
971-033-701	1 m	YEN 72500
619-539-473	2 m	YEN 119000
384-050-666	5 m	YEN 273000

IM301835	Thickness 0.075mm	Condition. Metallised on one side with 30 nm Aluminium
	Grade DuPont™ Kapton® HN	
Size		Quantity
Web Code	Size	1pc
116-812-101	150 x 150 mm	YEN 25600
171-940-910	300 x 300 mm	YEN 31000
223-642-545	600 x 600 mm	YEN 48200
		YEN 41800
		YEN 69000
		YEN 114000
		YEN 73000
		YEN 210000
		YEN 408000
Coil	Width 620mm	Quantity
Web Code	Length	1 Reel
642-230-749	0.5 m	YEN 62000
504-363-231	1 m	YEN 84000
319-328-951	2 m	YEN 152000
159-878-537	5 m	YEN 356000

IM301840	Thickness 0.125mm	Condition. Metallised on one side with 30 nm Aluminium
	Grade DuPont™ Kapton® HN	
Size		Quantity
Web Code	Size	1pc
420-990-605	150 x 150 mm	YEN 30000
063-492-710	300 x 300 mm	YEN 37000
749-286-952	600 x 600 mm	YEN 60000
		YEN 103000
		YEN 193000
		YEN 369000
		YEN 725000
Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
320-530-700	0.5 m	YEN 77000
732-887-837	1 m	YEN 137000
378-167-022	2 m	YEN 258000
663-491-987	5 m	YEN 619000



Laminate

IM301510	Thickness 0.05mm	Polymer Thickness 0.025mm
	Backing Material 0.009mm Copper	
Size		Quantity
Web Code	Size	1pc
330-296-143	100 x 100 mm	YEN 16900
287-014-910	150 x 150 mm	YEN 19200
876-865-882	300 x 300 mm	YEN 22400
		YEN 26400
		YEN 31800
		YEN 41800
Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
608-234-814	0.5 m	YEN 36200
029-351-221	1 m	YEN 55000

IM301522	Thickness 0.06mm	Polymer Thickness 0.025mm
	Backing Material 0.018mm Copper	
Size		Quantity
Web Code	Size	1pc
178-062-593	100 x 100 mm	YEN 15900
257-817-118	150 x 150 mm	YEN 17800
227-139-823	300 x 300 mm	YEN 20200
		YEN 23200
		YEN 27400
		YEN 32200
Coil	Width 610mm	Quantity
Web Code	Length	1 Reel
392-475-447	0.5 m	YEN 31000
059-429-873	1 m	YEN 38400

Polymer – Polyimide

Polyimide

PI



Laminate

IM301512

Thickness **0.07mm** Polymer Thickness **0.025mm**
 Backing Material **0.009mm Copper** Condition **Double-sided laminate**

Size Web Code	Size	Quantity			
		1pc	2pcs	5pcs	10pcs
718-200-086	100 x 100 mm	YEN 17900	YEN 20600	YEN 24600	YEN 29200
775-000-213	150 x 150 mm	YEN 20200	YEN 23800	YEN 29800	YEN 37000
875-030-147	300 x 300 mm	YEN 27000	YEN 33600	YEN 59000	

Coil Web Code	Width 610mm Length	Quantity
		1 Reel
378-771-818	0.5 m	YEN 46400
346-481-954	1 m	YEN 78000

Double sided laminate - Copper 0.009mm / Kapton 0.025mm / Copper 0.009mm.

IM301536

Thickness **0.1mm** Polymer Thickness **0.05mm**
 Backing Material **0.035mm Copper**

Size Web Code	Size	Quantity			
		1pc	2pcs	5pcs	10pcs
591-826-120	100 x 100 mm	YEN 16600	YEN 18700	YEN 21600	YEN 25200
978-266-203	150 x 150 mm	YEN 18200	YEN 21000	YEN 25400	YEN 30400
283-280-259	300 x 300 mm	YEN 23200	YEN 28000	YEN 37000	

Coil Web Code	Width 610mm Length	Quantity
		1 Reel
410-027-489	0.5 m	YEN 33200
253-431-867	1 m	YEN 46000

IM301560

Thickness **0.16mm** Polymer Thickness **0.075mm**
 Backing Material **0.07mm Copper**

Size Web Code	Size	Quantity				
		1pc	2pcs	5pcs	10pcs	20pcs
873-219-113	100 x 100 mm	YEN 17000	YEN 19300	YEN 22600	YEN 26400	YEN 32000
152-393-474	150 x 150 mm	YEN 18800	YEN 21800	YEN 26600	YEN 32200	
049-180-244	300 x 300 mm	YEN 24400	YEN 29600	YEN 42800		

Coil Web Code	Width 610mm Length	Quantity
		1 Reel
147-532-913	0.5 m	YEN 36600
441-615-230	1 m	YEN 56000

IM301620

Thickness **0.16mm** Polymer Thickness **0.025mm**
 Backing Material **0.125mm DuPont™ Nomex®**

Size Web Code	Size	Quantity			
		1pc	2pcs	5pcs	10pcs
543-461-366	150 x 150 mm	YEN 16500	YEN 19100	YEN 24400	YEN 30600
483-786-736	300 x 300 mm	YEN 22000	YEN 26800	YEN 36600	

Coil Web Code	Width 914mm Length	Quantity
		1 Reel
071-768-433	0.5 m	YEN 38200
629-259-582	1 m	YEN 55500

IM301650

Thickness **0.4mm** Polymer Thickness **0.025mm**
 Backing Material **0.38mm DuPont™ Nomex®**

Size Web Code	Size	Quantity			
		1pc	2pcs	5pcs	10pcs
352-022-718	150 x 150 mm	YEN 16900	YEN 19600	YEN 25200	YEN 31800
002-840-607	300 x 300 mm	YEN 22800	YEN 27800	YEN 38200	

Coil Web Code	Width 890mm Length	Quantity
		1 Reel
355-079-765	0.5 m	YEN 39400
384-965-949	1 m	YEN 60000



Sheet

IM303076

Thickness **0.76mm** Grade **Cirlex CL**

Size Web Code	Size	Quantity			
		1pc	2pcs	5pcs	10pcs
671-803-166	70 x 145 mm	YEN 25200	YEN 40200	YEN 85000	YEN 159000
702-608-252	145 x 145 mm	YEN 40800	YEN 71000	YEN 162000	
482-675-246	145 x 290 mm	YEN 71000	YEN 131000		
194-839-718	290 x 290 mm	YEN 131000			

Polymer – Polyimide

Polyimide

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Sheet

IM303110	Thickness 1mm	Grade Cirlex CL
Size	Quantity	
Web Code	1pc	2pcs
412-962-156	100 x 140 mm YEN 34800	YEN 59500 YEN 134000
774-212-037	200 x 280 mm YEN 105000	YEN 200000 YEN 486000
156-020-932	597 x 597 mm YEN 609000	YEN 1208000

IM303120	Thickness 1.5mm	Grade Cirlex CL
Size	Quantity	
Web Code	1pc	2pcs
047-424-899	140 x 140 mm YEN 46800	YEN 84000 YEN 195000 YEN 380000
070-495-385	140 x 296 mm YEN 86500	YEN 164000 YEN 394000
901-427-698	296 x 296 mm YEN 171000	YEN 332000



Rod

IM307910	Diameter 6.35mm	Grade Vespel SP1
Size	Quantity	
Web Code	1pc	2pcs
240-308-960	50 mm YEN 25400	YEN 40800 YEN 80000 YEN 145000
287-051-479	100 mm YEN 38200	YEN 66500 YEN 144000
041-209-172	200 mm YEN 64000	YEN 118000
193-443-599	300 mm YEN 89500	YEN 169000
206-318-996	500 mm YEN 141000	

IM307920	Diameter 12.7mm	Grade Vespel SP1
Size	Quantity	
Web Code	1pc	2pcs
232-702-391	50 mm YEN 31800	YEN 53500 YEN 112000
881-829-621	100 mm YEN 51000	YEN 92000 YEN 208000
600-511-478	200 mm YEN 89500	YEN 169000
996-645-436	400 mm YEN 167000	

IM307930	Diameter 19mm	Grade Meldin 7001
Size	Quantity	
Web Code	1pc	2pcs
938-802-774	50 mm YEN 34800	YEN 60000
613-665-294	100 mm YEN 57000	YEN 105000
826-640-514	200 mm YEN 102000	

IM307940	Diameter 25.4mm	Grade Vespel SP1
Size	Quantity	
Web Code	1pc	2pcs
083-037-902	50 mm YEN 42000	YEN 70000
850-234-680	97 mm YEN 66500	
003-707-292	200 mm YEN 125000	

IM307941	Diameter 25.4mm	Grade Meldin 7001
Size	Quantity	
Web Code	1pc	2pcs
061-412-601	50 mm YEN 38000	YEN 56500
172-835-516	100 mm YEN 54500	YEN 99500
347-493-556	200 mm YEN 97500	

IM307950	Diameter 38mm	Grade Meldin 7001
Size	Quantity	
Web Code	1pc	2pcs
087-933-442	25 mm YEN 30600	YEN 51500 YEN 110000
499-954-667	50 mm YEN 50000	YEN 90500 YEN 208000
475-996-336	100 mm YEN 89000	YEN 168000

IM307961	Diameter 50.8mm	Grade Vespel SP1
Size	Quantity	
Web Code	1pc	2pcs
859-950-840	25 mm YEN 70000	YEN 119000 YEN 265000
854-116-493	50 mm YEN 116000	YEN 211000
556-511-250	100 mm YEN 209000	

IM307960	Diameter 50.8mm	Grade Meldin 7001
Size	Quantity	
Web Code	1pc	2pcs
164-969-050	25 mm YEN 68000	YEN 119000
950-735-329	50 mm YEN 116000	

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Tube

IM307012	Outside Diameter..... 0.168mm	Wall Thickness..... 0.023mm						
	Inside Diameter..... 0.122mm							
Size		Quantity						
Web Code		Length	1pc	2pcs	5pcs	10pcs	20pcs	
909-784-857		100 mm	YEN 13500	YEN 15600	YEN 18400	YEN 21800	YEN 26600	
804-630-120		200 mm	YEN 14900	YEN 17500	YEN 21600	YEN 26200	YEN 33400	
648-887-231		500 mm	YEN 17600	YEN 21400	YEN 27800	YEN 38600		
636-175-756		1000 mm	YEN 20800	YEN 25800	YEN 38400	YEN 66000		
IM307013	Outside Diameter..... 0.18mm	Wall Thickness..... 0.02mm						
	Inside Diameter..... 0.14mm							
Size		Quantity						
Web Code		Length	1pc	2pcs	5pcs	10pcs	20pcs	
264-086-625		100 mm	YEN 13500	YEN 15600	YEN 18400	YEN 21800	YEN 26600	
010-836-425		200 mm	YEN 14900	YEN 17500	YEN 21600	YEN 26200	YEN 33400	
354-560-036		500 mm	YEN 17600	YEN 21400	YEN 27800	YEN 38600		
320-011-853		1000 mm	YEN 20800	YEN 25800	YEN 38400			
IM307014	Outside Diameter..... 0.193mm	Wall Thickness..... 0.019mm						
	Inside Diameter..... 0.155mm							
Size		Quantity						
Web Code		Length	1pc	2pcs	5pcs	10pcs	20pcs	
649-454-464		100 mm	YEN 13500	YEN 15600	YEN 18400	YEN 21800	YEN 26600	
671-371-168		200 mm	YEN 14900	YEN 17500	YEN 21600	YEN 26200	YEN 33400	
040-903-179		500 mm	YEN 17600	YEN 21400	YEN 27800	YEN 38600		
122-719-796		1000 mm	YEN 20800	YEN 25800	YEN 38400			
IM307015	Outside Diameter..... 0.196mm	Wall Thickness..... 0.015mm						
	Inside Diameter..... 0.166mm							
Size		Quantity						
Web Code		Length	1pc	2pcs	5pcs	10pcs	20pcs	
260-701-951		100 mm	YEN 13500	YEN 15600	YEN 18400	YEN 21800	YEN 26600	
846-139-233		200 mm	YEN 14900	YEN 17500	YEN 21600	YEN 26200	YEN 33400	
649-935-390		500 mm	YEN 17600	YEN 21400	YEN 27800	YEN 38600		
228-625-615		1000 mm	YEN 20800	YEN 25800	YEN 38400			
IM307016	Outside Diameter..... 0.201mm	Wall Thickness..... 0.022mm						
	Inside Diameter..... 0.157mm							
Size		Quantity						
Web Code		Length	1pc	2pcs	5pcs	10pcs	20pcs	
810-062-961		100 mm	YEN 13500	YEN 15600	YEN 18400	YEN 21800	YEN 26600	
405-080-855		200 mm	YEN 14900	YEN 17500	YEN 21600	YEN 26200	YEN 33400	
610-853-703		500 mm	YEN 17600	YEN 21400	YEN 27800	YEN 38600		
180-259-949		1000 mm	YEN 20800	YEN 25800	YEN 38400			
IM307030	Outside Diameter..... 0.30mm	Wall Thickness..... 0.025mm						
	Inside Diameter..... 0.25mm							
Size		Quantity						
Web Code		Length	1pc	2pcs	5pcs	10pcs	20pcs	
001-477-090		100 mm	YEN 13200	YEN 15200	YEN 17900	YEN 21000	YEN 25400	
184-625-390		200 mm	YEN 14500	YEN 17100	YEN 20800	YEN 25000	YEN 31200	
078-170-690		500 mm	YEN 17100	YEN 20600	YEN 26600	YEN 34800		
771-330-907		1000 mm	YEN 20000	YEN 24800	YEN 34600			
IM307040	Outside Diameter..... 0.35mm	Wall Thickness..... 0.025mm						
	Inside Diameter..... 0.3mm							
Size		Quantity						
Web Code		Length	1pc	2pcs	5pcs	10pcs	20pcs	
308-394-858		100 mm	YEN 13200	YEN 15200	YEN 17900	YEN 21000	YEN 25400	
948-109-905		200 mm	YEN 14500	YEN 17100	YEN 20800	YEN 25000	YEN 31200	
372-502-547		500 mm	YEN 17100	YEN 20600	YEN 26600	YEN 34800		
864-943-590		1000 mm	YEN 20000	YEN 24800	YEN 34600			
IM307046	Outside Diameter..... 0.46mm	Wall Thickness..... 0.025mm						
	Inside Diameter..... 0.41mm							
Size		Quantity						
Web Code		Length	1pc	2pcs	5pcs	10pcs	20pcs	50pcs
410-149-433		100 mm	YEN 11800	YEN 13200	YEN 14700	YEN 16400	YEN 19000	YEN 24400
731-227-574		150 mm	YEN 12200	YEN 13700	YEN 15500	YEN 17600	YEN 20800	
578-618-727		317 mm	YEN 13100	YEN 15100	YEN 17700	YEN 20600		
IM307050	Outside Diameter..... 0.55mm	Wall Thickness..... 0.025mm						
	Inside Diameter..... 0.5mm							
Size		Quantity						
Web Code		Length	1pc	2pcs	5pcs	10pcs	20pcs	
416-372-471		100 mm	YEN 13200	YEN 15100	YEN 17800	YEN 20800	YEN 25200	
046-560-909		200 mm	YEN 14400	YEN 16900	YEN 20600	YEN 24800	YEN 30800	
820-124-631		500 mm	YEN 17000	YEN 20600	YEN 26200	YEN 33800		
515-580-935		1000 mm	YEN 19800	YEN 24600	YEN 33600			

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IM307055	Outside Diameter..... 0.67mm Inside Diameter..... 0.62mm	Wall Thickness..... 0.025mm				
	Size Web Code 130-598-731	Quantity				
	Length 317 mm	1pc YEN 15600	2pcs YEN 18500	5pcs YEN 23200	10pcs YEN 28400	20pcs YEN 40200
IM307100	Outside Diameter..... 1.05mm Inside Diameter..... 1.0mm	Wall Thickness..... 0.025mm				
	Size Web Code 447-618-773 952-348-564 043-574-474 446-805-965	Quantity				
	Length 100 mm 200 mm 500 mm 1000 mm	1pc YEN 13400 YEN 14800 YEN 17500 YEN 20600	2pcs YEN 15500 YEN 17400 YEN 21200 YEN 25600	5pcs YEN 18300 YEN 21400 YEN 27400 YEN 37200	10pcs YEN 21600 YEN 25800 YEN 37400 YEN 63500	20pcs YEN 26200 YEN 32400
IM307101	Outside Diameter..... 1.105mm Inside Diameter..... 1.00mm	Wall Thickness..... 0.05mm				
	Size Web Code 327-942-079 395-907-478 316-152-195 402-677-394	Quantity				
	Length 100 mm 200 mm 500 mm 1000 mm	1pc YEN 13600 YEN 15000 YEN 17800 YEN 21000	2pcs YEN 15700 YEN 17600 YEN 21600 YEN 26000	5pcs YEN 20600 YEN 23600 YEN 30000 YEN 37000	10pcs YEN 27200 YEN 31600 YEN 40400 YEN 64000	20pcs YEN 32000 YEN 38200
IM307190	Outside Diameter..... 1.90mm Inside Diameter..... 1.80mm	Wall Thickness..... 0.050mm				
	Size Web Code 246-264-484 962-487-409 654-324-154 357-429-663	Quantity				
	Length 100 mm 200 mm 500 mm 1000 mm	1pc YEN 13400 YEN 15000 YEN 18200 YEN 21800	2pcs YEN 15700 YEN 17300 YEN 21800 YEN 26800	5pcs YEN 18500 YEN 22000 YEN 29200 YEN 41800	10pcs YEN 22400 YEN 27600 YEN 42200	20pcs YEN 27800 YEN 36200
IM307199	Outside Diameter..... 1.99mm Inside Diameter..... 1.93mm	Wall Thickness..... 0.032mm				
	Size Web Code 762-704-620 940-677-473 972-886-554 049-882-123 014-301-762	Quantity				
	Length 100 mm 200 mm 500 mm 1000 mm 1397 mm	1pc YEN 14400 YEN 15500 YEN 17700 YEN 20200 YEN 21800	2pcs YEN 15700 YEN 17300 YEN 20400 YEN 24000 YEN 28800	5pcs YEN 18500 YEN 21000 YEN 27600 YEN 42800	10pcs YEN 22400 YEN 25600	20pcs YEN 27800
IM307200	Outside Diameter..... 2.10mm Inside Diameter..... 2.0mm	Wall Thickness..... 0.05mm				
	Size Web Code 850-737-559 342-198-637 774-836-058 854-511-269	Quantity				
	Length 100 mm 200 mm 500 mm 1000 mm	1pc YEN 13800 YEN 15400 YEN 18400 YEN 22000	2pcs YEN 16100 YEN 18300 YEN 22600 YEN 27400	5pcs YEN 19200 YEN 22600 YEN 29600 YEN 42200	10pcs YEN 22800 YEN 27800 YEN 42400 YEN 73500	20pcs YEN 28200 YEN 36400
IM307300	Outside Diameter..... 3.0mm Inside Diameter..... 2.94mm	Wall Thickness..... 0.03mm				
	Size Web Code 278-183-541 753-674-578 661-190-581 501-316-517	Quantity				
	Length 100 mm 200 mm 500 mm 1000 mm	1pc YEN 12400 YEN 13400 YEN 15300 YEN 17500	2pcs YEN 14100 YEN 15500 YEN 18200 YEN 21200	5pcs YEN 16100 YEN 18300 YEN 22600 YEN 27400	10pcs YEN 18500 YEN 21600 YEN 27600 YEN 36000	20pcs YEN 22000 YEN 26200
Thin-walled tube, spirally wound from Kapton® film.						
IM307320	Outside Diameter..... 3.48mm Inside Diameter..... 3.2mm	Wall Thickness..... 0.14mm				
	Size Web Code 072-777-002 547-874-729 041-694-488 763-516-532	Quantity				
	Length 100 mm 200 mm 500 mm 1000 mm	1pc YEN 12400 YEN 13400 YEN 15400 YEN 17500	2pcs YEN 14100 YEN 15500 YEN 18200 YEN 21400	5pcs YEN 16200 YEN 18300 YEN 22600 YEN 27600	10pcs YEN 18500 YEN 21600 YEN 27800 YEN 36000	20pcs YEN 22000 YEN 26400
Thin-walled tube, spirally wound from Kapton® film.						

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Tube

IM307400	Outside Diameter..... 4.2mm	Wall Thickness..... 0.07mm				
	Inside Diameter..... 4.06mm					
	Size	Quantity				
	Web Code	Length	1pc	2pcs	5pcs	10pcs
571-341-236	100 mm	YEN 12600	YEN 14300	YEN 16400	YEN 18900	YEN 22400
417-651-042	200 mm	YEN 13600	YEN 15700	YEN 18700	YEN 22000	YEN 27000
206-375-926	500 mm	YEN 15600	YEN 18600	YEN 23200	YEN 28600	
796-991-453	1000 mm	YEN 17900	YEN 21800	YEN 28400		
Thin-walled tube, spirally wound from Kapton® film.						
IM307500	Outside Diameter..... 5.0mm	Wall Thickness..... 0.075mm				
	Inside Diameter..... 4.85mm					
	Size	Quantity				
	Web Code	Length	1pc	2pcs	5pcs	10pcs
043-187-478	100 mm	YEN 11800	YEN 13200	YEN 14700	YEN 16400	YEN 19500
794-550-662	200 mm	YEN 12500	YEN 14200	YEN 16200	YEN 18600	YEN 22000
176-759-168	500 mm	YEN 13900	YEN 16100	YEN 19300	YEN 23000	
054-556-833	1000 mm	YEN 15400	YEN 18300	YEN 22800		
Thin-walled tube, spirally wound from Kapton® film.						
IM307600	Outside Diameter..... 6.0mm	Wall Thickness..... 0.075mm				
	Inside Diameter..... 5.85mm					
	Size	Quantity				
	Web Code	Length	1pc	2pcs	5pcs	10pcs
247-871-096	100 mm	YEN 11900	YEN 13300	YEN 14900	YEN 16800	YEN 19500
409-842-963	200 mm	YEN 12600	YEN 14400	YEN 16600	YEN 19100	YEN 22800
108-159-597	500 mm	YEN 14100	YEN 16500	YEN 19900	YEN 23800	
578-936-757	1000 mm	YEN 15800	YEN 18900	YEN 23600		
Thin-walled tube, spirally wound from Kapton® film.						
IM307820	Outside Diameter..... 10.0mm	Wall Thickness..... 0.085mm				
	Inside Diameter..... 9.83mm					
	Size	Quantity				
	Web Code	Length	1pc	2pcs	5pcs	10pcs
924-696-512	100 mm	YEN 18800	YEN 23000	YEN 29800	YEN 46200	
540-195-715	200 mm	YEN 22200	YEN 27800	YEN 46000		
832-403-227	500 mm	YEN 29000	YEN 45800			
346-162-463	1000 mm	YEN 45200				
Thin-walled tube, spirally wound from Kapton® film.						
IM307828	Outside Diameter..... 10.28mm	Wall Thickness..... 0.14mm				
	Inside Diameter..... 10.0mm					
	Size	Quantity				
	Web Code	Length	1pc	2pcs	5pcs	10pcs
670-059-521	100 mm	YEN 17700	YEN 21600	YEN 28000	YEN 45200	YEN 79500
689-544-734	200 mm	YEN 20800	YEN 26000	YEN 45000	YEN 79500	YEN 148000
127-069-947	500 mm	YEN 27200	YEN 45000	YEN 96000	YEN 182000	
072-190-212	1000 mm	YEN 44200	YEN 79000	YEN 181000		
Thin-walled tube, spirally wound from Kapton® film.						
IM307840	Outside Diameter..... 30.6mm	Wall Thickness..... 0.3mm				
	Inside Diameter..... 30.0mm					
	Size	Quantity				
	Web Code	Length	1pc	2pcs		
942-279-145	220 mm	YEN 27000	YEN 32400			
Thin-walled tube, spirally wound from Kapton® film.						

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