

Starna[®] The Spectroscopy Specialists



Cells/Cuvettes for all
Spectrophotometer
Fluorimeter and
Laser applications



Introduction to Starna®

The wide variety of Starna® products in this catalogue are manufactured in the Optiglass factory founded in 1964, whose lineage of optical expertise is traceable to the early part of the last century.

Optiglass Limited is a wholly owned subsidiary of the international group of Starna® companies whose reputation is synonymous with quality and service in the manufacture and supply of spectrophotometer cells, optical components and certified reference materials around the world.

In the 1950s, the personnel who founded Optiglass developed and perfected the technique of fully fusing component parts by heat alone, without the distortion of optical surfaces. This major advance transformed the design and production of spectrophotometer cells and associated products. Continual development and improvement is reflected in the high quality world class Starna® products illustrated in this catalogue.

All manufacturing processes are carried out in our ISO 9000 certified production facility, from the design and development of products through to customised production machinery. The unique blend of skills including: cutting, slicing, grinding, polishing, conventional drilling, ultrasonic drilling and fusing as well as metallic, multi-layer and anti-reflection coating in one of many coating plants, achieves a complete vertically integrated process.

During manufacture of all component parts, special care is taken to avoid contamination by the use of stringent cleaning processes. Together with mandatory inspection procedures these stringent cleaning processes ensure that all products leave the factory in a pristine contamination-free condition, with an unconditional guarantee against faulty workmanship. This special treatment of cells also reduces bubble adhesion, which is of particular importance in flow cell applications.

In addition to ISO 9000 certification for production, UKAS accreditation has also been achieved for the Optiglass traceable reference material calibration laboratory. Again the unique combination of manufacturing and application skills permits full traceability throughout the whole production process, making Optiglass a much valued partner to instrument manufacturers, dealers and retail customers worldwide.

Cell specifications

Starna® spectrophotometer cells and other complex quartz assemblies, unless precluded by design, are assembled using a fully fused method of construction. This technique, pioneered by Optiglass personnel, ensures that cells are fused into a single homogeneous piece using heat alone, without intermediate bonding materials. All cells are carefully annealed to remove any possible remnants of strain after the fusing process, ensuring that cells achieve maximum physical strength as well as resistance to solvents. With few exceptions, cells can be used safely with pressure differentials of up to 3×10^5 Pa (three atmospheres).

General specifications

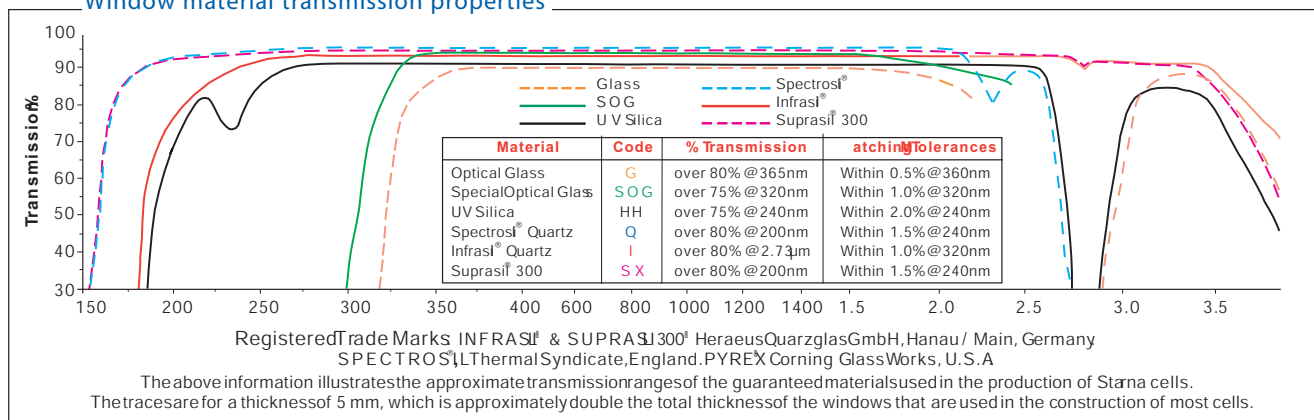
Windows parallel to:	better than 3 minutes of arc	
Window flatness to:	better than 4 Newton fringes	
Window polish, standard:	60/40 scratch/dig	
Window polish, laser:	20/10 scratch/dig	
Material	Path lengths	Tolerance
Glass	less than 10mm	± 0.02mm
Glass	10 to 30mm	± 0.1mm
Glass	40 to 100mm	± 0.2mm
Special Optical Glass	up to 20mm	± 0.01mm
Special Optical Glass	30 to 100mm	± 0.02mm
Quartz	0.01 to 0.05mm	± 0.002mm
Quartz	0.1 to 0.4mm	± 0.005mm
Quartz	0.5 to 100mm	± 0.01mm

Standard window thickness is 1.25mm, polished to better than 4 Newton Fringes per centimetre in the viewing area, typically flat to better than 1 micron (0.001mm) over the window area.

Although cells can be used with most solvents and acidic solutions, fluorinated acids such as Hydrofluoric Acid (HF) in all concentrations should be avoided as they will attack the quartz itself. Strong basic solutions (pH 9.0 and above) will also degrade the surface of the windows and shorten the useful life of the cells.

Flow cells with path lengths of less than 0.5mm are measured by an interference method both before and after final fusing. Calculation on this measurement provides an uncertainty of path length better than 0.2 microns (0.0002mm). Path length certification can be supplied for individual cells for a small additional charge. This must be requested at the time of ordering.

Window material transmission properties



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How to order

Essential ordering information is shown under the **Blue headings** throughout the catalogue. Detail shown under the black headings is additional descriptive and dimensional information and need not be included. eg. to order Type **1/I/10** (Standard Rectangular, Infrasil, 10mm Path length)

Type No.	Window Materials	Path Length	Internal Width	External L	External W	External H	Nominal Vol. ml
1	G, SOG, PX, HH, Q, I, SX	10	10	12.5	12.5	45	3.500

eg. to order Type **19.01/Q/1/Z8.5** (Ultra-micro, Spectrosil, 1mm path length, 8.5mm Z dimension)

Type No.	Window Materials	Path Length	Z Height	Sample chamber W	Sample chamber H	External L	External W	External H	Nominal Vol. ml
19.01	SOG, Q	1	8.5, 15, 20	5	1	12.5	12.5	40.5	0.0050

Material specifications

Optiglass offer five primary window materials, Optical Glass (G) and Special Optical Glass (SOG) for the visible range. Spectrosil® Quartz (Q) or equivalent for the far UV range, Infrasil® Quartz (I) or equivalent for the near infra-red (IR) as well as Suprasil® 300 (SX) or equivalent which transmits from the far UV to the near infra-red. Other window materials are also available such as Pyrex (PX) and UV Silica (HH).

If a specific window material is required and is not shown in this catalogue please contact us for availability. All materials used are fully guaranteed to transmit greater than 80% over the following usable wavelength range:

Optical Glass	G	334 through 2500 nm
Special Optical Glass	SOG	320 through 2500 nm
Pyrex	PX	325 through 2500 nm
UV Silica	HH	230 through 2500 nm
Spectrosil® Quartz	Q	190 through 2700 nm
Infrasil®	I	220 through 3800 nm
Suprasil® 300 Quartz	SX	190 through 3500 nm

For fluorescent applications Spectrosil® is the recommended window material, as it does not exhibit any background fluorescence. Some other materials, especially glass and lower grades of quartz may have some background fluorescence.

The meticulous care taken in the quality of the polishing and unique construction of regular Starna® quartz fluorescent cells brings them within tolerances which are sufficiently stringent for them to be used in laser applications. These techniques are particularly relevant in the manufacture of much larger Ultra High Vacuum (UHV) cells.

Cell matching

Modern production and fusing techniques have improved flatness, parallelism and construction tolerances. Together with consistent raw materials, these have virtually eliminated the need for transmission matching in regular standard high grade quartz cells.

The extremely accurate physical path length tolerances used in production, stated on page 2, are essential on very short path lengths, for instance in dissolution measurements where multiple short path length cells may be used. Such flow cells Types 73, 74, 75, 583, 584 and 585 each have a unique fully traceable serial number engraved on the window. Those cells with path lengths less than 0.5mm are measured using an interference method both before and after final fusing to provide a path length uncertainty calculation better than 0.2 microns (0.0002 mm). A certificate of path length and full production traceability can be provided for each individual cell on request, for a small additional charge.

Cells manufactured for **Circular Dichroism(CD)** must have strain-free oriented windows and the complete cell carefully annealed. This process incurs an additional charge for each cell. Cells required for **CD** must have this suffix **CD** added to the part number e.g. 34/Q/50/CD.

Z Height dimension - IMPORTANT!

In any instrument the 'Z' height is the distance from the bottom of the cell holder cavity to the centre of the incident light beam. This applies whether the cross-section of the beam is round or rectangular.

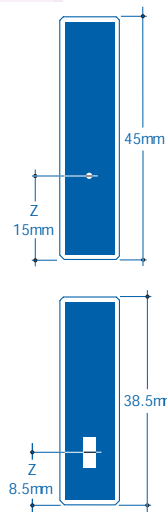
For the most efficient use of energy and sample volume the shape of the cell sample chamber should ideally be of the same shape as the light beam, but slightly larger. The 'Z' height of the cell, the centre of the sample chamber to the base of the cell, should be identical to that of the instrument, see diagram.

Typically instrument manufacturers have designed their instruments with a 'Z' height dimension of either 8.5 or 15mm, exceptions ranging from 5 to 20mm.

The 'Z' height is very important when the aperture in the cell is very small, such as sub-micro cells and micro flow cells. Standard 'Z' heights available for any given cell where this information is essential are shown in a separate column in the information tables, headed 'Z' Height.

The correct 'Z' height should be added to the part number e.g. if 8.5mm is required it should be shown as follows 73.4/SOG/10/Z8.5. As a double check it is helpful to state the instrument and model number, if available, in which the cells are intended to be used at the time of ordering.

All dimensions stated in this catalogue are in millimetres unless otherwise indicated



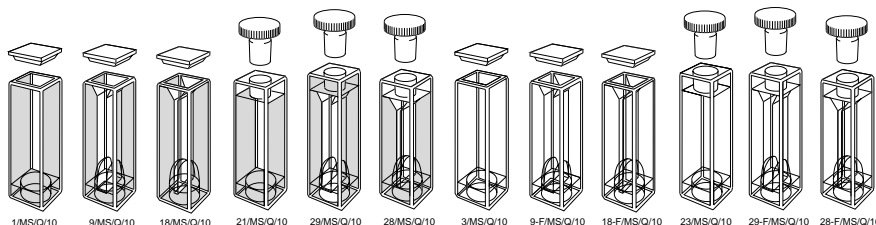
When cells matched for **transmission** are required, mainly but not exclusively for less consistent materials such as Glass and Special Optical Glass where consistency of raw material from melt to melt differs, each measured cell is given a match code relative to its transmission at a given wavelength as measured on a spectrophotometer. The transmission matching tolerances at measured wavelengths are shown as follows:

Window Material	Matching Tolerance	Measured at Wavelength
Optical Glass	0.5 %	350nm
Special Optical Glass	1.0%	320nm
Pyrex®	1.0%	320nm
UV Silica	1.5 %	240nm
Spectrosil® Quartz	1.5 %	200nm
Infrasil® Quartz	1.5 %	240nm
Suprasil® 300	1.5 %	240nm

The matching codes are only of real value when comparing new cells as transmission characteristics change during use because of surface contamination or wear due to cleaning processes. Therefore a brand new cell will not necessarily match an older used cell of the same match code.

Magnetic stirring

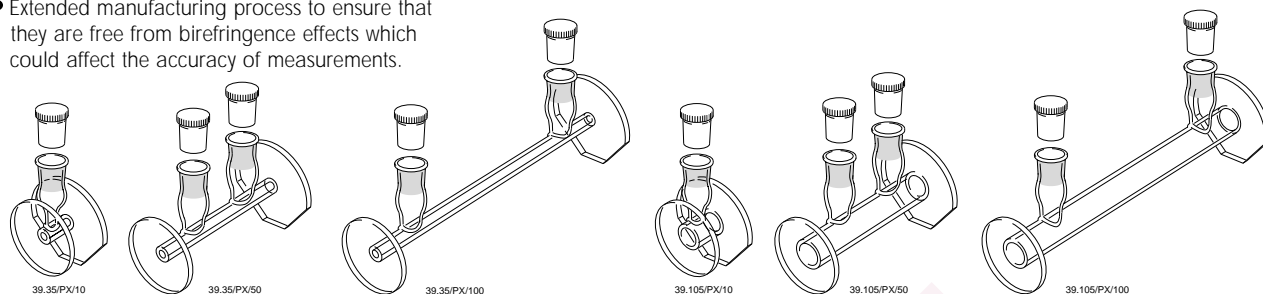
- Rectangular cells have a well for magnet location.
- Micro and semi-micro cells have a conical profile in walls for better mixing.
- One stir bar is supplied with each cell.
- For spare stirring bars. (see page 29)



Type No.	Window Materials	Path Length	W	External L	H	Nominal Vol. ml	Remarks
1/MS	SOG, Q	10	12.5	12.5	45	3.5	Macro
9/MS	SOG, Q	10	12.5	12.5	45	1.8	Semi-micro
18/MS	SOG, Q	10	12.5	12.5	45	0.9	Micro
21/MS	SOG, Q	10	12.5	12.5	48	3.5	Macro with stopper
29/MS	SOG, Q	10	12.5	12.5	48	1.8	Semi-micro with stopper
28/MS	SOG, Q	10	12.5	12.5	48	0.9	Micro with stopper
3/MS	SOG, Q	10	12.5	12.5	45	3.5	Macro fluorimeter
9-F/MS	Q	10	12.5	12.5	45	1.8	Semi-micro fluorimeter
18-F/MS	Q	10	12.5	12.5	45	0.9	Micro fluorimeter
23/MS	Q	10	12.5	12.5	48	3.5	Macro fluorimeter with stopper
29-F/MS	Q	10	12.5	12.5	48	1.8	Semi-micro fluorimeter with stopper
28-F/MS	Q	10	12.5	12.5	48	0.9	Micro fluorimeter with stopper

Type 39 Polarimeter. Standard and semi-micro

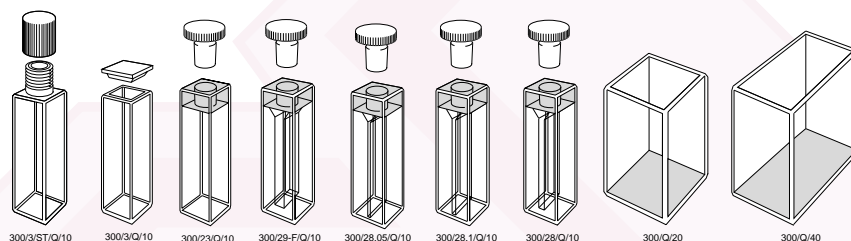
- Easy filling and emptying.
- Extended manufacturing process to ensure that they are free from birefringence effects which could affect the accuracy of measurements.



Type No.	Window Material	Path Length	Internal Diameter	External Dia.	External L	Nominal Vol. ml
39.35	PX	10	3.5	6	12.5	0.098
39.35	PX	50	3.5	6	52.5	0.490
39.35	PX	100	3.5	6	102.5	0.980
39.105	PX	10	10.5	13	12.5	0.890
39.105	PX	50	10.5	13	52.5	4.350
39.105	PX	100	10.5	13	102.5	8.700

Type 300. Dye laser

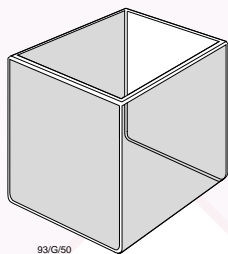
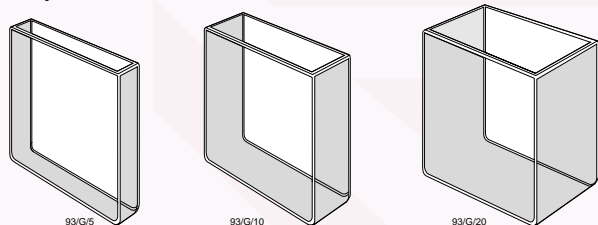
- Dye laser cells are made extremely accurately with a surface flatness which extends all the way to the edge of the cell.
- Many of the fluorescent type of cells illustrated in this catalogue may be used for laser applications, however, to ensure their optical flatness, they are polished to more exacting tolerances.



Type No.	Window Material	Path Length	W	External L	H	Internal W	Internal L	Nominal Vol. ml
300/3/ST	Q	10	12.5	12.5	45	10	10	3.500
300/3	Q	10	12.5	12.5	45	10	10	3.500
300/23	Q	10	12.5	12.5	48	10	10	3.500
300/29-F	Q	10	12.5	12.5	48	4	10	1.400
300/28.05	Q	10	12.5	12.5	48	0.5	10	0.175
300/28.1	Q	10	12.5	12.5	48	1	10	0.350
300/28	Q	10	12.5	12.5	48	2	10	0.700
300	Q	20	26	26	40	20	20	12.000
300	Q	40	26	46	40	20	40	24.000

Type 93. Colorimeter

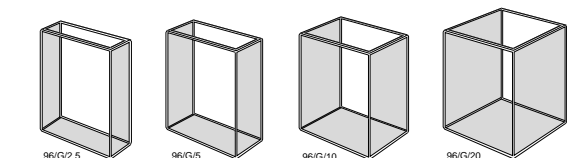
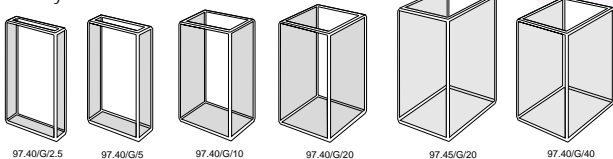
- Two polished windows.
- U-shaped wall construction.
- Fully fused.



Type No.	Window Material	Path Length	Internal Width	External			Nominal Vol. ml
				W	L	H	
93	G	5	51	55	9	56	12.5
93	G	10	51	55	14	56	25
93	G	20	51	55	24	56	50
93	G	50	51	55	54	56	125

Type 97.40 & 96. Absorption or Colorimeter

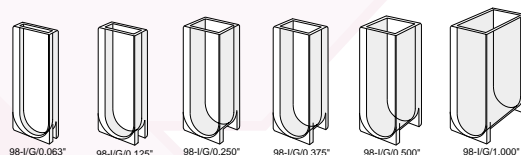
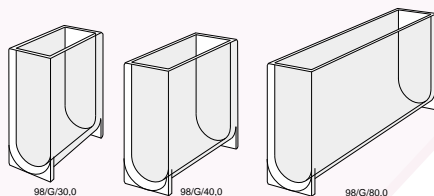
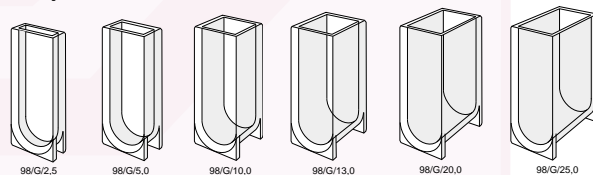
- Two polished windows.
- U-shaped wall construction.
- Fully fused.



Type No.	Window Material	Path Length	Internal Width	External			Nominal Vol. ml
				W	L	H	
97.40	G	2.5	16	20	6.5	40	1.40
97.40	G	5	16	20	9	40	2.80
97.40	G	10	16	20	14	40	5.60
97.40	G	20	16	20	24	40	11.20
97.45	G	20	16	20	24	40	14.00
97.40	G	40	16	20	44	40	22.40
97.40	G	50	16	20	54	40	28.00
97.40	G	100	16	20	104	40	56.00
96	G	2.5	24	28	8.5	40	1.80
96	G	5	24	28	11	40	3.60
96	G	10	24	28	16	40	7.20
96	G	20	24	28	26	40	14.00
96	G	40	24	28	46	40	28.00
96	G	100	24	28	106	40	70

Type 98. Lovibond Colorimeter

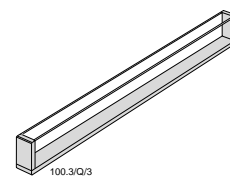
- Two polished windows.
- U-shaped wall construction.
- Fully fused.



Type No.	Window Material	Path Length	Internal Width	External			Nominal Vol. ml
				W	L	H	
98	G	2.5	12.4	17.6	6.1	40	1.00
98	G	5	12.4	17.6	8.6	40	2.00
98	G,Q	10	12.4	17.6	13.6	40	4.00
98	G	13	12.4	17.6	16.6	40	5.00
98	G	20	12.4	17.6	23.6	40	8.00
98	G	25	12.4	17.6	28.6	40	10.00
98	G	30	12.4	17.6	33.6	40	12.00
98	G	40	12.4	17.6	43.6	40	16.00
98	G	80	12.4	17.6	83.6	40	32.00
98-1	G	0.063"	0.48"	0.69"	0.20"	1.57"	0.64
98-1	G	0.125"	0.48"	0.69"	0.27"	1.57"	1.28
98-1	G	0.250"	0.48"	0.69"	0.39"	1.57"	2.54
98-1	G	0.375"	0.48"	0.69"	0.52"	1.57"	3.84
98-1	G	0.500"	0.48"	0.69"	0.64"	1.57"	5.08
98-1	G	1.000"	0.48"	0.69"	1.14"	1.57"	10.16
98-1	G	3.000"	0.48"	0.69"	3.14"	1.57"	30.48
98-1	G	5.000"	0.48"	0.69"	5.14"	1.57"	50.80
98-1	G	5.250"	0.48"	0.69"	5.39"	1.57"	53.34
98-1	G	6.000"	0.48"	0.69"	6.14"	1.57"	60.96

Type 100. Gel boat cells

- Two polished windows.
- Open top, no lid.



Type No.	Window Material	Path Length	Internal			External		
			W	L	H	W	L	H
100.3	Q	3	3	100	10	6	104	12
100.5	Q	5	5	97	10	7.5	100	10.5
100.6	Q	6	6	100	10	10	104	12
100.7	Q	7	7	100	10	11	104	12
100.8	Q	8	8	100	10	12	104	12

G = Optical Glass 334-2500nm SOG = Special Optical Glass 320-2500nm PX = Pyrex 325-2500nm HH = UV Silica 220-2500nm
 Q = Far UV Quartz 170-2700nm I = Near Infra- red Quartz 220-3800nm SX = Far UV to Near IR Quartz (Water free) 170-3500nm

Accessories

Cell holder, short path length

The cell holder Type CH/2049 is designed for use with Types 20 & 49 with path lengths of 3mm or less. Exterior dimensions are 12.5 x 12.5 x 52mm.

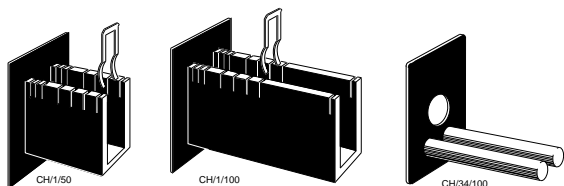
Type No.	Description
CH/2049	Cell holder, short path length



CH/2049

Cell holder, long path length

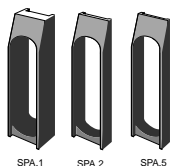
Cell holders Type CH/50 and CH/100 are for rectangular cells up to 50 and 100mm path lengths respectively. The CH/34/100 will fit 50mm or 100mm Type 34. All are complete with a 75mm x 50mm back plate to fit standard infrared instrument holders.



Type No.	Description
CH/1/50	Up to 50mm cell holder
CH/1/100	Up to 100mm cell holder
CH/34/100	50/100mm T34 holder

Cell compartment spacers

Aluminium spacers, black anodised, available in three sizes for use with 1, 2, and 5mm path length cells, supporting them in a normal 12.5 x 12.5mm holder where there is no cell holder path length adjustment facility.



SPA.1

SPA.2

SPA.5

Type No.	Description
SPA/1	for 1mm path length cells
SPA/2	for 2mm path length cells
SPA/5	for 5mm path length cells

Magnetic stir bars

PTFE coated magnetic stir bars, available in packs of ten to fit the MS range of cells illustrated on page 27 of this catalogue. Types 18/MS and 28/MS need the MSB/6x1.5 to allow the stirring bar to enter the narrow sample compartment.

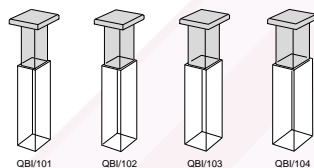


MSB.6x3

Type No.	Dimensions
MSB/6x1.5/10	6mm long x 1.5mm diameter
MSB/6x3/10	6mm long x 3mm diameter

Quartz block inserts

Precision polished FarUV quartz inserts are intended for use with Standard Rectangular 10mm path length cells (see page 5), when a reduced path length is required without using a different cell. Four different size combinations, each provide two different path lengths as indicated, by rotating the insert through ninety degrees.



Type No.	Path length	External L	W	H
QBI/101	1 or 5	9	5	48
QBI/102	1 or 2	9	2	48
QBI/103	1 or 0.5	9	9.5	48
QBI/104	1 or 0.05	9	9.95	48

Funnels

Black plastic or glass funnel suitable for use with top aspiration cells Types 25, 28-AS and 29-AS. Funnel has approximate diameter of 30mm.

Type No.	Description
FUN/P/30	Plastic funnel 30mm ø
FUN/G/30	Glass funnel 30mm ø



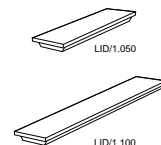
FUN/P/30

Cell lids

Cell lids are available in PTFE up to 100mm long. Vaned polypropylene lids for 10mm rectangular cells only. Lids for large rectangular cells manufactured to special order.

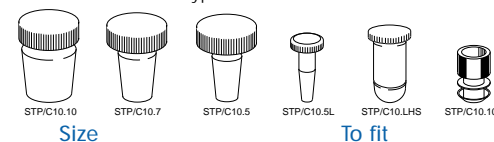


Types 1 & 3		9	18
LID/1.001	LID/9.001	LID/18.001	
1.002	9.002	18.002	
1.005	9.005	18.005	
1.010	9.010	18.010	
1.010V			
1.020	9.020	18.020	
1.040	9.040	18.040	
1.050	9.050	18.050	
1.100	9.100	18.100	



Stoppers

Spare stoppers for all cells require cell type identification. The most common types are shown in the table below

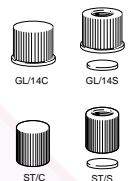


Size	To fit
STP/C10.10	21, 21N, 23, 34 (10mm or longer)
STP/C10.7	28 and 29
STP/C10.5	21, 23 (5mm or less)
STP/C10.5L	62 and 63
STP/C10.LHS	26/LHS
STP/C10.10V	16R

Caps, closed & septum

Screw caps to fit GL14 or ST threaded tops available as either fully closed cap or septum seal cap.

Type No.	Description	Dia.	Height
GL/14C	Closed cap	20mm	17mm
GL/14S	Septum cap	20mm	17mm
ST/C	Closed cap	12mm	12mm
ST/S	Septum cap	12mm	12mm



Anti-reflection & mirror coatings

Some fluorescent applications require either or both the excitation and emission energy to be enhanced by applying a metallic mirror coating to the outside of adjacent windows opposite to the source and the detector windows. Similarly, anti-reflection coatings on the other windows reduce reflective losses. Each suffix indicates coating for two adjacent walls per cell and is priced accordingly in the price list.

Type No.	Description
/AR	Anti-reflection coating
/MC	Mirror coating
/AR/MC	Anti-reflection & mirror coating



Advantages of Starna® Dissolution flow cells Types 583, 584 & 585

Superior construction

The quartz or glass fully fused body of the cell is accurately bonded within a precisely formed CNC drilled rectangular aluminium extruded box section.

The unique extruded sections, being extremely accurate and consistent in dimension, ensure precise alignment and positive sealing. The cell body retained by the base does not have to rely solely on the sheer strength of the bond between the glass and the metal.

A small gap of up to 300 microns between the top of the cell body and the extrusion allows for thorough cleaning as well as observation of the seal between the PTFE face of the fitting and the polished top surface of the cell. The unique construction means that considerable force can be applied to the screw connectors to ensure leak-proof seals, without damage to the cell or danger of dislocation. After final assembly all cells are individually tested to a pressure greater than 5 bar.

Internally, the inlet and outlet to each flow cell chamber is specially profiled to optimise the flow characteristics, giving a smooth laminar flow wherever possible as well as reducing bubble retention effects.

The gripper fitting system, illustrated below, makes possible efficient leak-proof sealing between the flow tubes and the cell. Alternative flange fittings are available on request. This series of cells can also be used with flexible silicone rubber tubing by using the barbed adaptors also illustrated below.

Guarantee, certification and traceability

The path length of every flow cell is engraved on the top of the cell window, in addition every **Starna®** flow cell has a unique identification number engraved on the bottom of the same window. This unique serial number guarantees full traceability throughout the manufacturing process. This is an important requirement in the certification of path lengths and their associated tolerances.

Cells with a path length less than 0.5 mm are checked for tolerance accuracy before and after final assembly by an interference method in a reference spectrophotometer. This method can determine the path length uncertainty to a tolerance better than 0.2 microns (0.0002 mm). Path lengths greater than 0.5mm are verified by physical measurements at other critical stages in the manufacturing processes.

Customers are therefore assured of the highest possible quality and the best possible performance when using **Starna®** dissolution flow cells.

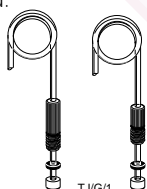
Fittings for 583, 584 & 585 Series cells

Universal single-ended connectors

- One pair of gripper fittings, M6 thread, consisting of one long and one short connector, single-ended.
- Each fitting comes with one metre of tubing as standard, other lengths available on request.
- PTFE tube is standard, 1.6mm O.D, ≈ 1mm I.D. FEP available on request.

Type No.	Description
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TJ/G/1/PTFE	Pair of connectors, PTFE tube
TJ/G/1/FEP	Pair of connectors, FEP tube



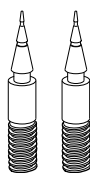
TJ/G/1

Universal adaptors, screw fitting to flexible tubing

- Supplied in pairs, to convert M6 screw thread.
- Suitable for using push-on flexible silicone tubing or similar with a range of internal diameters from 1mm to 3.5mm.

Type No.	Description
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TJ/G/038	Pair of adaptors, short and long barb
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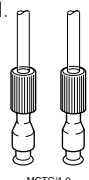
Adaptors

Fittings for TC external Quartz threads

- To fit male threaded quartz tubes fully fused to the cell.
- PTFE flange, ferrule and cap to screw onto the male thread, single ended.
- Each tube one metre length standard, 1.6mm O.D, ≈ 1mm I.D. Other lengths available on request.

Type No.	Description
----------	-------------

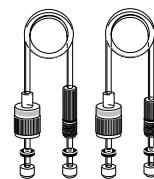
MCTC/1.0	Pair of connectors, PTFE tube
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MCTC/1.0

Varian C50 Dissolution connector spares kit

- One pair of gripper fittings, one long double-ended with M6 thread, to 1/4 28TPI female and one short double-ended with M6 thread, to 1/4 28TPI female.
- Each tube 30cms long between connectors.
- Clear PTFE tube standard coloured PTFE tubing available in following colours: Blue, Brown, Green, Natural, Purple, Red, White, Yellow.



TJ/G/C50

Type No.	Description
----------	-------------

TJ/G/C50	Pair of connectors, PTFE tube
TJ/G/C50x4	Four pairs of above, colours to be specified
TJ/G/C50x8	Eight pairs of above, one pair of each colour
TJ/G/C50x9	Set of 9 single dual path length inter-connecting tubing kit

Varian C100 Dissolution connector spares kit

- One pair of gripper fittings, one long double-ended with M6 thread, to 1/4 28TPI male and one short double-ended with M6 thread, to 1/4 28TPI male.
- Each tube 21cms long between connectors.



TJ/G/C100

Type No.	Description
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TJ/G/C100	Pair of connectors, PTFE tube
TJ/G/C100x9	Set of 9 single dual path length inter-connecting tubing kit

'Spinette' cell stirrer

'Spinette' cell stirrers offer the ability to simultaneously measure and stir the contents of specially designed cells (MS), see page 27. Mixing of solutions is with a tiny magnetic stir bar placed into a purpose made well at the bottom of the cell. A small electronic coil rotation assembly is placed under the cell in the sample compartment. This raises the cell by 5mm which, without affecting instrument operation may also reduce the required sample volume. The 'Spinette' will fit all standard spectrophotometers cell holders.

The speed of rotation can be adjusted with the controller which is connected to the electronic magnet by thin ribbon wire one metre in length. This will not interfere with insertion or removal of cells from the sample compartment and will also allow instrument covers to close normally.

Magnetic stir bars are available to fit the specially designed MS range of cells with 'stirring wells' depicted on page 27. When

purchasing stir bars separately for use with micro cells, the correct size must be selected. One stir bar is included with each MS cell. Typically, a cell filled with aqueous solution up to 30mm from the base, may be fully mixed within five seconds. The Spinette cell stirrer is supplied complete with speed controller, electronic rotation platform, ribbon wire and one stir bar. There are two models available, one with input voltage of 110 VAC and the other 220/240 VAC, see below.



Type No.	Description
SCS1.22	Spinette cell stirrer 240 VAC
SCS1.11	Spinette cell stirrer 110 VAC

Traceable liquid and glass reference materials



Over 30 years of experience has been invested in the development and production of **Starna**[®] liquid-filled, sealed quartz cells, to evaluate performance of UV-Visible spectrophotometers. For nearly 40 years production has included solid glass filter materials for both absorbance and wavelength measurements. All these materials are calibrated in our laboratory, which has been accredited to the ISO/IEC 17025

standard by the United Kingdom Accreditation Service (UKAS). The full range of Certified Reference Materials established traceable to the USA National Institute of Standards and Technology (NIST) currently available are described in detail in the **Starna**[®] catalogue entitled Certified Reference Materials.

Further information can be found in the **Starna**[®] booklet entitled: "Reference Materials for ultra violet and visible Spectrophotometry"

Fluorescent reference materials

Molecular fluorescence spectroscopy is a sensitive and often selective technique. Unlike absorption spectrophotometry it is not an absolute technique: instruments therefore require calibration before every series of measurements. This may be achieved using a stable reference material, which should absorb and emit at similar wavelengths to the samples of interest. Use of the general purpose fluorescent reference material set type **6BF** enables the day to day stability of instruments to be measured.

The **6BF** reference materials are not standards with absolute values, but a set of six relatively stable fluorescent materials in a polymethylmethacrylate matrix with which the stability and precision of the instrument can be monitored. Four blocks exhibit broad band spectra which cover the normally used UV and visible region of the spectrum, with considerable overlap. Two blocks contain materials suitable for illustrating the selectivity of the technique as well as checking instrument resolution and wavelength calibration. The materials have the following advantages:

Stability: no degradation, no evaporation.

Safety: no chemicals to mix.

Robust: unbreakable, easy to store and use.

Further information can be found in the **Starna**[®] booklet entitled: "Reference Materials for Molecular Fluorescence Spectrophotometry"

Terms of sale

Normal terms of sale are net 30 days, FOB Hainault to recognised accounts. Under our terms of sale 'Title of ownership of any goods shipped does not transfer until the goods have been paid for in full'.

Product warranty

Starna[®] Spectrophotometer and Fluorimeter cells are warranted to meet the specifications shown on page 2 of this catalogue and be equal to or better than the dimensional tolerance for each cell listed. Stringent quality control is exercised throughout production with only guaranteed and brand named raw materials used, so that cells will perform to the highest specification for any given design. Any goods to be returned under warranty require a Return of Merchandise Authorisation (RMA) number, which can be obtained by calling our Customer Service Department. We reserve the right to change the design or specification of any product without prior notification.

Technical information

Technical staff are available to assist in the selection of cell material or physical configuration to satisfy individual applications.

Method of shipment

Prices do not include shipping costs, duty or tax. Normal shipment, unless otherwise specified, is by recorded letter or parcel post. Overnight service is available via Carrier or Data Post. Overseas shipments utilise Air parcel or letter post, UPS, TNT, DHL, FedEx or regular air freight. Unless specified otherwise all shipping charges are prepaid and added to your invoice.

Stock items

Great efforts are made to stock the widest range of products so that purchase orders can be shipped the day they are received. Any item temporarily out of stock will be back ordered and shipped when available from production unless otherwise instructed.



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