



# **Starna Scientific** The Spectroscopy Specialists

Cell/Cuvettes for all  
Spectrophotometer  
Fluorimeter and  
Laser applications



**Starna** scientific

## Introduction to Starna®

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

Starna Scientific is the manufacturing division of the international group of Starna® companies, who have a recognised world-wide reputation for quality, service, innovation and co-operation in the production and supply of spectrophotometer cells, optical components and certified reference materials.

During the 1950s, the founding members of the company developed and perfected the technique of fully fusing optically polished component parts by heat alone, without distortion. 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.

All manufacturing processes are carried out in an ISO 9000 certified production facility, from design and development of product 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 manufacturing 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 all products leave the factory in a pristine contamination-free condition, with an unconditional guarantee against faulty workmanship. This special treatment of cells together with internally profiled cells reduces bubble adhesion, particularly important in flow cell applications. In addition to the **ISO 9001** certified manufacturing facility, the **Starna Reference Material Calibration Laboratory** which has been **UKAS** accredited to **ISO 17025** since 2001, also achieved **ISO guide 34** in 2006, the highest level of accreditation, recognised world-wide. The unique combination of manufacturing, application and laboratory skills, permits full traceability throughout the whole production process, making Starna Scientific a unique partner to instrument manufacturers, dealers and retail customers worldwide who require completely independent guaranteed validation reference materials for analytical equipment.

## Cell specifications

Starna® spectrophotometer cells and other quartz and glass assemblies, unless precluded by design, are assembled using a fully fused method of construction. This technique, pioneered and used by Starna Scientific since the mid 1950s, ensures that cells are fused into a single homogeneous entity using heat alone, without intermediate bonding materials. All cells are then carefully annealed to remove any residual strain from the fusing process. This ensures maximum physical strength as well as resistance to solvents. With few exceptions, most cells can be used safely with pressure differentials of up to  $3 \times 10^5 \text{ Pa}$  (3 Bar) and some up to  $10 \times 10^5 \text{ Pa}$  (10 Bar).

## 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 30mm	± 0.01mm
Quartz	40 to 100mm	± 0.02mm

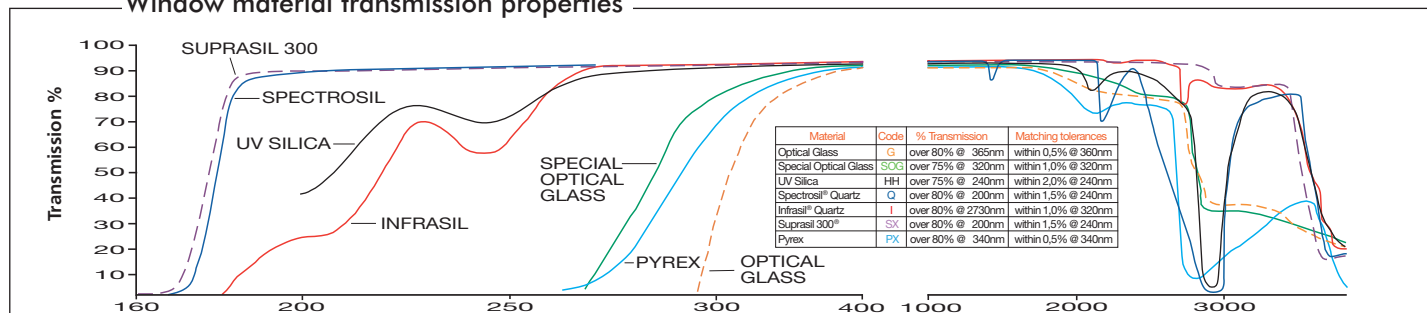
Standard window thickness is 1.25mm, polished to better than 4 Newton Fringes per centimetre in the viewing area, typically flat to better than 1 micron (0.001mm) over the window area.

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 should be requested at the time of ordering.

Water absorption band OH content ppm (mg/g) Infrasil ≤ 8, Suprasil 300 ≤ 1.

Window material transmission properties



Registered Trade Marks: INFRAASIL® & SUPRASIL 300® Heraeus Quarzglas GmbH, Hanau Germany. SPECTROSIL®, Vitreosil® & TSC3® Heraeus Quartz UK Ltd, Wallsend, England. PYREX® Corning Glass Works, U.S.A.

The above information illustrates the approximate transmission ranges of the guaranteed materials used in the production of Starna cells. The spectra does not take into account reflective losses from optical window surfaces which may vary depending on the material measured, resulting in actual measured transmission between 80%T and 90%T. Windows are normally 1.25mm thick and therefore the absorption of the windows themselves can be disregarded for normal analytical purposes.

## Contents

Absorption cells	27	Sub-micro, de-bubbler	19
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Funnels		Medium aperture	15 & 16
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Magnetic stir bars		Fluorimeter cells	21 - 25
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Stoppers		Micro cell adaptors - FCAs	21
Anaerobic cells	12	Sub-micro	22
Aspiration cells, micro and semi-micro	18	Flow cells, all types	14 & 24
CD matching	4	Triangular open top/stopper	23
Cell matching	4 & 2	Constant temperature	25
Cell specifications	2	Gel boat cells	27
Cell stirrer (Spinette)	30	Magnetic stirring cells	26
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Cube cells	23	NIST traceable certified reference materials	30
Cylindrical cells	10	Polarimeter cells	26
Constant temperature	25	Quartz/Pyrex graded seals fused to cells	11
Short path	10	Rectangular cells with small screw caps	12
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Standard	10	Refractometer cells	25
Large diameter	10	Screw cap & septum cap cells GL14	12
With tube	10	Semi-micro cells with lid or stopper	6
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Demountable cells, short path length	13	Semi Micro cells short	6
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### How to order

Essential ordering information is shown under the **Blue column 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

Starna Scientific 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
Borosilicate	PX	325 through 2500 nm
UV Silica	HH	220 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, together with consistent raw materials, 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 especially 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. 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!

The 'Z' height is the distance from the bottom of the cell holder cavity to the centre of the incident light beam profile, which can be round, rectangular or curved. For the most efficient use of energy and sample volume the sample chamber aperture should ideally encompass the light beam with a small extra margin to avoid beam clipping.

The 'Z' height of the cell, the distance from the centre of the cell sample chamber aperture to the base of the cell, should match to that of the instrument.

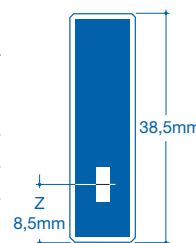
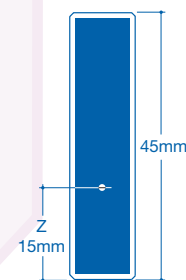
Manufacturers have generally designed their instruments with 'Z' dimensions ranging from 5 to 20mm with 8.5 or 15mm being the most popular.

Choosing the correct cell 'Z' height is very important when the aperture in the cell is very small, as in sub-micro cells and micro flow cells.

The standard 'Z' heights for any cell, where this information is critical, are shown in a separate column in the information tables, headed 'Z' Height. Other 'Z' dimensions can be supplied on request.

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 at the time of ordering, it is beneficial to state the instrument make and model number for which the cell is required.

**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 transmission characteristics from melt to melt differ, 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:

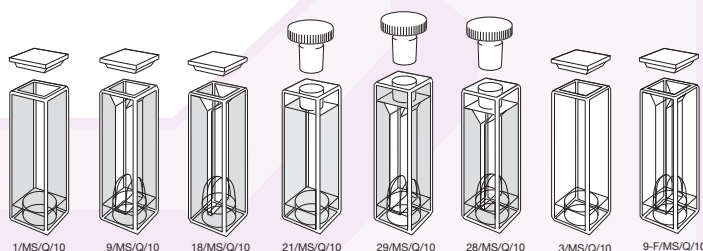
Window Material	Matching Tolerance	Measured at Wavelength
Optical Glass	0.5%	350nm
Special Optical Glass	1.0%	320nm
Borosilicate	1.0%	320nm
UV Silica	1.5%	240nm
Spectrosil® Quartz	1.5%	200nm
Infrasil® Quartz	1.5%	240nm
Suprasil 300®	1.5%	240nm

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 may not identically match an older used cell of the same match code.

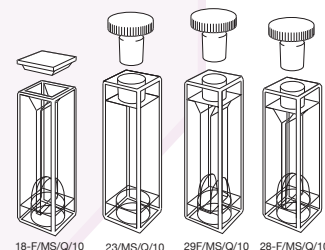


## Magnetic stirring

- 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 28).



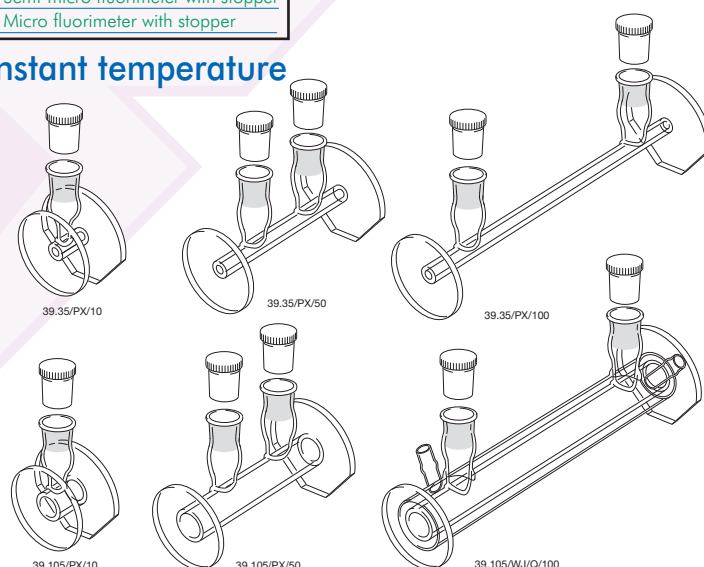
Type No.	Window Materials	Path Length	External L	External W	External H	Nominal Vol. ml	Remarks
1/MS	SOG,Q	10	12.5	12.5	45	3.5	Macro
9/MS	SOG,Q	10	12.5	12.5	45	1.8	Semi-micro
18/MS	SOG,Q	10	12.5	12.5	45	0.9	Micro
21/MS	SOG,Q	10	12.5	12.5	48	3.5	Macro with stopper
29/MS	SOG,Q	10	12.5	12.5	48	1.8	Semi-micro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

- Easy filling and emptying.
- Extended manufacturing process to ensure that they are free from birefringence effects which could affect the accuracy of measurements.
- Also available with two round windows, 39.35/2R and 39.105/2R.
- Water jacketed 'WJ'** available Q only, 100 & 200mm Path length.

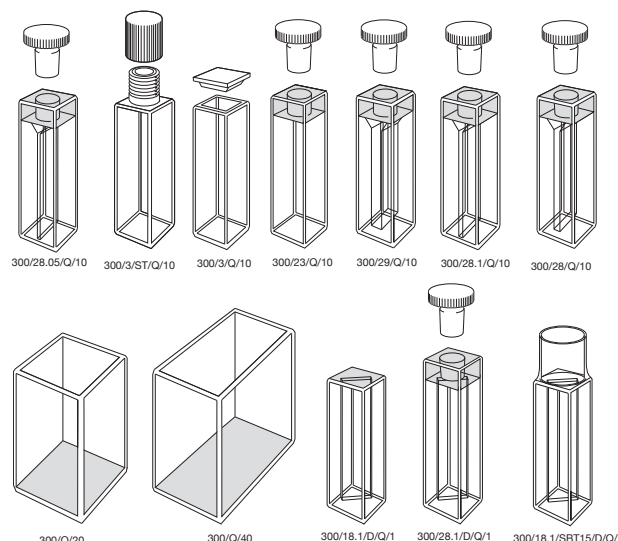
Type No.	Window Material	Path Length	Internal Dia.	External Dia.	L	Nominal Vol. ml
39.35	PX	10	4	6	14	0.098
39.35	PX	50	4	6	54	0.490
39.35	PX	100	4	6	104	0.980
39.105	PX	10	10	12	14	0.890
39.105	PX	50	10	12	54	4.350
39.105	PX	100	10	12	104	8.700
39.105/WJ	Q	100	10	12	104	8.700
39.105/WJ	Q	200	10	12	204	18.000



## Type 300. Dye laser

- Dye laser cells are made with extreme accuracy having 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.
- All **Type 300** cells have four polished walls and base except **300/Q/20** and **300/Q/40** which have a grey base.
- Types 300/18.1/D, 300/28.1/D & 300/18.1/ST15/D** have a diagonal sample compartment for front surface fluorescence.

Type No.	Window Material	Path Length	Internal Width	External L	External W	External H	Nominal Vol. ml
300/3/ST	Q	10	10	12.5	12.5	45	3.500
300/3	Q	10	10	12.5	12.5	45	3.500
300/23	Q	10	10	12.5	12.5	48	3.500
300/29	Q	10	4	12.5	12.5	48	1.400
300/28.05	Q	10	0.5	12.5	12.5	48	0.175
300/28.1	Q	10	1	12.5	12.5	48	0.350
300/28	Q	10	2	12.5	12.5	48	0.700
300	Q	20	20	26	26	40	12.000
300	Q	40	20	46	26	40	24.000
300/18.1/D	Q	1		12.5	12.5	45	0.350
300/28.1/D	Q	1		12.5	12.5	48	0.350
300/18.1/ST15/D	Q	1		12.5	12.5	59	0.350

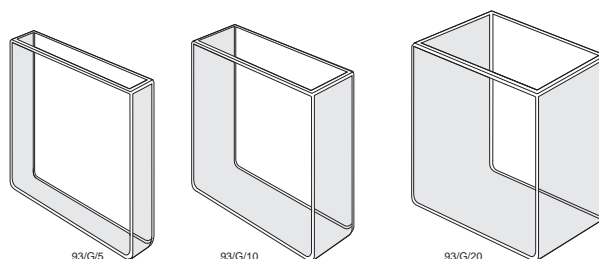


## Type 93, 96, 97 & 98 Colorimeter/Absorption cells

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

### Type 93. Colorimeter

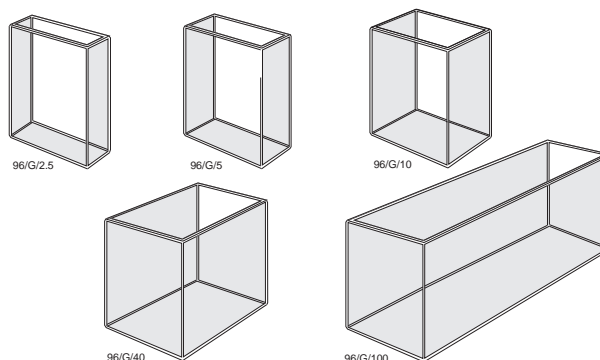
Type No.	Window Material	Path Length	Internal Width	External L	W	H	Nominal Vol. ml
93	G	2	50	6	55	56	5
93	G	5	50	9	55	56	12.5
93	G	10	50	14	55	56	25
93	G	20	50	24	55	56	50
93	G	30	50	34	55	56	75
93	G	40	50	44	55	56	100
93	G	50	50	54	55	56	125



### Type 96. Absorption or Colorimeter

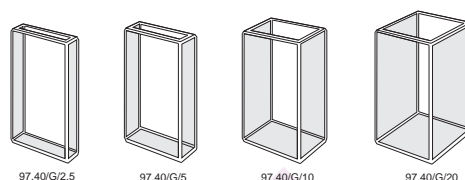
- 96/MCB for Macbeth colorimeter.

Type No.	Window Material	Path Length	Internal Width	External L	W	H	Nominal Vol. ml
96	G	2.5	24	8.5	28	40	1.80
96	G	5	24	11	28	40	3.60
96	G	10	24	16	28	40	7.20
96	G	20	24	26	28	40	14.00
96	G	40	24	46	28	40	28.00
96	G	100	24	106	28	40	70.00
96/MCB	G	10	24	14	28	40	7.20



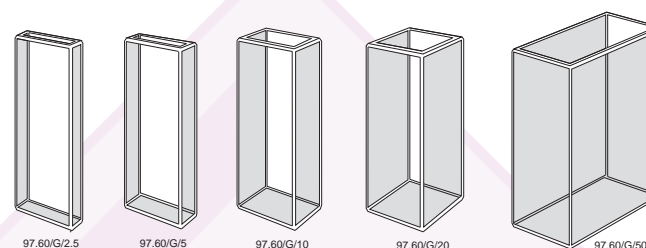
### Type 97.40. Absorption or Colorimeter

Type No.	Window Material	Path Length	Internal Width	External L	W	H	Nominal Vol. ml
97.40	G	2.5	16	6.5	20	40	1.4
97.40	G	5	16	9	20	40	2.8
97.40	G	10	16	14	20	40	5.6
97.40	G	20	16	24	20	40	11.20
97.40	G	40	16	44	20	40	22.40
97.45	G	40	16	44	20	45	25.60
97.40	G	50	16	54	20	40	28.00
97.40	G	100	16	104	20	40	56.00



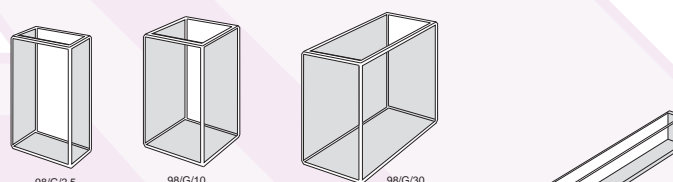
### Type 97.60 Absorption or Colorimeter

Type No.	Window Material	Path Length	Internal Width	External L	W	H	Nominal Vol. ml
97.60	G	2.5	16	6.5	20	60	1.60
97.60	G	5	16	9	20	60	3.20
97.60	G	10	16	14	20	60	6.40
97.60	G	20	16	24	20	60	12.80
97.60	G	40	16	44	20	60	25.16
97.60	G	50	16	54	20	60	32.00
97.60	G	100	16	104	20	60	64.00



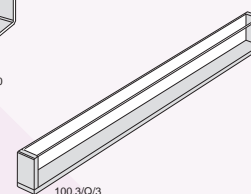
### Type 98. Absorption or Colorimeter

Type No.	Window Material	Path Length	Internal Width	External L	W	H	Nominal Vol. ml
98	G	2.5	12	8.5	18	40	1.20
98	G	5	12	11	18	40	2.40
98	G	10	12	16	18	40	4.80
98	G	13	12	19	18	40	6.24
98	G	15	12	21	18	40	7.20
98	G	20	12	28	18	40	9.60
98	G	25	12	31	18	40	12.00
98	G	30	12	36	18	40	14.40
98	G	33	12	39	18	40	15.85
98	G	40	12	46	18	40	19.20



### Type 100. Gel boat cells

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



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

## 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.

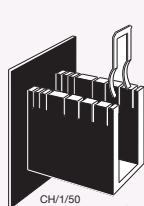
Type No.	Description
CH/2049	Cell holder, short path length



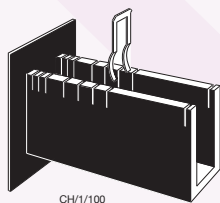
CH/2049

## Cell holder, long path length

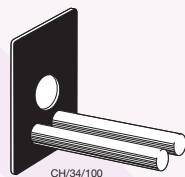
Cell holders **Type CH/50** and **CH/100** are for rectangular cells up to 50mm and 100mm path lengths respectively. The **CH/34/100** fits 50mm or 100mm **Type 34**. All are complete with a 75mm x 50mm back plate to fit standard infrared instrument holders.



CH/1/50



CH/1/100



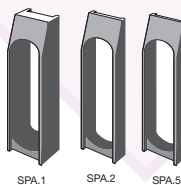
CH/34/100

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 12.5 x 12.5mm holder where there is no cell holder path length adjustment facility.

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



SPA/1

SPA/2

SPA/5

## Magnetic stir bars

PTFE coated magnetic stir bars, available in packs of ten to fit the MS range of cells illustrated on page 26 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.

Type No.	Dimensions
MSB/5x2/10	5mm long x 2mm diameter
MSB/6x1.5/10	6mm long x 1.5mm diameter
MSB/6x3/10	6mm long x 3mm diameter



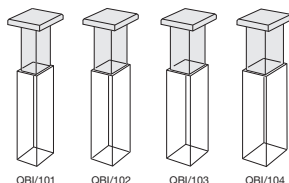
MSB/5x2

MSB/6x1.5

MSB/6x3

## Quartz block inserts

Precision polished Far UV 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 size combinations, each provide two different path lengths as indicated, by rotating the insert through ninety degrees.



QBI/101

QBI/102

QBI/103

QBI/104

Type No.	Path length	External L	W	H
QBI/101	1 or 5	9	5	48
QBI/102	1 or 2	9	8	48
QBI/103	1 or 0.5	9	9.5	48
QBI/104	1 or 0.05	9	9.95	48

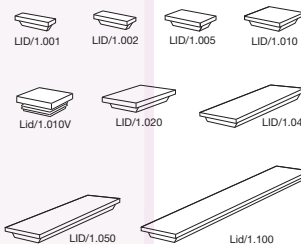
## Cell lids

Cell lids are available in PTFE up to 100mm long.

Vaned polyethylene 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
LID/1.002	9.002	18.002
LID/1.005	9.005	18.005
LID/1.010	9.010	18.010
LID/1.010V		
LID/1.020	9.020	18.020
LID/1.040	9.040	18.040
LID/1.050	9.050	18.050
LID/1.100	9.100	18.100

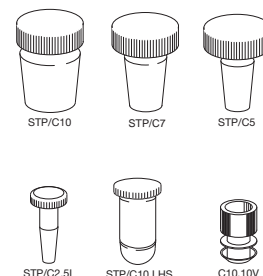


## Stoppers

Spare stoppers for all cells require cell type identification.

The most common types are shown in the table below

Type No.	To fit
STP/C2.5	23-1.45, 2.45, 3.45
STP/C5	23-4.45, 318, 21, 23 (5mm or less), 23-5.45
STP/C5L	62, 63
STP/C7	28, 29, 32 (up to 10mm)
STP/C10	21, 21N, 23
STP/C10L	34, 32 (over 10mm)
STP/C10.LHS/Z8.5	26/LHS/Z8.5
STP/C10.LHS/Z15	26/LHS/Z15 or Z20
STP/C10.10V	16R

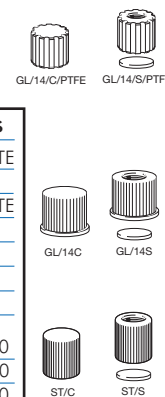


## Caps, closed & septum

Screw caps to fit GL14 or ST threaded tops

available as either fully closed cap or septum seal cap.

Type No.	Description	Dia.	Height	Remarks
GL/14C/PTFE	Closed cap	20mm	17mm	PTFE/WHITE
GL/14C/PBT	Closed cap	20mm	17mm	PBT/RED
GL/14S/PTFE	Septum cap	20mm	17mm	PTFE/WHITE
GL/14S/PBT	Septum cap	20mm	17mm	PBT/RED
GL/14C/PTFE/SPF	Closed cap, PTFE Faced Silicone Seal			
ST/C	Closed cap	12mm	12mm	
ST/S	Septum cap	12mm	12mm	
GL/14/SEAL/S	Cap or Septum seal Silicone			Pack of 10
GL/14/SEAL/SPF	Cap or Septum seal Silicone/PTFE Face			Pack of 10
ST/SEAL/S	Cap or Septum seal Silicone			Pack of 10
ST/SEAL/PT	Cap or Septum seal Nitrile/PTFE Face			Pack of 10

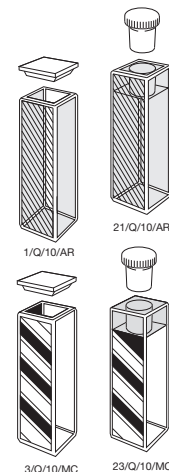


## Anti-reflection & mirror coatings

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.

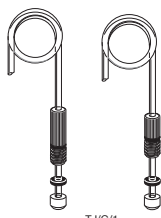
Type No.	Description
/AR	Anti-reflection coating
/MC	Mirror coating
/AR/MC	Anti-reflection & mirror coating



## 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 1,5 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.

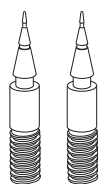


TJ/G/1

Type No.	Description
TJ/G/1.5/PTFE	Pair of connectors, PTFE tube
TJ/G/1.0/FEP	Pair of connectors, FEP tube

### Universal adaptors, screw fitting to flexible tubing

- Supplied in pairs, to convert M6 and 1/4 screw thread 28TPI.
- Suitable for using push-on flexible silicone tubing or similar with a range of internal diameters from 1mm to 3.5mm.

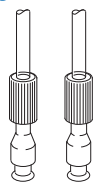


Adaptors

Type No.	Description
TJ/G/038	Pair of barbed adaptors for M6 thread
LTC/G/0.5	Pair of barbed adaptors for 1/4 x 28

### 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.

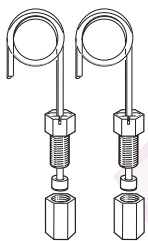


MCTC 1.0

Type No.	Description
MCTC/1.0	Pair of connectors, PTFE tube & collar.

### Fittings for LTC external Quartz threads

- For use with 1/4 28TPI male thread fully fused to the cell.
- PTFE collar, gripper fitting.
- Each tube one metre length standard, 1.6mm O.D, 1mm I.D. Other lengths available on request.

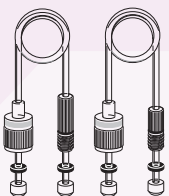


LTC/0.5

Type No.	Description
LTC/0.5	Pair of connectors, PTFE tube

### 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 30cm long between connectors.
- Clear PTFE tube standard coloured PTFE tubing available in following colours: Blue, Brown, Green, Natural, Purple, Red, White, Yellow.

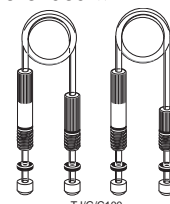


TJ/G/C50

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 21cm long between connectors.

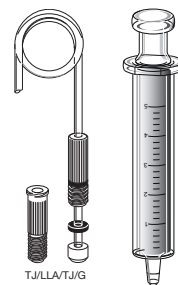


TJ/G/C100

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

### Luerlock Adaptor spares kit

- One Luerlock adaptor for use with syringe.
- One screw fitting for overflow or to waste. Note: Syringe not included.



TJ/LLA/TJ/G

Type No.	Description
TJ/LLA/TJ/G	One Luerlock adaptor
	One screw fitting with tube

### Starna Optical Polishing Cloth

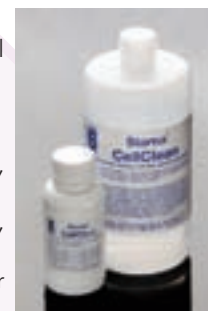
The Starna lint-free Optical Polishing Cloth is specifically for use with Starna Liquid Reference Materials sealed into quartz cells where the optical windows need to be kept scrupulously clean for all valuation procedures. It may also be used for cleaning most types of normal glass and quartz cell windows but is not intended for use with any type of glass or metal on quartz filter.



Type No.	Description
CellClean/OPC	Lint-free Optical Polishing Cloth 25cm sq.

### Starna® CellClean

Scrupulously clean glass or quartz cells are essential for consistent analytical results in all photometric disciplines. Starna® CellClean is an aqueous based cleaner with a unique combination of ingredients and provides cleaning actions that are able to lift, disperse, emulsify, sequester, dissolve, suspend or decompose. It may be used to remove oil, grease, resin, tar, wax, biological materials, insoluble oxides, fine particles and many other contaminants.



Type No.	Description
CellClean/150ml	Cell cleaner 150ml
CellClean/1000ml	Cell cleaner 1000ml

### Funnels

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



FUN/P/30

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



‘Spinette’ cell stirrer

‘Spinette’ cell stirrers offer the ability to simultaneously measure and stir the contents of specially designed cells (MS), see page 26. 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 26.

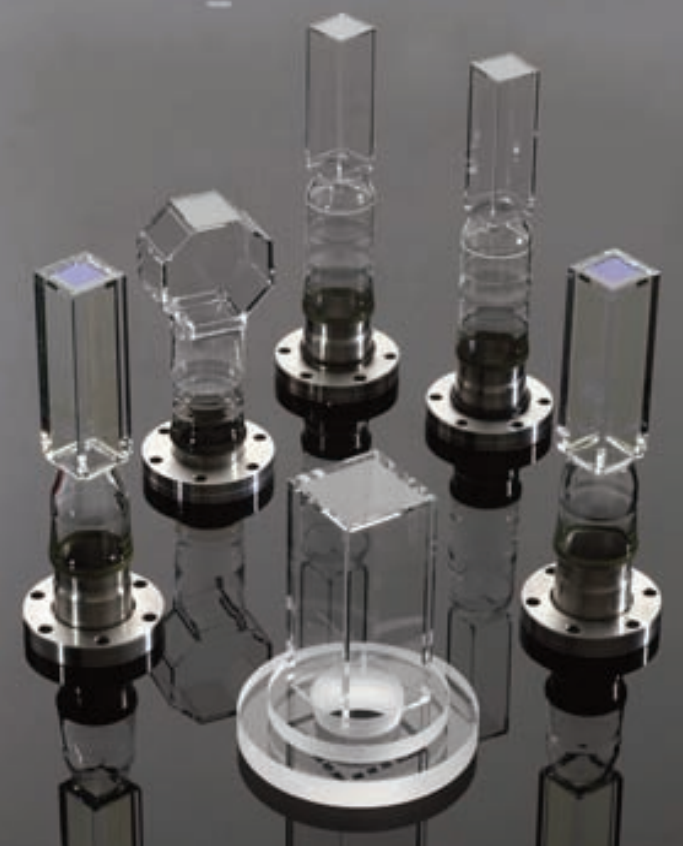
When purchasing stir bars separately for use with micro cells, the correct size must be selected. One stir bar is included with each MS cell. Typically, a cell filled with aqueous solution up to 30mm from the base, may be fully mixed within five seconds. The Spinette cell stirrer is supplied complete 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

Ultra High Vacuum (UHV) cells

- Designed for use in vacuums <10<sup>-9</sup> Torr
- Windows polished to λ10 per cm<sup>2</sup>.
- Fully heat fused
- 20/10 scratch & dig.
- Far UV synthetic quartz or borosilicate.



A wide variety of UHV cells are produced. Used for quantum mechanics experimentation including Bose Einstein condensate experiments. Multilayer ‘V’, ‘W’ or broadband coatings available for specific wavelengths.

Type No.	Window Materials	Typical dimensions	
		Internal	External
UHV	Q	20 x 20 x 97	26 x 26 x 100
UHV	Q	24 x 24 x 97	30 x 30 x 100
UHV	Q	30 x 30 x 96	38 x 38 x 100

Cutom sizes can be manufactured to special order. Dimensions should be specified when ordering, internal or external. Borosilicate materials may be used for UHV cells when dimensions allow.

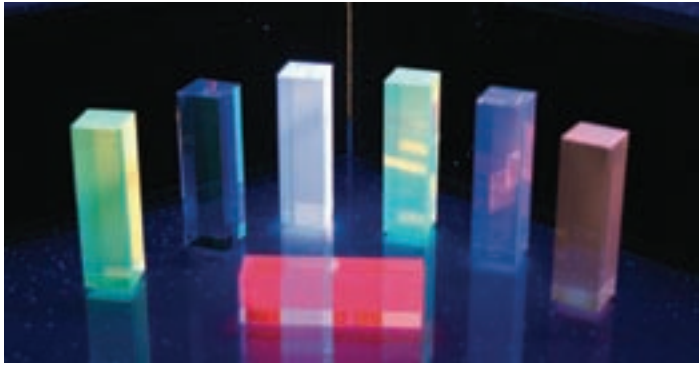
Fluorescent reference materials

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"



Also available in permanently flame-sealed cells are the following references for fluorimeter applications.

- Quinine Sulphate [RM-QS]**  
solution in sealed cells for fluorescent instrument qualifications.
- Rhodamine [4-TB/Rhodamine/101]**  
flame-sealed into triangular cells for quantum yield and spectral correction.
- Water cell [3/Q/10/Water]**  
suitable for Raman Band signal to noise determination.

# Instrument validation

## NIST Traceable Glass & Liquid References

\***Starna** are a world leading manufacturer and supplier of **Certified Reference Materials [CRMs]** for UV, Visible and Near Infrared photometer applications. All CRMs are manufactured to **ISO 17025 & ISO Guide 34** in the **Starna UKAS accredited laboratory**.

\***Starna** CRMs meet all current international regulatory validation requirements for UV, Visible and Near Infrared spectrophotometer instruments.

\*Glass filter CRMs are manufactured to the exacting standards required by **National Metrology Institutes [NMIs]**.

\*All Starna liquid references are heat fusion-sealed, eliminating both contamination and leakage issues. Starna has forty years experience in the production of heat fusion - sealed references.

\*A **Lifetime Guarantee** covers all Starna UKAS Certified references, provided the CRMs are re-certified at least every two years and are used in compliance with the conditions of use, stated in the documentation enclosed with each set.

\***Re-calibration service** with a guaranteed five working day turn-round is available from the Starna Calibration Laboratory, for all references. Some third party references can also be certified to ISO 17025 standard.



*Below are some typical set designations to meet various regulatory requirements.*

*Full details of all references are available from Starna.*

### European Pharmacopoeia - RM-0660HLKCTX

Potassium Dichromate 60 & 600mg/l, Holmium Perchlorate, Potassium Chloride, Toluene/Hexane

### Full Pharmacopoeia - RM-0660HLKCSITX

Potassium Dichromate 60 & 600mg/l, Holmium Perchlorate, Potassium Chloride, Sodium Iodide, Toluene/Hexane

### United States Pharmacopoeia (USP) - RM-06HLKITX

Potassium Dichromate 60mg/l, Holmium Perchlorate, Potassium Iodide, Toluene/Hexane

**RM-06** Potassium Dichromate 60mg/l

**RM-HL** Holmium Perchlorate

**RM-1N2N3N** Neutral Density Filter 10, 20 & 30%T

**RM-N1N35N** Neutral Density Filter 1, 3 & 50%T

**RM-NIR** TS5 Reference



Absorbance & Linearity



Wavelength



Stray Light



Instrument Resolution

## Terms of Sale

Normal terms of sale are net 30 days, FOB Hainault to authorised 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 Courier 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 the sales invoice.

## Stock items

Great efforts are made to stock the widest possible range of products for immediate shipping.

Any item temporarily out of stock will be back ordered to our own production facility and shipped at the earliest possible opportunity unless otherwise instructed.

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