

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

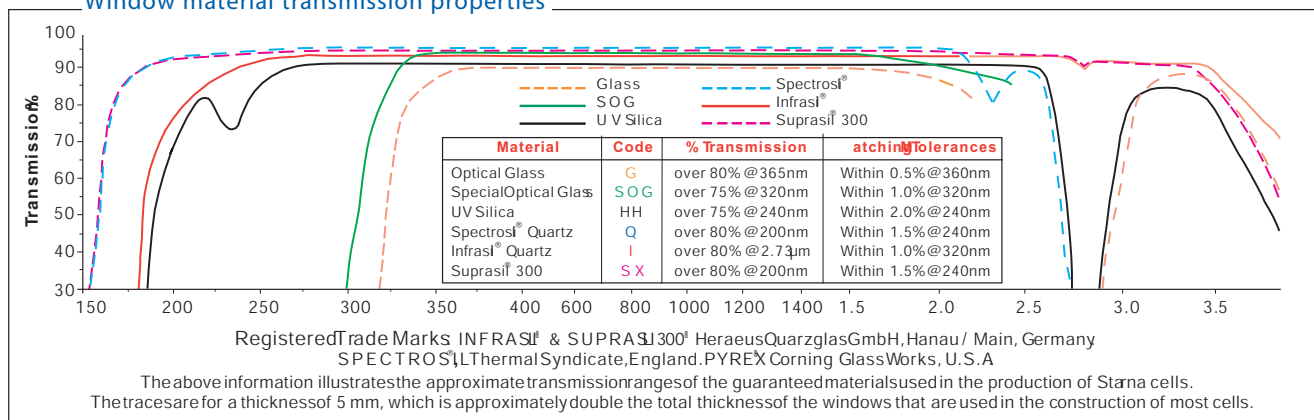
Windows parallel to:	better than 3 minutes of arc	
Window flatness to:	better than 4 Newton fringes	
Window polish, standard:	60/40 scratch/dig	
Window polish, laser:	20/10 scratch/dig	
Material	Path lengths	Tolerance
Glass	less than 10mm	± 0.02mm
Glass	10 to 30mm	± 0.1mm
Glass	40 to 100mm	± 0.2mm
Special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

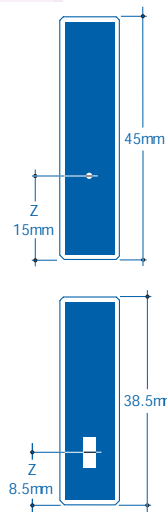
For the most efficient use of energy and sample volume the shape of the cell sample chamber should ideally be of the same shape as the light beam, but slightly larger. The 'Z' height of the cell, the centre of the sample chamber to the base of the cell, should be identical to that of the instrument,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



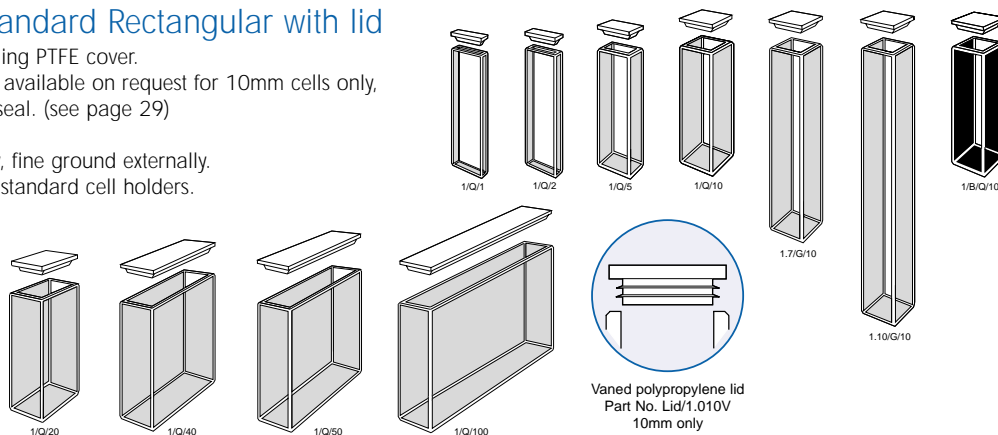
When cells matched for **transmission** are required, mainly but not exclusively for less consistent materials such as Glass and Special Optical Glass where consistency of raw material from melt to melt differs, each measured cell is given a match code relative to its transmission at a given wavelength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

Type 1. Macro/Standard Rectangular with lid

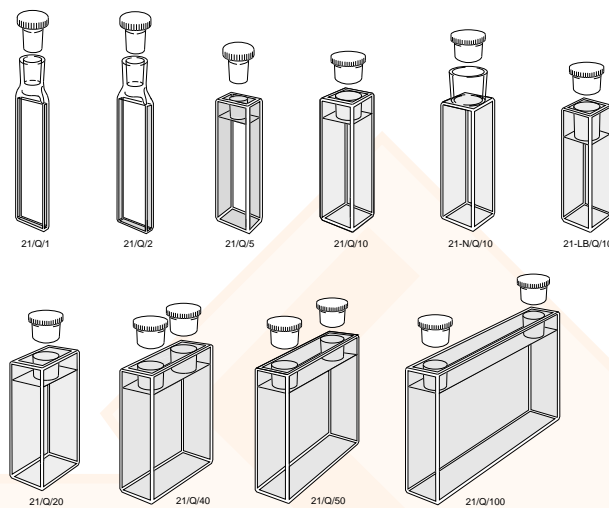
- Open top, with non-sealing PTFE cover.
- Polypropylene vaned lid available on request for 10mm cells only, providing a liquid-tight seal. (see page 29)
- Two polished windows.
- Walls polished internally, fine ground externally.
- Suitable for use with all standard cell holders.



Type No.	Window Materials	Path Length	Internal Width	External L W H	Nominal Vol. ml	Remarks
1	G, SOG, Q, I, SX	1	10	3.5 12.5 45	0.400	
1	G, SOG, Q, I, SX	2	10	4.5 12.5 45	0.700	
1	G, SOG, Q, I, SX	5	10	7.5 12.5 45	1.700	
1	G, SOG, PX, HH, Q, I, SX	10	10	12.5 12.5 45	3.500	
1	G, SOG, Q, I, SX	20	10	22.5 12.5 45	7.000	
1	G, SOG, Q, I, SX	40	10	42.5 12.5 45	14.000	
1	G, SOG, Q, I, SX	50	9.5	52.5 12.5 45	17.500	
1	G, SOG, Q, I, SX	100	9.5	102.5 12.5 45	35.000	
1/B	Q	10	10	12.5 12.5 45	3.500	Black walls
1.7	G	10	10	12.5 12.5 70	6.500	
1.10	G	10	10	12.5 12.5 100	10.000	

Type 21. Macro/Standard Rectangular with stopper(s)

- Closed by PTFE stopper(s), providing a liquid-tight seal.
- Two polished windows.
- Walls polished internally, fine ground externally.
- Suitable for use with all standard cell holders.

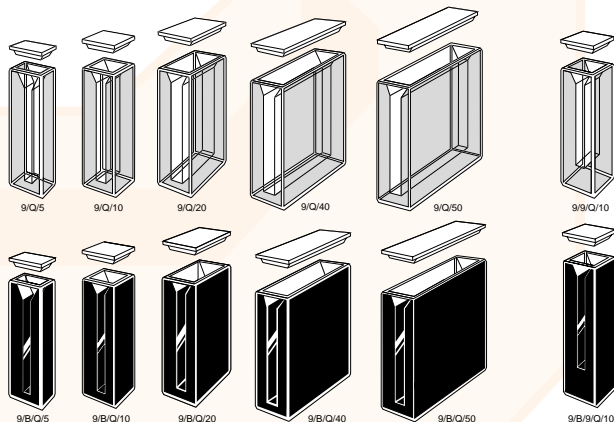


Type No.	Window Materials	Path Length	Internal Width	External L W H	Nominal Vol. ml	Remarks
21	G, SOG, Q, I, SX	1	10	3.5 12.5 55	0.400	
21	G, SOG, Q, I, SX	2	10	4.5 12.5 55	0.700	
21	G, SOG, Q, I, SX	5	10	7.5 12.5 48	1.700	
21	G, SOG, HH, Q, I, SX	10	10	12.5 12.5 48	3.500	
21	G, SOG, Q, I, SX	20	10	22.5 12.5 48	7.000	
21	G, SOG, Q, I, SX	40	10	42.5 12.5 48	14.000	
21	G, SOG, Q, I, SX	50	9.5	52.5 12.5 48	17.500	
21	G, SOG, Q, I, SX	100	9.5	102.5 12.5 48	35.000	
21-N	Q	10	10	12.5 12.5 43	3.000	Wide neck
21-LB	Q	10	10	12.5 12.5 42	3.000	

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

Type 9 & 9/B. Semi-micro with lid

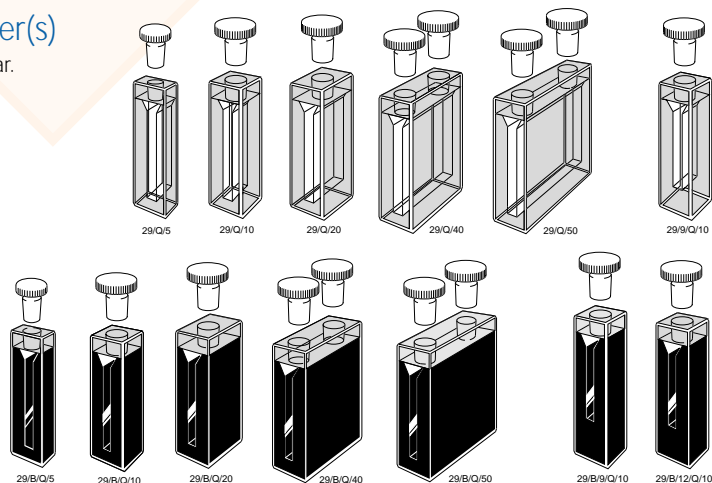
- Reduced nominal volume to <50% of Standard rectangular.
 - Open top, supplied with non-sealing PTFE cover.
 - Two polished windows.
 - Walls polished internally, fine ground externally.
 - Base thickness - 3mm unless indicated.
 - Suitable for use with all standard cell holders.
-
- Self-masking solid black walls enhance sensitivity and improve linearity at higher absorbances.



Type No.	Window Materials	Path Length	Internal Width	External L W H			Nominal Vol. ml	Remarks
Clear walls								
9	G,SOG, Q, I, SX	5	4	7.5	12.5	45	0.700	
9	G,SOG, PX, HH, Q, I, SX	10	4	12.5	12.5	45	1.400	
9	G,SOG, Q, I, SX	20	4	22.5	12.5	45	2.800	
9	G,SOG, Q, I, SX	40	4	42.5	12.5	45	5.600	
9	G,SOG, Q, I, SX	50	4	52.5	12.5	45	7.000	
9/9	SOG, Q, I, SX	10	4	12.5	12.5	45	1.160	9 mm thick base
Self-masking. Black walls								
9/B	SOG, Q, I, SX	5	4	7.5	12.5	45	0.700	
9/B	SOG, HH, Q, I, SX	10	4	12.5	12.5	45	1.400	
9/B	SOG, Q, I, SX	20	4	22.5	12.5	45	2.800	
9/B	SOG, Q, I, SX	40	4	42.5	12.5	45	5.600	
9/B	SOG, Q, I, SX	50	4	52.5	12.5	45	7.000	
9/B/9	SOG, Q, I, SX	10	4	12.5	12.5	45	1.160	9mm thick base

Type 29 & 29/B. Semi-micro with stopper(s)

- Reduced nominal volume to <50% of Standard rectangular.
 - Closed by PTFE stopper(s), providing a liquid-tight seal.
 - Two polished windows.
 - Walls polished internally, fine ground externally.
 - Base thickness - 3mm unless indicated.
 - Suitable for use with all standard cell holders.
-
- Self-masking solid black walls enhance sensitivity and improve linearity at higher absorbances.

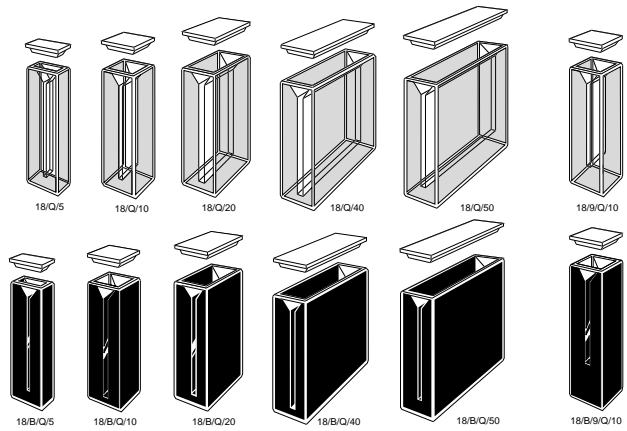


Type No.	Window Materials	Path Length	Internal Width	External L W H			Nominal Vol. ml	Remarks
Clear walls								
29	SOG, Q, I, SX	5	4	7.5	12.5	48	0.700	
29	SOG, PX, HH, Q, I, SX	10	4	12.5	12.5	48	1.400	
29	SOG, Q, I, SX	20	4	22.5	12.5	48	2.800	
29	SOG, Q, I, SX	40	4	42.5	12.5	48	5.600	
29	SOG, Q, I, SX	50	4	52.5	12.5	48	7.000	
29/9	SOG, Q, I, SX	10	4	12.5	12.5	48	1.160	9 mm thick base
Self-masking. Black walls								
29/B	SOG, Q, I, SX	5	4	7.5	12.5	48	0.700	
29/B	SOG, HH, Q, I, SX	10	4	12.5	12.5	48	1.400	
29/B	SOG, Q, I, SX	20	4	22.5	12.5	48	2.800	
29/B	SOG, Q, I, SX	40	4	42.5	12.5	48	5.600	
29/B	SOG, Q, I, SX	50	4	52.5	12.5	48	7.000	
29/B/9	SOG, Q, I, SX	10	4	12.5	12.5	48	1.160	9 mm thick base
29/B/12	Q	10	4	12.5	12.5	48	1.000	12 mm thick base

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

Type 18 & 18/B. Micro with lid

- Reduced nominal volume to <20% of Standard rectangular.
- Open top, with non-sealing PTFE cover.
- Two polished windows.
- Walls polished internally, fine ground externally.
- Base thickness - 3mm unless indicated.
- Suitable for use with all standard cell holders.

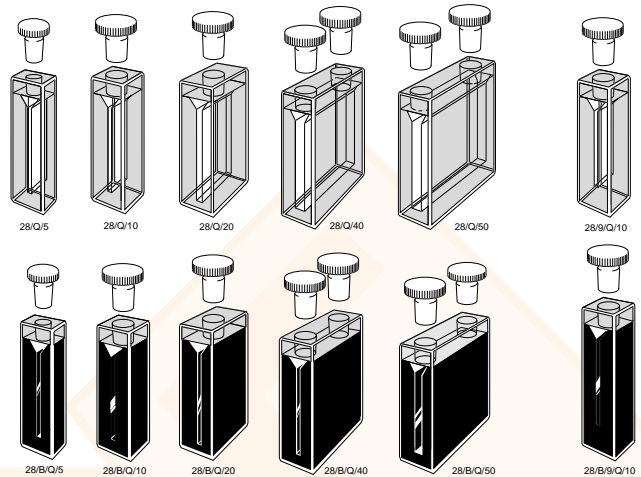


- Self-masking solid black walls enhance sensitivity and improve linearity at higher absorbances.

Type No.	Window Materials	Path Length	Internal Width	External L	External W	External H	Nominal Vol. ml	Remarks
Clear walls								
18	SOG, Q, I, SX	5	2	7.5	12.5	45	0.350	
18	SOG, PX, HH, Q, I, SX	10	2	12.5	12.5	45	0.700	
18	SOG, Q, I, SX	20	2	22.5	12.5	45	1.400	
18	SOG, Q, I, SX	40	2	42.5	12.5	45	2.800	
18	SOG, Q, I, SX	50	2	52.5	12.5	45	3.500	
18/9	SOG, Q, I, SX	10	2	12.5	12.5	45	0.580	9mm thick base
Self-masking. Black walls								
18/B	SOG, Q, I, SX	5	2	7.5	12.5	45	0.350	
18/B	SOG, HH, Q, I, SX	10	2	12.5	12.5	45	0.700	
18/B	SOG, Q, I, SX	20	2	22.5	12.5	45	1.400	
18/B	SOG, Q, I, SX	40	2	42.5	12.5	45	2.800	
18/B	SOG, Q, I, SX	50	2	52.5	12.5	45	3.500	
18/B/9	SOG, Q, I, SX	10	2	12.5	12.5	45	0.580	9mm thick base

Type 28 & 28/B. Micro with stopper(s)

- Reduced nominal volume to <20% of Standard rectangular.
- Closed by PTFE stopper(s), providing a liquid-tight seal.
- Two polished windows.
- Walls polished internally, fine ground externally.
- Base thickness - 3mm unless indicated.
- Suitable for use with all standard cell holders.



- Self-masking solid black walls enhance sensitivity and improve linearity at higher absorbances.

Type No.	Window Materials	Path Length	Internal Width	External L	External W	External H	Nominal Vol. ml	Remarks
Clear walls								
28	SOG, Q, I, SX	5	2	7.5	12.5	48	0.350	
28	SOG, PX, HH, Q, I, SX	10	2	12.5	12.5	48	0.700	
28	SOG, Q, I, SX	20	2	22.5	12.5	48	1.400	
28	SOG, Q, I, SX	40	2	42.5	12.5	48	2.800	
28	SOG, Q, I, SX	50	2	52.5	12.5	48	3.500	
28/9	SOG, Q, I, SX	10	2	12.5	12.5	48	0.580	9mm thick base
Self-masking. Black walls								
28/B	SOG, Q, I, SX	5	2	7.5	12.5	48	0.350	
28/B	SOG, HH, Q, I, SX	10	2	12.5	12.5	48	0.700	
28/B	SOG, Q, I, SX	20	2	22.5	12.5	48	1.400	
28/B	SOG, Q, I, SX	40	2	42.5	12.5	48	2.800	
28/B	SOG, Q, I, SX	50	2	52.5	12.5	48	3.500	
28/B/9	SOG, Q, I, SX	10	2	12.5	12.5	48	0.580	9mm thick base

Type 15. Sub-micro & Multi-micro, short

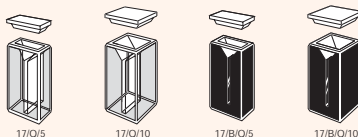
- Two polished windows.
- Open top.
- To be used with holder supplied by instrument manufacturer.



Type No.	Window Material	Path Length	Z Height	Internal Width	External			Nominal Vol. ml
					L	W	H	
15.40/10	Q	10	2	2	12.5	12.5	10	0.040
15.40/12	Q	10	2	2	12.5	12.5	12	0.040
15.40/12.5	Q	10	8.5	2	12.5	12.5	12.5	0.040
15.30x4	Q	10	3	3	12.5	36	14.5	0.300

Type 17. Micro short

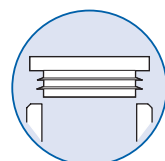
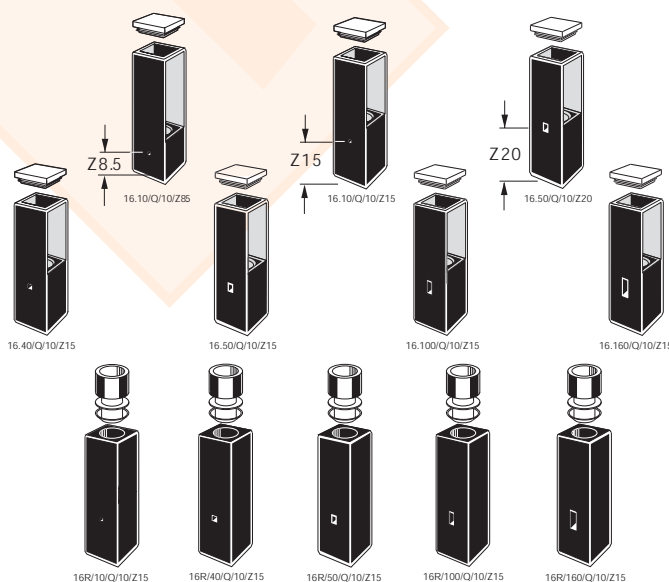
- Two polished windows.
- Open top, supplied with non-sealing PTFE cover.
- Walls polished internally, fine ground externally.
- Base thickness - 3mm.



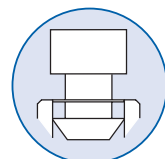
Type No.	Window Materials	Path Length	Internal Width	External			Nominal Vol. ml
				L	W	H	
Clear walls							
17	SOG, Q	5	2	7.5	12.5	25	0.200
17	SOG, Q	10	2	12.5	12.5	25	0.400
Self-masking. Black walls							
17/B	SOG, Q	5	2	7.5	12.5	25	0.200
17/B	SOG, Q	10	2	12.5	12.5	25	0.400

Type 16 & 16R. Sub-micro

- Sub-micro volumes from 10 μ l to 160 μ l.
- Type 16 has a top; comprising two black walls and two translucent side walls with a square internal cross-section.
- Open top, supplied with non-sealing PTFE cover as well as a vaned lid to provide a liquid-tight seal.
- To avoid possible meniscus errors; it may be necessary to increase the nominal sample fill volume by at least 20%.
- May be used with all standard cell holders.
- Filling and emptying with a pipette is recommended.
- Type 16R. Similar to Type 16 except that the top is solid black quartz and round internal cross-section.
- Closed by a vaned polypropylene plug stopper to provide a liquid-tight seal.



Vaned polypropylene lid
Part No. Lid/1.010V

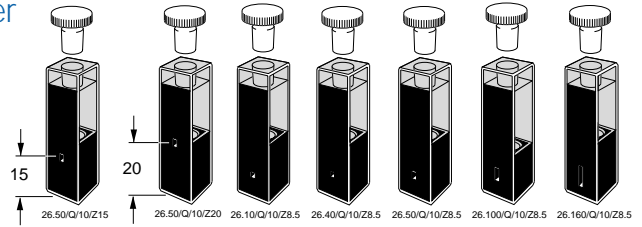


Vaned stopper
Part No. STP/C10.10V

Type No.	Window Material	Path Length	Z Height	Sample chamber		External			Nominal Vol. ml
				W	H	L	W	H	
Square top, two translucent walls									
16.10	Q	10	8.5, 12, 15, 20	1	1	12.5	12.5	45	0.010
16.40	Q	10	8.5, 12, 15, 20	2	2	12.5	12.5	45	0.040
16.50	Q	10	8.5, 12, 15, 20	2	2.5	12.5	12.5	45	0.050
16.100	Q	10	8.5, 12, 15, 20	2	5	12.5	12.5	45	0.100
16.160	Q	10	8.5, 12, 15, 20	2	8	12.5	12.5	45	0.160
Square top with round hole, solid black									
16R/10	Q	10	8.5, 12, 15, 20	1	1	12.5	12.5	45	0.010
16R/40	Q	10	8.5, 12, 15, 20	2	2	12.5	12.5	45	0.040
16R/50	Q	10	8.5, 12, 15, 20	2	2.5	12.5	12.5	45	0.050
16R/100	Q	10	8.5, 12, 15, 20	2	5	12.5	12.5	45	0.100
16R/160	Q	10	8.5, 12, 15, 20	2	8	12.5	12.5	45	0.160

Type 26. Sub-micro & Ultra-micro with stopper

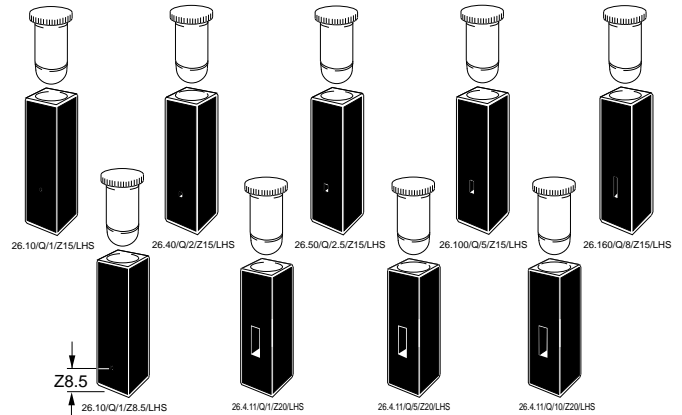
- Reduced nominal volume from 10µl to 160µl.
- Rectangular internal top with two black walls and two translucent walls.
- Closed by PTFE stopper, providing a liquid-tight seal.
- To avoid possible meniscus errors; it may be necessary to increase the nominal sample fill volume by at least 20%.
- May be used with all standard cell holders.
- Filling and emptying with a pipette is recommended.



Type No.	Window Material	Path Length	Z Height	Sample chamber		External			Nominal Vol. ml
				W	H	L	W	H	
26.10	Q	10	8.5, 15, 20	1	1	12.5	12.5	48	0.010
26.40	Q	10	8.5, 15, 20	2	2	12.5	12.5	48	0.040
26.50	Q	10	8.5, 15, 20	2	2.5	12.5	12.5	48	0.050
26.100	Q	10	8.5, 15, 20	2	5	12.5	12.5	48	0.100
26.160	Q	10	8.5, 15, 20	2	8	12.5	12.5	48	0.160

Type 26/LHS. Sub-micro, low head space

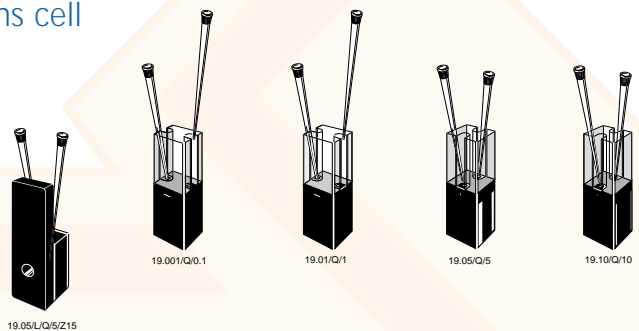
- Reduced nominal volume range from 10µl to 440µl.
- Round internal solid black top closed by a specially profiled PTFE stopper.
- The cell and liquid-tight stopper are specially designed so that the volume of air above the sample is reduced by >95% compared with normal sub-micro cells.
- This reduces evaporation loss of samples such as DNA to a minimum.
- To avoid possible meniscus errors; it may be necessary to increase the nominal sample fill volume by at least 20%.
- Sample may be introduced and retrieved by a syringe or micro pipette.



Type No.	Window Material	Path Length	Z Height	Sample chamber		External			Nominal Vol. ml
				W	H	L	W	H	
26.10/LHS	Q	10	8.5, 15, 20	1	1	12.5	12.5	45	0.010
26.40/LHS	Q	10	8.5, 15, 20	2	2	12.5	12.5	45	0.040
26.50/LHS	Q	10	8.5, 15, 20	2	2.5	12.5	12.5	45	0.050
26.100/LHS	Q	10	8.5, 15, 20	2	5	12.5	12.5	45	0.100
26.160/LHS	Q	10	8.5, 15, 20	2	8	12.5	12.5	45	0.160
26.4.11/LHS	Q	1	20	4	11	12.5	12.5	45	0.044
26.4.11/LHS	Q	5	20	4	11	12.5	12.5	45	0.220
26.4.11/LHS	Q	10	20	4	11	12.5	12.5	45	0.440

Type 19 Ultra-micro & 19/L Ultra-micro lens cell

- Ultra-micro volume range from 0.5µl to 10µl
- Two polished windows.
- Sample inserted and retrieved with micro pipette tip.
- Two micro pipette tips provided with each cell.
- Type 19/L is a patented design with integral lens.
- The focusing lens increases the energy entering the sample.
- Type 19/L is not suitable for all instruments.
- Performance is dictated by instrument optical configuration.



Type No.	Material choice	Path Length	Z Height	Sample chamber		External			Nominal Vol. ml	Remarks
				W	H	L	W	H		
19.001	Q	0.1	8.5, 15, 20	5	1	12.5	12.5	45	0.0005	
19.01	Q	1	8.5, 15, 20	5	1	12.5	12.5	45	0.0050	
19.05	Q	5	8.5, 15, 20	0.8Ø		12.5	12.5	45	0.0025	
19.10	Q	10	8.5, 15, 20	0.8Ø		12.5	12.5	45	0.0050	
19.05/L	Q	5	8.5*, 15, 20	1	1	12.5	12.5	45	0.0050	* Cell height - 38.5mm



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