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 x 105Pa (3 Bar) and some up to10 x 105Pa (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

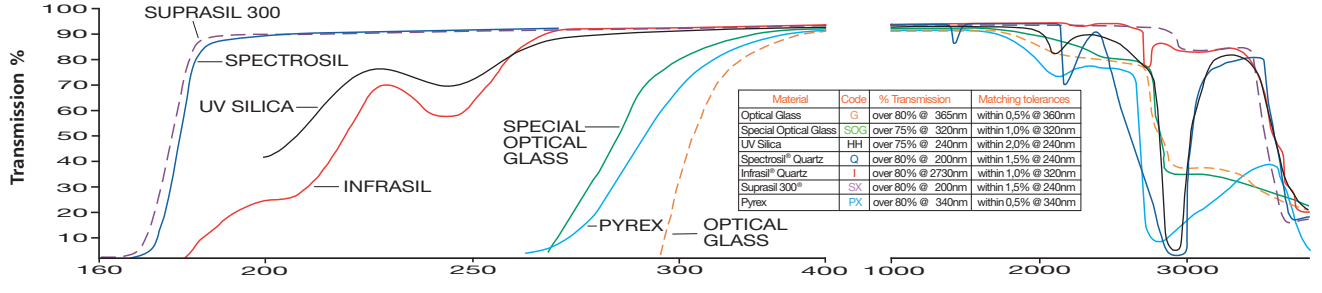
Standard window thickness is 1.25mm, polished to better than 4 Newton Fringes per centimetre in the viewing area, typically flat to better than 1 micron (0.001mm) over the window area.

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: INFRASIL® & 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

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:

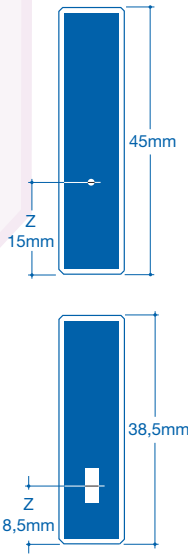
Optical Glass	G	334 through 2500 nm
Special Optical Glass	SOG	320 through 2500 nm
Borosilicate	PX	325 through 2500 nm
UV Silica	HH	220 through 2500 nm
Spectrosil® Quartz	Q	190 through 2700 nm
Infrasil®	I	220 through 3800 nm
Suprasil 300® Quartz	SX	190 through 3500 nm

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.

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

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.

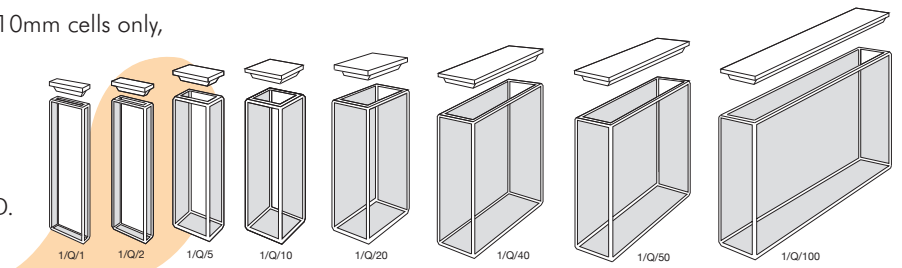
When cells matched for transmission are required, mainly but not exclusively for less consistent materials such as Glass and Special Optical Glass where transmission characteristics from melt to melt differ, each measured cell is given a match code relative to its transmission at a given wavelength as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

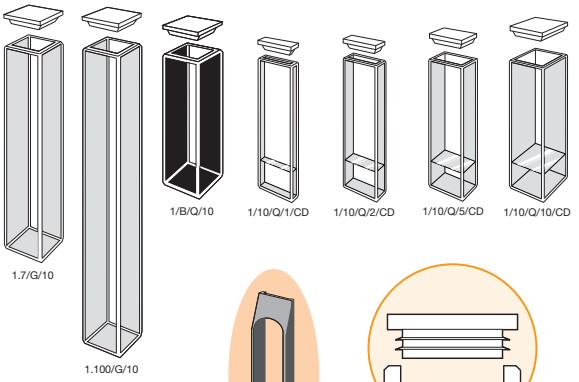
The matching codes are only of real value when comparing new cells as transmission characteristics change during use because of surface contamination or wear due to cleaning processes. Therefore a brand new cell may not identically match an older used cell of the same match code.

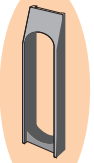
Type 1. Macro/Standard Rectangular with lid, and Reduced Volume with lid

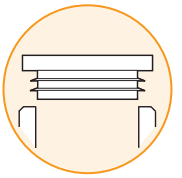
- Open top, with non-sealing PTFE cover.
- Polyethylene vaned lid available on request for 10mm cells only, providing a liquid-tight seal. **(see page 28)**
- Two polished windows.
- Walls polished internally, fine ground externally.
- Suitable for use with all standard cell holders.
- **Type 1/B** has black side walls.
- **Type 1/10/CD** thick base, reduced sample for CD.
- Cell compartment spacers **SPA** available for 1, 2 & 5mm Path length cells **(see page 28)**.



Type No.	Window Materials	Path Length	Internal Width	External L	W	H	Nominal Vol. ml
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	30	10	32.5	12.5	45	10.500
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
1.7	G	10	10	12.5	12.5	70	6.500
1.100	G	10	10	12.5	12.5	100	10.000
1/10/CD	Q, I	1	10	3.5	12.5	45	0.275
1/10/CD	Q, I	2	10	4.5	12.5	45	0.450
1/10/CD	Q, I	5	10	7.5	12.5	45	1.200
1/10/CD	Q, I	10	10	12.5	12.5	45	2.500



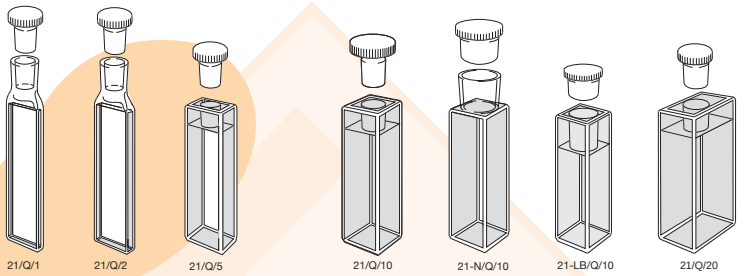

SPA.5


Vaned polyethylene lid
Part No. Lid/1,010V
10mm only

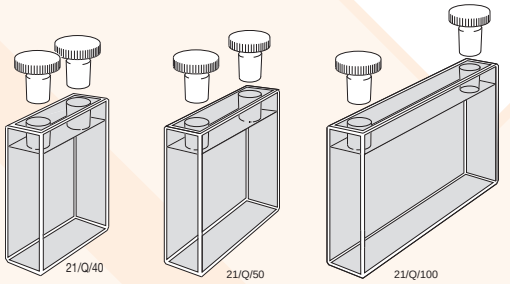
For GL/14 Screw tops, graded seals & straight bore tubes - See pages 11 &12

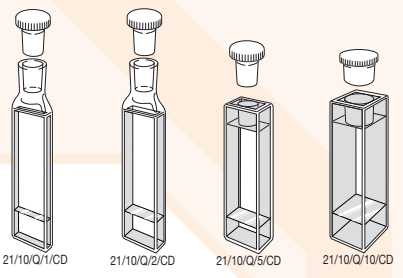
Type 21. Macro/Standard Rectangular with stopper(s), and Reduced Volume with stopper(s)

- 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 21-N** Wide neck.
- **Type 21-LB** With long stopper block.
- **Type 21/10/CD** thick base, reduced sample for CD.
- Cell compartment spacers **SPA** available for 1, 2 & 5mm Path length cells **(see page 28)**.



Type No.	Window Materials	Path Length	Internal Width	External L	W	H	Nominal Vol. ml
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	30	10	32.5	12.5	48	10.500
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
21-LB	Q	10	10	12.5	12.5	42	3.000
21/10/CD	Q, I	1	10	3.5	12.5	55	0.275
21/10/CD	Q, I	2	10	4.5	12.5	55	0.450
21/10/CD	Q, I	5	10	7.5	12.5	48	1.200
21/10/CD	Q, I	10	10	12.5	12.5	48	2.500

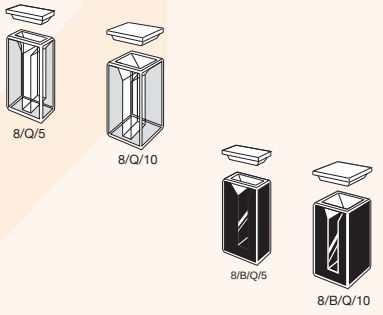




G = Optical Glass 334-2500nm SOG = Special Optical Glass 320-2500nm PX = Borosilicate 325-2500nm HH = UV Silica 220-2500nm
Q = Far UV Quartz 170-2700nm I = Near Infra-Red Quartz 220-3800nm SX = Far UV to Near IR Quartz (Water free) 170-3500nm

Type 8. Semi Micro short

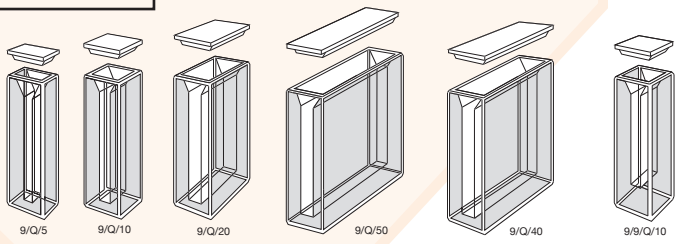
- Open top, supplied with non-sealing PTFE cover.
- Two polished windows.
- Walls polished internally, fine ground externally.

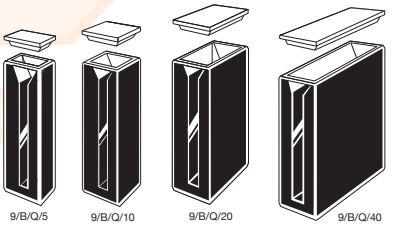


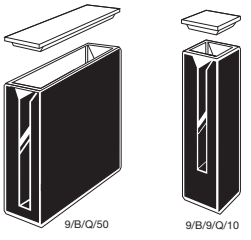
Type No.	Window Materials	Path Length	Internal Width	External L	W	H	Base Thickness	Nominal Vol. ml
Clear walls								
8	SOG, Q	5	4	7.5	12.5	25	3	0.400
8	SOG, Q	10	4	12.5	12.5	25	3	0.800
Self-masking. Black walls								
8/B	SOG, Q	5	4	7.5	12.5	25	3	0.400
8/B	SOG, Q	10	4	12.5	12.5	25	3	0.800

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.
- Suitable for use with all standard cell holders.
- **Self-masking solid black walls** enhance sensitivity and improve linearity at higher absorbances.



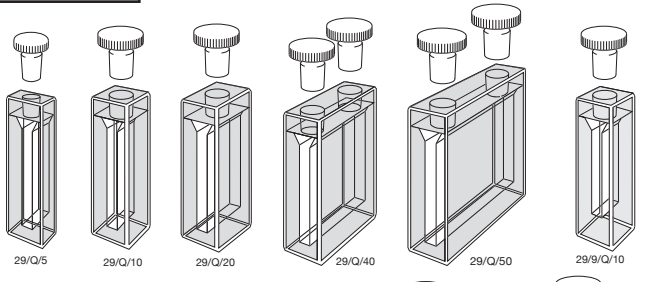


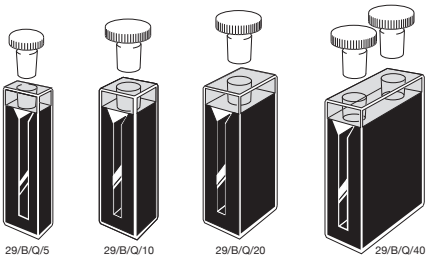


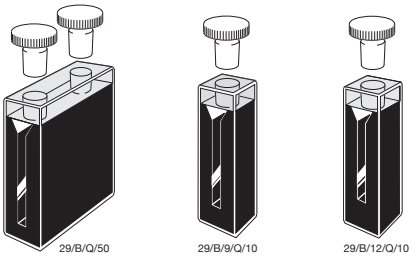
Type No.	Window Materials	Path Length	Internal Width	External L	W	H	Base Thickness	Nominal Vol. ml
Clear walls								
9	G,SOG, Q, I, SX	5	4	7.5	12.5	45	3	0.700
9	G,SOG, PX, HH, Q, I, SX	10	4	12.5	12.5	45	3	1.400
9	SOG, Q, I, SX	20	4	22.5	12.5	45	3	2.800
9	SOG, Q, I, SX	40	4	42.5	12.5	45	3	5.600
9	SOG, Q, I, SX	50	4	52.5	12.5	45	3	7.000
9	Q, I, SX	100	4	102.5	12.5	45	3	14.00
9/9	SOG, Q, I, SX	10	4	12.5	12.5	45	9	1.160
Self-masking. Black walls								
9/B	SOG, Q, I, SX	5	4	7.5	12.5	45	3	0.700
9/B	SOG, HH, Q, I, SX	10	4	12.5	12.5	45	3	1.400
9/B	SOG, Q, I, SX	20	4	22.5	12.5	45	3	2.800
9/B	SOG, Q, I, SX	40	4	42.5	12.5	45	3	5.600
9/B	SOG, Q, I, SX	50	4	52.5	12.5	45	3	7.000
9/B/9	SOG, Q, I, SX	10	4	12.5	12.5	45	9	1.160

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.
- Suitable for use with all standard cell holders.
- **Self-masking solid black walls** enhance sensitivity and improve linearity at higher absorbances.







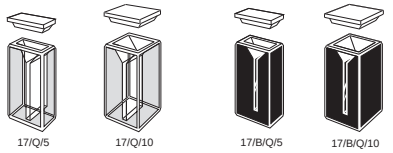
Type No.	Window Materials	Path Length	Internal Width	External L	W	H	Base Thickness	Nominal Vol. ml
Clear walls								
29	SOG, Q, I, SX	5	4	7.5	12.5	48	3	0.700
29	SOG, PX, HH, Q, I, SX	10	4	12.5	12.5	48	3	1.400
29	SOG, Q, I, SX	20	4	22.5	12.5	48	3	2.800
29	SOG, Q, I, SX	40	4	42.5	12.5	48	3	5.600
29	SOG, Q, I, SX	50	4	52.5	12.5	48	3	7.000
29/9	SOG, Q, I, SX	10	4	12.5	12.5	48	9	1.160
Self-masking. Black walls								
29/B	SOG, Q, I, SX	5	4	7.5	12.5	48	3	0.700
29/B	SOG, HH, Q, I, SX	10	4	12.5	12.5	48	3	1.400
29/B	SOG, Q, I, SX	20	4	22.5	12.5	48	3	2.800
29/B	SOG, Q, I, SX	40	4	42.5	12.5	48	3	5.600
29/B	Q, I, SX	50	4	52.5	12.5	48	3	7.000
29/B/9	SOG, Q, I, SX	10	4	12.5	12.5	48	9	1.160
29/B/12	Q	1	4	12.5	12.5	48	12	0.100
29/B/12	Q	2	4	12.5	12.5	48	12	0.200
29/B/12	Q	5	4	12.5	12.5	48	12	0.500
29/B/12	Q	10	4	12.5	12.5	48	12	1.000

G = Optical Glass 334-2500nm SOG = Special Optical Glass 320-2500nm PX = Borosilicate 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 17. Micro short

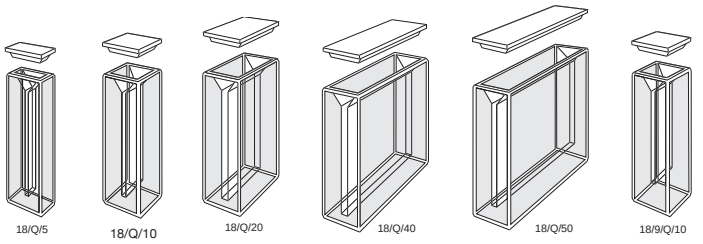
- Two polished windows.
- Open top, supplied with non-sealing PTFE cover.
- Walls polished internally, fine ground externally.
- Base thickness - 3mm.

Type No.	Window Materials	Path Length	Internal Width	External L	W	H	Nominal Vol. ml
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

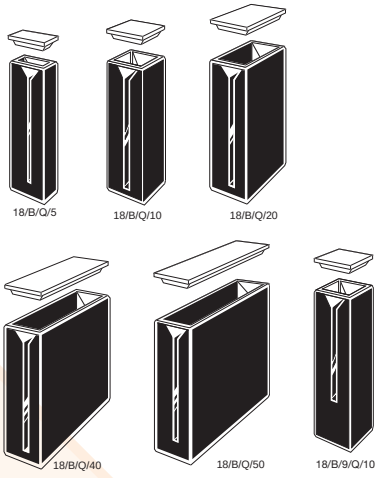


Type 18 & 18/B. Micro with lid

- Reduced nominal volume to <20% of Standard rectangular.
- Open top, with non-sealing PTFE cover.
- Two polished windows.
- Walls polished internally, fine ground externally.
- Suitable for use with all standard cell holders.
- **Self-masking solid black walls** enhance sensitivity and improve linearity at higher absorbances.

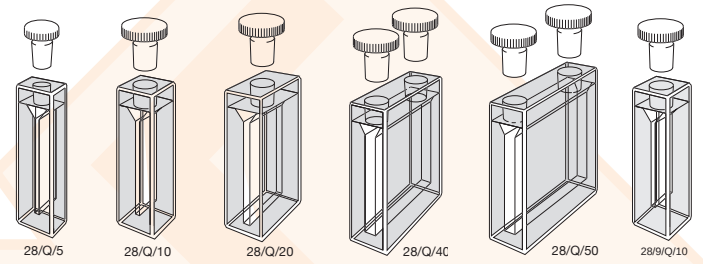


Type No.	Window Materials	Path Length	Internal Width	External L	W	H	Base Thickness	Nominal Vol. ml
Clear walls								
18	SOG, Q, I, SX	5	2	7.5	12.5	45	3	0.350
18	SOG, PX, HH, Q, I, SX	10	2	12.5	12.5	45	3	0.700
18	SOG, Q, I, SX	20	2	22.5	12.5	45	3	1.400
18	SOG, Q, I, SX	40	2	42.5	12.5	45	3	2.800
18	SOG, Q, I, SX	50	2	52.5	12.5	45	3	3.500
18	SOG, Q, I, SX	50	2	52.5	12.5	45	3	3.500
18	Q, I, SX	100	2	102.5	12.5	45	3	7.000
18/9	SOG, Q, I, SX	10	2	12.5	12.5	45	9	0.580
Self-masking. Black walls								
18/B	SOG, Q, I, SX	5	2	7.5	12.5	45	3	0.350
18/B	SOG, HH, Q, I, SX	10	2	12.5	12.5	45	3	0.700
18/B	SOG, Q, I, SX	20	2	22.5	12.5	45	3	1.400
18/B	SOG, Q, I, SX	40	2	42.5	12.5	45	3	2.800
18/B	SOG, Q, I, SX	50	2	52.5	12.5	45	3	3.500
18/B/9	SOG, Q, I, SX	10	2	12.5	12.5	45	9	0.580

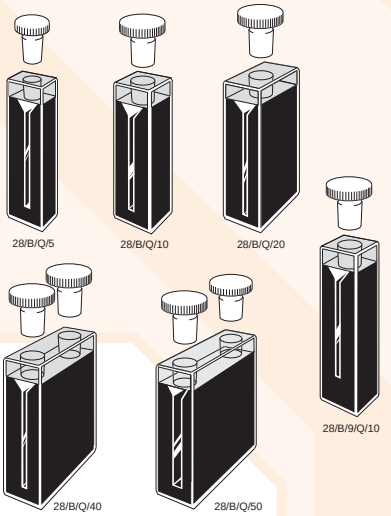


Type 28 & 28/B. Micro with stopper(s)

- 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.
- 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	Base Thickness	Nominal Vol. ml
Clear walls								
28	SOG, Q, I, SX	5	2	7.5	12.5	48	3	0.350
28	SOG, PX, HH, Q, I, SX	10	2	12.5	12.5	48	3	0.700
28	SOG, Q, I, SX	20	2	22.5	12.5	48	3	1.400
28	SOG, Q, I, SX	40	2	42.5	12.5	48	3	2.800
28	SOG, Q, I, SX	50	2	52.5	12.5	48	3	3.500
28/9	SOG, Q, I, SX	10	2	12.5	12.5	48	9	0.580
Self-masking. Black walls								
28/B	SOG, Q, I, SX	5	2	7.5	12.5	48	3	0.350
28/B	SOG, HH, Q, I, SX	10	2	12.5	12.5	48	3	0.700
28/B	SOG, Q, I, SX	20	2	22.5	12.5	48	3	1.400
28/B	SOG, Q, I, SX	40	2	42.5	12.5	48	3	2.800
28/B	Q, I, SX	50	2	52.5	12.5	48	3	3.500
28/B/9	SOG, Q, I, SX	10	2	12.5	12.5	48	9	0.580



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

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


15.40/5/Q/5/Z2

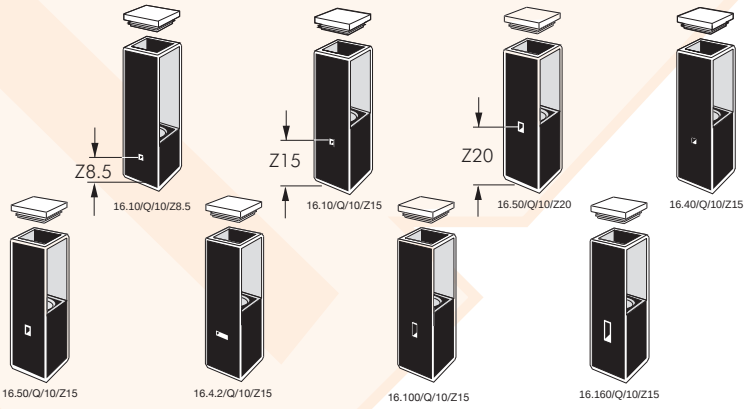

15.40/2/Q/10/Z8.5

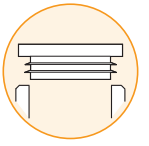

15.30 x 4/Q/10/Z3

Type No.	Window Material	Path Length	Z Height	Internal W	Internal H	External L	External W	External H	Nominal Vol. ml	Remarks
15.40/5	Q	10	2	2	5	12.5	12.5	8	0.100	Cecil
15.40/4	Q	10	2	2	4	12.5	12.5	10	0.050	Biochrom® (masked 2x2)
15.40/7.5	Q	10	2	2	7.5	12.5	12.5	10	0.160	Shimadzu®
15.40/2	Q	10	8.5	2	2	12.5	12.5	12	0.040	Beckman®
15.30x4	Q	10	3	3	10	36	36	14.5	0.300	Beckman®

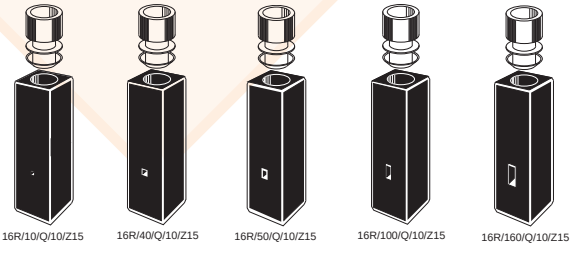
Type 16 & 16R. Sub-micro

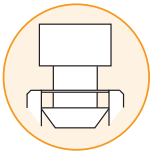
- Sub-micro volumes from 10µl to 160µl.
- **Type 16** has a top section; comprising two black walls and two translucent side walls with a square internal cross-section.
- Open top, supplied with non-sealing PTFE cover as well as a vaned lid to provide a liquid-tight seal.
- To avoid possible meniscus errors; it may be necessary to increase the nominal sample fill volume by at least 20%.
- Z dimension measurement or instrument information is required when ordering.
- May be used with all standard cell holders.
- Filling and emptying with a pipette is recommended.




Vaned polyethylene lid
Part No. Lid/1.010V

- **Type 16R**. Similar to **Type 16** except that the top section is solid black quartz and round internal cross-section.
- Closed by a vaned polyethylene plug stopper to provide a liquid-tight seal.




Vaned stopper
Part No. STP/C10.10V

Type No.	Window Material	Path Length	Z Height	Internal W	Internal H	External L	External W	External H	Nominal Vol. ml
Square top, two translucent walls									
16.10	Q	10	8.5, 15, 20	1	1	12.5	12.5	45	0.010
16.40	Q	10	8.5, 15, 20	2	2	12.5	12.5	45	0.040
16.50	Q	10	8.5, 15, 20	2	2.5	12.5	12.5	45	0.050
16.4.2	Q	10	15	4	2	12.5	12.5	45	0.080
16.100	Q	10	8.5, 15, 20	2	5	12.5	12.5	45	0.100
16.160	Q	10	8.5, 15, 20	2	8	12.5	12.5	45	0.160
Square top with round hole, solid black									
16R/10	Q	10	8.5, 15, 20	1	1	12.5	12.5	45	0.010
16R/40	Q	10	8.5, 15, 20	2	2	12.5	12.5	45	0.040
16R/50	Q	10	8.5, 15, 20	2	2.5	12.5	12.5	45	0.050
16R/100	Q	10	8.5, 15, 20	2	5	12.5	12.5	45	0.100
16R/160	Q	10	8.5, 15, 20	2	8	12.5	12.5	45	0.160

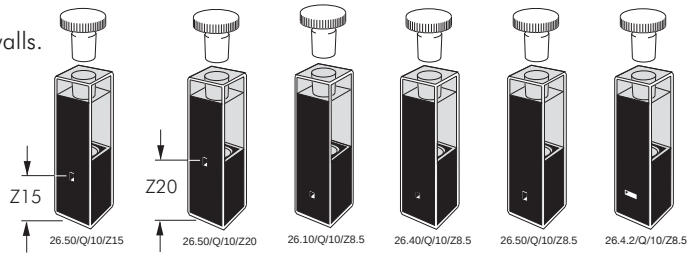
Z Dimension per instrument

Manufacturer	Z Dimension
Agilent®	15mm
Beckman®	8.5mm
Bio-Rad®	8.5mm
Eppendorf®	8.5mm
GBC®	15mm
Hewlett Packford®	15mm
Hitachi®	8.5mm
Jasco®	12mm
Perkin-Elmer®	15mm
Pharmacia®	15mm
Scinco®	15mm
Shimadzu®	15mm
Spectronics®	8.5mm
Turner®	8.5mm
Varian® (Cary®/Agilent®)	20mm

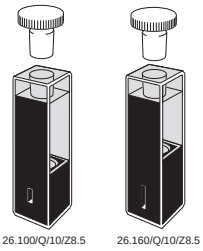
G = Optical Glass 334-2500nm SOG = Special Optical Glass 320-2500nm PX = Borosilicate 325-2500nm HH = UV Silica 220-2500nm
Q = Far UV Quartz 170-2700nm I = Near Infra-Red Quartz 220-3800nm SX = Far UV to Near IR Quartz (Water free) 170-3500nm

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

- Reduced nominal volume from 10µl to 160µl.
- Rectangular top section 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 also be used with all standard cell holders.
- Z dimension or instrument information required when ordering.
- Filling and emptying with a pipette is recommended.

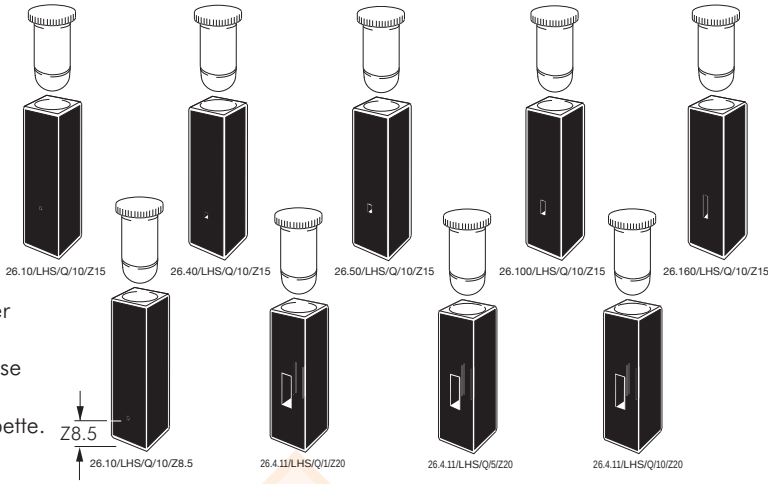


Type No.	Window Material	Path Length	Z Height	Internal W	Internal H	External L	External W	External H	Nominal Vol. ml
26.10	Q	10	8.5, 15, 20	1	1	12.5	12.5	48	0.010
26.40	Q	10	8.5, 15, 20	2	2	12.5	12.5	48	0.040
26.4.2	Q	10	15, 20	4	2	12.5	12.5	48	0.080
26.50	Q	10	8.5, 15, 20	2	2.5	12.5	12.5	48	0.050
26.100	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

- The cell and liquid-tight stopper are specially designed so 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.
- Reduced nominal volume range from 10µl to 440µl.
- Round internal solid black top closed by a specially profiled PTFE stopper. Spare stoppers, **see page 28**.
  Part No. STP/C10.LHS/Z8.5 or STP/C10.LHS/Z15/20
- Quartz stoppers available to avoid condensation errors at higher temperatures (see page 28)
- 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 syringe or micro pipette.
- Z dimension or instrument information required when ordering.



Type No.	Window Material	Path Length	Z Height	Internal W	Internal H	External L	External W	External H	Nominal Vol. ml
26.10/LHS	Q	10	8.5, 15, 20	1	1	12.5	12.5	48	0.010
26.40/LHS	Q	10	8.5, 15, 20	2	2	12.5	12.5	48	0.040
26.50/LHS	Q	10	8.5, 15, 20	2	2.5	12.5	12.5	48	0.050
26.100/LHS	Q	10	8.5, 15, 20	2	5	12.5	12.5	48	0.100
26.160/LHS	Q	10	8.5, 15, 20	2	8	12.5	12.5	48	0.160
26.4.11/LHS	Q	1	20	4	11	12.5	12.5	48	0.044
26.4.11/LHS	Q	5	20	4	11	12.5	12.5	48	0.220
26.4.11/LHS	Q	10	20	4	11	12.5	12.5	48	0.440

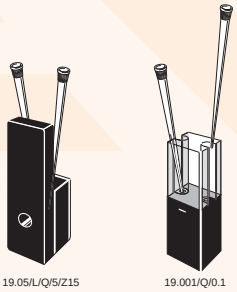
Z Dimension per instrument

Manufacturer	Z Dimension
Agilent®	15mm
Beckman®	8.5mm
Bio-Rad®	8.5mm
Eppendorf®	8.5mm
GBC®	15mm
Hewlett Packford®	15mm
Hitachi®	8.5mm
Jasco®	12mm
Perkin-Elmer®	15mm
Pharmacia®	15mm
Scinco®	15mm
Shimadzu®	15mm
Spectronics®	8.5mm
Turner®	8.5mm
Varian® (Cary®/Agilent®)	20mm

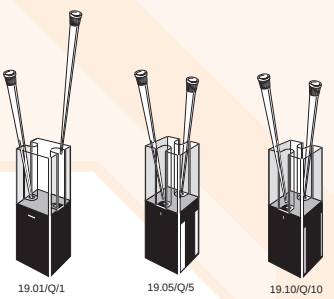
Type 19 Ultra-micro & 19/L Ultra-micro lens cell

- 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 focusing lens. Which increases the energy entering the sample. Performance is dictated by instrument optical configuration.
- **Type 19/L** is not suitable for all instruments.
- **Type 19/L Z 8.5*** has an External height of 38.5mm

Z dimension or instrument information required when ordering.



Type No.	Window Material	Path Length	Z Height	Internal W	Internal H	External L	External W	External H	Nominal Vol. ml
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



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.

First published 1972. Revised 1978, 87, 91, 95, 01 & 03. This edition UK 09/10. The copyright © of this catalogue is held by the Starna® group of companies.

Starna Scientific Limited
52-54 Fowler Road,
Hainault, Essex
IG6 3UT, UK

Starna Scientific Sales
& Technical Assistance
Tel: +44 (0)20 8501 5550
Fax: +44 (0)20 8501 1118
Email: sales@starna.com
www.starna.com

Starna scientific

Starna Cells Inc.
PO Box 1919
Atascadero
CA 93423
USA
Tel: 800 228 4482
805 466 8855
Fax: 805 461 1575
Email:info@starnacells.com

Starna Pty. Ltd.
PO Box 6751
Baulkham Hills BC
NSW 2153
AUSTRALIA
Tel: 61-2-9659 8088

Fax: 61-2-9659 8511
Email: info@starna.com.au

Starna GmbH
Postfach 1206
D-64311
Pfungstadt
GERMANY
Tel: +49 (0) 6157 2813

Fax: +49 (0) 6157 85564
Email: starna@t-online.de

Local Distributor