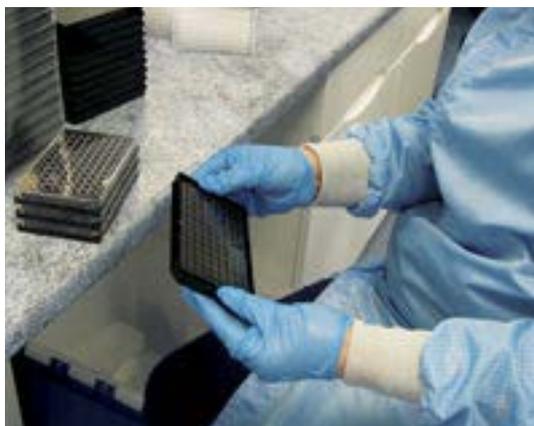


CATALOGUE OF MICROPLATES & MICROPLATE EQUIPMENT
SIXTH EDITION - 2019 UPDATE





Pictures taken inside the Porvair Sciences clean room in Wrexham, showing production of clear bottom assay plates.

Welcome to the 2019 edition of the Porvair Sciences Microplate catalogue. Our aim is to provide you with a comprehensive range of precision-assembled, top quality microplates to enhance your research and analysis. We take great pride in our quality of materials, especially our extractable-free polypropylene, to ensure that our plates will not compromise your sensitive analytical techniques. We do this through rigorous testing and selection with a careful eye for quality control in our UK clean room assembly plant.

Porvair Sciences present here the majority of microplate types used in life science research around the world. You will find extensive ranges of solid and clear-bottomed polystyrene assay plates, a full line of deep well collection plates for compound handling, storage and fraction collection together with Solid Phase Extraction and biological sample clean-up plates. To complement these we also offer microplate heat sealers and of course our renowned microplate evaporators for solvent removal. Our brand-new Ultravap models, the Levante and Mistral combine the very latest advanced evaporation technology with a full colour touch-screen display packed with useful software to help you concentrate, dry down and recover your precious samples faster and more easily.

For many years, Porvair Sciences has led the field in nitrogen blowdown evaporation. This new family of concentrators makes it even easier than ever to integrate an automatic dry down step into your liquid handling workstation. The Ultravap Mistral is designed to connect directly to most laboratory liquid handling robots.

Add to this new SLE plates and more protein removal options and you will see that the 2019 catalogue remains an indispensable reference guide to any laboratory using, or interested in using, microplates. Porvair Sciences is one of the largest global manufacturers of ultraclean microplates for life science, synthetic chemistry and many other applications. Our modern Class VIII clean room facility in Wrexham, UK, is responsible for production of all of our clear-bottom plate products, including the highly-acclaimed glass bottom Krystal plates. The same highly experienced UK team also provides first-class customer service to our customers and distributors worldwide. Should you be interested in evaluating and testing any of our microplates - just give our friendly team a call, or send them an email asking for a free sample of your microplate of choice. With a proud history of innovative microplate manufacturing dating back to 1992, Porvair Sciences' mission is to become your preferred global partner for microplate products. Our technical and sales teams are at your disposal – so take a look through this catalogue and you will see a wide array of microplate products and instruments designed to enable you to get better results faster and more consistently.

Porvair Sciences products are designed for use in research environments and are not suitable for clinical, diagnostic or medical use.

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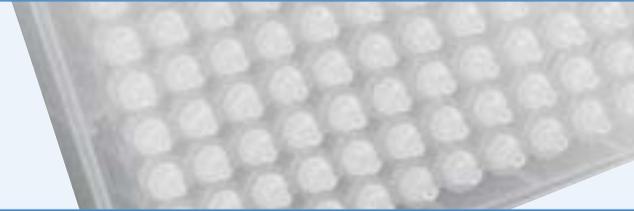
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Application table

	COMBINATORIAL CHEMISTRY	GROWTH STUDIES	ARRAY TECHNOLOGY	CLINICAL SAMPLE SCREENING	ENVIRONMENTAL ANALYSIS	GENOMICS/PROTEOMICS	FOOD TESTING	HTS SCREENING	COMPOUND STORAGE	DRUG DISCOVERY
Storage/collection	■			■	■	■	■	■		■
Life science										
Solid bottom			■			■	■		■	
Clear bottom			■	■		■	■		■	
Glass bottom	■		■	■	■				■	
Quartz bottom	■		■	■	■				■	
PCR plates								■		
Filtration plates					■	■	■			
Bacti-growth plates			■							
SPE										
MicroLute	■									■
MaxiLute						■	■			
CombiLute	■									
p3					■					■
Equipment										
Manifolds	■					■	■			■
Evaporators	■					■	■			■
Cappers	■					■	■	■		■
Sealers			■		■		■	■	■	■
Seals			■		■		■	■	■	■
Thawing station			■		■		■	■	■	■
Automation										
Reservoir trays					■	■	■	■	■	

STORAGE/COLLECTION

LIFE SCIENCES

SOLID PHASE EXTRACTION

EQUIPMENT

AUTOMATION ACCESSORIES

CUSTOM MANUFACTURE

Are your plates whiter than white? Or do they harbour a dirty secret?

Deep well polypropylene microplates are commonly used for sample storage in life science laboratories. An essential aspect of the manufacture of these plates is the selection of clean raw materials for injection moulding. Polypropylene is an inert and heat resistant material, ideal for sample storage. However, all grades of polypropylene are not the same, for example, Injection moulding grades of polypropylene often have high concentrations of chemicals to aid the moulding process.

This allows rapid production of plates and lower costs, but may compromise the integrity of samples or compounds which are stored in such plates for extended periods. The problem is particularly acute where compounds are stored as solutions in solvents such as methanol or DMSO, as these excellent solvents have a tendency to extract from the polypropylene base material any added extractable compounds such as mould release agents or polymer flow improvers.

Porvair Sciences has carried out tests on many manufacturers' deep well plates to establish levels of extractables in each. A typical example is illustrated. Samples of deep well microplate for testing were obtained from all the major manufacturers. A new unused plate was selected from each batch and subjected to a stream of clean, dry compressed air to remove any particulates that may have accumulated. Testing for polymer leachate and extractable contamination was performed by incubating overnight an appropriate volume of HPLC grade methanol in three wells in each sample plate. The methanol was spiked with 10ug/ml of Caffeine as an internal standard. The plates were sealed with a friction seal and left to stand overnight.

After overnight incubation, 1ul aliquots of each well sample were subjected to analysis on a GC-MS system using splitless injection at 250°C.

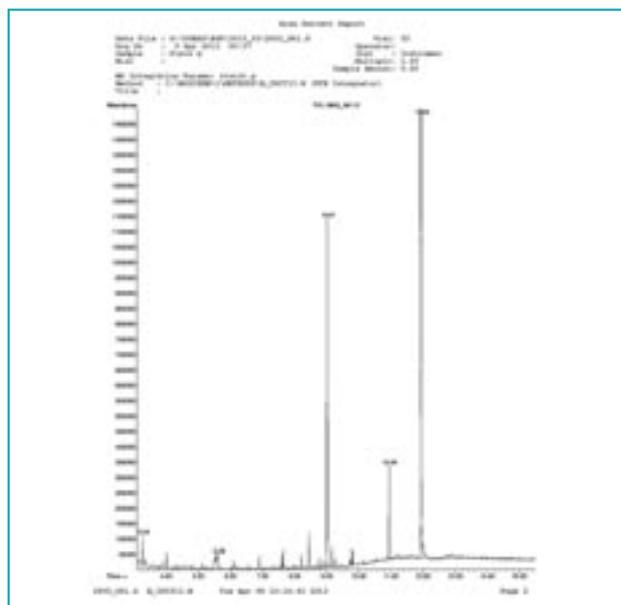
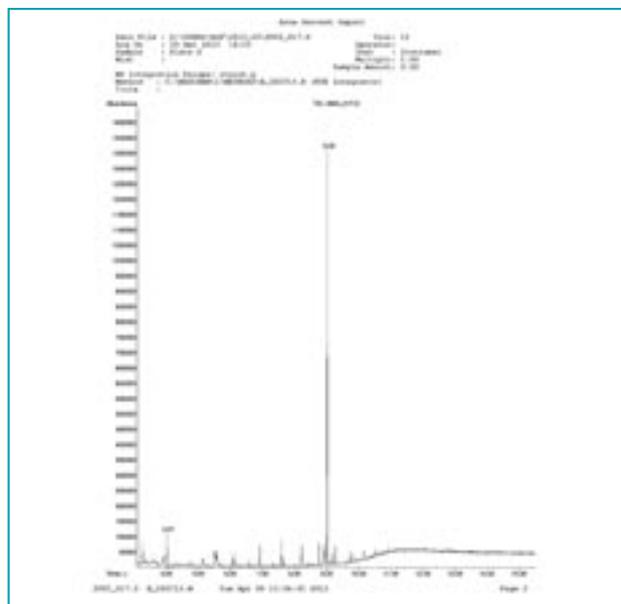
Separation was performed on a capillary column using the appropriate temperature gradient. Detection was by positive ion EI-MS.

In order to simplify the full data set here, results from each of the three wells per plate tested have been combined and averaged.

Results from the GC-MS showed good performance from the Porvair microplate, with a clean caffeine peak and no significant levels of leachable or extractable compounds. Plate B shown here, is a

typical example of the other commercial microplates tested, which included two major German manufacturers and several other well-known suppliers. These variously displayed extra peaks with a variety of retention times across the run, indicating several different contaminants. Further analysis of these extra peaks revealed that they were, indeed, mostly recognized chemicals used as additives in the polypropylene to assist the injection moulding process.

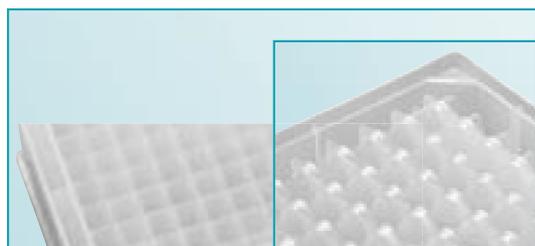
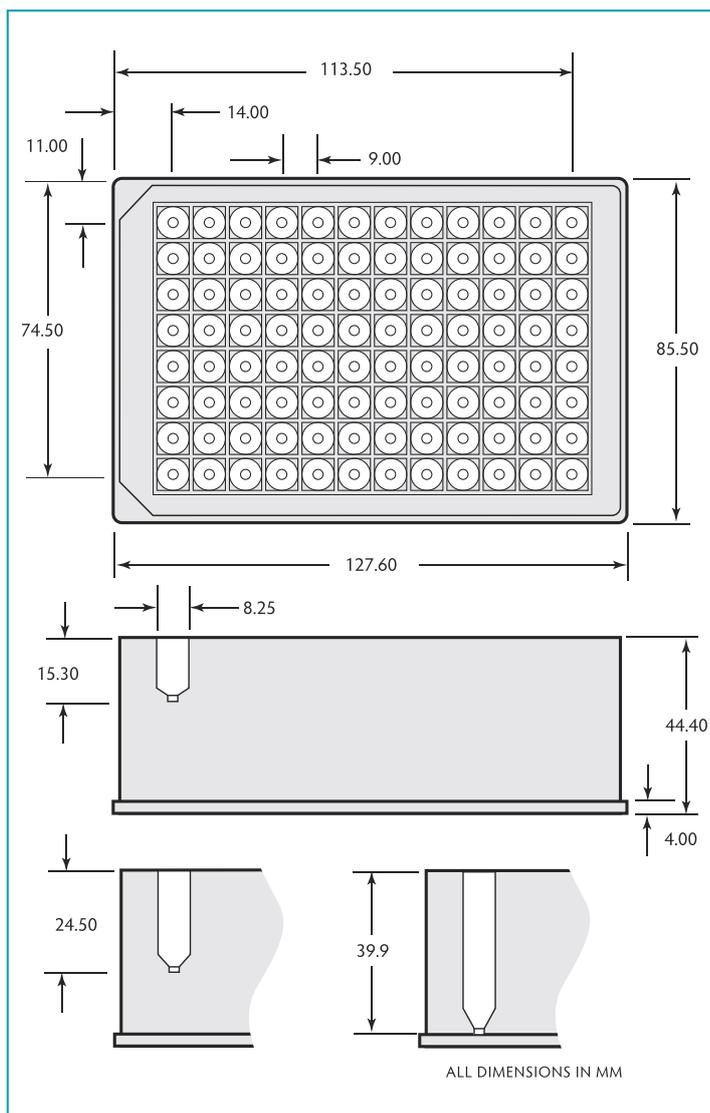
From this it can be seen that it is essential to select the correct grade of polypropylene material for storage plate manufacture. The full report can be downloaded from our website.



96-well deep square 44mm height

The family of 96 square well plates was designed so that it would make the interchange of plates simpler in automated systems. All three plates have the same geometry and the only variable is the well depth.

- Made from virgin polypropylene
- Tested for low extractables
- V bottom to allow total liquid removal, partial collection and to aid re-suspension
- No inner edges to allow better collection of magnetic beads
- DNase/ RNase free
- Working volumes of 350µl, 1ml, and 2ml
- Raised well rims to improve heat sealing
- Conical base which aids sample concentration, reconstitution and centrifugation
- Sterile and non-sterile versions available
- Toughened genomics version for seed and leaf grinding



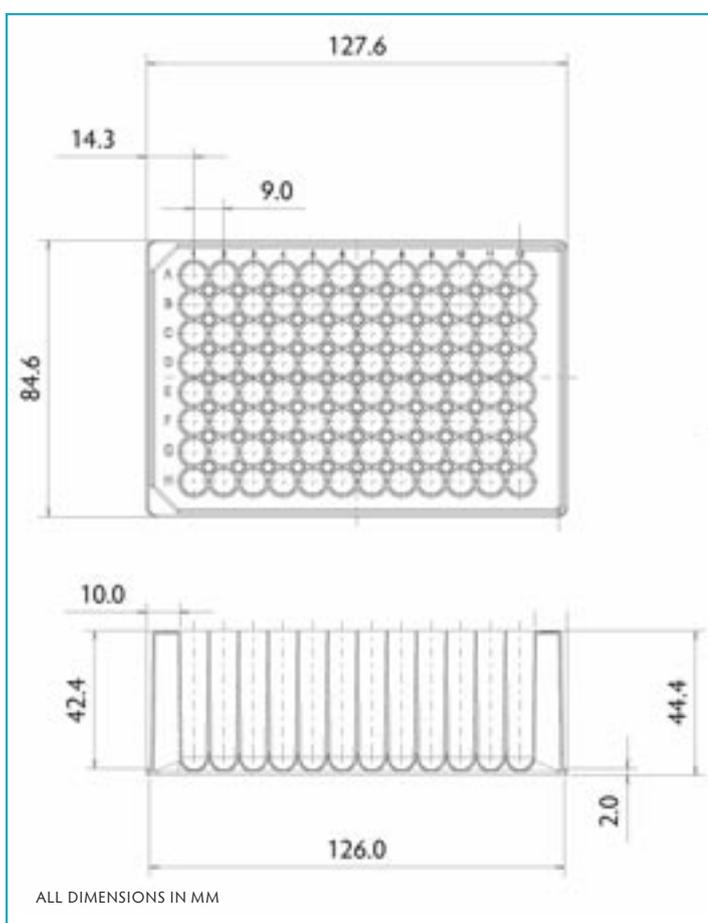
Storage plates 96 square well

Description	Well volume	Sterile	Use cap mat	Quantity/case	Cat. no.
Polypropylene, pyramid bottom	2.0ml	–	219004	50	219009
Polypropylene, pyramid bottom, sterile, inner bag of 5	2.0ml	✓	219019	50	219027
Polypropylene, pyramid bottom, toughened for genomics	2.2ml	–	219004	50	219030
Polypropylene, pyramid bottom, toughened for genomics	2.2ml	✓	219004	50	219031
Polypropylene, pyramid bottom	1.0ml	–	219004	50	219008
Polypropylene, pyramid bottom, sterile, inner bag of 5	1.0ml	✓	219019	50	219026
Polypropylene, pyramid bottom	350µl	–	219004	50	219006
Polypropylene, pyramid bottom, sterile, inner bag of 5	350µl	✓	219019	50	219025

96-well deep round 'common wall' 45mm height

These revolutionary plates are made in virgin polypropylene to minimise extractables. Maximum volume is 2.075ml per well and working volume is a useful 1.85ml, more than any other comparable '2ml Round Well' plate in this class. The 'common wall' design allows the highest possible volume to be used whilst maintaining an overall height of just 45mm, complete with ANSI/SLAS standard base and footprint. Extra working volume is thus assured in a convenient round bottom, round well format.

- Manufactured from pre-tested polypropylene for low extractables
- Alphanumeric grid-referencing
- DNase/ RNase free
- Packed in sealed sleeves of 5 plates
- Cylindrical well with round bottom for optimal mixing and recovery
- Very easy to use with automated sample handling systems
- Can be stored at -80°C
- Easily sealed with matching Cap Mat or heat seal
- Fits Waters AcQuity™ autosamplers



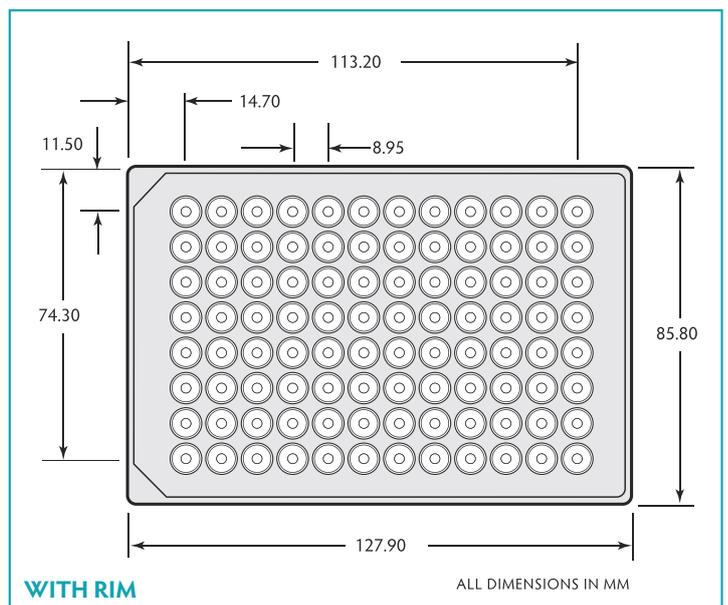
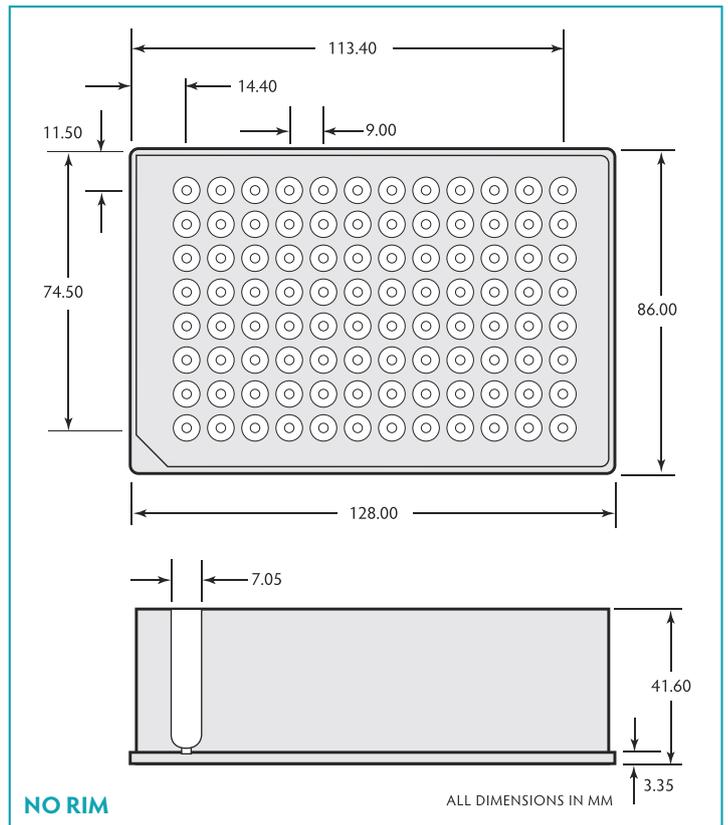
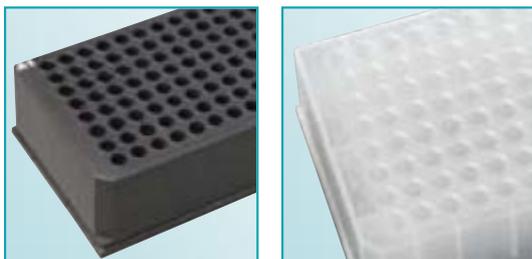
96-well deep round 'common wall'

Description	Pk/Qty	Part No.
96 deep well, 2ml/well Polypropylene round well rimless DNA/RNAase free, inner bag of 5	50	219020
96 deep well, 2ml/well Sterile Polypropylene round well rimless DNA/RNAase free, inner bag of 5	50	219021

Deep well round 1ml 42mm height

The plates are made in virgin polypropylene to minimise extractables. Working volume is 1ml per well and total volume is 1.1ml. Coloured plates aid identification when retrieving from storage. Black plates are suitable for storing light sensitive compounds.

- Manufactured from pre-tested polypropylene for low extractables
- Alphanumeric grid-referencing
- DNase/ RNase free
- Packed in sealed sleeves of 5 plates
- Rimmed version to stop cross contamination and enable a better seal
- Non rimmed version to allow insertion of vials, or where the seal is not crucial
- Cylindrical well with round bottom for optimal mixing and recovery
- Very easy to use with automated sample handling systems
- Can be stored at -80°C



Polypropylene storage plates round

Rim and bottom well shape	Colour	Well volume	Sterile	Use cap mat	Quantity/case	Cat. no.
Raised- round	Natural	1ml	-	219036	50	219002
Raised- round	Natural	1ml	✓	219042	50	219012
No rim- round	Natural	1ml	-	219036	50	219037
Raised- round	Black	1ml	-	219036	50	219412

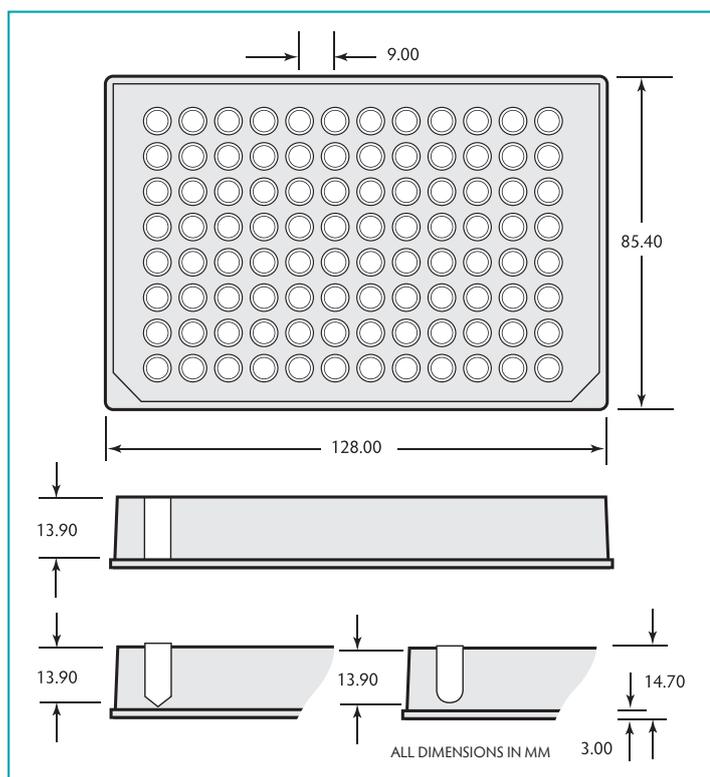
96-well shallow round

14.7mm height

Porvair Sciences has developed a number of storage/collection plates to help in the fields of cell biology, molecular biology, drug discovery, combinatorial chemistry, screening and genomics. The plates are manufactured under clean room conditions and a significant number are DNase/RNase free. They are mainly made from polypropylene, an inert material giving heat and solvent resistant qualities. Porvair Sciences offers the largest combination of well shape, number of wells and well volume on the market. Each is made to the ANSI/SLAS format for compatibility with most readers/washers and automated equipment.

Porvair Sciences offers three plates with well capacities of 350µl, 270µl and 220µl. They have flat-, round- or V-bottoms and can be used for compound storage and culturing.

- *Manufactured in polypropylene*
- *Alphanumeric grid reference*
- *Round and V-bottom allow greater liquid removal and particulate collection*
- *Raised rims improve sealing and stop cross contamination*



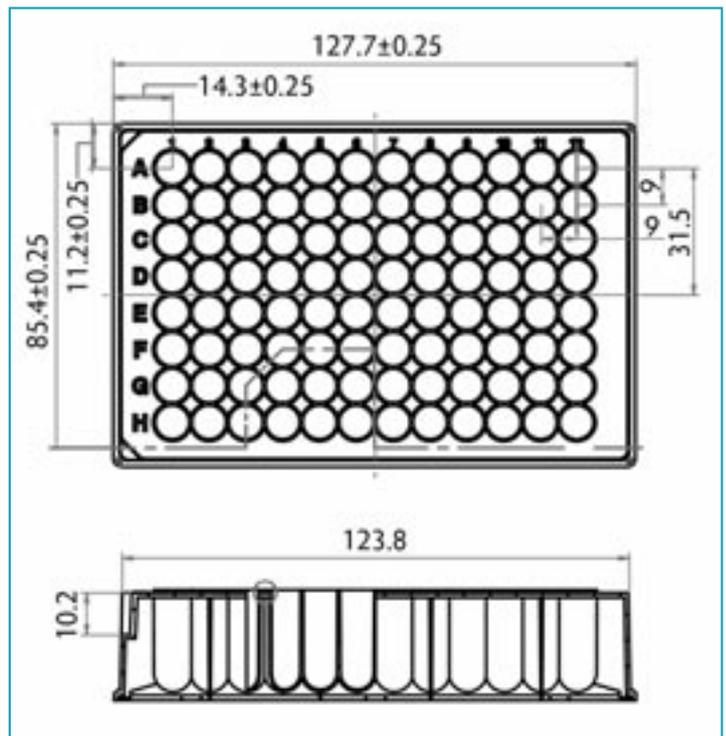
Storage plates round

Rim and bottom well shape	Material	Well volume	Sterile	Quantity/case	Cat. no.
Flat bottom, raised rim	Polypropylene	350µl	–	100	208003
Raised-round	Polypropylene	270µl	–	100	209003
Raised-V	Polypropylene	220µl	–	100	210003

96-well round low profile

A new introduction to the Porvair range is a low profile 1.2ml 96-well round plate with a height of just 27mm. This allows more plates to be stored or stacked in a given space. The plates are made with extractable-free polypropylene for excellent results. A specific anti-evaporation cap mat is also available for this plate manufactured from thermoplastic elastomer.

- *Allows stacking in higher densities*
- *Minimises space needed for compound storage*
- *Pure virgin polypropylene*
- *Matching snug-fitting cap mat*



96-well round low profile

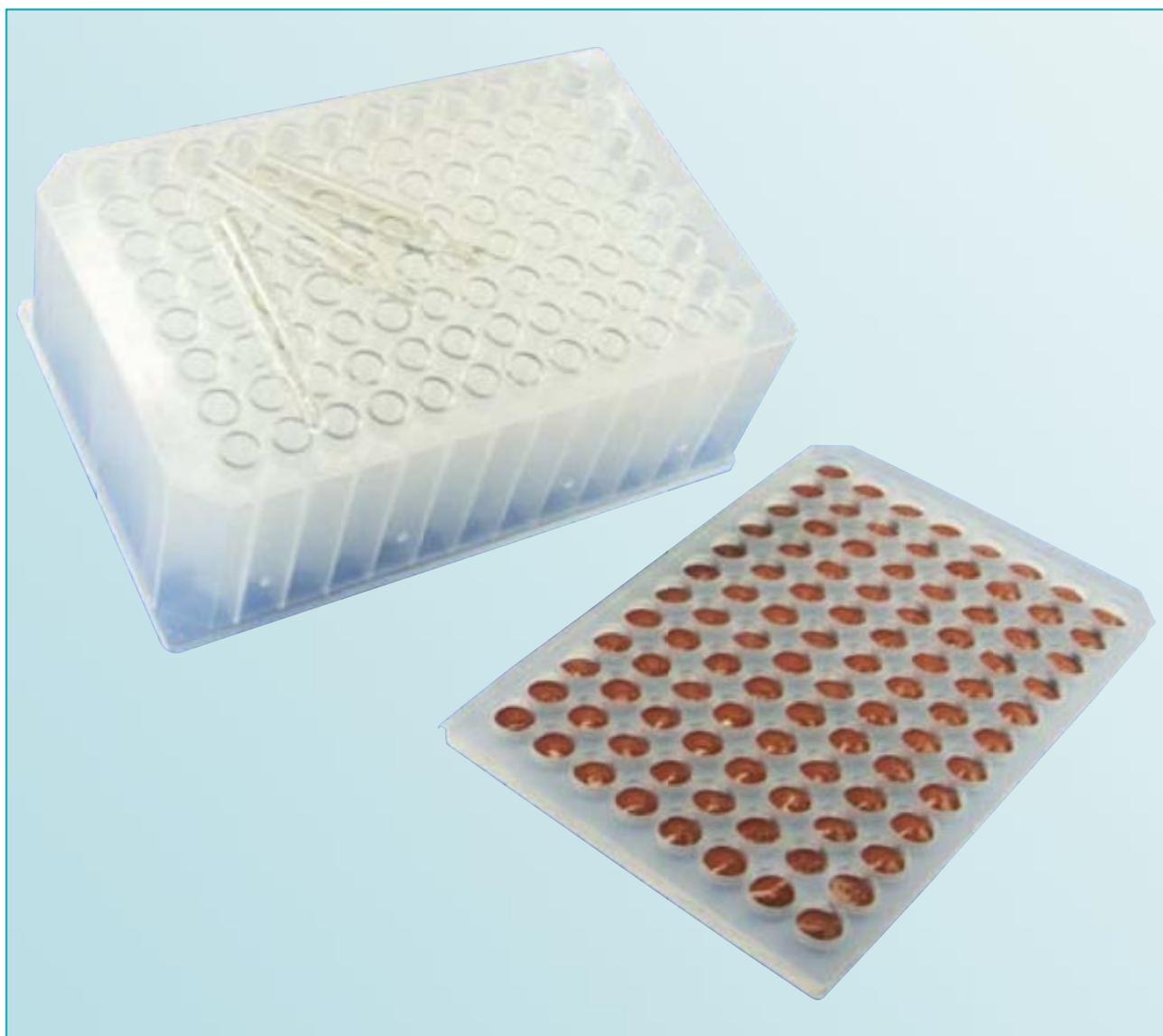
Description	Working well vol	Sterile	Qty/case	Cat. no.
96-well round low profile plate	1.1ml	–	50	219250

96-well glass vial storage plate

44mm height

The new Porvair glass vial storage plate combines 96 borosilicate glass vials of 700µl into a rigid polypropylene carrier plate for ease of storage and transportation. The glass vials are round bottomed and the plate can be capped with our matching square-well cap mat to prevent evaporation or contamination. This is the zero-leachates solution for UHPLC and where organic solvents must be stored in a plate footprint.

- Store aggressive solvents in glass vials
- Chemically resistant
- No trace impurities for UHPLC
- Prevent evaporation with matching cap mat



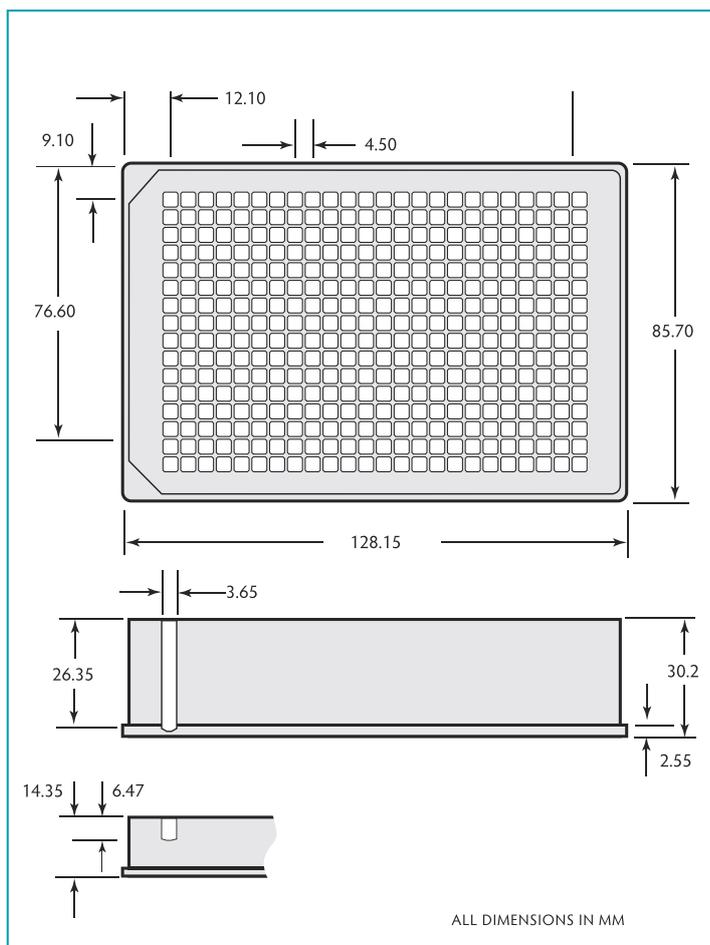
96-well glass vial storage plate

Description	Qty/case	Cat. no.
Round wells with 1.0mL Glass Conical Tapered Inserts, 8x45mm & pierceable PTFE/Silicone cap mat	1	229231
Round wells with 1.0mL Glass Flat tip Tapered Inserts, 8x45mm & pierceable PTFE/Silicone cap mat	1	229232

384-well square

Porvair Sciences has a selection of 384-well polypropylene plates to suit most applications. All of them are made from pre-tested polypropylene in Class 100000 clean rooms.

- Manufactured for high density sample collection / storage
- Two sizes: 58µl and 300µl per well working volume
- Each are designed to allow almost total removal of liquid sample
- Extra flat – allows plate sealing
- Storage temperature down to -80°C
- Available sterile and non sterile
- All manufactured to ANSI/SLAS specifications



Storage plates 384-well

Well shape, top & bottom	Working well vol	Sterile	Qty/case	Cat. no.
Square-round	58µl	–	60	224001
Square-V	300µl	–	48	219040
Square-V	300µl	✓	48	219041



Large volume deep well plates

The range of large volume plates is designed to meet special requirements. Focused on the combinatorial, environmental and food technology markets, it allows large volumes of samples to be transported in recognised ANSI/SLAS format microplates, to allow greater automation. Plates will accept the Porvair universal lid (see page 55). All plates are manufactured from virgin polypropylene, can be heat sealed and stored for prolonged periods at -80°C.

24-well features:

- 24 wells with a working capacity of 10ml/well
- Standard height (44mm) of a deep well plate
- Sterile or non sterile versions
- Lidded version available

48-well features:

- Two versions:
- 5ml/well, 44mm high
- 7ml/well, 68mm high

High volume deep well microplates

Well shape, bottom shape	No of wells	Working well vol	Sterile	Lid	Qty/ case	Cat. no.
Rectangle, V-bottom	24	10ml	–	–	25	360013
Rectangle, V-bottom (bulk pack)	24	10ml	✓	–	25	360115
Rectangle, V-bottom (with bar code)	24	10ml	✓	✓	25	360080
Rectangle, round-bottom	24	10ml	–	–	25	360117
Rectangle, V-bottom	48	5ml	–	–	25	360002
Rectangle, V-bottom	48	7ml	–	–	30	360004

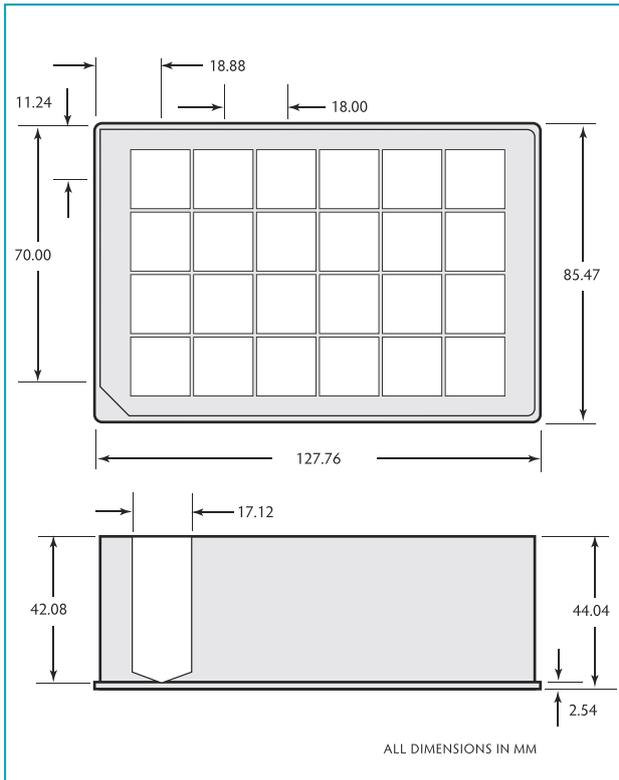
- Available for the 2ml and 1ml square and 2mm round deep well plates
- Easily fitted below plates
- Made from impact resistant silicone

Centrifuge support plate

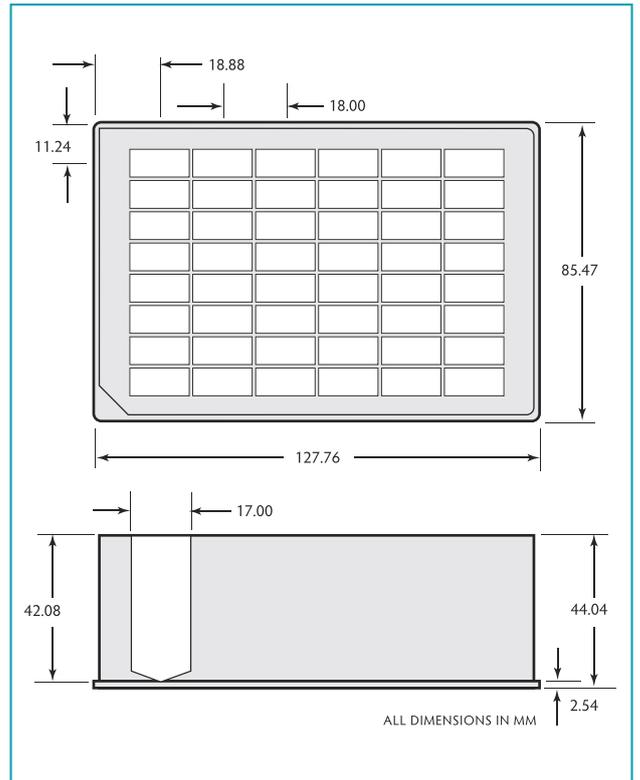
The support plate is designed to fit into the skirt of the deep well plates. This then allows the plate to be used in a centrifuge at 3,500G or GenoGrinder® without the risk of the plate distorting and causing the well to leak.

Deep well microplate accessories

Description	Quantity/pack size	Cat. no.
Centrifuge support plates for 219008 & 219026	2	500150
Centrifuge support plates for 219009 & 219027	2	500114
Centrifuge support plates for 219020 & 219021	2	500180
Silicone impact support mat for 219030 genomics plate	2	500201

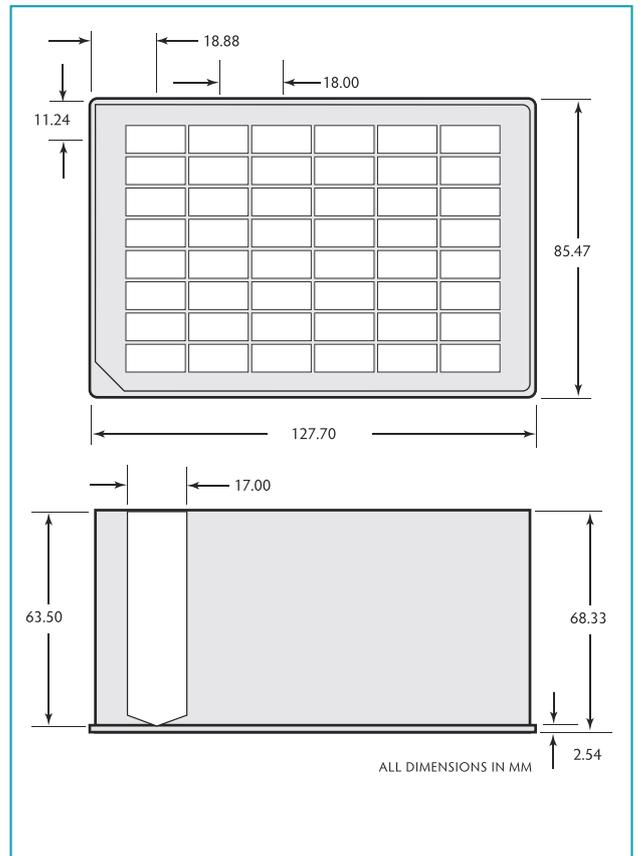


360013



360002

CENTRIFUGE SUPPORT PLATES



360004

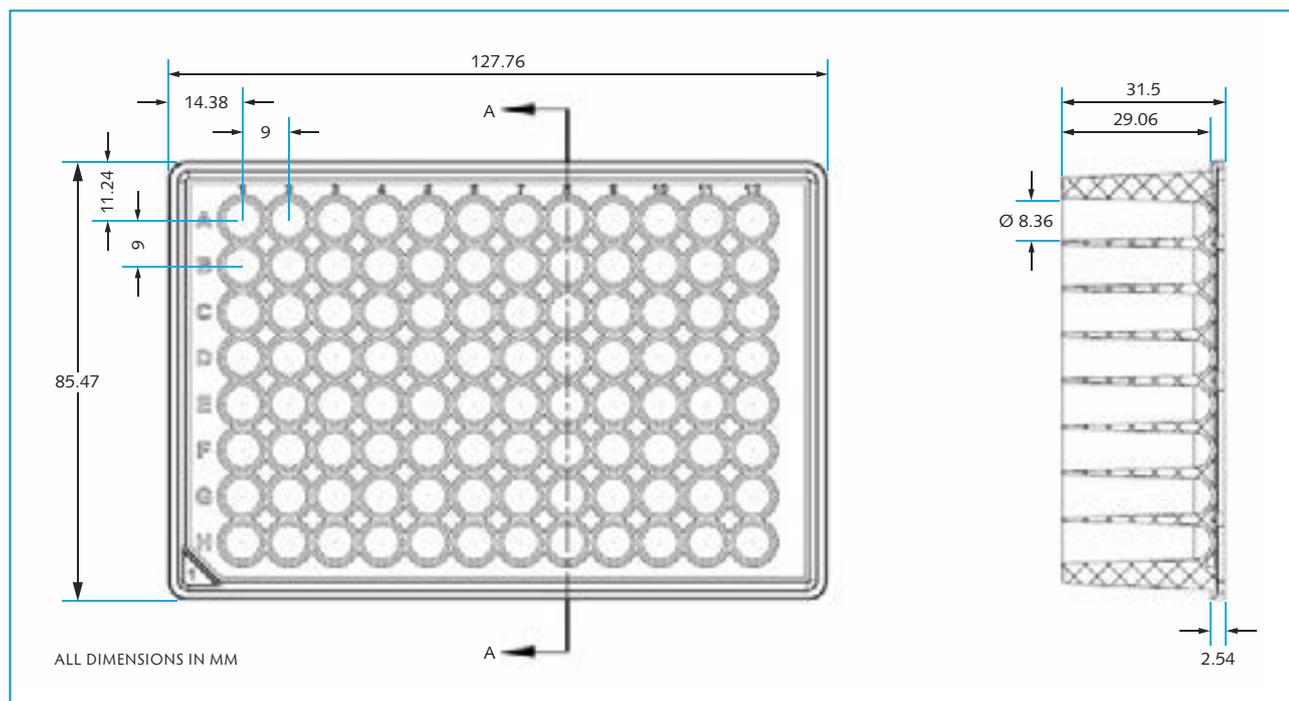
1.1ml round well, round bottom, magnetic separation plate

Porvair Sciences new style 1ml microplate is designed to optimize performance on all popular liquid handling automated platforms and manual workstations with locators for incubation functionality and/or magnetic separations. The bottom geometry of these plates easily fits over heating and cooling post arrays designed to fit between the well walls. The design also accommodates a variety of magnet arrays to support bead-based separation assays. This microplate is molded with high purity, medical grade, polypropylene homopolymer in a DNase/RNase free ISO9001 certified environment and is available irradiated or with laser etch barcode ready white pigment. The plate can be sealed with clear and aluminum heat seals or with a variety of adhesive seals from the Porvair Sciences range.



1.1ml round well, round bottom, magnetic separation plate

Description	Quantity/pack size	Cat. no.
1ml round well magnetic plate 96-well	25	360121
1ml round well magnetic plate 96-well	25	360122
1ml round well magnetic plate 96-well white	25	360123



CHOOSE THE NUMBER OF WELLS, OR PLATE FORMAT YOU NEED

<500 µl – use a 350 µl plate

CHOOSE THE WELL BOTTOM

Round bottom –
good mixing 14mm high **209003**

Flat-well bottom –
highest volume 14mm high **208003**

270 µl V-well –
high recovery 14mm high **210003**

350 µl V-well –
high recovery 45mm

CHOOSE STERILITY

Sterilised by gamma radiation **219025**

Unsterilised **219006**

96-WELL
MICROPLATES

OR >500 µl <1 ml – use a 1.1 ml plate

CHOOSE WELL SHAPE

1.1 ml round-well, round bottom – good mixing

1 ml square-well, V-bottom – good recovery

CHOOSE HEIGHT

27mm high

Common wall rimless,
natural PP **219250**

44mm high

CHOOSE RIM

Rimless, natural PP
non-sterile **219037**

Rimmed

CHOOSE STERILITY

Sterilised by gamma
radiation, natural PP **219012**

Unsterilised

CHOOSE STERILITY

Sterilised by gamma radiation **219026**

Unsterilised **219008**

CHOOSE COLOUR & TYPE

Natural – **219002**

Red – for easy
identification **219422**

Black – for light sensitive
operations **219412**

Blue – for easy
identification **219432**

96-WELL
MICROPLATES

OR $> 1 \text{ ml} < 2 \text{ ml}$ - use a 2.2 ml plate

CHOOSE WELL SHAPE

Round-well, round bottom – good mixing

CHOOSE STERILITY

Sterilised by gamma radiation **219021**

Unsterilised **219020**

Square-well, V-bottom – good recovery

CHOOSE STERILITY

Sterilised by gamma radiation

Unsterilised

CHOOSE TYPE

For everyday use **219027**

For bead-beating **219031**

For everyday use **219009**

For bead-beating **219030**

**96-WELL
MICROPLATES**

OR $> 4.8 \text{ ml} < 10 \text{ ml}$

CHOOSE VOLUME OF RECTANGLE-WELL

48 x 4.8 ml square-well, non-sterile **360096**

48 x 5 ml rectangle-well non-sterile **360002**

24 x 10 ml square-well

CHOOSE STERILITY

Sterilised by gamma radiation **360115**

Unsterilised **360013**

**24/48-WELL
MICROPLATES**

CHOOSE VOLUME OF RECTANGLE-WELL

58 μl per well, not sterile **224001**

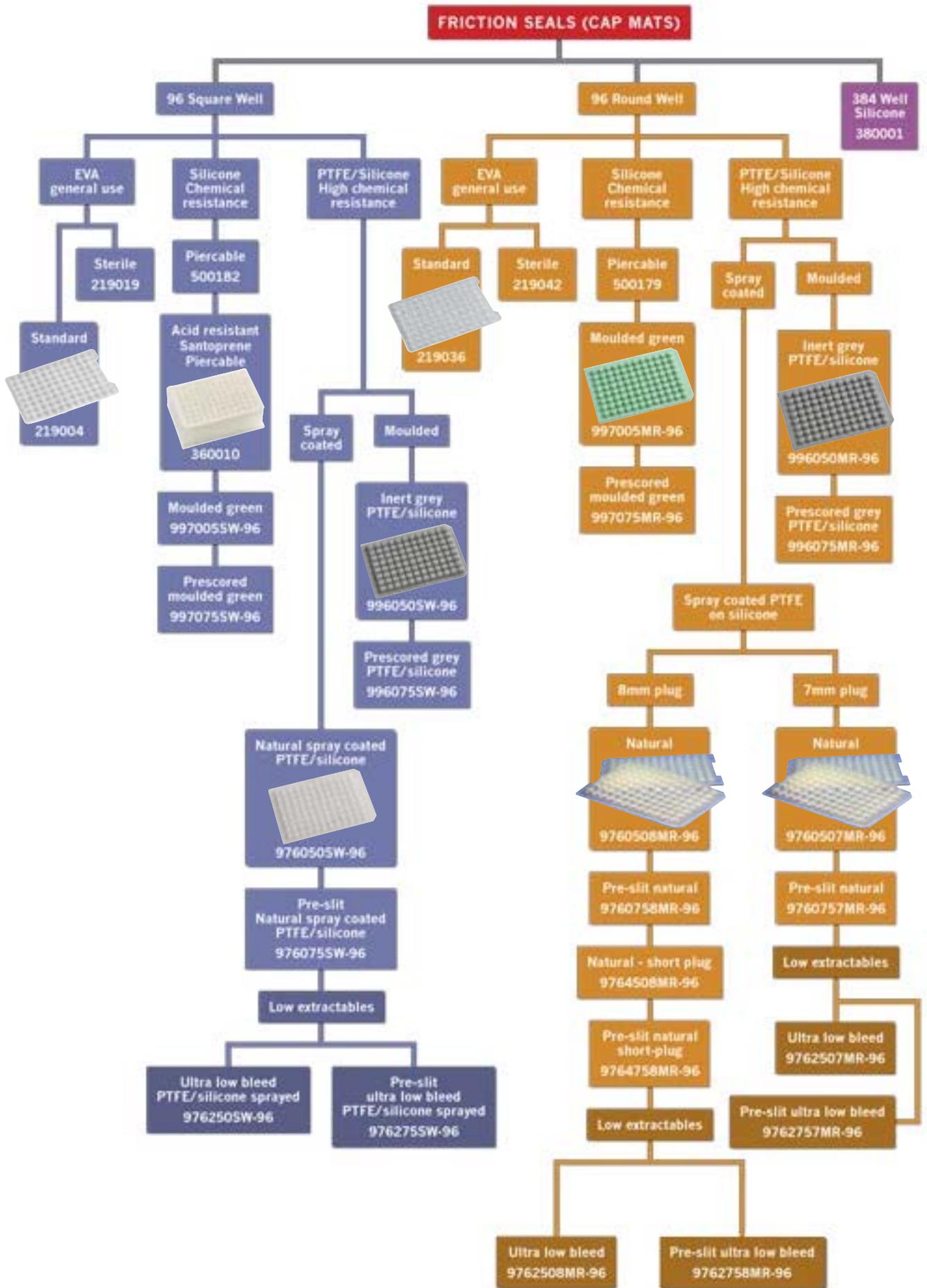
300 μl per well

CHOOSE STERILITY

Sterilised by gamma radiation **219041**

Unsterilised **219040**

**384-WELL
MICROPLATES**



Which cap mat should I use with each plate type?

SQUARE WELL PLATES

96 Deep Square Well, 350µl/well, Polypropylene, DNase/ RNase free	219006
96 Deep Square Well, 350µl/well, Polypropylene, DNase/ RNase free, Sterile	219025
96 Deep Square Well, 1ml/well, Polypropylene, DNase/RNase free	219008
96 Deep Square Well, 1ml/well, Polypropylene, DNase/RNase free, Sterile	219026
96 Deep Square Well, 2ml/well, Polypropylene, pyramid bottom, DNase/ RNase free	219009
96 Deep Square Well, 2ml/well, Polypropylene, pyramid bottom, DNase/ RNase free, Sterile	219027

The following mats fit the above plates:

96 Square EVA Sealing Cap Mat	219004
96 Square EVA Sealing Cap Mat, Sterile	219019
96 Square Well Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	976050SW-96
96 Square Well Pre-Slit Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	976075SW-96
96 Square Well Ultra Low Bleed Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	976250SW-96
96 Square Well Pre-Slit Ultra Low Bleed Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	976275SW-96
96 Square Well Molded Gray PTFE/Silicone Mat	996050SW-96
96 Square Well Prescored Gray Molded PTFE/Silicone Mat	996075SW-96
96 Square Well Molded Green Silicone Mat	997005SW-96
96 Square Well Prescored Molded Green Silicone Mat	997075SW-96

96 Deep Square Well, 2ml/well, Toughened Genomics Plate	219030
96 Deep Square Well, 2ml/well, Toughened Genomics Plate, Sterile	219031

The following mats fit the above plates:

96 Square Well Friction Sealing Cap Mat, Polypropylene	219033
96 Square Well Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	976050SW-96
96 Square Well Pre-Slit Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	976075SW-96
96 Square Well Ultra Low Bleed Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	976250SW-96
96 Square Well Pre-Slit Ultra Low Bleed Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	976275SW-96
96 Square Well Molded Gray PTFE/Silicone Mat	996050SW-96
96 Square Well Prescored Gray Molded PTFE/Silicone Mat	996075SW-96
96 Square Well Molded Green Silicone Mat	997005SW-96
96 Square Well Prescored Molded Green Silicone Mat	997075SW-96

ROUND WELL PLATES

96 Deep Round Well, 2ml/well, Polypropylene, Rimless, DNase/RNase free	219020
96 Deep Round Well, 2ml/well, Polypropylene, Rimless, DNase/RNase free, Sterile	219021

The following mats fit the above plates:

96 Round (8mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9760508MR-96
96 Round Pre-Slit (8mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9760758MR-96
96 Round Ultra Low Bleed (8mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9762508MR-96
96 Round Pre-Slit Ultra Low Bleed (8mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9762758MR-96
96 Round (8mm dia. & Short Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9764508MR-96
96 Round Pre-Slit (8mm dia. & Short Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9764758MR-96

96 Deep well, 1ml/well, Polypropylene, round well, Raised rim DNase/RNase free	219002
96 Deep well, 1ml/well, Polypropylene, round well, Raised rim DNase/RNase free, Sterile	219012

The following mats fit the above plates:

96 Round Well EVASealing Cap Mat	219036
96 Round Well EVASealing Cap Mat, Sterile	219042
96 Round Well (7mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9760507MR-96
96 Round Well Pre-Slit (7mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9760757MR-96
96 Round Well Ultra Low Bleed (7mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9762507MR-96
96 Round Well Pre-Slit Ultra Low Bleed (7mm dia. Plug) Clear Mat with Spray Coated PTFE/Premium Silicone	9762757MR-96
Round Well - Molded Blue PTFE/Silicone Mat	986050VP-812
Round Well - Prescored Blue Molded PTFE/Silicone Mat	986075VP-812
Round Well - Molded Blue Silicone Mat	987050VP-812
Round Well - Prescored Blue Molded Silicone Mat	987075VP-812

96 Deep well, 1ml/well Polypropylene, round well, rimless, DNase/RNase free	219037
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The following mats fit the above plate:

96 Round Well EVASealing Cap Mat	219036
96 Round Well (7mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9760507MR-96
96 Round Well Pre-Slit (7mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9760757MR-96
96 Round Well Ultra Low Bleed (7mm dia. Plug) Clear Sealing Mat with Spray Coated PTFE/Premium Silicone	9762507MR-96
96 Round Well Pre-Slit Ultra Low Bleed (7mm dia. Plug) Clear Mat with Spray Coated PTFE/Premium Silicone	9762757MR-96
Round Well - Molded Blue Silicone Mat	987050VP-812
Round Well - Prescored Blue Molded Silicone Mat	987075VP-812
Round Well - Molded Gray PTFE/Silicone Mat	996050MR-96
Round Well - Prescored Molded Gray PTFE/Silicone Mat	996075MR-96
Round Well - Molded Green Silicone Mat	997005MR-96
Round Well - Prescored Molded Green Silicone Mat	997075MR-96

Choosing the correct assay plate

Choosing the correct microplate for your application can mean the difference between indifferent and great results.

There are three basic methods of obtaining useful optical data from microplate-based samples. The simplest method is absorbance measurement. Where greater sensitivity is required, fluorescence measurements are preferred. Sensitivity can be ten times greater than simple absorbance measurements. The third method involves luminescence, a naturally occurring phenomenon exhibited by certain animal and plant species which can emit light. This is a biological adaptation of a process which can also be seen as purely chemically-driven reactions, in which case it is referred to as chemiluminescence.

Microplate readers are designed to read from either the top or the bottom of a microplate. Top reading instruments rely on measuring reflected light above the wells. A good solid bright white plate is best for these absorbance measurements and a solid black plate for fluorescence readings. Bottom reading units illuminate the sample from above and then use detectors placed below the plate to measure the absorption or fluorescence/luminescence emission. This necessitates the use of clear-bottomed plates. The requirement is to transmit the light wavelengths of interest.

Visible wavelength range (900-350nm) measurements require only clear plastic bases, whilst readings between 220nm and 350nm will require a UV-transparent material. This can be Quartz sheet or a modern polymer such as Cyclo-Olefin Co-Polymer (COP/COC). Optical glass sheet is used where visible range detection is combined with confocal optics or whole plate imaging which requires a very clear uniformly-flat base.

Simple 96-well microplates for ELISA type assays are made from solid clear polystyrene with no additives. These are adequate for clinical and diagnostic tests, ELISA assays and any colour end-point determination with relatively high absorbance. Typically they are available with flat well bottoms, giving high surface area, round well bottoms for good mixing or V-wells for high liquid recovery.

Crosstalk can also be an issue in bottom-reading absorbance and fluorescence measurements. To address this applications challenge, Porvair Sciences has developed the Krystal 2000 zero-crosstalk plates in which individual clear wells are moulded into either a white or black matrix. The black or white base material also projects down below the clear well bottom to further reduce the possibility of crosstalk.

By carefully selecting the correct plate type for the assay, it is possible to significantly improve results. By following the simple guidelines set out here, those tasked with assay development can ensure that their final assay has the best possible chance of success.

The table summarizes the choices available for Assay Plate selection and indicates the plate type most likely to give the best results. Porvair Sciences will be happy to supply samples of their plates for evaluation free of charge, as different detection systems and differing assay development may lead to variances in results between ostensibly similar plate types.

Choosing the correct assay plate

Absorbance assays –

Top Reading Instruments

High signal from majority of wells e.g. test kits, ELISA
Use a simple solid clear plate

Low signal from some or all wells e.g. kinetics or genetic marker assays
Use a solid white plate to boost the signal

Bottom Reading Instruments

Normal visualisation: White plates with clear plastic bottoms

Confocal visualisation: White plates with glass bottoms
For very sensitive assays - Zero Crosstalk white plate with individual clear wells

Fluorescence assays –

Top Reading Instruments

Use a solid black plate

Bottom Reading Instruments

Visible wavelength range 350-700nm
High signal from majority of wells e.g. GFP, Reporter Gene kits,
Use a black clear-bottomed plate

Low signal from some or all wells e.g. poor sensitivity assays, low specificity
Use a black Zero Crosstalk clear bottom plate to boost the signal-to-noise ratio

UV Wavelength range 220-350nm
Use black clear-bottomed COP plates

Confocal or whole plate imaging:
Use black glass-bottomed plates

Luminescence assays –

Top reading instruments

Bio- and Chemi- Luminescence use the same plates
Good signal
Use solid white plates

Poor signal or high dynamic range across the plate
Use solid Black with White wells

Bottom Reading Instruments

Use a white clear-bottomed plate

An introduction to clear bottomed assay microplates

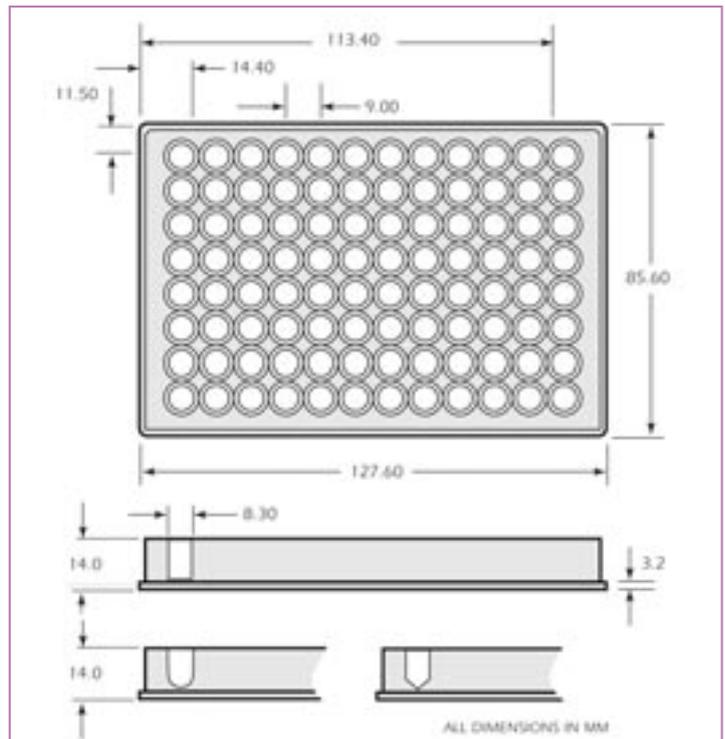
Porvair Krystal series clear bottom plates are now recognised as industry-leading tools for Pharma drug discovery and screening. Our standard clear polystyrene bottom plates have bases just 0.4mm thick (384-well) or 0.75mm (24- and 96-well) and are moulded from highly polished tools to reduce flow lines, artefacts and scratches, guaranteeing good results with all types of bottom-reading instruments. For the more modern demanding confocal readers, Porvair Glass Bottom plates have been shown by leading research institutes to be unsurpassed for flatness, linearity and optical clarity. Our sparkling pure borosilicate glass is just 175µm thick with a flatness tolerance across the plate of +/- 15µm ensuring superb crisp images every time.

We supply our Krystal clear plates treated for cell culture with a low pressure gas plasma that produces an even surface treatment right across the plate. It is particularly suited to cell lines which do not grow easily on plastics. Our plastic-bottomed plates are ultrasonically welded together – a tried and tested method which both guarantees a perfect seal every time and eliminates the inconsistencies seen with laser membrane welding used by other manufacturers. Only biocompatible adhesives are used for glass bottom plates, cured by UV radiation to ensure that the finished plates are solvent-free, have very low autofluorescence and will allow good cell growth.

96-well clear plates

For routine adsorption, absorption, ELISA, mixing and storage applications the standard range of 96-well assay plates offers the perfect mix of affordability and high quality.

- Manufactured from high quality crystal polystyrene
- Flat bottom for spectrophotometric work
- V-bottom minimizing residual liquid
- Round (U) bottom for cell/particulate collection
- Robot compatible
- Working volumes from 275µl down to 10µl



Solid assay plates

Plate description	Sterile	Colour	Qty/pack	Cat. no.
96 well 270µl with a round bottom	–	Clear	100	209004
96 well 220µl with a V bottom	–	Clear	100	210004
96 well 350uL polystyrene, clear F bottom	–	Clear	100	500268
96 well 350uL polystyrene, clear F bottom, tissue culture treated, with lid	✓	Clear	50	500269

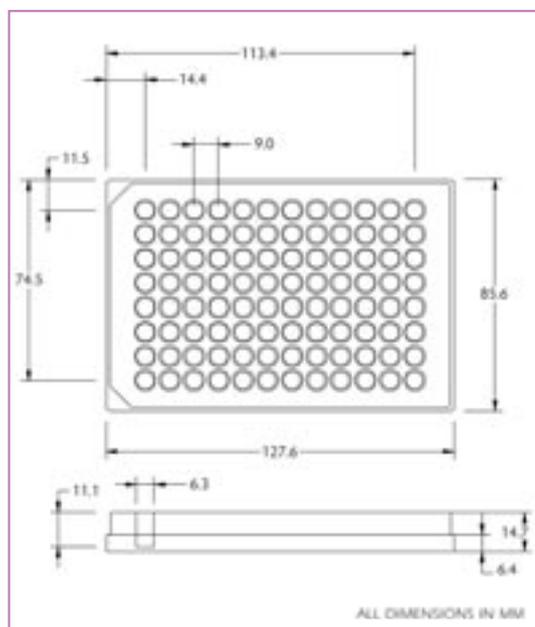
96-well black, white & black with white wells

Porvair Sciences range of solid bottom 96-well assay plates is specifically designed for absorbance, fluorescence, luminescence and scintillation applications. The design uses the most popular 96-well format with standard 'chimney' wells to overcome optical crosstalk and contamination.

These plates are designed to give optimum results from any instrument which reads from the top of the plate.

The acclaimed composite black/white plate has been shown to be ten times more sensitive than a standard white plate for chemi-luminescence assays.

- Black plates designed for top reading fluorescence instruments
- Black plates have low background fluorescence and minimise light scattering
- White plates maximise signal for luminescence readers
- Highly polished well to give better readings
- Specially designed plate featuring a white well set in a black matrix to overcome the problem of a very high luminescence causing false positives
- Working volumes of 350µl/well
- Complies with the standard ANSI/SLAS format
- Alphanumerically labelled wells mean samples can be easily traced



Solid polystyrene assay plates

Plate description	Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
96 wells	White	–	–	–	100	204003
96 wells	White	Tissue culture	✓	✓	50	204512
96 wells	White	Tissue culture	✓	✓	100	204012
96 wells	Black	–	–	–	50	205503
96 wells	Black	–	–	–	100	205003
96 wells	Black	Tissue culture	✓	✓	50	205512
96 wells	Black	Tissue culture	✓	✓	100	205012
96 wells	Black with white wells	–	–	–	100	301004

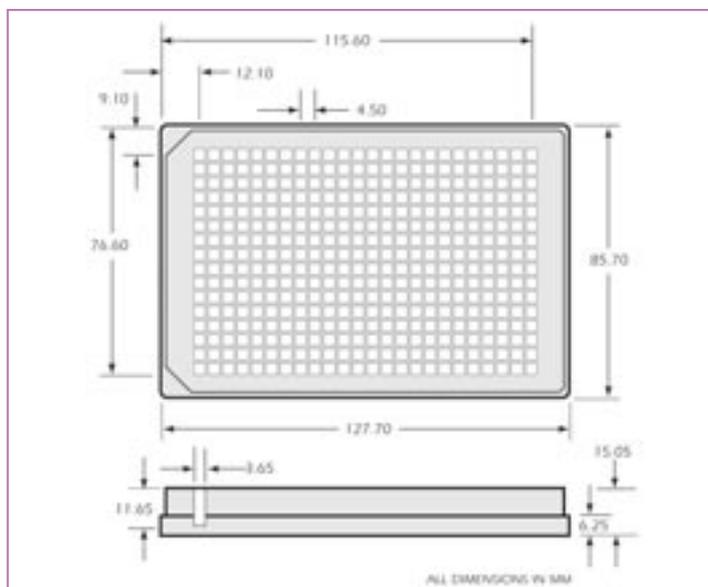
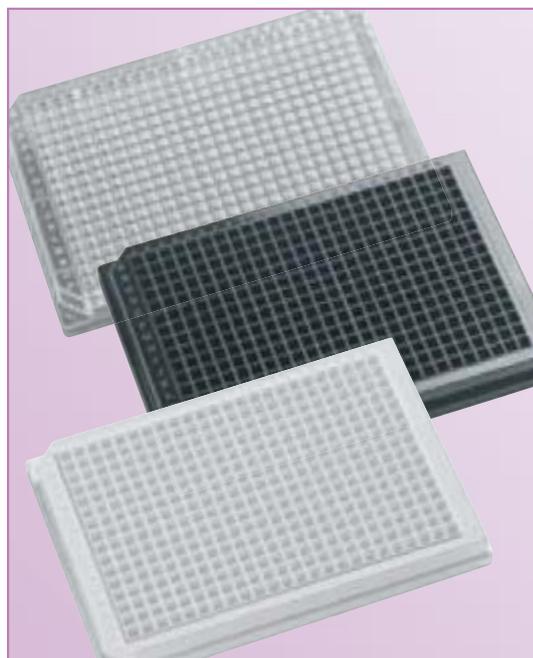
384 square-well plates

384-well assay plates from Porvair Sciences are available in black, white and clear. These have been optimised for fluorescence, luminescence/scintillation and ELISA/turbidity measurements respectively. The working volume is 120µl/well. All 384-well assay plates are available in standard and tissue culture treated formats.

The 384-well format, with its higher density of wells, allows more work to be carried out in a standard sized plate, aiding higher throughput. All of these plates are manufactured from high quality polystyrene.

- Designed to reduce well-to-well crosstalk
- Black plates have low background fluorescence and minimise light scattering
- White plates enhance bio- & chemi-luminescence signals and have low background luminescence and fluorescence
- Well working volumes of 120µl
- Rounded square at the well bottom to reduce wicking
- Low residual volume
- Designed to the standard ANSI/SLAS format
- Alphanumerically labelled wells mean samples can be stored and easily traced

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120µl/well

Solid assay plates

	Plate description	Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
S Q U A R E W E L L	384 wells of 120µl	Clear	–	–	–	100	221003
	384 wells of 120µl	Clear	Tissue culture	✓	✓	50	221509
	384 wells of 120µl	Clear	Tissue culture	✓	✓	100	221009
	384 wells of 120µl	White	–	–	–	50	222503
	384 wells of 120µl	White	–	–	–	100	222003
	384 wells of 120µl	White	Tissue culture	✓	✓	50	222509
	384 wells of 120µl	White	Tissue culture	✓	✓	100	222009
	384 wells of 120µl	Black	–	–	–	50	223503
	384 wells of 120µl	Black	–	–	–	100	223003
	384 wells of 120µl	Black	Tissue culture	✓	✓	50	223509
	384 wells of 120µl	Black	Tissue culture	✓	✓	100	223009

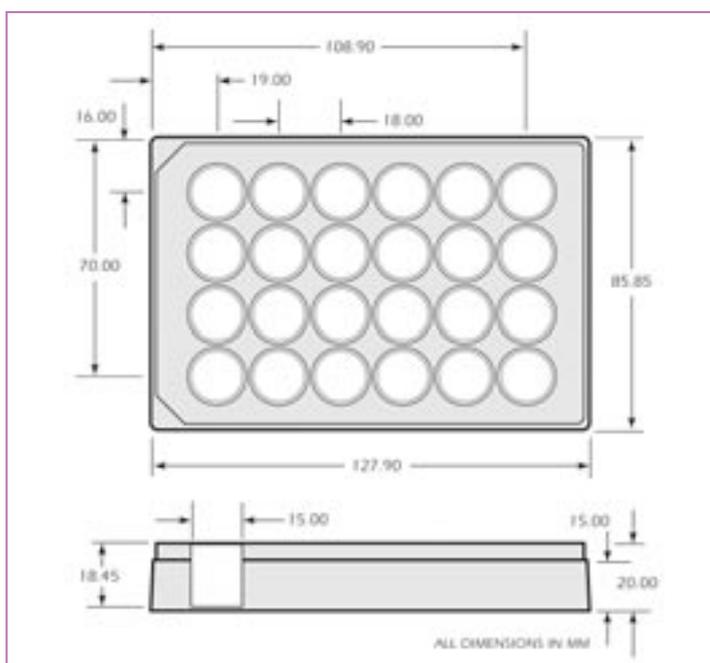
24-well Krystal™ black & white

Clear bottom plates allow the cells grown on the bottom surface to be viewed using an inverse microscope. In addition, light-emitting assays can be measured from the bottom.

Porvair Sciences collection of clear bottom 24-well Krystal plates are optimised for fluorescence and luminescence. The special design of the plate virtually eliminates well-to-well light crosstalk inherent with other clear-bottomed microplate designs, enabling unmatched accuracy, higher sensitivity and better repeatability of photometric readings.

For photometric applications where samples are typically large, Porvair Sciences range of unique black or white Krystal 24 plates provides a perfect solution. Offering 24 high volume (3.1ml) wells in the same convenient footprint of a standard 96-well plate, the Krystal 24 provides a large surface area per well, enabling efficient cell growth. All tissue-culture treated plates are supplied lidded and sterile, in individual bags.

- Opaque walls to prevent well-to-well crosstalk
- Clear plate bottom permits direct microscopic viewing
- Base plate thickness 0.75mm
- For use with top or bottom reading instruments
- Conforms to the standard ANSI/SLAS format
- Well volume of 3.1ml
- Constructed with ultra-pure polystyrene components polished to give exceptional photometric performance and optimised for cell growth



Krystal™ 24-well

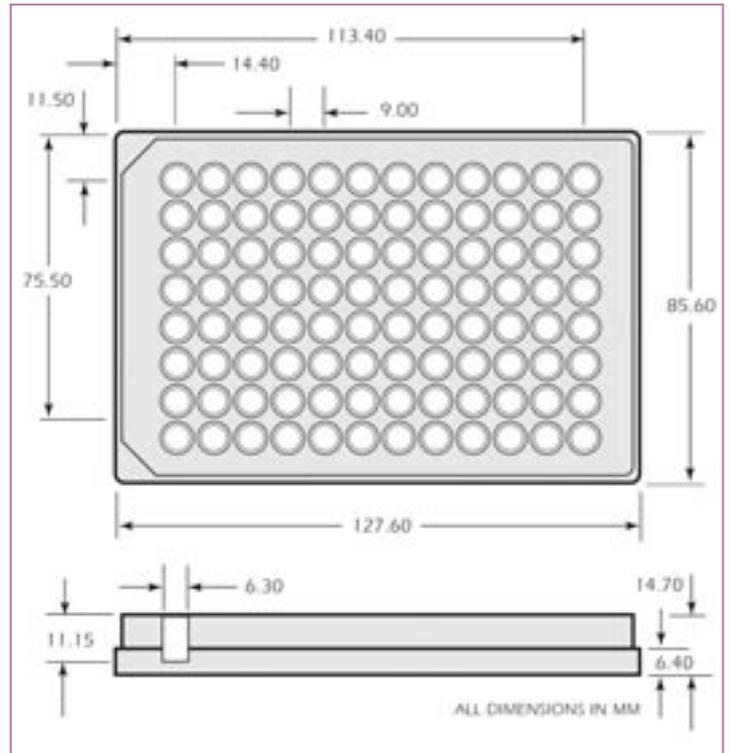
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	–	–	–	68	303002
White	Tissue culture	✓	✓	56	303006
Black	–	–	–	68	303008
Black	Tissue culture	✓	✓	56	303012



96-well Krystal™ black and white

Porvair Sciences clear bottom 96-well Krystal plates are optimised for fluorescence and luminescence. Proprietary ultra-sonic welding is used to assemble the clear bases to the solid top plate in our clean room. This design provides flat, optically clear bases to each well with no leakage, enabling excellent accuracy and reproducibility of photometric readings. All tissue-culture treated plates are supplied lidded and sterile, in individual bags.

- Opaque walls to prevent well-to-well crosstalk
- Clear plate bottom permits direct microscopic viewing
- Thickness of bottom 0.75mm
- For use with top or bottom reading instruments
- Standard ANSI/SLAS format
- Well volume of 350µl
- Constructed from ultra pure grade polystyrene



Krystal™ 96-well

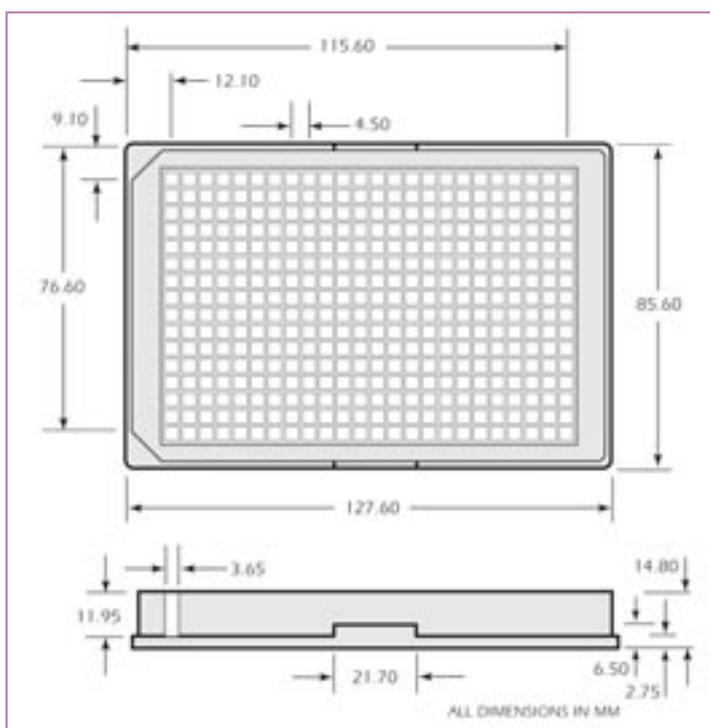
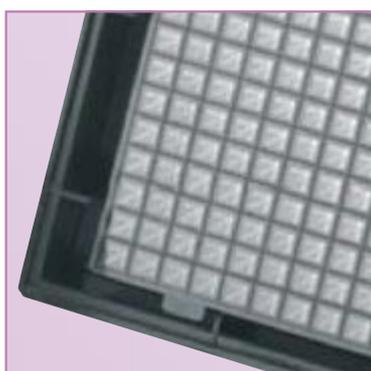
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	–	–	–	100	214003
White	Tissue culture	✓	✓	100	214006
Black	–	–	–	100	215003
Black	Tissue culture	✓	✓	100	215006

384-well Krystal™ black and white

The Krystal 384-well microplate range incorporates novel square wells with a large liquid capacity of 120µl per well, increasing the achievable sensitivity of most HTS assays.

Using a proprietary manufacturing technique, the Krystal 384 offers market leading plate flatness (+/- 0.1mm tolerance) that translates into a significant increase in measurement precision and elimination of read errors when performing cell based assays using fluorescent or luminescent imaging. All tissue-culture treated plates are supplied lidded and sterile, in individual bags.

- Opaque walls to prevent well-to-well crosstalk
- Clear plate bottom permits direct microscopic viewing
- Thickness of bottom 0.40mm
- For use with top or bottom reading instruments
- Maintaining the standard ANSI/SLAS format
- Well volume of 120µl
- Constructed from ultra pure grade polystyrene



Krystal™ 384-well

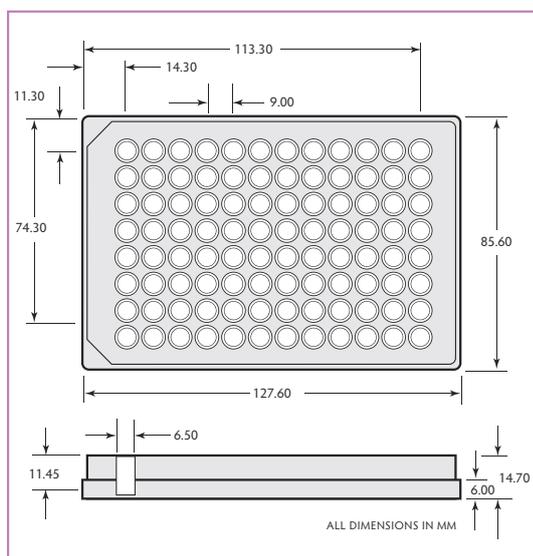
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	–	–	–	100	311001
White	Tissue culture	✓	✓	100	311003
Black	–	–	–	100	312001
Black	Tissue culture	✓	✓	100	312003

96-well Krystal™ 2000 black and white

The unique Krystal 2000 plate range from Porvair Sciences has been optimised for luminescence and fluorescence assays. A patented manufacturing process, using a 'two-shot' mould, provides clear, individual wells in an opaque matrix. The special design of the plate totally eliminates the well-to-well optical crosstalk inherent with other clear-bottomed microplate designs, giving unmatched accuracy, sensitivity and repeatability of photometric readings. Very high signal-to-noise ratio and low detection limits can be achieved with this superb plate. All tissue-culture treated plates are supplied lidded and sterile, in individual bags.

- Raised rims to prevent well-to-well crosstalk
- Lowered bottom rim to stop lateral light piping
- Clear well bottom permits direct microscopic viewing
- For use with top or bottom reading instruments
- Designed to the standard ANSI/SLAS format
- Total well volume of 350µl
- White matrix provides for maximum reflectivity, allowing high sensitivity luminescence assays
- Black matrix provides a quenching of background fluorescence, reducing false positives
- Constructed from ultra pure grade polystyrene

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Krystal™ 2000 96-well

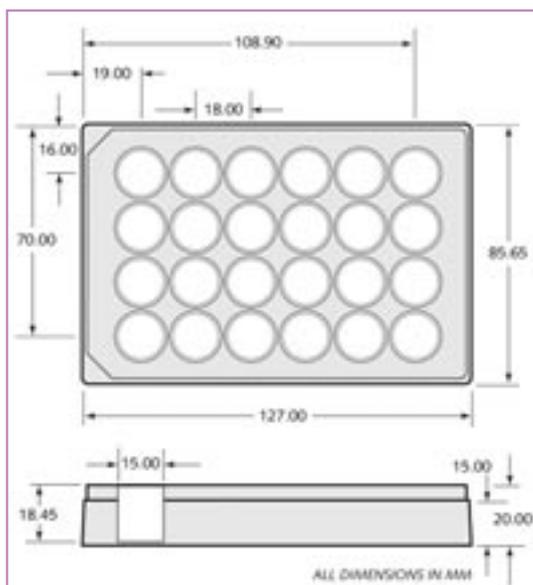
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	–	–	–	100	301010
White	Tissue culture	✓	✓	50	301512
White	Tissue culture	✓	✓	100	301012
Black	–	–	–	100	301002
Black	Tissue culture	✓	✓	50	301506
Black	Tissue culture	✓	✓	100	301006

Krystal™ glass bottom plates

Manufactured for whole-plate CCD imaging and laser detection applications, Krystal glass bottom plates consist of a polystyrene upper part and a clear borosilicate glass sheet fixed to the base with a proprietary adhesive. This process results in consistent flatness of the base and gives improved light transmission whilst maintaining a flat optical plane for growing cells. The nominal cut-off wavelength of 335nm allows most fluorescence assays to be excited or read through the glass bottom. All plates are supplied lidded.

- 175µm glass thickness
- +/- 30µm flatness across base
- 335nm UV optical cut-off
- Industry-standard well layout
- Very low autofluorescence
- High degree of planar flatness
- Biocompatible adhesive
- Resistant to alcohol, DMSO and PBS
- Robot friendly
- Manufactured to ANSI/SLAS specification

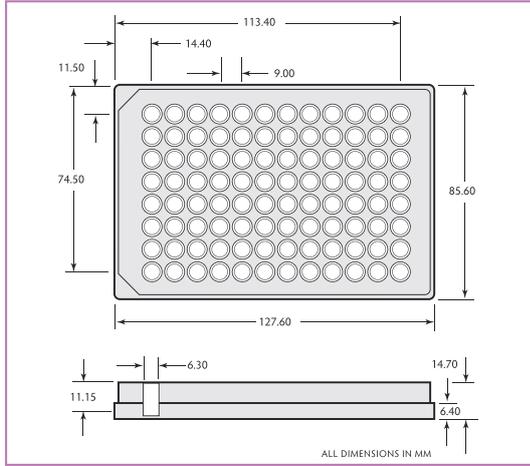
Krystal™ 24-well glass bottom plates



Glass bottom assay plates

Number of wells	Description	Sterile	Lid	Pack size	Cat. no.
24 wells	Black with lid, single pack	–	✓	10	324041
24 wells	Black with lid, single pack	✓	✓	10	324042
24 wells	White with lid, single pack	–	✓	10	324051
24 wells	White with lid, single pack	✓	✓	10	324052

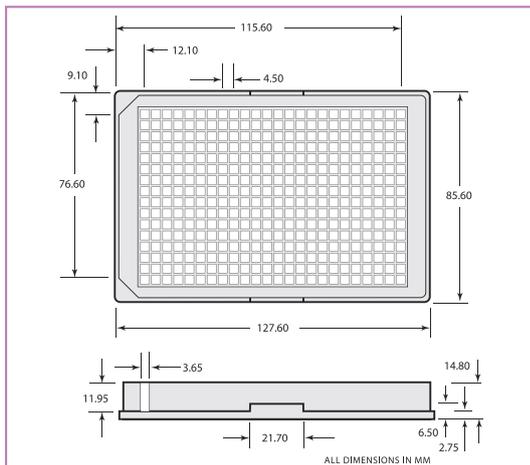
Krystal™ 96-well glass bottom plates



Glass bottom assay plates

Number of wells	Description	Sterile	Lid	Pack size	Cat. no.
96 wells	Black with lid, single pack	–	✓	10	324001
96 wells	Black with lid, single pack	✓	✓	10	324002
96 wells	White with lid, single pack	–	✓	10	324011
96 wells	White with lid, single pack	✓	✓	10	324012

Krystal™ 384-well glass bottom plates



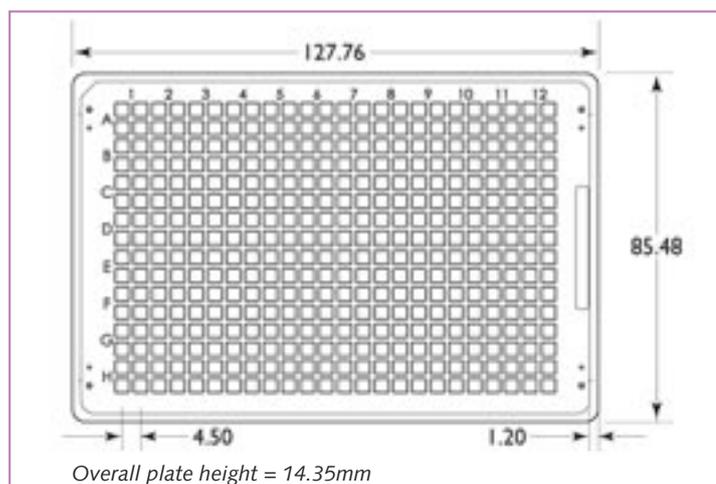
Glass bottom assay plates

Number of wells	Description	Sterile	Lid	Pack size	Cat. no.
384 wells	Black with lid, single pack	–	✓	10	324021
384 wells	Black with lid, single pack	✓	✓	10	324022
384 wells	White with lid, single pack	–	✓	10	324031
384 wells	White with lid, single pack	✓	✓	10	324032

Krystal UV clear bottomed microplates

Recently, scientists have begun using assay chemistries which require excitation or detection wavelengths in the far UV region, below 350nm. To enable our customers to develop assays in this area, Porvair Sciences has introduced a very high specification range of COP-bottomed, UV-transparent microplates. Precision engineered and assembled, these plates are available in 384-well black matrix only for the most sensitive UV range fluorescence assays using whole-plate imaging or confocal microscopy.

- 220nm far UV cut-off
- Industry-standard well layout
- Very low autofluorescence
- High degree of planar flatness
- High chemical resistance to most solvents
- Robot friendly
- Cyclo Olefin Polymer construction with clear base
- Precision engineered to meet ANSI/SLAS specification



Krystal UV COP-bottomed microplates

Description	Pack size	Cat. no.
384-well Krystal COP-bottomed plate	32	327001

Detailed schematics available on request

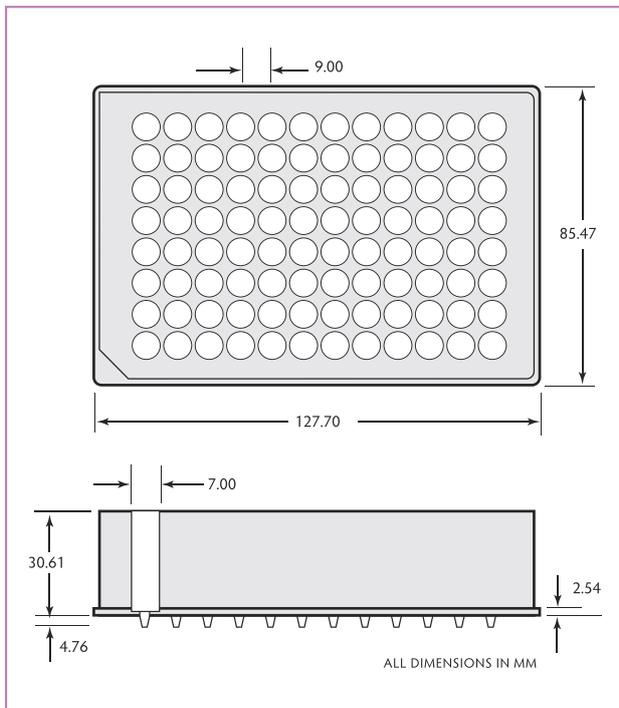
Filtration plates

Filtration plates are used in their simplest form to remove particulate matter from liquid. Either the particulate matter or the filtrate is needed for further study.

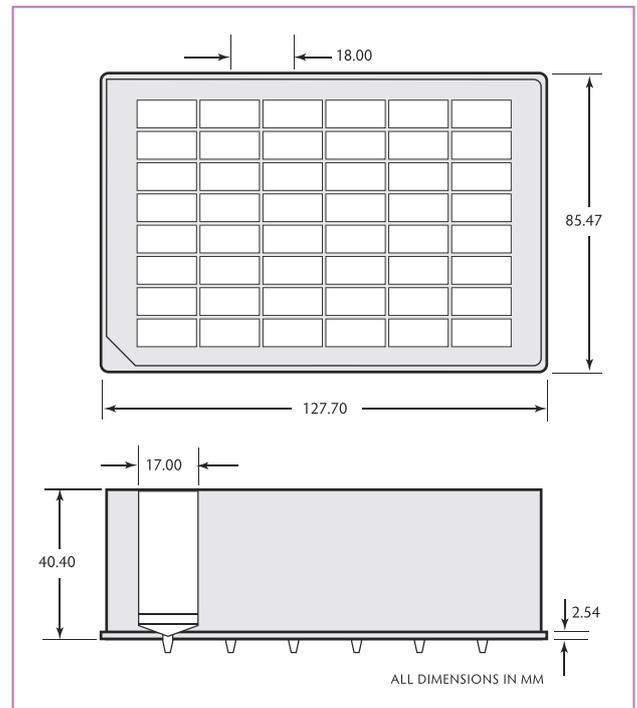
Porvair Sciences has a range of filter plates to suit most filtration applications. The company has optimised filter plates for applications including cell harvesting, DNA separations, binding studies, Plasmid isolation, general filtration and sample clean up.

Porvair has a full range of 48-, 96- and 384-well microplates with a choice of glass fibre, PES PVDF, polypropylene or polyethylene filtration materials and well volumes ranging from 300µl to 5ml.

- Polypropylene filter plates
- Long and short drip directors
- Each well has an individual drainage spout ensuring 100% sample transfer
- Manufactured from ultra pure grade polymer
- Standard ANSI/SLAS footprint
- Robot friendly
- Fit standard vacuum manifold



800µl/well



5ml/well

Filter bottom microplate application guide

Solvent resistant	Application	Filter	Drip detector	Vol (µl/well)	Cat. no.
Low Biomolecule Binding	YAC (Yeast Cloning Assays)	Hydrophilic	Short	300	360043
	DNA extraction from agarose gel	PVDF 0.45µm		400	360037
	Dye Terminator Clean Up			800	360031
	Sequencing Reaction Clean Up				
	DNA/RNA Purification				
	Ni-Nta				
	Affinity Bead				
	Streptavidin/biotin bead				
	Chromatography beads/resins		Long	300	360049
	Purified cloned receptors			400	360027
	Cell Based Receptor Binding			800	360023
	Signal transduction				
	Phosphodiesterase				
	Protein or nucleic acid desalt				
	Cell membrane				
Neonatal Screening					
Vesicle Assay					
Low Biomolecule Binding	Dye Terminator Removal	UHMW PE	Short	300	360047
	Dye Terminator Clean Up	25µm		400	360035
	Sequencing Reaction Clean Up			800	360029
			Long	300	360041
				400	360026
				800	360011
Low Biomolecule Binding	Solid Phase Extraction (SPE)	P E Frit 25µm	Long	2000	360021
				5000	360008
Low Biomolecule Binding	YAC (Yeast Cloning Assays)	Polypropylene	Short	300	360050
	Bacterial DNA prep for PCR	0.45µm		400	360038
	Alumina			800	360032
	Cell fragments/membranes				
	Whole Cells				
	Protease assays				
	Phosphodiesterase				
	Antibody neutralization		Long	300	360044
	Mammalian Cells Capture			400	360020
	Calcium uptake			800	360019
	Dual assay: Ca + receptor			2000	360058
Microsomes					
Solid Phase Radioimmunoassays					
High Biomolecule Binding	DNA Binding	Glass fibre	Long	140	360073
	Lysate Clarification	0.7µm		400	360017
				800	360025
				2000	360057
High Biomolecule Binding	Cell homogenates, crude	Glass fibre	Short	300	360051
	DNA Binding	1.0µm		400	360039
	DNA Isolation			800	360033
	DNA/RNA Purification				
	PCR Clean up				
	Plasmid Minipreps		Long	300	360045
	Recovering DNA from gels			400	360028
	Reverse Transcriptase			800	360024
	Sample Clean up				
High Biomolecule Binding	M13 phage preps	Glass fibre	Short	140	360067
	Thymidine Uptake	1.2µm		300	360048
	Cell homogenates, crude			400	360036
				800	360030
	Cell fragments/membranes		Long	140	360072
	Cytotoxic/Cell Proliferation			300	360042
	Signal transduction			400	360016
	Mammalian Cells Capture			800	360022

Filtration plates

No & vol. of wells	Plate, filter material and pore size	Qty/pack	Cat. no.
48 wells of 7.5ml	Polypropylene, polyethylene, mean pore size 25 microns, long drip	15	360053
48 wells of 5ml	Polypropylene, polyethylene filter, mean pore size 10 to 20 microns	25	360008
96 wells of 300µl	Polypropylene, UHMW polyethylene, mean pore size 25 microns, short drip	50	360047
96 wells of 300µl	Polypropylene, glass fibre, mean pore size 0.7 microns, short drip	50	360052
96 wells of 300µl	Polypropylene, glass fibre, mean pore size 0.7 microns, long drip	50	360046
96 wells of 300µl	Polypropylene, glass fibre, mean pore size 1.0 microns, short drip	50	360051
96 wells of 300µl	Polypropylene, glass fibre, mean pore size 1.0 microns, long drip	50	360045
96 wells of 300µl	Polypropylene, glass fibre, mean pore size 1.2 microns, short drip	50	360048
96 wells of 300µl	Polypropylene, glass fibre, mean pore size 3.0 microns, long drip	50	360066
96 wells of 300µl	Polypropylene, hydrophilic PVDF, mean pore size 0.45 microns, short drip	50	360049
96 wells of 300µl	Polypropylene, hydrophilic PVDF, mean pore size 0.45 microns, long drip	50	360043
96 wells of 300µl	Polypropylene, polypropylene, mean pore size 0.45 microns, short drip	50	360050
96 wells of 300µl	Polypropylene, polypropylene, mean pore size 0.45 microns, long drip	50	360044
96 wells of 400µl	Polypropylene, UHMW polyethylene, mean pore size 25 microns, short drip	25	360035
96 wells of 400µl	Polypropylene, UHMW polyethylene, mean pore size 25 microns, long drip	25	360026
96 wells of 400µl	Polypropylene, glass fibre, mean pore size 0.7 microns, short drip	25	360040
96 wells of 400µl	Polypropylene, glass fibre, mean pore size 0.7 microns, long drip	25	360017
96 wells of 400µl	Polypropylene, glass fibre, mean pore size 1.0 microns, short drip	25	360039
96 wells of 400µl	Polypropylene, glass fibre, mean pore size 1.0 microns, long drip	25	360028
96 wells of 400µl	Polypropylene, glass fibre, mean pore size 1.2 microns, short drip	25	360036
96 wells of 400µl	Polypropylene, glass fibre, mean pore size 1.2 microns, long drip	25	360016
96 wells of 400µl	Polypropylene, hydrophilic PVDF, mean pore size 0.45 microns, short drip	25	360037
96 wells of 400µl	Polypropylene, hydrophilic PVDF, mean pore size 0.45 microns, long drip	25	360027
96 wells of 400µl	Polypropylene, polypropylene, mean pore size 0.45 microns, short drip	25	360038
96 wells of 400µl	Polypropylene, polypropylene, mean pore size 0.45 microns, long drip	25	360020
96 wells of 400µl	Polypropylene, PES, pore size 10kD, short drip	25	360061
96 wells of 400µl	Polypropylene, PES, pore size 30kD, short drip	25	360062
96 wells of 400µl	Polypropylene, PES, pore size 100kD, short drip	25	360118
96 wells of 400µl	Polypropylene, PES, pore size 300kD, short drip	25	360119



Filtration plates

No & vol. of wells	Plate, filter material and pore size	Qty/pack	Cat. no.
96 wells of 800µl	Polypropylene, UHMW polyethylene, mean pore size 25 microns, short drip	25	360029
96 wells of 800µl	Polypropylene, glass fibre, mean pore size 0.7 µm, short drip	25	360034
96 wells of 800µl	Polypropylene, glass fibre, mean pore size 0.7 µm, long drip	25	360025
96 wells of 800µl	Polypropylene, glass fibre, mean pore size 1.0 microns, short drip	25	360033
96 wells of 800µl	Polypropylene, glass fibre, mean pore size 1.0 microns, long drip	25	360024
96 wells of 800µl	Polypropylene, glass fibre, mean pore size 1.2 microns, short drip	25	360030
96 wells of 800µl	Polypropylene, glass fibre, mean pore size 1.2 microns, long drip	25	360022
96 wells of 800µl	Polypropylene, glass fibre, mean pore size 0.7 microns and a polyethylene frit, long drip	25	360065
96 wells of 800µl	Polypropylene, hydrophilic PVDF, mean pore size 0.45 microns, short drip	25	360031
96 wells of 800µl	Polypropylene, hydrophilic PVDF, mean pore size 0.45 microns, long drip	25	360023
96 wells of 800µl	Polypropylene, polypropylene, mean pore size 0.45 microns, short drip	25	360032
96 wells of 800µl	Polypropylene, polypropylene, mean pore size 0.45 microns, long drip	25	360019
96 wells of 800µl	Polypropylene, polyethylene, mean pore size 10 to 20 microns, long drip	25	360011
96 wells of 2ml	Polypropylene, UHMW PE, mean pore size 25 microns, long drip	25	360056
96 wells of 2ml	Polypropylene, glass fibre, mean pore size 0.7 microns, long drip	25	360057
96 wells of 2ml	Polypropylene, GF 3.0 µm & polypropylene 10 µm, long drip	25	360063
96 wells of 2ml	Polypropylene, polypropylene, mean pore size 0.45 microns, long drip	25	360058
96 wells of 2ml	Polypropylene, polyethylene mean pore size 25 microns, long drip	25	360021
96 wells of 2ml	Polypropylene, Hydrophilic PES, mean pore size 0.45 microns, long drip	25	360059
96 wells of 2ml	Polypropylene, Affymetrix, SNP 5.0 assay DNA prep plate	10	360090
384 wells of 140µl	Polypropylene, glass fibre 0.7 microns, long drip	10	360073
384 wells of 140µl	Polypropylene, glass fibre 1.2 microns, long drip	10	360072
384 wells of 140µl	Polypropylene, UHMW PE, mean pore size 25 microns, long drip	25	360082
384 wells of 140µl	No filter, long drip	10	360107
384 wells of 140µl	Filter bottom, GF 5.0µm, long drip	10	360108



Bacti-growth plates

Bacti-growth plates are specially packaged plates to allow the growth of bacteria, yeast, mammalian or insect cell lines.

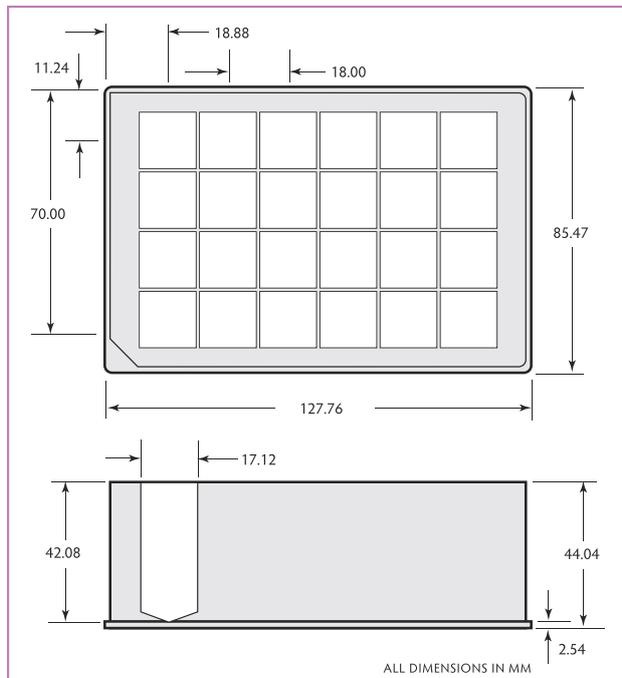
Using only the highest-grade raw materials, our plates are tested to ensure no moulding or polymer contaminants leach out into the samples. This guarantees reproducibility and maintains customer confidence. Each Bacti-growth plate consists of a deep well plate and a tight fitting lid, packed sterile in bags.

- Plate well configuration available from 24- through to 384-well
- Well volumes from 300µl through to 10ml per well
- Round and square well available
- Sealed in sterile bags of 5 plates
- Robot friendly
- Manufactured to the highest specifications
- Conform to the ANSI/SLAS format



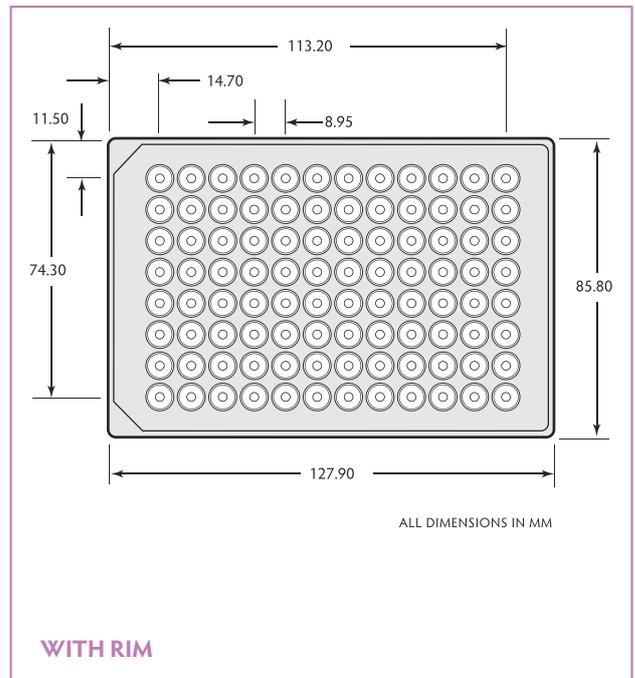
Bacti-growth plates

Description	Sterile	Lid	Qty/Pack	Cat. no.
24 x 10ml square wells, polypropylene with lid	✓	✓	25	360080
96 x 1ml round wells, polypropylene with lid	✓	✓	25	219101
96 x 2ml square wells, polypropylene with lid	✓	✓	25	219102



219115

For a schematic of 219102, please refer to 219009 (page 6).



219101

Components for assay development

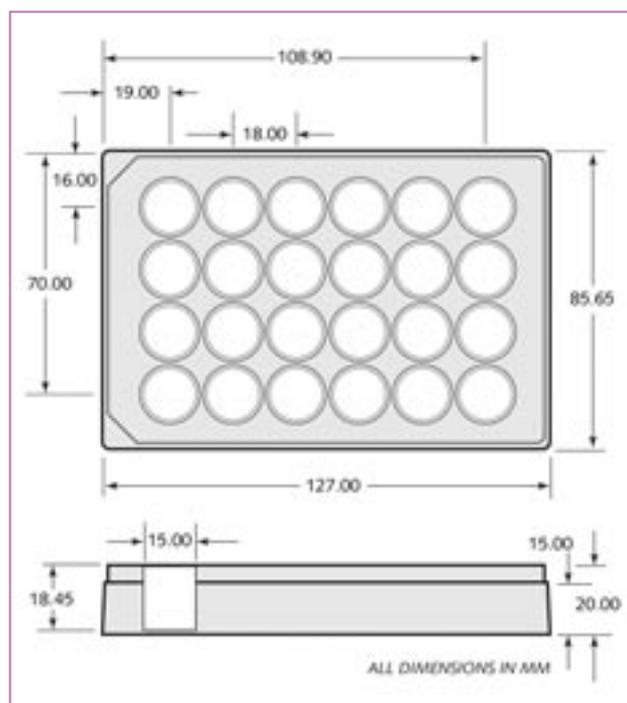
Porvair has many years of developing bespoke microplates and injection-moulded components for Life Science research companies. As such, we are often asked for small numbers of the components used to make our two-part plates. We are happy to make these available as standard items to aid your product or method development programme.

Please note that the following part numbers are individual components of two-part microplates and NOT complete plates. For assembled plates please refer to the appropriate section of this catalogue.

Description	Qty/pack	Cat. no.
24-well A-Plate Krystal glass bottom plate, black	20	229218
96-well A-Plate Krystal glass bottom plate black	20	229220
24-well clear polystyrene lid for Krystal glass bottom plate	20	229219
96-well clear polystyrene lid for Krystal glass bottom plate	20	229221
Borosilicate glass sheet, 74 x 110mm x 175µm	100	229217
96-well A plate Krystal polystyrene, black	126	500011
96-well B plate Krystal polystyrene, clear	1350	500012
96-well lid polystyrene, clear, with anti-condensation rings	400	500013

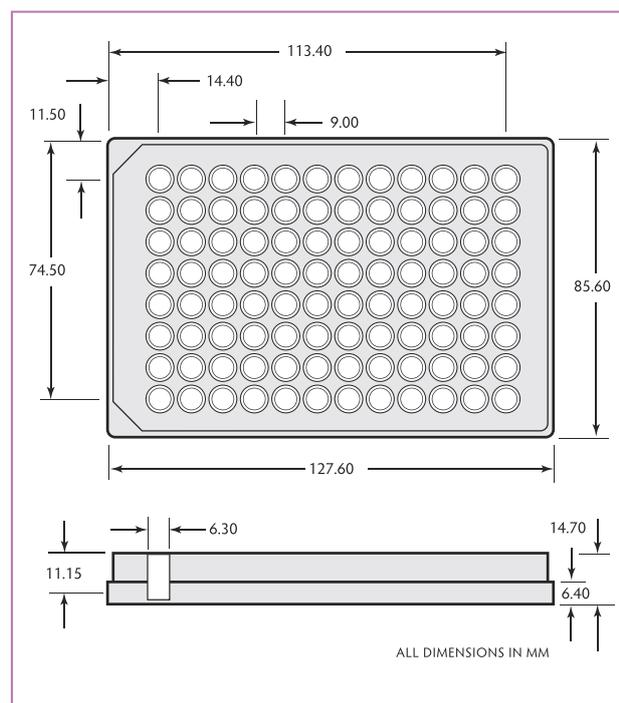
Krystal™ 24-well glass bottom plates

(see page 29)



Krystal™ 96-well glass bottom plates

(see page 30)



Microlute - the complete 96-well sample preparation system from Porvair Sciences

For more than twenty years, Porvair's Microlute 96-well SPE plates have been helping scientists increase the throughput of their analytical laboratory by speeding up sample preparation. Using 20 µm frits with a range of quality sorbent materials, including cation- and anion-exchange resins, Microlute sets the industry standard for 96-well plate based solid phase extraction.

The complete Microlute system provides a matched filter plate, vacuum manifold and choice of collection plates with the option of a dedicated sample concentrator if needed. Microlute plates are designed to fit most available manifolds and conform to ANSI/SBS standards. Combined with the Porvair Sciences acrylic vacuum manifold, they provide a simple, cost-effective sample clean up method, suitable for use in medicinal chemistry, compound synthesis and purification.



For biological sample clean up – such as protein and phospholipid removal prior to analysis – Porvair Sciences offer the Microlute P³ device. This protein precipitation plate is simple to use and enables cost-effective de-proteination using easy procedures. Acetonitrile or methanol is added to serum or plasma samples to crash the protein out of solutions. Porvair Sciences' proprietary superhydrophobic membrane technology ensures that no precious sample comes through until you are ready to apply vacuum and collect the filtrate. No agitation needed, no caps or seals and no messy, inefficient valves underneath. You get simple, fast, clean, clear samples every time. The Microlute P³ is setting new standards for drugs of abuse screening, neonatal metabolic disorders and many other biological assays worldwide.



The clear acrylic sides of the Porvair Sciences manifold allow you to see quickly and easily that the filter drip directors are aligned to the collection plate. With Porvair Sciences' deep well collection plates, you get virgin pure polypropylene that won't contaminate your samples with extractables or additives from the plastic. In addition, they are available in THREE convenient sizes, which optimise your sample recovery – 2ml, 1ml and

350 µl. To make your life easier, all three collection plates are the same height – so no adjustment or fiddly spacers are needed when used in the Porvair acrylic manifold.

With a solid base plate made from chemically resistant acetal, you don't need to worry about spillage in the manifold either. For added reproducibility and compliance with SOPs, a premium manifold is available, fitted with a vacuum gauge.

To help you reduce costs in the laboratory, Porvair also provide inexpensive, disposable waste trays made from polycarbonate, so that waste eluent can be cheaply and quickly eliminated. Once again, these waste trays are designed to fit exactly into the Porvair manifold plenum chamber in order to catch all the waste liquid.

Many analysts require sensitivity levels that are lower than ever before, especially with mass spectroscopy detection. By pre-concentrating your

samples, you can improve your detection limits. The Porvair Sciences sample concentrators are the perfect complement to the Microlute system. Following clean-up, simply place your deep well collection plate on the deck of the evaporator and a stream of warm nitrogen will gently evaporate the excess solvent leaving you with a pre-concentrated, or even a dry, sample if required.

Microlute™ Solid Phase Extraction (SPE)

Microlute™ is the original 96-well plate format for Solid Phase Extraction (SPE). This device consists of a polypropylene 96-well plate loaded with a choice of sorbent and sorbent volumes. For classical solid phase extraction (SPE) we offer top-quality C18 silica held between our inert Vyon frits, a microporous high-density polyethylene, for stability, low hold-up volume and consistent flow through. The SPE method of sample preparation concentrates and purifies analytes from solution by sorption, followed by elution of the analyte with a solvent appropriate for instrumental analysis, such as LC-MS. Porvair Sciences offers a range of products to implement SPE.



Porvair's flexible manufacturing approach enables us to consider manufacture of small runs of MicroLute™ devices packed with specialty resins or sorbents of your choice. Typically, minimum runs of just 50 plates can be produced economically. Please contact Porvair Sciences for more details of this service.

See page 46 for MicroLute™ packed with IRIS Polymeric Resin Sorbents for SPE.

- Choice of popular sorbents
- Packed bed volumes from 10mg to 100mg per well
- Mean frit pore size 20µm
- No channelling due to proprietary sorbent loading technique
- Working volume of 2ml per well
- Up to four times quicker than cartridge systems
- Long drain directors locate accurately with collection plate to avoid cross contamination
- Virgin polypropylene, tested and chosen for having no extractables
- Plate designed to be automated, meets ANSI/SLAS specification

Microlute™ Supported Liquid Extraction (SLE)

Microlute™ Supported Liquid Extraction (SLE) is a method of separation based on liquid-liquid extraction, but with one phase immobilised onto an inert support, in this case, diatomaceous earth (DE). This has the advantage of eliminating costly and fragile glassware while allowing simple laboratory automation in 96-well plate format. SLE-DE has been shown to successfully remove phospholipids from biological samples such as serum, plasma and urine where it can cause ion suppression in LC/MS analysis. The Porvair Sciences SLE-DE plates are designed for the quick and cost-effective clean-up of biological materials prior to LC/MS analysis and work in harmony with our vacuum manifolds and deep-well collection plates.

Microlute™ Solid Liquid Extraction Plate

Description	Qty/pack	Cat. no.
P3SLE – Microlute™ Solid Liquid Extraction (Diatomaceous Earth) Plate	1	240079

P³ Protein Precipitation Plates

Biological samples commonly contain proteins that interfere with downstream applications. The P³ plate uses the CRASH method, in which the protein is denatured with acetonitrile and the flocculant filtered out, allowing 96 samples to be handled at one time.

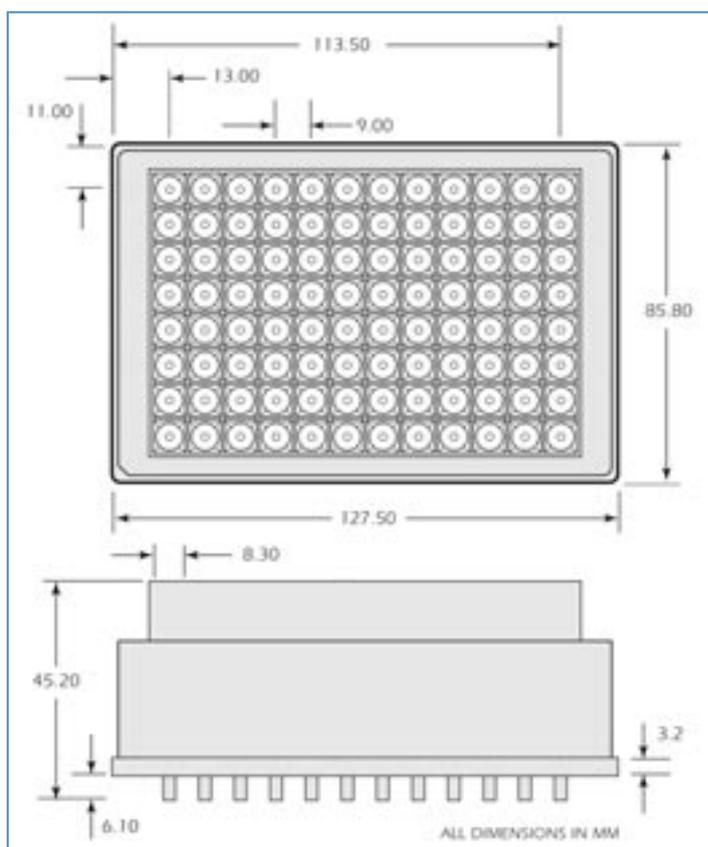
The Protein Precipitation Plate, P³, is based on the industry standard MicroLute™ format, but without the chromatographic sorbent. Protein 'crashes' out of solution and precipitates directly in each well when acetonitrile is added, thus solving all common problems associated with the CRASH technique of protein clean-up.

The novel dual frit, hydrophobically treated matrix means that there is no 'wetting out' and leakage of the sample through the plate before the application of vacuum. P³ is now commonly used as the protein precipitation plate of choice in many major pharmaceutical companies.

Optional drain cap and top cap mats are available for those wishing to use vortex sample mixing (see page 41).

- Dual frit design
- Pre-filter frit at 100µm traps large flocculant particles
- Secondary frit traps fine protein particles at <10µm
- Frits are Hydrophobic/Oleophobic. This retains sample/acetonitrile in the well to allow precipitation of proteins until vacuum is applied.
- Pore size optimised to allow ideal flow rate
- Inert filter material to ensure no adsorption of sample components
- Frit structure prevents break through of protein particles
- Industry standard MicroLute™ format enables easy automation
- Specially selected polypropylene for low extractables

P³ Protein Crash Plate shown on top of typical collection plates



MicroLute™ Protein Precipitation Plate

Description	Qty/pack	Cat. no.
P ³ Protein Precipitation Plate (single pack)	1	240100
P ³ Protein Precipitation Plate (bulk pack)	5	240200
P ³ Protein Precipitation Plate High Efficiency*	1	240010

*The Protein MicroLute High Efficiency plate is exactly the same as the P³ but with the frits untreated. This plate is used when sample and acetonitrile are pre-mixed before being pipetted into the plate.

Development MicroLute™

This is an SPE Development MicroLute™, which is designed for research and development laboratories, where it may not be known which sorbent best suits the process.

The system allows the researcher to specify which sorbents go into specific wells, with what designated packed bed volume. This allows the researcher to have full control of the SPE plate.

- Uses an industry standard SPE plate, MicroLute™
- Sorbents from Thermo-Fisher Hypersil
- Packed bed volumes ranging from 10mg to 100mg
- Allows up to 2ml of sample to be tested
- Can be packed either in 8-row or 12-column format
- Manufactured within ANSI/SLAS standard to allow for automation



MicroLute™ – Development

	10mg	15mg	25mg	50mg	100mg
Eight sorbents	271014	271016	271018	271020	271022
Twelve sorbents	271024	271026	271028	271030	271032



MicroLute™ accessories

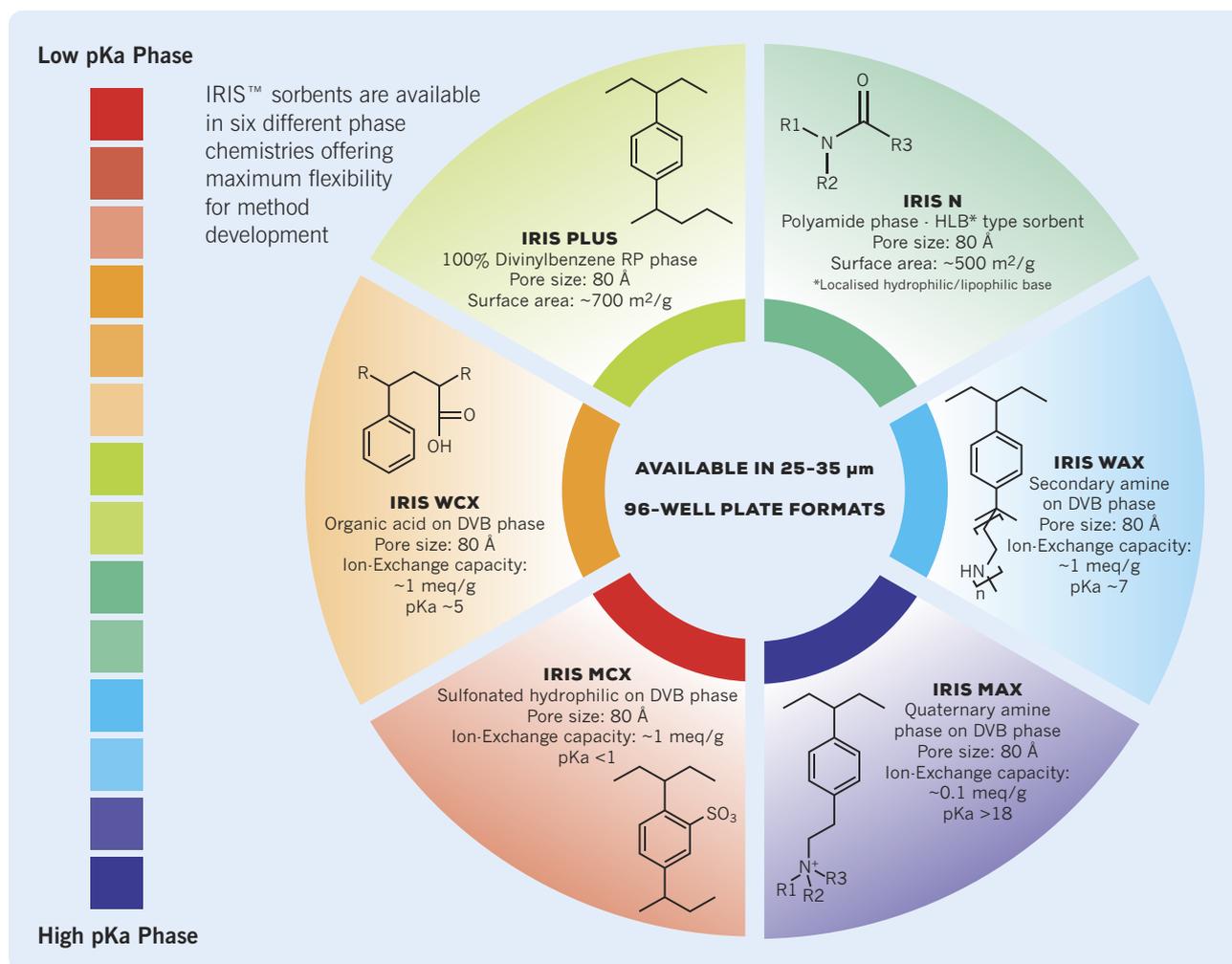
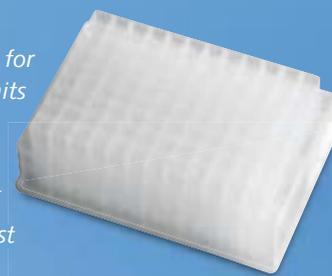
- Disposable reservoir tray. Used for the collection of waste products in the vacuum manifold
- Sealing cap, square well, fits top of MicroLute™. Used for retaining the sample in the well during transit or stopping the well from becoming contaminated
- Drain cap mat that seals the bottom of the plate, preventing liquid leakage

MicroLute™ – accessories

Description	Qty/pack	Cat. no.
Disposable reservoir tray	25	219010
Sealing cap, square well, fits to top of plate	50	219004
Drain cap mat, seals base of plate	25	219005
EVA sealing strip, 8 square-well to fit MicroLute™	300	500018

IRIS Polymeric SPE Microplates

- Excellent recoveries thanks to the highly retentive nature of polymeric phases
- An absence of residual silanol groups associated with silica media
- A high surface area that results in higher analyte capacity compared to silica-based SPE
- Benefiting from the absence of leachates and extractables, from the plastic and the media
- Inert to a wide array of solvents and works across a wide pH range
- Reduced resin volumes for improved detection limits and lower hold-up volumes
- Resistant to de-wetting
- Six phases to cover most applications



IRIS Polymeric SPE plates

Description	10 mg	25 mg	50 mg	100 mg
IRIS N	240055	240056	240057	240058
IRIS PLUS	240059	240060	240061	240062
IRIS MCX	240063	240064	240065	240066
IRIS MAX	240067	240068	240069	240070
IRIS WCX	240071	240072	240073	240074
IRIS WAX	240075	240076	240077	240078

IRIS N (Neutral) RP-HLB: Polyamide SPE Phase

- Polyamide sorbent – HLB phase
- Pore size: 80Å
- Surface area: ~500 m²/g
- Available in 25-35 µm or 55-65 µm particle sizes

Example of applications:

Sulfonamides: *Sulfadiazine, Sulfathiazole, Sulfamerazine, Sulfamethazine*

Hormones: *Prednisolone Acetate, Estradiol, Methyl Testosterone*

Florfenicol & Chloramphenicol

Carbaryl, Atrazine, Methiocarb, Alachlor, Caffeine

IRIS MAX (Mixed Mode Strong Anion Exchange)

- Quaternary amine phase on DVB support
- Pore size: 80Å
- Ion-Exchange capacity: ~0.1 meq/g
- pKa >18
- Available in 25-35 µm or 55-65 µm particle sizes

Example of applications:

DL-Tyrosine, Ketoprofen, Nortriptyline, Sodium Salicylate

IRIS PLUS (100% DVB): Highly retentive reverse phase SPE

- 100% divinylbenzene (DVB) phase
- Features reduced swelling and increased retention over (PS-DVB) phases
- Superhydrophobic for highest retention
- Excellent for environmental samples
- Available in 25-35 µm or 55-65 µm particle sizes

Example of applications:

Theobromine, Theophylline, Caffeine

Polycyclic aromatic hydrocarbons (PAHs)

IRIS WCX (Weak Cation Exchange)

- Organic acid on divinylbenzene support
- Pore size: 80Å
- Ion-Exchange capacity: ~1 meq/g
- pKa ~5
- Available in 25-35 µm or 55-65 µm particle sizes
- Available in various cartridge sizes and 96-well plates

Example of applications:

Diquat Dibromide, Deoxyadenosine Monohydrate, Sulfonamides: Sulfadiazine, Sulfathiazole, Sulfamerazine, Sulfamethazine

IRIS MCX (Mixed Mode Strong Cation Exchange)

- Sulfonated hydrophilic on DVB support
- Pore size: 80Å
- Ion-Exchange capacity: ~1 meq/g
- pKa <1
- Available in 25-35 µm or 55-65 µm particle sizes

Example of applications:

Melamine in milk, Amphetamine, Barbituate, Cocaine, Opiate, Norephedrine Hydrochloride and Ephedrine, Hydrochloride, Carbendazim and Thiabendazole

IRIS WAX (Weak Anion Exchange)

- Secondary amine on DVB support
- Pore size: 80Å
- Ion-Exchange capacity: ~1 meq/g
- pKa ~7
- Available in 25-35 µm or 55-65 µm particle sizes

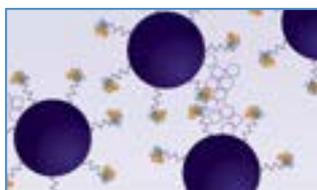
Example of applications:

Ketoprofen, Nitro-L-Tyrosine, Iodo-L-Tyrosine, N-Acetyl-L-Tyrosine



MicroLute™ BioVyon Co-sinter products

BioVyon™ Co-sinter products are made using a solid-state media created from an ultra-pure and highly modified polymeric material with the lowest levels of extractables and leachables. Our proprietary BioVyon™ technology allows high-purity silica resins to be supported in a matrix which provides a high surface area whilst reducing channelling through the column. As the porous material is co-sintered under high pressure and temperature with the BioVyon™ polymer matrix, the resultant frit or column is impervious to further compression and easily resists channelling of liquids, even at high flow rates.



Micro structure of BioVyon substrate



BioVyon C8 and C18 products

Porvair Sciences have introduced MicroLute™ BioVyon™ Co-sintered C8 and C18 silica SPE 96-well plates for low volume assays. Offered in 96-well MicroLute™ plates as a 10mg per well loading of C8 or C18 suitable for low sample volume bioassay preps and clean ups.

MicroLute™ BioVyon™ Co-sinter products

Solid Phase Extraction		
Description	Qty/pack	Cat. no.
C8 96-well plate 10mg per well	1	240030
C18 96-well plate 10mg per well	1	240031

- Accepted industry standard
- Up to 2ml per well of sample
- Low frit liquid retention
- Virgin polypropylene
- Polypropylene is tested and chosen for having no extractables
- Manufactured to ANSI/SLAS standard to allow for automation

Combinatorial MicroLute™

Combinatorial MicroLute™ is based on the tried and tested MicroLute™ format. This is a 96-well polypropylene plate with a bottom polyethylene frit already in place. It is designed to allow packing with any material required for chemical synthesis. Two bottom frit sizes are available, 10µm and 30µm, however, we recommend the use of 30µm top frits to ensure a good flow rate in both cases.

Combinatorial MicroLute™

Description	Qty/pack	Cat. no.
Combinatorial MicroLute™ plate, unpacked with bottom frits. Mean pore size 30µm, polyethylene	1	240002
30µm Vyon F PE frits to fit Combinatorial MicroLute 1.5 x 7.2mm frits	1,000	239007
Combinatorial MicroLute™ plate, unpacked with bottom frits. Mean pore size 10 µm, polyethylene	1	240054
10µm Vyon T PE frits to fit Combinatorial MicroLute 1.5 x 7.2mm frits	1,000	239010
Empty 96-well MicroLute shell with no top or bottom frits	40	240011

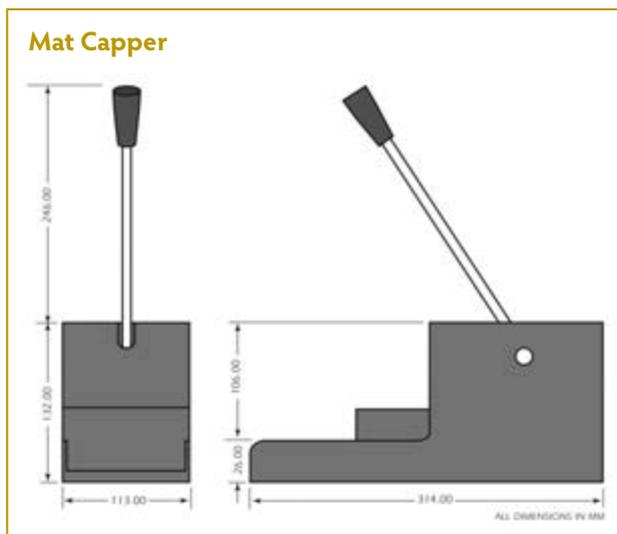
Mat Capper

For laboratories having to seal medium numbers of microplates the Mat Capper offers an affordable solution. Compact and portable, the Mat Capper is very easy to use, requiring only one operation of the system to produce an accurate and tight seal on a wide range of both collection and shallow well microplates. The seals used are EVA or silicone mats, which work by friction fit and are re-usable with care. For a wide range of friction seals, please see page 59.



Shown with cap mat
229093

- Caps shallow and deep well polypropylene storage plates
- Needs minimal pressure for capping, reducing fatigue and RSI
- Powder coated to resist chemical spillage
- Universal plate 'shuttle' to take shallow or deep well plates
- Fixing holes for securing to bench



- Automated application of friction sealing caps
- Reproducible, even pressure every time
- Speeds up the general workflow
- Small footprint for laboratory benches



AutoCapper

The new AutoCapper from Porvair Sciences has been designed to take the strain out of applying friction sealing caps to deep well plates and tube racks. Simply place your rack or plate with its attendant cap mat in the drawer and push it firmly shut. The sophisticated electronics take over, applying reproducible and even pressure every time to force the cap mat down into each tube or well. Time after time, the AutoCapper does the hard work for you. It's more reproducible, quicker and less likely to cause a strain injury than trying to do this by hand. The compact unit requires only a mains power supply to operate and is small enough to sit on most lab benches.

Mat Capper and AutoCapper

Description	Qty/pack	Cat. no.
Mat Capper, applicator for storage and assay plates	1	229078
AutoCapper, electrically operated mat capper for storage plates and vial racks, 110/220V	1	500246

Vacuum manifolds

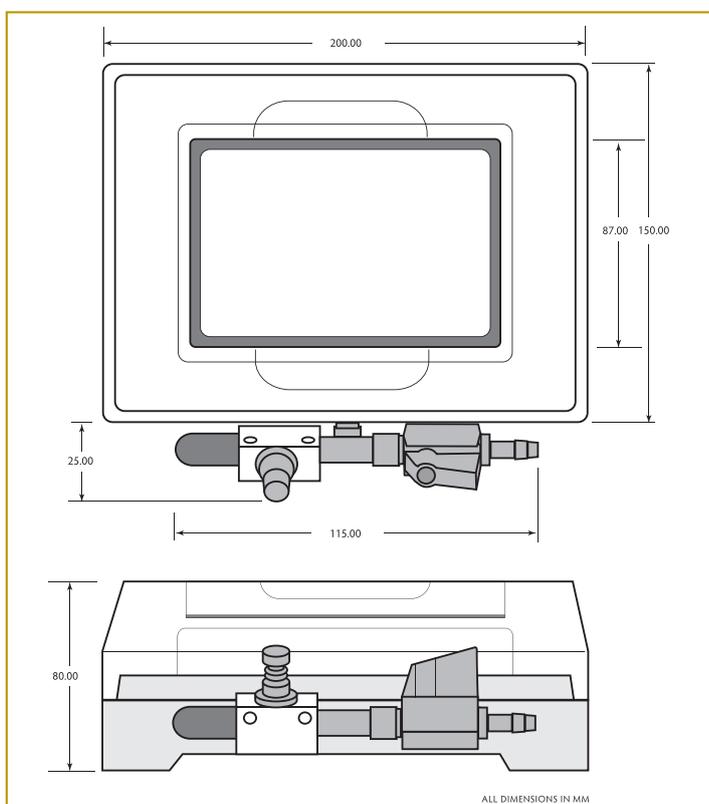
Vacuum manifolds are used to draw liquid through a filter or SPE plate into either a waste tray or a collection plate. The application of vacuum increases the speed at which samples can be collected.

MicroLute™ manifold

The MicroLute™ vacuum manifold from Porvair Sciences is precision machined from crystal clear acrylic (top plate) and acetal polymer (plenum chamber). The acrylic top plate allows visual access to the plenum chamber for checking progress of the separation process.



- Designed to take most filter plates manufactured to the ANSI/SLAS specification with long drip directors
- Also designed so that SPE plates can be used, especially the Porvair Sciences MicroLute™ plate
- Fitted with valve controller to ensure accurate adjustments of vacuum to the manifold
- On/off valve for speed of use
- Square well collection plate volumes of 350µl, 1ml and 2ml may be used. Any plate up to 44mm in height can be used
- Fitted with a custom O-ring in upper surface allowing airtight interface between plates during operation
- Removable top plate to install reservoir tray or collection plate
- Chamber has a medium resistance to alcohols and weak acids



MicroLute™ manifold

Description	Qty/pack	Cat. no.
Standard MicroLute™ manifold to hold deep 96-well collection plate	1	228008
Replacement gasket, profile (to fit between top plate and vacuum chamber), for 228008/228020	1	228007
Replacement gasket, flat (to fit top plate below filtration plate), for 228008/228020	1	228009
Optional spacer insert, polypropylene, to allow use of 1ml round well polypropylene microplates (219002) in acrylic deep well manifolds (228008/228020)	1	228010
Optional spacer insert, HDPE, to allow use of 350µl microplates in acrylic manifolds (228008/228020)	1	228012
Disposable reservoir tray, PVC	25	219010

Microplate evaporators

Porvair evaporators are designed to remove the traditional laboratory 'bottleneck' of solvent evaporation from microplates prior to analysis or reconstitution in storage buffer. These evaporators give significant throughput advantages to laboratories looking to optimise microplate sample preparation productivity. Faster than centrifugal evaporation, significant increases in sample throughput are achieved through advanced evaporator head technology and an innovative manifold design, which directly injects heated nitrogen into each individual well of the microplate simultaneously. The evaporators have been designed to be simple to install, operate and maintain. Installation requires only connection to a gas supply or cylinder and mains electricity. Safety of operation is ensured as the CE marked compact units fit into all fume cupboards. The blowdown technique is not suitable for high boiling solvents such as DMSO and water.

Both MiniVap™ and UltraVap™ may be operated with a supply of clean, dry compressed air in place of nitrogen, if the chemistry allows. A 5um in-line gas filter should be used where the cleanliness of the air supply is uncertain.

Nitrogen blow-down

The nitrogen blow-down principle is easy to understand. Warm gas is blown down into the wells of the microplate, just above the liquid level. The effect is to speed up solvent evaporation by providing more energy for the latent heat of evaporation. This enables a steady-state equilibrium to be reached more quickly, leading to shorter drying times. Nitrogen blow-down has been shown to be the easiest way to automate the frequent bottlenecks caused by the requirement to remove solvent from samples that need to be concentrated, dried or reconstituted in a more suitable solvent.

Solvent compatibility

With a choice of 96 straight or 96 spiral needles, plus 24 and 384 straight needles, the sphere of application for Ultravap™ and MiniVap™ evaporators is huge. Most common chromatography solvents can be evaporated with ease, such as dichloromethane, methanol, acetonitrile and hexane. The nitrogen blow-down method is not, however, suitable for high-boiling point solvents such as DMF, DMSO and water. It is also unable to be used with acids or acid chlorides, as special corrosion-resistant systems are needed for this work. The choice of straight or spiral needles allows the user to choose between faster dry down (spiral) and better final drying in V-well plates (straight). The spirals cause a vortex to form in the solvent, increasing the surface area and thus speeding up the rate of evaporation. However, for plates with V-bottom wells, or for smaller wells such as those in 384-well plates, straight needles are required.



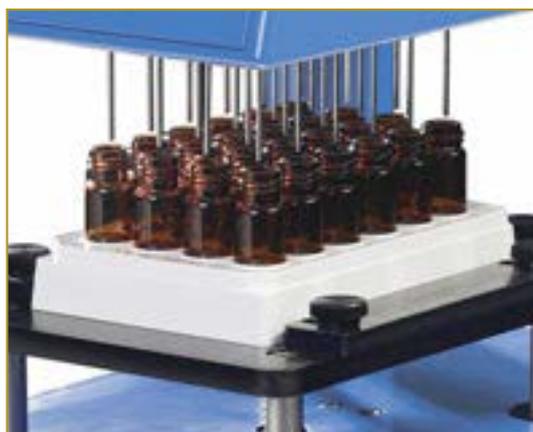
MiniVap™

The MiniVap™ series is purpose designed for low usage research and development departments where low numbers of individual plates or vials need drying. The MiniVap™ is simple to operate and maintain. Installation requires only connection to a gas supply and standard mains socket. With manual control of the needle depth, gas temperature and flow rate, it allows fine control and quicker drying times than other standard methods.

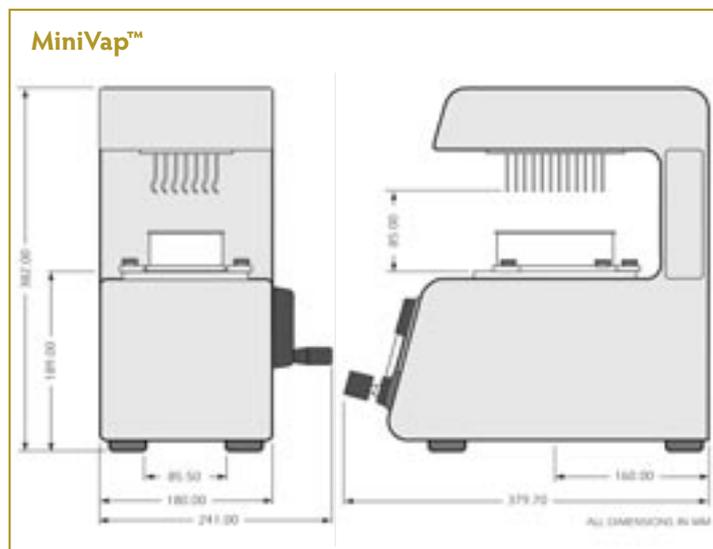
- Quicker dry down times than standard methods such as vacuum oven
- Tests have shown that the MiniVap™ can evaporate 500µl of methanol in less than 6 minutes
- Designed for any ANSI/SLAS 96-well plate
- 24 vial head now available
- Simple to install and operate
- Easy adjustments of temperature, gas flow rates and needle depth into the wells
- Compact footprint – fits all standard fume cupboards



MiniVap 229201



MiniVap™ 229204



MiniVap™ blowdown sample concentrator

Description	Qty/pack	Cat. no.
Blowdown Evaporator MiniVap™ (110/230 Volts), without a head	1	229206

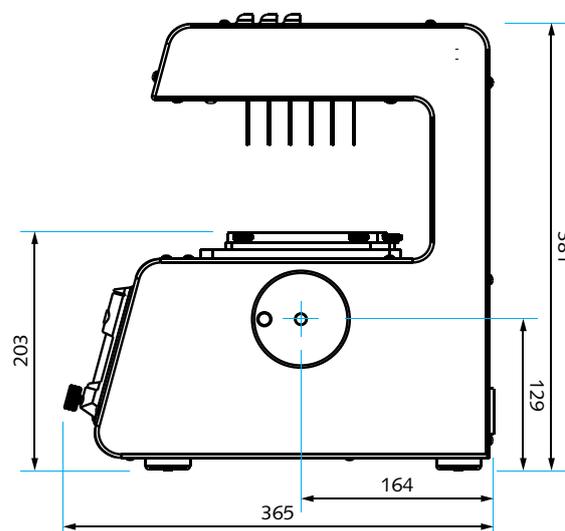
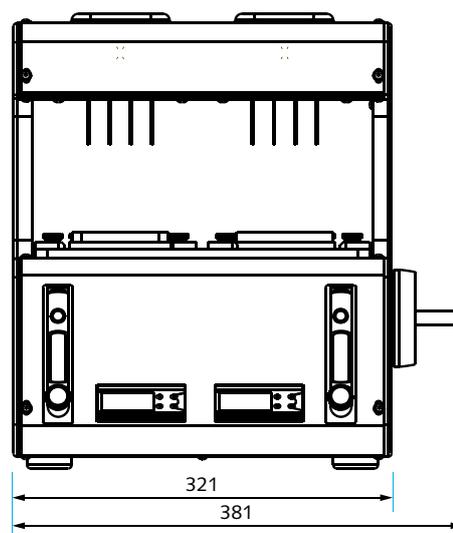
MiniVap™ Gemini™

Now you can dry down two 96 well plates simultaneously on the same instrument. Each evaporator head has its own temperature controller and heater manifold to give you excellent control over the drying process.

- Twin lift platform
- Easy adjustments of individual gas temperature for each plate
- Space-saving and economical option for busier labs



MiniVap™ Gemini™



MiniVap™ Gemini™ blowdown evaporator

Description	Qty/Pack	Cat. No.
MiniVap™ Gemini™ Blowdown Evaporator (110/230 volts), without heads	1	500234

Spares and consumables for Porvair evaporators

Description	Qty/pack	Cat. no.
Replacement 96 Needle Head with spiral needles for all Porvair evaporators	1	229072
Replacement 96 Needle Head with straight needles for all Porvair evaporators	1	229036
Replacement 384 Needle Head with straight for Ultravap™ RC. Mistral & Levante™ only	1	229073
Replacement 24 Needle Head with straight for all Porvair evaporators	1	229409
Dedicated 48 Needle Head straight for use with HPLC vial adaptor for all Porvair evaporators	1	229410
Gasket for Needle head manifold for all Porvair evaporators	1	229048
24 Well 12mm i.d. Vial Holder for solid aluminium for all Porvair evaporators	1	229650
Vial adaptor for 48 x 1.5ml HPLC vials (12 x 32mm Finneran type) black polypropylene	1	500109
Disposable plastic vial rack with clear bottom for 13.75mm o.d. glass vials x 24	5	229216

Ultravap™ Levante™

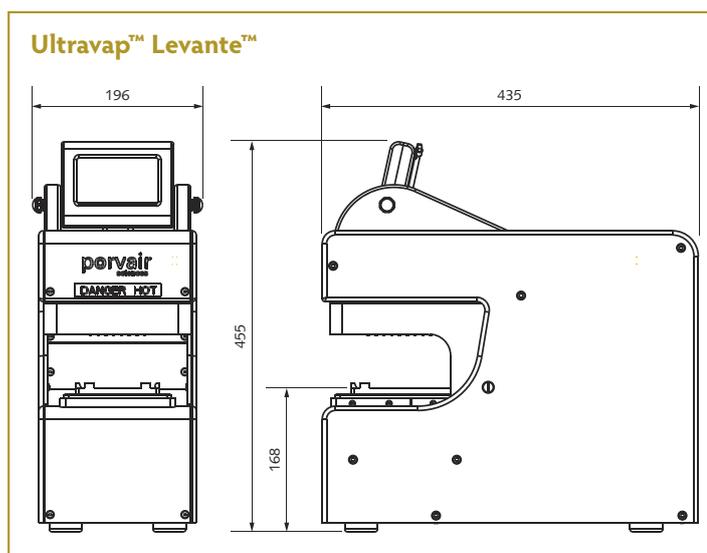
The Ultravap™ Levante™ is the latest in Porvair Sciences' popular series of nitrogen blow-down sample concentrators and evaporators. Using technology from our very successful Ultravap™ Mistral series of robot-ready, integration compatible evaporators we have re-designed the classic single plate evaporator to meet the needs of the modern laboratory.

Now you get full-colour touch screen graphic displays, an integrated auto-ranging power supply and built-in fume venting. Combined with real-time run displays showing actual gas temperature, gas flow rate and stage height the Ultravap™ Levante™ puts you more in control of the evaporation process. Offering multi-step ramped programming with full alphanumeric program naming, the Levante is our state-of-the-art standalone evaporator.

The precision engineered mechanism uses a standard ANSI/SLAS plate 'nest' to accept most microplate formats and tube racks. It can accommodate tubes up to 80mm in height in a variety of configurations to allow the use of 2 Dram vials, 1.5ml HPLC vials, bar-coded tubes in racks and many other common formats. Evaporator heads are made to match these formats in 24-, 48-, 96- and 384-well configurations. Our unique 96-well spiral needle head, which creates a vortex in certain plates to speed up evaporation, can also be used on the Ultravap™ Levante™.

Designed to give you long life in the laboratory, Ultravap™ Series evaporators are robustly built with solid aluminium billet sides, steel cover plates powder-coated for solvent resistance and wide large rubber feet for bench top mounting. The Levante™ has a built-in fume duct and an optional fan unit is available to speed solvent vapour removal away from the plate, thus increasing the evaporation rate further. New auto-ranging 110/220V power supplies eliminate the need for a transformer and provide sufficient power to drive the heaters and motor without drawing an excessive load, thereby extending the life of your instrument.

- Designed for heat sensitive and thermally labile samples
- Standard SLAS plate holder
- Five different drying programmes can be stored
- Ability to upload and download methods on SD card
- Robotic plate stage automatically moves plates up in three phase dry-down programme
- RS232 allows remote control via PC or LH robot
- Removes most chromatography solvents in just minutes
- Can evaporate 500µl methanol in five minutes
- Compact footprint allows the Ultravap™ Levante™ to fit into all standard fume cupboards
- Optional fume extraction with fan and 4" duct adaptor
- Clear acrylic side screens speed up solvent removal
- Choice of straight, curved 24, 48, 96 or 384 needles
- Compatible with most robotic liquid handlers fitted with long grippers



For a detailed dimensional drawing or STEP file, please contact Porvair Sciences via our website.

Precision Swiss-made stepper motors are used in all Ultravaps to precisely control the upward movement of the stage in 0.1cm increments, ensuring that with careful programming, the evaporator head remains just above the surface of the liquid to be removed for optimum efficiency. An on-board digital flow controller allows accurate programming of real gas flow rates for the first time, ensuring reproducible results every time.

Ultravap™ Levante™ can be operated from both a gas cylinder and an in-house supply of nitrogen or clean dry air. The blow-down technique is very useful for removing chromatography solvents such as dichloromethane, acetonitrile, methanol and hexane. However, it is not suitable for higher boiling solvents such as DMF, DMSO and large quantities of water.

The Ultravap™ Levante™ comes with an RS232 connection and a remote command set. Whilst not sporting the smart plate “shuttle” of the premium Ultravap™ Mistral, it is still possible to connect to and operate from a robot liquid handling station using the Ultravap™ Levante™. This should appeal to the budget-conscious laboratory who may wish to automate the dry-down bottleneck in the future.

The Ultravap™ Levante™ will require a head of your choice, which may be interchanged quickly and easily with a head of a different pattern as your workflow demands.



Ultravap™ Levante™ integration-compatible High Speed Sample Concentrator

Description	Qty/Pack	Cat. No.
Ultravap™ Levante™ fully robot compatible Blowdown Evaporator without needle head, 110/230V		500226
Replacement fume extractor fan complete plug-in assy with housing	1	500194

Ultravap™ Mistral

The Ultravap™ Mistral from Porvair Sciences is designed to remove the traditional laboratory 'bottleneck' of solvent evaporation from microplates. Fully automating the dry-down step has always been impossible because it is difficult to interface liquid handling robots with traditional centrifugal-type evaporators. The Ultravap™ Mistral design, by dispensing with the rotating arm of the centrifuge, overcomes this problem and is much better positioned to link with your robot. With more than 20 years' experience in producing deep well microplates, Porvair Sciences has thoroughly researched the problems of drying down organic solvents in plates. This has led to the ultimate microplate blow down evaporator – the Ultravap™ Mistral.

The Ultravap™ Mistral is the most sophisticated automation-friendly model yet, giving significant throughput advantages to laboratories looking to optimise microplate sample preparation. The new Ultravap™ Mistral has been designed in close co-operation with the leading suppliers of laboratory liquid handling robots. The result is a fully robot compatible evaporator, suitable for integration directly with the following leading laboratory liquid handling robots:

- Hamilton Robotics • Tecan • Perkin Elmer
- Beckman Coulter • Agilent

Designed with the demands of linear robots very much in mind, the Ultravap™ Mistral offers a plate shuttle which can serve and retrieve plates from the deck of most liquid handlers. The colour touch-screen controlled dry down station accepts interchangeable 24-, 48-, 96- or 384-needle heads and comes complete with clear safety screens and integral fume management leading to a 4 inch duct adaptor that incorporates a fan for high speed fume removal..

Flexible programming

The Ultravap™ Mistral has been designed to allow robots with standard gripper arms to place and remove microplates directly onto the shuttle. The evaporation table is able to rise under the control of a stepper motor as the drying process proceeds. This can be programmed at a suitable rate for each solvent type being evaporated. In addition, gas temperature, pressure and flow rate can all be programmed individually and stored in up to fifteen multistep programmes on the Ultravap™ Mistral controller.

Each programme allows the table to rise in up to five distinct ramped phases, so that a fast initial drying period can be followed by a gentler final drying phase. The Ultravap™ Mistral is usually located on the



right-hand side of the robot deck, where control commands are sent directly from the robot controller to the Ultravap™. These standard commands are listed in the manual, but most robot manufacturers have drivers available to control the Ultravap™, making integration a seamless process.

The choice of straight or spiral needles allows the user to choose between faster dry down (spiral) and better final drying in V-well plates (straight). The spiral needle system is only compatible with square-well plates and larger vials. Ultravap™ Mistral can dry down solvent in most HPLC vials and 1 or 2 dram vials using optional vial holders with a microplate footprint. The maximum height of plates or vials in a holder that can be accommodated on a standard Mistral is 80mm, however an extended Ultravap™ Mistral XT100 is available for samples up to 100mm high, including glass tubes.

Smart Safety

The Ultravap™ Mistral has been designed to protect you from harm, to protect your robot and to look after your samples. The moving plate shuttle has no less than six sensitive micro switches to detect obstacles or obstructions both on and off the robot deck. Triggering this safety system automatically stops the Mistral and prompts the user to clear the obstruction before re-setting the plate shuttle.

- *Ultravap™ Mistral - saving you time every day*
- *Fully Liquid Handling Robot compatible Dry Down Station*
- *Plate Shuttle sends/retrieve plates from robot deck*
- *Adjustable shuttle position and height*
- *Intuitive graphical colour touch screen display*
- *Up to 15 stored evaporation programmes*
- *Up to 5 programmable steps per method*
- *On board gas management*
- *Master & multiple Slave configuration supported*
- *Remote control from PC option*
- *Reversible screen for integration at side of robot*
- *Built in fan-assisted fume management and duct connector*
- *Faster evaporation times*
- *Choice of 384, 96, 48 & 24 well heads*
- *Small footprint to fit in your hood*

In addition to the safety role, this system also provides positive plate detection for the robot and is able to confirm correct placement of a plate.

Method Security

Authority to change or edit stored methods is controlled by a password-protected Administrative User level in the Mistral software, ensuring that

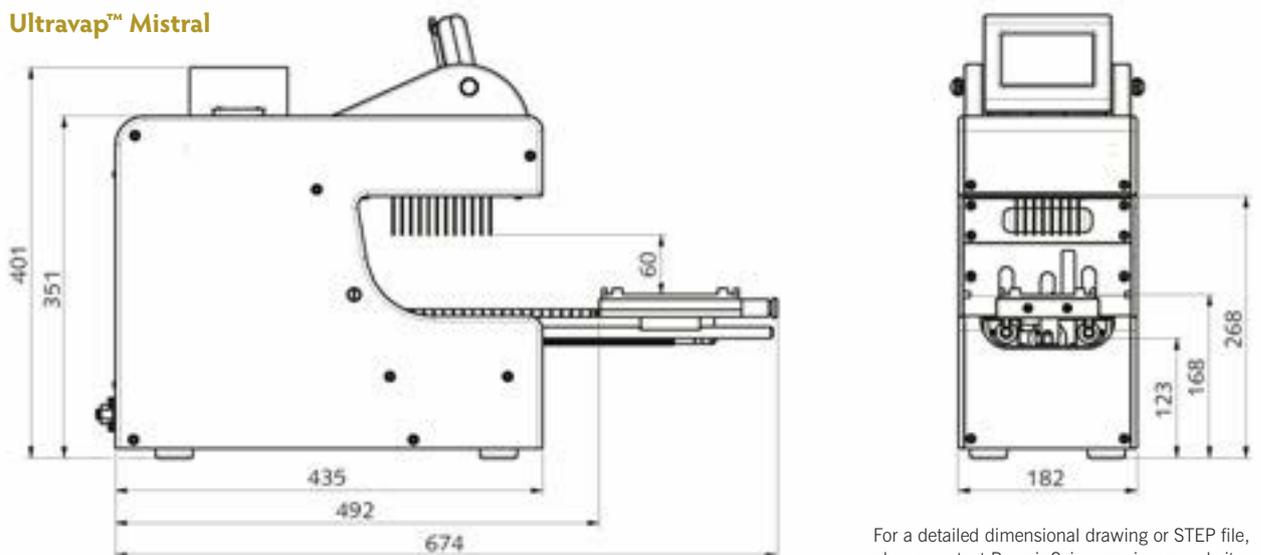
unauthorised users cannot tamper with stored protocols. Other users may only recall and run stored methods approved by the Administrator.

Flexibility in the Production Environment

The Ultravap™ Mistral software has been specially designed and written to allow the control of several Mistral “slave” units from one “master” evaporator. Using the latest CAN interface technology, any number of Mistral units can be connected together in series. A method selected on a Master unit will be automatically distributed over the CAN bus to all the slave units, which will then begin to run the programme simultaneously. In addition, a Master unit can be operated directly over the built-in RS232 link, so that programming can be carried out remotely and start/stop commands sent from a network. Again, all slaved units will respond to these commands, making the instrument highly flexible in the production environment. Station I.D. numbers can be set and stored for each Master and Slave unit. Units can easily be taken out of Remote Control mode, without disconnecting the CAN bus, for maintenance or where a random-access programme is required.

All Porvair Sciences evaporators now run from 110V or 220V at 50/60Hz using an auto-ranging power supply. The heaters on all models will be switched off if the gas supply drops below 25 L/min for maximum safety. Optimal gas flow rate is 60-80 L/min at 5.5-6.0 bar. Similarly, if the pressure exceeds 7 bar, safety valves will shut down the system to prevent damage. All units can be used with nitrogen or dry compressed air if the chemistry allows, but are not suitable for use with strong acids or acid chlorides. A 5µm in-line gas filter should be used where the cleanliness of the air supply is uncertain.

Ultravap™ Mistral



For a detailed dimensional drawing or STEP file, please contact Porvair Sciences via our website.



Ultravap™ Mistral fully Integration-ready High Speed Sample Concentrator

Description	Qty/Pack	Cat. No.
Ultravap™ Mistral fully robot compatible Blowdown Evaporator without needle head, 110/230V	1	500149
Ultravap™ Mistral XT100 fully robot compatible Blowdown Evaporator without needle head, 110/230V	1	500197EX
24-well 95mm long needle head straight for Mistral XT100 only	1	229417
96-well 95mm long needle head straight for Mistral XT100 only	1	229413
Spare Mistral CAN bus interface cable with RS232 initiator and CAN terminator plugs	1	500193

Thermal plate sealers

Of the various methods for sealing microplates, heat sealing has become the preferred option. It creates an air tight and chemically-resistant seal without the complications of adhesives being applied to a plate. Porvair Sciences has developed a range of units to meet the needs of low, medium and high throughput laboratories for microplate sealing.

MiniSeal II semi-automatic heat sealer

The new MiniSeal II semi-automatic plate sealer builds on the reputation of our earlier Minseal design for robustness and an ability to seal most types of plate. For users who need a tight seal on deep well plates, conventional sealers may not offer sufficient down force to guarantee a good seal.

With powerful stepper motor control and a mighty 450 watts of heating power available, the new MiniSeal II copes effortlessly with PCR, filter-bottomed, assay and deep well plates, EVEN if the plate itself is distorted or bowed. Easy to set up with simple up/down programming for both sealing time and sealing temperature, the MiniSeal II also boasts a robust drawer design that ensures excellent conformance to health & safety regulations.

With so much available power, sealing times for most polypropylene plates with Porvair seals are less than 3 seconds each. Sealed plates are automatically ejected from the MiniSeal II. With a footprint smaller than a sheet of A4 paper and weighing just 6kgs, this electrically-driven sealer is ideal for small bench spaces.

Unlike some other manufacturer's products, MiniSeal II comes complete with plate adaptors for standard SBS microplates, deep well microplates and PCR plates. The unused adaptors are ingeniously designed to stack on top of the unit when not in use. Also included is a brass plate weight to keep your foils and seals flat during sealing.

MiniSeal II semi-automatic single plate sealer

Description	Qty/pack	Cat. no.
MiniSeal II semi-automatic single plate heat sealer 110V / 220V Supplied complete with two plate adaptor blocks, plate weight and line cord.	1	500090
Skirtless plate adaptor 96-well	1	500083
Plate adaptor flat top 384 PCR plate	1	500084

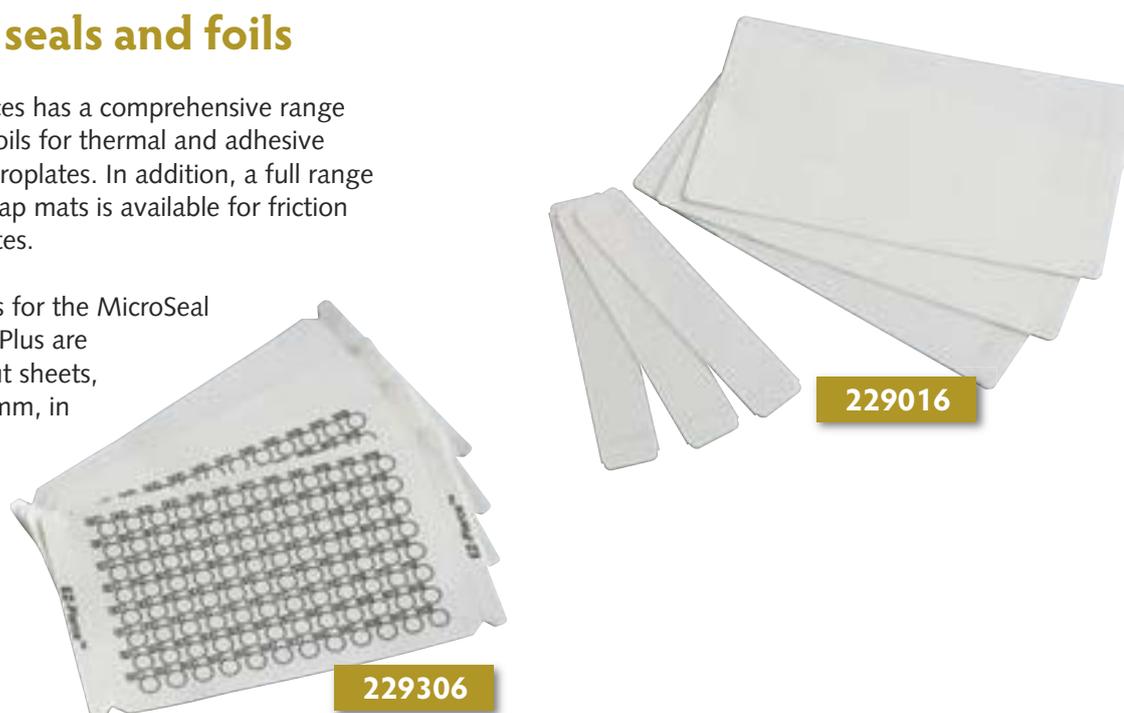


- Desktop semi-automatic Heat Applied Plate Sealing System
- Seal SBS format micro well plates and tubes
- Seals plates of any height from 9 - 48mm
- Temperature range from ambient to 200°C
- Seal time from 0.1 - 9.9 seconds
- Simple slide operation
- Combined temperature and seal time display
- Light weight system, only 6kgs (14lbs)
- 110V / 220V 50/60 Hz compatible
- No compressed air required

Porvair seals and foils

Porvair Sciences has a comprehensive range of seals and foils for thermal and adhesive sealing of microplates. In addition, a full range of re-usable cap mats is available for friction sealing of plates.

Foils and seals for the MicroSeal and MiniSeal Plus are supplied as cut sheets, 125mm x 78mm, in packs of 100.

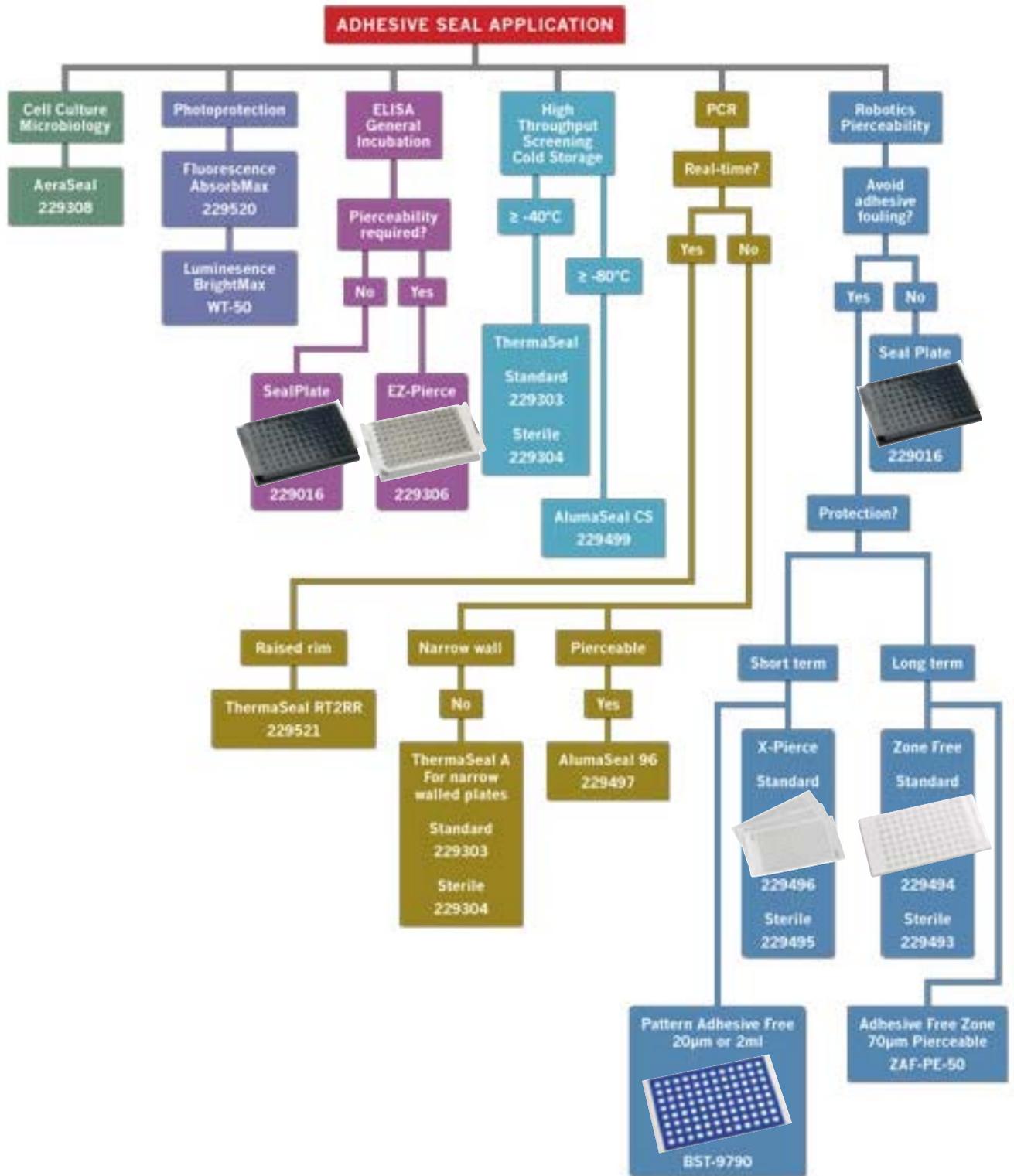


Porvair colour-coded thermal seals

Description	Qty/pack	Cat. no.
Easily pierced 20µm PP/PS lacquered aluminium foil – colour coded green 125mm x 78mm sheets printed with colour coding and right side up for ease of use	100	229572
Peelable 70µm polyester/aluminium laminate sealing foil – colour coded red 125mm x 78mm sheets printed with colour coding and right side up for ease of use	100	229571
Pierceable/peelable 38µm lacquered aluminium foil – colour coded blue 125mm x 78mm sheets printed with colour coding and right side up for ease of use	100	229573
Strong 85µm thick aluminium foil for long term storage – colour coded black 125mm x 78mm sheets printed with colour coding and right side up for ease of use	100	229574
Sealing film optically clear 75µm – non peelable, but pierceable 125mm x 78mm sheets printed with black coding and right side up for ease of use	100	5000090
Sealing film optically clear 105µm – peelable, but non pierceable 125mm x 78mm sheets printed with black coding and right side up for ease of use	100	500010

Adhesive seals (suitable for use down to -40°C unless shown)

Description	Qty/pack	Cat. no.
SealPlate® clear adhesive film for PP or PS plates	100	229016
ThermalSeal A® thermal cyclers film for standard PCR	100	229303
ThermalSeal A® thermal cyclers film for standard PCR, sterile	100	229304
ThermalSeal RT2RR™ thermal cyclers film for real-time PCR – 50µm films	100	229521
AlumaSeal 96® aluminium seal for PCR and storage in 96-well plates with raised rims	100	229497
AlumaSeal CS™ aluminium seal for long term cold storage -80°C	100	229499
Absorb Max™ optically-black film for light-sensitive assays	100	229520
EZ-Pierce™ easily pierceable polyethylene film	100	229306
Aeraseal™ gas-permeable, hydrophobic Rayon seal for cell culture, sterile (-20°C only)	50	229308
X-pierce™ pre-scored film, 96-well round – sterile	50	229495
X-pierce™ pre-scored film, 96-well round	100	229496
Bright Max™ optically-white film for luminescent assays	100	WT-50
Pattern printed sealing film with no adhesive over the wells, 96-well round	100	BST-9790



**HEAT SEALS (THERMAL SEALS)
FOR USE IN THERMAL HEAT SEALING MACHINES**

Aluminium foil

Red
Polyester/Aluminium
laminate peelable
70µm



229571

Green
Lacquered aluminium
Pierceable/peelable
20µm



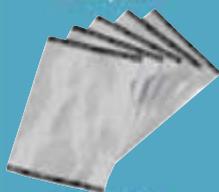
229572

Blue
Lacquered aluminium
Pierceable/peelable
38µm



229573

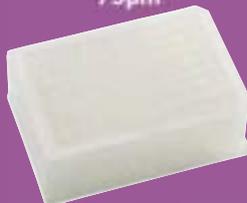
Black
Strong seal for
cold storage
85µm



229574

Clear polyester film

Optically clear
Pierceable not peelable
75µm



5000090

EVA/Polyethelene
Peelable not pierceable
105µm
500010

**UNIVERSAL LIDS
TO FIT ALL SLAS/ANSI FORMAT MICROPLATES**

Polysterene Clear



229125

Polysterene Clear
Sterile
229225

Polysterene Black
(Light blocking)
229126

Reservoir trays

Porvair Sciences reservoir trays are designed for use with any robotic liquid handling system. These reservoirs offer options for a single liquid or a partitioned space for several liquids. Most working configurations are accounted for as well as varying liquid volumes. Made to take a range of liquid handling configurations from 8 or 12 channel pipettes through to 96 or 384 pipette heads.

- *Pyramid bottom for very low dead volume*
- *Robot friendly*
- *Moulded in natural virgin polypropylene*
- *Chemically and heat resistant*
- *Autoclavable*
- *Can be gamma irradiated*
- *Made to ANSI/SLAS standard dimensions*



Reservoirs

Description	Max. vol.	Dead vol.	Qty/Pack	Cat. no.
96-well, full height, pyramid bottom	300ml	<64µl	25	390001
12-column full height, pyramid bottom	290ml	<540µl	25	390002
8-row, full height, pyramid bottom	300ml	<82µl	25	390003
96-well, low profile, pyramid bottom	86ml	<64µl	25	390004
12-column, each of 21ml, partitioned, pyramid bottom	252ml	<54µl (per col)	25	390005
8-row reservoir, each of 32ml, partitioned, pyramid bottom	256ml	<82µl	25	390006
384-well, full height, pyramid bottom	282ml	<7µl	25	390007
384-well, low profile, pyramid bottom	92ml	<7µl	25	390008
Reservoir, low profile, flat bottom	85ml	–	25	390009
12-column, each of 7ml, partitioned, pyramid bottom, low profile	84ml	<54µl (per col)	25	390012
384-well, low profile, with four controls	49.3ml	<120µl	25	390013
8-row, partitioned, each of 10.6ml, pyramid bottom, low profile	84ml	<82µl (per col)	25	390014
6-column, each of 47ml, partitioned, full height, pyramid bottom	282ml	<82µl (per col)	25	390015
384-well, 2 control wells, full height, pyramid bottom	282ml	<7µl	25	390016
16-row, partitioned, each of 4.9ml, low profile, pyramid bottom	78ml	<18µl (per col)	25	390017
24-column, each of 3.5ml, partitioned, low profile reservoir, pyramid bottom	84ml	<110µl (per col)	25	390018
4-column partition reservoir pyramid bottom	300ml	<540µl	25	390107
24-column reservoir, 3.5ml, partitioned, low profile	78ml	250µl	25	390108
384-well reservoir, 4 controls, half height	155ml	7µl	25	390109
4 rows of 73ml partitioned reservoir, pyramid bottom	292ml	0.5ml	25	390111
12 column reservoir, half-height, with outer channel	170ml	0.5ml	25	391001
96-well reservoir, pyramid bottom, black polypropylene	380ml	64µl	25	391002
2 column, deep well pyramid bottom reservoir	288ml	270µl	25	391003
12 column reservoir, pyramid bottom, natural, PP, sterile	252ml	<54µl	25	391004
8 row reservoir, partitioned, pyramid bottom, natural polypropylene	256ml	<82µl	25	391005
4 column partitioned reservoir, deep well, sterile	300ml	540µl	25	391006
Disposable polycarbonate reservoir trays, suitable for Porvair acrylic manifolds	250ml	–	25	219010

Reservoir trays



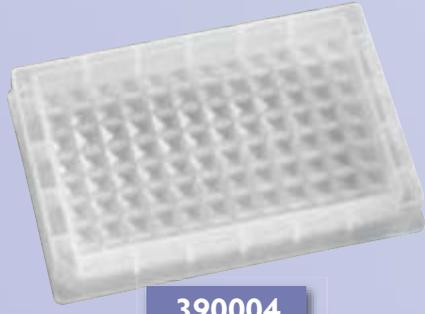
390001



390002



390003



390004



390005



390006



390008



390007



219010

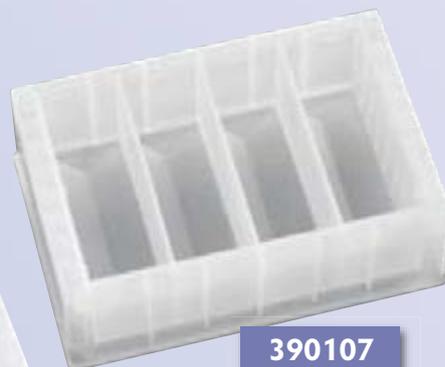


390012

Reservoir trays



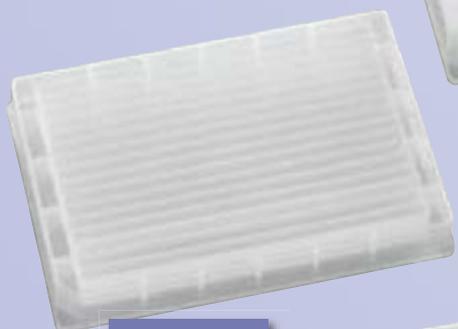
390013



390107



390111



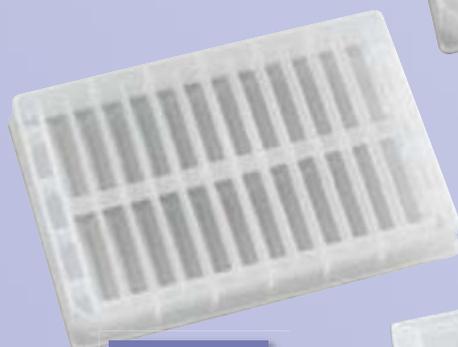
390017



390109



390014



390108



391001



390015

Custom manufacture

Porvair Sciences Ltd has a long history of successfully helping customers develop new and innovative microtitre plates and equipment. Porvair Sciences expertise in polymer moulding, surface treatment, specialist assembly and general understanding of life science applications makes the company ideal for custom manufacture. We can also undertake 'private labelling' of our standard products. Current customers for custom manufacture include the following groups:

- *Scientific instrument companies*
- *Pharmaceutical R&D laboratories*
- *Cell biology companies*
- *Compound library suppliers*
- *Diagnostic companies*
- *Military contractors*
- *Microarray research companies*

Techniques which Porvair Sciences use in the generation of custom products include:

- *Polymer ultrasonic welding*
- *Plasma surface treatment of polymers*
- *'Two-shot' injection moulding*
- *Co-sintering of polymers/silicas*

Porvair Sciences offers rapid solutions to problems by consultancy, design and speedy prototyping for biotech, pharmaceutical and life science companies.



Examples of specially-commissioned microplates developed and manufactured by Porvair Sciences for specific clients include the unique 'Flower Plate' developed for German client M2P-Labs

Based in Baesweiler, Germany, m2p-labs was founded in 2005 as a spin-off of RWTH Aachen University. The company focuses on development and supply of systems for microreaction and automated solutions for screening and bioprocess development. Using the FlowerPlate, in conjunction with their BioLector or BioLector Pro micro bioreactor system, m2p-labs can provide an intelligent micro fermentation platform.

The novel shape of the FlowerPlate ensures turbulent mixing for biological suspensions and broths when incubated and shaken on an BioLector or BioLector Pro system. In addition to the unusual well shape, which is proprietary to this plate, the underside features a clear polystyrene base through which m2p-labs can make real-time physical measurements during the shaking and incubation cycle, giving valuable kinetic information about the processes occurring inside the flower microplate wells as they proceed. This unique microplate is produced, assembled and quality-assured by Porvair Sciences in their Class 10000 clean room in Wrexham, UK especially for m2p-labs. This is a recent example of a collaborative new product development requiring speciality microplates where risk was shared, with costs agreed upfront between the developer and Porvair Sciences thereby reducing development risk and bringing novel products to market much faster than would otherwise happen. The second plate shown here has a microfluidic channel base and is assembled using propriety techniques by Porvair Sciences for a Dutch University spin-out company.

Porvair Sciences Ltd would be pleased to discuss your exact requirements for specialised microplates. We can undertake everything from concept, design, toolmaking, production and packaging for you. We can consider short runs and prototyping contracts, so please do contact our Customer Service team using the information on the rear of this brochure.

Please note: Porvair Sciences are unable to supply either of the plates shown in these examples directly to customers – For more information about the Flower plate please visit the M2P-Labs website at www.M2p-labs.com



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219006	6	229036	50	240031	44	286103	18 & 19
219008	6	229048	50	240054	44	286104	18 & 19
219009	6	229072	50	240055	42	286105	18 & 19
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219025	6	229218	37	240061	42	286111	18
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219027	6	229220	37	240063	42	286115	18
219030	6	229221	37	240064	42	301002	28
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360002	13 & 14	360057	33 & 35	390107	60 & 62	976250SW-96	19
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Chemical compatibility chart

This chemical compatibility chart should be used as a general guide. It is recommended that tests are performed if there is any doubt about material compatibility

Chemicals	Membranes			Plate matrix	
	Cellulose nitrate	Nylon	PVDF	Polystyrene	Polypropylene
Acids					
Acetic acid 25%	S	S	S	S	S
Acetic acid 100%	X	M	?	M	?
Formic acid 25%	S	X	S	M	S
Formic acid 100%	M	X	S	M	S
Hydrochloric acid 25%	S	X	S	S	S
Hydrochloric acid 100%	X	X	S	M	S
Nitric acid 25%	S	?	S	X	S
Nitric acid 65%	X	X	M	X	S
Phosphoric acid 25%	S	?	S	M	S
Sulphuric acid 25%	S	?	S	S	S
Sulphuric acid 98%	X	X	X	X	S
Alcohols					
Amyl alcohol	S	S	S	S	S
Benzyl alcohol	M	S	S	X	S
Ethanol (ethyl alcohol) 70%	M	S	S	M	S
Ethanol (ethyl alcohol) 98%	X	S	S	M	S
Ethylene glycol	M	S	S	S	S
Glycerol	S	S	S	S	S
Isopropanol, n-propanol	S	S	S	S	S
Methanol 98%	X	S	S	M	S
Phenol	S	S	M	M	S
Propylene glycol	X	S	S	S	S
Bases					
Ammonium hydroxide 25%	X	S	M	M	S
Ammonium hydroxide 1N	S	S	S	M	S
6N Sodium hydroxide	X	?	X	S	S
Potassium hydroxide	X	?	S	M	S
Sodium hydroxide 5%	X	S	S	M	S
Sodium hydroxide 1N	X	S	S	M	S
Esters					
Amyl, Propyl, Butyl acetate	X	S	M	X	M
Benzyl benzoate	S	?	M	?	M
Ethyl acetate, Methyl acetate	X	S	M	X	M
2-Ethoxyethyl acetate	X	?	S	X	M
Methyl cellosolve acetate	X	S	S	X	M
Hydrocarbons					
Gasoline, Kerosene	S	S	S	S	M
Hexane	S	S	S	X	M
Toluene	S	S	S	X	M
Xylene	S	S	S	X	M
Carbon tetrachloride	S	S	S	X	M
Chloroform	S	S	S	X	M
Freon	S	S	S	X	M
Methylene chloride	M	S	S	X	M
Monochlorobenzene	S	S	S	X	M
Perchloroethylene	S	S	S	X	M
1,1,1-Trichlorethane	M	S	S	X	X
1,1,2-Trichlorethane	X	S	S	X	X
Trichloroethylene	S	S	S	X	M
Ketones					
Acetone	X	S	X	X	M
Cyclohexanone	X	S	M	X	M
Methyl ethyl ketone	X	S	M	X	M
Miscellaneous					
Acetronile	X	S	S	X	S
Dimethylsulfoxide (DSMO)	X	?	X	M	S
Dioxane	X	S	X	X	S
Ethyl ether	M	S	S	X	S
Formaldehyde 30%	S	?	S	X	S
Hydrogen peroxide 30%	S	S	S	S	S
Methyl cellosolve	X	S	S	X	S
Pyridine	X	M	S	X	M
Tetrahydrofuran	X	S	X	X	S

S = suitable M = short term contact X = unsuitable ? = not tested Tests were performed at room temperature

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