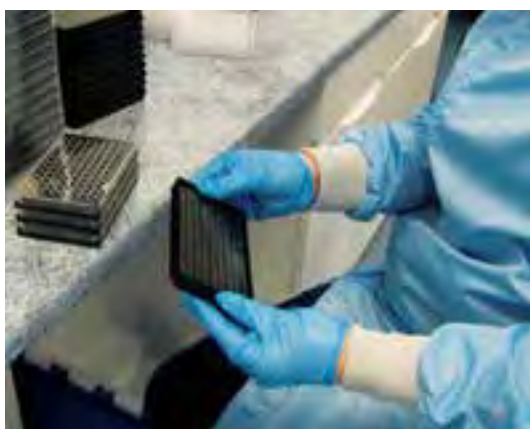


CATALOGUE OF MICROPLATES & MICROPLATE EQUIPMENT

SIXTH EDITION





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

Welcome to the 2018 Porvair Sciences and J.G. Finneran catalog of microplates. Since the merger of these two great brands during 2017, we've been working hard to bring you the very best of laboratory consumables from both parent companies. Be sure to check out the J.G. Finneran website for all your glass & polypropylene vial requirements at www.jgfinneran.com

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 2018 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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Contents

Application table Page 4

Storage/Collection

96-well deep square	Page 6
96-well deep round	Page 7
Deep well round 1ml	Page 8
96-well shallow round	Page 9
96-well round low profile	Page 10
96-well glass vial storage plate	Page 11
384-well square	Page 12
Large volume deep well plates	Page 13
1.1ml round well, round bottom ms plate	Page 15
Deep well plates selection guide	Page 16



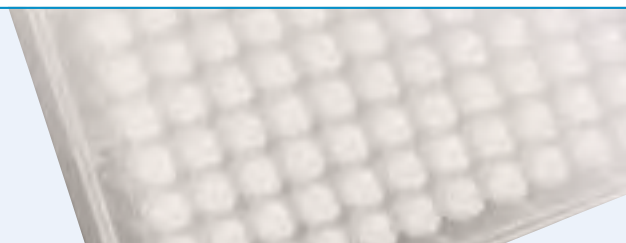
Life Sciences

Choosing the correct assay plate	Page 18
Solid bottom assay plates	Page 20
Clear bottom assay plates	Page 23
Glass bottom assay plates	Page 27
UV clear bottom assay plates	Page 29
Bacti-growth plates	Page 30
Components for assay development	Page 31



Solid phase extraction

MicroLute	Page 32
P ³ Protein Precipitation Plates	Page 34
SPE starter pack	Page 35
BioVyon™ Co-sinter products	Page 36
IRIS Polymeric SPE Microplates	Page 37



Equipment

Vacuum manifolds	Page 39
Microplate evaporators	Page 41
MiniVap™ microplate evaporator	Page 42
MiniVap™ Gemini microplate evaporator	Page 43
Ultravap™ Levante™ microplate evaporator	Page 44
Ultravap™ Mistral microplate evaporator	Page 46
Mat Capper and AutoCapper	Page 49
MiniSeal II semi-automatic sealer	Page 50
Seals and foils	Page 51



Custom manufacture Page 54

Index by number Page 56

Chemical compatibility chart Page 58

Application table

	COMBINATORIAL CHEMISTRY	GROWTH STUDIES	ARRAY TECHNOLOGY	CLINICAL SAMPLE SCREENING	ENVIRONMENTAL ANALYSIS	GENOMICS/PROTEOMICS	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

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.

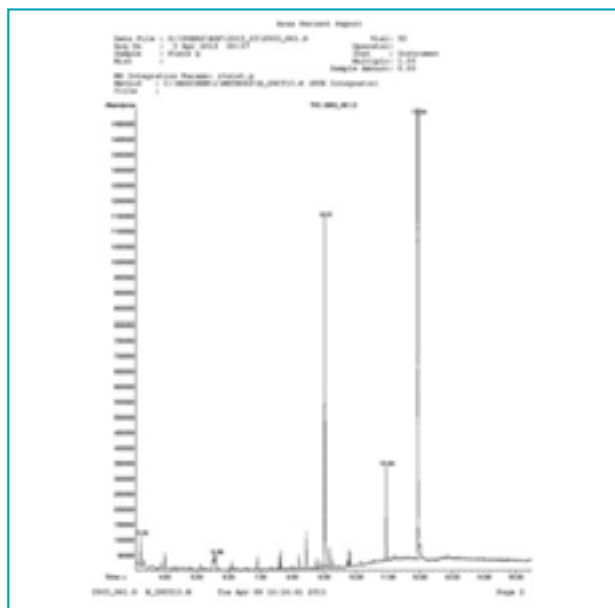
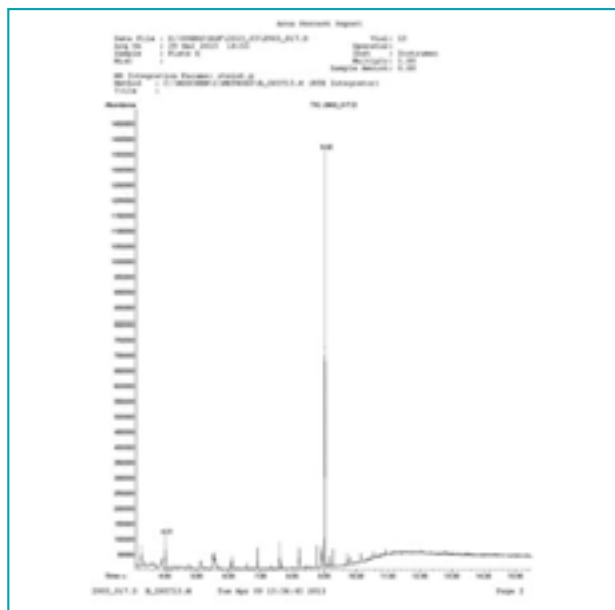
Separation was performed on a capillary column using the appropriate temperature gradient. Detection was by positive ion EI-MS.

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.

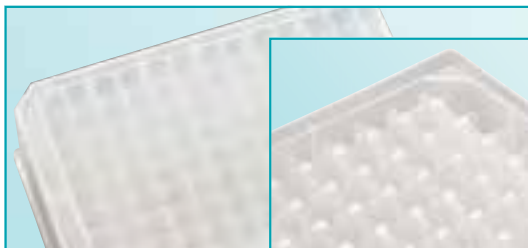
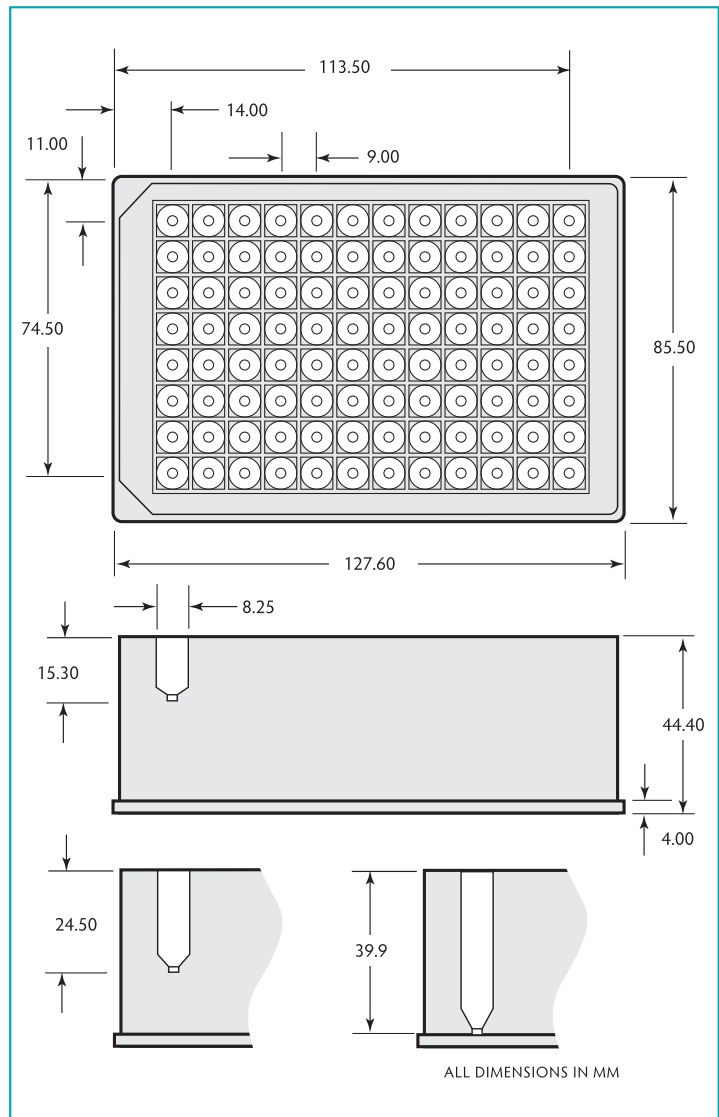


96-well deep square

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



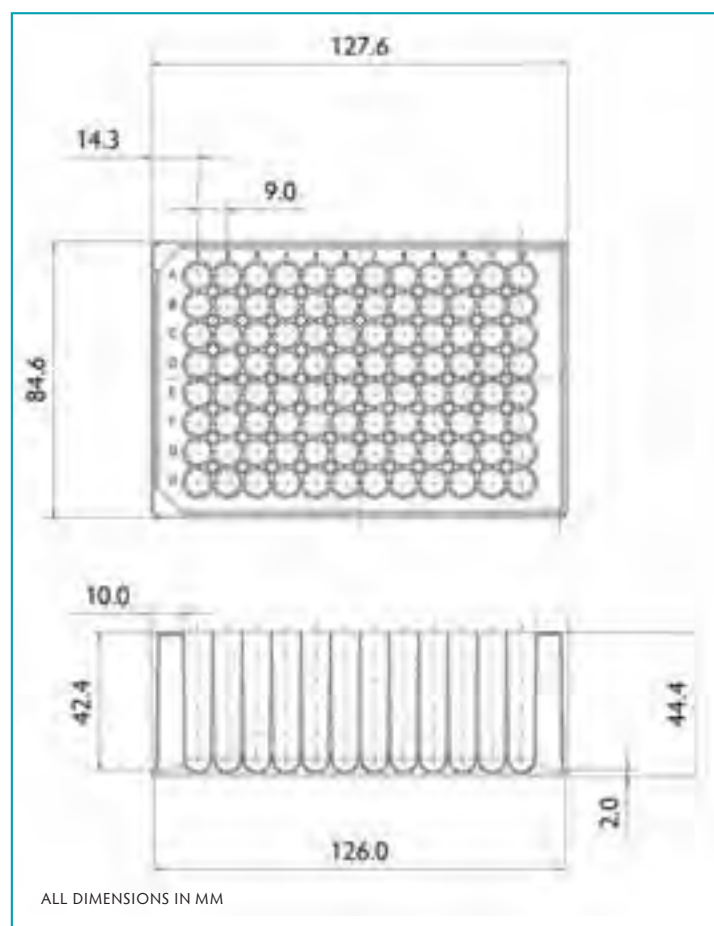
Storage plates 96 square well

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



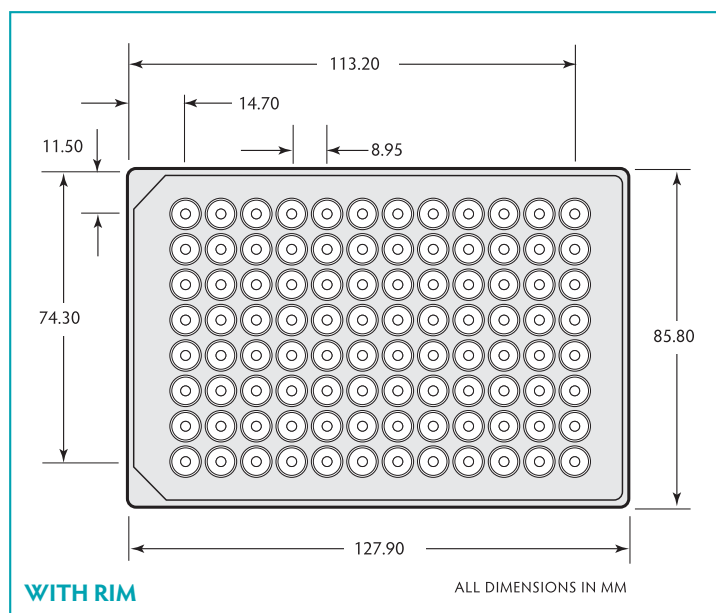
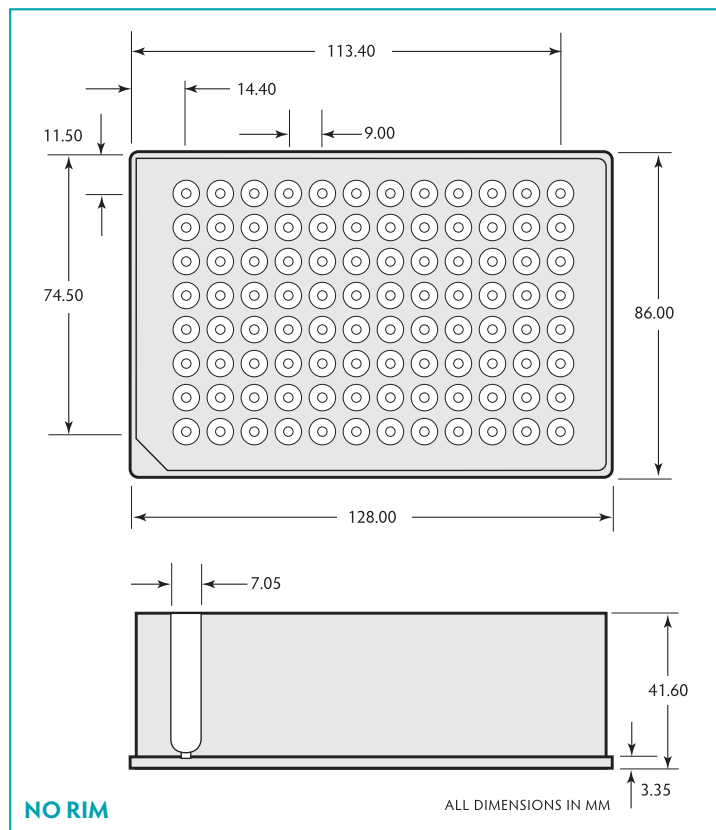
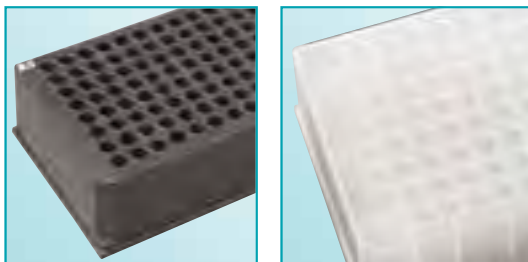
96-well deep round 'common wall'

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

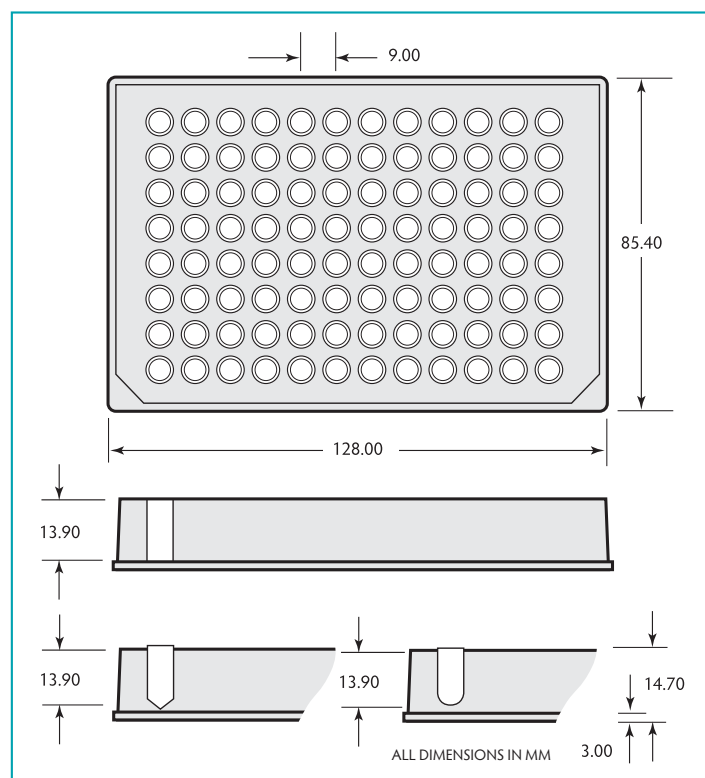
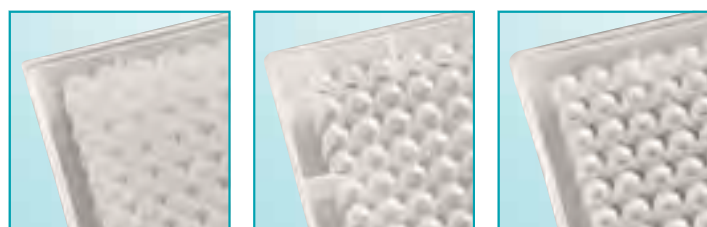
96-well shallow round

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*



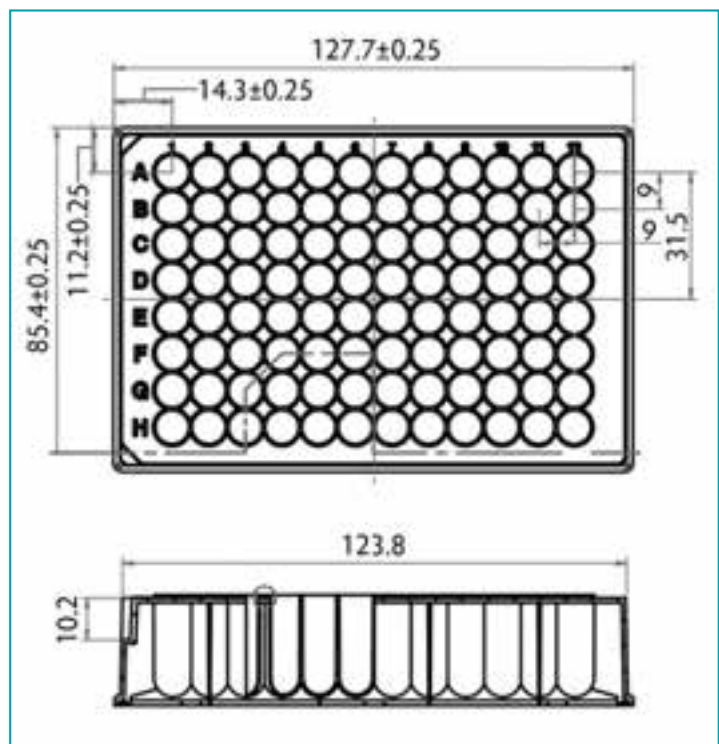
Storage plates round

Rim and bottom well shape	Material	Well volume	Sterile	Quantity/case	Cat. no.
No rim, flat	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

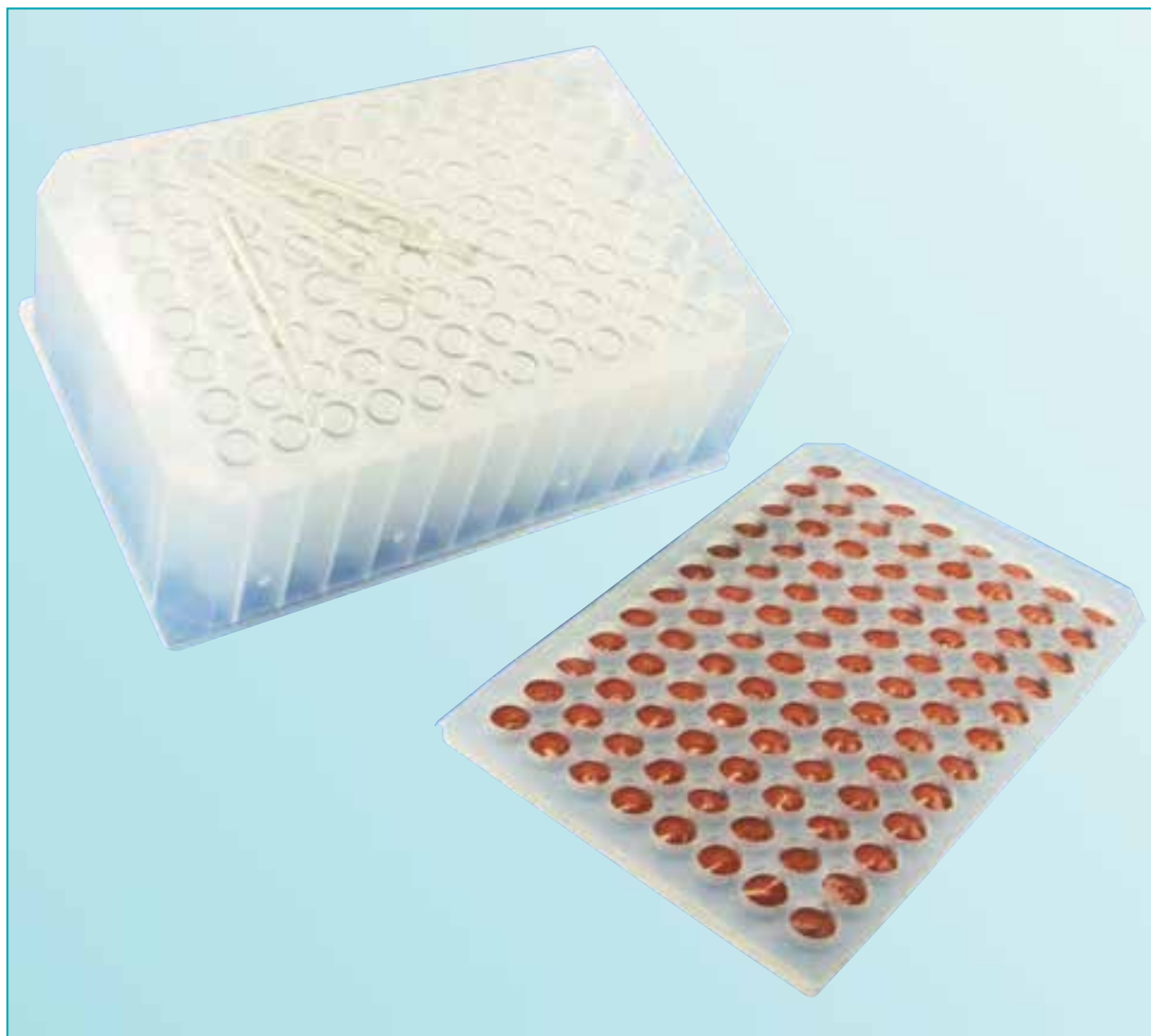
Description	Working well vol	Sterile	Qty/case	Cat. no.
96-well round low profile plate	1.1ml	–	50	219250

96-well glass vial storage plate

44mm height

The new Porvair glass vial storage plate combines 96 borosilicate glass vials of 1.0mL into a rigid polypropylene carrier plate for ease of storage and transportation. The tapered glass vials and the plate can be capped with our matching round-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



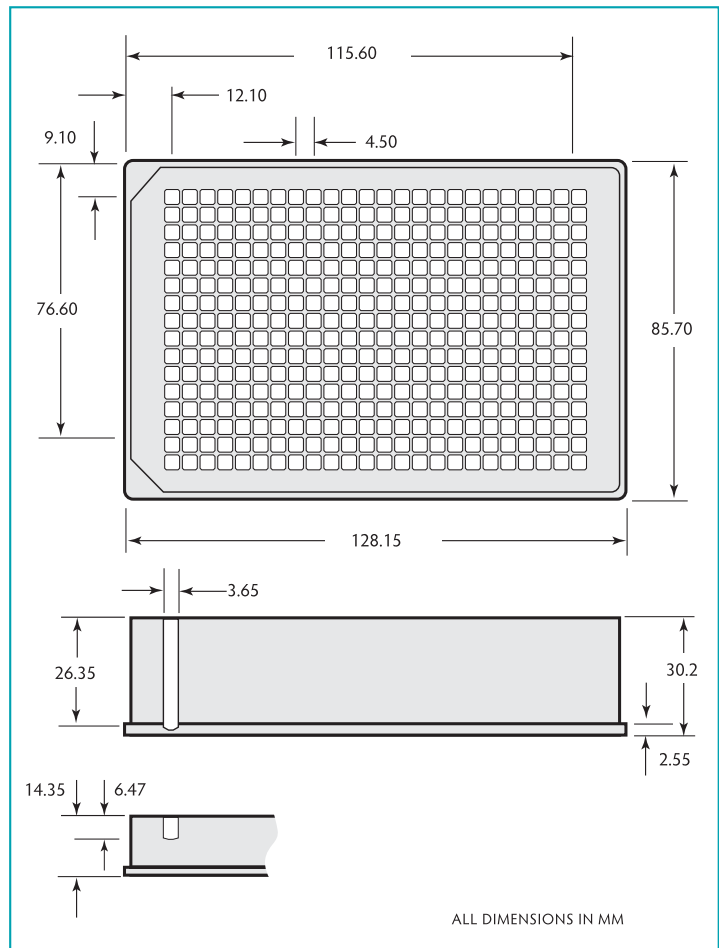
96-well glass vial storage plate

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	24	10ml	–	✓	25	360077
Rectangle, V-bottom (single pack)	24	10ml	✓	✓	25	360079
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

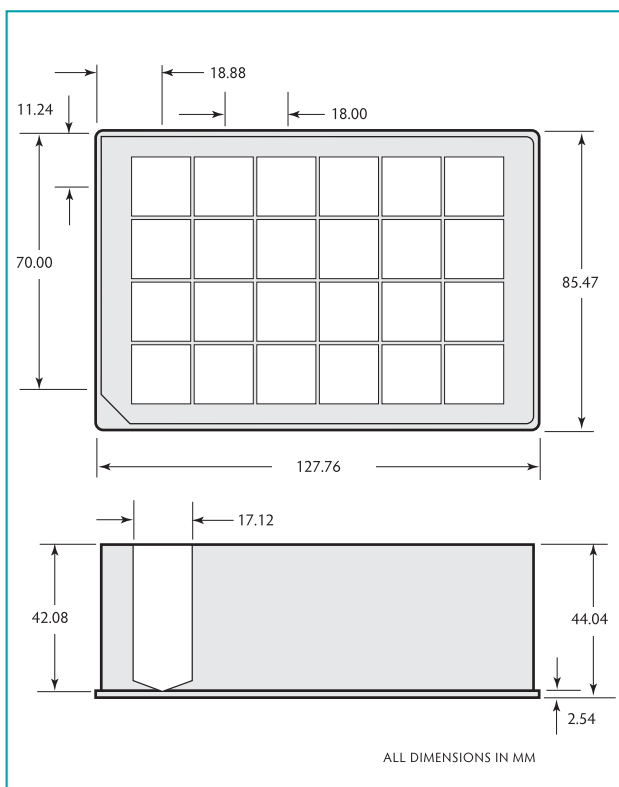
- Available for the 2ml and 1ml square and 2mm round deep well plates
- Easily fitted below plates
- Made from impact resistant silicone

Centrifuge support plate

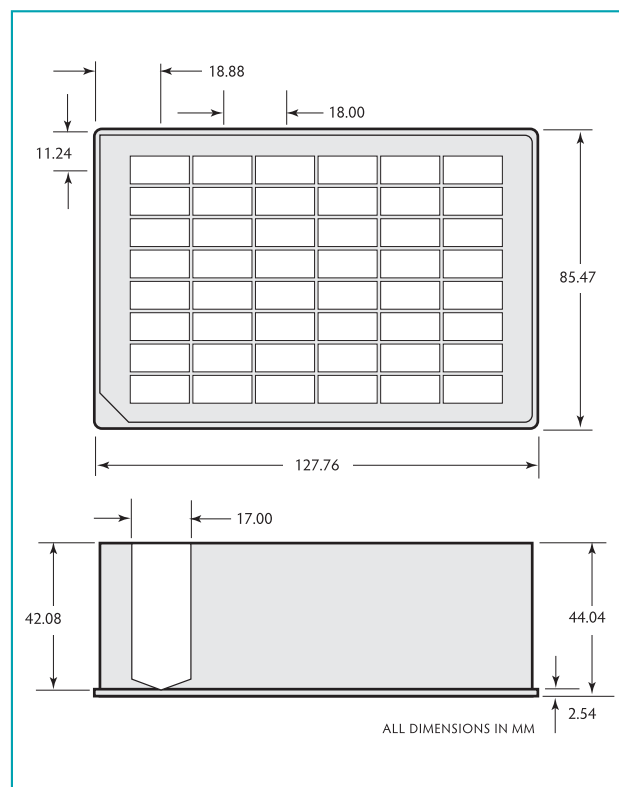
The support plate is designed to fit into the skirt of the deep well plates. This then allows the plate to be used in a centrifuge at 3,500G or GenoGrinder® without the risk of the plate distorting and causing the well to leak.

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
Centrifuge support plates for 360004	2	500212

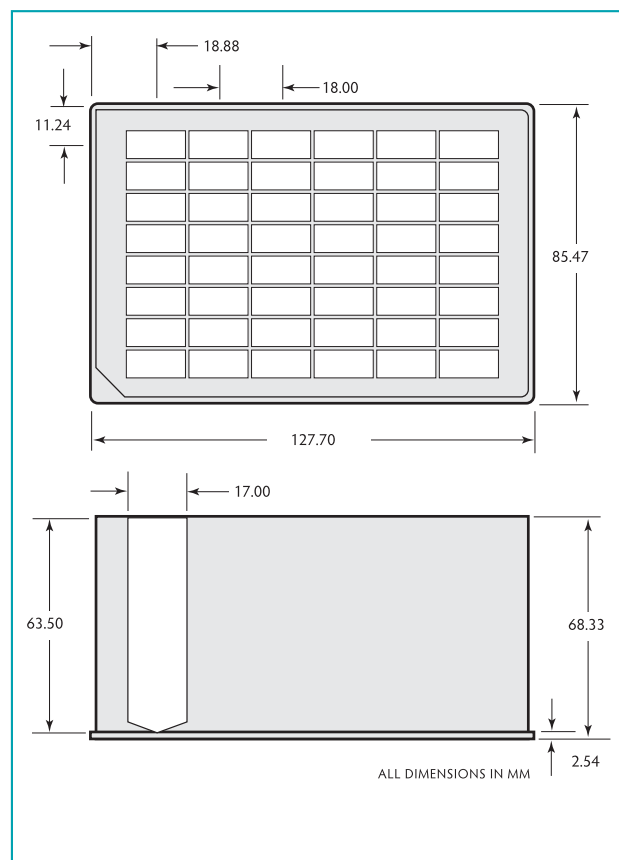
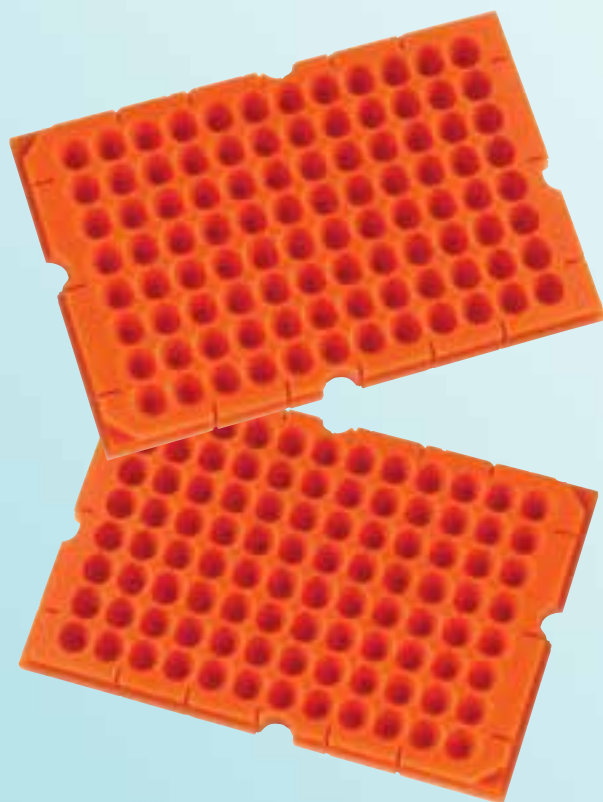


360013



360002

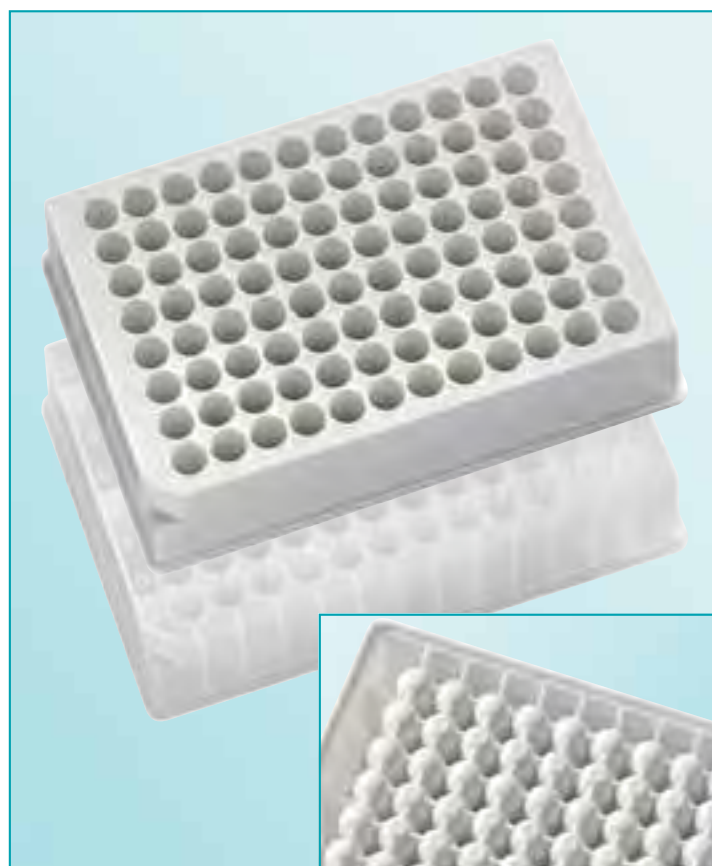
CENTRIFUGE SUPPORT PLATE



360004

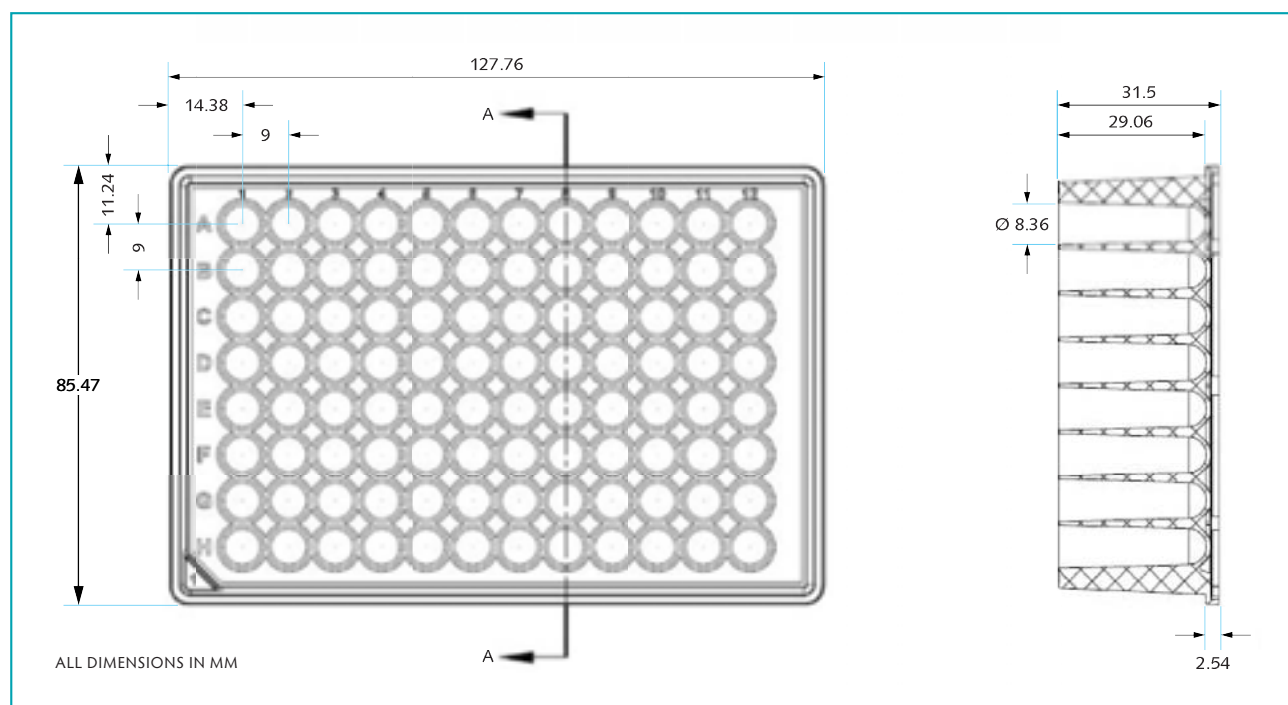
1.1ml round well, round bottom, magnetic separation plate

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



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.

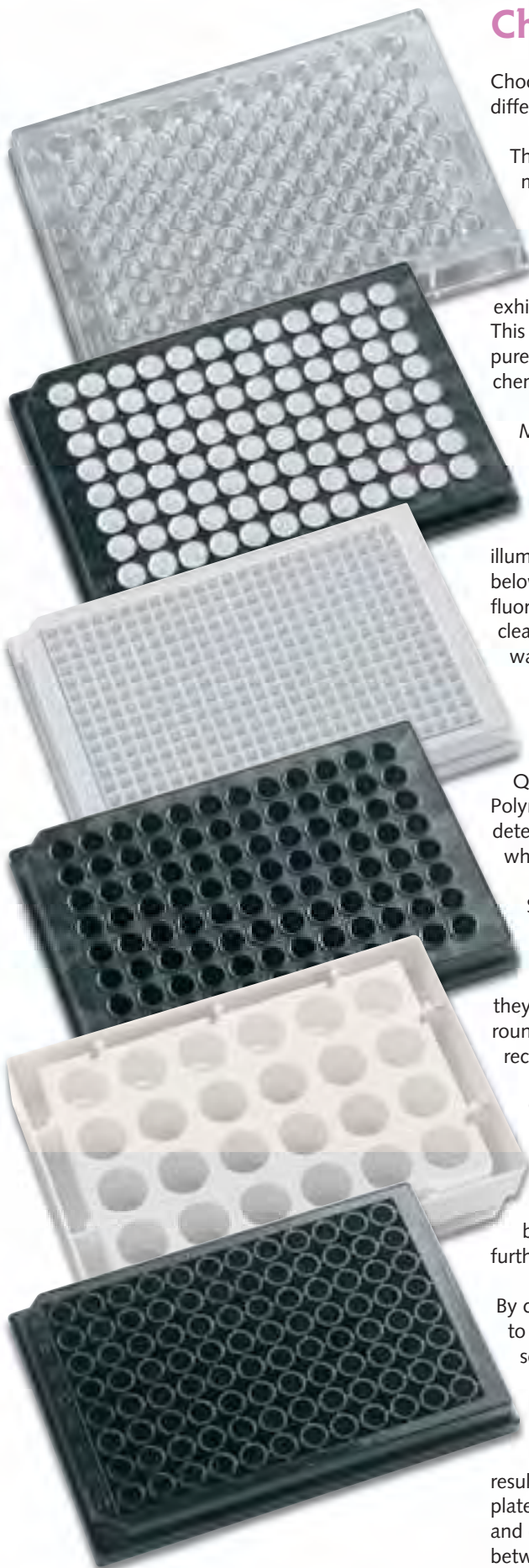
Visible wavelength range (900-350nm) measurements require only clear plastic bases, whilst readings between 220nm and 350nm will require a UV-transparent material. This can be Quartz sheet or a modern polymer such as Cyclo-Olefin Co-Polymer (COP/COC). Optical glass sheet is used where visible range detection 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

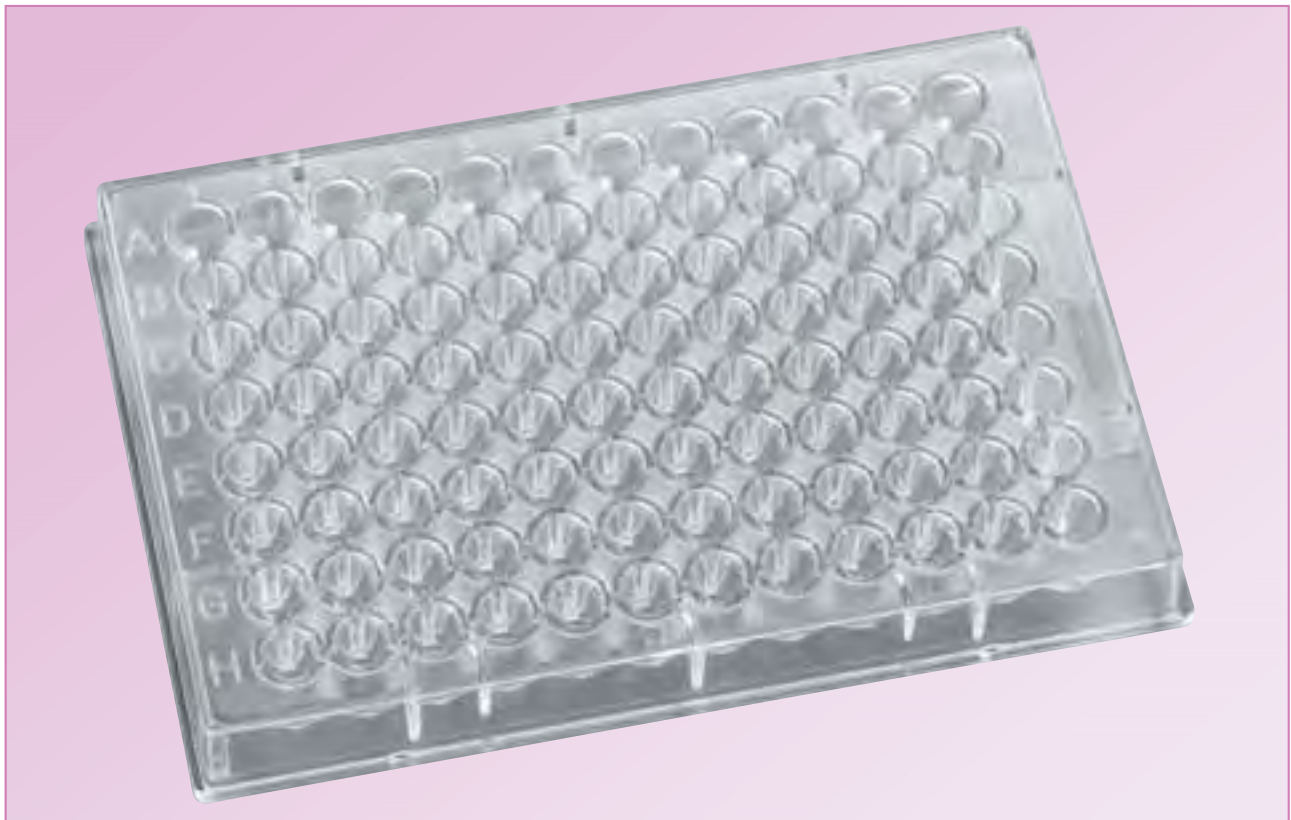
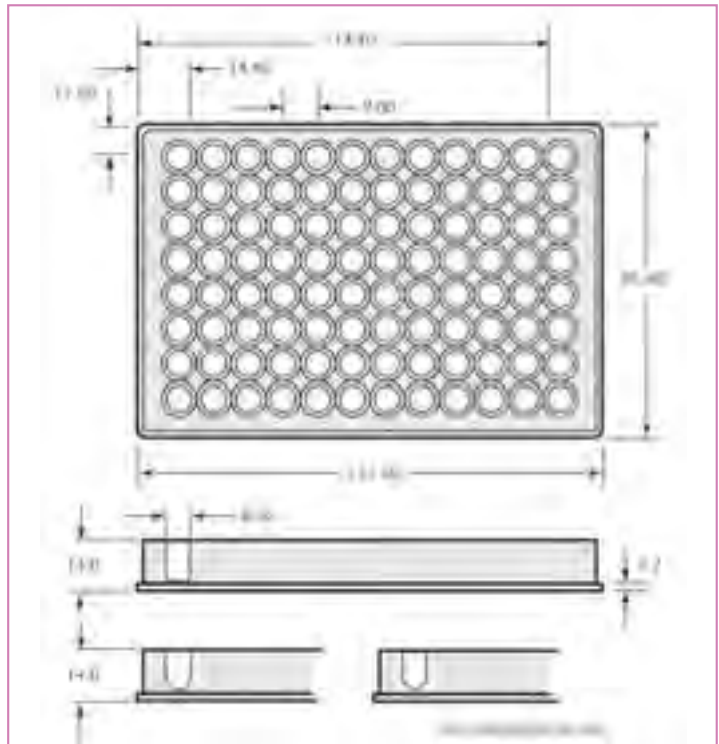
Porvair Krystal series clear bottom plates are now recognised as industry-leading tools for Pharma drug discovery and screening. Our standard clear polystyrene bottom plates have bases just 0.4mm thick (384-well) or 0.75mm (24- and 96-well) and are moulded from highly polished tools to reduce flow lines, 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 275 μ l down to 10 μ l



Solid assay plates

Plate description	Sterile	Colour	Qty/pack	Cat. no.
96 wells of 350 μ l with a flat bottom	–	Clear	100	208004
96 wells of 270 μ l with a round bottom	–	Clear	100	209004
96 wells of 220 μ l with a V bottom	–	Clear	100	210004

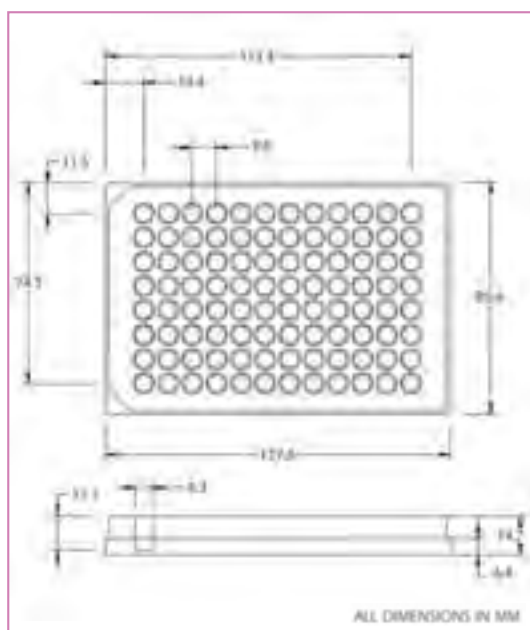
96-well black, white & black with white wells

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

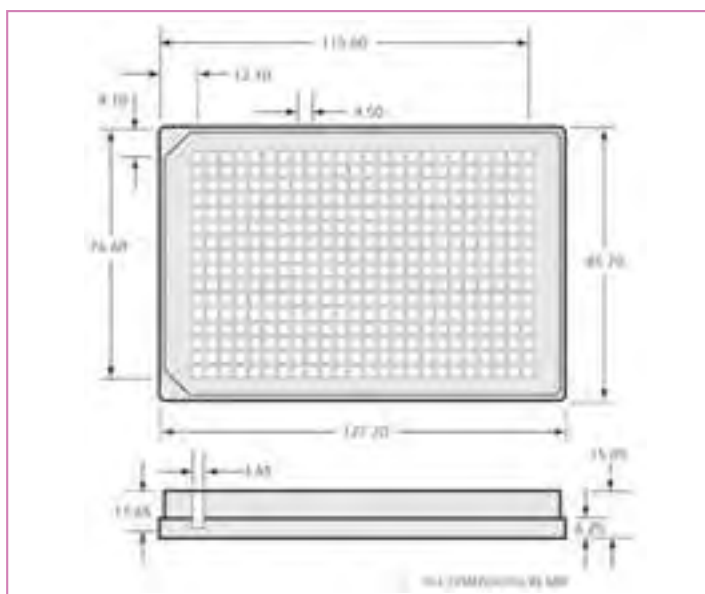
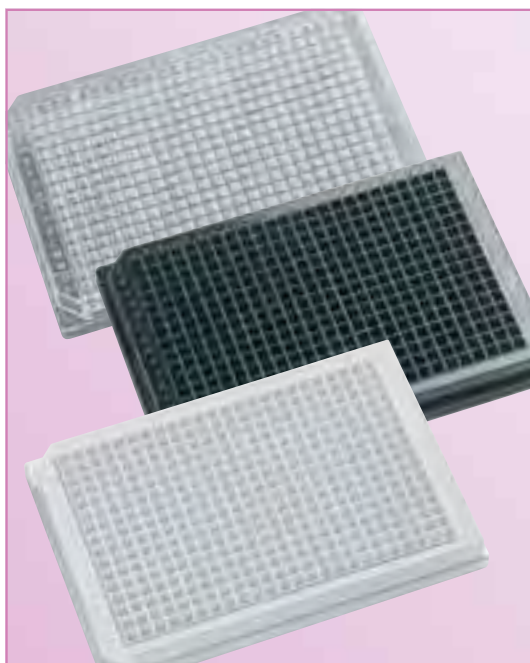
Plate description	Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
96 wells	White	–	–	–	100	204003
96 wells	White	Tissue culture	✓	✓	50	204512
96 wells	White	Tissue culture	✓	✓	100	204012
96 wells	Black	–	–	–	50	205503
96 wells	Black	–	–	–	100	205003
96 wells	Black	Tissue culture	✓	✓	50	205512
96 wells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



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

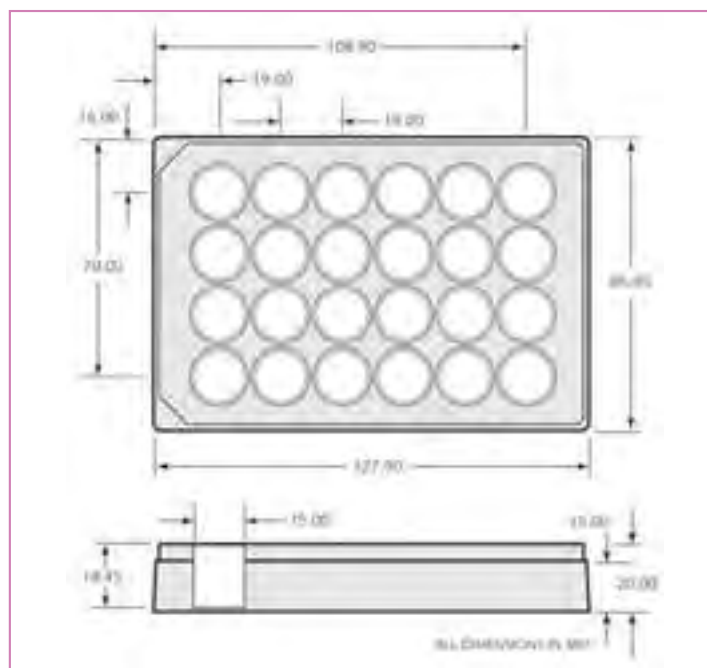
24-well Krystal™ black & white

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

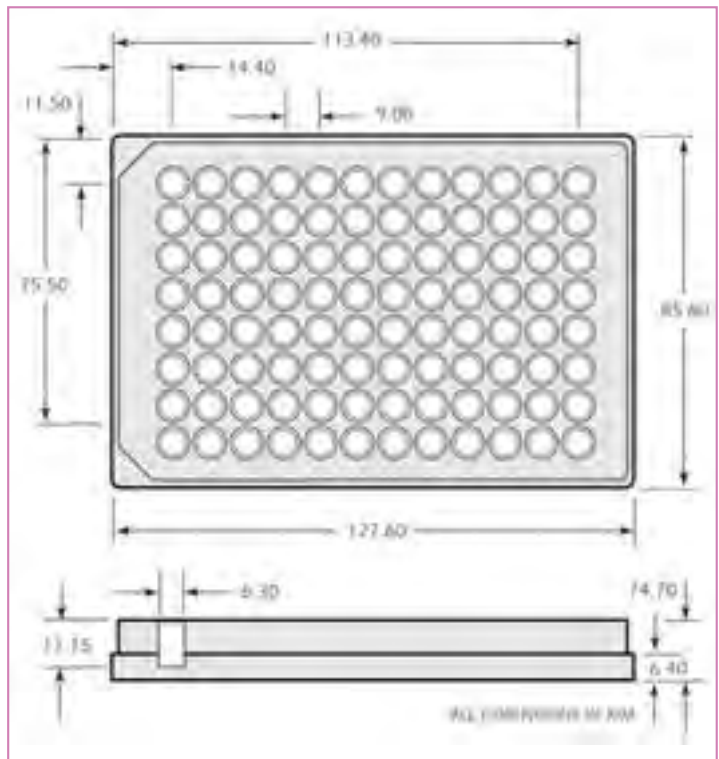
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	–	–	–	68	303002
White	Tissue culture	✓	✓	56	303006
Black	–	–	–	68	303008
Black	Tissue culture	✓	✓	56	303012



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

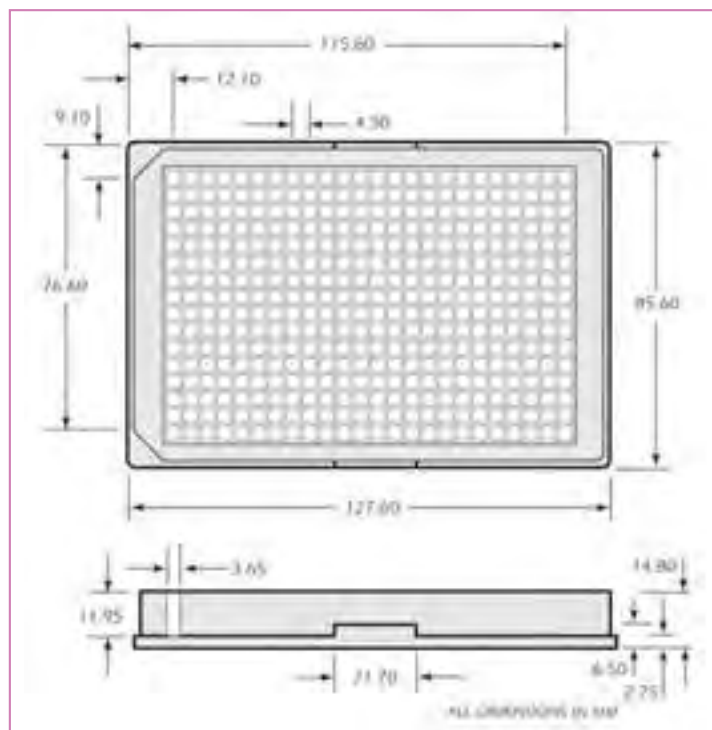
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	–	–	–	100	214003
White	Tissue culture	✓	✓	100	214006
Black	–	–	–	100	215003
Black	Tissue culture	✓	✓	100	215006

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

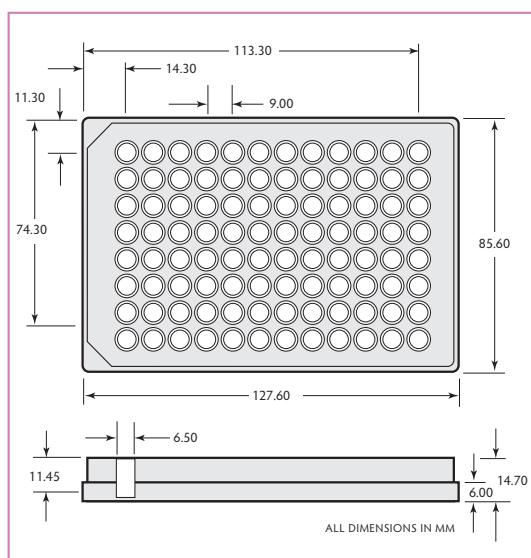
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	-	-	-	100	311001
White	Tissue culture	✓	✓	100	311003
Black	-	-	-	100	312001
Black	Tissue culture	✓	✓	100	312003

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

26



Krystal™ 2000 96-well

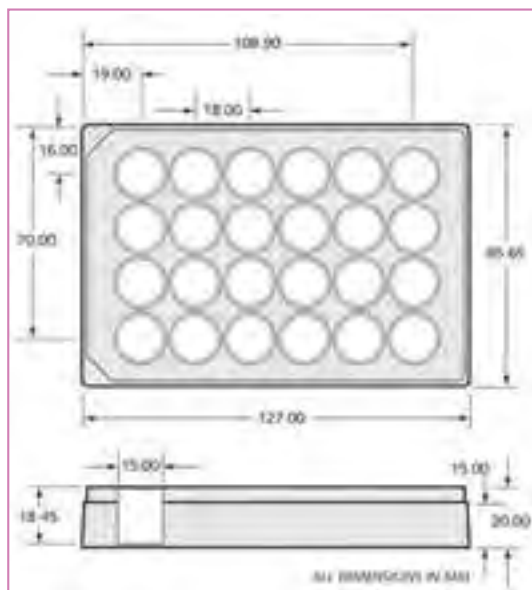
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	–	–	–	100	301010
White	Tissue culture	✓	✓	50	301512
White	Tissue culture	✓	✓	100	301012
Black	–	–	–	100	301002
Black	Tissue culture	✓	✓	50	301506
Black	Tissue culture	✓	✓	100	301006

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

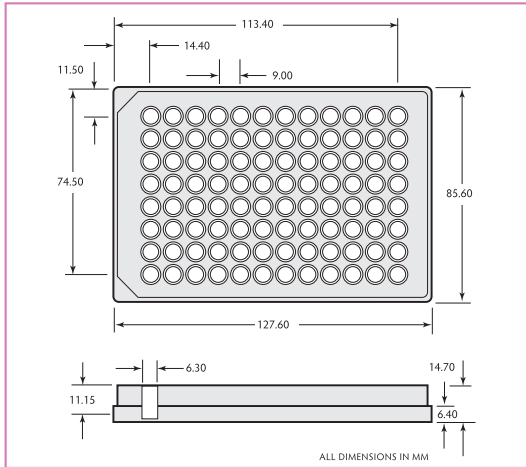
Krystal™ 24-well glass bottom plates



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

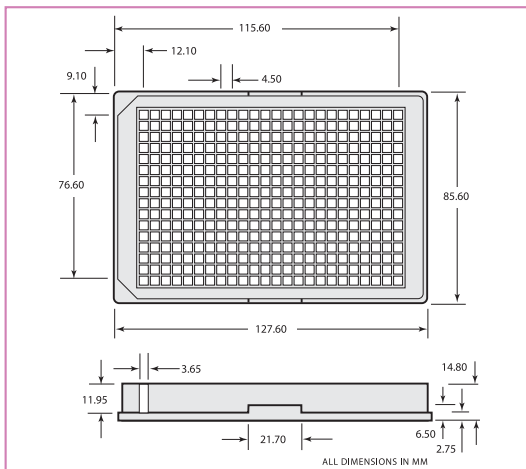
Krystal™ 96-well glass bottom plates



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



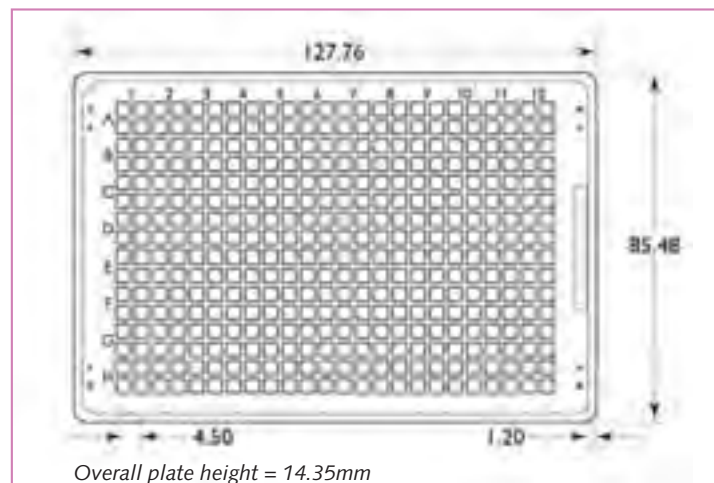
Glass bottom assay plates

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

Bacti-growth plates

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

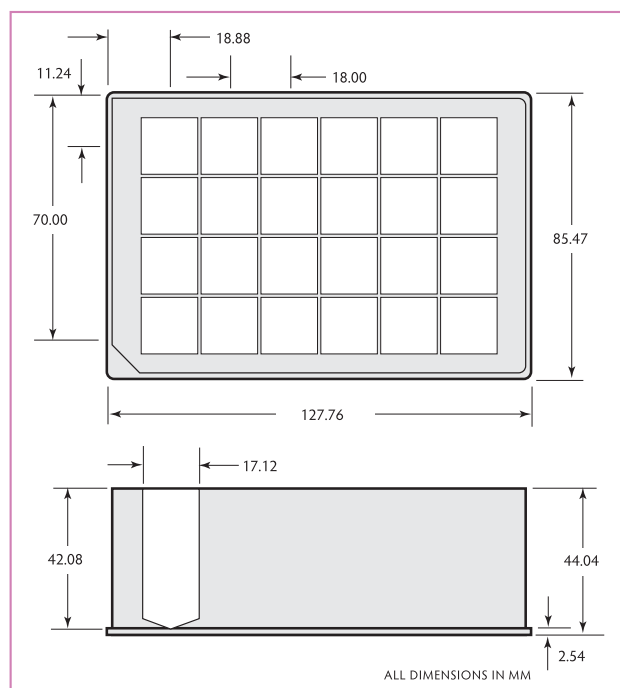
Using only the highest-grade raw materials, our plates are tested to ensure no moulding or polymer contaminants leach out into the samples. This guarantees reproducibility and maintains customer confidence. Each Bacti-growth plate consists of a deep well plate and a tight fitting lid, packed sterile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

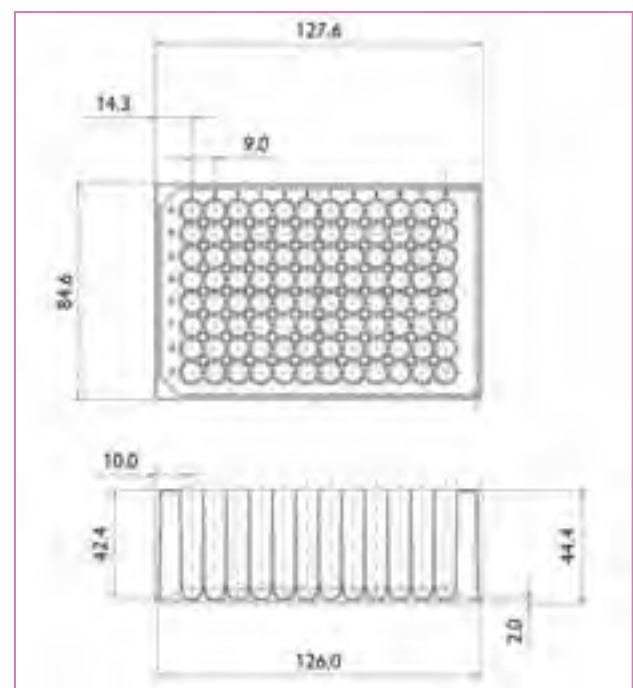


Bacti-growth plates

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
96 x 2ml round wells, polypropylene with lid	✓	✓	25	219022



219115



219022

For schematics of 219101 and 219102, please refer to 219002 (page 8) and 219009 (page 6).

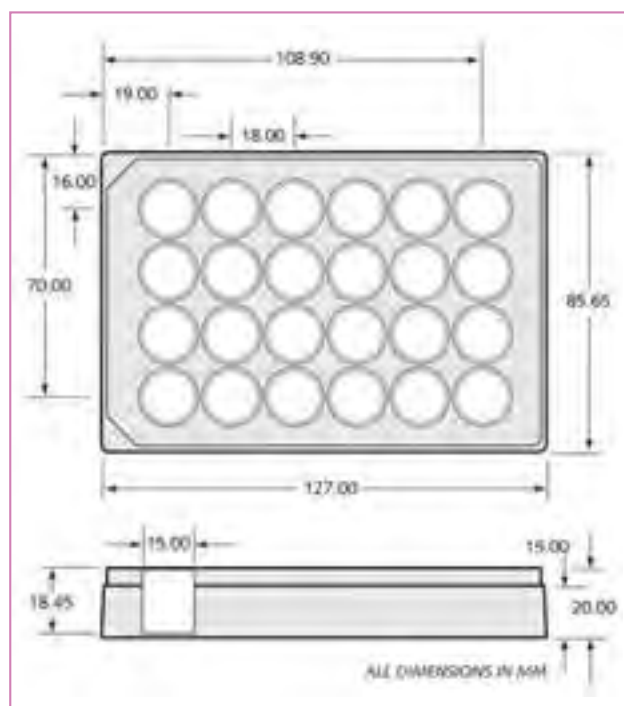
Components for assay development

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.

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

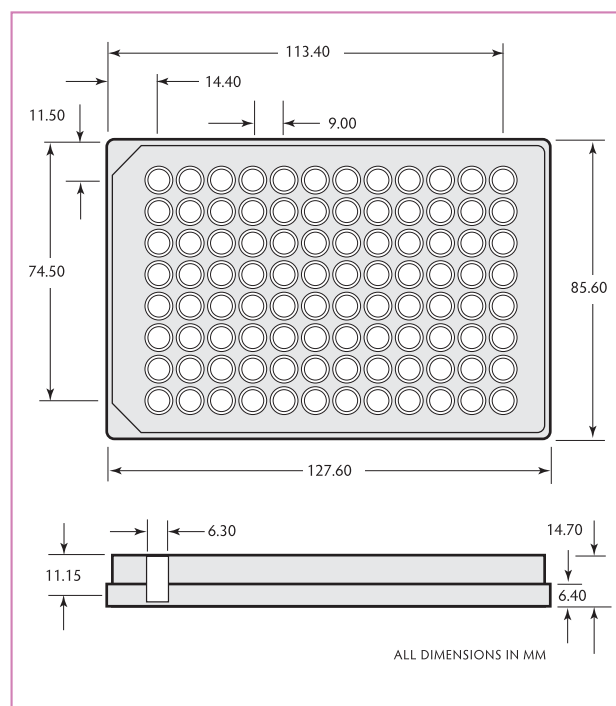
Krystal™ 24-well glass bottom plates

(see page 27)



Krystal™ 96-well glass bottom plates

(see page 28)



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 37 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

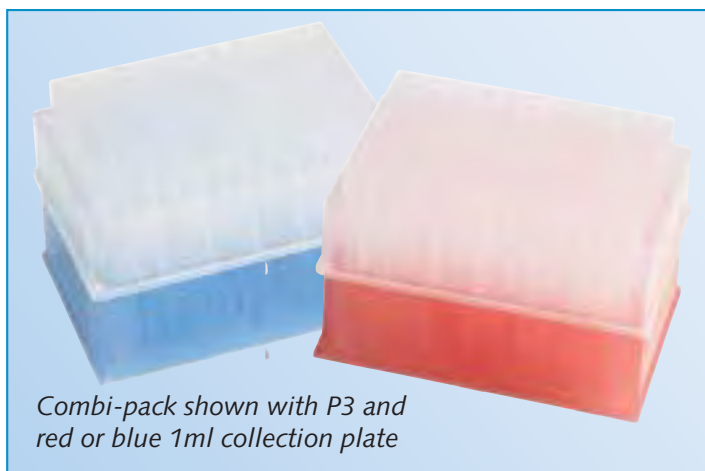
P³ Protein Precipitation Plates

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.

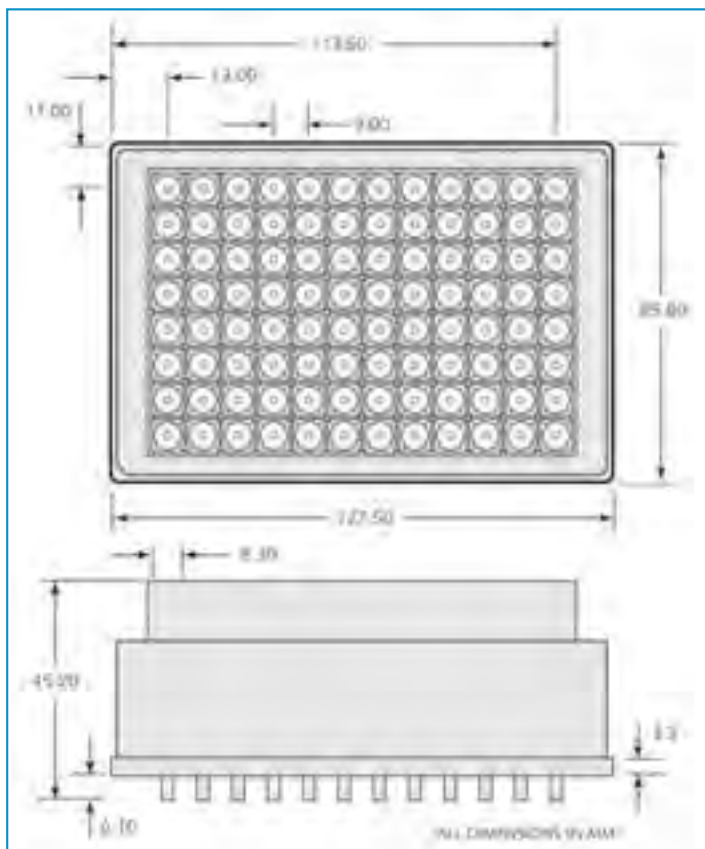
The Protein Precipitation Plate, P³, is based on the industry standard MicroLute™ format, but without the chromatographic sorbent. Protein ‘crashes’ out of solution and precipitates directly in each well when acetonitrile is added, thus solving all common problems associated with the CRASH technique 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 35).



Combi-pack shown with P³ and red or blue 1ml collection plate



- 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

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
P ³ Combi pack – Red, 5 x P ³ Protein Precipitation Plate plus 5 x deep well 1ml red collection plates	5 + 5	500086
P ³ Combi pack - Blue, 5 x P ³ Protein Precipitation Plate plus 5 x deep well 1ml blue collection plates	5 + 5	500087

*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.

SPE starter pack

This kit has been designed to form the starting point for SPE analysis. This gives the researcher the necessary hardware to process samples using an SPE plate and to collect under vacuum the analyte for further analysis.

The kit consists of:

- 2 x 50mg MicroLute™ – containing: 50mg of Thermo Fisher C18, C8, C2, SAX, SCX, NH2 and CBA, Verify CX, Verify CX HF
- 1 x 50mg Thermo Fisher C18
- 1 x acrylic manifold
- 1 x 1ml spacer insert
- 3 x 2ml 96-well microplates
- 3 x disposable reservoir trays

MicroLute™ starter pack

Starter pack 271023



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



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

Vacuum manifolds

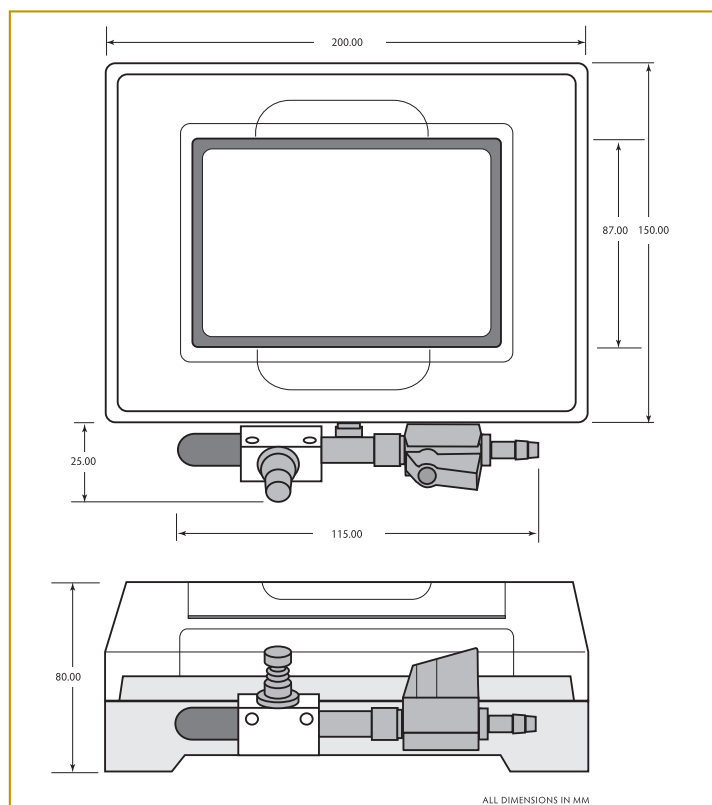
Vacuum manifolds are used to draw liquid through a filter or SPE plate into either a waste tray or a collection plate. The application of vacuum increases the speed at which samples can be collected.

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

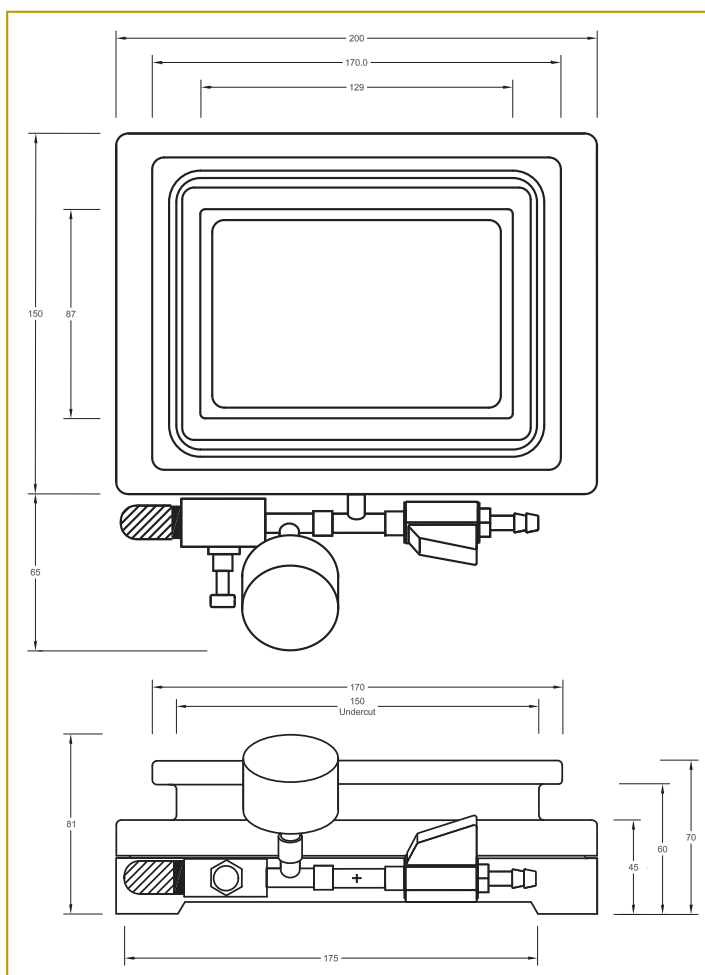
Universal robotic manifold

Based on our successful MicroLute™ Acrylic Manifold, the new Universal Robotic Manifold is designed to be easily assembled and disassembled by robotic manipulators, thus enabling productive automation of SPE or DNA clean-up procedures. Able to accommodate collection plates from 14mm - 44mm in height and adaptable for working with short, medium and long skirts and drip directors, the Universal Robotic Manifold can operate with many different brands of filter plate and collection trays. Supplied with an integral vacuum gauge, the Manifold provides complete control of vacuum pressure ensuring plates are processed with high reproducibility. The Manifold is fully compatible with most commercial robotic liquid handling systems.

The Universal Robotic Manifold is suitable for a range of manufacturer's plates without an adaptor. For certain plate types a Shallow Adaptor or a Deep Adaptor, is required.

- *Compatible with any filter plate type*
- *Robotic friendly designs aids automation*
- *Chemically resistant acetal/acrylic construction*
- *Adaptable for different collection plates*
- *Easy visual inspection of process*
- *Built in vacuum gauge for reproducibility*

Manufacturer	Plate type	Base	Adapt. 1	Adapt. 2
Qiagen™		■	■	
Waters™	Standard plate	■		
Waters™	μElution plate	■	■	
Biotage™		■		
Varian™		■		
Phenomenex™		■		
Axygen™		■		■
Seahorse™		■		
Porvair™		■		



Universal robotic manifold

Description	Qty/pack	Cat. no.
Universal robotic compatible manifold to hold deep 96-well collection plate	1	228020
Adaptor 1 for medium skirt/medium drip director plates	1	228021
Adaptor 2 for short skirt/long drip director plates	1	228022

Gaskets and spacers are identical to those for our standard MicroLute™ acrylic manifold shown on page 39.

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 5µm 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.

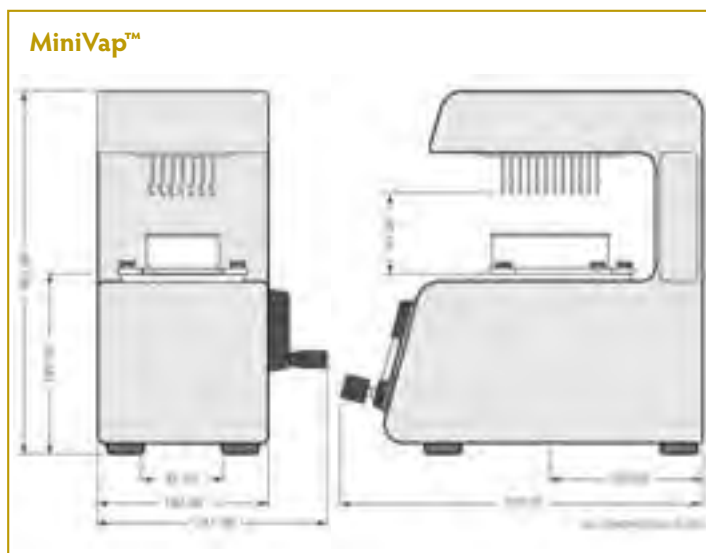
- Quicker dry down times than standard methods such as vacuum oven
- Tests have shown that the MiniVap can evaporate 500µl of methanol in less than 6 minutes
- Designed for any ANSI/SLAS 96-well plate
- 24 vial head now available
- Simple to install and operate
- Easy adjustments of temperature, gas 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

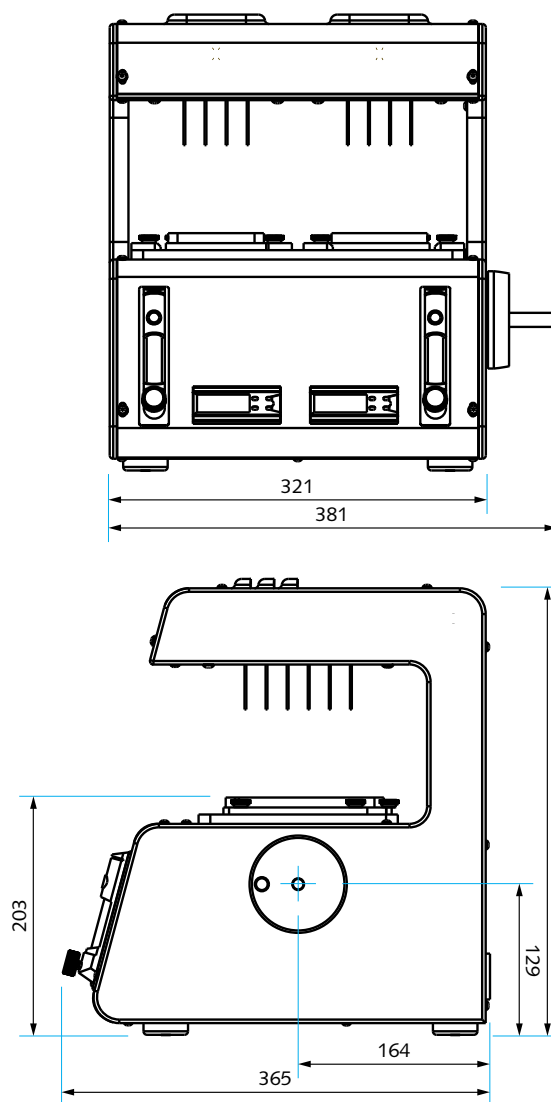
Minivap Gemini™

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™

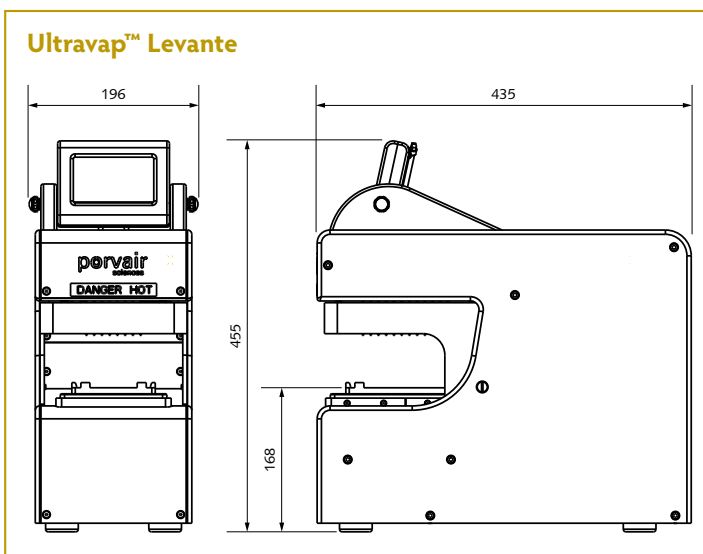
The Ultravap Levante™ is the latest in Porvair Sciences' popular series of nitrogen blow-down sample concentrators and evaporators. Using technology from our very successful Ultravap Mistral™ series of robot-ready, integration compatible evaporators we have re-designed the classic single plate evaporator 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 XT is available to special order for samples up to 100mm high – please enquire directly with Porvair for this option.

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

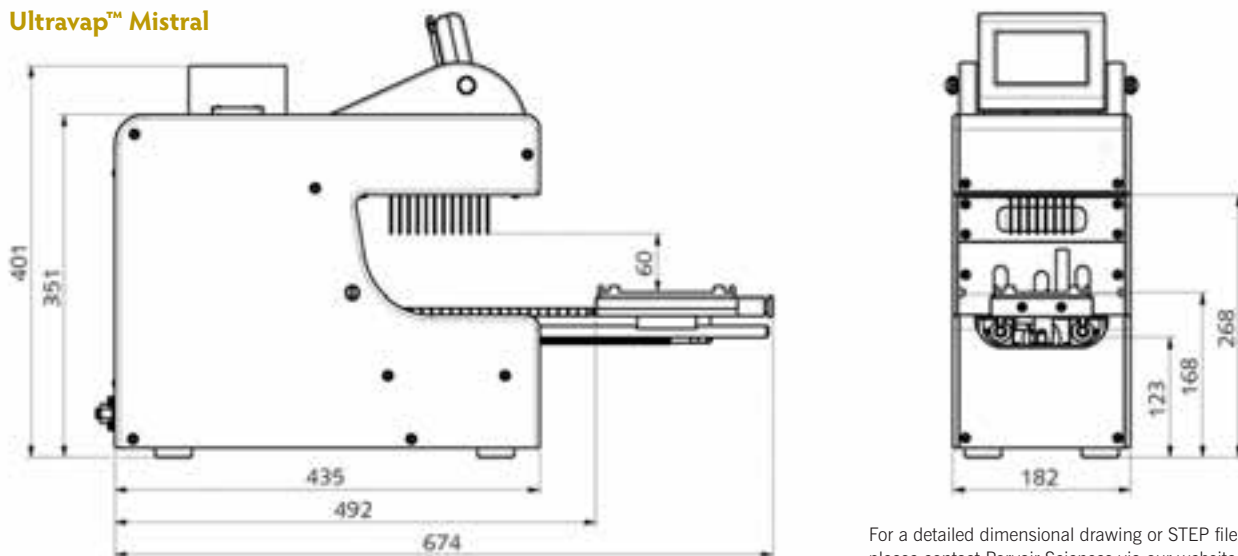
unauthorised users cannot tamper with stored protocols. Other users may only recall and run stored methods approved by the Administrator.

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.



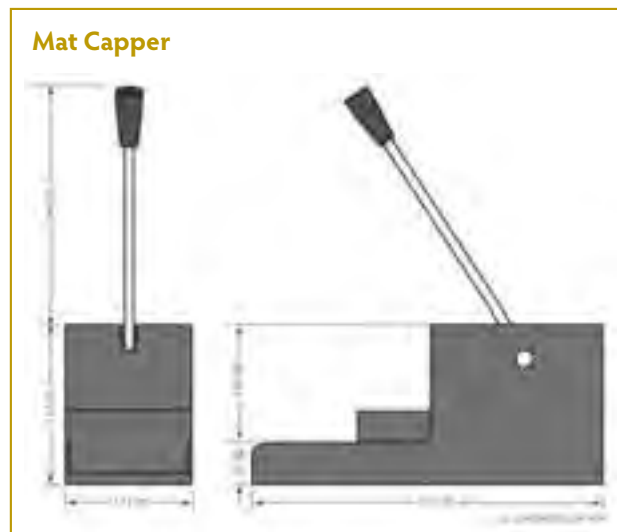
Ultravap™ Mistral fully Integration-ready High Speed Sample Concentrator

Description	Qty/Pack	Cat. No.
Ultravap Mistral fully robot compatible Blowdown Evaporator without needle head, 110/230V	1	500149
Mistral CAN bus interface cable with RS232 initiator and CAN terminator plugs	1	500193
High Plate guard for Mistral	1	500196
Mistral fitted with High Plate guard, no head	1	500197
96-well short straight needle head for use with plates up to 80mm high	1	500199

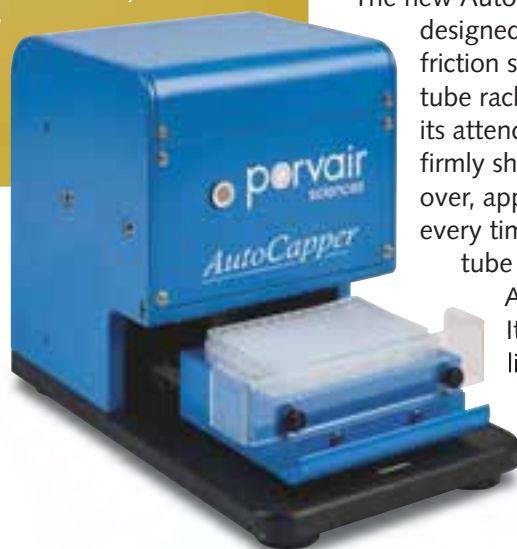
Mat Capper

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 53.

- 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

MiniSeal II semi-automatic heat sealer

The new MiniSeal II semi-automatic plate sealer builds on the reputation of our earlier Miniseal 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.



- 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

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

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 cyler film for standard PCR	100	229303
ThermalSeal A® thermal cyler film for standard PCR, sterile	100	229304
ThermalSeal RT2RR™ thermal cyler 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
96-well pattern adhesive free sealing films for robotic & high-throughput screening, PTFE, 2mil thick	100	BST-9790

Heat seals and foils



229574



229573



229572

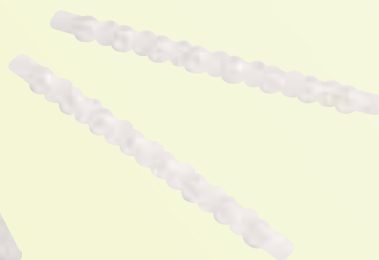


229571

Friction sealing strips and PCR cap mats



286113



286116



360005

Friction seals



Friction seals (cap mats)

Description	Cross reference to Porvair Sciences plates	Qty/pack	Cat. no.
Silicone sealing mat to fit 384-well plates	219040, 219041	50	380001
EVA sealing mat to fit 96-square well plates	219006, 219008, 219009	50	219004
EVA sealing mat to fit 96-square well plates, sterile	219025, 219026, 219027	50	219019
Pierceable Santoprene mat for 96-square well plates	219006, 219008, 219009	100	360010
EVA sealing mat for 96-round well plates	219002, 219032	50	219036
EVA sealing mat for 96-round well plates, black	219002, 219032	50	219038
EVA sealing mat for 96-round well plates, sterile	219012	50	219042
Pierceable Santoprene seal strip to fit 24-well plates	360013	100	360014
Pierceable Santoprene seal mat to fit 48-well plates	360002, 360004	100	360006
Pierceable Santoprene seal strip to fit 96-well plates	360001	400	360007
Pierceable sealing cap, round 96-well	219002	50	219044
Mat for round 96-well plates (standard silicone)	219002 and round well plates	5	229090
Mat for square 96-well plates (standard silicone)	229230 and square well plates	5	229091
Mat for round 96-well plate (PTFE coated silicone)	219002 and round well plates	5	229092
Mat for square 96-well plate (PTFE coated silicone)	229230 and square well plates	5	229093
Polystyrene clear lid for all 96-well SBS standard plates	Fits all plates	100	229125
Polypropylene lid for all 96-well SBS standard plates	Fits all plates	100	229128
Cap mat for 1.1ml low profile storage plate	219250	5	219251
96-well PCR sealing mat, natural	For rimless PCR plates	50	286113
96-well PCR sealing mat, rubber, natural	For rimless PCR plates	50	286114
8-well PCR sealing strip, 125 strips per pack, 10 packs per case	–	1250	286116
Round well, molded blue PTFE/silicone plug mat	219002, 219012		986050VP-812

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	Acetonitrile	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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