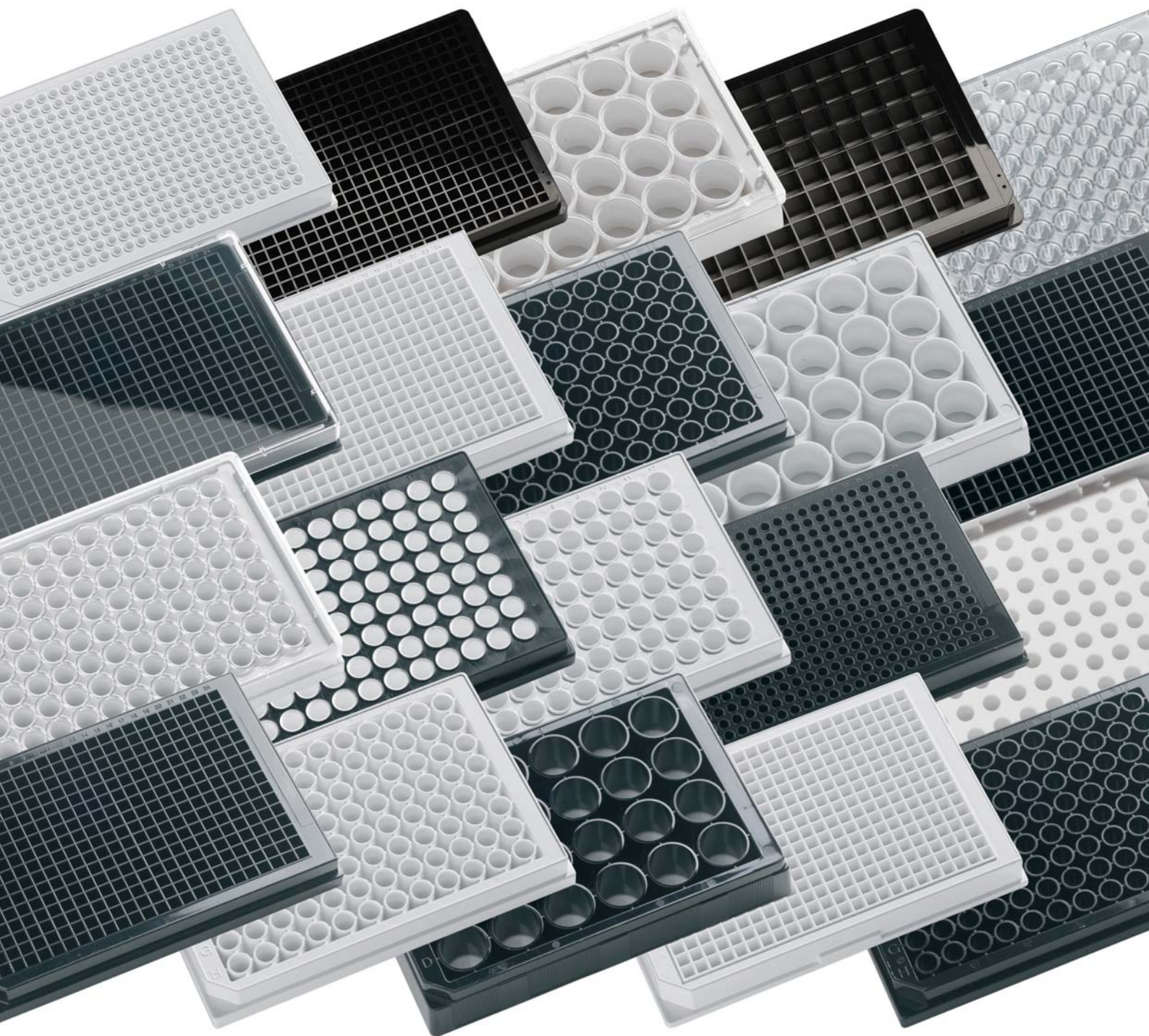


ASSAY PLATES



## 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 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.

### 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

## 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.

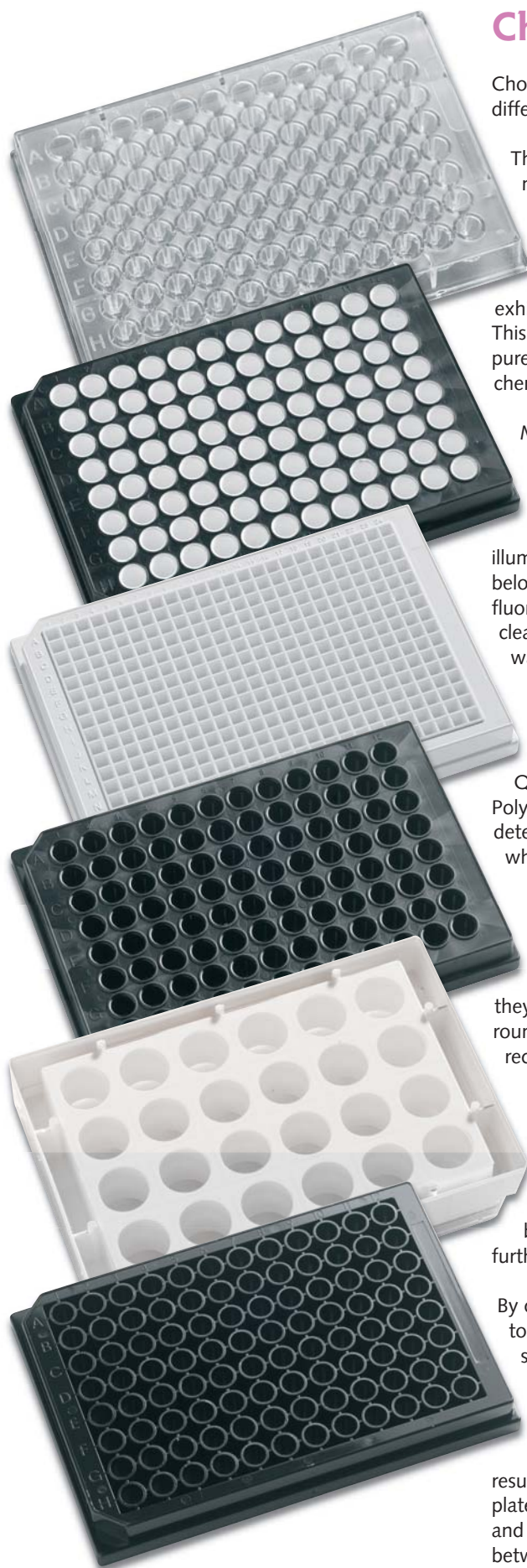
Visible wavelength range (900-350nm) measurements require only clear plastic bases, whilst readings between 220nm and 350nm will require a UV-transparent material. This can be Quartz sheet or a modern polymer such as Cyclo-Olefin Co-Polymer (COP/COC). Optical glass sheet is used where visible range detection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

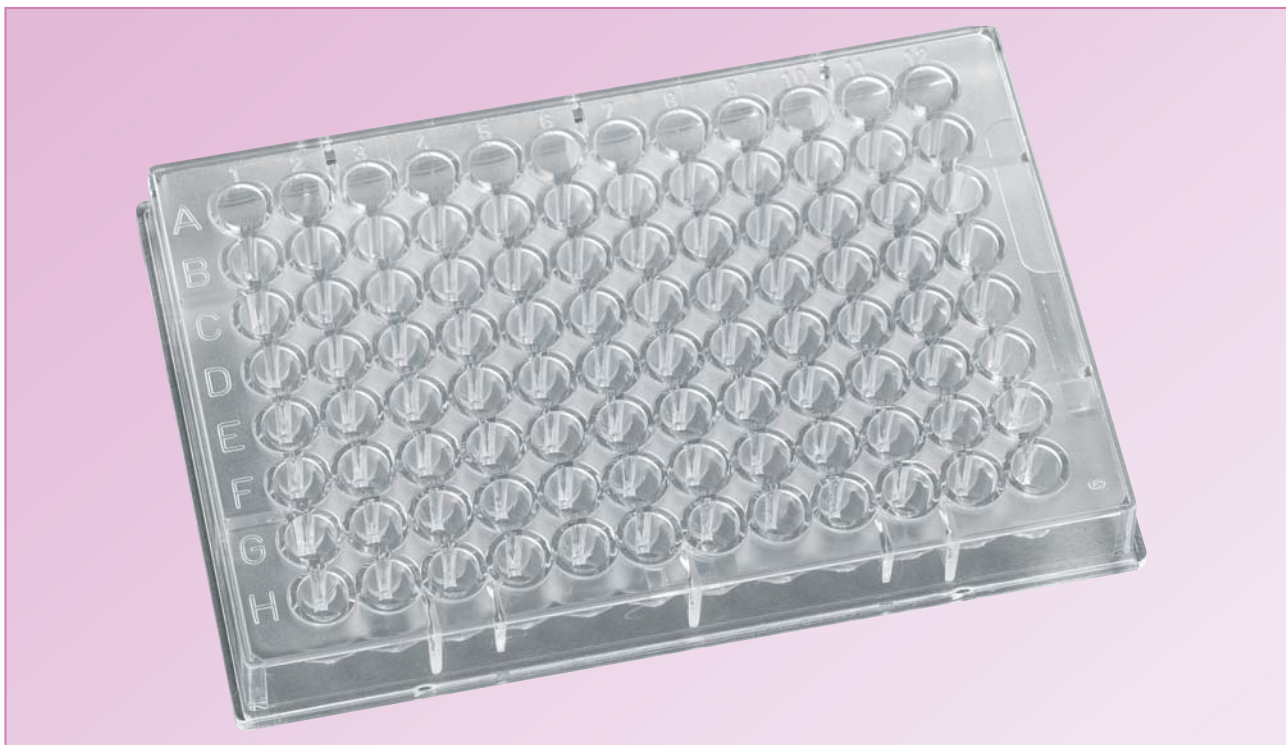
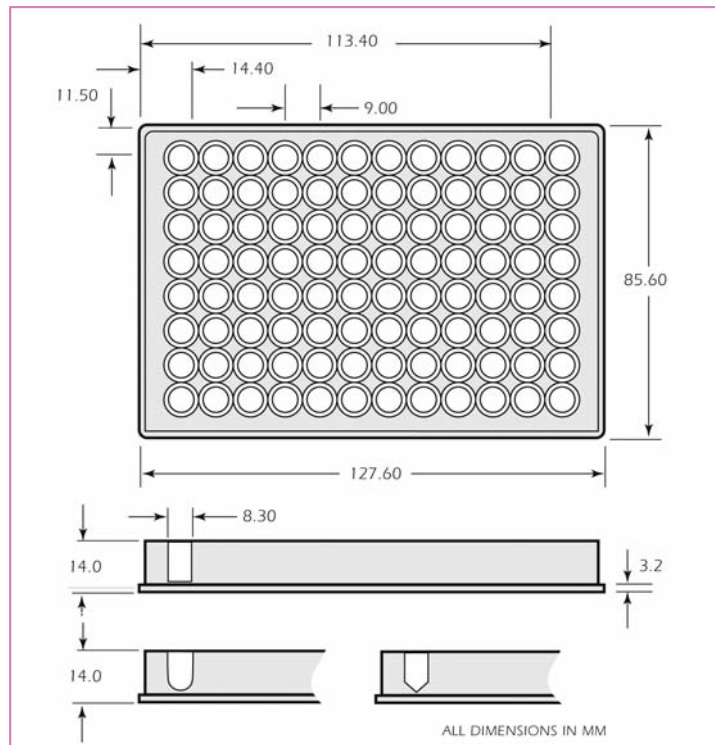
The table summarizes the choices available for Assay Plate selection and indicates the plate type most likely to give the best results. Porvair Sciences will be happy to supply samples of their plates for evaluation free of charge, as different detection systems and differing assay development may lead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



## 96-well clear plates

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

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



### Solid assay plates

Plate description	Sterile	Colour	Qty/pack	Cat. no.
96 wells of 350µl with a flat bottom	–	Clear	100	208004
96 wells of 270µl with a round bottom	–	Clear	100	209004
96 wells of 220µl with a V bottom	–	Clear	100	210004
96 wells of 350µl with a flat bottom, medium bind polystyrene for ELISA tests	✓	Clear	200	500045
96 wells of 350µl with a flat bottom, standard bind polystyrene for ELISA tests	✓	Clear	200	500046

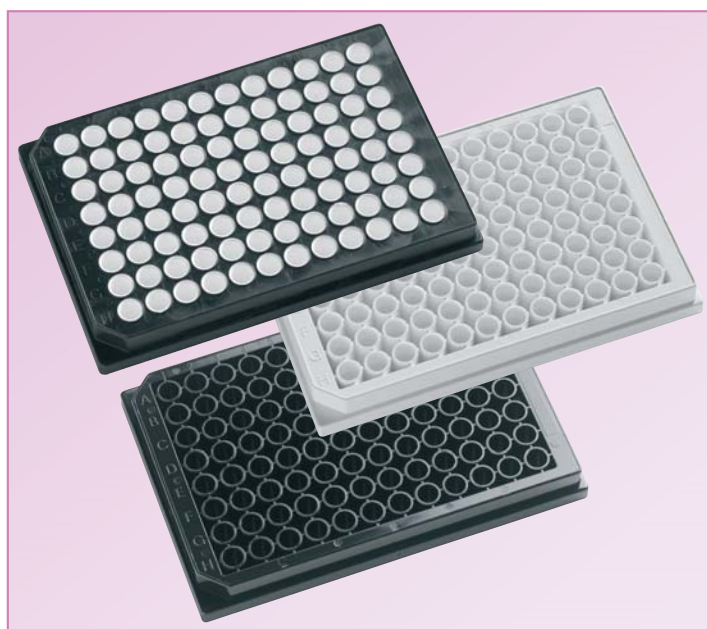
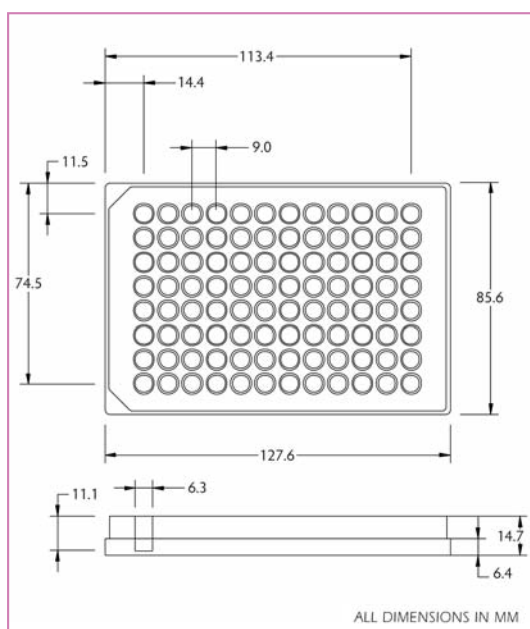
## 96-well black, white & black with white wells

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	–	–	–	50	204503
96 wells	White	–	–	–	100	204003
96 wells	White	Hi protein binding	–	–	100	204006
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	Hi protein binding	–	–	100	205006
96 wells	Black	Tissue culture	✓	✓	50	205512
96 wells	Black	Tissue culture	✓	✓	100	205012
96 wells	Black with white wells	–	–	–	100	301004

## 384-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. There are two working volumes: 30µl/well or 120µl/well. All 384-well assay plates are available in standard, high bind and tissue culture treated formats.

**NEW**

Very low volume 5µl clear  
TC plate 500079



## Round well low volume

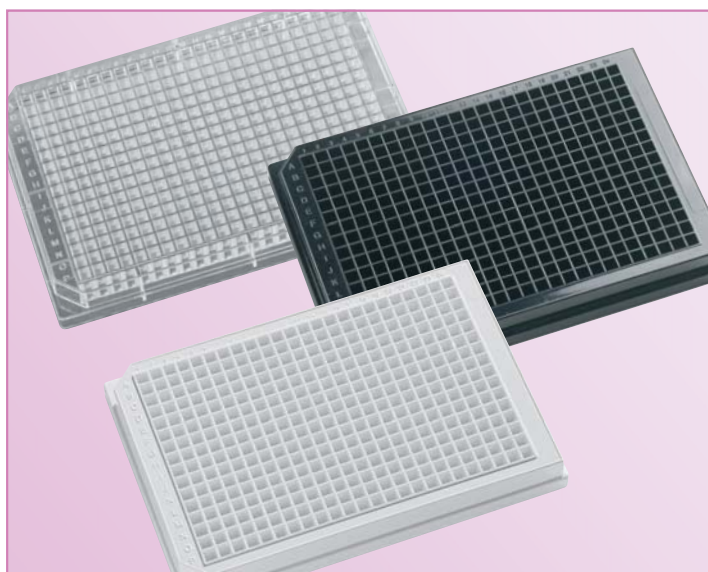
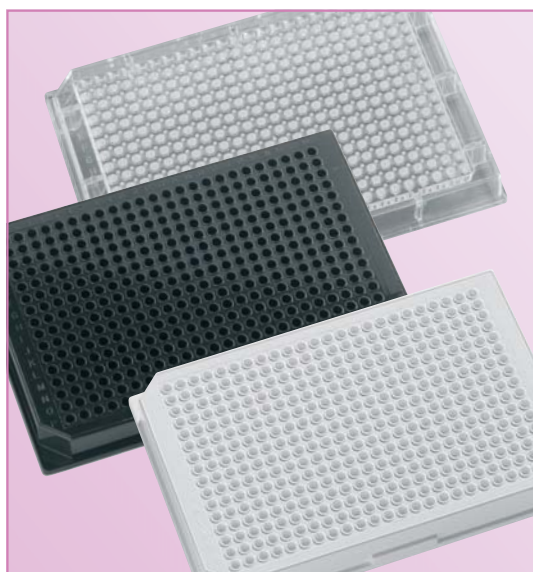
The low volume 384-well assay plate is designed for high throughput screening with 30µl total volume to reduce the amount of sample and reagent required for the assay.

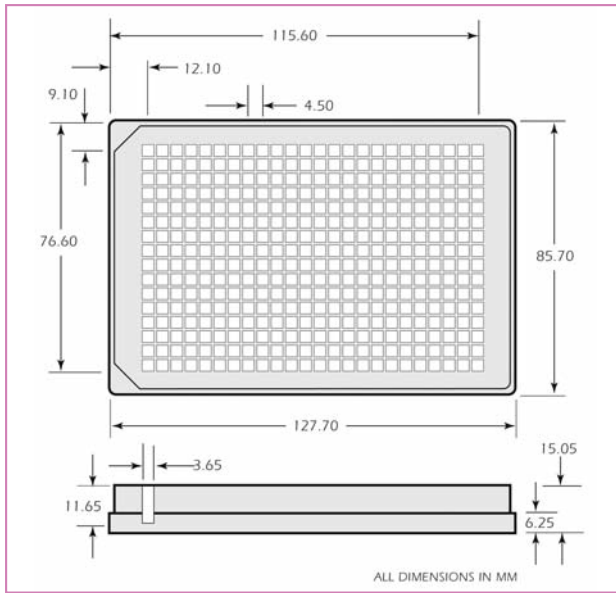
- Specially rounded well to allow pipette tip access to the bottom of the well without interference
- Rounded edges to reduce droplet formation
- Provides a total liquid capacity of 30µl or 5µl per well
- Unique moulding technique to achieve superb flatness to a tolerance of +/-0.2mm
- Standard height plate (14.7mm) for greater ease of automation
- Standard ANSI/SLAS format

## Square well plates

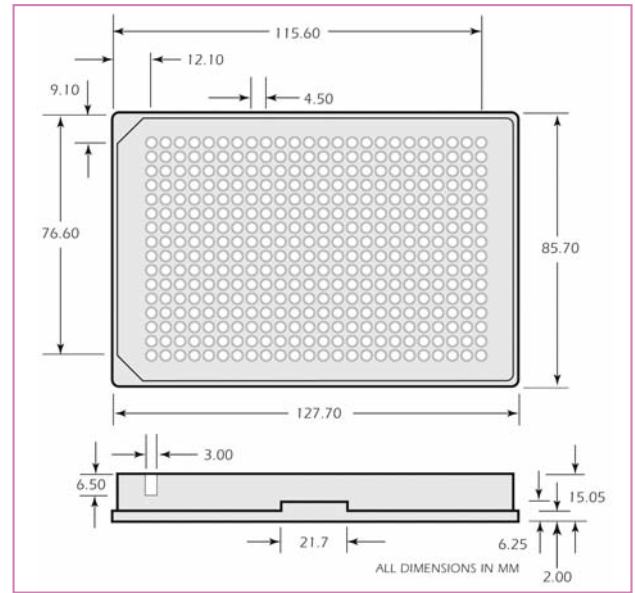
The 384-well format, with its higher density of wells, allows more work to be carried out in a standard sized plate, aiding higher throughput. Well volume is 120µl per well. All of these plates are manufactured from high quality polystyrene.

- 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 100µl
- 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



30µl/well

Solid assay plates

	Plate description	Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
S Q U A R E W E 	384 wells of 120µl	Clear	–	–	–	50	221503
	384 wells of 120µl	Clear	–	–	–	100	221003
	384 wells of 120µl	Clear	Hi protein bind	–	–	100	221012
	384 wells of 120µl	Clear	High bind with lid	–	✓	50	221006
	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	Hi protein bind	–	–	100	222012
	384 wells of 120µl	White	Hi protein bind with lid	–	✓	50	222006
	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	Hi protein bind	–	–	100	223012
	384 wells of 120µl	Black	Hi protein bind with lid	–	✓	50	223006
	384 wells of 120µl	Black	Tissue culture	✓	✓	50	223509
	384 wells of 120µl	Black	Tissue culture	✓	✓	100	223009
R O U N D W E L L	384 wells of 30µl	Clear	–	–	–	50	221103
	384 wells of 30µl	Clear	Tissue culture	✓	✓	50	221109
	384 wells of 30µl	White	–	–	–	50	222103
	384 wells of 30µl	White	Tissue culture	✓	✓	50	222109
	384 wells of 30µl	Black	–	–	–	50	223103
	384 wells of 30µl	Black	Tissue culture	✓	✓	50	223109
	384 wells of 5µl	Clear	Tissue culture	✓	✓	180	500079

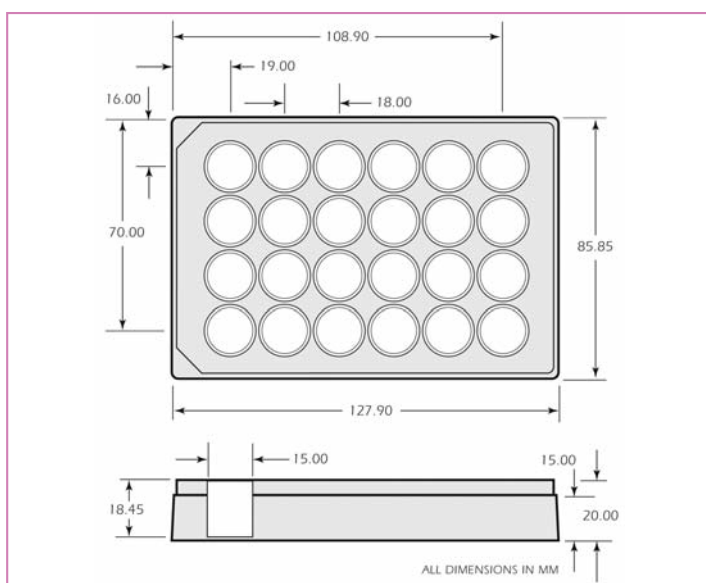
## 24-well Krystal™ black & white

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	Hi protein binding	–	–	68	303004
White	Tissue culture	✓	✓	56	303006
Black	–	–	–	68	303008
Black	Hi protein binding	–	–	68	303010
Black	Tissue culture	✓	✓	56	303012

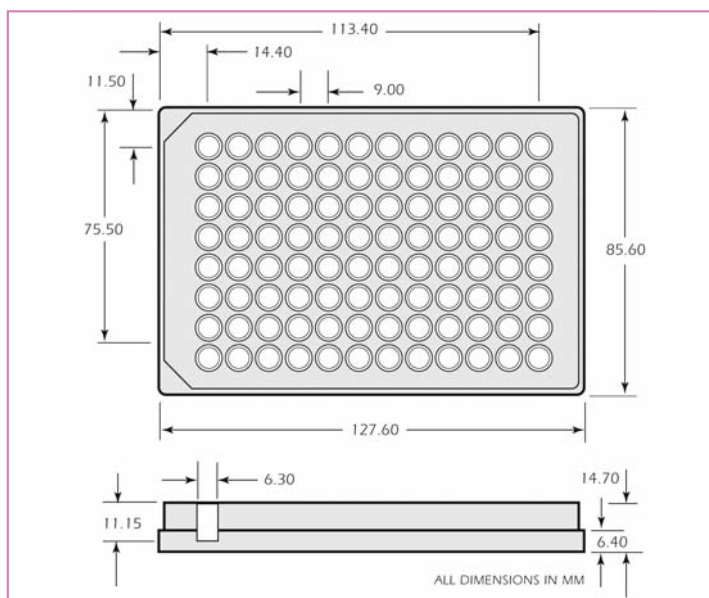




## 96-well Krystal™ black and white

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	–	–	–	50	214503
White	–	–	–	100	214003
White	Tissue culture	✓	✓	50	214506
White	Tissue culture	✓	✓	100	214006
White	Tissue culture	✓	✓	100 (4 x pack of 25)	214030
Black	–	–	–	50	215503
Black	–	–	–	100	215003
Black	Tissue culture	✓	✓	50	215506
Black	Tissue culture	✓	✓	100	215006
Black	Tissue culture	✓	✓	100 (4 x pack of 25)	215030

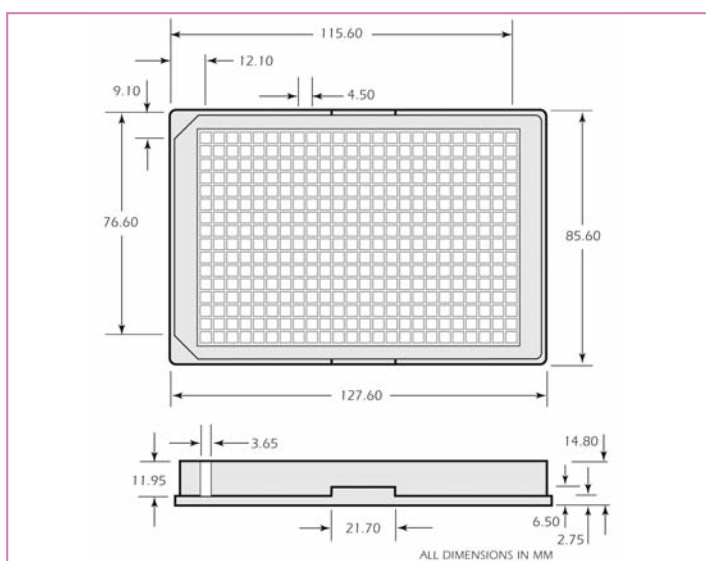
## 384-well Krystal™ black and white

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

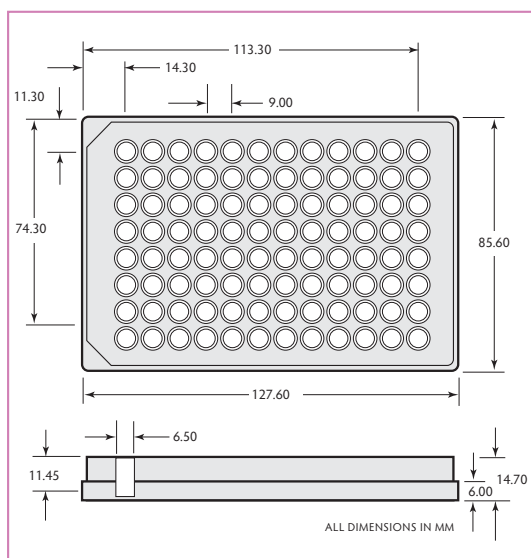


### Krystal™ 384-well

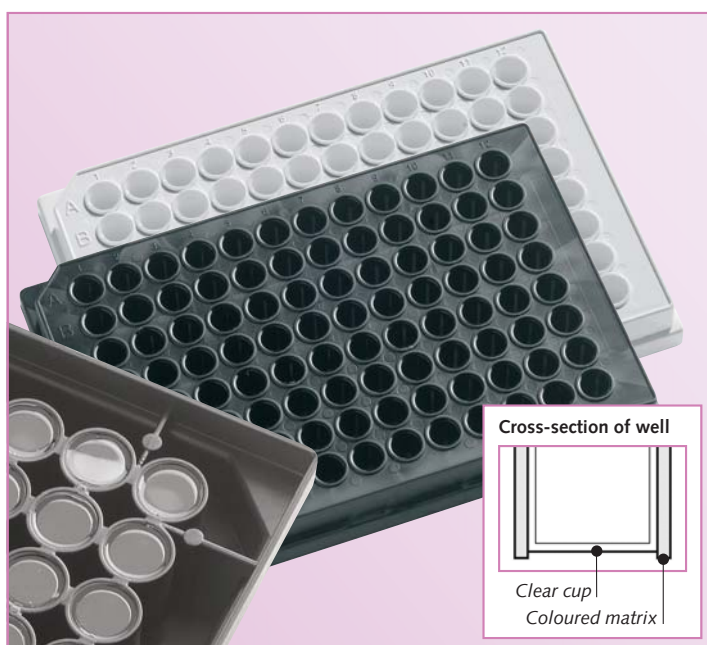
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	–	–	–	100	311001
White	Tissue culture	✓	✓	50	311503
White	Tissue culture	✓	✓	100	311003
White	Tissue culture	✓	✓	100 (4 x pack of 25)	311030
Black	–	–	–	100	312001
Black	Tissue culture	✓	✓	50	312503
Black	Tissue culture	✓	✓	100	312003
Black	Tissue culture	✓	✓	100 (4 x pack of 25)	312030

## 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



### Krystal™ 2000 96-well

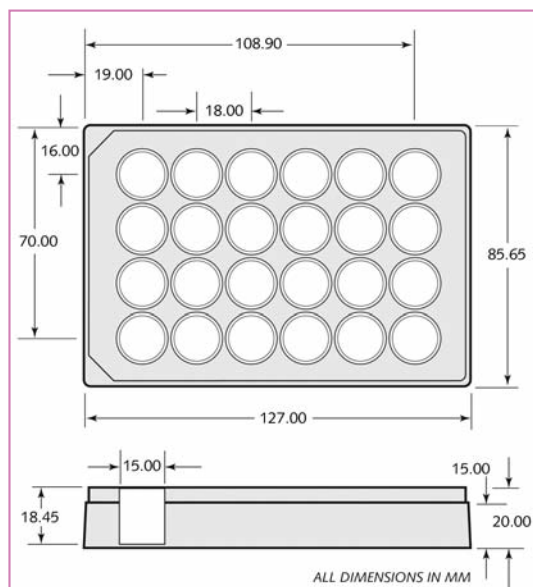
Colour	Treatment	Sterile	Lid	Qty/pack	Cat. no.
White	–	–	–	50	301510
White	–	–	–	100	301010
White	Hi protein binding	–	–	100	301018
White	Tissue culture	✓	✓	50	301512
White	Tissue culture	✓	✓	100	301012
White	Tissue culture	✓	✓	100 (4 x pack of 25)	301070
Black	–	–	–	50	301502
Black	–	–	–	100	301002
Black	Hi protein binding	–	–	100	301014
Black	Tissue culture	✓	✓	50	301506
Black	Tissue culture	✓	✓	100	301006
Black	Tissue culture	✓	✓	100 (4 x pack of 25)	301060

## 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
- +/- 15µm 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

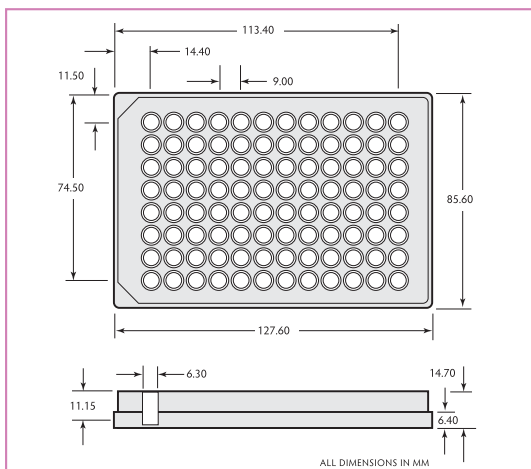
## Krystal™ 24-well glass bottom plates



### 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

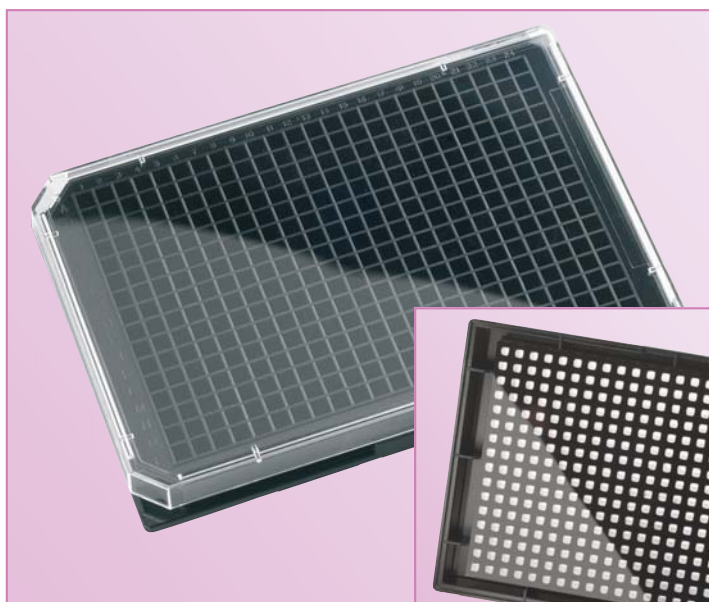
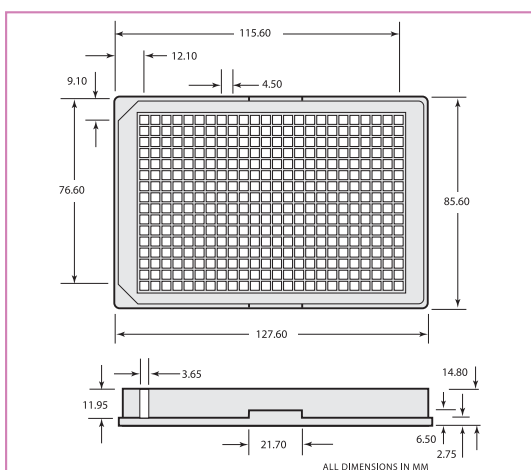
## Krystal™ 96-well glass bottom plates



### 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



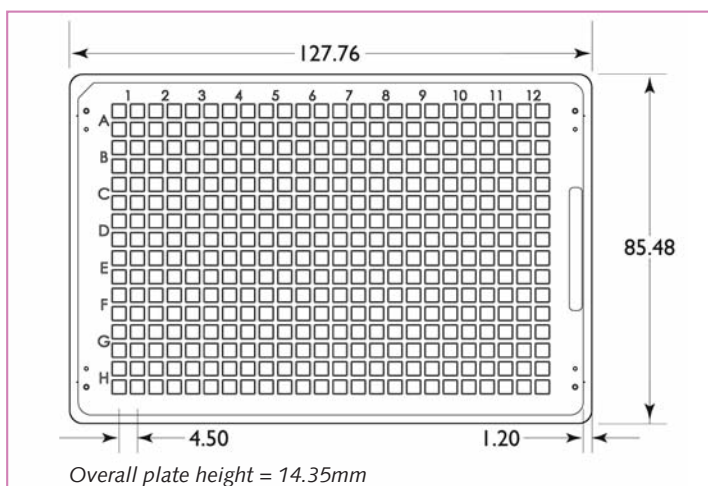
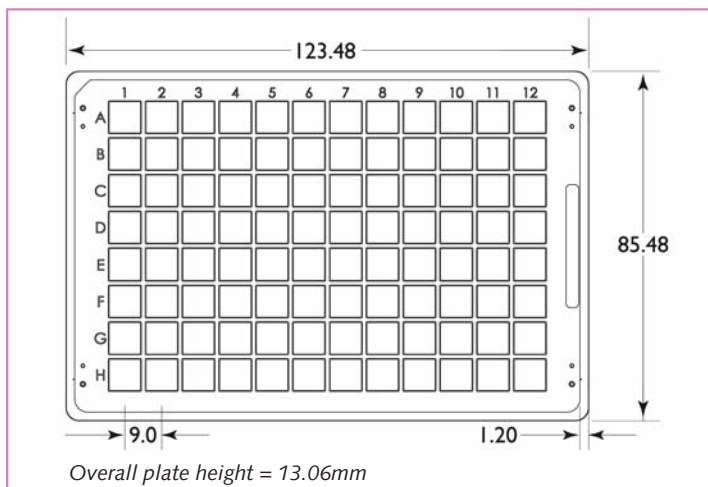
### Glass bottom assay plates

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 96- and 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
- 96- and 384-well black versions
- 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.
96-well Krystal COP-bottomed plate	32	327002
384-well Krystal COP-bottomed plate	32	327001

Detailed schematics available on request

## High performance microplate thermal seals

The perfect accompaniment to Porvair precision engineered assay plates are Porvair colour-coded thermal seals. These easy to use thermal seals work with all commercially available heat sealers that take pre-cut strip seals. They are printed in five different colours and marked “This way up” to ensure easy selection of the right gauge of seal and correct positioning on the microplate. Seals are compatible with most heat sealers from: Thermo-Fisher, Abgene, Agilent, Caliper, 4titude, Fluidx, Porvair, KBiosystems and Matrix.

Each aluminium foil is spray-coated with an acrylic varnish that is solvent resistant and will not contaminate your samples. It also makes an excellent permanent weld seal to our polystyrene and polypropylene microplates. The easily peelable foil is actually a laminate of aluminium and polyester for durability and strength, while remaining easy to remove. A sample pack of foils is available on request from Porvair Sciences for you to determine the optimum seal for your application.

Porvair colour-coded optically clear seals come in two gauges, both printed black “This way up” for ease of use. The thinner gauge gives the best optical results and is easily removed. The thicker material, while remaining clear after heat sealing, is more suitable for long-term cold storage down to -20C.



### Aluminium foils

All are 125mm x 78mm sheets printed with colour coding and Right Side Up for ease of use, 100 sheets per pack

Description	Qty/pack	Cat. no.
Easily pierced 20µm PP/PS lacquered aluminium foil – colour coded green	100	229572
Peelable 70µm polyester/aluminium laminate sealing foil – colour coded red	100	229571
Pierceable/peelable 38µm lacquered aluminium foil – colour coded blue	100	229573
Strong 85µm thick aluminium foil for long term storage – colour coded black	100	229574

### Clear polyester

All are 125mm x 78mm sheets printed in black with Right Side Up for ease of use, 100 sheets per pack

Description	Qty/pack	Cat. no.
Sealing film clear 75µm – non peelable, but pierceable	100	500009
Sealing film optically clear 105µm – peelable, but non pierceable	100	500010

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