

# Cyclo-olefin Microplates

Manufactured from 100% cyclo-olefin polymer (COP) to provide superior optical clarity, thermal stability, biocompatibility, low auto-fluorescence, flatness and chemical resistance (suitable for use with 100% DMSO).



- **EVAPORATION MANAGEMENT REDUCES RISK OF SAMPLE DAMAGE**  
Extra perimeter wells added around the plate edge protect samples against the damaging effects of evaporation and water uptake. Snug lid fitting provides an additional barrier.  
Offers better quality results across the whole plate and does not interfere with liquid handling access.
- **SUPERIOR OPTICAL INERTNESS**  
Optically transparent, with ultra-low autofluorescence reduces background noise.  
Broad transmission window, 230nm, near IR.  
Low optical isotropy, with very low birefringence.
- **FLAT WELL BOTTOMS**  
Improved flatness, less than 100 microns, helps imaging applications to perform better and faster.  
Homogenous design, no adhesives are used during manufacturing.
- **BIOLOGICALLY AND CHEMICALLY INERT**  
Broad chemical resistance. Cyclo-olefin microplates are not compromised by DMSO and can be used for pre-printing chemical libraries for just-in-time screening operations.  
100% biocompatible, cells will grow readily on the plate surface. Surface chemistry similar to polypropylene. When untreated, plate surface displays very low non-specific binding.  
Available tissue-culture treated for cell, or biochemical attachment. Can be coated with pdL, collagen, and many other processes, to improve surface performance for sensitive cell-lines or biomolecules.
- **DUAL USE, STORE AND SCREEN**  
Rigid and meet SBS standards. COP plates can be used reliably in most automated systems, at any temperature.  
384, 1536 and 3456 well formats, ideal for a wide variety of screening workloads and throughput.  
Ideal for cell-based assays and most general biological assays such as receptor binding, enzymatic activity and molecular biological reactions.

Acoustic ready. These cyclo-olefin microplates are recommended for use on the Ats-100 acoustic (non-contact) dispenser.

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## WHY USE CYCLO-OLEFIN POLYMER?

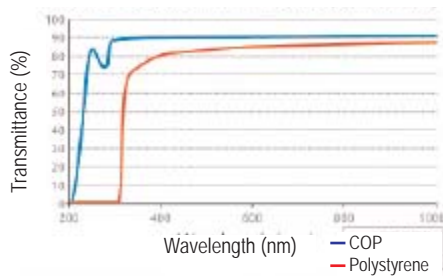
### Optical

Improved high light transmittance and low auto-fluorescence. These plates exhibit high transmittance of ultraviolet, visible, and near infrared wavelengths of light, greater than other plastics, including polystyrene, with an expanded optical window down to 230 nm.

Cyclo-olefin co-polymer has less than 1% the auto-fluorescence of polystyrene when excited at UV wavelengths of light, the reduced background offers greater sensitivity and better results.

Compared with polystyrene, COP more closely resembles the auto-fluorescence of high-silica content glass.

Transmittance of 0.1 mm thick sheet (well bottom)



100 micron thick film optical transmittance scan comparing COP with polystyrene.



Superior fluorescence and luminescence detection. Images show GPCR assay using Jurkat cells in 3456-well cyclo-olefin microplate.

**A less expensive alternative to fragile glass-bottom plates.**

Well suited for UV absorbance measurements of DNA, nucleic acid, and protein concentrations at 260 nm and 280 nm.

### Mechanical

COP is more stiff than polystyrene (Young's modulus of 2.2 compared to 2.0) and less hard than polystyrene. This combination enables a microplate well to be injection molded in such a way that:

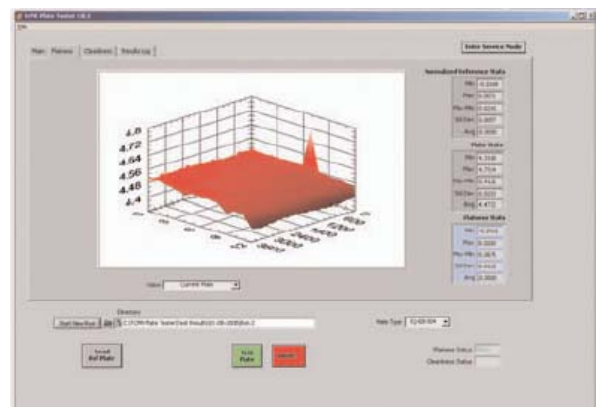
- Small pieces of excess material are prevented from forming at the edges.
- Dimensions can be produced to the nearest thousandth of an inch.
- The perimeter of each well rim is flat.
- The bend along the entire length of the top surface of the plate is less than 0.1mm enabling dispensers to be positioned more closely and improving accuracy of liquid delivery.

### High Rigidity for Mechanical Stability

The hardness and 2.2 GPa rigidity of cyclo-olefin resists the curvature or distortion that can result from mechanical handling or heat treatments (up to 120°C).

### Flatness

State of the art laser-based measurements test every lot of microplates manufactured with sub-micron resolution.

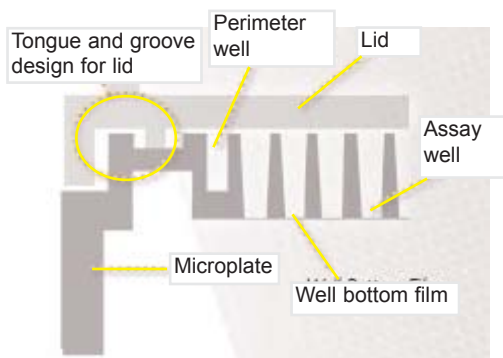


The above image depicts a flatness test result of a 46 micron flat microplate.

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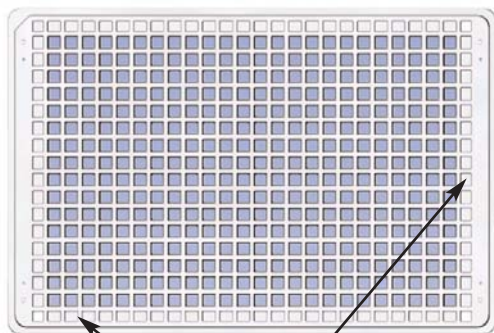
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## Evaporation control design



COP microplates are ideal for use with aqueous and DMSO samples, and DMSO-water combinations, due to the following properties:

- Evaporation control wells are extra wells placed around the plate perimeter and do not replace sample wells.
- Tongue-and groove-configuration of the lid and top plate surface to produce a snug fit.
- Decreased permeability of COP when compared to polystyrene or polypropylene.



Evaporation control perimeter wells



Close up of perimeter wells

## Exhibits thermal stability from -80°C to +120°C

Cyclo-olefin microplates are suitable for cold storage, incubation, and thermo cycling.

## Biological

COP is biologically inert. The resin is induced to polymerise by thermal activation of intrinsic olefin groups, rather than by oxidation of electronegative functional groups (as in polystyrene).

The resin matrix does not present residual oxidiser that could leach into an assay and contaminate the results, or lead to the need for experimental control.

COP is non-polar. The microplate surface is controlled by the user alone. Hydrophobic compounds and cells may bind to the surface.

The binding of biomolecules and typical proteins such as albumin and IgG is low. A 1mg load in a 3456 well microplate will result in a typical residue of several attograms.

COP does not show endogenous protease or nuclease activities.

## Choice of Surface Treatments

The surface of an untreated cyclo-olefin microplate is hydrophobic and behaves chemically like untreated pure polypropylene. Proteins are not absorbed onto the surface. For sensitive enzyme assays, an untreated plate is preferred.

Surface treatment is available to enhance cell adhesion and protein binding. Other coatings are available, such as Poly-D-Lysine, Collagen and Streptavidin.

## Quality Assurance

Our microplates are manufactured under clean-room conditions according to quality standards. All microplates are non-pyrogenic (<0.06 EU/mL), and are regularly tested using an FDA-approved LAL-test (Limulus Amoebocyte Assay).

# Cyclo-olefin microplates

## Smaller volumes, lower cost, faster results

Low-volume 1536 and 3456 well microplates successfully reduce reagent usage without compromising data integrity of assay window measurements.

Low assay volumes also help to extend the life of historical chemical libraries, reduce the cost of reagents and reduce the use of scarce compounds, proteins, cells, membranes and reagents.

Using a simple example, a single 100,000-point assay can result in a 99% reduction in reagent use when performed with 3456-well plates, at 1ul assay volumes, compared to conventional 96-well microplate assays.

## Chemical resistance

COP microplates exhibit a broad chemical resistance, especially to DMSO and alcohol.

These microplates are suitable for library storage of chemical compounds. Allows dry spotting onto plates during compound reformatting without the need for dilution into aqueous media.

The main susceptibility is to aliphatics e.g. octanol and benzene.

## Relatively chemically inert

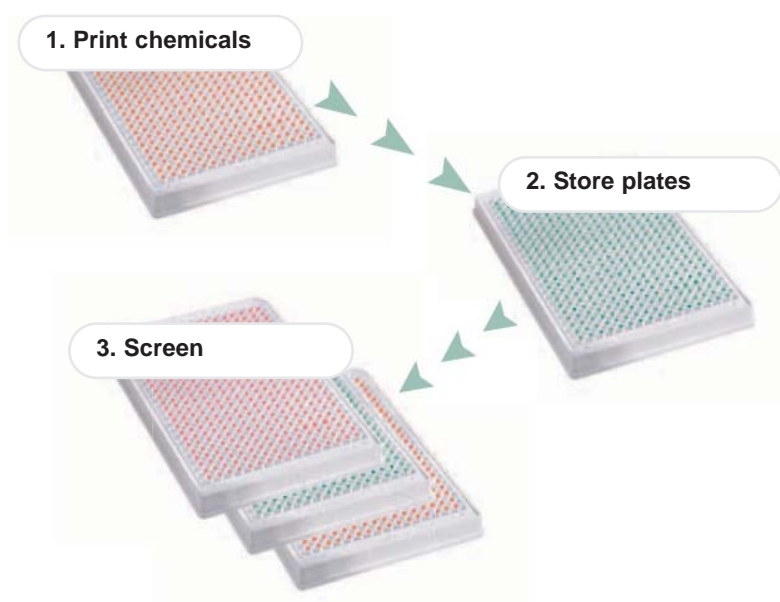
No reactive intermediaries or catalysts are used for polymerisation. No heavy metals or oxidizers are present in the plastic which could adversely affect the assay.

Reagent use comparison for 100,000 point assay

Microplate type	Microplate quantity	Assay volume	Total reagent consumption
96 well	1,075	200uL	20.7L
384 well	269	50uL	5.1L
1536 well	81	7uL	871mL
3456 well	32	1uL	110mL

## Dual use

The same plate can be used for storage and screening.



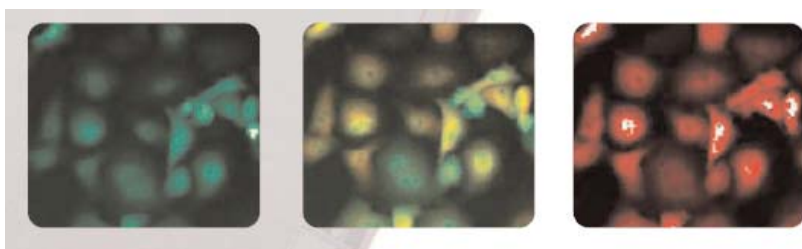
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## COMPARISON OF MICROPLATE POLYMER PROPERTIES

Property	Cyclo-olefin polymer	Polystyrene	Polypropylene
<b>Spectroscopy-Fluorescence</b>			
High light transmittance 240nm - 900nm	Excellent	Good	Average
Low autofluorescence 240nm - 700nm	Excellent	Average	Poor
Broad chemical resistance	Yes	No	Yes
Thermal stability at 140C	Yes	No	No
Flat bottom	120 microns flat (approx.)	250 microns flat (approx.)	1000 microns flat (approx.)
<b>Drug discovery/ cell biology</b>			
DMSO solvent stable	Yes	No	Yes
Biocompatibility, low protein binding	Ultra-low binding	High binding	Yes
Fluorescence assay compatible	Yes	yes	No
Luminescence assay compatible	Yes	Yes	No
Cell culture compatible	Yes	Yes	No
Chemical storage compatible	Yes	No	Yes
Evaporation control	Yes	no	No
Cellular image analysis compatible	Yes	No	No
<b>Genomic applications</b>			
PCR compatible	Yes	No	Yes
Real-time PCR compatible	Yes	No	Yes
High throughput robot PCR compatible	Yes	No	No
SNP reaction compatible	Yes	No	Yes
mRNA analysis	Yes	No	Yes
DNA sequencing reaction compatible	Yes	No	Yes
<b>Proteomic applications</b>			
Protein crystallography compatible	Yes	Yes	No
Image analysis compatible	Yes	Yes	No
Antibody compatible	Yes	Yes	No
Protein synthesis compatible	Yes	Yes	Yes



# Cyclo-olefin microplates

## APPLICATION-BASED MICROPLATES

### Cellular Assays

Most applications require a disposable microplate with good growth surface, preferably not glass, and good optical properties for imaging.

Cyclo-olefin microplates offer specific features to enhance cellular assays:

- Flat bottom provides uniform surface for adherence and growth.
- Low birefringence enables microscopic interrogation of cellular events.
- Surface treatment, RF-gas plasma treatment for surface attachment with adherent cell lines.
- Small-volume container allows the user to perform cellular assays with as little as 1000 cells/well.
- Round wells prevent cell wicking or clumping into well corners.

### Biochemical Assays

Require the lowest possible background to achieve maximum signal-to-noise ratio, chemical inertness and low variability due to evaporation while working with minimal volumes.

Cyclo-olefin microplates offer specific features to enhance biochemical assays:

- Low native auto-fluorescence enables very sensitive fluorescence assays to be performed.
- Perimeter wells prevent evaporation within the wells around plate edge, giving more uniform data sets.
- Small well volumes help to reduce amount of reagent, rare proteins or enzymes required.
- Reduced surface energy provides significantly low non-specific binding.
- High light transmittance. Clear optical window from 230 nm to the near IR.

### Compound Storage

Microplates must be suitable for use in automated systems, solvent resistant and help to avoid compound evaporation during storage to maintain library integrity.

Cyclo-olefin microplates offer specific features for compound storage:

- Broad chemical resistance, especially to DMSO and alcohol, allows for storage of compound concentrates.
- Mechanical stability, with a hardness of 2.2GPa to resist curvature or deformation caused by robotic handling.
- Clear plates available to enable easy viewing of chemical in solution.
- Low evaporation lids provide a snug fit to dramatically reduce sample loss caused by evaporation.
- Pre-labelled bar codes. Labels are chemical and temperature resistant and are provided in sequence.

### Proteomic Applications, Protein-Protein Interactions

Protein applications require minimum non-specific surface interaction combined with ideal optical properties for quantitative detection.

Cyclo-olefin microplates offer specific features for proteomic applications:

- Reduced surface energy provides significantly low non-specific protein binding due to hydrophobic surface properties.
- High light transmittance offers a clear optical window from 230nm to the near IR.
- Low well volumes help to conserve expensive reagent or rare proteins/enzymes.
- Perimeter wells prevent evaporation from wells around the plate edge giving a more uniform data sets.
- Mechanical stability, with a hardness of 2.2GPa, to resist curvature or deformation caused by robotic handling.



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## SPECIFICATIONS

Description	384 round well low volume	384 square well with evaporation control perimeter wells	384 square well, without evaporation control wells
Assay well density	384 wells	384 wells	384 wells
Perimeter wells	84 wells	84 wells	N/A
Total wells	468 wells	468 wells	384 wells
Well shape	Round	Square	Square
Material	Cyclo-olefin polymer	Cyclo-olefin polymer	Cyclo-olefin polymer
Well side colour	Black, white or clear	Black, white or clear	Black, white or clear
Well bottom colour	Black, white or clear	Black, white or clear	Black, white or clear
Clear film thickness options, solid bottom thickness	100/200 micron film or 1000um solid bottom	100/200 micron film or 1000um solid bottom	100/200 micron film or 1000um solid bottom
Suitable for tissue culture	Yes	Yes	Yes
RF plasma and liquid surface treatments	Yes	Yes	Yes
Sterile	Available	Available	Available
Lid	Yes	Yes	Yes
Bar code label	1 bar code opposite A1	1 bar code opposite A1	1 bar code opposite A1
Microplate sealing	Yes	Yes	Yes
Dimensions (LxWxH)	127.75 x 85.50 x 10.40mm	127.75 x 85.50 x 14.53mm	127.75 x 85.50 x 14.53mm
Well spacing	4.50mm	4.50mm	4.50mm
ANSI-SBS 2004 standards	Meets 1,3,4	Meets 1,2,3,4	Meets 1,2,3,4
Well A1 column offset	12.12mm	12.12mm	12.12mm
Well A1 row offset	8.99mm	8.99mm	8.99mm
Well diameter at top/bottom	3.07mm/2.52mm	3.60mm/2.74mm	3.60mm/2.74mm
Well bottom style	Flat	Flat	Flat
Well depth	7.90mm	12.35mm	12.35mm
Microplate flatness	Within 100 microns	Within 100 microns	Within 100 microns
Well volume	48.94ul	126.39ul	126.39ul
Usable well volume	45.00ul	120.00ul	120.00ul
A1 corner evaporation control well position (column/row)	8.12mm x 4.99mm	8.12mm x 4.99mm	N/A
Evaporation control barrier usable well volume	25.00ul	60.00ul	N/A

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## SPECIFICATIONS

Description	1536 well straight sided	1536 well "flanged"	1536 LoBase	3456 well
Assay well density	1536 wells	1536 wells	1536 wells	3456 wells
Perimeter wells	164 wells	164 wells	N/A	244 wells
Total wells	1700 wells	1700 wells	1536 wells	3700 wells
Well shape	Round	Round	Square	Round
Material	Cyclo-olefin polymer	Cyclo-olefin polymer	Cyclo-olefin polymer	Cyclo-olefin polymer
Well side colour	Black, white or clear	Black, white or clear	Black, white or clear	Black, white or clear
Well bottom colour	Black, white or clear	Black, white or clear	Black, white or clear	Black, white or clear
Clear film thickness options, solid bottom thickness	100 micron film or 1000ul solid bottom	100 micron film or 1000ul solid bottom	100/200 micron film	100 micron film or 1000um solid bottom
Suitable for tissue culture	Yes	Yes	Yes	Yes
RF plasma and liquid surface treatments	Yes	Yes	Yes	Yes
Sterile	Available	Available	Available	Available
Lid	Yes	Yes	Yes	Yes
Bar code label	1 bar code opposite A1	1 bar code opposite A1	1 bar code opposite A1	1 bar code opposite A1
Microplate sealing	Yes	Yes	Yes	Yes
Dimensions (LxWxH)	127.75 x 85.50 x 8.50mm	127.75 x 85.50 x 8.50mm	127.75 x 85.50 x 8.00mm	127.75 x 85.50 x 8.50mm
Well spacing	2.25mm	2.25mm	2.25mm	1.5mm
ANSI-SBS 2004 standards	Meets 1,3,4	Meets 1,3,4	Meets 1,3,4	Meets 1,3,4
Well A1 column offset	11.00mm	11.00mm	11.00mm	10.675mm
Well A1 row offset	7.875mm	7.875mm	7.875mm	7.50mm
Well diameter at top/bottom	1.70mm/1.36mm	1.70mm/1.36mm	1.70mm/1.47mm	1.13mm/0.9mm
Well bottom style	Flat	Flat	Flat	Flat
Well depth	4.85mm	4.85mm	6.70mm	3.25mm
Microplate flatness	Within 250 microns	Within 250 microns	Within 150 microns	Within 250microns
Well volume	8.95ul	8.95ul	16.92ul	2.64ul
Usable well volume	8.75ul	8.75ul	15.00ul	2.40ul
A1 corner evaporation control well position (column/row)	8.75mm x 5.63mm	8.75mm x 5.63mm	N/A	9.175mm x 6.0mm
Evaporation control barrier usable well volume	5ul	5ul	N/A	1.5ul

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