N° 20

FORUM

TECHNICAL NOTES & APPLICATIONS FOR LABORATORY WORK

CONTENT

1536 WELL CYCLOOLEFIN MICROPLATE FOR COMPOUND STORAGE AND ACOUSTIC LIQUID HANDLING

1/ CYCLOOLEFIN MICROPLATES

Cycloolefin microplates have become increasingly popular in research and high-throughput screening due to their excellent optical, chemical, and physical properties. Cycloolefins feature low water absorption and low impurities. Their high transparency and exceptional chemical resistance to polar solvents, especially DMSO, the commonly used solvent in compound management, render cycloolefin microplates ideal for drug discovery.

Greiner Bio-One's 1536 well cycloolefin microplate with low dead volume follows the most relevant ANSI recommendations and features a smooth microplate top absent of alphanumeric coding to facilitate flush lid mounting and heat sealing. The wells are more tapered than in classic 1536 well microplates, reducing the dead volume in different liquid handling systems. The 1536 well microplate is suitable for acoustic liquid handling systems, pin tool liquid handling systems and optical density measurements in biochemical assays.

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2/ ACOUSTIC LIQUID HANDLING IN DRUG DISCOVERY

The quality of the chemical entities in a compound library and the size of a compound library are certainly key success factors in drug discovery. However, large compound libraries need clever compound management, high tech software and instrumentation in order to supply high quality active agents for the different screening units in a drug discovery team.

Active agents are commonly dissolved in 100 % DMSO for use in the screening process, and plastic disposable tips or metal pins are generally used for liquid transfer of DMSO solved compounds.

In recent years, acoustic-based liquid handling systems have become of interest, as they allow a direct transfer of picoliter range sample droplets of highly concentrated compounds from storage to assay microplates. The compounds are directly transferred from the compound storage microplate into the final assay plate without intermediate dilution steps, simply by acoustic energy transfer **(Fig. 1)**.

This assay ready plate concept **(Fig. 2)** enables direct preparation of assay plates and, for several screening groups, circumvents preliminary dilution steps to allow the centralisation of compound management.

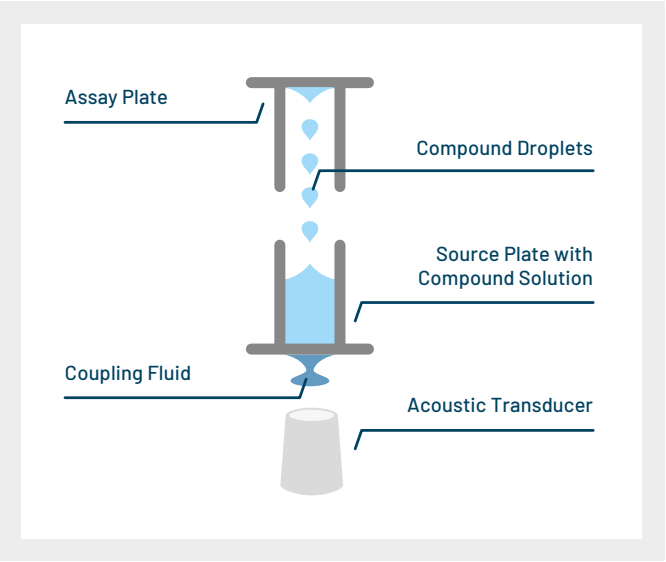


Figure 1: Acoustic droplet ejection (ADE) uses ultrasound to transfer low volumes of fluids without physical contact. Unlike other liquid handling approaches, this process does not require pipette tips or pin tools for the compound transfer.

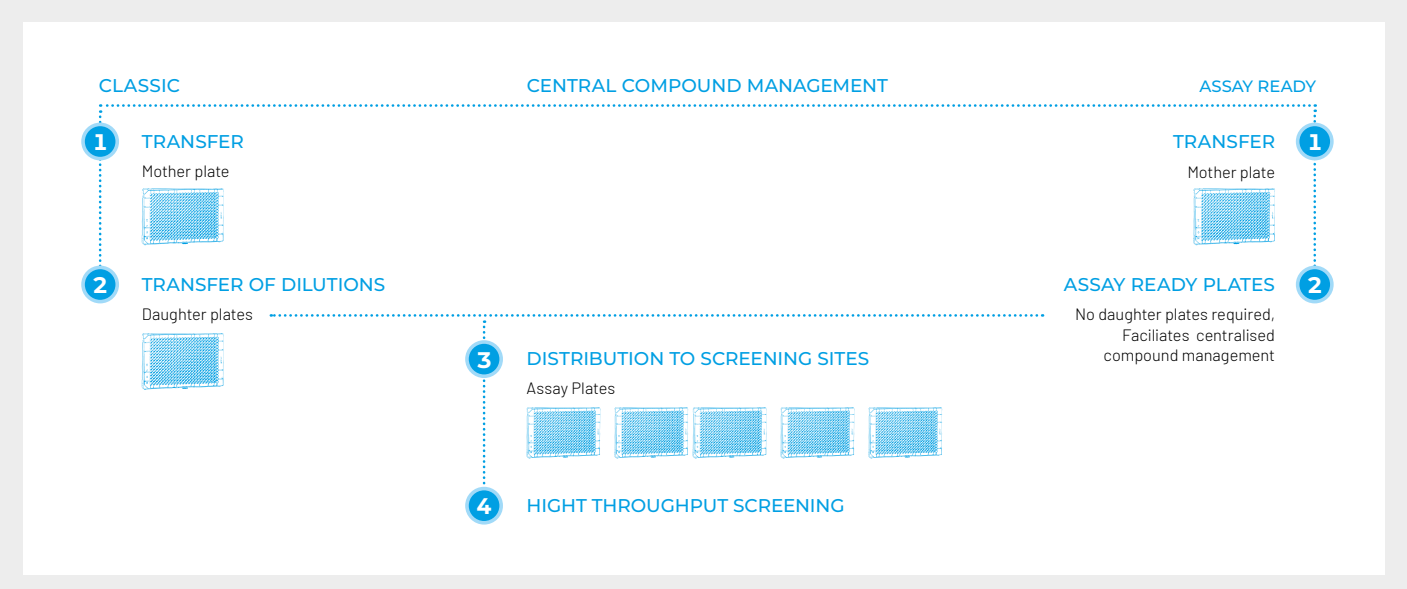


Figure 2: The assay ready plate concept
Diagram showing the assay ready plate compound management versus the classical compound management which is based on intermediate compound dilutions. The assay ready plate concept allows the centralisation of compound managements and circumvents dilution steps.

3/ FEATURES OF THE 1536 WELL COMPOUND STORAGE MICROPLATE FOR ACOUSTIC LIQUID HANDLING

The compound management microplate is manufactured of cycloolefin copolymer (COC) **(Fig. 3)** that demonstrates excellent acoustic liquid handling properties comparable to existing low dead volume cycloolefin compound storage microplates **(Fig. 4).**

Due to an exceptionally precise design and manufacture, the microplate is suitable for use with existing plate definition files of low dead volume source plates in existing acoustic liquid handling systems.

The generic design of the microplate fulfills major ANSI requirements and can be used within most automated HTS systems without time-consuming or complicated adaptations **(Fig. 5)**.

The wells of the 1536 well storage and source plate are more tapered than those of classic 1536 well microplates, thereby reducing the dead volume in different liquid handling systems **(Fig. 5)**.

A 1536 well standard microplate height of 10.4 mm enables ease of handling within all existing automated systems without time-consuming optimisation.

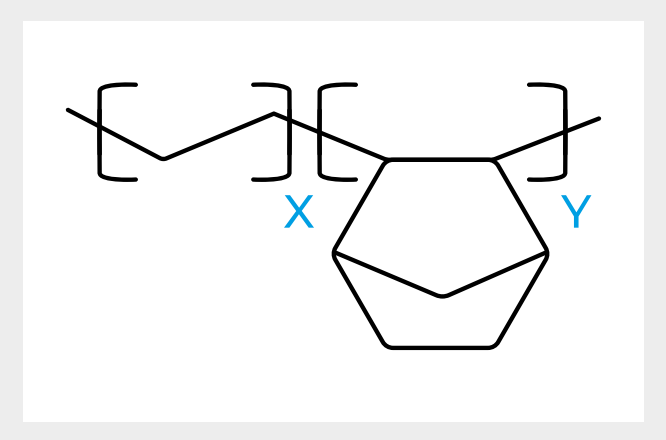


Figure 3: Cyclic olefin copolymers (COC) are produced by chain copolymerisation of cyclic monomers such as norbornene or tetracyclododecene with ethylene

The low dead volume 1536 well compound storage microplate for acoustic liquid handling features a smooth microplate top absent of alphanumeric coding to facilitate flush lid mounting and heat sealing.

Due to its generic design and material selection, existing settings for 1536 well cycloolefin copolymer microplates can be used for heat sealing.

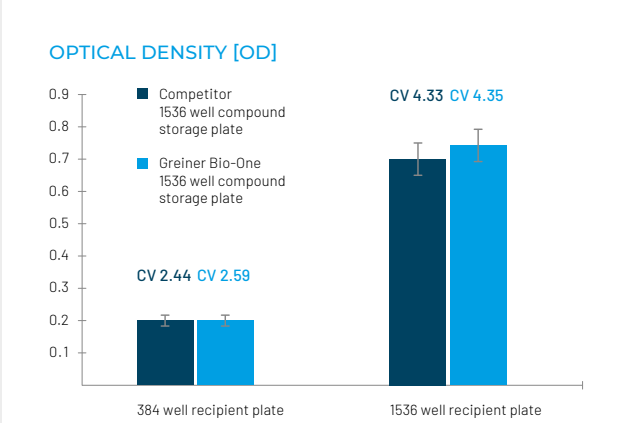
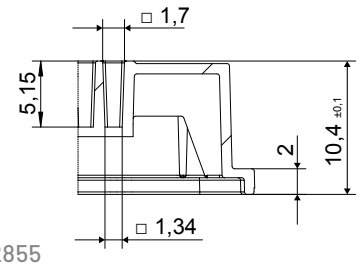
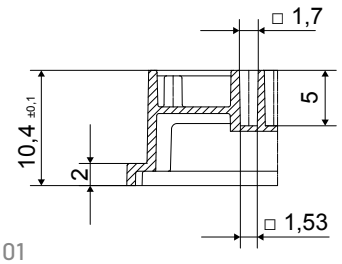


Figure 4: Acoustic liquid transfer from 1536 well COC compound storage microplates into 384 well and 1536 well assay plates.
Compound transfer was simulated by acoustic liquid transfer of a 50 mmol Tartrazin-DMSO solution. Two different 1536 well COC compound storage microplates were used for a transfer into a 384 well (20 nL Tartrazin-DMSO into 20 µl water) and 1536 well (2.5 nL Tartrazin-DMSO into 2.5 µl water) recipient microplate. Subsequently the optical density at 435 nm was measured and the homogeneity of the liquid transfer was evaluated by calculating the standard deviation and the coefficient of variation. A difference between the two 1536 well COC compound storage microplates was not observed. Measurements courtesy of Dr. Carsten Pieck / Merck Darmstadt / Germany



Item No. 782855



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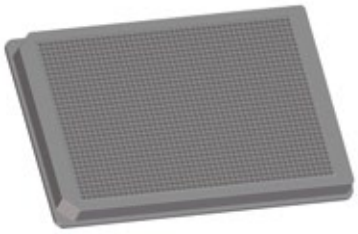

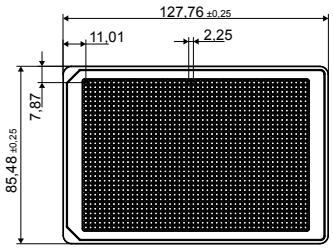

	Item No. 782855	Item No. 782101
Well depth	5.15 mm	5 mm
Well diameter top	1.7 mm	1.7 mm
Well diameter bottom	1.34 mm	1.53 mm
Microplate height	10.4 mm	10.4 mm
Length	127.76 mm	127.76 mm
Width	85.48 mm	85.48 mm
A1 position	7.87 / 11.01 mm	7.87 / 11.01 mm
Well to well	2.25 mm	2.25 mm

Figure 5: **Well design of the 1536 well COC storage plate**
compared to the well design of a standard polystyrene microplate (Item No. 782101).The more tapered well geometry of the low dead volume 1536 well storage microplate (Item No. 782855) reduces dead volume in different liquid handling systems.

4/ ORDERING INFORMATION

1536 Well Microplate for Compound Storage

Well profile: F-bottom, Bottom: solid, Lid: no

Item No.	Well format	Raw material	Product colour	Plate geometry	Working volume (well)	Qty. inner / outer
782855	1536	cycloolefin	○ clear	HiBase	1 µl - 10 µl	15 / 60

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