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### 1. UV-Star® microplates with UV-transparent bottom

Applications:

- reading of DNA and total protein at 260 nm or 280 nm

Advantages:

- extended optical UV-window
- low background
- superior overall performance

### 2. µClear® microplates high clarity film as bottom, optimized black and white pigmented resins

Applications:

- Luminescence
- Fluorescence
- Cell monitoring
- Transmission
- Imaging

Advantages:

- low background
- low crosstalk
- low autofluorescence

## 96, 384 and 1536 Well Microplates: Optical and Physical Properties of µClear® and UV-Star®

The microplate format was commercially introduced in the mid 1960's as a handy and miniature replacement of high volume test tubes. At that time, no one expected that this plate would serve as a reliable format in screening applications. Based on the well-established 96 well microplate, a new era of high-throughput screening for miniaturized assays started in 1994/95 with the launch of 384 well microplates.

The 384 well microplate quadruples the well density with a well to well spacing of 4.5 mm and a total volume slightly more than 120 µL. The design of the microplate complies with the 96 well footprint and the SBS-recommendations.

The on-going demand to further reduce cost per assay and limitations in the availability of reagents and test material turned the direction to even higher density microplates. To utilize space most efficiently, we focused on a high density microplate with 1536 wells, another 4-fold increase over the 384 well microplate. The center of a group of sixteen wells is unchanged at 9.0 mm and a well to well pitch of 2.25 mm.

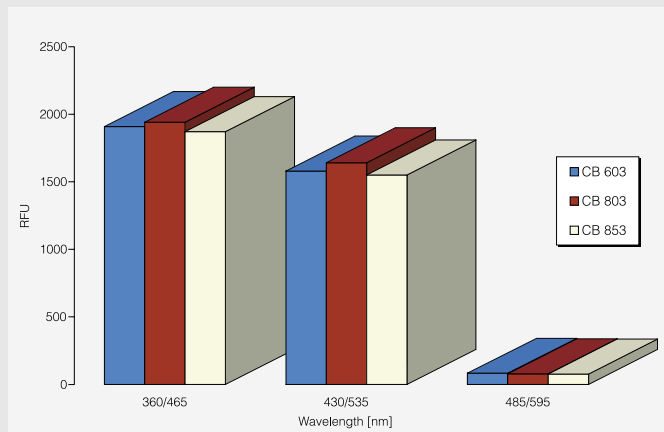
The introduction of this high density microplate fulfills the requirements in fully automated systems formats for High-Throughput Screening (HTS). Initially mostly solid white opaque and black pigmented microplates were requested. With the move from isotopic to non-isotopic assays (fluorescence, luminescence and colorimetric) and new applications in all culture there has been a demand for clear bottom microplates as well.

Conventionally, clear bottom microplates have been manufactured by either 2-component injection molding or the assembling of two individual parts by ultrasonic welding or glue. The development of a completely new molding and process technology enabled the manufacture of unique clear bottom microplates with ultra-thin films (50 – 500 µm). The process in use is absolutely free of any kind of solvents and avoids leakage from the wells. Additionally, a new proprietary resin and modifications on the process technology expanded the optical window in the UV-range down to 200 nm. The new UV-Star® microplates are advantageous when DNA- and protein samples are investigated at 260 nm or 280 nm.

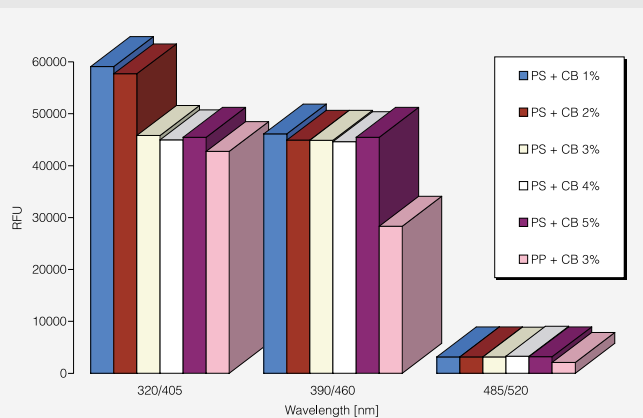
### Black and white opaque microplates

White opaque microplates are commonly used in luminescence applications (e.g. *luciferase reporter assay*) while black pigmented plates are preferred in fluorescence assays (e.g. *Green Fluorescence protein*).

485/520 nm (Fig. 1 and 2). A similar effect has been observed in white opaque microplates when examining phosphorescence in different sets of pigmented resins.



**Figure 2:** Impact of various carbon black pigments on autofluorescence in 96 well microplates



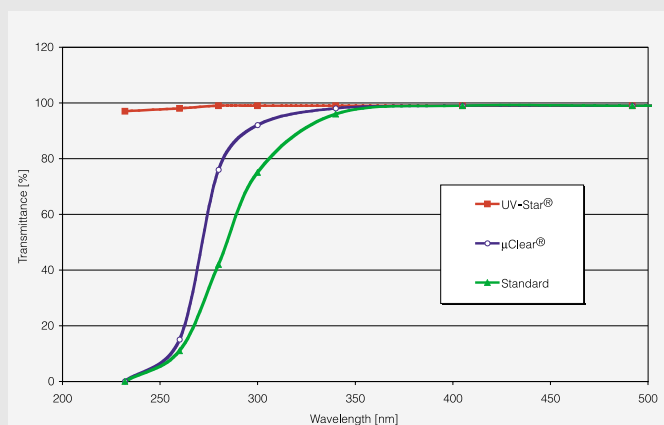
**Figure 1:** Impact of carbon black and wavelength on autofluorescence in 96 well microplates

The optical and physical properties of UV-Star® and µClear® microplates have been investigated in our labs on a BMG Fluostar or TECAN SpectraFluor Plus, respectively. It was clearly demonstrated that the amount of pigment in the parent resin has a major impact on the performance of the microplates. This effect was seen more clearly at lower excitation and emission wavelengths and resulted in a tremendous increase of autofluorescence compared to the fluorescein wavelengths

### µClear® and UV-Star® microplates

In the near and far UV-range transmission of µClear® and UV-Star® microplates have advantages versus conventional microplates (Figure 3).

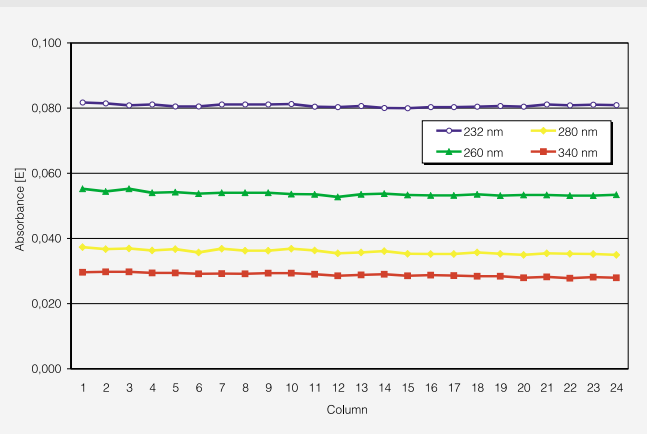
µClear® plates have an extended wavelength range and



**Figure 3:** Light transmittance of UV-Star®, µClear® and Standard 96 well microplates

gain more sensitivity due to a reduced background.

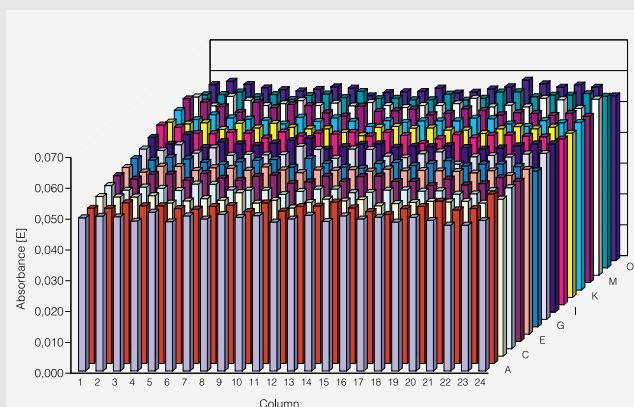
Measurements, e.g. *NADH* and *NADPH* at 340 nm become more critical as they are directed with a significant decrease in transmittance when read in conventional plates. The span from 400 to 600 nm and above is not effected in transmittance between a  $\mu$ Clear<sup>®</sup> and the new UV-Star<sup>®</sup> microplate (Figure 3).



**Figure 4:** Performance of background of a 384 well UV-Star<sup>®</sup> microplate at different wavelengths

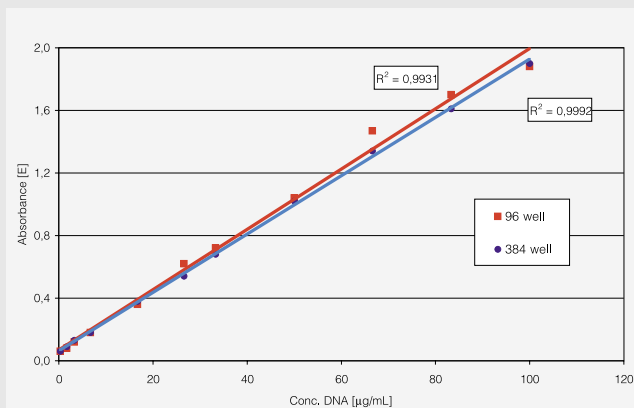
## UV-Star<sup>®</sup> microplates for DNA and Proteins

For measurements of protein and DNA concentrations (Figure 4 and Figure 6) at 260 nm and 280 nm respectively, the most advanced UV-Star<sup>®</sup> microplates are highly recommended. For applications in Genomics and HTS there was a strong demand for higher density plates, UV-Star<sup>®</sup> microplates with a 384 well format. The background is less than 0.060 E at 260 nm (Figure 4) with excellent homogeneity of the plate (Figure 5), similar to 96 well plates.



**Figure 5:** Homogeneity of background at 260 nm of 384 well UV-Star<sup>®</sup> microplate

To cross-reference 384 well and 96 well UV-Star<sup>®</sup> microplates in DNA-applications the linearity was evaluated at multiple concentrations at 260 nm (Figure 6). With the availability of disposable UV-transparent microplates there is no further need for expensive fragile quartz glass plates in routine laboratory work.



**Figure 6:** DNA-concentration in 96 and 384 well UV-Star<sup>®</sup> microplates

## Ordering Information

	Cat.-No.	Format	Description	Qty. per bag/case
	655 087	<b>96 well</b>	black, µClear®, PS, TC, sterile	10/40
	655 088		white, µClear®, PS, TC, sterile	10/40
	655 090		black, µClear®, PS, TC, lid, sterile	8/32
	655 098		white, µClear®, PS, TC, lid, sterile	8/32
	655 097		black, µClear®, PS, high binding, sterile	10/40
	655 094		white, µClear®, PS, high binding, sterile	10/40
	655 096		black, µClear®, PS, med. binding	10/40
	655 095		white, µClear®, PS, med. binding	10/40
	781 092	<b>384 well</b>	black, µClear®, PS, TC, sterile	10/40
	781 093		white, µClear®, PS, TC, sterile	10/40
	781 091		black, µClear®, PS, TC, lid sterile	8/32
	781 098		white, µClear®, PS, TC, lid sterile	8/32
	781 097		black, µClear®, PS, high binding, sterile	10/40
	781 094		white, µClear®, PS, high binding, sterile	10/40
	781 096		black, µClear®, PS, med. binding	10/40
	781 095		white, µClear®, PS, med. binding	10/40
	788 092	<b>384 well Small Volume™</b>	black, Small Volume™, LoBase, µClear®, PS, TC, sterile	10/80
	788 093		white, Small Volume™, LoBase, µClear®, PS, TC, sterile	10/80
	788 096		black, Small Volume™, LoBase, µClear®, PS, med. binding	10/80
	788 095		white, Small Volume™, LoBase, µClear®, PS, med. binding	10/80
	782 092	<b>1536 well</b>	black, HiBase, µClear®, PS, TC, sterile	15/60
	782 093		white, HiBase, µClear®, PS, TC, sterile	15/60
	782 096		black, HiBase, µClear®, PS, med. binding	15/60
	782 095		white, HiBase, µClear®, PS, med. binding	15/60
	782 097		black, HiBase, µClear®, PS, high binding, sterile	15/60
	782 094		white, HiBase, µClear®, PS, high binding, sterile	15/60
	783 092		black, LoBase, µClear®, PS, TC, sterile	15/60
	783 093		white, LoBase, µClear®, PS, TC, sterile	15/60
	783 096		black, LoBase, µClear®, PS, med. binding	15/60
	783 095		white, LoBase, µClear®, PS, med. binding	15/60
			783 886	<b>1536 well AURORA UHTSS® Nanowell®</b>
783 876		black, AURORA UHTSS® Nanowell®, µClear®, Polyolefin, lid, Barcode	8/32	
787 886		<b>3456 well AURORA UHTSS® Nanowell®</b>	black, AURORA UHTSS® Nanowell®, µClear®, Polyolefin, TC, lid, Barcode, sterile	8/32
787 876			black, AURORA UHTSS® Nanowell®, µClear®, Polyolefin, lid, Barcode	8/32
	655 801	<b>UV-Star®</b>	96 well, µClear®	10/40
	781 801		384 well, µClear®	10/40