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High Tech Solutions

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Microreaction Technology - Applications in

Biotechnology

mgt mikroglas technik AG develops and manufactures various components for applications in the field of biotechnology and medical technology.

Properties of Mikroglas Products Used In Biotechnological Applications

- optical transparency
- hardness
- chemical stability
- high electrical isolation
- retention of shape
- temperature resistance up to 400 °C
-

Mikroglas -Titerplates

Mikroglas-titerplates are made of glass or glass ceramics and have a lot of advantages compared to titerplates made of plastic due to the unique properties of glass.

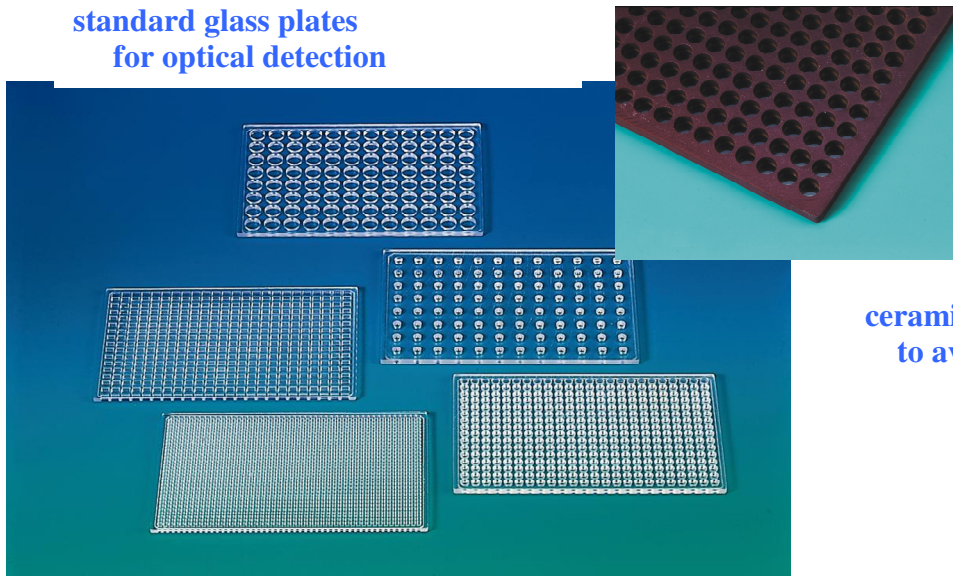
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**standard glass plates
for optical detection**



**ceramic plate
to avoid cross talk**

Figure 1: mikroglas-titerplates



material: FOTURAN

40 x 50 wells

diameter: 1,5 mm

depth: 1 mm

transparent

bottom plate: 160 μ m

special design for EVOTEC

Figure 2: Microtiterplate

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What are the features of standard mikroglas – titerplates?

- No. of wells: 96, 384 or 1536 wells
- plate size: 125 x 85 mm²
- tolerance: $\pm 0,1$ mm
- well volume: 30, 10 or 5 μ l

Which variations of mikroglas - titerplates are possible?

- well design: round or rectangular in various designs
- well volume: 0.1 nl - 100 μ l
- hole plate: opaque glass ceramics or transparent
- ground plate: quartz glass, FOTURAN®, microscope slides, B270, etc.
- plate thickness: 0.3 – 2.5 mm
- bottom thickness 150 μ m - 1 mm
- No. of wells: up to 500 wells per mm²

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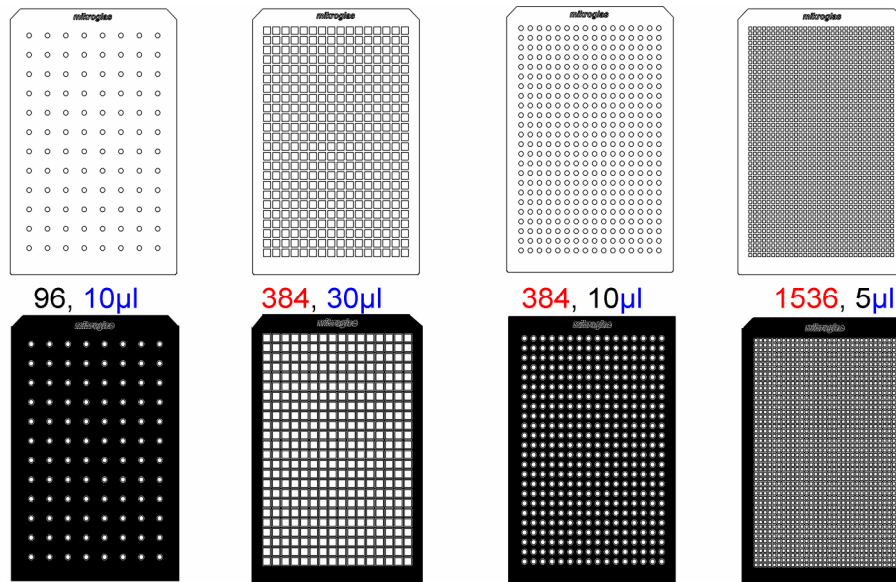


Figure 3: Mikroglas-Titerplate According to the SBS-standards

What are the advantages of mikroglas-titerplates?


- Usable in wide temperature range
high temperature stability
- Higher throughput
planar bottom plate; tight tolerances
- Usable for aggressive and hazardous chemicals
high chemical resistivity
- Excellent for analysis purposes
optically transparent; low self-fluorescence; no cross-talk
- Plates can be cleaned and sterilized
Plates are re-usable (up to 20 times)

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<p>mgt mikroglas technik AG Galileo-Galilei-Strasse 28 55129 Mainz Phone: +49-6131/55550 - 65 Fax: +49-6131/55550 - 62 E-Mail: d.vogel@mikroglas.com Internet: www.mikroglas.com</p>	<p>Cleaning Recommendations for mikroglas[®] Titerplates</p>	
<p><u>Cleaning Recommendations for mikroglas[®] Titerplates with bonded Bottom Plate</u></p>		
<p>Automatic washing machine:</p>	<p>G7783 MIELABOR laboratory automatic washing machine, produced by Miele.</p> <p>This is an appliance with a spraying pressure from a rotary pump delivering a Q-max of 400 litres / minute. Generally speaking, any automatic dish-washing machine can be used which works at this or any higher pressure.</p>	
<p>Dosing pump:</p>	<p>DOS C 60 module, for liquid cleaning agent</p>	
<p>Cleaning:</p>	<p>neodisher[®] FLA</p> <ul style="list-style-type: none">Highly alkaline cleaning agent for glass goods, manufactured by Chemische Fabrik Dr. Weigert GmbH & Co (UBA-No.: 0942 1301).	
<p>Neutraliser:</p>	<p>neodisher N</p> <ul style="list-style-type: none">Neutraliser and acid cleaner for use in specialised dish-washing machines, manufactured by Chemische Fabrik Dr. Weigert GmbH & Co (UBA-No.: 0942 1160).	
<p>Washing programm:</p>	<p>Special programme B</p> <ul style="list-style-type: none">cleaning and thermal disinfection at 93 °Cintermediate rinsing and neutralisationintermediate rinsingfinal rinsing at 70 °C with ADif necessary, drying <p>AD = <i>aqua destillata</i>; (ultra-)pure water as fully desalinated water (VE) H₂O pure, demineralised water, <i>aqua purificata</i>, or distilled water.</p>	
<p>Baskets:</p>	<p>Upper and lower baskets are designed and produced specifically for holding mikroglas[®] titerplates, but generally speaking other inserts and baskets can also be used if they ensure that the plates stand at an angle of about 30°.</p>	
<p>Covering nets:</p>	<p>A2 covering nets manufactured by Miele → sanitised metal frames covered with a plastic net.</p> <ul style="list-style-type: none">It is recommended to place these covering nets over the baskets in order to prevent the plates from moving and falling out.	

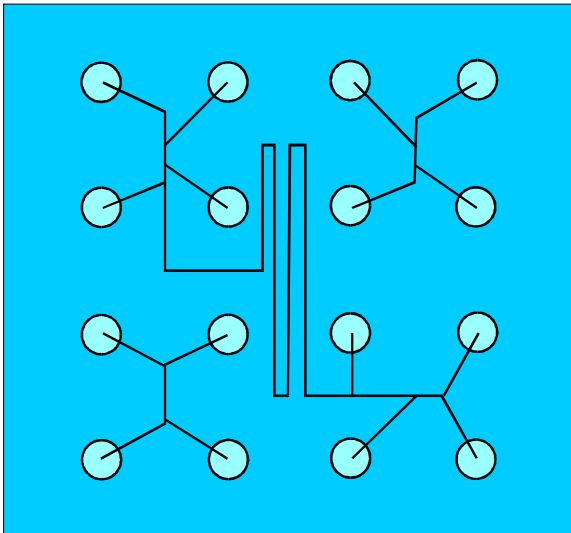
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Lab-on-a-chip



Electrophoresis chips

material: FOTURAN

Chip size : 25mm x 25mm

channel depth: 10 μm

channel width: 30 μm

(isotropic etching)

hole diameter: 1,5 mm

hole depth: 1,5 mm

(photo etching)

Figure 4 : Electrophoresis chip

Lab-on-chip systems

- can be used for capillary electrophoresis
- can be filled by dispensing systems
- optimal adjustment of the wells to the channels
- typical channel depth 10 μm
- individual system or process solutions
- glue-free connection
- temperature independence of its function
- suitable for applications in medical technology, genomics and proteomics

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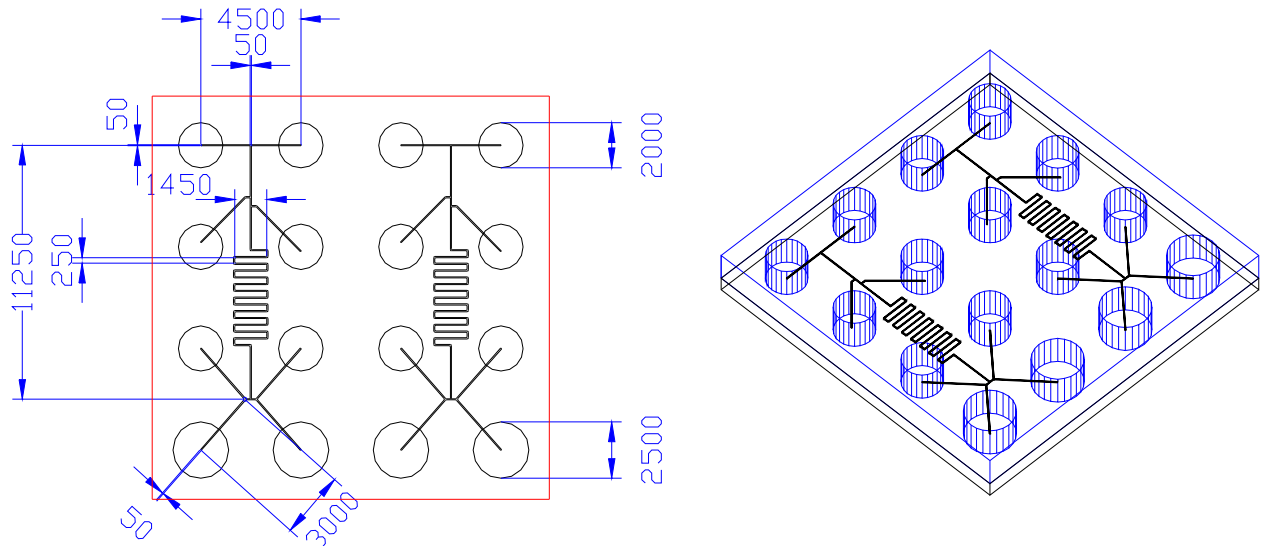


Figure 5: Sketch of Lap-On-a-Chip

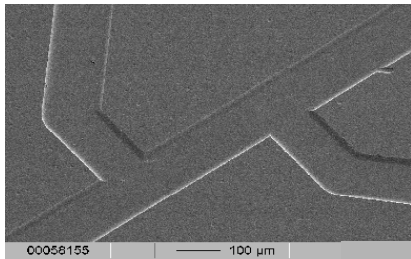
Channel depth: 10 - 20 μm
width: 30 - 40 μm
length: 30 mm

material:

hole plate: FOTURAN

bottom plate: microscope slides

SEM pictures of channels and holes



channel width: approx. 130 μm

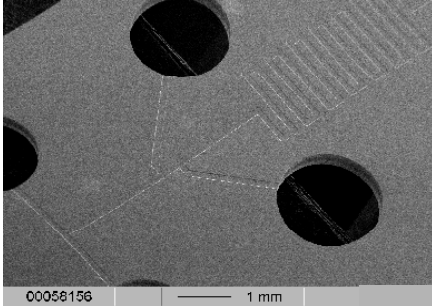
channel depth: approx. 15 μm

Figure 6 : Intersection of two channels, isotropically etched in FOTURAN®

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hole diameter: approx. 2.5 mm
channel width: approx. 130 μm
channel depth: approx. 15 μm

Figure 7 : FOTURAN® chip with anisotropically etched holes and isotropically etched channels

Advantages of glass chips

- thermal stability for reactions at higher temperatures
e.g. in PCR or chemical applications
- chemical resistivity no restriction when using different
chemicals
- mechanical stability small tolerances achievable
- optically transparency optical detection through bottom plate
- low self-fluorescence fluorescence detection
- low conductivity usable for electrophoresis
- surface treatment e.g. for integrated electrodes
e.g. for bio-coating

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Mikroglas Filter for Medical Application

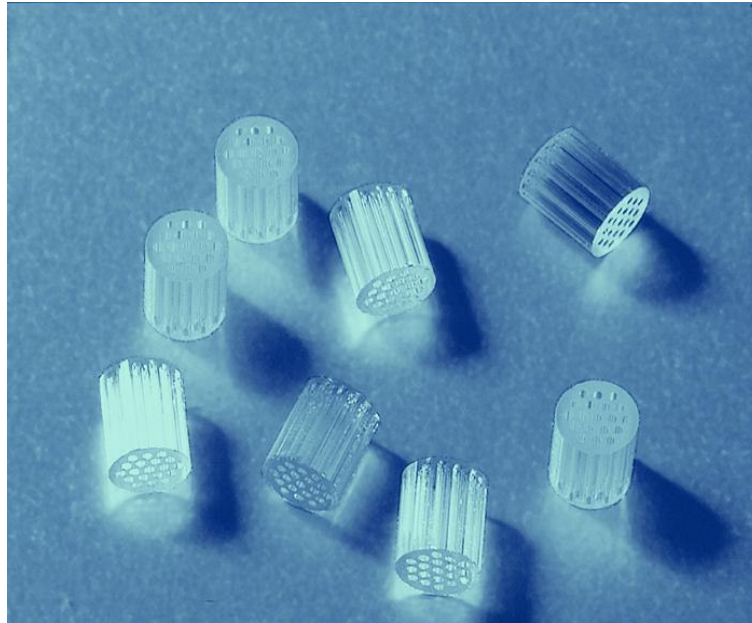


Figure 8 : Mikroglas – filter

Feature of filter:

diameter: 1.65 mm

length: 2.0 mm

number of channels: 19

diameter of channels: 0.20 mm