

Membrane Chips

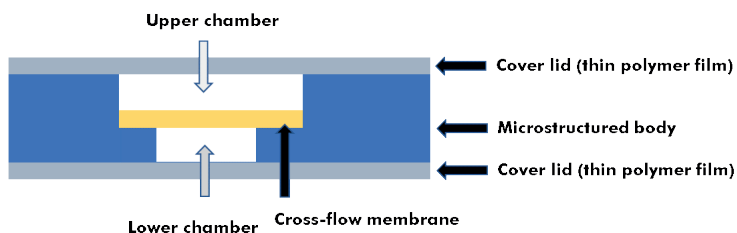
Solutions for Membrane Integration as Versatile Tool for Filtration, Sample Preparation or Organ-on-a-Chip Experiments

Membrane chips serve a variety of applications: from simple filtration tasks, plasma generation and dialysis to cell culture and organ-on-chip applications.

While the microfluidic chips themselves feature rather generic designs, the integration of our sophisticated membranes enables to achieve a wide range of different applications.

Membrane Chips - Design Approach

Two general design approaches from the microfluidic perspective are used to cope with the different applications, namely a membrane placed on a support structure for filtering or plasma generation tasks or cross-flow-membrane chips with a membrane as element that can be flooded with liquid from both sides.



Filtration or Plasma Generation

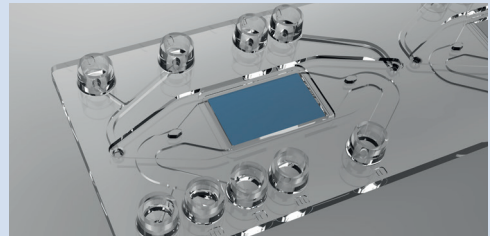
- Generation of plasma from whole blood
- Various filtration applications
- Different membranes with various pore sizes



Membrane chip with support structure e.g. for filtration application

Cross-Flow Membrane Chips

- Co-cultures of various cell types in separate culture compartments
- Chambers divided by a permeable membrane



Cross-flow membrane chip in which the membrane is embedded in the liquid flow from both sides

Off-The-Shelf Membrane Integration

- A range of different membranes is available
- Can be integrated on request

Membrane Integration and Membrane Choice

Membrane chips come in standard configuration, with membranes dedicated for specific applications. Nevertheless, they can be equipped with different membrane types, either from *microfluidic ChipShop's* range or supplied by the customer. This allows for rapid evaluation of new membranes and applications, whether for a stand-alone membrane chip or as part of a complete lab-on-a-chip system. Each chip can be ordered with an optional hydrophilization treatment to enhance cell attachment. Please note that all our integrated cell culture membranes are treated to promote cell adhesion, regardless of the chip surface treatment.

Membrane	Application	Material	Color	Pore size [μm]	Pore Orientation	Pore density [/cm ²]	Thickness [μm]
mcs-membrane 001	Size exclusion filtering, cell culture, cell recovery	PET, hydrophilic	translucent	0.4	-	1.5 x 10 ⁸	23
mcs-membrane 002	Size exclusion filtering, cell culture, cell recovery	PET, hydrophilic	translucent	0.8	-	4.0 x 10 ⁷	22
mcs-membrane 003	Size exclusion filtering, cell culture, cell recovery	PET, hydrophilic	translucent	1.0	-	2.5 x 10 ⁷	22
mcs-membrane 052	Plasma separation	Polysulfone	-	-	-	Asymmetric	330
mcs-membrane 058	Venting membrane	PTFE, hydrophobic	white	0.45	-	-	50
mcs-membrane 073	Size exclusion filtering, cell culture, cell recovery	PET, hydrophilic	translucent	3.0	multitangles*	3 x 10 ⁶	20
mcs-membrane 074	Size exclusion filtering, cell culture, cell recovery	PET, hydrophilic	-	5.0	-	4 x 10 ⁵	19
mcs-membrane 076	Cell culture	PET, hydrophilic	translucent	0.2	multitangles*	5 x 10 ⁸	23
mcs-membrane 115	Size exclusion filtering, cell culture, cell recovery	PET, hydrophilic	-	8.0	-	6 x 10 ⁴	16
mcs-membrane 120	Cell culture, Imaging	PET, hydrophilic	transparent	8.0	90° parallel	1 x 10 ⁶	11.5
mcs-membrane 132	Cell culture, Imaging	PET, hydrophilic	transparent	0.4	90° parallel	4 x 10 ⁶	12
mcs-membrane 155	Cell culture, Imaging	PET, hydrophilic	transparent	3.0	90° parallel	8 x 10 ⁵	12
mcs-membrane 156	Cell culture, Imaging	PET, hydrophilic	transparent	0.2	90° parallel	1 x 10 ⁷	12

Did you know?
Customized membrane

We offer integration trials of your customized membrane. Reach out to discuss your project!

*90° parallel pores come with a lower pore density and a higher light transmission rate

Plasma Generation Chips

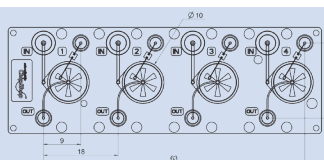
microfluidic ChipShop's plasma generation chip family was specifically developed to generate plasma from whole blood. While this application is rather prominent, these chips can be used for various other filtering applications by exchanging the membrane material and using various pore sizes.

Plasma Generation Chip - 10 mm Diameter Membrane

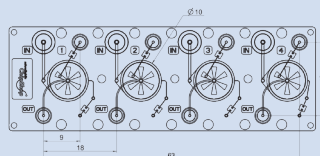
Each 10 mm diameter membrane can generate roughly 12 – 15 μl plasma out of 25 μl full blood. Each unit consists of a (Mini) Luer interface for blood loading, a support channel with a cross-section for blood transfer to the membrane, a plasma collection channel below the membrane and a ventilation channel, also below the membrane. The vacuum is applied via the collection channel and a second interface. A third interface helps to smoothly release the slight vacuum once the membrane pores are blocked by the solid components of the blood. The chips are offered without (Fluidic 168) and with an additional venting line (Fluidic 200) to facilitate filling of the membrane chamber itself.



Plasma generation chip Fluidic 168



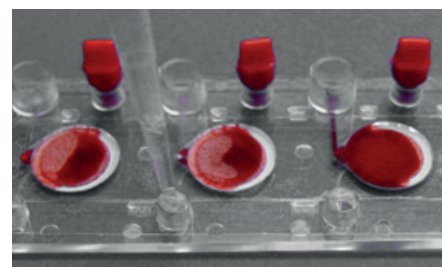
Schematic drawing of Fluidic 168 (top) and Fluidic 200 (below)



Plasma generation chip Fluidic 200

Product Code	Capacity Full Blood [μl]	Generated Plasma Volume [μm]	Surface Treatment	Material	Price [€/chip]		
					1+	10+	100+
10000242	25	12 - 15	-	Topas	79.50	63.50	42.50
10000789	25	12 - 15	Hydrophilized	Topas	89.50	69.40	47.10

Product Code	Capacity Full Blood [μl]	Generated Plasma Volume [μm]	Surface Treatment	Material	Price [€/chip]		
					1+	10+	100+
10000021	25	12 - 15	-	Topas	79.50	63.50	42.50
10000757	25	12 - 15	-	PS	79.50	63.50	42.50
10000756	25	12 - 15	Hydrophilized	Topas	89.50	69.40	47.10
10000758	25	12 - 15	Hydrophilized	PS	89.50	69.40	47.10



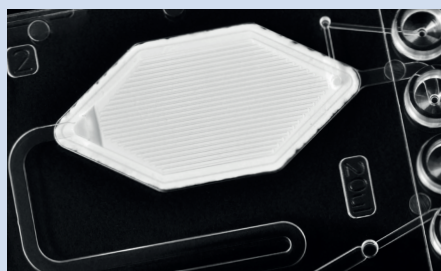
Blood loading of the plasma generation chip

Plasma Generation Chip - High Capacity Membrane

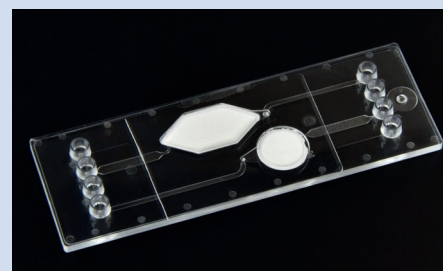
Due to a massively enlarged footprint in the high capacity membrane chips (Fluidic 783 and Fluidic 1113), these chips enable the generation of larger amounts of plasma. Depending on the sample, achievable volumes range from 20 – 35 μ l.



Membrane chip Fluidic 1113 equipped with plasma generation membranes



Close up of membrane integrated in Fluidic 1113



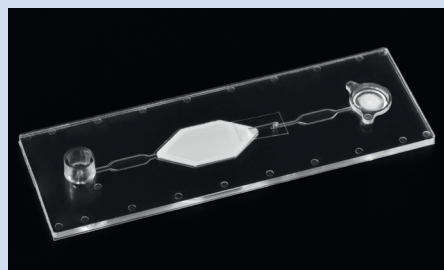
Membrane chip Fluidic 783 equipped with plasma generation membranes

Product Code Fluidic 1113	Capacity Full Blood [μ l]	Surface Treatment	Material	Price [€/chip]		
				1+	10+	100+
10001525	20 - 35	-	Topas	79.50	63.50	42.50
10001527	20 - 35	-	PS	79.50	63.50	42.50
10001583	20 - 35	Hydrophilized	Topas	89.50	69.40	47.10
10001693	20 - 35	Hydrophilized	PS	89.50	69.40	47.10

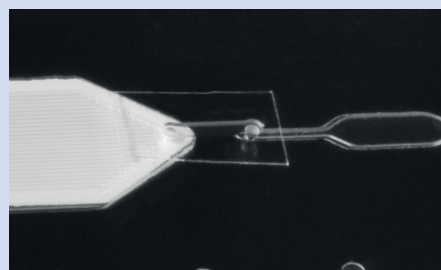
Product Code Fluidic 783	Capacity Full Blood [μ l]	Surface Treatment	Material	Price [€/chip]		
				1+	10+	100+
10000981	20 - 35	-	Topas	79.50	63.50	42.50
10000982	20 - 35	-	PS	79.50	63.50	42.50
10000983	20 - 35	Hydrophilized	Topas	89.50	69.40	47.10
10000984	20 - 35	Hydrophilized	PS	89.50	69.40	47.10

Plasma Generation Chip - On-Chip Analysis

This chip has been tailored for on-chip analysis with a pre- and post-membrane chamber enabling i.e. optical readouts. The chip is filled via its Luer interface, while a venting membrane prevents generated plasma from exiting the chip. Please note that generated plasma is retained in this chip, hence it is not suitable for off-chip downstream experiments.



Plasma generation chip Fluidic 973 equipped with plasma generation membrane



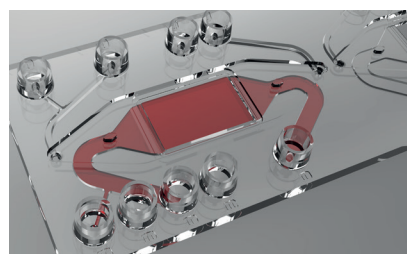
Close up of membranes integrated in Fluidic 973

Product Code Fluidic 973	Material	Price [€/chip]		
		1+	10+	100+
10001338	Topas	69.20	44.40	39.80

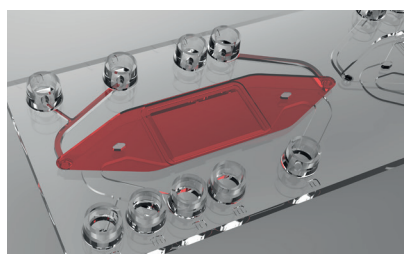
Cross Flow Membrane Chips

The cross-flow membrane chips have two in- and outlet ports above and below the membrane. Cell culture is just one potential application area of those versatile chips. The design also allows experiments such as small molecule transfer measurements, on-chip dialysis and many more.

The cross-flow membrane chip represents a microfluidic chip system for adherent cell culture and thus the generation of diverse cellular tissues or organ cultures. The cell cultivation is conducted in two units per chip, each representing a membrane-divided two-chamber system itself. Cell cultivation takes place on the integrated membrane. Cavities are connectable via the ports and allow chamber comprehensive applications and examinations.



Bottom chamber of cross-flow membrane chip Fluidic 480



Upper chamber of cross-flow membrane chip Fluidic 480

Expert tip



All chips are manufactured in a clean-room environment and, therefore, have a low germ count. If customers wish to sterilize their chips, we recommend using EtO (ethylene oxide) treatment.

Extended exposure to ethanol can impact chip quality and membrane integrity and is therefore not recommended with cross-flow membrane chips.

Sounds interesting? More designs available!

The cross-flow membrane chips are available in various designs and with different membranes, featuring distinct pore sizes. Reach out to inquiries@microfluidic-ChipShop.com for more information.

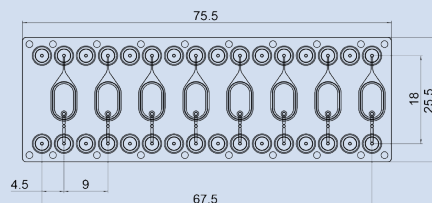
Membrane Chips

Filtration Chips

Complex samples, such as e.g. blood, often require purification steps prior to further analysis. In this regard, one prominent procedure is sample preparation with the help of membranes, which can facilitate purification and filtration.



Filtration chip Fluidic 398



Schematic drawing of Fluidic 1332



Filtration and separation chip Fluidic 1332

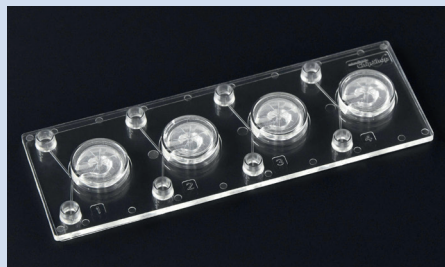
The filtration chip Fluidic 398 is based on the cross-flow membrane principle. The Fluidic 1332 enables filtration, capture and concentration of e.g. cell populations. A stream is lead through the membrane (8 μm pore size) and captures larger components on the bottom of the chip, while smaller cells can pass through the membrane. Captured fractions can be monitored from below.

Product Code	Description	Pore size	Material	Price [€/chip]		
				1+	10+	100+
1000022	Filtration chip	4 μm	Topas	79.50	63.50	42.50

Product Code	Surface Treatment	Pore size	Material	Price [€/chip]	
				1+	10+
10001837	-	8 μm	Topas	115.35	79.60
10001840	Hydrophilized	8 μm	Topas	118.35	82.10

Open Membrane Chip

The open membrane chip Fluidic 219 allows direct access to membrane area and provides a permanent entry port for liquid supply, storage and exchange. It features 4 independent units per chip. In combination with *microfluidic ChipShop's* matching tanks, like Fluidic 234 and 235 for liquid supply and storage, this chip enables a wide variety of filtration and assay tasks.



Open membrane chip Fluidic 219 with 8 μm pore size membrane



Open membrane chip Fluidic 219 with tank Fluidic 235 as reservoir

Product Code	Material	Surface Treatment	Price [€/chip]		
			1+	10+	100+
1001069	Topas	-	79.50	63.50	42.50
1001070	PS	-	79.50	63.50	42.50
1001071	Topas	Hydrophilized	89.50	69.50	47.50
1001072	PS	Hydrophilized	89.50	69.50	47.50

Tailored Membrane Solutions

microfluidic ChipShop is also your specialized partner when it comes to the development of membrane-containing microfluidic cartridges - from relatively simple customer-specific membrane chips to sophisticated, fully integrated lab-on-a-chip platforms.

No matter how basic or complex your microfluidic assay requirements are, please contact us with your idea at inquiries@microfluidic-ChipShop.com!



Sophisticated lab-on-a-chip devices with integrated membranes.



FILF1MEV3.1

