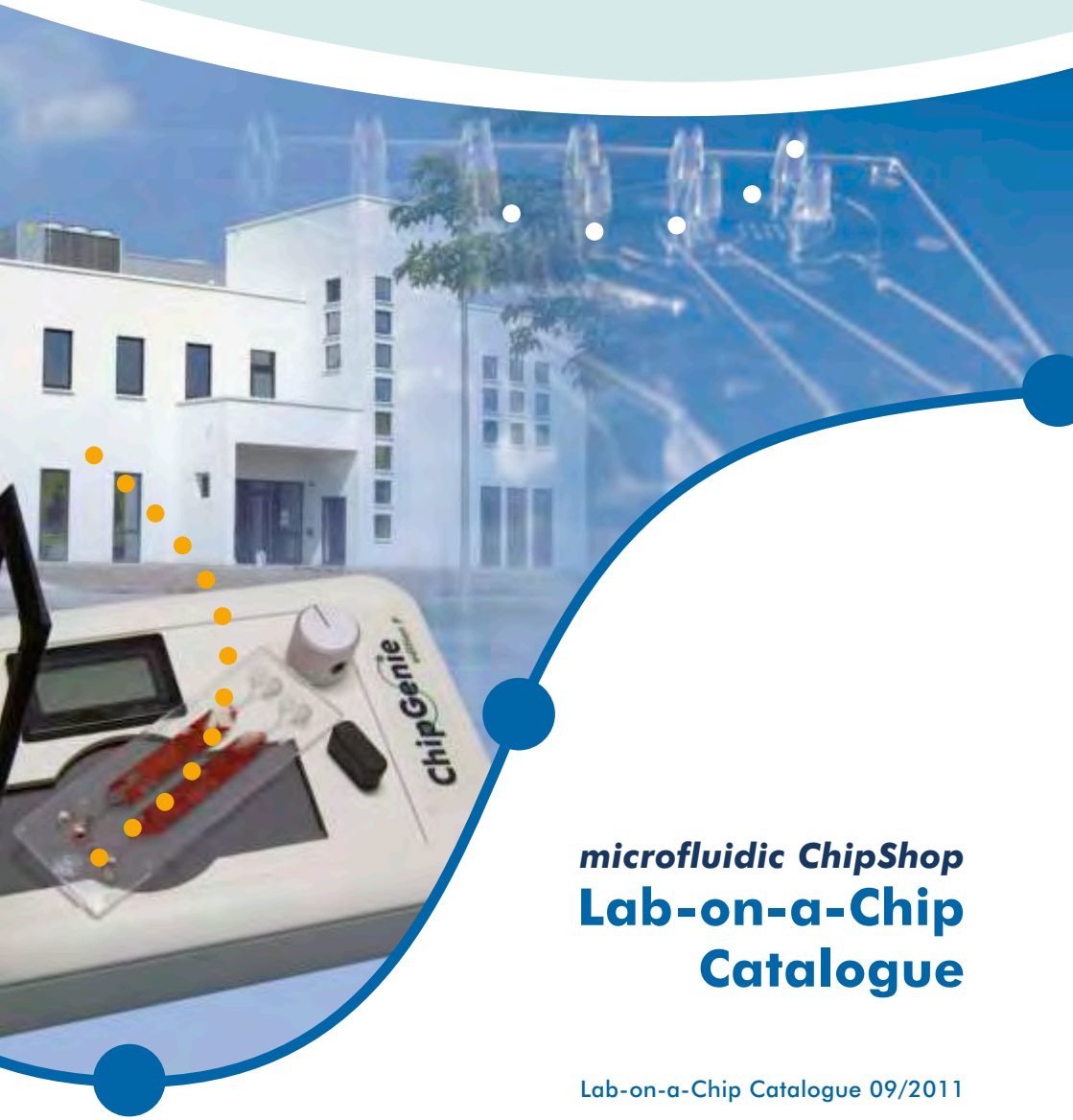
microfluidic ChipShop



microfluidic ChipShop
Lab-on-a-Chip Catalogue

Lab-on-a-Chip Catalogue 09/2011

microfluidic ChipShop – The company

The lab on the chip – miniaturized solutions as easier and faster analytical tools for the life sciences, diagnostics, analytical sciences, and chemistry are at the heart of *microfluidic ChipShop*'s business.

The company, started in 2002 as a spin-off from the Fraunhofer Institute for Applied Optics and Precision Engineering and the Application Center for Microtechnology Jena, has become a world leader in this rapidly growing technology field. Specialists from microfluidics, precision engineering, polymer microtechnology, medical technology, chemistry, biology, and diagnostics form a multi-disciplinary team to develop and manufacture "lab-on-a-chip" systems mainly in polymers. Using industrial manufacturing techniques allows a seamless transition from development stage through small batch production to mass fabrication, an important role in comprehensive support for our customers.

Precision manufacturing on the micrometer scale

A unique feature in *microfluidic ChipShop*'s services is to offer miniaturized components and systems both as self-developed standard products as well as customized solutions from prototype to volume production. *microfluidic ChipShop* covers the entire value and technology chain, starting from the design of the microstructures, followed by mold-insert fabrication, polymer replication using precision injection molding, hot embossing, or casting, mechanical processing steps up to the biochemical functionalization of surfaces and reagent storage on the chip, and finally, industrial quality control. In addition, *microfluidic ChipShop* supports customers in the miniaturization of their biological and diagnostic tasks, e.g. in the transfer of biological assays on the chip, the development of PCR protocols for chip-based applications, or the selection of suitable materials for the immobilization of biomolecules. For these means, the company has its own application department.

Furthermore, the development of complete systems including instrument, chip, and associated application protocols is carried out by *microfluidic ChipShop*; examples include systems for the polymerase chain reaction in a continuous flow or chip-based capillary electrophoresis. To implement these highly complex projects, *microfluidic ChipShop* maintains a worldwide network of research and development collaborations.

In order to fulfill our customers' needs and to deal with all regulatory issues associated with the development and fabrication of diagnostic and medical devices, *microfluidic ChipShop* has been certified according to DIN EN ISO 9001 and DIN ISO 13485 since 2003.

Miniaturized solutions for diagnostics, analytical sciences, and life sciences

Miniaturization has already transformed the world of electronics and became a driver for many markets. Now it's a driving force for an innovation in the life sciences, diagnostics, analytical sciences, and chemistry, which is labeled "lab-on-a-chip." The use of micro- and nano-technologies allows the development of fast, portable, and easy-to-use systems with a high level of functional integration for applications such as point-of-care diagnostics, forensics, the analysis of biomolecules, environmental or food analysis, and drug development. The core of such "lab-on-a-chip" systems are polymer substrates in standard laboratory formats such as microscopy slides or microtiter plates, equipped with tiny structures for the transport and handling of samples. All the functionalities of a chemical or biochemical laboratory, such as the mixing of liquids, aliquoting, the amplification of biomolecules, the synthesis of novel materials, the hybridization of DNA molecules, or the detection of specific substances by optical or electrochemical methods, can be integrated on a single chip. Furthermore, components such as filtration or separation membranes, valves, biochemical sensors, electrodes, and magnetic beads can be integrated into a microstructured polymer substrate.

The integration of biochemical functions on a single chip makes numerous time-consuming and potentially error-prone individual steps redundant, such as multiple pipetting or sample transfer from one device to another.

Standardization: Established formats – Innovation in the core

Lab-on-a-chip technology as a novel technology offers a wide range of advantages for the different applications but also throws up some challenges. On the one hand, restrictions on using novel tools need to be overcome, while on the other hand the introduction of new technologies needs to be affordable. To meet these challenges, *microfluidic ChipShop* drives standardization efforts forcefully: As chip formats, *microfluidic ChipShop* makes use of existing laboratory standards like the microscopy slide or the microtiter plate, allowing the use of standard laboratory equipment like microscopes, pipettes, or laboratory automation. Directly integrated fluidic interfaces enable an easy chip-to-world coupling and a seamless transfer of liquids from the standard lab to the microworld.

The second major advantage of the strict implementation of the standardization concept is cost. During the development process, an investment in an injection-molding tool is a significant hurdle, especially for small- and medium-scale production. To overcome this obstacle, *microfluidic ChipShop* has various injection-molding tools that can be used on existing platforms – ranging from microscopy slides, microtiter plates, to the CD format – for the integration of custom-specific designs. This approach not only reduces costs, but it also speeds up the development process, since the time from design release to the first chips in our customers' hands can be reduced significantly.

microfluidic ChipShop – Our infrastructure

In May 2011, *microfluidic ChipShop* moved into its new corporate headquarters. The purpose-built facility, located in one of Jena's new industry parks conveniently located close to the autobahn, contains on a space of approx. 2.500 sqm (approx. 27.000 sqft) all the required infrastructure for your one-stop-shopping in microfluidics development and production. The building is organized in three main production areas: The first wing contains the precision mechanic workshops. In this area, the design and generation of molding tools, mold inserts and precision machined polymer or metal components takes place. Design data generated by our CAD/CAM team is transformed into parts and tools by our precision and ultraprecision milling and turning machines. These machines as well as equipment for electro-discharge machining (EDM) are placed in a climate-controlled environment with a temperature control of ±0.5 °C, partly with especially vibration-isolated foundations.

For the manufacturing of polymer parts using injection molding and hot embossing, a temperature controlled clean space of approx. 400 sqm (4.300 sqft) is provided. The injection molding machines are housed in clean-room hoods in order to reduce the particle load. From this area, the parts are transported into a class 7 cleanroom area of 500 sqm (5.400 sqft) for back-end processing. In this area, processes like surface functionalization, integration of wet and dry reagents, spotting, assembly and packaging takes place. For special purposes the company has in addition a class 6 cleanroom (room in room concept). Optical measurement stations including a confocal white-light interferometer and high-precision stereo microscopes are complemented by functional fluidics testing stations for an industrial quality control of our manufactured goods.

The third division contains our biological and biochemical laboratories. In these labs, our team of biologists and chemists develops protocols for on-chip assays, reagent storage solutions or surface modifications for our customers. For this purpose, equipment like spotting tools, PCR machines, lyophilizers or electrophoresis stations is available. These labs also house our microfluidics instrumentation labs, where not only our own instruments, the ChipGenie series, are developed, but also validation experiments for the microfluidic characterization of components and systems are carried out.

Training facilities and office space for guest scientists and development partners complement our infrastructure offerings.

The *Lab-on-a-Chip Catalogue* – Shortcut to the world of microfluidics

Offering catalogue devices and development platforms, fulfilling common laboratory standards in their dimensions and interfaces, *microfluidic ChipShop* allows users a quick, low-cost, and low-risk entry into the innovative field of microfluidics. The chips offered within *microfluidic ChipShop's Lab-on-a-Chip Catalogue* cover a range of applications from simple liquid handling, electrophoresis, extraction, or mixing up to sample preparation and complete analytical tasks.

Please enjoy our *Lab-on-a-Chip Catalogue* as your roadmap to microfluidics. We will be more than happy to assist you with our design and fabrication services as well as to discuss your special needs in the microfluidic world.

Yours,

Dr. Claudia Gärtner
CEO

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microfluidic ChipShop's Lab-on-a-Chip Catalogue

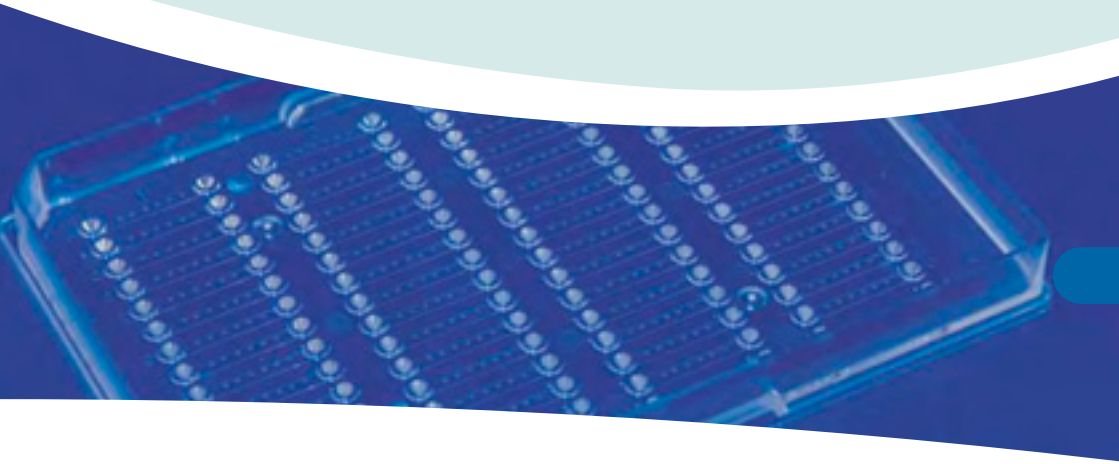
Our mission at *microfluidic ChipShop* is to shrink the biological and chemical laboratory and to bring lab-on-a-chip systems into daily laboratory life.

This catalogue is part of our service to make our mission happen: From off-the-shelf microfluidic chips to complete lab-on-a-chip systems, our products serve a wide range of customer needs.

Whether you need a single chip or thousands, in the following pages you will find the essential components for an easy route into the world of microfluidic handling and manipulation. Be it for the first steps with lab-on-a-chip systems or the evaluation of new designs and functions: you do not need to make up your own design, you avoid tooling costs, and we ensure fast delivery to your doorstep.

Of course, our expertise at *microfluidic ChipShop* extends well beyond the products listed in this catalogue: Whether you seek a competent microfluidic-chip manufacturer, whether you want to translate specific functions into microfluidic designs, or whether you want to develop entire lab-on-a-chip systems, we are here to help you with our full range of production and development services.

1. Off-the-shelf microfluidic chips



Off-the-shelf microfluidic chips

Ready-to-go microfluidic chips – this chapter summarizes various kinds of standard chips such as simple straight channels, cross-shaped channel chips for electrophoresis, extractors, micro-mixers, droplet generators, and nanotiter plates. All chips are easy to use with a pipette or the fluidic interfaces and support kits offered in our accessories in Chapter 3.

Taking our standardization principles into account, all these chips have the format of a microscopy slide or a microtiter plate. The spacing between the fluidic interfaces either corresponds with the spacing of a 96 or 384 well plate, namely 4.5 mm or 9 mm respective distance from center to center of the wells.

1.1 Straight channel chips – Microscopy slide format

On the format of a microscopy slide (75.5 mm x 25.5 mm x 1.5 mm), microfluidic channels in various widths and depths are available. The channel distance from center to center is 4.5 mm according to the spacing of a 384 microtiter plate. The fluidic chips are available with simple through-holes fitting to normal pipette tips, and Mini Luer interfaces that can be used with the respective counterpart (see Chapter 5, fluidic interfaces). Alternatively, standard Luer interfaces are convenient, as are olives integrated on the chip to be directly connected with silicone tubings, for example.

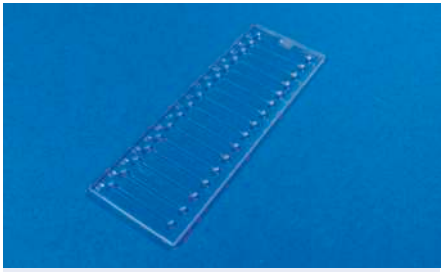


Fig. 1: Microfluidic chip – 16-channel through-hole chip family

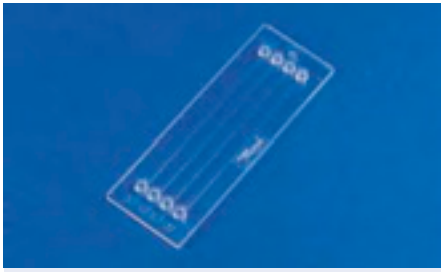


Fig. 2: Microfluidic chip – four-channel Mini Luer chip family

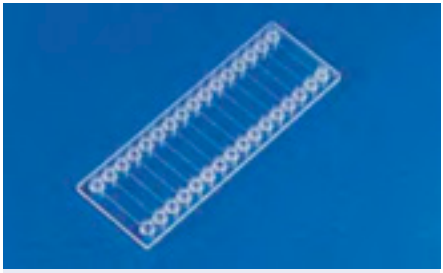


Fig. 3: Microfluidic chip – 16-channel Mini Luer chip family

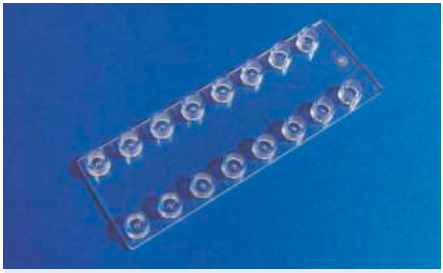


Fig. 4: Microfluidic chip – 8-channel Luer chip family

1.1.1 Straight channel chips – Fluidic interface: Through-holes

1.1.1.1 Straight channel chips – Fluidic interface: Through-holes – Four parallel channels

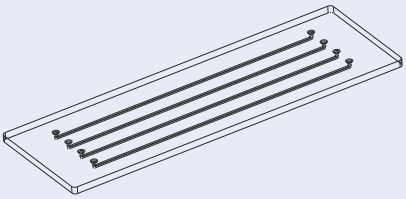


Fig. 5: Schematic drawing of the four-channel through-hole chip family

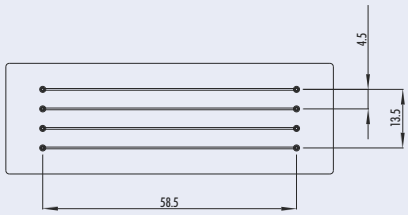


Fig. 6: Details of the four-channel through-hole chip family

Product Code	Channel			Cover Lid Thickness	Material	Price [€/chip]		
	Width [µm]	Depth [µm]	Length [mm]	[µm]		1+	10+	30+
01-0152-0143-01	20	20	58.5	250	PMMA	42.50	31.20	23.50
01-0153-0143-02	20	20	58.5	140	Topas	42.50	31.20	23.50
01-0154-0145-01	50	50	58.5	250	PMMA	42.50	31.20	23.50
01-0155-0145-02	50	50	58.5	140	Topas	42.50	31.20	23.50
01-0156-0144-01	100	100	58.5	250	PMMA	42.50	31.20	23.50
01-0157-0144-02	100	100	58.5	140	Topas	42.50	31.20	23.50
01-0158-0156-01	200	200	58.5	250	PMMA	36.20	24.30	18.10
01-0159-0156-02	200	200	58.5	140	Topas	36.20	24.30	18.10
01-0203-0180-01	800	20	58.5	250	PMMA	36.20	24.30	18.10
01-0204-0180-02	800	20	58.5	140	Topas	36.20	24.30	18.10
01-0160-0138-01	1,000	200	58.5	250	PMMA	36.20	24.30	18.10
01-0161-0138-02	1,000	200	58.5	140	Topas	36.20	24.30	18.10

1.1.1.2 Straight channel chips – Fluidic interface: Through-holes – 16 parallel channels

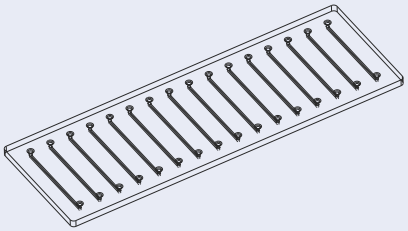


Fig. 7: Schematic drawing of the 16-channel through-hole chip family

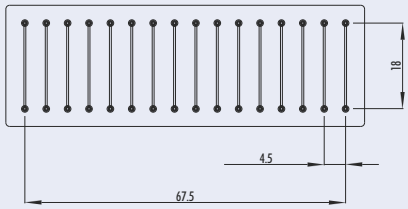


Fig. 8: Details of the 16-channel through-hole chip family

Product Code	Channel			Cover Lid Thickness	Material	Price [€/chip]		
	Width [µm]	Depth [µm]	Length [mm]	[µm]		1+	10+	30+
01-0162-0142-01	200	100	18.0	250	PMMA	36.20	24.30	18.10
01-0163-0142-02	200	100	18.0	140	Topas	36.20	24.30	18.10
01-0164-0152-01	1,000	200	18.0	250	PMMA	36.20	24.30	18.10
01-0165-0152-02	1,000	200	18.0	140	Topas	36.20	24.30	18.10

1.1.2 Straight channel chips – Fluidic interface: Olives
1.1.2.1 Straight channel chips – Fluidic interface: Olives – Four parallel channels

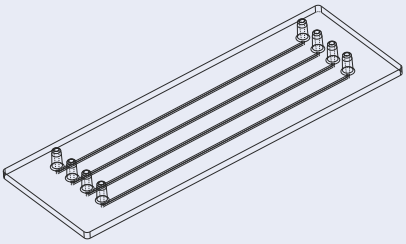


Fig. 9: Schematic drawing of the four-channel olive chip family

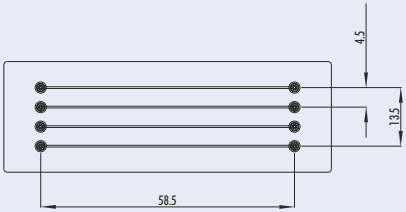


Fig. 10: Details of the four-channel olive chip family

Product Code	Channel			Cover Lid Thickness [µm]	Material	Price [€/chip]		
	Width [µm]	Depth [µm]	Length [mm]			1+	10+	30+
01-0182-0143-01	20	20	58.5	250	PMMA	42.50	31.20	23.50
01-0183-0143-02	20	20	58.5	140	Topas	42.50	31.20	23.50
01-0184-0145-01	50	50	58.5	240	PMMA	42.50	31.20	23.50
01-0185-0145-02	50	50	58.5	140	Topas	42.50	31.20	23.50
01-0186-0144-01	100	100	58.5	250	PMMA	42.50	31.20	23.50
01-0187-0144-02	100	100	58.5	140	Topas	42.50	31.20	23.50
01-0188-0156-01	200	200	58.5	250	PMMA	36.20	24.30	18.10
01-0189-0156-02	200	200	58.5	140	Topas	36.20	24.30	18.10
01-0205-0180-01	800	20	58.5	250	PMMA	36.20	24.30	18.10
01-0206-0180-02	800	20	58.5	140	Topas	36.20	24.30	18.10
01-0190-0138-01	1,000	200	58.5	250	PMMA	36.20	24.30	18.10
01-0191-0138-02	1,000	200	58.5	140	Topas	36.20	24.30	18.10

1.1.2.2 Straight channel chips – Fluidic interface: Olives – 16 parallel channels

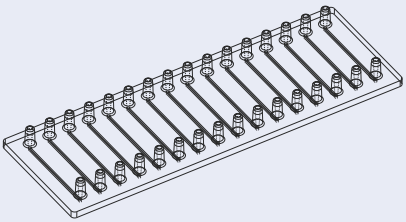


Fig. 11: Schematic drawing of the 16-channel olive chip family

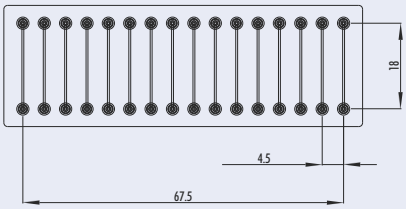


Fig. 12: Details of the 16-channel olive chip family

Product Code	Channel			Cover Lid Thickness	Material	Price [€/chip]		
	Width [µm]	Depth [µm]	Length [mm]	[µm]		1+	10+	30+
01-0192-0142-01	200	100	18.0	250	PMMA	36.20	24.30	18.10
01-0193-0142-02	200	100	18.0	140	Topas	36.20	24.30	18.10
01-0194-0152-01	1,000	200	18.0	250	PMMA	36.20	24.30	18.10
01-0195-0152-02	1,000	200	18.0	140	Topas	36.20	24.30	18.10

1.1.3 Straight channel chips – Fluidic interface: Mini Luer

1.1.3.1 Straight channel chips – Fluidic interface: Mini Luer – Four parallel channels

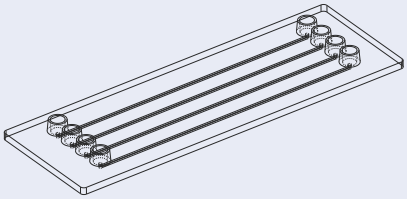


Fig. 13: Schematic drawing of the four-channel Mini Luer chip family

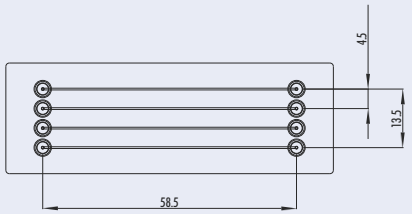


Fig. 14: Details of the four-channel Mini Luer chip family

Product Code	Channel			Cover Lid Thickness	Material	Price [€/chip]		
	Width [µm]	Depth [µm]	Length [mm]	[µm]		1+	10+	30+
01-0166-0143-01	20	20	58.5	250	PMMA	42.50	31.20	23.50
01-0167-0143-02	20	20	58.5	140	Topas	42.50	31.20	23.50
01-0168-0145-01	50	50	58.5	250	PMMA	42.50	31.20	23.50
01-0169-0145-02	50	50	58.5	140	Topas	42.50	31.20	23.50
01-0170-0144-01	100	100	58.5	250	PMMA	42.50	31.20	23.50
01-0171-0144-02	100	100	58.5	140	Topas	42.50	31.20	23.50
01-0172-0156-01	200	200	58.5	250	PMMA	36.20	24.30	18.10
01-0173-0156-02	200	200	58.5	140	Topas	36.20	24.30	18.10
01-0207-0180-01	800	20	58.5	250	PMMA	36.20	24.30	18.10
01-0208-0180-02	800	20	58.5	140	Topas	36.20	24.30	18.10
01-0174-0138-01	1,000	200	58.5	250	PMMA	36.20	24.30	18.10
01-0175-0138-02	1,000	200	58.5	140	Topas	36.20	24.30	18.10

1.1.3.2 Straight channel chips – Fluidic interface: Mini Luer – 16 parallel channels

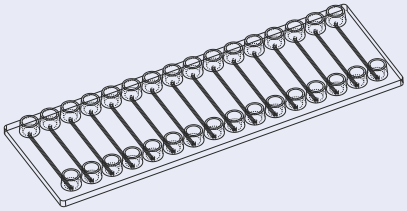


Fig. 15: Schematic drawing of the 16-channel Mini Luer chip family

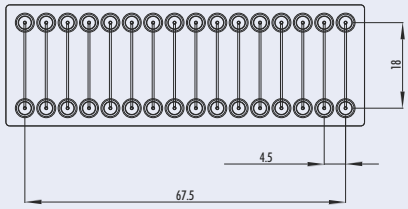


Fig. 16: Details of the 16-channel Mini Luer chip family

Product Code	Channel			Cover Lid Thickness	Material	Price [€/chip]		
	Width [µm]	Depth [µm]	Length [mm]	[µm]		1+	10+	30+
01-0176-0142-01	200	100	18.0	250	PMMA	36.20	24.30	18.10
01-0177-0142-02	200	100	18.0	140	Topas	36.20	24.30	18.10
01-0178-0152-01	1,000	200	18.0	250	PMMA	36.20	24.30	18.10
01-0179-0152-02	1,000	200	18.0	140	Topas	36.20	24.30	18.10

1.1.4 Straight channel chips – Fluidic interface: Luer – Eight parallel channels

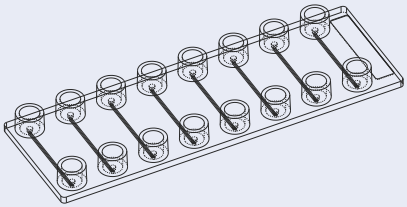


Fig. 17: Schematic drawing of the eight-channel Luer chip family

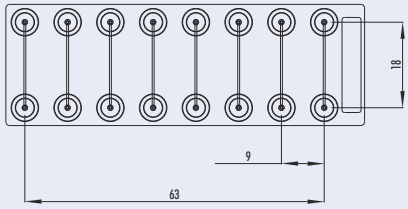


Fig. 18: Details of the eight-channel Luer chip family

Product Code	Channel			Cover Lid Thickness	Material	Price [€/chip]		
	Width [µm]	Depth [µm]	Length [mm]	[µm]		1+	10+	30+
01-0180-0157-01	100	100	18.0	250	PMMA	42.50	31.20	23.50
01-0181-0157-02	100	100	18.0	140	Topas	42.50	31.20	23.50

1.2 Straight channel chips – Microtiter-plate format – Fluidic interface: Through-holes

The SBS titer-plate format (85.48 mm x 127.76 mm) is a worldwide standard used by almost all pieces of equipment in the laboratory. To easily integrate a microfluidic development into existing lab environments, we have developed a microfluidic platform with the outer dimensions of a standard microtiter plate. The plate is equipped with four labeled sets of 16 microchannels each, with the dimensions 2 mm width, 150 μm height, and 18 mm length. Fluidic access is easily provided by conical openings of 2.5 mm diameter at either channel end. The plate is available in a variety of polymer materials like PC, PS, PMMA, or COP (Zeonor), either in its native state or hydrophilically primed for self-filling of the microchannels with aqueous solutions. It is possible to include surface functionalization in the channels like the spotting of DNA probes, etc. (see Fig. 22: Microfluidic titer plate with spotted probes). Applications include cell-based assays, hybridization assays, or small volume chemical synthesis.

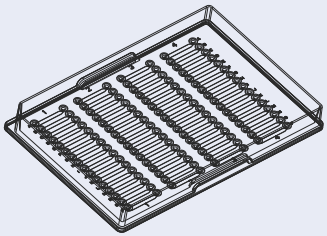


Fig. 19: Schematic drawing of the microfluidic titer plate

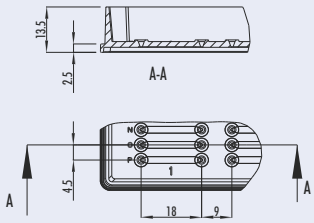


Fig. 20: Details of the microfluidic titer plate

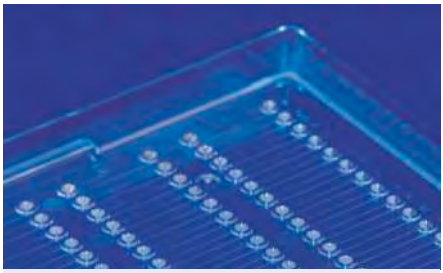


Fig. 21: Microfluidic titer plate

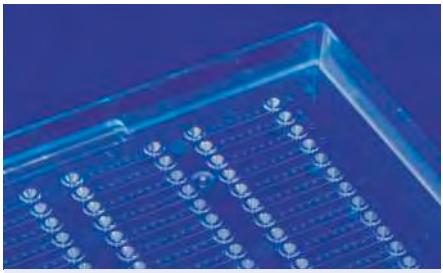


Fig. 22: Microfluidic titer plate with spotted probes

Product Code	Channel Dimensions Width [mm]	Depth [mm]	Length [mm]	Material	Surface Treatment	Price [€/chip] 1+	10+	30+
01-0242-0102-01	2	0.15	18	PMMA	-	79.00	59.00	29.00
01-0243-0102-03	2	0.15	18	PC	-	79.00	59.00	29.00
01-0244-0102-07	2	0.15	18	PS	-	79.00	59.00	29.00
01-0245-0102-05	2	0.15	18	Zeonor	-	79.00	59.00	29.00
01-0246-0102-01	2	0.15	18	PMMA	hydrophilized	98.00	78.00	38.00
01-0247-0102-03	2	0.15	18	PC	hydrophilized	98.00	78.00	38.00
01-0248-0102-07	2	0.15	18	PS	hydrophilized	98.00	78.00	38.00
01-0249-0102-05	2	0.15	18	Zeonor	hydrophilized	98.00	78.00	38.00

1.3 Straight channel chips with waste chamber – Microscopy-slide format – Fluidic interface: Luer

This device features a single broad channel with an additional large chamber, for example to allow on-chip waste storage. As fluidic interfaces, female Luer connectors are attached.

For the colored chips, the structured part is dyed and the cover lid is transparent.

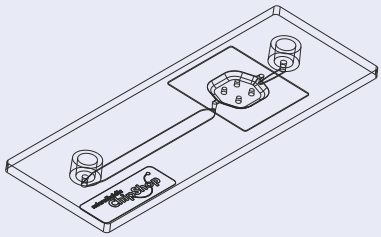


Fig. 23: Schematic drawing of a straight channel chip with additional large chamber

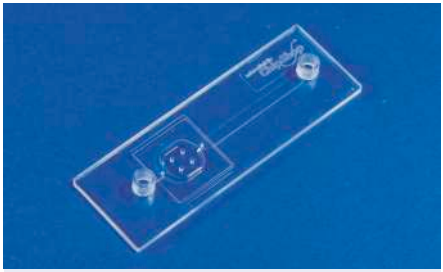


Fig. 24: Straight channel chip – transparent

Fig. 25: Straight channel chip – transparent with spotted probes

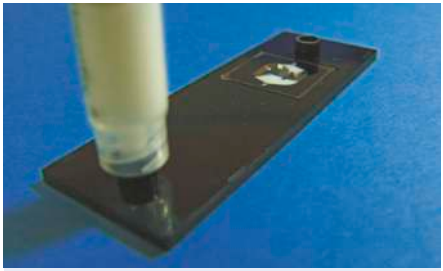


Fig. 26: Straight channel chip – black

Product Code	Channel			Volume chamber	Material	Price [€/chip]		
	Width [µm]	Depth [µm]	Length [mm]	[µl]		1+	10+	30+
01-0196-0095-01	2,000	300	36.0	75	PMMA	44.50	31.20	23.50
01-0197-0095-02	2,000	300	36.0	75	Topas	44.50	31.20	23.50
01-0198-0095-02b	2,000	300	36.0	75	Topas, black	44.50	31.20	23.50
01-0199-0095-03	2,000	300	36.0	75	PC	44.50	31.20	23.50
01-0200-0095-03b	2,000	300	36.0	75	PC, black	44.50	24.30	18.10
01-0201-0095-05	2,000	300	36.0	75	Zeonor	44.50	24.30	18.10
01-0202-0095-05b	2,000	300	36.0	75	Zeonor, black	44.50	24.30	18.10

1.4 Cross-shaped channel chips

A variety of chips with crossing channels either with T or double-T junctions is offered in this chapter. The standard outer format of these chips is 95 mm x 16 mm x 1.5 mm. As fluidic interfaces, simple through-holes for the filling with pipettes or female Luer adapters are available. One of the most common applications of this chip category is the use in capillary electrophoresis.

1.4.1 Cross-shaped channel chips – Fluidic interface: Through-holes

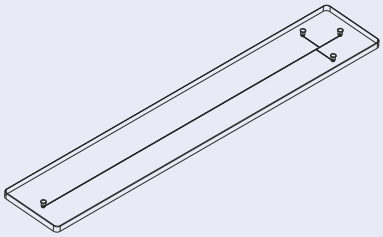


Fig. 27: Schematic drawing of the cross-shaped channel chip

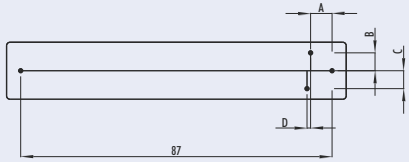


Fig. 28: Details of the cross-shaped channel chips

Product Code	Channel Width	Channel Depth	Channel Length	Hole Diameter	Geometry A	Geometry B	Geometry C	Geometry D	Lid Thickness	Material	Price [€/chip] 1+	10+	100+	1000+
	[µm]	[µm]	[mm]	[mm]	[mm]				[µm]					
02-0758-0082-01	50	50	87.0	1.0	6.0	5.0	5.0	0	250	PMMA	42.35	31.19	25.18	9.98
02-0759-0082-02	50	50	87.0	1.0	6.0	5.0	5.0	0	140	Topas	42.35	31.19	25.18	9.98
02-0760-0201-01	50	50	87.0	1.0	6.0	5.0	5.0	0.1	250	PMMA	42.35	31.19	25.18	9.98
02-0761-0201-02	50	50	87.0	1.0	6.0	5.0	5.0	0.1	140	Topas	42.35	31.19	25.18	9.98
02-0762-0106-01	75	75	87.0	1.0	6.0	5.0	5.0	0	250	PMMA	42.35	31.19	25.18	9.98
02-0763-0106-02	75	75	87.0	1.0	6.0	5.0	5.0	0	140	Topas	42.35	31.19	25.18	9.98
02-0764-0166-01	100	100	87.0	1.0	6.0	5.0	5.0	0	250	PMMA	42.35	31.19	25.18	9.98
02-0765-0166-02	100	100	87.0	1.0	6.0	5.0	5.0	0	140	Topas	42.35	31.19	25.18	9.98

1.4.2 Cross-shaped channel chips – Fluidic interface: Luer

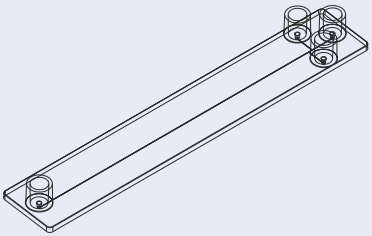


Fig. 29: Schematic drawing of the cross-shaped channel chip

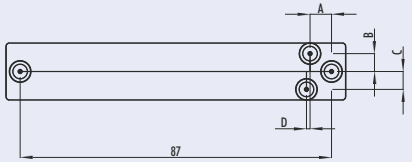


Fig. 30: Details of the cross-shaped channel chips with Luer interfaces

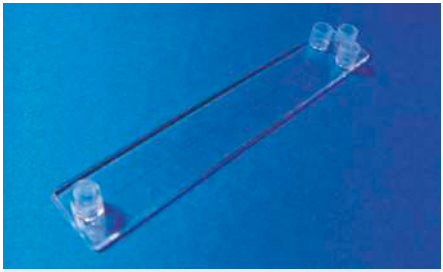


Fig. 31: Cross-shaped channel chip with Luer interfaces

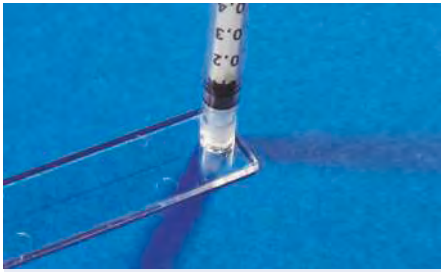


Fig. 32: Cross-shaped channel chip with female Luer interface and a syringe as male counterpart

Product Code	Channel Width	Channel Depth	Channel Length	Hole Diameter	Geometry A	Geometry B	Geometry C	Geometry D	Lid Thickness	Material	Price [€/chip] 1+	10+	100+	1000+
	[µm]	[µm]	[mm]	[mm]	[mm]				[µm]					
02-0750-0082-01	50	50	87.0	1.0	6.0	5.0	5.0	0	250	PMMA	42.35	31.19	25.18	9.98
02-0751-0082-02	50	50	87.0	1.0	6.0	5.0	5.0	0	140	Topas	42.35	31.19	25.18	9.98
02-0769-0082-05	50	50	87.0	1.0	6.0	5.0	5.0	0	100	Zeonor	42.35	31.19	25.18	9.98
02-0752-0201-01	50	50	87.0	1.0	6.0	5.0	5.0	0.1	250	PMMA	42.35	31.19	25.18	9.98
02-0753-0201-02	50	50	87.0	1.0	6.0	5.0	5.0	0.1	140	Topas	42.35	31.19	25.18	9.98
02-0767-0201-05	50	50	87.0	1.0	6.0	5.0	5.0	0.1	100	Zeonor	42.35	31.19	25.18	9.98
02-0754-0106-01	75	75	87.0	1.0	6.0	5.0	5.0	0	250	PMMA	42.35	31.19	25.18	9.98
02-0755-0106-02	75	75	87.0	1.0	6.0	5.0	5.0	0	140	Topas	42.35	31.19	25.18	9.98
02-0768-0106-05	75	75	87.0	1.0	6.0	5.0	5.0	0	100	Zeonor	42.35	31.19	25.18	9.98
02-0770-0202-01	75	75	87.0	1.0	6.0	5.0	5.0	0.1	250	PMMA	42.35	31.19	25.18	9.98
02-0771-0202-02	75	75	87.0	1.0	6.0	5.0	5.0	0.1	140	Topas	42.35	31.19	25.18	9.98
02-0772-0202-05	75	75	87.0	1.0	6.0	5.0	5.0	0.1	100	Zeonor	42.35	31.19	25.18	9.98
02-0756-0166-01	100	100	87.0	1.0	6.0	5.0	5.0	0	250	PMMA	42.35	31.19	25.18	9.98
02-0757-0166-02	100	100	87.0	1.0	6.0	5.0	5.0	0	140	Topas	42.35	31.19	25.18	9.98
02-0766-0166-05	100	100	87.0	1.0	6.0	5.0	5.0	0	100	Zeonor	42.35	31.19	25.18	9.98

1.4.3 Cross-shaped channel chips – Format: Microscopy slide – Fluidic interface: Mini Luer Connector

These chips offer two separate channel structures with crossing channels on each device. One of those with, one without a channel offset.

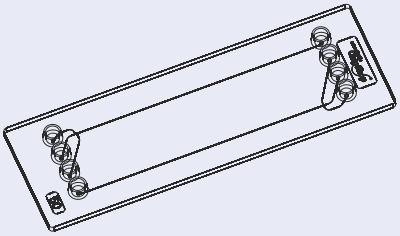


Fig. 33: Schematic drawing cross-shaped channel chips 0160 and 0161

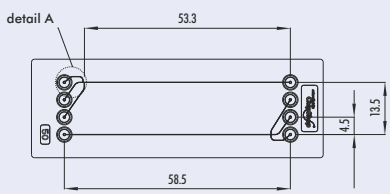


Fig. 34: Detail cross-shaped channel chip 0160

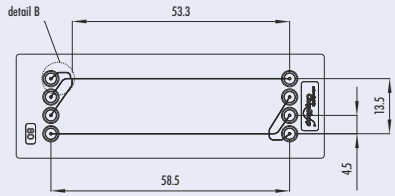


Fig. 35: Detail cross-shaped channel chip 0161

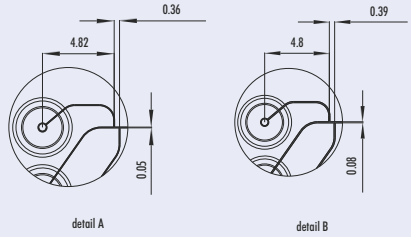


Fig. 36: Detail of channel offset in chip 0160 and 0161

Product Code	Channel Width [µm]	Channel Depth [µm]	Cover Lid Thickness [µm]	Material	Price [€/chip] 1+	10+	30+
14-1050-0160-01	50	50	250	PMMA	42.50	31.20	23.50
14-1051-0160-02	50	50	140	Topas	42.50	31.20	23.50
14-1052-0161-01	80	80	250	PMMA	42.50	31.20	23.50
14-1052-0161-02	80	80	140	Topas	42.50	31.20	23.50

1.4.4 Cross-shaped channel chips with electrodes (contact mode) – Fluidic interface: Through-holes

This variation of the cross-shaped channel chips includes electrodes that can be used for the detection of charged molecules, for example. The material of the electrodes is 10 nm titanium and 100–150 nm gold. The electrodes are placed on the cover lid and assembled towards the channel, resulting in a direct contact of the electrode material with the liquid to be analyzed.

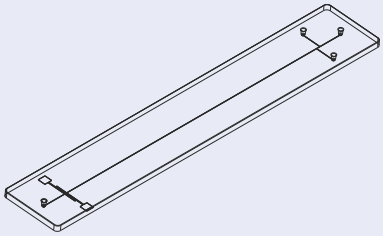


Fig. 37: Schematic drawing of the cross-shaped channel chip with electrodes

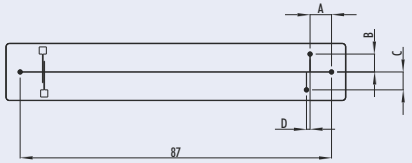


Fig. 38: Chip detail

Fig. 39: Details of the electrodes

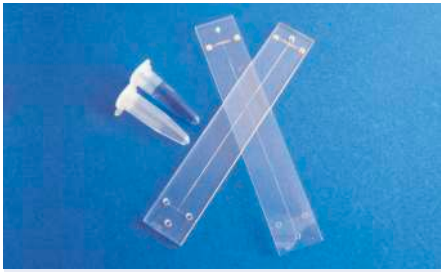


Fig. 40: Cross-shaped channel chips with through holes and electrodes

Product Code	Channel Width [µm]	Channel Depth [µm]	Channel Length [mm]	Hole Diameter [mm]	Geometry A [mm]	Geometry B [mm]	Geometry C [mm]	Geometry D [mm]	Geometry E [mm]	Lid Thickness [µm]	Material	Price [€/chip] 1+	Price [€/chip] 10+	Price [€/chip] 30+
03-0118-0082-01	50	50	87.8	1.0	6.0	5.0	5.0	0	0.2	250	PMMA	155.00	145.00	125.00
03-0120-0201-01	50	50	87.8	1.0	6.0	5.0	5.0	0.1	0.2	250	PMMA	155.00	145.00	125.00

1.4.5 Cross-shaped channel chips with electrodes (non-contact mode) – Fluidic interface: Luer

This variation of the cross-shaped channel chips includes electrodes that can be used for the detection of charged molecules, for example. The material of the electrodes is 10 nm titanium and 100–150 nm gold. The electrodes are placed on the cover lid and assembled towards the atmosphere, resulting in electrode and the liquid to be analyzed having no contact. The use of these chips with this electrode arrangement requires a special instrumentation set-up. This detection technology is called C^4D (capacitively coupled contactless conductivity detection). Chapter 5.2 highlights the respective instrument that allows for an easy use of these chips for several kinds of applications.

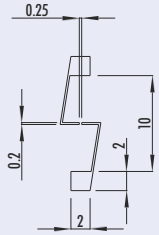


Fig. 41: Details of the electrodes

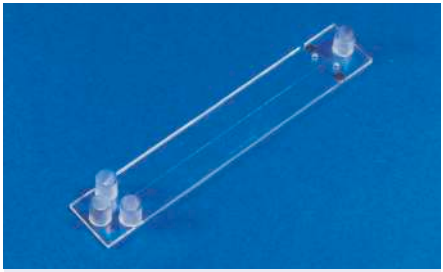


Fig. 42: Cross-shaped channel chip with electrodes for contactless conductivity detection

Product Code	Channel Width [µm]	Channel Depth [µm]	Channel Length [mm]	Hole Diameter [mm]	Geometry A [mm]	Geometry B [mm]	Geometry C [mm]	Geometry D [mm]	Lid Thickness [µm]	Material	Price [€/chip] 1+	Price [€/chip] 10+	Price [€/chip] 100+
03-0110-0082-01	50	50	87.0	1.0	6.0	5.0	5.0	0	60	PMMA	125.00	85.00	32.50
03-0111-0201-01	50	50	87.0	1.0	6.0	5.0	5.0	0.1	60	PMMA	125.00	85.00	32.50
03-0798-0166-01	100	100	87.0	1.0	6.0	5.0	5.0	0	60	PMMA	125.00	85.00	32.50
03-0799-0166-05	100	100	87.0	1.0	6.0	5.0	5.0	0	50	Zeonor	125.00	85.00	32.50

1.5 H-shaped channel chips

The H-shaped channel chip family is placed on the format of a microscopy slide (75.5 mm x 25.5 mm x 1.5 mm). As fluidic interfaces, Mini Luer adapters are integrated on the chip. These chips can for example be used as extractors or to establish concentration gradients.

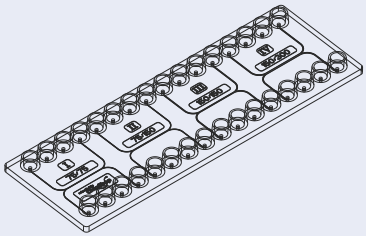


Fig. 43: H-shaped channel chip

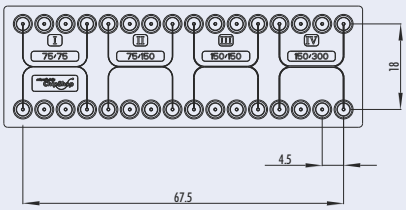


Fig. 44: Detail of H-shaped channel chip

Product Code	Channel Dimensions I II III IV Width inlet & outlet / middle [µm] [µm] [µm] [µm]	All Depth [µm]	Lid Thick-ness [µm]	Mate-rial	Price [€/chip] 1+	10+	30+
04-0129-0164-01	75/75 75/150 150/150 150/300	75	250	PMMA	42.50	31.20	23.50
04-0130-0164-02	75/75 75/150 150/150 150/300	75	140	Topas	42.50	31.20	23.50

1.6 Sample preparation chip – Fluidic interface: Mini Luer

The sample preparation chips have the format of a microscopy slide (75.5 mm x 25.5 mm x 1.5 mm) and are equipped with female Mini Luer connectors. Their key microfluidic elements are reaction chambers of various volumes in order to extract the target molecules out of a given sample in preparative quantities. These chips can for example be used as nucleic acid extraction devices via magnetic beads simply via applying beads and sample and by using an external magnet to hold the beads in place. These procedures can be done completely manually with a pipette – besides the magnet no additional equipment is necessary – or semi-automated with normal peristaltic pumps found in most life science labs.

Instrumentation: If you are interested in basic instruments for bead actuation and temperature control for the sample preparation chips illustrated in Fig. 47, 49, 51 please have a look at our ChipGenie edition P in Chapter 5, page 54.

Preloaded chips: If you are interested in chips preloaded with dried reagents for nucleic acid extraction and the respective buffer solutions, please do not hesitate to contact us.

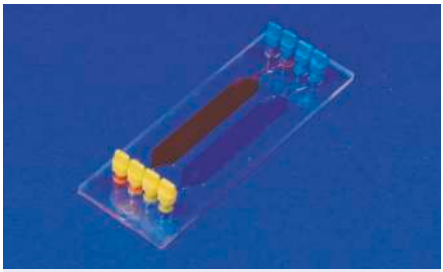


Fig. 45: Rhombic chamber chip filled

Fig. 46: Rhombic chamber chip in handling frame connected to PCR chip

1.6.1 Rhombic chamber chip eP1

The rhombic chamber chips eP1 are can be run with our ChipGenie edition P instrument, see Chapter 5, page 54.

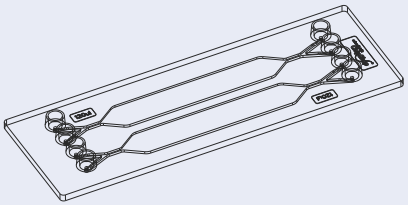


Fig. 47: Schematic drawing of the rhombic chamber chip

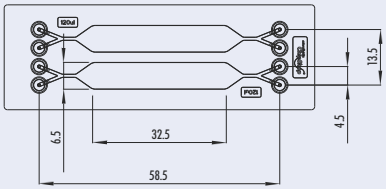


Fig. 48: Rhombic chamber chip – 120 µl chamber volume

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0901-0172-01	120	500	250	PMMA	-	36.20	24.30	16.10
12-0902-0172-02	120	500	140	Topas	-	36.20	24.30	16.10
12-0903-0172-03	120	500	175	PC	-	36.20	24.30	16.10
12-0904-0172-05	120	500	188	Zeonor	-	36.20	24.30	16.10
12-0905-0172-01	120	500	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0906-0172-02	120	500	140	Topas	hydrophilized	39.20	26.30	17.80
12-0907-0172-03	120	500	175	PC	hydrophilized	39.20	26.30	17.80
12-0908-0172-05	120	500	188	Zeonor	hydrophilized	39.20	26.30	17.80

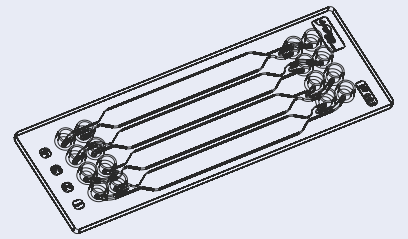


Fig. 49: Schematic drawing rhombic chamber chip

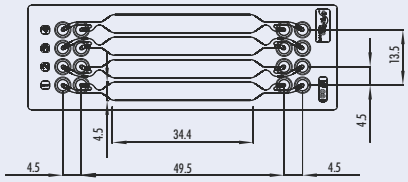


Fig. 50: Rhombic chamber chip – 100 µl chamber volume

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0909-0221-01	100	600	250	PMMA	-	36.20	24.30	16.10
12-0910-0221-02	100	600	140	Topas	-	36.20	24.30	16.10
12-0911-0221-05	100	600	188	Zeonor	-	36.20	24.30	16.10
12-0912-0221-01	100	600	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0913-0221-02	100	600	140	Topas	hydrophilized	39.20	26.30	17.80
12-0914-0221-05	100	600	188	Zeonor	hydrophilized	39.20	26.30	17.80

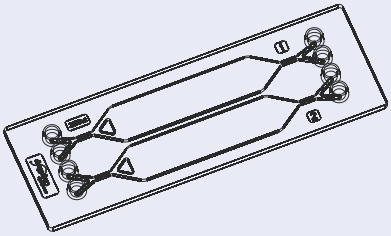


Fig. 51: Schematic drawing rhombic chamber chip

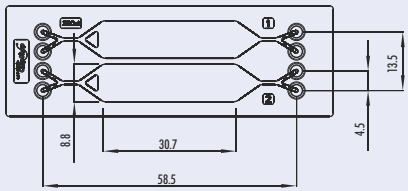


Fig. 52: Rhombic chamber chip – 250 µl chamber volume

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0915-0194-01	250	800	250	PMMA	-	36.20	24.30	16.10
12-0916-0194-02	250	800	140	Topas	-	36.20	24.30	16.10
12-0917-0194-05	250	800	188	Zeonor	-	36.20	24.30	16.10
12-0918-0194-01	250	800	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0919-0194-02	250	800	140	Topas	hydrophilized	39.20	26.30	17.80
12-0920-0194-05	250	800	188	Zeonor	hydrophilized	39.20	26.30	17.80

1.6.2 Rhombic chamber chip eP2

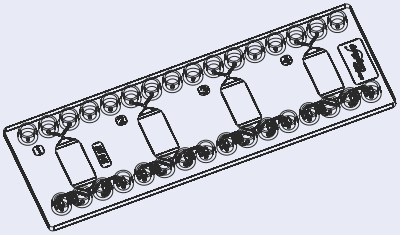


Fig. 53: Schematic drawing rhombic chamber chip

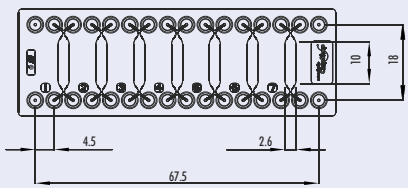


Fig. 54: Rhombic chamber chip – 6 µl chamber volume

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0921-0132-01	6	200	250	PMMA	-	36.20	24.30	16.10
12-0922-0132-02	6	200	140	Topas	-	36.20	24.30	16.10
12-0923-0132-05	6	200	188	Zeonor	-	36.20	24.30	16.10
12-0924-0132-01	6	200	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0925-0132-02	6	200	140	Topas	hydrophilized	39.20	26.30	17.80
12-0926-0132-05	6	200	188	Zeonor	hydrophilized	39.20	26.30	17.80

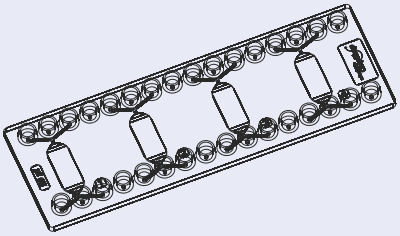


Fig. 55: Schematic drawing rhombic chamber chip

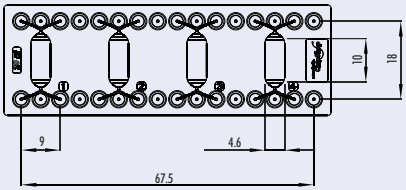


Fig. 56: Rhombic chamber chip – 20 µl chamber volume

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0927-0131-01	20	400	250	PMMA	-	36.20	24.30	16.10
12-0928-0131-02	20	400	140	Topas	-	36.20	24.30	16.10
12-0929-0131-05	20	400	188	Zeonor	-	36.20	24.30	16.10
12-0930-0131-01	20	400	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0931-0131-02	20	400	140	Topas	hydrophilized	39.20	26.30	17.80
12-0932-0131-05	20	400	188	Zeonor	hydrophilized	39.20	26.30	17.80

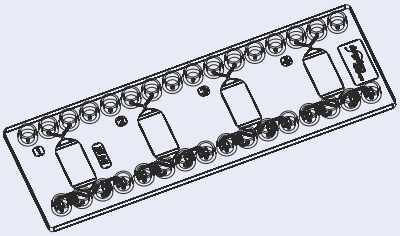


Fig. 57: Schematic drawing rhombic chamber chip

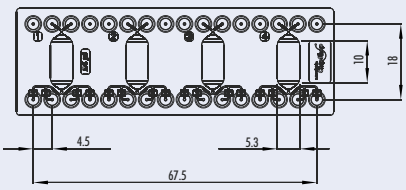


Fig. 58: Rhombic chamber chip – 24 µl chamber volume

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0933-133-01	24	200	250	PMMA	-	36.20	24.30	16.10
12-0934-133-02	24	200	140	Topas	-	36.20	24.30	16.10
12-0935-133-05	24	200	188	Zeonor	-	36.20	24.30	16.10
12-0936-133-01	24	200	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0937-133-02	24	200	140	Topas	hydrophilized	39.20	26.30	17.80
12-0938-133-05	24	200	188	Zeonor	hydrophilized	39.20	26.30	17.80

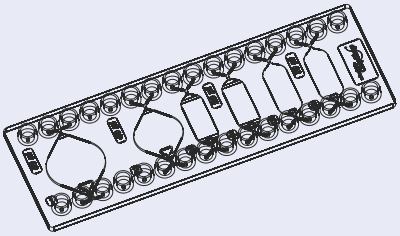


Fig. 59: Schematic drawing rhombic chamber chip

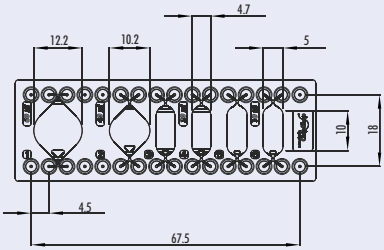


Fig. 60: Rhombic chamber chip – chamber volumes: 60 µl, 40 µl, 2 x 20 µl, 2 x 10 µl

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0939-0134-01	10/10 20/20 40/60	200/200 400/400 540/540	250	PMMA	-	36.20	24.30	16.10
12-0940-0134-02	10/10 20/20 40/60	200/200 400/400 540/540	140	Topas	-	36.20	24.30	16.10
12-0941-0134-05	10/10 20/20 40/60	200/200 400/400 540/540	188	Zeonor	-	36.20	24.30	16.10
12-0942-0134-01	10/10 20/20 40/60	200/200 400/400 540/540	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0943-0134-02	10/10 20/20 40/60	200/200 400/400 540/540	140	Topas	hydrophilized	39.20	26.30	17.80
12-0944-0134-05	10/10 20/20 40/60	200/200 400/400 540/540	188	Zeonor	hydrophilized	39.20	26.30	17.80

1.7 Droplet generators – Fluidic interfaces: Mini Luer

On the format of a microscopy slide (75.5 mm x 25.5 mm x 1.5 mm) with female Mini Luer fluidic interfaces a droplet generator structure is placed with several inlet and outlet interfaces. The droplet generator chips are available with two different channel widths in the droplet generation region.

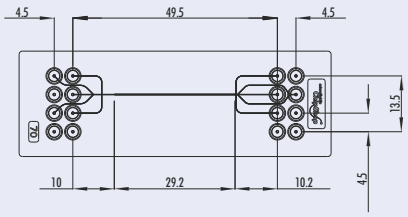


Fig. 61: Detail of droplet generator 0162

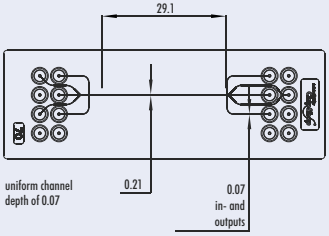


Fig. 62: Channel dimensions of droplet generator 0162

Product Code	Lid Thickness [µm]	Material	Price [€/chip] 1+	10+	100+
13-1001-0162-02	140	Topas	42.20	34.30	26.10
13-1002-0162-03	175	PC	42.20	34.30	26.10

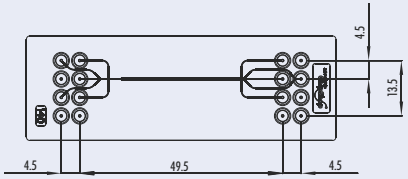


Fig. 63: Detail of droplet generator 0163

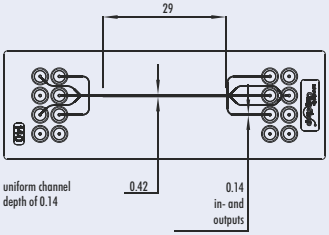


Fig. 64: Channel dimensions droplet generator 0163

Product Code	Lid Thickness [µm]	Material	Price [€/chip] 1+	10+	100+
13-1003-0163-02	140	Topas	42.20	34.30	26.10
13-1004-0163-03	175	PC	42.20	34.30	26.10

1.8 Field-flow fractionation chips

On the format of a microscopy slide (75.5 mm x 25.5 mm x 1.5 mm) with olives as fluidic interfaces, a field-flow fractionation structure is placed. The chips can be used for example for free-flow electrophoresis and free-flow magnetophoresis. The chips were developed within the BMBF-Project "Free-Flow-Chip", FKZ 01RI0643D.

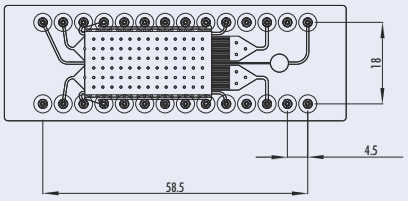


Fig. 65: Details of the field flow fractionation chip 0120

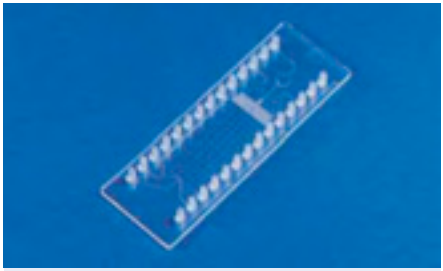


Fig. 66: Field flow fractionation chip 0120

Product Code	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
14-1020-0120-03	175	PC	-	42.20	34.30	26.10
14-1021-0120-05	188	Zeonor	-	42.20	34.30	26.10
14-1022-0120-03	175	PC	hydrophilized	45.20	36.30	27.80
14-1023-0120-05	188	Zeonor	hydrophilized	45.20	36.30	27.80

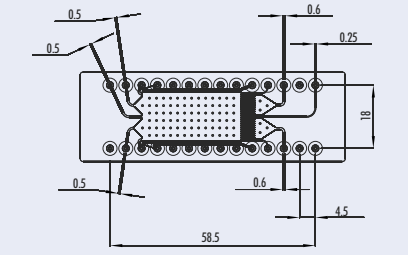


Fig. 67: Details of the field flow fractionation chip 0159

Fig. 68: Field flow fractionation chip 0159

Product Code	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
14-1024-0159-03	175	PC	-	42.20	34.30	26.10
14-1025-0159-05	188	Zeonor	-	42.20	34.30	26.10
14-1026-0159-03	175	PC	hydrophilized	45.20	36.30	27.80
14-1027-0159-05	188	Zeonor	hydrophilized	45.20	36.30	27.80

1.9 Meander and continuous-flow PCR chips

On the format of a microscopy slide (75.5 mm x 25.5 mm x 1.5 mm), long meandering channels are implemented. As interfaces, olives are used to directly connect tubing. If more than two interfaces are required, 28 interfaces are part of the platform.

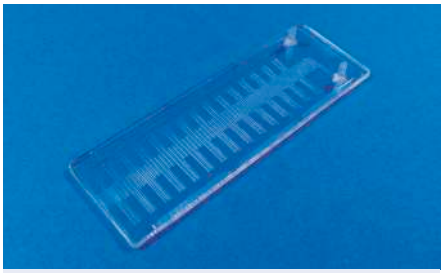


Fig. 69: 15-cycle chip

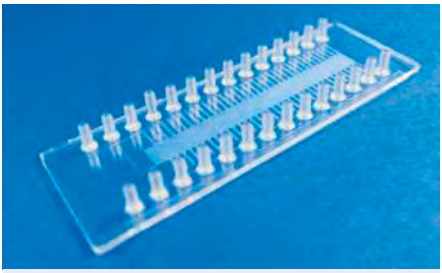


Fig. 70: 36-cycle chip

Product Code	Lid Thickness [µm]	Material	Comments Design Channel Dimensions Width / Depth / Length	Price [€/chip] 1+	10+	100+	1000+
08-0470-0047-03	250	PC	15 cycles (1 inlet, 1 outlet) 500 µm / 100 µm / 810 mm	42.50	32.50	25.50	12.00
08-0471-0065-03	250	PC	36 cycles (2 inlets, 3 outlets) 220 µm / 100 µm / 1,257 mm	42.50	32.50	25.50	12.00
08-0472-0061-03	250	PC	41 cycles (1 inlet, 1 outlet) 200 µm / 100 µm / 1,879 mm	42.50	32.50	25.50	12.00

1.10 Titer plates – Microscopy slide format

Our micro- or nanowell plates have the format of a microscopy slide (75.5 mm x 25.5 mm x 1.5 mm) and include cavities with different shapes and volumes.

1.10.1 Nanotiter plate – Microscopy slide format

On our nanowell plates, three well arrays with wells of different edge lengths are placed. The arrays have 14 x 14 (well spacing of 1,125 µm), 28 x 28 (well spacing of 562.5 µm), and 60 x 60 (well spacing of 281.25 µm) single wells.

Fig. 71: Nanotiter plate

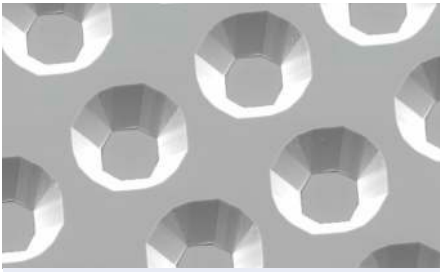


Fig. 72: Nanotiter plate – well detail

Product Code	Well Depth	Well Size [µm] Structure 1		Structure 2		Structure 3		Well Spacing [µm] Structure 1	Structure 2	Structure 3	Material	Price [€/chip] 1+	10+	50+	100+	500+
	[µm]	Top	Bot.	Top	Bot.	Top	Bot.									
05-0133-0018-01	20	124	96	224	196	424	396	281.25	562.5	1125	PMMA	40.00	30.00	9.00	7.00	5.20
05-0134-0018-02	20	124	96	224	196	424	396	281.25	562.5	1125	Topas	45.00	35.00	14.00	8.00	5.40
05-0137-0018-03	20	124	96	224	196	424	396	281.25	562.5	1125	PC	40.00	30.00	9.00	7.00	5.20
05-0138-0018-05	20	124	96	224	196	424	396	281.25	562.5	1125	Zeonor	45.00	35.00	14.00	8.00	5.40
05-0139-0018-04	20	124	96	224	196	424	396	281.25	562.5	1125	Zeonex	45.00	35.00	14.00	8.00	5.40

1.10.2 18-well titer plate – Microscopy slide format

The 18-well titer plate works with the spacing of a 96-well microtiter plate, namely 9 mm, and is available in different materials and in transparent and colored versions. It can be used with our adapter frame in microtiter-plate format that is made as a special adapter for microfluidic chips in microscopy slide format.

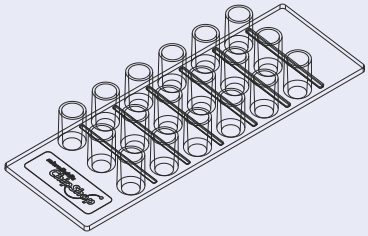


Fig. 73: Schematic drawing of the 18-well titer plate

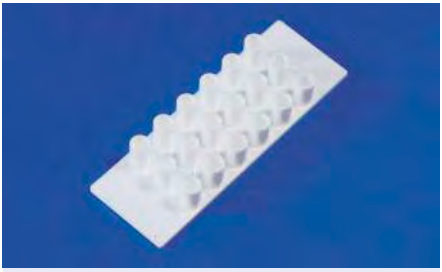


Fig. 74: 18-well microtiter-plate

Product Code	Well Volume [µl]	Material	Price [€/chip] 1+	10+	100+
05-0950-0141-05	119	Zeonor	20.00	15.00	5.40
05-0951-0141-05.1	119	Zeonor, white	20.00	15.00	5.40

1.11 Membrane chip

Microscopy slide chips with 4 membranes for plasma/serum generation out of full blood. Each membrane can generate roughly 12 – 15 µl plasma/serum out of 25 µl full blood. Each unit of the plasma/serum generation chip consists of a Luer interface (1) for blood loading, a support channel with a cross-section of 300 µm × 100 µm (2) for the transfer of the blood on top of a separation membrane (3) that is fused into a chip-based chamber of 10 mm diameter, a plasma/serum collection channel (4) below the membrane, and a ventilation channel of 100 µm × 100 µm (5) also below the membrane. The vacuum is applied via the collection channel and a second interface (6) to the outer world. A third interface (7), which is closed during the sample loading, helps to smoothly release the slight vacuum if the membrane pores are blocked by the solid components of the blood such as erythrocytes, monocytes, platelets, or leucocytes.

The chips are offered without (membrane chip 0166) and with an additional venting line (membrane chip 200) to allow for an easier filling of the membrane chamber itself.

Fig. 75: Plasma/serum generation chip

Fig. 76: Close-up of one plasma/serum generation unit

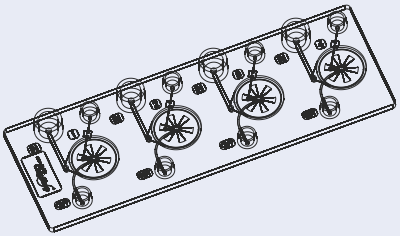


Fig. 77: Schematic drawing of membrane chip 0166

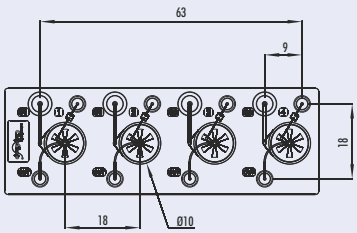


Fig. 78: Detail of membrane chip 0166

Product Code	Description	Material	Price [€/chip]		
			1+	10+	100+
15-1503-0166-02	Chip with 4 plasma generation membranes	Topas	79,50	63,50	49,50

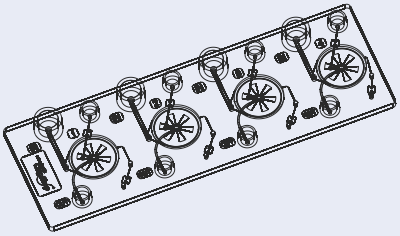


Fig. 79: Schematic drawing of membrane chip 0200

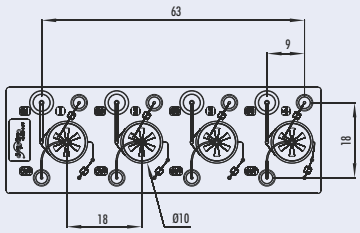


Fig. 80: Detail of membrane chip 0200

Product Code	Description	Material	Price [€/chip]		
			1+	10+	100+
15-1504-0200-02	Chip with 4 plasma generation membranes	Topas	79,50	63,50	49,50

1.12 Micro mixer

Microfluidic micro mixers apply different mixing principles. This chapter includes mixers applying the diffusion principle and a so-called "herringbone" mixing structure.

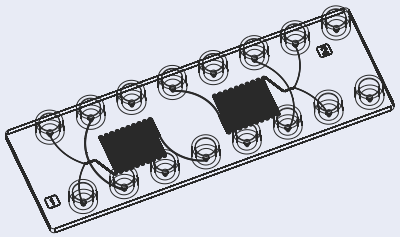


Fig. 81: Schematic drawing of diffusion mixer

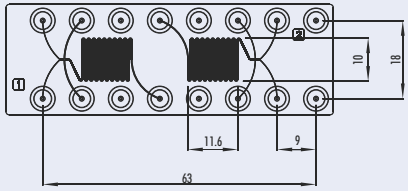


Fig. 82: Detail of diffusion mixer

Product Code	Lid Thickness [µm]	Channel Depth [µm]	Channel Width [µm]	Material	Price [€/chip]		
					1+	10+	100+
14-1035-186-02	175	100	inlets 100 / 200 mixer 200 outlet 200	PC	42.20	34.30	26.10
14-0136-186-05	188	100	inlets 100 / 200 mixer 200 outlet 200	Zeonor	42.20	34.30	26.10

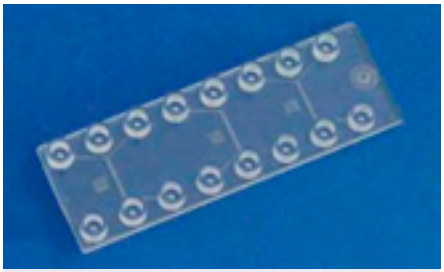


Fig. 83: Herringbone mixer

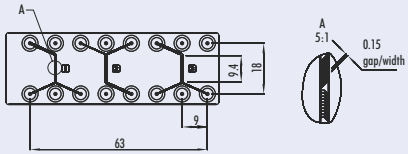


Fig. 84: Detail of herringbone mixer

Product Code	Lid Thickness [µm]	Channel Depth [µm]	Channel Width [µm]	Material	Price [€/chip]		
					1+	10+	100+
14-1037-187-03	175	200	inlet 300 mixer 600 outlet 600	PC	42.20	34.30	26.10
14-1038-187-05	188	200	inlet 300 mixer 600 outlet 600	Zeonor	42.20	34.30	26.10

1.13 Weir-filter chip

The chip contains four channels with weir structures for retaining particles (e.g. beads, cells etc.) of different sizes. The weirs have a residual weir slit height of 5 µm, twice 10 µm and 20 µm. The chip was developed within the project Cajal4EU.

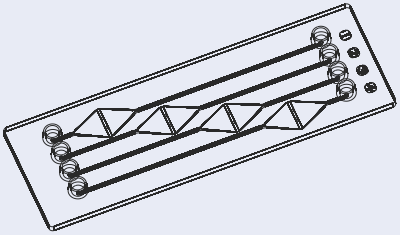


Fig. 85: Schematic drawing of weir chip

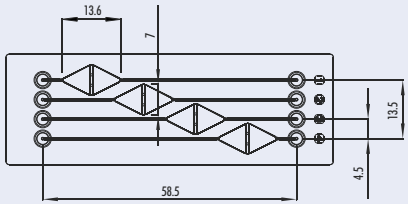
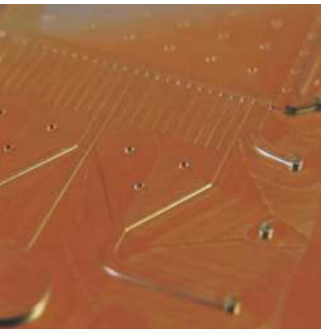
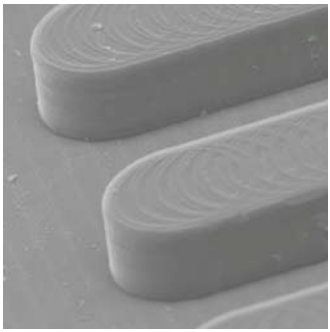
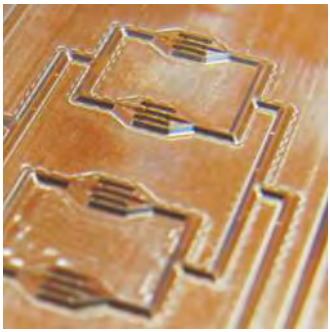


Fig. 86: Detail of weir chip

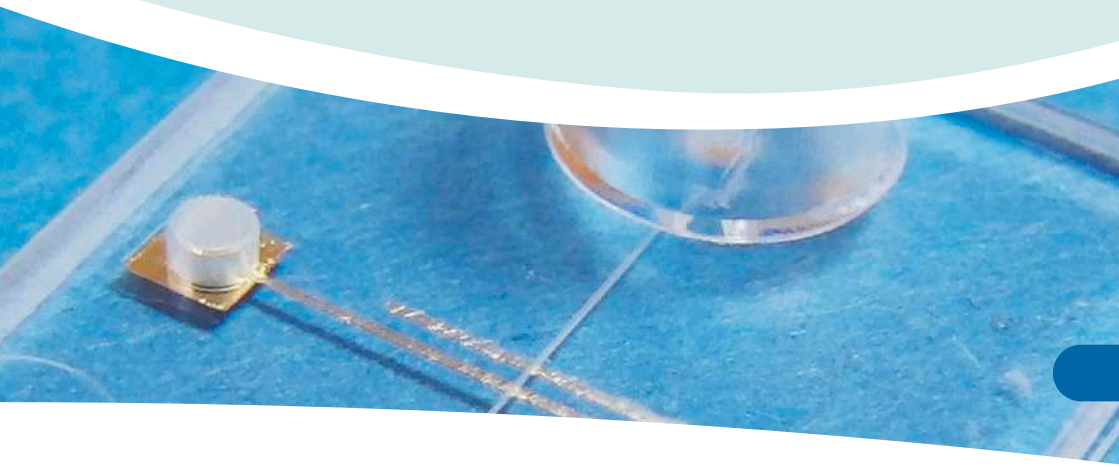
Product Code	Channel Depth [µm]	Channel Width [µm]	Material	Price [€/chip]		
				1+	10+	100+
14-1030-0220-03	500	500	PC	42.20	34.30	26.10
14-1031-0220-05	500	500	Zeonor	42.20	34.30	26.10







2. Silicone chips



Silicone chips

Our product range in silicone covers standard designs as well as tailor-made microfluidic devices. Practically all microfluidic designs shown in this catalogue can be ordered in silicone.

The silicone parts can be delivered as silicone-only devices without a cover lid or bonded for example to glass, silicone, or polymers, including the various polymer platforms shown in this catalogue. This enables the simple combination of standard fluidic interfaces with user-specific fluidic designs.

If you are interested in this service, please tell us your requirements and we will provide you with a quote.

2.1 MicCell

The MicCell system from our partner GeSim is a modular and versatile system to create individual PDMS microchannel setups and run own rapid prototyping experiments under the microscope. Its fluidic system is made of PDMS elastomer (silicone) – precast microchannel layers can be bought (called PDMS Channel Plates) or they can be self-made at user side with a special casting station. The system is easy to use, and it the entire periphery can be reused with new microfluidic channel designs. Items needed for the new microfluidic design are a new master and PDMS solution.

The modularity of the system allows to start with a small setup (also using existing syringe pumps) and grow bigger as required. Standard MicCells can be purchased in the sizes 22 mm x 22 mm and 25 mm x 75 mm; special designs (e. g. with microelectrodes) are available on request.

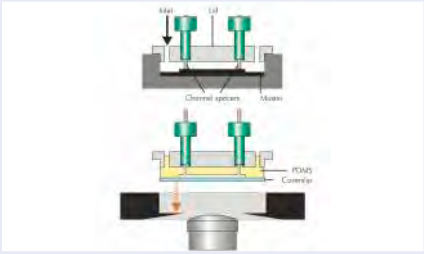


Fig. 87: Molding of the Channel Plate on a silicon master and subsequent mounting in an inverted microscope

2.1.1 PDMS Channel Plate flow cells (precast, ready to use)l

The Channel Plate (CP) is a precast silicone gel layer that comes with a polycarbonate body (lid) containing all necessary threaded holes so that it is ready to use. The channel is closed by a coverslip (that can be plain or equipped with a microarray, nanostructures, cultured cells, etc.). The use of the system is simple: Add tubes, insert the Channel Plate into the MicCell support, and place it in an inverted microscope. Plasma activation of the PDMS to seal the channel is usually not necessary. Different channel shapes are available; the S-shape, for instance, is an unbranched channel running from one corner to the other, for shear stress or other experiments. Other designs are available on request

The polycarbonate (PC) body above the PDMS Channel Plate that contains all fluidic connections can be recycled.

Fig. 88: Channel Plate 22 mm x 22 mm with S-shaped single channel, precast, ready to use

Fig. 89: Channel Plate 22 mm x 22 mm with double-Y-branched channel, precast, ready to use

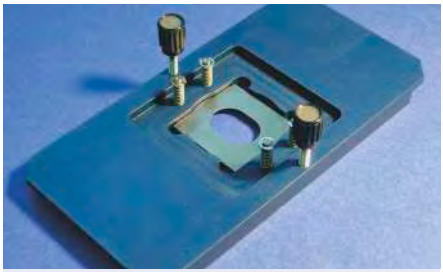


Fig. 90: MicCell support for 22x22 Channel Plates, to be placed in an inverted microscope via an adapter plate (not shown)

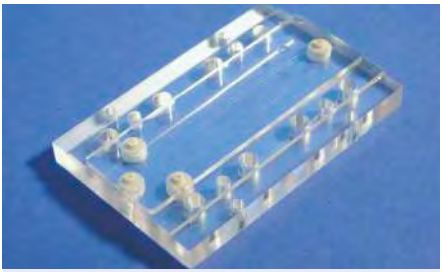


Fig. 91: Channel Plate 25x75 with crossed-shaped (T-junction) channel, different channel designs are available on request

Fig. 92: MicCell support for 25x75 Channel Plate

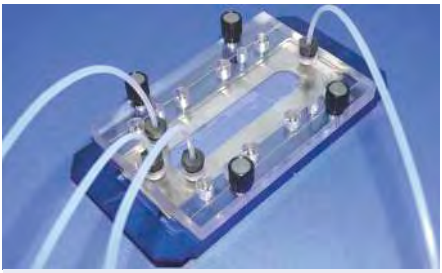


Fig. 93: Fully assembled MicCell with 25x75 Channel Plate, cross-shaped with 3 inlets and 1 outlet

Product Code	Description	Channel Design, Depth [µm]	Price [€/chip] 1+	5+	10+
07-0452-0000-06	PDMS-CP/22x22/S-100	S-shape, 100 µm deep	150.00	135.00	125.00
07-0453-0000-06	PDMS-CP/22x22/2Y-50	Double-Y-shape, 50 µm deep	150.00	135.00	125.00
07-0455-0000-06	PDMS-CP/25x75/Cross-50	Cross shape, 50 µm deep	260.00	235.00	215.00
07-0454-0000-00	MicCell support 22x22	to fix a PDMS-CP	780.00	699.00	650.00
07-0456-0000-00	MicCell support 25x75	to fix a PDMS-CP	780.00	699.00	650.00

2.1.2 Accessories for the PDMS Channel Plate

With these products individual flow cells can be casted. The casting station comes with an overview on the technology, detailed hands-on instructions, PC-bodies, channel spacers and one liter of Sylgard 184 two-component PDMS solution (base and curing agent); a microstructured master for molding must be ordered separately. You also need single-use glassware and syringes with needles to prepare and inject the PDMS mixture, a pump and desiccator for degassing, and an oven for curing. An initial set of mixing glasses, syringes and needles is included in the box.

Fig. 94: Polycarbonate (PC) body 22 mm x 22 mm

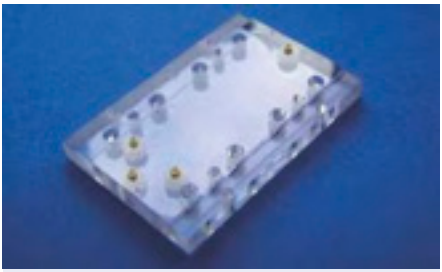


Fig. 95: Polycarbonate (PC) body 25 mm x 75 mm

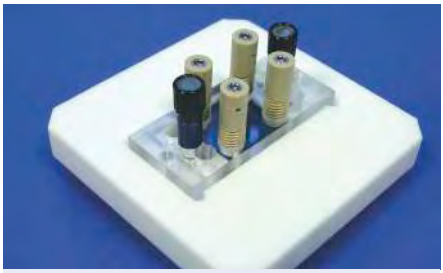


Fig. 96: Casting Station 22 mm x 22 mm. Top: assembled, including channel spacers (brown)

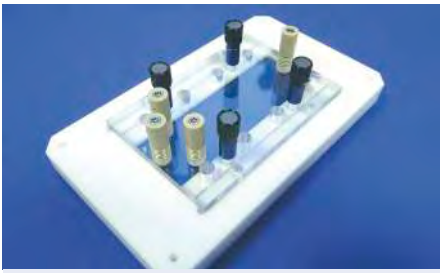
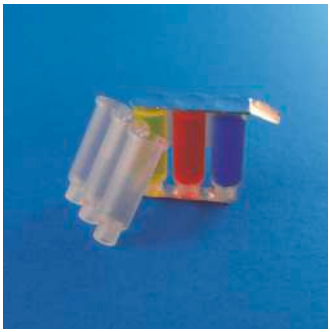


Fig. 97: Casting Station 25 mm x 75 mm

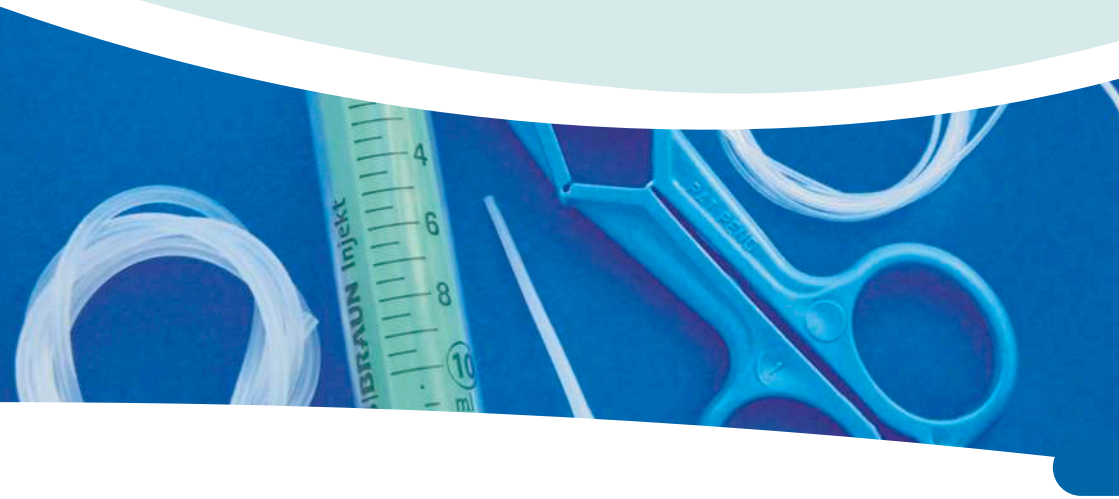
Fig. 98: Casting Station box

Product Code	Description	Design	Price [€/chip] 1+	10+	20+
07-0457-0000-03	polycarbonate-body, 22 x 22 mm / 4	22 mm x 22 mm, 4 inlets 1/4-28 UNF	85.00	76.00	70.00
07-0458-0000-03	polycarbonate-body, 25 x 75 mm / 6	25 mm x 75 mm, 6 inlets 1/4-28 UNF	195.00	162.00	145.00
07-0459-0000-00	Casting station box 22 x 22 mm	casting station for 22 x 22 mm PDMS-CP, accessories*, technology description	2,070.00	1,850.00	1,750.00
07-0460-0000-00	Casting station box 25 x 75 mm	casting station for 25 x 75 mm PDMS-CP, accessories*, technology description	2,742.00	2,450.00	2,335.00

* Set of PDMS-CPs, channel spacers, mixing glasses, syringes, needles



3. Accessories



Accessories

With the help of our *Lab-on-a-Chip Catalogue*, it is our aim to ensure that you have all the necessary equipment for an easy and immediate start with our microfluidic products. This includes not only our wide variety of off-the-shelf microfluidic chips but also all accessories required to run microfluidic chips, such as fluidic interfaces, tubings, complete accessory kits, and special reagents.

If you have any additional wishes that might help you with your microfluidic work, please do not hesitate to contact us.

3.1 Fluidic interface

The use of lab-on-a-chip devices routinely requires interfaces between the chip and the macroscopic world. Our fluidic interfaces enable easy and well-proven chip-to-world interfacing.

Material matters: We offer the fluidic interfaces and plugs in different materials. Whereas PP is a harder material that is easy to use for interfacing with tubes, TPE as soft material allows for an easy closing of the interfaces without applying much pressure. Whilst to heavy forces applied by the user himself on the PP interfaces can damage the chip, the TPE interfaces will withstand such handling.

3.1.1 Male Mini Luer fluid connectors

In order to cope with minimized footprints, a merger of the miniaturization with well-proven fluidic interfaces from the medical world has been realized, resulting in our Mini Luer connectors. These allow *microfluidic ChipShop*'s Mini Luer fluidic platforms to connect with tubes or, integrated in an instrument, directly with the instrument.

The male Mini Luer fluid connectors are the means to connect the female Mini Luer platforms with tubing to connect for example pumps, valves, or waste reservoirs. They are offered as single interfaces, twins, or as rows of four. Furthermore, they are available in different colors for an easy differentiation between different liquids going in and out of the chip.

Male Mini Luer connectors have a dead volume of approximately 8 µl.

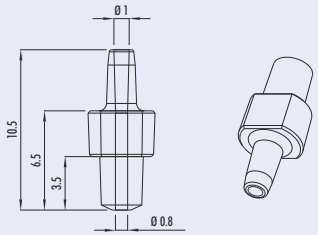


Fig. 99: Schematic drawing of a Mini Luer connector

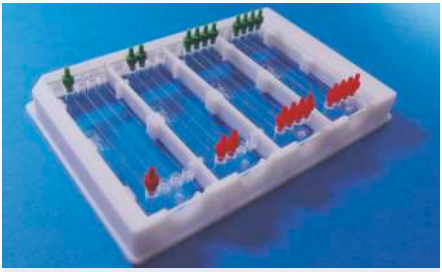


Fig. 100: Single, twin type Mini Luer connectors and row of four

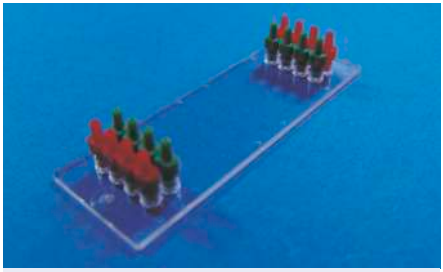


Fig. 101: Four times row of four Mini Luer connectors mounted on a Mini Luer platform

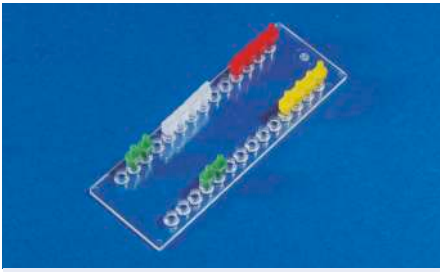


Fig. 102: Mini Luer connectors mounted on a Mini Luer fluidic platform

Product Code	Connector Type	Material	Color	Price [€/10 pieces] 1+	5+	10+	20+
09-0538-0000-09	Single	PP	Opaque	19.00	14.00	9.40	7.40
09-0539-0000-09	Single	PP	Yellow	19.00	14.00	9.40	7.40
09-0540-0000-09	Single	PP	Red	19.00	14.00	9.40	7.40
09-0541-0000-09	Single	PP	Green	19.00	14.00	9.40	7.40
09-0542-0000-09	Single	PP	Blue	19.00	14.00	9.40	7.40
09-0543-0000-09	Single	PP	Black	19.00	14.00	9.40	7.40
09-0532-0000-09	Twin	PP	Opaque	19.00	14.00	9.40	7.40
09-0533-0000-09	Twin	PP	Yellow	19.00	14.00	9.40	7.40
09-0534-0000-09	Twin	PP	Red	19.00	14.00	9.40	7.40
09-0535-0000-09	Twin	PP	Green	19.00	14.00	9.40	7.40
09-0536-0000-09	Twin	PP	Blue	19.00	14.00	9.40	7.40
09-0537-0000-09	Twin	PP	Black	19.00	14.00	9.40	7.40
09-0544-0000-09	Row of four	PP	Opaque	19.00	14.00	9.40	7.40
09-0545-0000-09	Row of four	PP	Yellow	19.00	14.00	9.40	7.40
09-0546-0000-09	Row of four	PP	Red	19.00	14.00	9.40	7.40
09-0547-0000-09	Row of four	PP	Green	19.00	14.00	9.40	7.40
09-0548-0000-09	Row of four	PP	Blue	19.00	14.00	9.40	7.40
09-0549-0000-09	Row of four	PP	Black	19.00	14.00	9.40	7.40
09-0562-0000-11	Single	TPE	Opaque	19.00	14.00	9.40	7.40
09-0563-0000-11	Twin	TPE	Opaque	19.00	14.00	9.40	7.40
09-0564-0000-11	Row of four	TPE	Opaque	19.00	14.00	9.40	7.40

3.1.2 Male Mini Luer plugs

The male Mini Luer plugs are the means to close the female Mini Luer interfaces on our fluidic platforms. As the Mini Luer fluid connectors, they are offered as single units, twins, or as rows of four. Furthermore, they are available in different colors for an easy differentiation between different input and output ports. They are offered in a hard polymer component (PP) and a soft polymer (TPE).

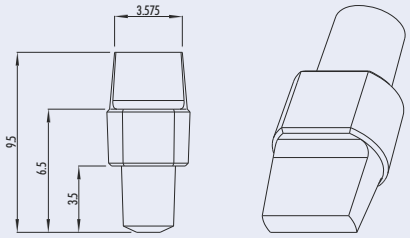


Fig. 103: Schematic drawing of a Mini Luer plug

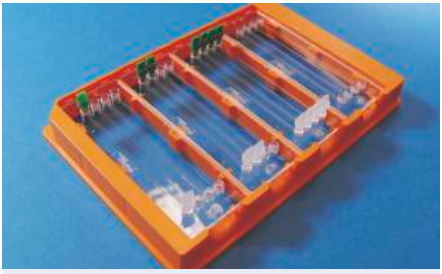


Fig. 104: Single, twin type Mini Luer plugs and row of four

Product Code	Plug Type	Material	Color	Price [€/10 pieces] 1+	5+	10+	20+
09-0550-0000-09	Single	PP	Opaque	19.00	14.00	9.40	7.40
09-0551-0000-09	Single	PP	Red	19.00	14.00	9.40	7.40
09-0552-0000-09	Single	PP	Green	19.00	14.00	9.40	7.40
09-0553-0000-09	Twin	PP	Opaque	19.00	14.00	9.40	7.40
09-0554-0000-09	Twin	PP	Red	19.00	14.00	9.40	7.40
09-0555-0000-09	Twin	PP	Green	19.00	14.00	9.40	7.40
09-0556-0000-09	Row of four	PP	Opaque	19.00	14.00	9.40	7.40
09-0557-0000-09	Row of four	PP	Red	19.00	14.00	9.40	7.40
09-0558-0000-09	Row of four	PP	Green	19.00	14.00	9.40	7.40
09-0559-0000-11	Single	TPE	Opaque	19.00	14.00	9.40	7.40
09-0560-0000-11	Twin	TPE	Opaque	19.00	14.00	9.40	7.40
09-0561-0000-11	Row of four	TPE	Opaque	19.00	14.00	9.40	7.40

3.1.3 Female Luer Lok compatible connectors

Our female Luer Lok compatible connectors are tools for chip prototyping. These devices can be mounted on the fluidic chips and are compatible with standard male Luer and Luer Lok adapters as for example used for syringes. This enables also prototyped chips, usually chips with directly milled structures, or glass and silicon microfluidic devices to make use of standard fluidic interfaces. The diameter of the through hole is 1.3 mm.

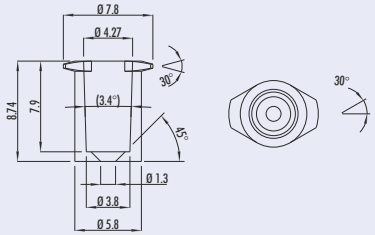


Fig. 105: Schematic drawing of the Luer Lok compatible adapter

Fig. 106: Female Luer Lok adapters

Product Code	Material	Price [€/10 pieces] 1+	5+	10+	20+
09-0500-0000-01	PMMA	30.00	25.00	20.00	15.00

3.1.4 Upchurch Nanoports

The Upchurch Nanoports N-126H allow for chip holes up to 1/16" (1.57 mm) and for tubing with an outer diameter of 1/32" (0.79 mm). They can be used with capillary peek tubing with an outer diameter of 1/32". Please be aware when you make your fluidic design that the footprint of these Nanoports is 8.4 mm.

Fig. 107: Upchurch Nanoports assembly set

Fig. 108: Prototyped analytical platforms with Upchurch Nanoports

Product Code	Comment	Price [€/piece] 1+	20+
09-0510-0000-00	Upchurch Nanoports N-126H	16.90	15.80

3.2 Liquid storage

One problem that often occurs with microfluidics is the storage of liquid reagents on the chip. This often conflicts with either dry-stored reagents on the chip, the available space, or the volume of the liquid. For this reason, *microfluidic ChipShop* has developed several solutions to deal with this task, including our so-called "tank" solution as well as blister pouches.

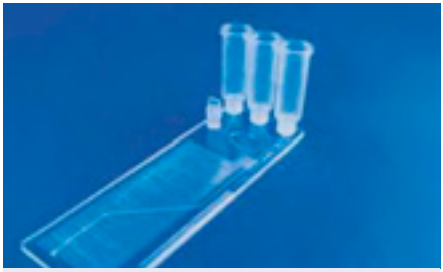


Fig. 109: Tanks mounted on a microfluidic chip

Fig. 110: Blister pouches integrated in a microfluidic chip

3.2.1 Tank

The "tank" solution allows the storage of liquids in separate tanks which are simply plugged onto the chip. The openings can be sealed with a heat-sealing aluminum foil which is piercable. Liquid actuation can also be done via the tanks either by a mechanical piston or pneumatic pressure.

3.2.1.1 Tank 500 µl

This tank version, which exists in single, double, and triple tank versions, has a volume of 500 µl and is 25 mm high.

Fig. 111: Single, double, and triple tank

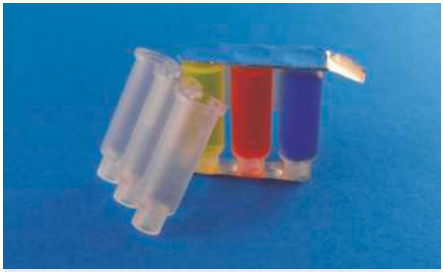


Fig. 112: Filled tanks sealed with alumina foil

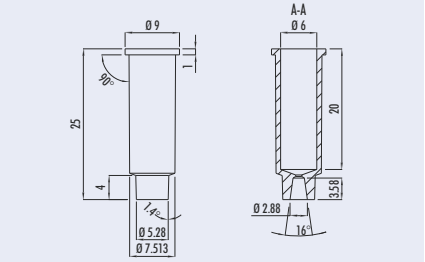


Fig. 113: Single tank

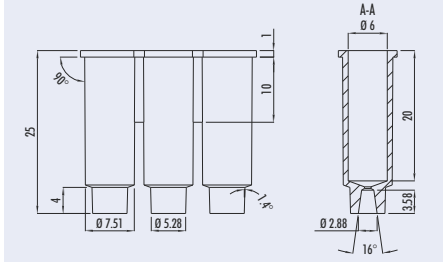


Fig. 114: Triple tank

Product Code	Description	Material	Price [€/10 pieces] 1+	10+	100+
16-0601-0229-09	Single Tank	PP	25.00	10.20	5.40
16-0602-0230-09	Double Tank	PP	26.00	11.80	5.80
16-0603-0231-09	Triple Tank	PP	27.00	12.40	6.10

3.2.1.2 Tank 4.5 ml

A larger tank version was created in order to allow for liquid storage up to 4.5 ml. This tank is offered as pure reservoir or with a cap allowing for a pneumatic actuation of the fluids. The fluidic interface is realized as male Luer connector.

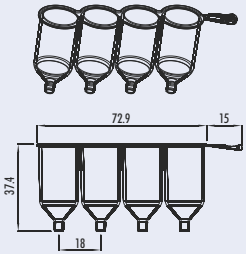


Fig. 115: Schematic tank layout – fluidic interface: male Luer

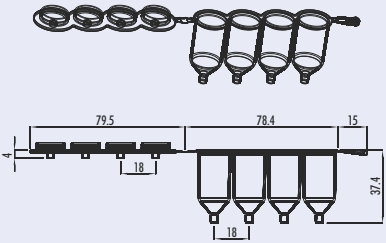


Fig. 116: Schematic tank layout with cap for pneumatic actuation

Product Code	Description	Material	Price [€/10 pieces] 1+	10+	100+
16-0604-0232-09	Row of 4 tanks	PP	35.00	22.00	9.40
16-0605-0233-09	Row of 4 tanks with cap	PP	38.00	25.00	11.40

3.2.2 Blister pouches

A convenient method for storing liquids on-chip is the use of blister pouches made out of a coated aluminum foil. They are available in a variety of sizes with internal volumes of up to 500 µl.

3.3 Tubing

3.3.1 Capillary PEEK tubing

The capillary PEEK tubing is intended to be used with the Upchurch Nanoports but is also suited for various other applications. One package contains 10 capillaries with a length of 12" (30.48 cm).

Fig. 117: Capillary PEEK tubing

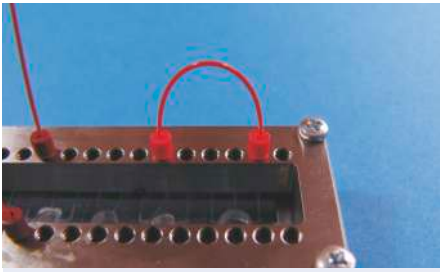


Fig. 118: Capillary PEEK tubing in use with nuts of the Upchurch Nanoport set in combination with a chip adapter frame

Product Code	Description	Price [€/10 pieces] 1+
09-530-0000-00	Capillary PEEK tubing 1575-12x OD: 795 µm (0.0313"), ID: 200 µm (0.008")	60.10

3.4 Microfluidic chip support kits – Microfluidic and chip-PCR support kits

The **microfluidic support kits** comprise different components necessary for running microfluidic systems. This includes tubes to bring the fluid into the chip, and silicone tubes to enable the interconnection between for example a *microfluidic ChipShop* fluidic platform chip and tubing, or between tubing and a syringe. Forceps can be used to stop a flow by clamping a silicone tube and syringes to fill chips manually.

These small kits allow you to directly start with your microfluidic experiments without losing time searching for suitable components.

Comparable to the **microfluidic support kits**, the **chip-PCR support kits** enable you to directly start with your continuous-flow PCR from the fluidic side. They include tubes and mineral oil to drive the PCR. Besides this and the PCR system consisting of chip and thermocycler, only your own biological reagents are needed to start the PCR.

Fig. 119: Microfluidic support kit 1

Fig. 120: Chip-PCR support kit 1

Product Code	Kit Type	Product Description	Price [€/kit]
11-0800-0000-00	Microfluidic support kit 1	**Microfluidic support kit 1:** - Silicone tube (ID: 0.5 mm, OD: 3 mm, 1 m) - PTFE tube (ID: 0.5 mm, OD: 1 mm, 2 m) - forceps (3) - single-use syringes (3) - syringe adapter (3)	27.80
11-0850-0000-00	PCR support kit 1	**Chip-PCR support kit 1:** *ChipGenie edition T* support kit - Silicone tube (ID: 0.5 mm, OD: 3 mm, 1 m) - PTFE tube (ID: 0.5 mm, OD: 1 mm, 2 m) - mineral oil (3 ml) - mcs foil 007 – adhesive Al-tape (3 sheets)	28.90

3.5 Handling frames

To interface our microscopy-slide-sized microfluidic chips, we have developed stackable handling frames which comply with the SBS microtiter plate standard. They can therefore be handled with standard laboratory automation equipment and support the integration of microfluidic devices into your lab workflow. Four microscopy-slide-sized chips can be securely fixed in the frames. The frames are available in different colors for a safe differentiation of different applications.

Furthermore, they are available in two versions: One handling frames has the standard skirt of the microtiter plate, the second one is version with reduced height, still complying with standard robots but allowing for a read out of the chips in plate readers or inverted optical microscopes with a reduced optical working distance.

Fig. 121: Handling frame

Fig. 122: Handling frame with different chip types connected with each other

Product Code	Description	Color	Price [€/pieces] 1+	5+	20+
15-4000-0000-12	Handling frame with high skirt	Yellow	22.00	15.00	12.40
15-4001-0000-12	Handling frame with high skirt	Orange	22.00	15.00	12.40
15-4002-0000-12	Handling frame with high skirt	Red	22.00	15.00	12.40

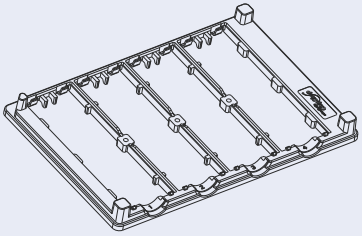


Fig. 123: Schematic drawing of handling frame with flat skirt

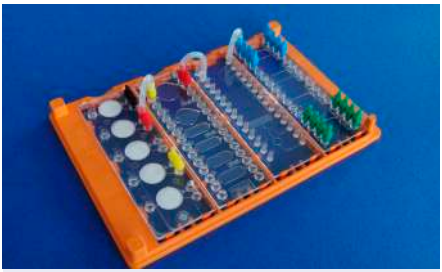


Fig. 124: Handling frame with flat skirt with different chip types connected with each other

Product Code	Description	Color	Price [€/pieces] 1+	10+	100+
15-4003-0000-12	Handling frame with reduced skirt height	Orange	22.00	15.00	12.40

3.6 Microfluidic connector probes

Microfluidic connector probes (formerly available from Cascade Microtech) allow an easy, bubble-free, reusable, and non-destructive fluidic and electrical contacting of planar microfluidic chips. Applications include chip-based electrophoresis, electrokinetic pumping or mixing. The microfluidic probes contain fluidic and/or electrical connections and are available in three different versions. The probes have a 6.35 mm diameter hole for connection to a fixture (not included):

MFP:
Provides fluidic contact via a planar sealing face.
Fluidic input is provided by a standard Upchurch Nanoport connector.

EBP:
Provides electrical contact for up to 5 kV to a chip through a platinum wire tip.
The holder provides insulation between the probe tip and positioner.

MFP-HV:
Combines fluidic and electrical contacts (up to 5 kV). Ideal for chip-based electrophoresis experiments in case of planar chips with holes as fluidic reservoirs.

Fig. 125: MFP – fluidic probe

Fig. 126: EBP – electrical probe

Fig. 127: MFP-HV – fluidic and electrical probe

Product Code	Description	Price [€/per probe]			
		1	2+	4+	10+
09-0520-0000-00	MFP – fluidic probe	255.00	235.00	215.00	195.00
09-0521-0000-00	EBP – electrical probe	415.00	385.00	355.00	320.00
09-0522-0000-00	MFP-HV – fluidic and electrical probe	495.00	450.00	395.00	355.00
09-0523-0000-00	Spare electrode for MFP electrical probe	19.00	18.00	17.00	15.00

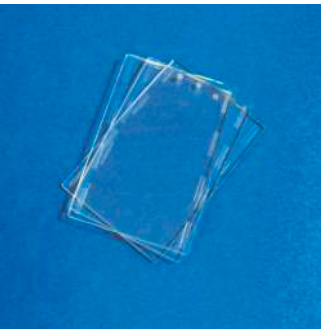
3.7 Reagents

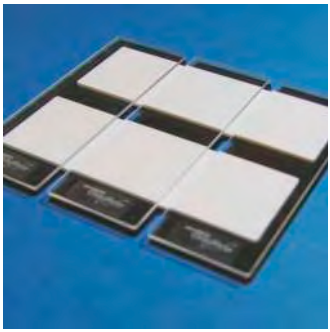
In order to enable a convenient use of our microfluidic systems, reagents are offered to fulfill special requirements. This includes for instance reagents usable with different polymer materials offered in the catalogue or being compatible with reactions carried out on chip.

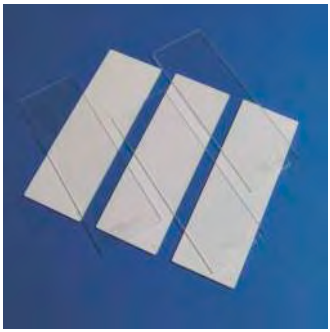
3.7.1 Oil

Special oils are used in microfluidic systems e.g. in droplet generator chips to generate and separate individual droplets, in PCR chips to avoid evaporation or the separation of sample plugs. The right choice of the oil is crucial since viscosity, material and reaction compatibility have to be taken into consideration.

Product Code	Description	Material compatibility	Application	Price [€/10 ml]
20-5002-0000-00	mcs-oil-02	PC	PCR compatible	28.50
20-5004-0000-00	mcs-oil-04	PC, PMMA, COC (Topas), COP (Zeonor)	PCR compatible	35.40







4. Polymer substrates & foils

Polymer substrates & foils

Some interesting materials that are useful in microfluidics, in particular a range of different polymers, are either not commercially available as plate materials or not of sufficient quality for the special requirements of microfabrication. If you are in need of plain substrate material, e.g. for hot embossing experiments or as unstructured platform for surface chemistry experiments, we can provide you with substrates in our standard formats like the microscopy-slide, the ¼-microtiterplate (43 mm x 64 mm) or round substrates with a diameter of 115 mm. Wafers, to be used, for instance, as substrates for hot embossing, come in several units in one package. If surface quality matters, each wafer is separately packaged.

The dimensions of the substrates may differ in the range of 0.5% depending on the material.

If the material or the color you require is not listed, we are happy to provide you with a special quote for substrate for your material needs.

Besides the thicker polymer substrates in various formats special foil materials in different thickness are available.

4.1 Wafer format – 115 mm diameter

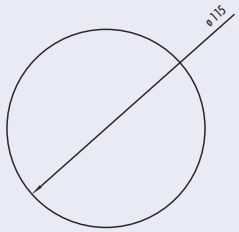


Fig. 128: Schematic drawing of 115 mm diameter wafer

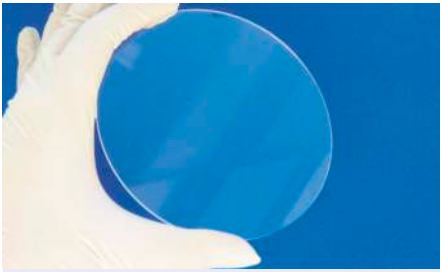


Fig. 129: 115 mm diameter wafer

Product Code	Material	Comment	Price [€/per unit*] 1+	10+	50+
10-0650-0000-02	Topas	thickness 1.5 mm	70.00	60.00	35.00
10-0651-0000-03	PC		70.00	60.00	35.00
10-0652-0000-04	Zeonex		70.00	60.00	35.00
10-0660-0000-05	Zeonor		70.00	60.00	35.00
10-0653-0000-02	Topas	thickness 2.0 mm	70.00	60.00	35.00
10-0654-0000-03	PC		70.00	60.00	35.00
10-0655-0000-04	Zeonex		70.00	60.00	35.00
10-0661-0000-05	Zeonor		70.00	60.00	35.00
10-0656-0000-02	Topas	thickness 1.5 mm, individually wrapped	75.00	62.00	36.00
10-0657-0000-03	PC		75.00	62.00	36.00
10-0658-0000-04	Zeonex		75.00	62.00	36.00
10-0659-0000-05	Zeonor		75.00	62.00	36.00

*1 unit consists of 10 wafers

4.2 Microscopy slide format (75.5 mm x 25.5 mm)

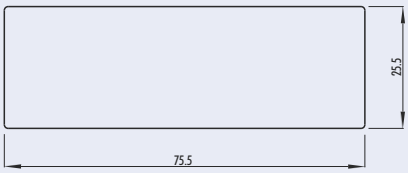


Fig. 130: Schematic drawing of the slide substrate

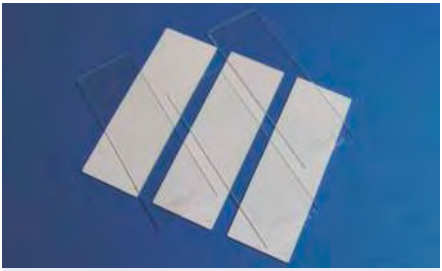


Fig. 131: Various polymeric substrates in the format of a microscopy slide

Product Code	Material	Comment	Price [€/per unit*] 1+	10+	50+
10-0671-0000-01	PMMA	thickness 1.0 mm, individually wrapped	55.00	30.00	22.00
10-0662-0000-02	Topas		55.00	30.00	22.00
10-0663-0000-03	PC		55.00	30.00	22.00
10-0664-0000-04	Zeonex		55.00	30.00	22.00
10-0672-0000-05	Zeonor		55.00	30.00	22.00
10-0673-0000-01	PMMA	thickness 1.5 mm, individually wrapped	55.00	30.00	22.00
10-0675-0000-02	Topas		55.00	30.00	22.00
10-0666-0000-03	PC		55.00	30.00	22.00
10-0667-0000-04	Zeonex		55.00	30.00	22.00
10-0674-0000-05	Zeonor		55.00	30.00	22.00
10-0668-0000-02	Topas	thickness 4.0 mm, individually wrapped	75.00	35.00	26.00
10-0669-0000-03	PC		75.00	35.00	26.00
10-0670-0000-04	Zeonex		75.00	35.00	26.00

*1 unit consists of 10 wafers

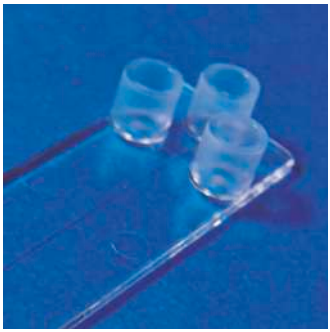
4.3 Foils

For special needs thin foils in various materials are offered. This includes pure polymer foils as well as pressure sensitive adhesive tapes.

Product Code	Description	Material	Thickness [µm]	Price [€/m²] 1+	5+	10+
10-0680-0000-05	mcs foil 005	Zeonor	188	120.00	104.00	98.00
10-0681-0000-05	mcs foil 015	Zeonor	100	120.00	104.00	98.00
10-0682-0000-05	mcs foil 051	Zeonor	50	110.00	94.00	88.00
10-0683-0000-05	mcs foil 049	Zeonor	40	110.00	94.00	88.00
10-0684-0000-02	mcs foil 028	Topas	300	78.00	52.50	38.50
10-0685-0000-02	mcs foil 029	Topas	240	78.00	52.50	38.50
10-0686-0000-02	mcs foil 011	Topas	140	78.00	52.50	38.50
10-0687-0000-00	mcs foil 008	Double sided pressure sensitive adhesive tape	140	78.00	52.50	38.50

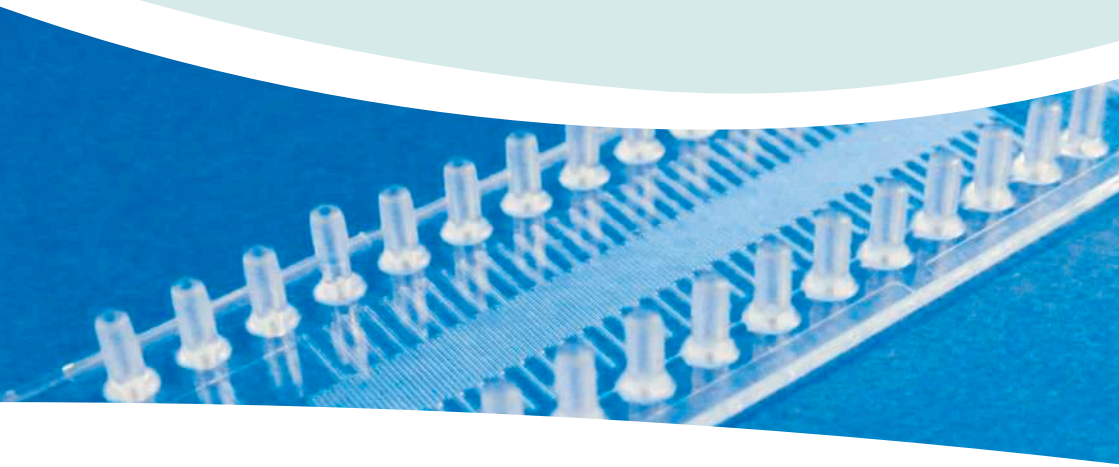
Precise dimensions of the foils may vary and are available on request.


SYSTEM 1




ChipGenie

5. Instruments & applications



Instruments & applications

Using microfluidic systems in the daily laboratory life usually requires not only the chips but also the relevant instrumentation. Here, our ChipGenie® editions come into play.

ChipGenie® edition T, for instance, consists of both chips in a variety of formats and a matching temperature control unit to enable you to directly start your reactions/amplifications in a fraction of the time compared to conventional instruments.

ChipGenie® edition E, an extremely compact electrophoresis system, allows the label-free detection of small ions thanks to its contactless conductivity detection scheme. Again, the instrument is complemented by a variety of chips ideally suited for the system.

5.1 Continuous-flow-chip-PCR ChipGenie® edition T

microfluidic ChipShop and Clemens GmbH offer an innovative system for PCR on the chip. Different from conventional PCR with heating-up and cooling-down cycles, in this chip-PCR system the complete reaction vessel is temperature controlled: The PCR solution flows through separated temperature zones, winding itself through the temperature profile. The time-determining step in PCR – the carrying out of the repeated heating and cooling cycles – is no longer necessary since the temperature in the heating zones remains constant and only the liquid undergoes the temperature cycling.

The PCR system comprises the PCR chip and the thermocycler (or better: thermal control unit, as no cycling in the conventional sense is involved) that has been specially developed for Lab-on-a-Chip applications. A pump moves the PCR solution through the chips. In comparison to conventional systems, this lab-on-a-chip PCR system allows for a significant reduction of the PCR reaction time: Without much optimization, a 15-cycle PCR can be completed in less than five minutes.

In order to allow you easy use of the PCR system we offer **chip-PCR support kits** (that include tubes and mineral oil for pumping the PCR solution) as well as **pumps** for the driving of the fluids.

Product Code	Lid Thickness [µm]	Material	Comments Design Channel Dimensions Width / Depth / Length	Price [€/chip] 1+	10+	100+	1000+
08-0470-0047-03	250	PC	15 cycles (1 inlet, 1 outlet) 500 µm / 100 µm / 810 mm	42.50	32.50	25.50	12.00
08-0471-0065-03	250	PC	36 cycles (2 inlets, 3 outlets) 220 µm / 100 µm / 1,257 mm	42.50	32.50	25.50	12.00
08-0472-0061-03	250	PC	41 cycles (1 inlet, 1 outlet) 200 µm / 100 µm / 1,879 mm	42.50	32.50	25.50	12.00

Product Code	Description	Price [€]
08-0493-0000-00	***ChipGenie edition T*⁺ instrument**	14,980.00
11-0850-0000-00	***ChipGenie edition T* support kit:** - Silicone tube (ID: 0.5 mm, 1 m) - PTFE tube (ID: 0.5 mm, 2 m) - mineral oil (3 ml) - mcs foil 007 – adhesive Al-tape (3 sheets)	28.90

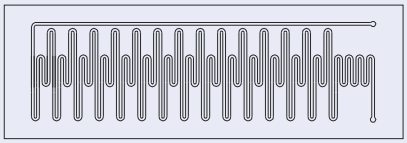


Fig. 132: Schematic drawing of 15-cycle continuous-flow PCR chip

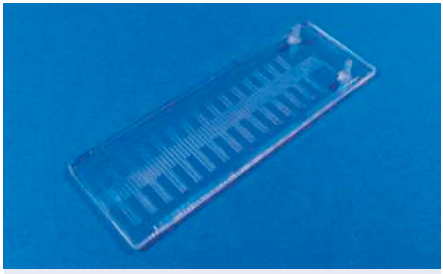


Fig. 133:15-cycle continuous-flow PCR-chip

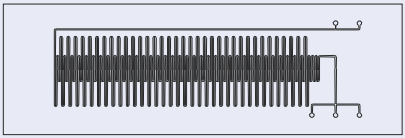


Fig. 134: Schematic drawing of 36-cycle continuous-flow PCR chip

Fig. 135: 36-cycle continuous-flow PCR chip

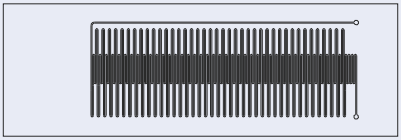


Fig. 136: Schematic drawing of 41-cycle continuous-flow PCR chip

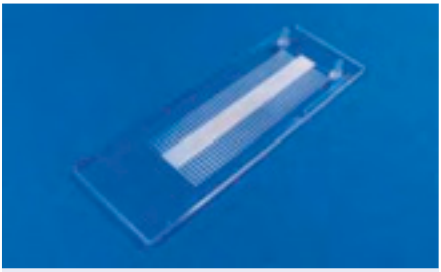


Fig. 137: 41-cycle continuous-flow PCR-chip

Fig. 138: Chip-PCR support kit

Fig. 139: ChipGenie® edition T+ instrument

5.2 Capillary electrophoresis system with contactless conductivity detection – ChipGenie® edition E

ChipGenie® edition E is an extremely compact electrophoresis system that allows the label-free detection of small ions thanks to its capacitively coupled contactless conductivity detection (C^4D) scheme. The extremely rugged instrument with the size of a cigar box contains a bipolar high-voltage supply for the separation of both anions and cations and a high-frequency detection circuit. It is controlled through an easy-to-use software program and is powered through its USB port. The instrument is complemented by a variety of chips ideally suited for the system. Applications include the analysis of foodstuffs, water, or other sources of small ions as well as larger molecules from biological samples.

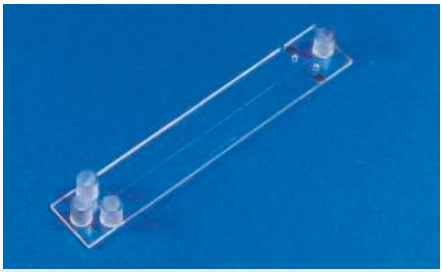


Fig. 140: Microfluidic chips for the ChipGenie® edition E series

Fig. 141: ChipGenie® edition E capillary electrophoresis unit

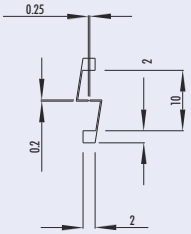


Fig. 142: Details of the electrodes

Fig. 143: Microscopy image of electrodes over microchannel

Product Code	Channel Width [µm]	Channel Depth [µm]	Channel Length [mm]	Geometry A	B	C	D [mm]	Lid Thickness [µm]	Material	Price [€/chip] 1+	10+	100+
03-0110-0082-01	50	50	87.0	6.0	5.0	5.0	0	60	PMMA	125.00	85.00	32.50
03-0111-0082-01	50	50	87.0	6.0	5.0	5.0	0.1	60	PMMA	125.00	85.00	32.50
03-0798-0166-01	100	100	87.0	6.0	5.0	5.0	0	60	PMMA	125.00	85.00	32.50
03-0799-0166-05	100	100	87.0	6.0	5.0	5.0	0	50	Zeonor	125.00	85.00	32.50

Product Code	Description	Price [€/instrument]
08-0486-0000-00	*ChipGenie® edition E* instrument	3,780.00

5.3 On-chip sample-preparation system – ChipGenie® edition P

ChipGenie® edition P is an instrument for on-chip sample preparation steps like DNA-extraction or cell lysis. The instrument in the size of a cigar box features a click–in holder frame for microscope slide format chips and contains a linearly moving magnet as well as a temperature control. The heating element as well as the permanent magnet is located underneath the chip as shown in Fig. 144. LED signals indicate the current operating status and a LCD display indicates the set temperature, alternatively the actual temperature. The arrangement of the switches provides a comfortable handling for pipetting in manual use. The instrument is a bench top instrument with a 5V DC power supply.

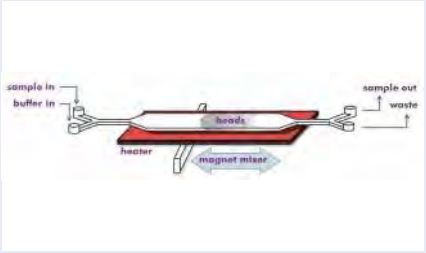


Fig. 144: Principle of a bead-based assay with the ChipGenie® edition P instrument

Fig. 145: ChipGenie® edition P instrument with bead-filled sample-prep chip

Product Code	Description	Price [€/instrument]
08-0487-0000-00	ChipGenie® edition P instrument	695.00

5.3.1 Chips eP1 – chips for ChipGenie® edition P

The chips highlighted below are suited to be run with the ChipGenie® edition P instruments.

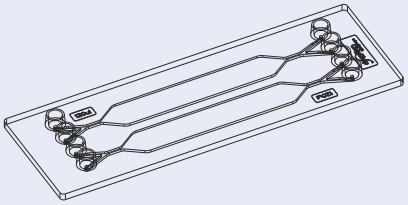


Fig. 146: Schematic drawing of the rhombic chamber chip

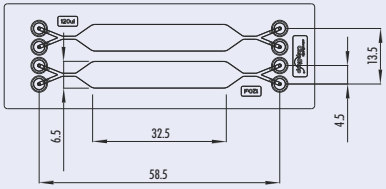


Fig. 147: Rhombic chamber chip – 120 µl chamber volume

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0901-0172-01	120	500	250	PMMA	-	36.20	24.30	16.10
12-0902-0172-02	120	500	140	Topas	-	36.20	24.30	16.10
12-0903-0172-03	120	500	175	PC	-	36.20	24.30	16.10
12-0904-0172-05	120	500	188	Zeonor	-	36.20	24.30	16.10
12-0905-0172-01	120	500	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0906-0172-02	120	500	140	Topas	hydrophilized	39.20	26.30	17.80
12-0907-0172-03	120	500	175	PC	hydrophilized	39.20	26.30	17.80
12-0908-0172-05	120	500	188	Zeonor	hydrophilized	39.20	26.30	17.80

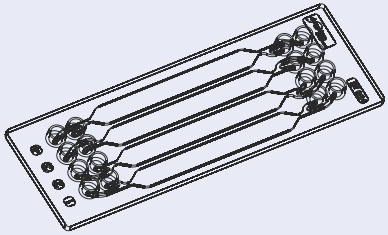


Fig. 148: Schematic drawing rhombic chamber chip

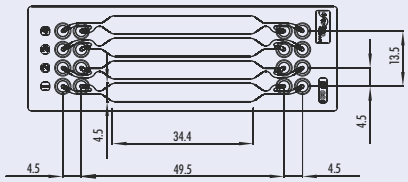


Fig. 149: Rhombic chamber chip – 100 µl chamber volume

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0909-0221-01	100	600	250	PMMA	-	36.20	24.30	16.10
12-0910-0221-02	100	600	140	Topas	-	36.20	24.30	16.10
12-0911-0221-05	100	600	188	Zeonor	-	36.20	24.30	16.10
12-0912-0221-01	100	600	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0913-0221-02	100	600	140	Topas	hydrophilized	39.20	26.30	17.80
12-0914-0221-05	100	600	188	Zeonor	hydrophilized	39.20	26.30	17.80

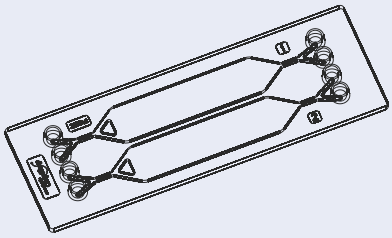


Fig. 150: Schematic drawing rhombic chamber chip

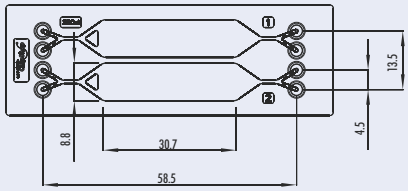


Fig. 151: Rhombic chamber chip – 250 µl chamber volume

Product Code	Chamber Volume [µl]	Chamber Depth [µm]	Lid Thickness [µm]	Material	Surface Treatment	Price [€/chip] 1+	10+	100+
12-0915-0194-01	250	800	250	PMMA	-	36.20	24.30	16.10
12-0916-0194-02	250	800	140	Topas	-	36.20	24.30	16.10
12-0917-0194-05	250	800	188	Zeonor	-	36.20	24.30	16.10
12-0918-0194-01	250	800	250	PMMA	hydrophilized	39.20	26.30	17.80
12-0919-0194-02	250	800	140	Topas	hydrophilized	39.20	26.30	17.80
12-0920-0194-05	250	800	188	Zeonor	hydrophilized	39.20	26.30	17.80

5.4 Syringe pump

The cetoni neMESYS syringe pump is a high-end syringe pump for extremely precise dosing and pumping of fluids. The pump can be easily controlled by the user-friendly software with a comfortable user interface.

Major benefits are that a) fluids can be pumped and sucked, b) the valve allows switching between sample taking and sample dosing, and c) the pump operates nearly pulsation free.

With these pumps, microfluidic set-ups can be realized where sample plugs of only a few microliters or even less have to be pumped back and forth and need to always reach the same point in the microfluidic chip.

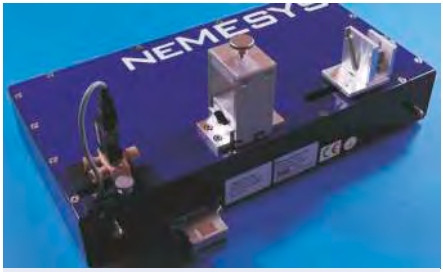


Fig. 152: cetoni neMESYS syringe pump, starter unit with valve

Fig. 153: cetoni neMESYS syringe pump system in use

Product Code	Description	Price [€/instrument]
11-0900-0000-00	cetoni neMESYS syringe pump, starter unit, valve	3,852.90

5.5 MicCell Fluid Processor

The MicCell Fluid Processor system contains all macroscopic actuators that control liquid handling: syringe pump(s), macrovalves (either turn/selector valves or simple on/off valves), and/or the control electronics for hydrogel microvalve(s). It can be controlled by a graphics-oriented Windows software.

The picture shows the MicCell FP-1-1-standard Fluid Processor that contains a syringe pump with 3-way valve (left), a hydrogel valve control and a 2/2 macrovalve (middle) and a 4/1-selector valve (right). Other configurations are available.

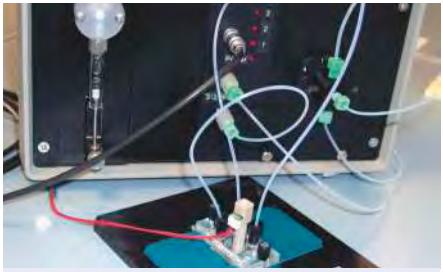


Fig. 154: MicCell FP-1-1-standard Fluid Processor. Foreground: MicCell with hydrogel valve in its blue support and black adapter plate

Product Code	System Type	Product description	Price [€/instrument]
08-0489-0000-00	MicCell FP-1-1-standard	1x syringe pump, 1x 1/4-selector valve, 1x 2/2-macrovalve, 1x hydrogel valve control	5,300.00
08-0490-0000-00	MicCell FP-2-0	2x syringe pumps (no 1/4-selector valve, no 2/2-macrovalve, no hydrogel valve control)	5,300.00
08-0491-0000-00	MicCell FP-2-1	2x syringe pump, 1x 1/4-selector valve (no 2/2-macrovalve, no hydrogel valve control)	7,050.00
08-0492-0000-00	MicCell FC1 Software	For the interactive control of 1-8 syringe pumps	970.00

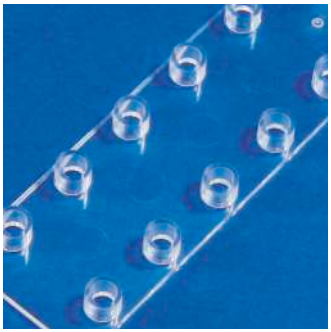
5.6 Elveflow Pressure Generators

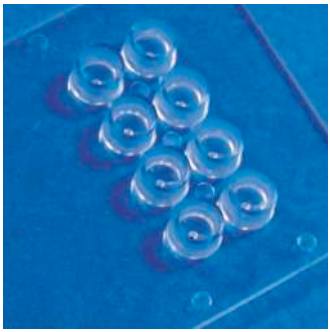
Elveflow Pressure Generators integrate pressure controller and pressure source and thus provide you with an autonomous source to generate and control pressure for your microfluidic chip – no further pressure or vacuum lines or pumps are required. Based on their low weight (1.2 kg) and small footprint (15 x 15 cm), these instruments are highly transportable and allow you to set up your experiments at a convenient place within minutes: Typically it takes approx. 5 min for the first installation and about 2 minutes prior to every experiment. In addition, these units provide accurate, stable, and quickly responding pressure settings.

Fig. 155: Elveflow Pressure Generators

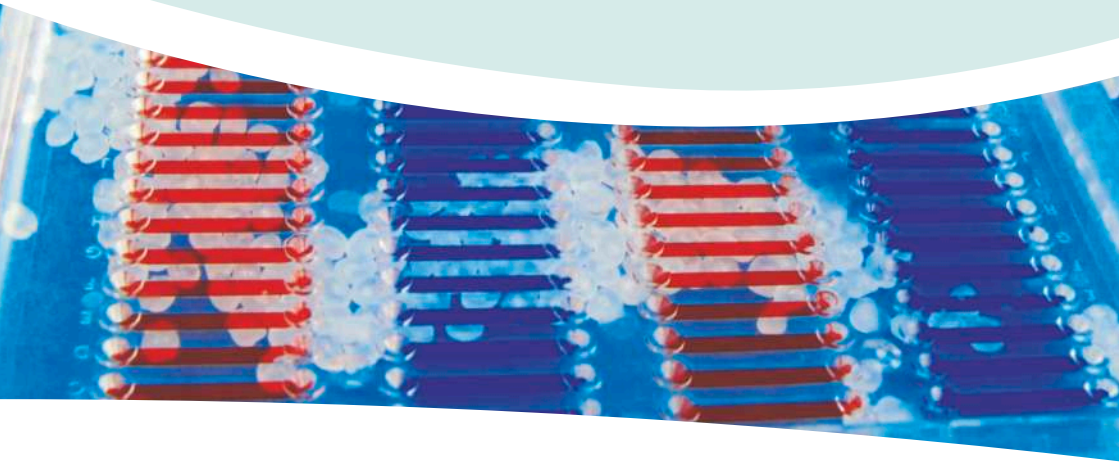
Product Code	Description	Pressure Range	Precision	Stability	Response Time [s]	Price [€]
11-0851-0000-00	Large Range Pressure Generator	0-1.6 bar	1 mbar	1 mbar	< 1	2,572.00
11-0852-0000-00	High Precision Pressure Generator	0-200 mbar	100 µbar	300 µbar	< 1	3,762.00
11-0853-0000-00	Vacuum Pressure Generator	0- -600 mbar	1 mbar	1 mbar	< 1	2,926.00

Delivery times for these articles is 4 weeks minimum.





6. Fabrication services



Fabrication services

The main part of our work is dedicated to the realization of custom-designed chips. We assist in the proper microfluidic design, the adoption of the design to fabrication needs, as well as the choice of the appropriate fabrication technology.

In order to assist you in your design work, chapter **6.1 General design guidelines for polymer-based microfluidic devices** helps you to judge the feasibility of design features of microfluidic chips.

Chapter **6.2 Fluidic platforms for custom design** helps you in making the proper choice of, for example, proprietary microfluidic chip formats versus standard formats or of the appropriate fluidic interface, also considering cost and functional aspects.

6.1 General design guidelines for polymer-based microfluidic devices

The manufacturability of a device depends on the individual design and the interaction between its various design elements. In this respect, the following design guidelines for polymer-based microfluidic devices give the user a better understanding of possible limitations in the design of a specific structure. For the microfluidic design, two aspects besides the functionality have to be considered right at the start of the design process: It must firstly be checked whether the design can be realized by replicative technologies – allowing for low-cost mass-manufacturing – like injection molding, and secondly whether the back-end processes, in particular the assembly (usually the secure sealing of the fluid with a cover lid), can be ensured.

Besides the purely technical constraints, cost considerations can also have an influence on the chosen manufacturing route, as different methods for mold insert fabrication have different technical constraints (minimum feature size, maximum height, surface roughness, etc.) as well as different cost ranges.

a) Feature density

In order to allow for a good bond between a structured part and a cover foil, two adjacent channels or similar features should be separated by at least twice their width, but not less than 200 µm.
Not more than 50% of the overall surface area should be covered with structural elements.

b) Distance to device edges

In order to allow for a good bond, features should have a minimum distance from the edge of the device of 2 mm. The larger the device and the feature size, the larger this distance should be.

c) Minimum feature depth

Structures should have a minimum depth of 5 µm for features < 100 µm. For features between 100 and 1000 µm, the minimum depth is 15 µm.

d) Minimum residual thickness of the device

The minimum residual thickness of the device in structured areas (see Fig. 156) is 500 µm for areas > 1 cm^2. For smaller areas, a lower residual thickness might be possible, depending on the overall device layout.

e) Maximum feature width

There is no practical limit to the feature width, however in the case of features wider than 4 mm, support structures to prevent the cover lid from sagging might have to be included in the design.

f) Aspect ratio

For injection molded parts, the aspect ratio for microstructured elements should be less than 2.

g) Through-holes

The minimum diameter of through-holes realized by standard core pins is 500 µm. Smaller holes can be realized with additional means upon request.

h) Open areas

Open areas (see Fig. 156) are possible.

Fig. 156: Through-holes, open and structured areas

6.1.1 General design guidelines for mechanically machined mold inserts

For mold inserts fabricated using precision machining for example in brass or stainless steel), the following design restraints are valid in addition to the ones given above:

a) Minimum feature size

The minimum feature size for sunk features (i.e. features where the mold insert material has to be removed; see Fig. 157) is 50 µm. For features in the range between 50 and 100 µm, the aspect ratio is limited to 1.5.

b) Minimum radius of curvature

At intersecting features (e.g. channel crossings), a radius of curvature of 40 µm occurs as standard.

c) Feature heights

Different height steps as well as slopes of up to 45°–90° (depending on absolute feature size) are possible.

d) Surface roughness

Mechanical machining results in a surface roughness of the order of 0.5–1 µm RMS. The features can be polished if protruding (e.g. channel floors in the polymer part which are ridges in the mold insert; see Fig. 157), to create an optical finish (roughness < 50 nm RMS).

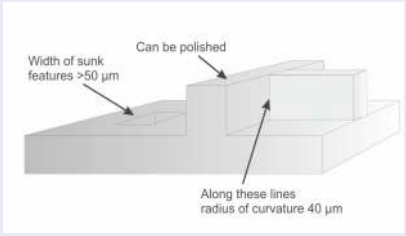


Fig. 157: Features of a milled mold insert

6.1.2 General design guidelines for mold inserts fabricated using lithography and electroplating

For mold inserts fabricated using lithography and electroplating (either e.g. from a silicon or glass master), the following design restraints are valid in addition to the ones given above:

a) Minimum feature size

The minimum feature size is 10 µm. For features in the range between 10 and 100 µm, the aspect ratio is limited to 1.5.

b) Maximum height

For lithography-based mold inserts, the maximum feature height is 100 µm.

6.2 Fluidic platforms for custom design

The investment in an injection-molding tool is quite frequently between the choice of a chip in a unique outer format and an existing format. *microfluidic ChipShop*'s unique "Design-your-Lab Catalogue" enables you to benefit from existing injection-molding tools for quite common microfluidic chip formats like the microscopy slide, the microtiter plate, or the CD, avoiding the costs of investing in your own injection-molding tool.

Within this chapter, our standard formats, including various kinds of fluidic interfaces, are summarized. The interfacing side of the device has a fixed geometry while the bottom part is free for your individual design.

6.2.1 Microscopy slide format

The microscopy slide format (75.5 mm x 25.5 mm x 1.5 mm) is now an accepted standard in the lab-on-a-chip field and has several advantages: A handy format that makes manual manipulation easy, not too big and not too small, it fits perfectly onto any microscope, and handling frames can be used in order to place the microscopy slide inside and to work with existing laboratory equipment systems, for example for filling or read-out.

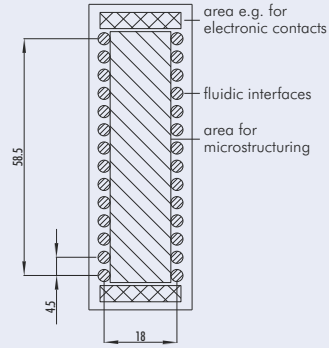


Fig. 158: Principle drawing of a microscopy slide with fluidic interfaces – in this version, fluidic interfaces are grouped along the long sides of the chip.

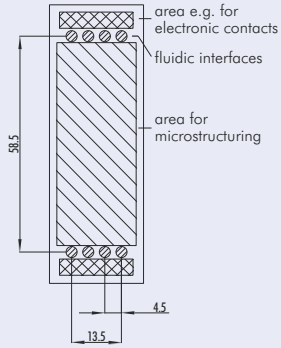


Fig. 159: Principle drawing of a microscopy slide with fluidic interfaces – in this version,fluidic interfaces are grouped along the short sides of the chip

The chip-to-world interface frequently remains a challenge – and standard solutions and solutions optimized for microfluidic applications are directly at hand. This raises two questions that are promptly answered by *microfluidic ChipShop*'s fluidic platforms:

I. The kind of fluidic interface:
microfluidic ChipShop's microscopy slide formats are available with:
- Simple through holes
- Olives as tube interfaces
- Female Luer connectors
- Female mini Luer connectors

II. The position of the fluidic interface:
- Grouped along the long side with 9 mm spacing, corresponding to the spacing of a 96-well plate
- Grouped along the long side with 4.5 mm spacing, corresponding to the spacing of a 384-well plate
- Grouped along the short side with 4.5 mm spacing, corresponding to the spacing of a 384-well plate

As highlighted above, the range of fluidic interfaces offered with the microscopy slide format includes simple through-holes, olives, and Luer and Mini Luer connectors. All connectors are spaced according to the well-spacing of a 384-well microtiter plate, e.g. with a center-center distance of 4.5 mm between connectors except for the standard Luer connectors working with the spacing of a 96-well plate of 9 mm in order to allow pipetting robots or other automated equipment to be used.
One of the microscopy slide chip families is characterized by 16 interfaces with 4.5 mm spacing along the long side, which allows two rows of eight reagents from a microwell plate to be pipetted and the use of a conventional eight-times multipipette.

6.2.1.1 Microscopy slide platforms – Fluidic interface: Through holes

The **through-hole platforms** are frequently used with O-rings or membranes integrated in an instrument in order to give a proper sealing via press fittings. They are also a good interface for pipettes. One additional advantage of this interface besides the ease of application is the potential storage of the chips after use, as the interfaces can be sealed with tape to prevent contamination or evaporation. A drawback of this kind of interface is the low pressure stability on the chip-side of the connection, which has to be countered with a suitable counterpart on the instrument side. Standard diameter for the through-holes is 0.8 mm (top) and 0.5 mm (bottom); other diameters are available upon request.

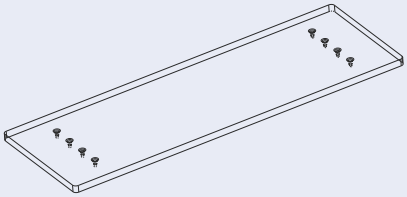


Fig. 160: Microscopy slide through-hole platform – version with eight fluidic interfaces

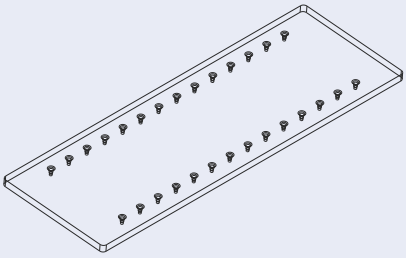


Fig. 161: Microscopy slide through-hole platform – version with 28 fluidic interfaces

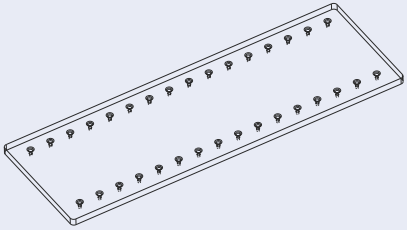


Fig. 162: Microscopy slide through-hole platform – version with 32 fluidic interfaces

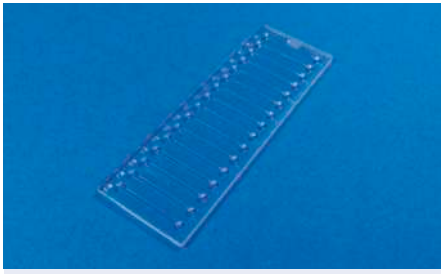


Fig. 163: Example of microscopy slide through-hole platform with 32 through-holes

6.2.1.2 Microscopy slide platforms – Fluidic interface: Olives

Our **olive microfluidic platforms** enable a direct interface of tubing and microfluidic chips. For example, silicone tubes can be used to connect the olives with standard PE or PTFE tubing or PEEK capillaries. The silicone tubing easily slides over the tapered olives and guarantees a hermetic seal up to pressures of approximately 3 bar (42 psi). This connector is especially suited to non-automated experiments where syringes or other external pumps are to be connected to the chip. To minimize experimental variations due to the pressure-induced expansion of a longer silicone tube, short sections of silicone tubing can be used to connect stiff tubes (e.g. PTFE, PEEK, or PE tubing) with either the chip or the pump. This interface results in a dead volume of roughly 2 μl due to the internal volume of the olives which is added to the dead volume of the tubing.

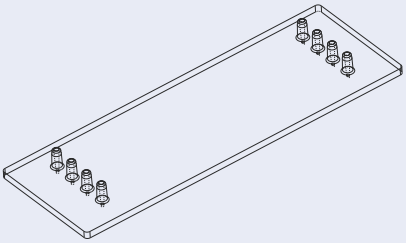


Fig. 164: Microscopy slide olive platform – version with eight fluidic interfaces

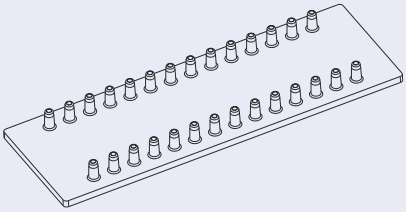


Fig. 165: Microscopy slide olive platform – version with 28 fluidic interfaces

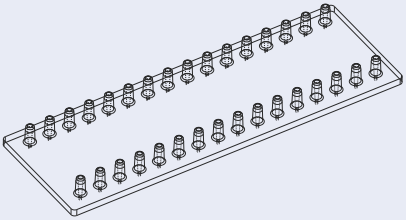


Fig. 166: Microscopy slide olive platform – version with 32 fluidic interfaces

Fig. 167: Example of microscopy slide olive platform with 28 olive fittings

6.2.1.3 Microscopy slide platforms – Fluidic interface: Luer

Our **Luer platforms** are equipped with standard Luer connectors known from the medical field and are especially suited for operations working with a male Luer counterpart, as is found in conventional syringes. This opens the way for manual operations and the direct transfer of samples taken with a syringe to the chip. Furthermore, they are perfectly suited as press-fittings to connect with an instrument. Luer microfluidic platforms are available with either Luer connectors on either side with a symmetrical arrangement and 9 mm spacing or five Luer connectors on either side with a spacing of 13.5 mm and an offset of 2.5 mm from the center. The Luer connectors ensure leak-tight connections up to pressures of several bar, enough for complex chips with comparatively high back-pressures.

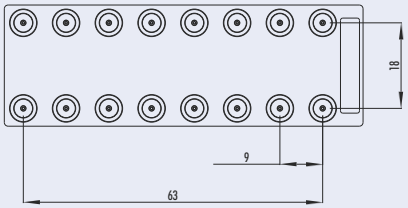


Fig. 168: Microscopy slide Luer platform – version 16 fluidic interfaces

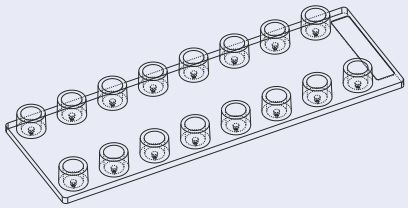


Fig. 169: Microscopy slide Luer platform – version 16 fluidic interfaces

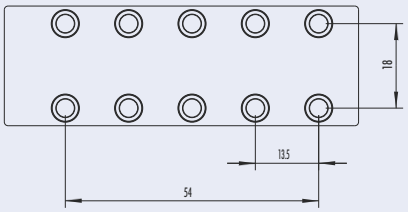


Fig. 170: Detail of the microscopy slide Luer platform with ten fluidic interfaces

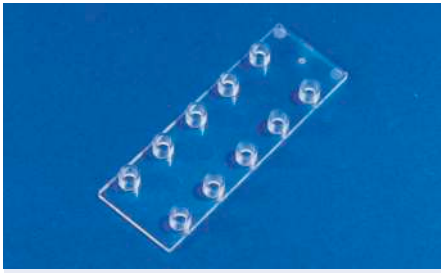


Fig. 171: Example of microscopy slide Luer platform with ten Luer interfaces

6.2.1.4 Microscopy slide platforms – Fluidic interface: Mini Luer

The Mini Luer microfluidic platforms combine the same advantages as their larger counterparts, with reduced dimensions (outer diameter 4 mm instead of 6 mm), thus allowing for more connectors on the chip. Up to 16 ports along the long side of a microscopy slide can thus be realized. Male Mini Luer plugs for closing the Mini Luer interface are available as well as adapter pins to connect silicone tubing to these chips, which increases the versatility of the various Mini Luer platforms.

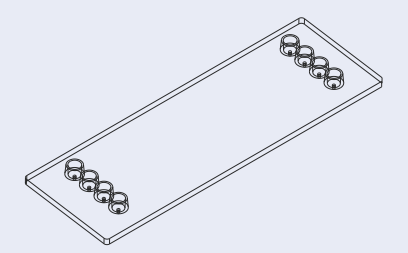


Fig. 172: Microscopy slide Mini Luer platform – version with eight fluidic interfaces

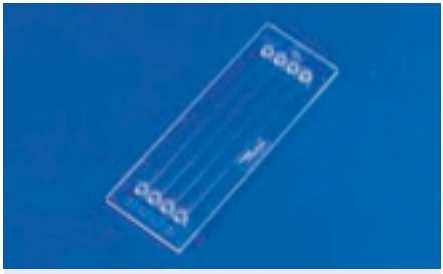


Fig. 173: Microscopy slide Mini Luer platform – version with eight fluidic interfaces

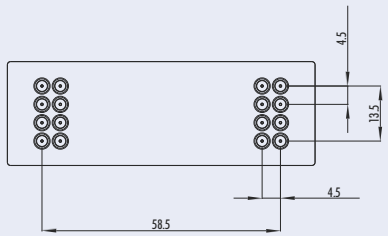


Fig. 174: Microscopy slide Mini Luer platform – version with 16 fluidic interfaces on the short edges

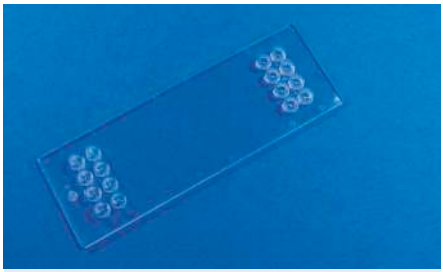


Fig. 175: Microscopy slide Mini Luer platform – version with 16 fluidic interfaces on the short edges

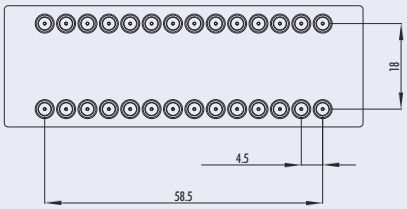


Fig. 176: Microscopy slide Mini Luer platform – version with 28 fluidic interfaces on the long edges

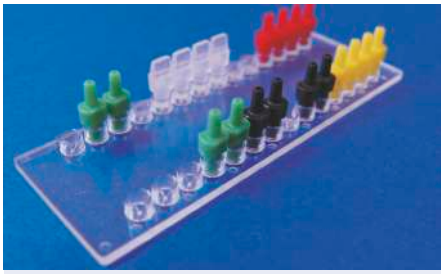


Fig. 177: Microscopy slide Mini Luer platform – version with 28 fluidic interfaces on the long edges

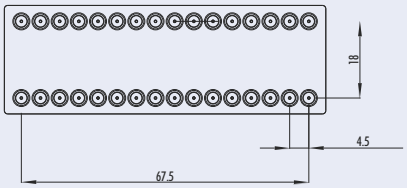


Fig. 178: Microscopy slide Mini Luer platform – version with 32 fluidic interfaces on the short edges

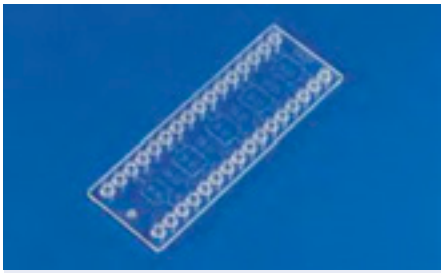


Fig. 179: Microscopy slide Mini Luer platform – version with 32 fluidic interfaces on the short edges

6.2.2 Microtiter plate format

The combination of the microfluidic world with its advantages with the well-known world of laboratory automation is the merger of microfluidics with the SBS standard microtiter plate (85.48 mm x 127.76 mm). Directly available from *microfluidic ChipShop* are several injection-molding tools to allow for the fabrication of microfluidic networks on the microtiter plate, ensuring the outer rim of the SBS pattern also fits with existing automation set-ups. Taking laboratory automation into consideration during the design phase, namely by incorporating fluidic interfaces and optical detection areas according to the well spacing of the microtiter plates, allows the use of, for example, pipetting robots or conventional plate readers for optical detection.

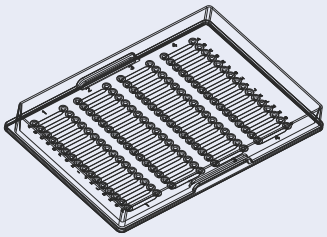


Fig. 180: Schematic drawing of one microfluidic microtiter plate

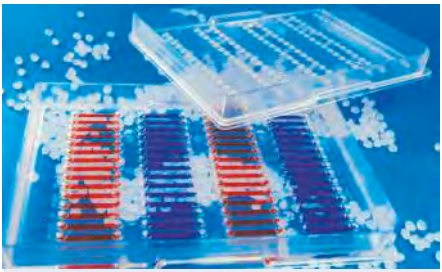


Fig. 181: Example of one of *microfluidic ChipShop's* microfluidic microtiter plates

6.2.3 ¼ Microtiter-plate format

For those applications which do not require the full size of a microtiter plate, a variation with a footprint of one-quarter of the titerplate is also available. This is particularly relevant for instruments with tighter size restrictions.

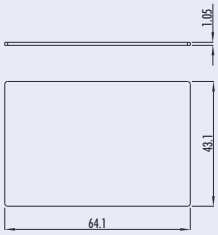


Fig. 182: Schematic drawing of 1/4 microtiter-plate

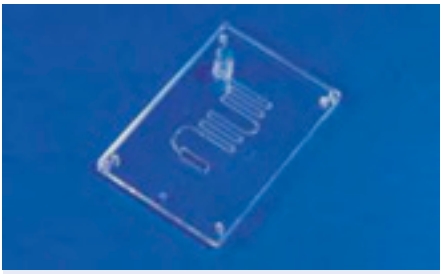


Fig. 183: Example for 1/4 microtiter-plate, realized within EU-FP7 project "CD-Medics", No. 216031. Design: IMM

6.2.4 Extended size platform format

This platform is for those who require chips in a long and narrow format (95 mm x 16 mm). Microstructured examples in this chip format are our electrophoresis chips. The platform is available with through-holes as well as with Luer connectors.

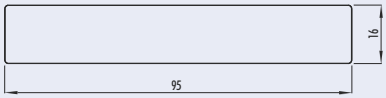


Fig. 184: Schematic drawing of the extended size platform with simple through-holes

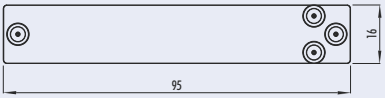


Fig. 185: Schematic drawing of the extended size platform with Luer interfaces

6.2.5 CD-format

For applications making use of liquid transport by centrifugal forces, a CD-sized tool is available. Please note that for this format, the central hole with a diameter of 15 mm is required plus the CD clamping region with diameter of 25 mm centered around the hole which cannot be used for structuring. Only open-hole fluidic access is possible in this format.

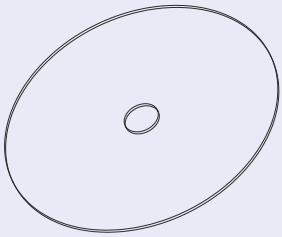


Fig. 186: Schematic drawing of the CD-platform

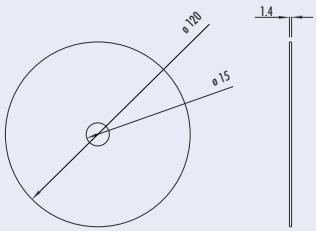


Fig. 187: CD-platform with measures

6.2.6 Pie-slice plate

A variation of the centrifugal platform is the pie-slice plate. This is a 60-degree sector of a circle and allows the modular assembly of different functions in different sectors of a disc. This format allows for higher fluidic volume applications than the CD format as it has a maximum thickness of 4 mm.

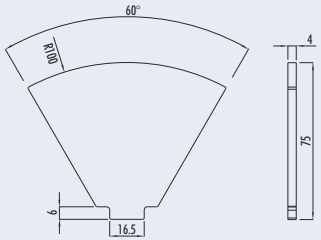


Fig. 188: Geometrical layout of the pie slice plate

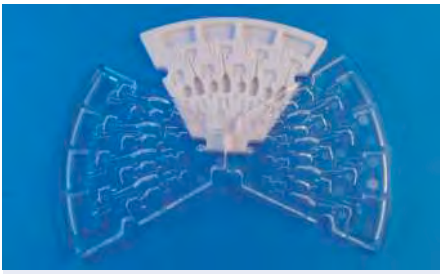
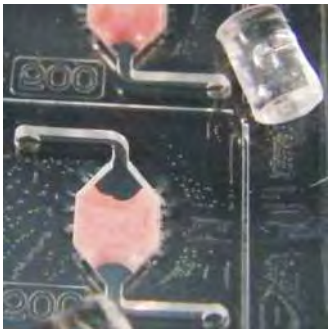
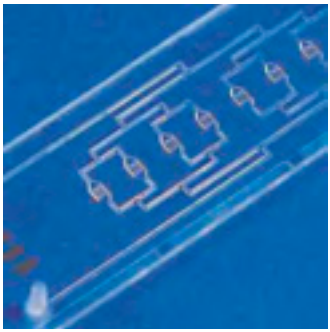


Fig. 189: Examples of pie slice plate chips.
The chips were developed within the BMBF-Project "ZentriLab", FKZ 16SV2350.





7. Finally – Some examples

Examples

Hopefully you were delighted by our *Lab-on-a-Chip Catalogue* and we were either able to serve you with standard microfluidic chips or we could provide you with a roadmap to your custom-made design. Finally, we would like to round up our *Lab-on-a-Chip Catalogue* with some examples of fluidic chips that might be an inspiration to you and also provide a good impression of our technological capabilities.

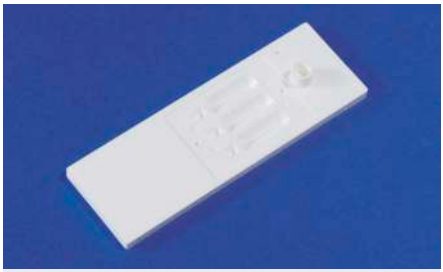


Fig. 190: Diagnostic platform with Luer connectors

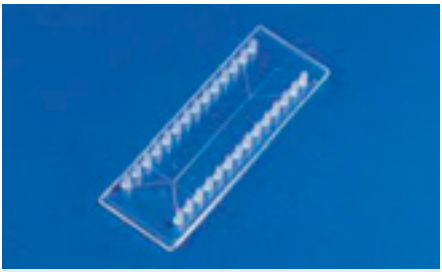


Fig. 191: Cell sorting chip

Fig. 192: PCR chip with integrated freez-dried master mix

Fig. 193: Channel-array chip

Fig. 194: Hybrid chip consisting of polymer and filters for plasma generation

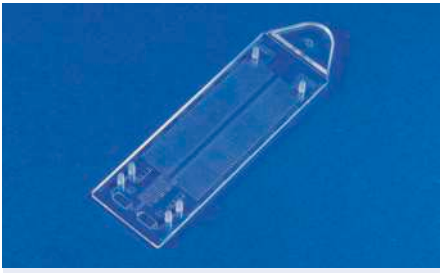


Fig. 195: Continuous-flow PCR chip, chip, realized within the BMBF-Project "ChipFlussPCR", FKZ 13N9556

Fig. 196: Hybrid chip for immunoassays with electrochemical detection, realized within the EU-FP6 project "SmartHEALTH", No. 016817

Fig. 197: Cell culture chips with integrated thin film electrodes, realized within the BMBF-Project "HepaChip", FKZ 01GG0728

Fig. 198: Hybrid chip for immunoassays with plasma generation unit for electrochemical detection, realized within EU-FP6 project "SmartHEALTH", No. 016817

Fig. 199: Two component microinjection molding – Device for agglutionation based assays, realized within the BMBF project FASAMOS, FKZ 02PC2001

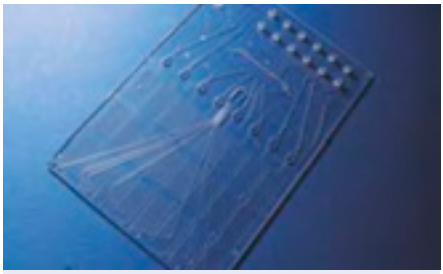


Fig. 200: Sample-in-result-out DNA-analysis chip, realized within the BMBF project ChipFlussPCR, FKZ 13N9556

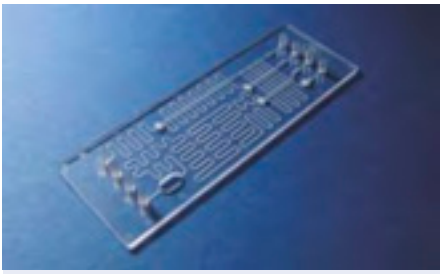


Fig. 201: Microfluidic chip for a complete SELEX-cycle, realized within the ETB project Artamis, FKZ 03139428

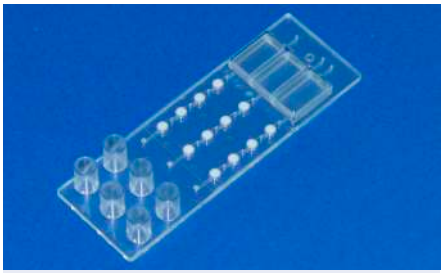
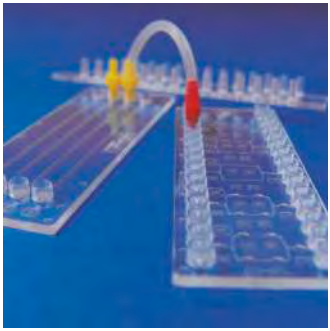


Fig. 202: Microfluidic chip for immunoassay applications with reagent reservoirs and antibody-coated frits for three assays, realized within the BMBF project IFSA, FKZ 16SV5417

Fig. 203: Sample-in-result-out DNA-analysis chip with hybridisation zone for optoelectronic read-out, realized within the project PatholD Chip, A-102-RT-GC



8. Order form

8. Order form

FAX: + 49 (0) 36 41 347 05 90 • Email: sales@microfluidic-ChipShop.com
Stockholmer Str. 20 • 07747 Jena • Germany

Company Information		
Company:	Department:	
Contact Name:	Email:	
Shipping Address:		
City, State:	Zip Code:	Country:
Phone Number:	Fax Number:	
VAT Number (EU only):	Order Number:	

Product Number	Product Description	Material	Quantity	Unit Price	Total Price

Total amount without shipping cost and potential minimum quantity surcharge:	*
Minimum quantity surcharge for orders below €250: €15.00	
Shipping charges (please choose): ☐ Provide courier account number: ☐ *microfluidic ChipShop* prepay and add to invoice (see estimation below**)	
Credit card fee: 3.5% on total invoice amount	
Total amount:	

* Minimum order volume: €250 (below this amount we charge a €15 minimum quantity surcharge)
**Estimated shipping charges: Germany: €15-30 / EU: €20-60 / RoW: €60-120

- The prices quoted above are net amounts and do not include packaging, transport, and tax.
- For larger quantities, other materials, or custom designs please ask for a quote.
- Slight variations in the microstructures by +/- 3-4 µm may occur.

Credit Card Payment:		
A credit card fee of 3.5% of the invoice amount applies.		
☐ VISA ☐ MasterCard Card Number:		
Expiration Date (MM/YY):	Security Code:	
Name of Cardholder:		
Billing Address:		
City, State:	Zip Code:	Country:

Date, name in block letters, signature

microfluidic ChipShop GmbH

Stockholmer Str. 20
07747 Jena
Germany

Phone : + 49 (0) 36 41 - 347 05 0
Fax: + 49 (0) 36 41 - 347 05 90
info@microfluidic-ChipShop.com
www.microfluidic-ChipShop.com