

FluidicLab[®]

Droplet Generator

(DG-01)





Droplet Generator (DG-01)

The DG-01 is the most advanced microdroplets/microspheres preparation system. One that integrates pressure control, flow monitor and real-time imaging for real-time control and observation of microdroplets.

With the real-time monitoring of pressure and flow rate, the continuous phase and dispersed phase was injected into the FluidicLab standard microfluidic chip at a constant flow rate to generate high monodisperse microdroplets with a diameter of 25~300 μm . Build in camera enables real-time observation of droplet generation, which ensures the extremely high repeatability and stability of generated microdroplets. The compact instrument can work in a clean bench or anaerobic incubator.

Advantages

- **High precision and responsiveness in pressure control**
High precision pressure sensor for high speed PID control, Response time: <100 ms, Pressure stability: <0.2% FS.

- **High precision constant flow rate control**
Fast response time (<40 ms), the smooth, pulseless and constant flow output under different flow resistance through feedback algorithm.

- **Easy generation and reproducible of microdroplets**
Generates high monodisperse droplets (CV<5%).

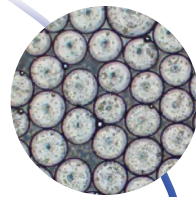
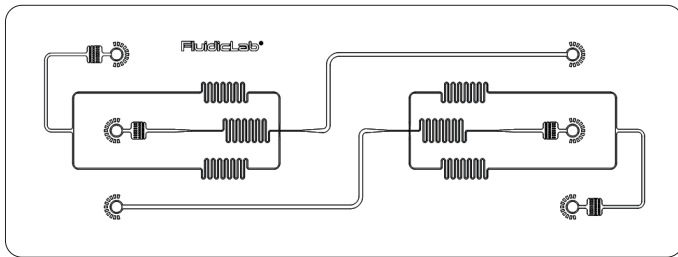
- **Real-time observation of microdroplets generation**
The size and motion track of microdroplet can be instantly captured.

- **Reagents kits and application notes**
We provide a full portfolio of application notes and reagents.

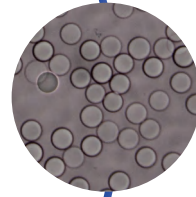
Applications

The DG-01 can be used to prepare various microdroplets/microspheres with different microfluidic chips and reagents, which is widely used in a range of research fields including single cell analysis, drug screening, cell culture, regenerative medicine, synthetic biology and tissue engineering. Learn more on our website <http://en.fluidiclab.com>.

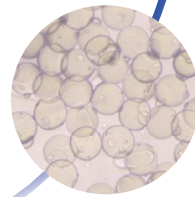
PDMS FLOW FOCUSING CHIPS



Cell-laden GelMA-based hydrogels microspheres

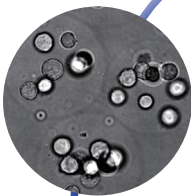


Dissolvable beads for droplet DNA barcoding

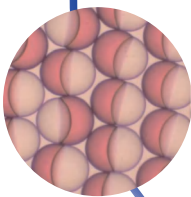


Chitosan microspheres

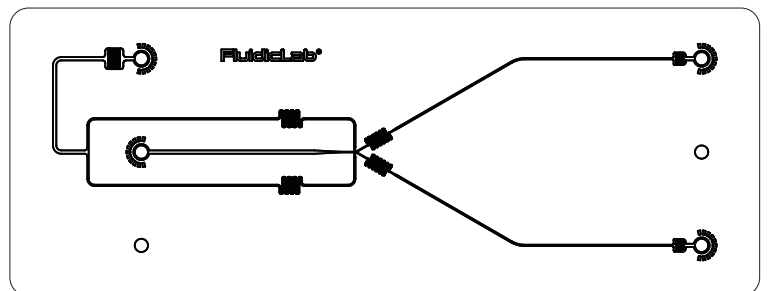
Alginate microspheres for cell encapsulation and culture



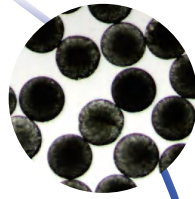
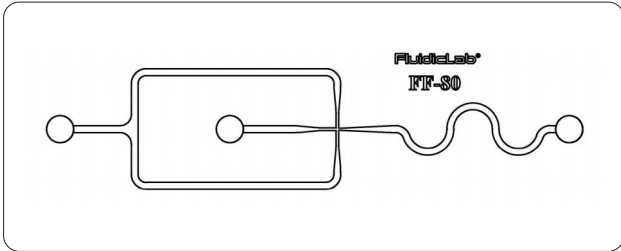
Janus microspheres



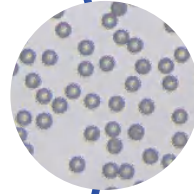
PDMS 2 REAGENT FLOW FOCUSING CHIPS



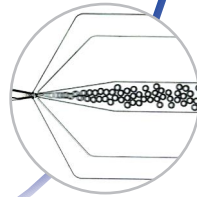
GLASS FLOW FOCUSING CHIPS



PCL microdroplets



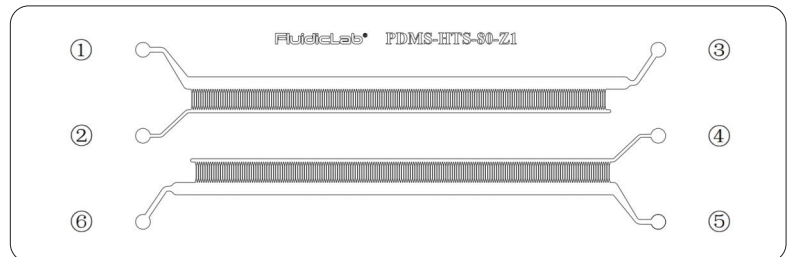
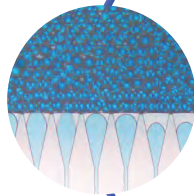
Poly(lactic-co-glycolic acid) (PLGA) microspheres for drug delivery



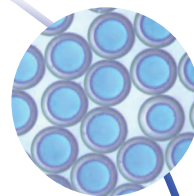
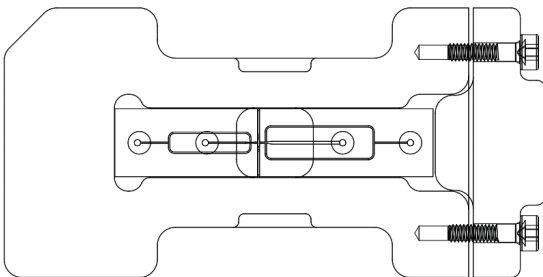
Microbubbles for contrast agents

HIGH-THROUGHPUT STEP EMULSIFICATION CHIP

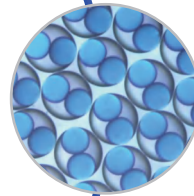
Droplet Generation picture



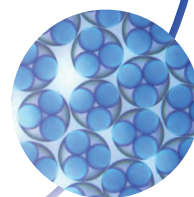
MULTICORE MICRODROPLET GENERATION CHIPS



Single-core microdroplets



Double-core microdroplets



Tripe-core microdroplets

Features of DG-01

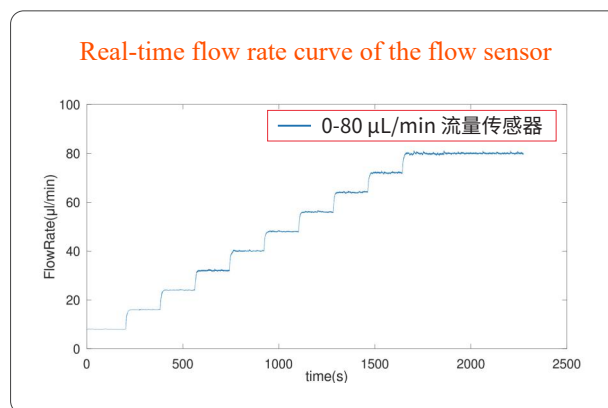
High precision and responsiveness of the pressure control

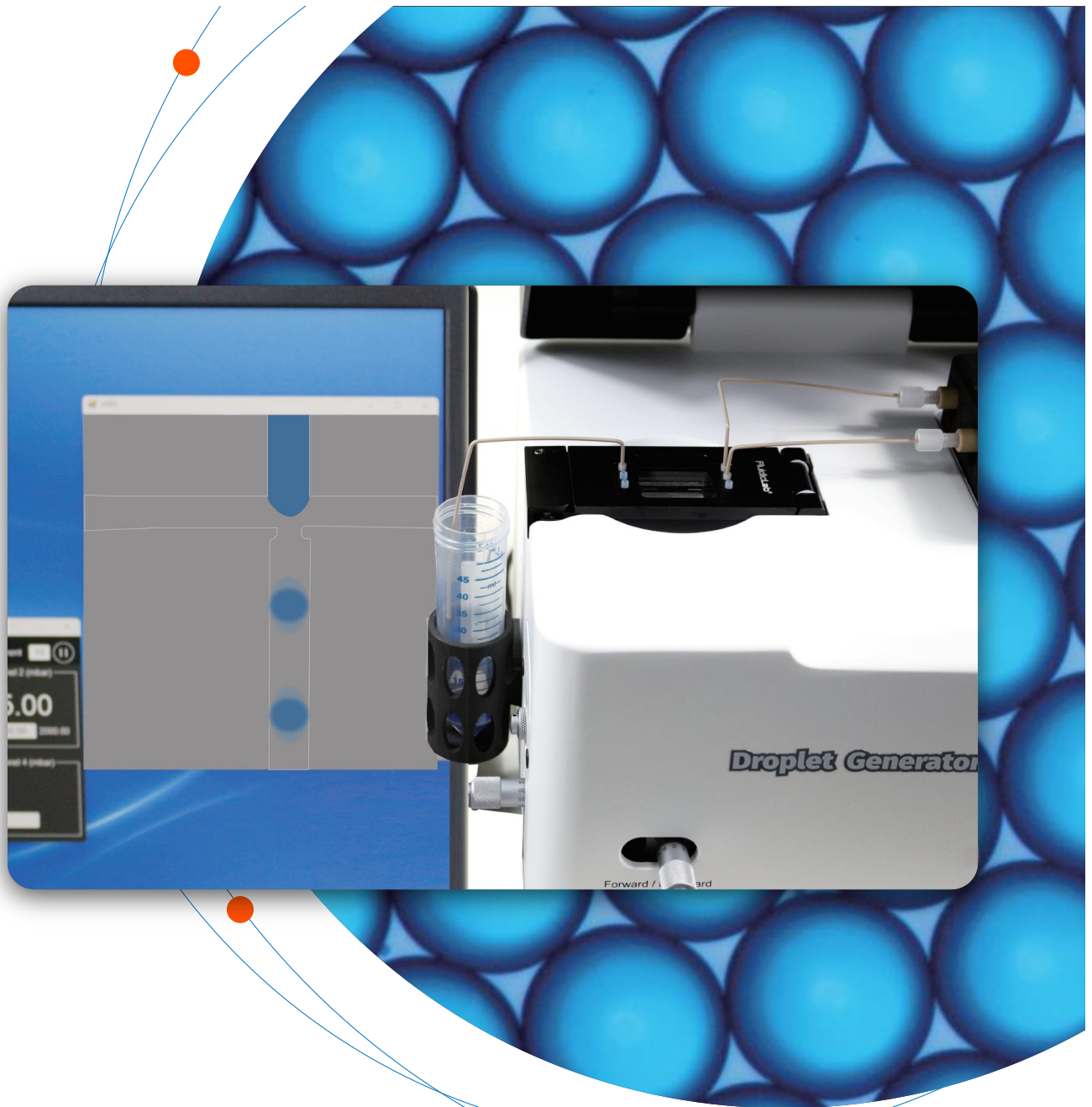
- Based on pressure control and fast PID control, the pressure stability $<0.2\%$.
- the response time to reach the set value is less than 100 ms.
- Support standard reservoir size ranges from 1.5 mL to 50 mL.



High precision constant flow rate control

- The key in flow rate control is an integrated temperature sensor chip, which measures precisely through thermal difference.
- The pressure output is controlled via feedback algorithm to achieve a smooth, pulseless and constant flow monitoring (ranging from 0 to 80 $\mu\text{L}/\text{min}$).
- The response time of constant flow control is less than 40 ms, which is capable in various applications of different flow resistance.





Real-time observation of microdroplets generation

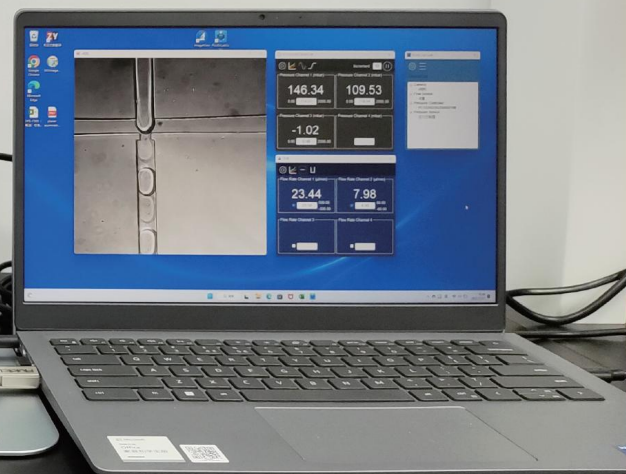
With a microscope and built-in camera, the size and status of microdroplet can be instantly captured.

▶ User-friendly software operation interface

- The user of software is simple and intuitive
- Can be achieved by few simple clicks smooth and pulseless constant pressure or constant flow rate output.

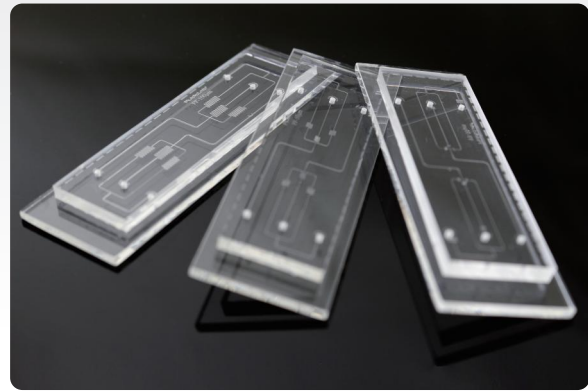
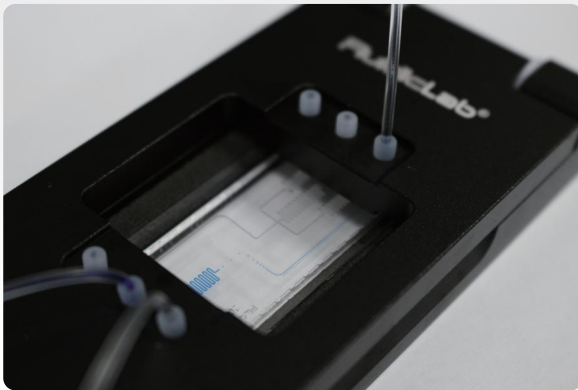


Power



▶ Microdroplets/microspheres size from 25 to 300 μm

- Standard microdroplets/microsphere generation chips and chip holders are provided for the preparation of both W/O and O/W emulsion.
- The assembly of chip and connection tubing is simple and convenient.
- FluidicLab provides customized chip services.



▶ Reagents kits and application note

- Drop-surf droplet generation oil with good biocompatibility, meeting the stringent requirements of cell and tissue culture
- Drop-surf demulsifier rapidly and thoroughly removes the surfactant to break the emulsion droplets, allowing the release of the droplet phase for further analyses
- and research.

We provide a full portfolio of application notes and reagent kits to ensure the repeatability of your experiments, greatly reducing your trial-and-error costs.



Specifications DG-01

Pressure Control

Number of pressure channels: 2 or 3
 Available Pressure Range: 30 ~ 1940 mbar
 Reservoir Size: 1.5 mL, 15 mL or 50 mL
 Pressure Stability: Fluctuation less than
 0.2% of full scale
 Response Time: 100 ms

Real-time imaging

Speed: 120 FPS at full resolution
 Maximum Resolution: 1280 × 720
 View field: 1.6 × 0.9 mm
 Working distance: 5 mm

Flow Control

Flow Rates: 0 ~ ± 80 µL/min
 Liquid Compatibility: Any non-strong alkali, non-strong acid, aqueous, partially oil, or biological sample solution
 Response Time: 40 ms
 Material: PEEK & Quartz
 Working Temperature: 10 ~ 50 °C



DG-01 (Volume: 26 × 26 × 20 cm)

MICROFLUIDIC CHIPS

Microfluidic chips	PDMS flow focusing chips	PDMS flow focusing chips	GLASS flow focusing chips	Multi-core microdroplet generation chips
Specification	PDMS-FF-30/50/100/200	PDMS-SCE-30/50/100	GL-FF/100/250	GL-WOW-100-150
Chip size (l × w × h)	62 × 19 × 2 mm (PDMS)		30 × 7.5 × 3 mm	35 × 7.5 × 3 mm
Max. Operating pressure	2.5 bar (Paired with a chip holder)			
Material	PDMS & B270 glass		B270 glass	
Fabrication	Soft lithography, plasma treatment, covalent bonding		Hydrogen fluoride etching and low thermal bonding	
Microdroplet sizes*	25 ~ 300 µm	25 ~ 140 µm	40 ~ 240 µm	135 (86) ~ 189 (163) µm

* The microdroplet sizes differ from one reagent to another.



ABOUT US

FluidicLab is committed to providing the professional microfluidic solutions. We focus on...

Development & manufacture of microfluidic control systems.

We provide integrated systems, such as smart LNP generator, microdroplet/microsphere generator, microfluidics distribution system, along with standard microfluidic devices including precision pressure controller, flow sensor, sensor reader, microfluidic distribution valve, solenoid valve and controller, etc.

Development & manufacture of ODM/OEM systems.

Since the beginning of our business, FluidicLab has developed equipment in mRNA vaccine production (for pilot scale), library construction for single-cell transcriptome analysis. Fluid control system for single-cell spatial transcriptome and its sample preparation, liquid handling for CAR-T cell preparation, and equipment for digital PCR are well developed.

CRO service.

Provide CRO of barcode beads, organoid cultivation, single cell encapsulation, etc., as well as technical consultations of optimizing experimental procedures and industrial scale-up production.

Design & fabrication of microfluidic chips.

We provide customized service of microfluidic PDMS/glass/COC chips from design to fabrication. Organ/organoid chip customization is also available.

The Partners


















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