Atrandi BIOSCIENCES | Droplet Genomics

CHIP FLOW RATE USER GUIDE

DESCRIPTION

Producing droplets of controlled sizes as well as at controlled generation rates are key factors in obtaining consistent and robust results of droplet-based assays. Flow rate ratio variation is an established technique for adjusting droplet size. The increase in the continuous phase (oil) flow rate enables the reduction of droplet size while the decrease in oil flow rate will result in larger droplets.

To better facilitate your studies with droplets please refer to the tables below for information on our chip characteristics and flow rates.

Most common chip characteristics table.

Type	Chip	Modules per chip	Inlets	Outlets	Channel Height	Nozzle Width	Collection channel width	Volume constant
Generation	MCN-G1	6	2	1	10	10	30	0.1
	MCN-G2	6	2	1	15	10	30	0.1
	MCN-G3	6	2	1	30	15	40	0.1
	MCN-G4	6	2	1	45	20	60	0.1
	MCN-G5	6	2	1	40	30	70	0.1
	MCN-G36	6	2	1	65	40	70	0.1
	MCN-G35	6	2	1	80	40	80	0.1
Co-Flow	MCN-C1Q	6	3	1	10	10	70	0.1
	MCN-C2	6	3	1	20	20	40	0.1
	MCN-C3Q	6	3	1	30	30	60	0.1
	MCN-C4	6	3	1	40	40	70	0.1
	MCN-C5	6	4	1	80	100/60	180	0.1
Manipulation	MCN-M1	3	4	1	30	20/30	60/50	0.1
	MCN-M2Q	3	4	1	30	20/30	60/50	0.1
	MCN-A1	3	3	1	25	30/10	50/35	0.1
	MCN-A2Q	3	3	1	25	30/10	50/35	0.1
Sorting	MCY-R1	1	2	2	30	50	200	0.1
	MCY-R15	1	2	2	80	80	200	0.1
	MCY-R17	1	2	2	105	80	200	0.1

Standard droplet generation flow rates using 2-inlet microfluidic chips. As assessed with LB media.

Type	Chip	Droplet diameter, µm	Droplet volume, pL	Aqueous phase, µL/h	Oil phase, µL/h
Generation	MCN-G1	18-22	3-6	100	100
	MCN-G2	25-30	8-14	250	300
	MCN-G3	30-40	14-34	500	500
	MCN-G4	45-55	48-87	800	900
	MCN-G5	55-65	87-144	1400	1400
	MCN-G36	70-90	180-382	2000	2000
	MCN-G35	90-110	382-697	1000	1000

Standard droplet generation flow rates using 3/4-inlet (co-flow) microfluidic chips. As assessed with LB media.

Type	Chip	Droplet diameter, µm	Droplet volume, pL	Aqueous Phase 1, µL/h	Aqueous Phase 2, µL/h	Aqueous Phase 3, µL/h	Oil phase, µL/h
Co-Flow	MCN-C1Q	18-22	3-6	50	50	x	100
	MCN-C2	30-40	14-34	150	150	x	200
	MCN-C3Q	45-55	48-87	200	200	x	600
	MCN-C4	55-65	87-144	500	500	x	1000
	MCN-C5	160-180	2145-3054	180	250	250	400

Standard droplet manipulation flow rates using addition, merging, and sorting microfluidic chips. As assessed with LB media.

NOTE: the flow rates for the sorting chips are displayed in kPa as the pump system within the Styx system is based on pressure.

Type	Chip	Reinjected Emulsion diameter, µm	Emulsion, µL/h	Spacing Oil, µL/h	Generated Emulsion diameter, µm	Aqueous Phase, µL/h	Oil phase, µL/h
Manipulation	MCN-M1	25-30	30	300	40-50	100	200
	MCN-M2Q	25-30	30	300	40-50	100	200
	MCN-A1	30-40	100	300	x	100	x
	MCN-A2Q	30-40	100	300	x	100	x

Type	Chip	Droplet diameter, µm	Droplet volume, pL	Emulsion, kPa	Spacing Oil, kPa
Sorting	MCY-R1	25-40	14-34	15	25
	MCY-R15	55-65	87-144	7	10.5
	MCY-R17	70-90	180-382	5.4	6.5

Standard SPC generation flow rates using 3-inlet (co-flow) microfluidic chips.

Type	Chip	SPC diameter, µm	SPC volume, pL	Core Phase, µL/h	Shell Phase, µL/h	Oil phase, µL/h
Co-Flow (For SPC generation)	MCN-C2	25- 35	14-34	60	30	400
	MCN-C4	60-70	113-180	75	75	550

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Revision history

Revision	Date	Description
V2	14 February 2023	Overhauled User Guide.
V3	22 August 2023	User Guide corrected to reflect the company rebranding. Additional, minor stylistic and informational changes.
V4	27 March 2024	Added “Chip characteristics” and “Manipulation flow rate” tables and renewed other tables to better reflect the existing products.
V5	3 August 2024	Added rows MCN-G36, MCN-G35, MCN-M2Q and MCN-A2Q. Revamped Droplet Diameter, Droplet Volume, Aqueous Phase, Emulsion, Spacing Oil, and Oil Phase columns based on new data. Tables redesigned. Changed channel height of MCN-G3 chip. New Co-Flow (for SPC generation) table created.
V6	28 March 2025	Updated P/N for MCN-G1 and MCN-G5
V7	16 April 2025	Changed Oil phase flow rate from 850 µL/h to 400 µL/h for MCN-C5 based on new data.