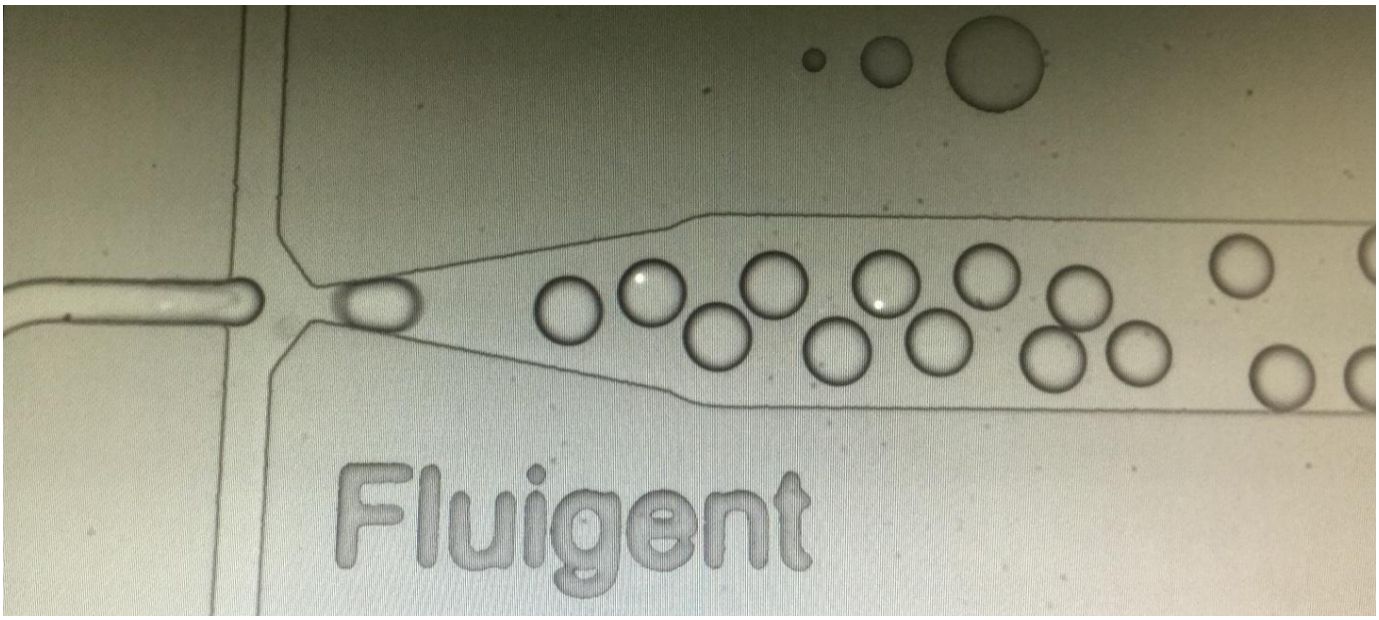
EZ Drop Data sheet:

Fluigent Droplet Kit P/N: Dropkit01



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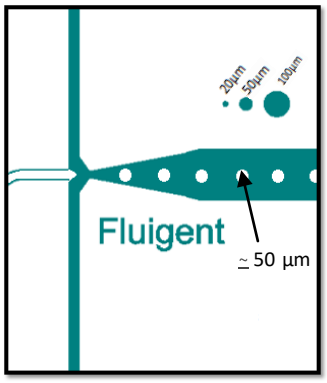
Description:

The Droplet Starter Pack is ideal for biologists and chemists who want to get started with microfluidic droplets experiments. PDMS offers a cost effective and surface coating free solution which is particularly suitable for biochemical analysis experiments.

The EZ Drop chip allows an easy and friendly use with a very fast set up time (<1min) with no leaking or complex connectors. The chip includes size markers at the nozzle for easy live droplet size estimation. EZ Drop is flexible allowing to experiment a large scale of droplet formation frequencies (up to 1200Hz with the Droplet Starter Pack) and sizes (20-100µm diameter). Also, the EZ Drop chip has exceptional performance with extremely high monodispersity (CV<2%). This chip can be use for various applications such as cell encapsulation and polymer particle formation.

Benefits:

- Highly mono-dispersed droplets (C.V < 2%)
- Water in oil droplets: adapted for bio-encapsulation.
- Markers on the PDMS for EZ connection and droplet size visualization
- Surface coating free
- Ultra fast set-up: less than 1min
- Fluidic resistance integrated to avoid back flows
- Up to 4000hz production: 240 000 droplets in 1 min
    - Up to 1200Hz with the Droplet Starter Pack



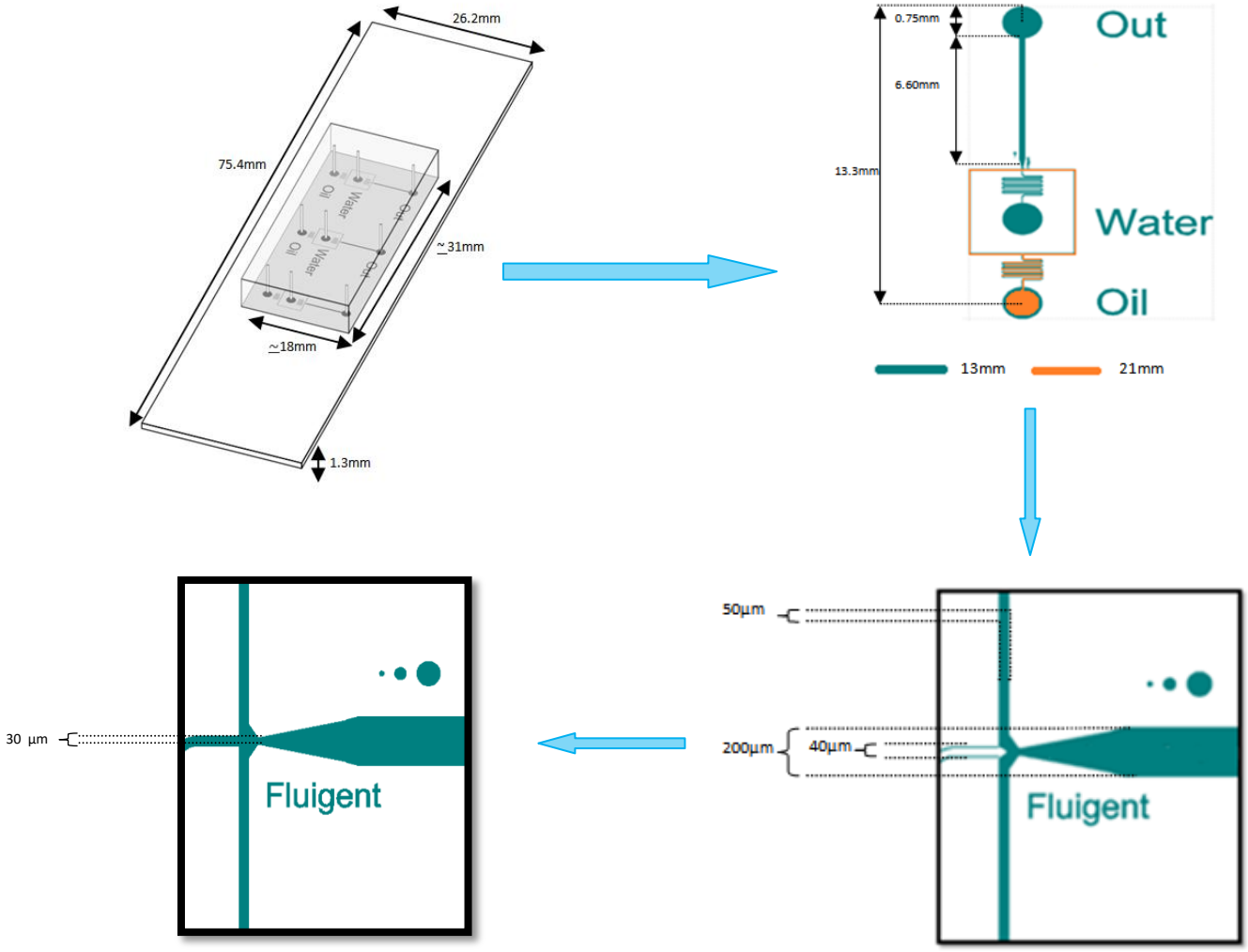
Elements in the Fluigent Droplet kit (P/NDropkit01):

Elements	Quantity
EZ Drop chip	3
PEEK Tubing 1/32″ OD x 0.005 ID	2 m
Green sleeve 1/16″ OD x 0.033 ID x 1.6″	2

For more information on system setup refer to the Fluigent web site

System specifications:

Chip Overview:



Specifications	
Chip Characteristics:	PDMS chip for water in oil droplets
	2 inputs 1 output
	3 devices per chip
Tubing Compatibility	1/32 tubing compatible
Droplet Characteristics	From 15µm to 100µm diameter droplet size
Operating pressure	0-2bar
Burst pressure	5 bar

Device design:

Specifications		
Channel cross section at junction (depth x width)	30 x 30 µm	
Channel depth elsewhere	30 µm	
Chanel total length after junction	6.60 mm	
Chanel total length (inner to outer tubing)	Oil	Water
	21 mm	13 mm

End production quality:

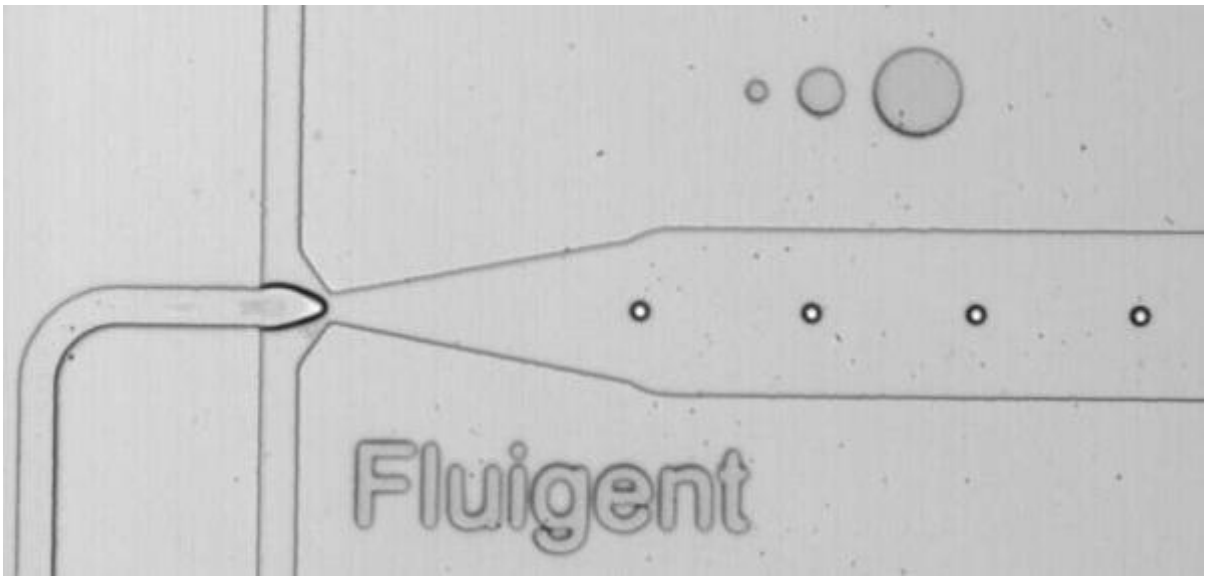
Each individual chip is optically checked at the end of the production line. The specific characteristics are implemented in the QR code:

- Batch and Master traceability
- Fabrication and quality check operator
- Clean level
- Nozzle measured size

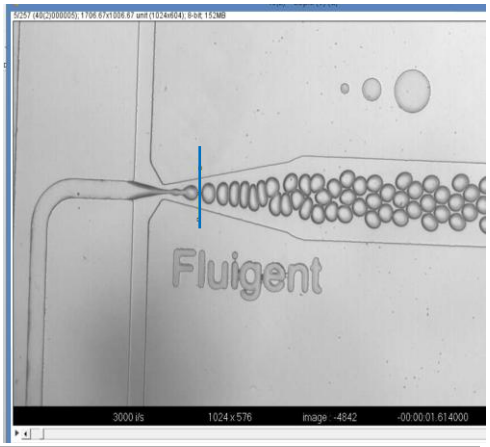
Applications:

The Fluigent Droplet starter Pack, profits to la large range of industries such as pharmaceutical, cosmetics, food and also the research domain for:

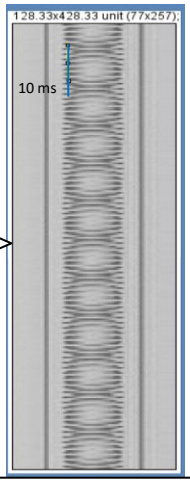
- Droplet production for academic research
- Cells and biomolecules encapsulation
- High throughput drug screening and drug delivery
- Synthesis of polymeric hydrogels



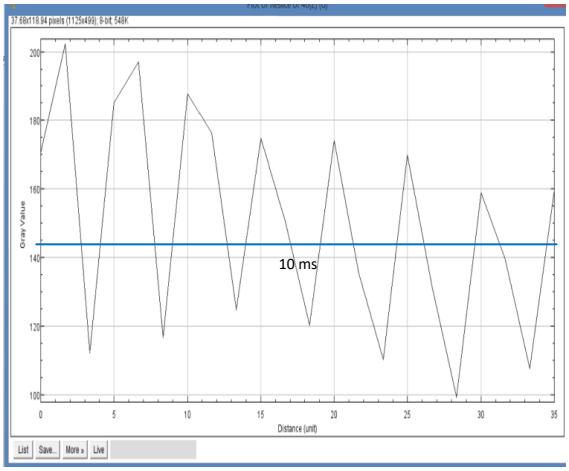
Measurement of droplet frequency:



The line represents, where the picture was taken up to 10,000 images / second

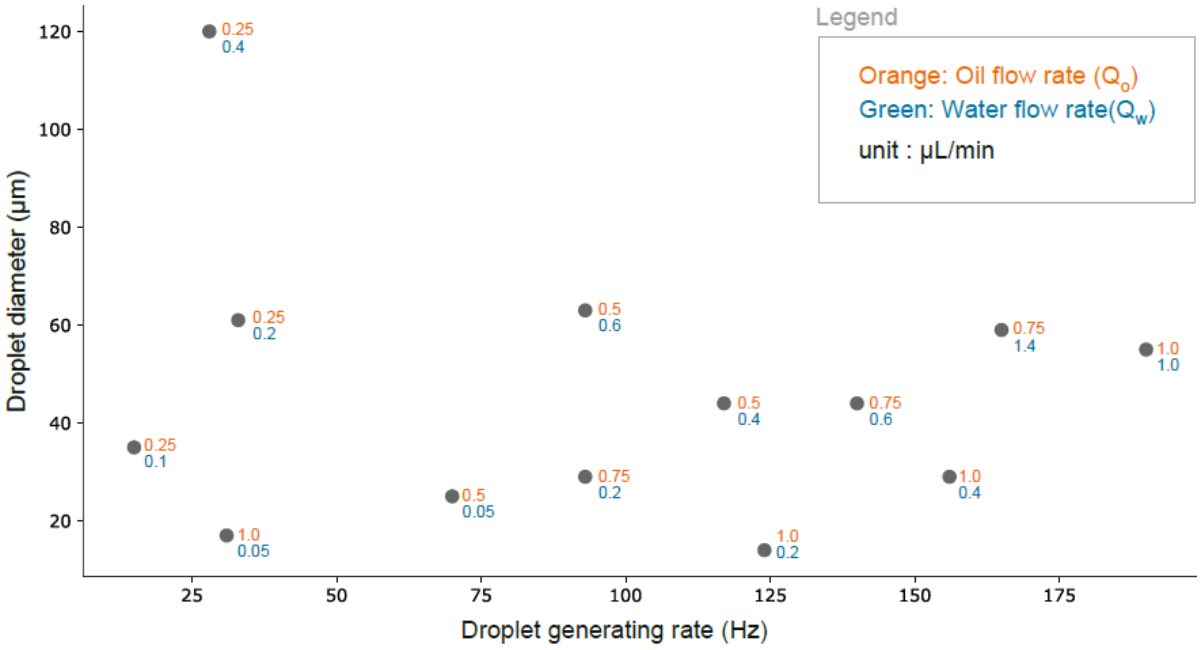


The stack of pictures was then compiled, in Z line projection. Black strip = droplets / White strip = no droplets/



Pick corresponds to the black strip which is the presence of droplets. Then from the number of picks and the lapse of time, we obtain the frequency.

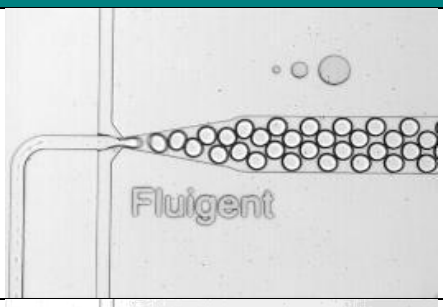
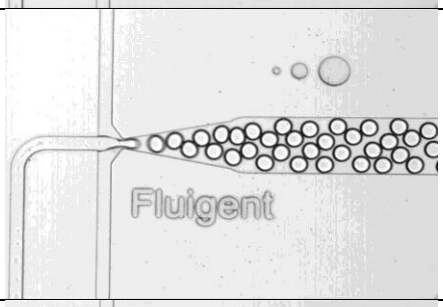
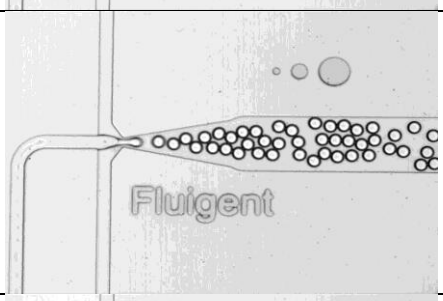
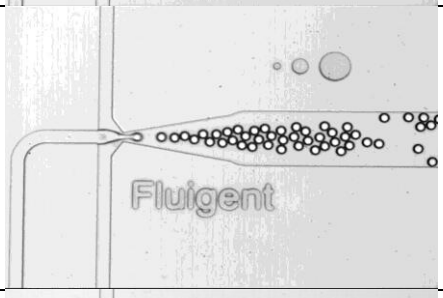
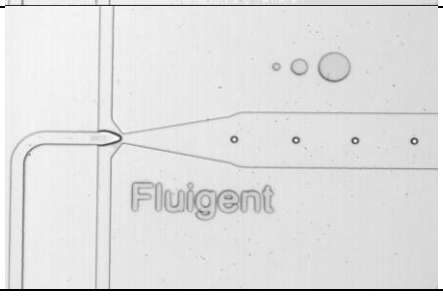
Fast droplet setup diagram:



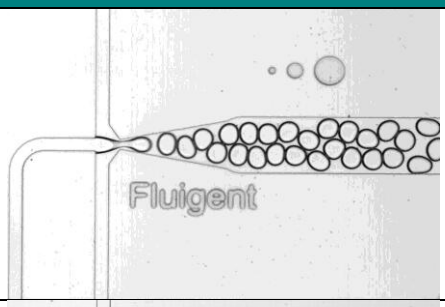
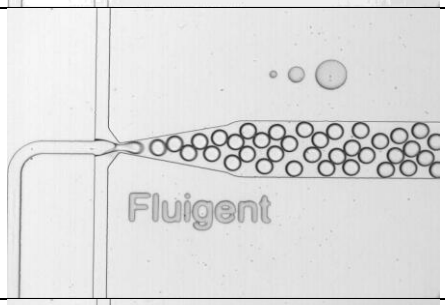
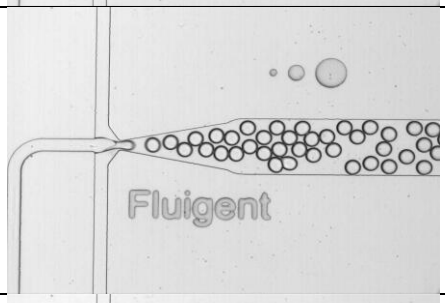
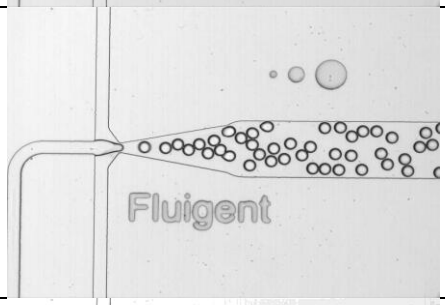
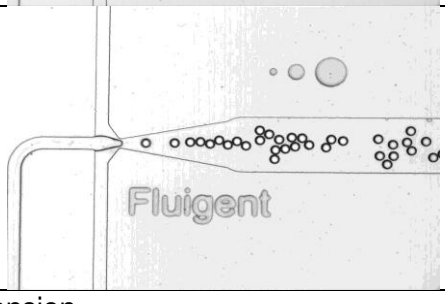
Note: 1. This diagram is only for indicative purpose, the resultat may change depending on your experience environment.

Experiments performed with Light Mineral Oil (Sigma, PN: M8410) with 2% w/w Span 80 (Sigma PN: 85548) and DI water

EZ Drop phase diagram

Oil		Water		Droplets		Pictures
P (mbars)	Q (µl/min)	P (mbars)	Q (µl/min)	Diameter (µm)	Rate (Hz)	
1200	1	232	1	55	190	
1200	1	235	0.8	46	171	
1200	1	179	0.4	29	156	
1200	1	135	0.2	14	124	
1200	1	103	0.05	17	31	

*Pressure values may change due to variability in tubing dimension

Oil		Water		Droplets		Pictures
P (mbars)	Q (µl/min)	P (mbars)	Q (µl/min)	Diameter (µm)	Rate (Hz)	
850	0.75	240	1.2	59	165	
850	0.75	188	0.6	44	140	
850	0.75	158	0.4	37	117	
850	0.75	125	0.2	29	93	
850	0.75	106	0.1	26	85	

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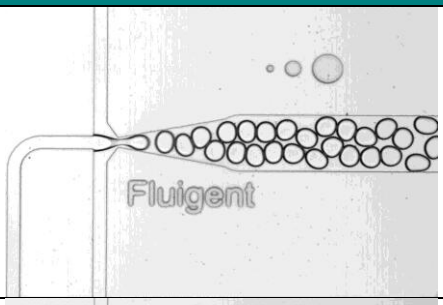
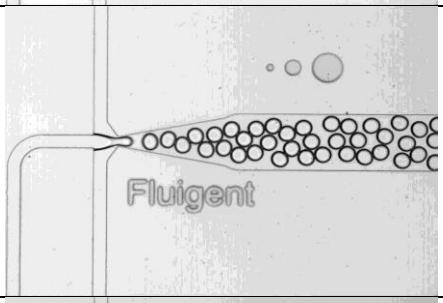
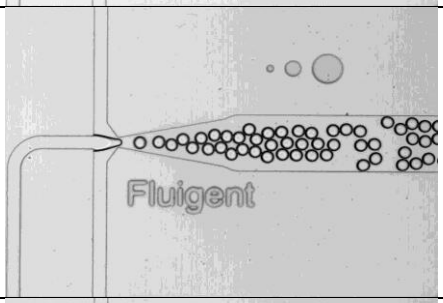
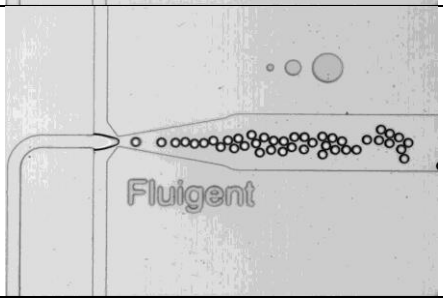
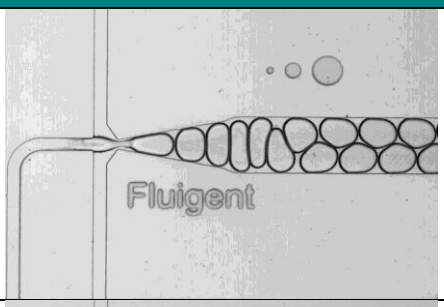
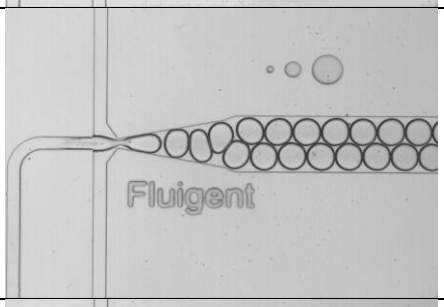
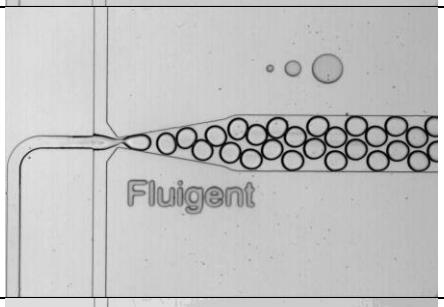
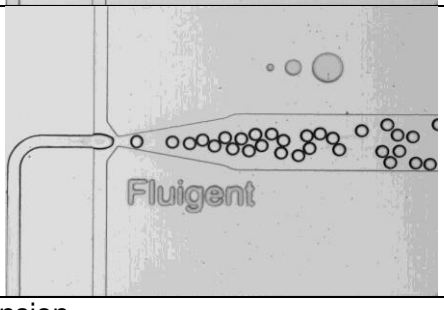
Oil		Water		Droplets		Pictures
P (mbars)	Q (µl/min)	P (mbars)	Q (µl/min)	Diameter (µm)	Rate (Hz)	
585	0.5	161	0.6	63	93	
585	0.5	139	0.4	44	117	
585	0.5	89	0.2	30	95	
585	0.5	67	0.05	25	70	

*Pressure values may change due to variability in tubing dimension

Oil		Water		Droplets		Pictures
P (mbars)	Q (µl/min)	P (mbars)	Q (µl/min)	Diameter (µm)	Rate (Hz)	
224	0.25	93	0.4	110-120	28	
215	0.25	87	0.3	84	32	
275	0.25	81	0.2	61	33	
299	0.25	68	0.1	35	15	

*Pressure values may change due to variability in tubing dimension