

# RAYDROP

**RayDrop, P/N: 1DPRD01**

**RayDrop connector and fitting kit, P/N: 1DPRDC1**



## CONTENT

- Description
- Benefits & Features
- Detailed contents
- Specifications
- Technology
- Performance

## DESCRIPTION

The Fluigent RayDrop is a patented technology for droplet generation presenting most of the advantages of a glass chips as resistance to strong chemicals and compatibility with high pressures ( $> 2$  bar). However, glass chips represent a very expensive disposable in everyday lab work, they can lead to leakage issues and have limited lifetime as they are almost impossible to recover once clogged. The RayDrop device uses standard fittings leading to sealed connections and its design allows an easy recovery if clogging occurs. The RayDrop technology has two additional features: one can produce water-in-oil and oil-in-water droplets without any surface coating. Furthermore, the system does not need any surfactant for droplet formation. We present here a robust brand new device for droplet generation with outstanding monodispersed production.

## BENEFITS AND FEATURES

- Highly flexible: can perform water-in-oil and oil-in-water droplets
- No need of surfactant for droplet formation
- Surface coating free
- Up to 10 000 Hz droplet generation rate
- Droplet size from 40 $\mu$ m to 130 $\mu$ m diameter
- Easy to clean, exchangeable nozzle
- No leakage, uses standard HPLC PEEK connectors
- Easy microscope visualization

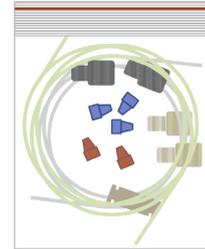
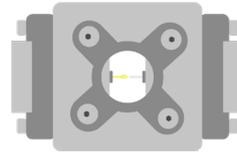
# PRODUCT DATASHEET

## DETAILED CONTENTS

Reference: 1DPRDC1

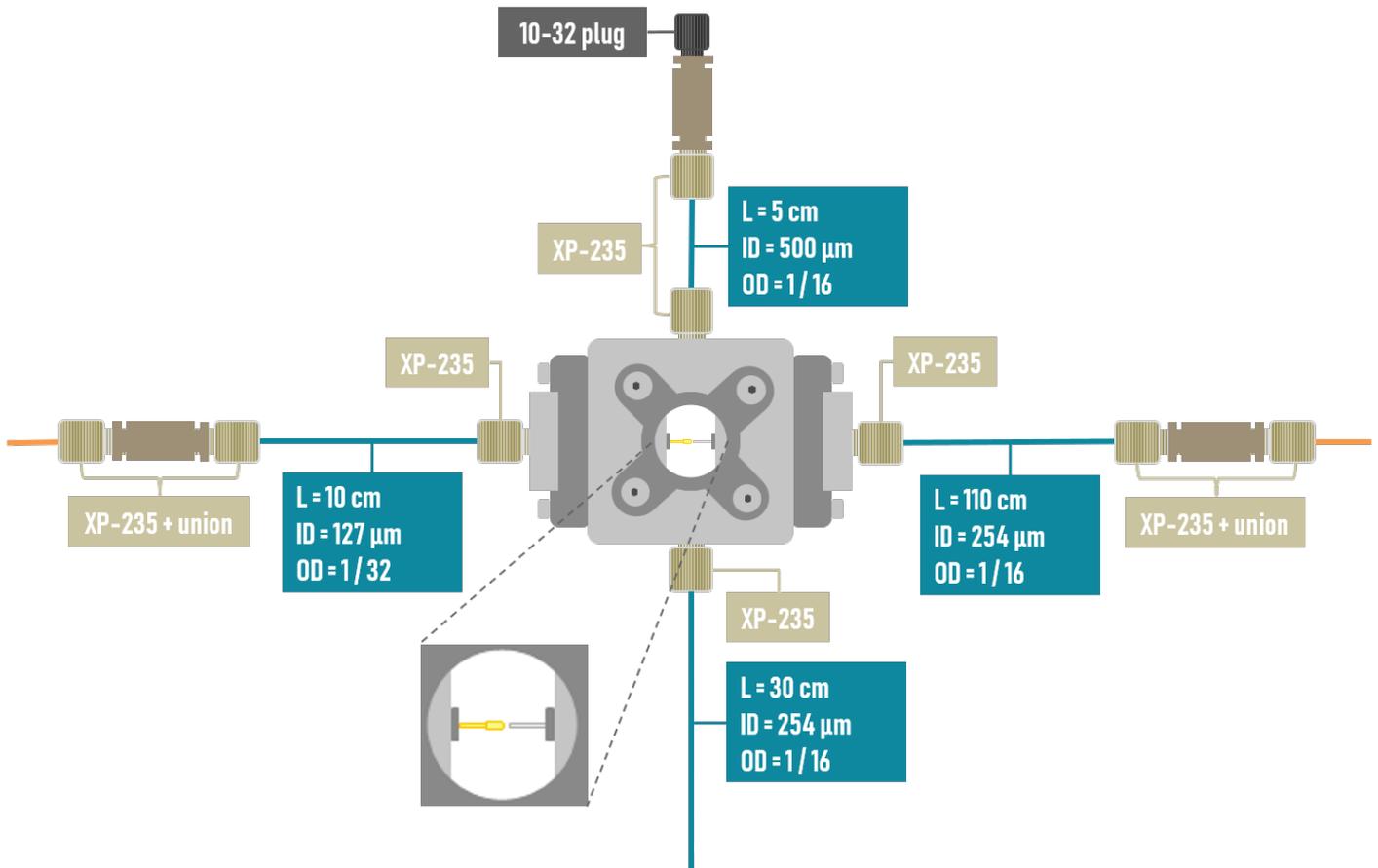
### Contents

1 \* RayDrop  
RayDrop connector and fitting kit

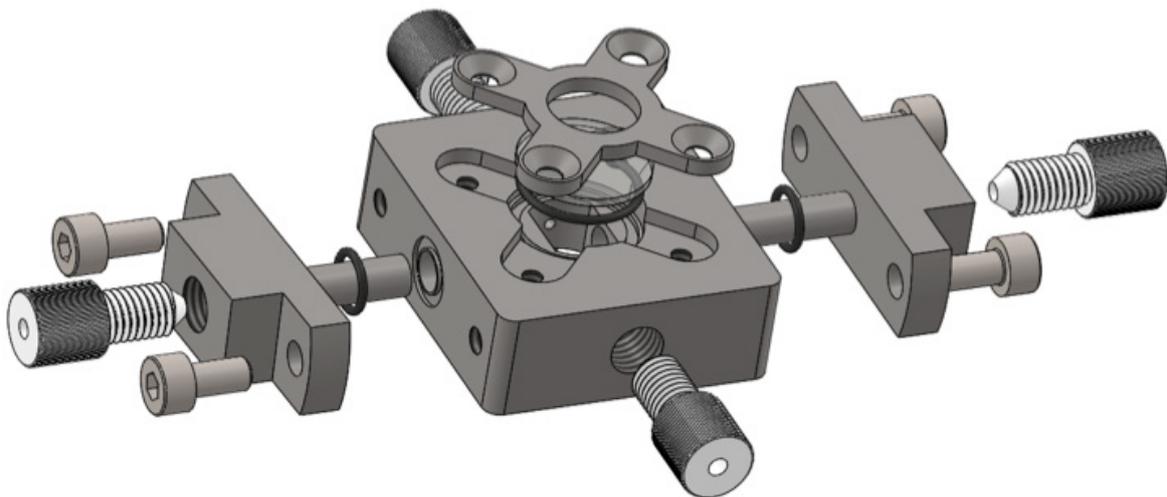


### RayDrop connector and fitting kit

RayDrop kit contents	Quantity	Picture
Tubing 1/32" OD, 127µm ID	2 * 10cm	
Output tubing 1/16" OD, 254 µm ID	1 * 2m	
Tubing 1/16" OD, 508µm ID	2 * 5cm	
Sleeves for 1/32" OD tubing	2	
Union with XP-235 fittings	3	
10-32 plugs	3	
XP235+ferrules	4	
Additional ferrules	4	
Raydrop support	1	



## RayDrop overall design

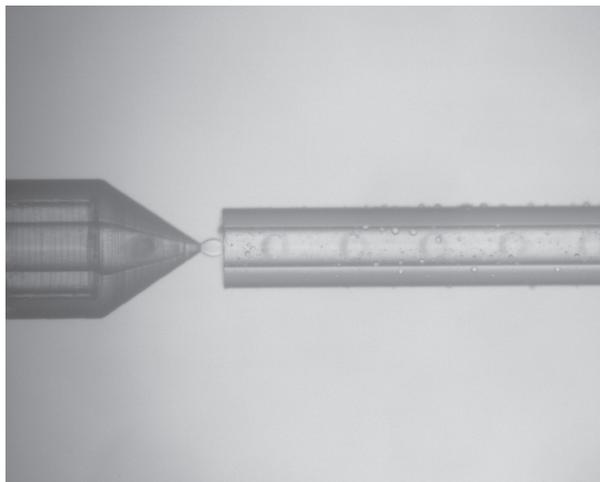


## SPECIFICATIONS

<b>Chip characteristics</b>	Co-flow focusing design
	2 inputs, 1 output
	Water-in-oil and oil-in-water droplets
<b>Connectors</b>	Standard 1/4-28 Flat-Bottom connectors
<b>Droplet size</b>	From 40 µm to 130 µm diameter droplet size
<b>Generation rate</b>	10 000 Hz (measured for the smallest droplet size) can go higher under specific conditions
<b>Capillaries dimensions</b>	Nozzle: 30 µm ID Inlet and outlet capillaries: 150 µm ID
<b>External dimensions</b>	L * l * h = 60 mm * 40 mm * 13 mm
<b>Weight</b>	205 g
<b>Operating pressure</b>	0-5 bar
<b>Burst pressure</b>	10 bar
<b>Wetted material continuous phase</b>	PEEK, FEP, glass, stainless steel, polyimide, Viton (seal), resin (nozzle)
<b>Wetted material dispersed phase</b>	PEEK, FEP, Glass, resin (nozzle)

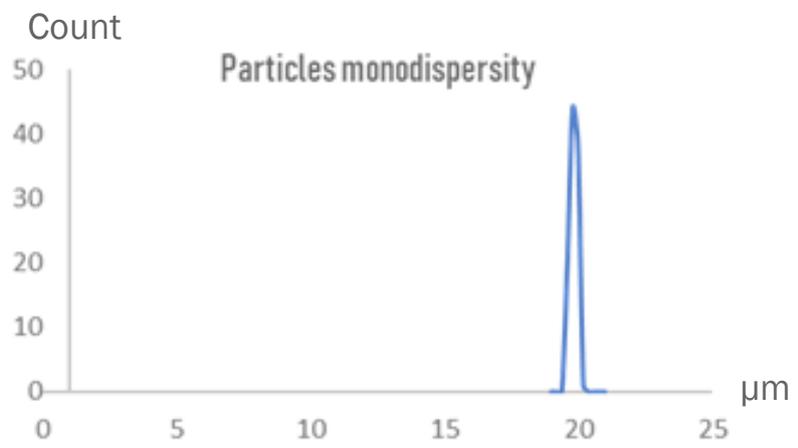
## TECHNOLOGY

The RayDrop is a combination of a co-flow device and a flow-focusing device. When a droplet is formed, at the nozzle, the hydrophobic forces associated to the acceleration of the continuous phase entering the outer capillary produce a droplet without any need of surfactant. The device could even produce droplet of two miscible fluids. The droplets never touch a surface which allows one to make either water-in-oil or oil-in-water droplets on the same device and without any surface treatment. The mechanical design of the RayDrop is done in a modular way so that the user can change the nozzle and the outlet capillary for cleaning or for using new dimensional elements.



## PERFORMANCE

The RayDrop device has been specifically adapted for PLGA microparticle production showing outstanding performance and reliability. The device showed a monodispersity of the produced particles below 2% CV.

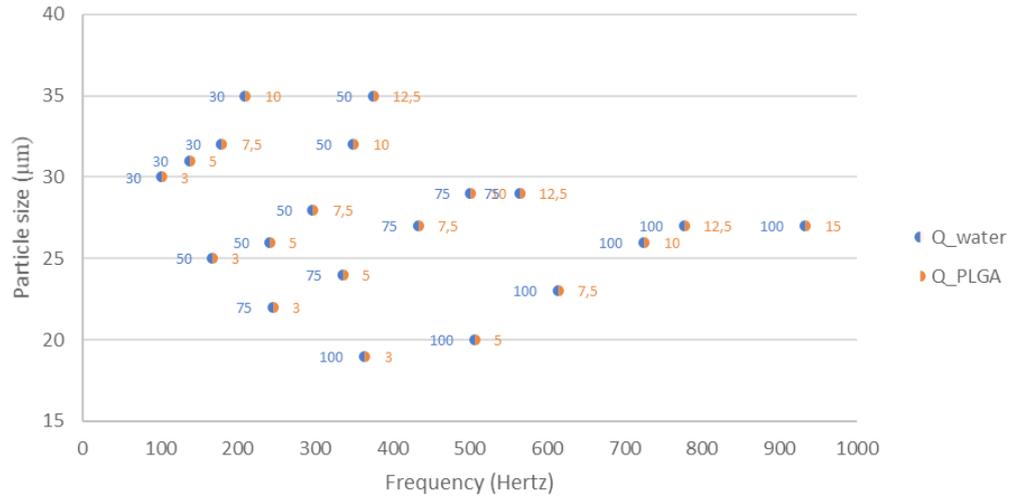


Combined together with LineUP series Fluigent precision pumps, a wide range of particle sizes were achieved.

# PRODUCT DATASHEET

2% PLGA in ethyl acetate

Below is a part of the phase diagram obtained with the Fluigent PLGA particle generation.



**Dispersed phase:** 2% (w/v)  
PLGA in ethyl acetate  
**Continuous phase:** 2% (w/v)  
PVA in water

Dispersed phase / Droplet phase		Continuous phase		Droplets		Picture	Micro-particles	Quantity
P (mbar)	Q (µL/min)	P (mbar)	Q (µL/min)	Diameter (µm)	Rate (Hz)		Diameter (µm)	Quantity (mg/h)
492	3	1348	100	64	364		19	4.7
592	5	1348	100	68	506		20	7.65
893	10	1374	100	76	725		26	24.1
1052	12.5	1400	100	80	778		27	29.1
1222	15	1454	100	80	933		27	35

(Pressure ranges may be different for a setup due to variety in tubing ID)