3201105 - Dolomite Mitos System

Product Datasheet

Version: 1.1

Issue Date: Nov-2024

Author: CK/MW

Contents

1 Disclaimer

This product is for research use only and is not to be used for any other purposes, including, but not limited to, the manufacture of drugs, in vitro diagnostics, or materials intended for human consumption / veterinary use. This document is confidential and is the property of property of Unchained Labs. No attempt should be made to copy this document in any way without prior consent. © 2023 Unchained Labs. All rights reserved. The document and its contents shall not be reproduced, disclosed, or used for any other purpose without written consent of Unchained Labs. Unchained Labs does not convey any license under its trademark, copyright, or common-law rights nor similar rights of any third parties by this document. Revisions and modifications of kit components and manuals will be performed as appropriate. The instructions within this document must be followed rigorously by qualified and trained personnel. Failure to adhere may result in damage to the product, injury to persons or damage to other property. Unchained Labs shall not be liable for any damages or expenses arising directly or indirectly from the use of this product (including parts or software).

2 Description

Designed for versatility and innovation, the Dolomite Mitos System (3201105) provides a flexible, high-performance solution for droplet microfluidics. The system enables Users to produce highly monodispersed droplets (aqueous or organic) ranging from Ø 10 to 500 µm using single junction, reusable, glass microfluidic chips at lab scale.

The Mitos System provides a pulseless and stable liquid flow, with a wide pressure range of 0 – 10 bar. The pressure driven pumps enable precise control over flowrates and droplet size, providing a highly advanced and flexible solution for droplet formation. In addition, quick changes to flow conditions using user-friendly control software enable fast optimization of droplet parameters.

Application specific packs enable the formation of PLGA particles, Hydrogel particles, Aqueous Droplets and Double Emulsion for advanced research and development in a wide range of area, such as drug discovery, microparticle synthesis and cell encapsulation.

Note: Illustrations on the front page show the Dolomite Mitos System along with the Dolomite Imaging Pack, which is optional but highly recommended, enabling real-time imaging and capture of high-throughput emulsion formation.

3 Applications

The following applications packs are compatible with the Dolomite Mitos System and are available for purchase. Each pack includes tailored <u>flow rate sensors, microfluidic chips, calibrated tubing</u>, and reagents required to achieve droplets/particles within the specified size range.

Part Number	Description
3201094	PLGA Particles 1-20 µm Application Pack
3201095	PLGA Particles 10-60 µm Application Pack
3201096	PLGA Multiple Emulsions 40-140 µm Application Pack
3201097	Hydrogel Particles 10-60 µm Application Pack
3201098	Hydrogels Particles 40-300 µm Application Pack
3201099	Polyacrylamide and Polystyrene Particles 40-200 µm Application Pack
3201100	Aqueous Droplets 10-50 µm Application Pack
3201101	Aqueous Droplets 40-300 µm Application Pack
3201102	Aqueous 2 Reagent Droplets 50-400 µm Application Pack
3201103	µEncapsulator 20-60 µm Droplets Application Pack

4 System Components

The Mitos System is supplied with:

- 3 x P-Pumps
- 3 x Sensor Interfaces
- 1 x System Controller PC
- 1 x USB Hub
- 3 x Linear Connector Seal (FFKM Black)
- 1 x Plug for 1.6 mm (10 Pack)
- 1 x Plugs for 1/4 - 28 Ports (pack of 6)
- 1 x End Fittings and Ferrules for 1.6mm Tubing (pack of 10)
- 1 x Mitos P-Pump Vessel Holders Kit
- 1 x Pneumatic Connector Kit

- 3 x 2-way In-line Valve

- 1 x Ferrule with Integrated Filter (pack of 10)

- 4 x Converter 10-40 to 1/4-28 thread for flow sensor

- 3 x FKM Seal for Linear Connector 4-way

- 1 x Chip flushing kit for Top Interfaces

- 1 x Chip flushing kit for Interface H

- 1 x Pressure Isolation/Dump Valve

- 1 x Tubing Clip (5 pc)

- 1 x T Connector (PEEK)

The Dolomite Imaging Pack (containing a High-Speed Microscope and Camera; Part No. 3201107) and region-specific compressors can be purchased alongside the Mitos System.

5   Benefits

- Monodisperse droplets, with precisely controlled and reproducible droplet volumes

- Wide range of droplet/particle size and generation frequency

- Versatile platform with application packs tailored for advance R&D

- Small size and batch manufacturability

- Ease of use and reliability

- Chemically stable

- User friendly control software

- Scale-out option available

6   System Specifications

System Components	3 x P-Pump, 3 x Sensor Interface, System PC, USB Hub, Range of essential accessories
Operating Pressure	0 - 10 bar
Supply Pressure (PFS)	> 1 Bar < 11 Bar
Pump Type	Pulseless Pressure Driven Pump
Flow Rate Range	70 nL/min to 5 mL/min (Flow Rate Sensor dependent)
Sample volume	Accepts a wide range of vials and vessels from 100 µl to 30 ml (higher on request)
Dimensions (complete system)	1300 mm (L) x 600 mm (W) x 600 mm (H)
Intended use space requirements	Recommended 200 cm (access is required to the rear and front of the system)
System Weight	8 Kg
Voltage Input	100 V – 240 V AC, 50 – 60 Hz

Working Temperature Range (external)	5 - 40 °C
Maximum Relative Humidity	80 %
Communication	DB9 to USB via Dolomite Flow Control Center Software
Wetted Material	Glass, FEP (tubing), FFKM, FKM, PEEK and PTFE
Tubing Dimensions	1/16" OD x 0.25 mm ID

7   P-Pump

The P-Pump (Part No. 3200175) provides pulseless liquid flow with a precise pressure driven pumping mechanism. It operates over a wide pressure range (0 – 10 bar) with excellent response time and accuracy. The design features a lockable pressure chamber for safety, which is easy to access and accommodates a wide range of fluid vessels. The User controls the P-Pump via the Dolomite Flow Control Centre software that comes pre-loaded on the system PC. Pressure driven flow is ideal for microfluidic systems where highly stable flow is required in the nl/min to µl/min range for applications such as droplet formation.

7.1   Features and benefits:

- Pulseless pumping performance
- Fast response time
- Wide pressure (0 - 10 bar) range enabling use with systems of high fluidic resistance
- Accommodates a wide range of fluid vessels (standard and non-standard)
- Quick and easy to set-up and run, with intuitive control
- Works with laboratory N_2 or Ar supply, gas bottle or compressor
- Uses samples direct from your container – no mess and no waste
- Closed-loop flow control option (with Mitos Flow Rate Sensor in-line)

7.2   Specifications

Weight	2 Kg
Ampere	1 A
Voltage	100 V – 240 V AC
Operating Temperature	5 - 40 °C

Operating Humidity	20 – 80 %
Dimensions	239 mm (L) x 93 mm (W) x 146 mm (H)

8 Sensor Interface

The Sensor Interface (Part No. 3200200) can be used interchangeable with the Flow Rate Sensors supplied within an Application Pack which simply attach with a push-click action. The Sensor Interface seamless connects a flow rate sensor to the P-Pump using a circular multi-pin interface cable, allowing users to switch from pressure control mode to flow control mode within the control software.

8.1 Features and Benefits

- Real-time display of flow rate with control software

- Easy to use, just connect to P-Pump

- Dimensions: 20.5 mm (length) x 82 mm (width) x 55 mm (height)

- Interchangeable flow rate sensors to provide wide range of flow rates

- Excellent chemical resistance

9 PC Specifications

Weight	PC: 0.649 Kg Screen: 2.9 Kg Keyboard: 0.50 Kg
Ampere	1 A
Voltage	100 V – 240 V AC
Operating Temperature	5-40 °C
Operating Humidity	20-80%
Dimensions	PC: 120 mm (L) x 110 mm (W) x 50 mm (H) Screen: 498 mm (L) x 164 mm (W) x 387 mm (H) Keyboard: 190 mm (L) x 140 mm (W) x 25 mm (H)