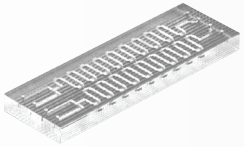
dolomite

fluidic factory

innovative creation of microfluidic devices

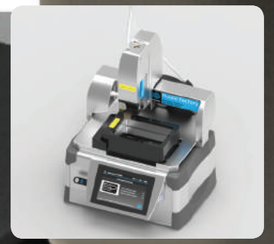
www.dolomite-microfluidics.com

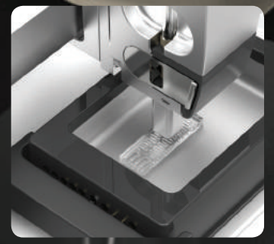


Print microfluidic devices in minutes for as little as $1 each

innovative design

fluidic factory » overview





Fluidic Factory is the world's first commercially available 3D printer for quick and easy fabrication of fluidically sealed devices.

Design your own microfluidic chips, manifolds and connectors, or select from the design library; and print for as little as $1 per chip.

Fluidic Factory enables fast prototyping using COC (FDA approved, biocompatible, translucent and robust polymer).

Ideal for a wide range of applications such as organ-on-a-chip, analytical, point of care diagnostics, drug development, education, chemical synthesis and biomedical assays.

» benefits

Fluidically sealed devices

Fluidic Factory's intelligent software creates leak-free flow paths and the hardware innovatively re-melts contact points, ensuring sealing.

Chemically and biologically compatible

Fluidic Factory prints COC (cyclic olefin copolymer), a hard, translucent and FDA approved polymer for implantables. Ideal for a wide range of applications.

Flexible

Create your own design or select from a wide range of devices in the design library.

Low cost

Print chips for as little as $1 per chip.

Create unique devices

3 dimensional mixers, non-rectangular chips, unique channel geometries and features not possible using etching, embossing, moulding or machining.

Ultimate design creativity

Design a device using virtually any CAD software on your PC. Load the universal (.stl) design file into the Fluidic Factory software and simply transfer the print file to the printer.

Easy to use

Insert your USB flash drive, select your design and press "Print" on the touch screen. Real time status, time remaining and filament use. Replace the polymer reel in seconds.

Fast print times

Print chips and other devices in minutes. Replaceable print bed trays allow chips to cool while others are printed.

Durable and simple to run

Quick to set up and run, with built in durability and reliability.

Compact, light and quiet

Ideal for bench top or desk top use, even in an office.

» specifications

General COC device specifications

Material:	COC (cyclic olefin copolymer), grade 8007S-04
Maximum size:	85 mm (l) x 50 mm (w) x 25 mm (h)
Maximum pressure:	10-20 bar, subject to design geometry
Temperature range:	Up to 77°C
Chemical compatibility:	COC is one of the most resistant plastics to a wide range of polar solvents and molecules
Method of printing:	Features are created by adding layers with an obround cross sectional area ("cylinder" with flattened, parallel top and bottom and semicylinder sides). As adjacent layers are printed, the polymer flows into the areas above and below the semicylindrical layers to create one seamless layer
Printing resolution (dimensions of layer):	Fine printing mode: 320 µm (w) x 150 µm (h). Increased operating pressure and greater fluidic sealing Fast printing mode: 400 µm (w) x 200 µm (h). Quicker prototyping, useful for larger print items
Print time (size):	20mins (small 15 x 15 x 2 mm), 1hr (medium 40 x 15 x 4 mm), 24hr (large 85 x 50 x 25 mm)

Key Fluidic Factory specifications

Size:	300 x 300 x 500 mm
Weight:	10 kg
Setup time:	10 min from unboxing to print
Print head with inductive heater:	User replaceable to enable future upgrades. Heats up to 240°C. Includes safety feature to ensure print head cannot be removed when hot. Self cleaning
COC polymer filament reel:	Contains 60 m of polymer (typically suitable for printing 100 medium sized chips) with disposable nozzle. User replaceable as filament is used
Print bed:	User replaceable to enable future upgrades. Temperature up to 120°C
Print bed tray:	Magnetically detachable to enable easy removal of printed device or replacement in the case of wear
Data transfer:	USB flash drive

features

COC (cyclic olefin copolymer) - Fluidic Factory prints COC devices

Motor feedback ensures correct polymer feed rate

Inductive heating coil ensures high speed heating and accurate control, and enables disposable print nozzle to be easily replaced

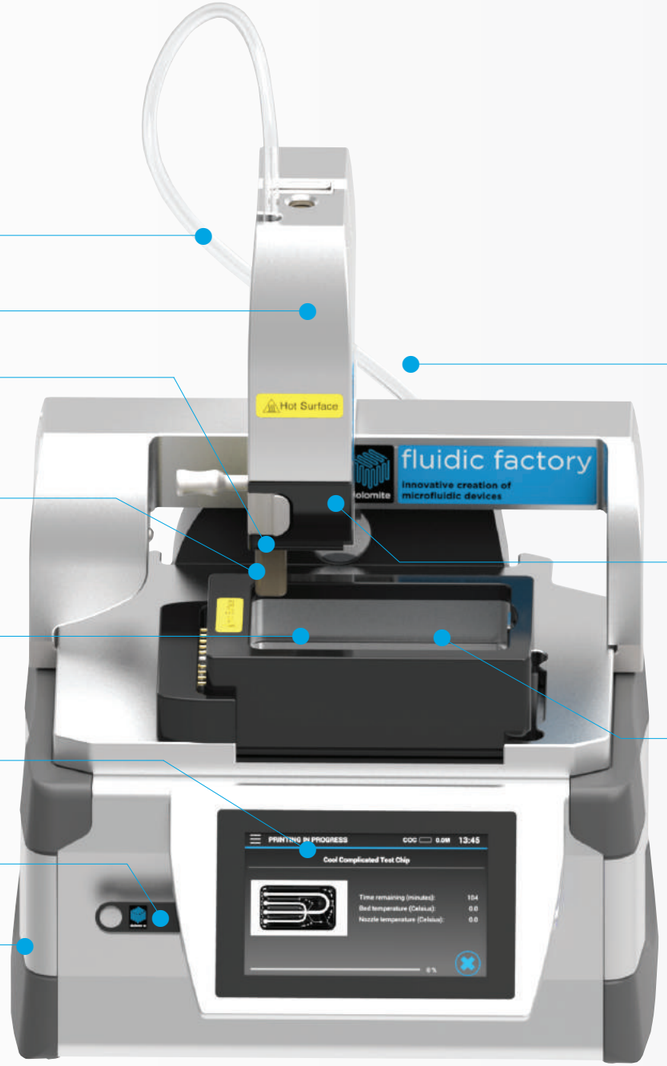
Extremely accurate movement of nozzle head allows precise features to be printed. Disposable nozzle ensures preservation of printing quality and accuracy of less than 1 µm

Magnetically attached print bed tray allows easy removal of the printed device

Intuitive touch screen for easy selection of design and quick 'print'. Real time status, time remaining and filament use

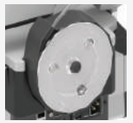
USB flash drive for simple transfer of .stl design file from PC to printer

Compact and lightweight: 300 x 300 x 500 mm; 10 kg



Replaceable Print Head, Print Bed, Print Bed insert, Reel Holder, Filament Reel with Nozzle

Polymer reel contains 60 m of polymer with a disposable nozzle that is changed for every reel to ensure that high quality of print is maintained over time. The reel can be changed in seconds. Auto-alert when COC is running low



Future enabled print head
A user-changeable print head and print bed plus easy to upgrade software enables future developments such as printing different polymers, ultra high definition printing, micromilling, fluid dispensing and bio-printing

Create unique devices: 3 dimensional mixers, non-rectangular chips, unique channel geometries and features not possible using etching, embossing, moulding or machining

applications

Wide range of devices: Microfluidic chips, sensor cartridges, fluid manifolds, valves, connectors, medical devices.

Cost effective and rapid prototyping: Model and print new designs in minutes.

Wide range of applications: Organ-on-a-chip, analytical, point of care diagnostics, emulsion formation, micromixing, biomedical assays, chemical synthesis.

Manufacturing: Rapidly print 10's or 100's of low cost, disposable devices.

the future

Fluidic Factory features a replaceable head and bed and upgradeable software to enable future functionality e.g. on-line chip design file shop, printing alternative polymers, high definition printing, micromilling, fluid dispensing, bio-printing.

Your opinion matters, send us your feedback and contribute to the future development of Fluidic Factory: info@dolomite-microfluidics.com

» innovative technology

Future-proof technology

Fluidic Factory features a replaceable head and bed, and upgradeable software to enable future functionality e.g. on-line chip design file shop, printing alternative polymers, high definition printing, micromilling, fluid dispensing, bio-printing.

Reliable fluidic sealing

Fluidic Factory has been designed for reliable sealing even in pressures of up to 10-20 bar (dependent on design).

» Intelligent software

The desktop PC software analyses the 3D geometry of the device and identifies the internal voids and surfaces. The print paths are then created from the inside of the device outwards and the print head deposits filaments in a continuous, leak-proof manner.

» Inductive heating

Fluidic Factory's clever design allows filaments to melt together when depositing on top of each other. A small volume of polymer is melted to a fluid state at very high temperatures and only held a few seconds before ejecting and depositing in a 'squashed' manner. This ensures excellent adherence, optimal polymer quality and leak-free channels.

» 'Squashed' bead method*

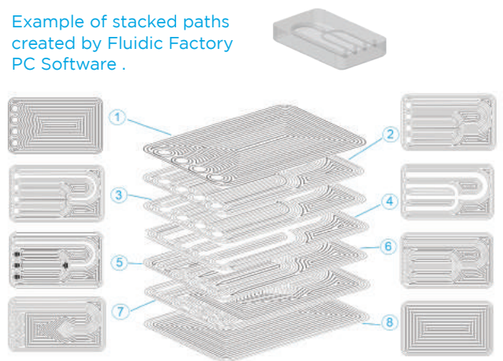
Fluidic Factory uses a 'squashed' bead method when depositing beads as opposed to many traditional FDM printers which deposit beads in circular cross-sections. The system is optimized for fluidic sealing.

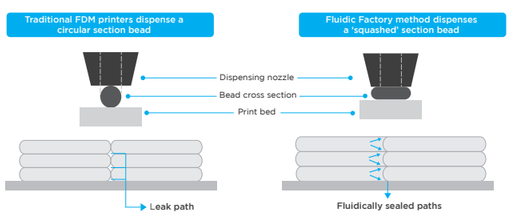
**FDM printers eject the molten polymer, which cools down and solidifies. What is ejected is called a bead. The size of the bead depends on the speed that the nozzle is moving, the nozzle diameter and the rate at which the polymer is ejected.*

Fluidic Factory 3D printing method

Fluidic Factory uses FDM (fused deposition modelling) method to melt the polymer at high temperatures and eject through the nozzle to the print bed which then solidifies at temperatures below 75°C.

Example of stacked paths created by Fluidic Factory PC Software .





Unique properties of COC (cyclic olefin copolymer)

Fluidic Factory is the world's first COC printer and the first printer in the world able to fabricate fluidically sealed devices. COC has many benefits over other polymers:

- » COC is FDA approved
- » Optically transparent
- » Non-auto fluorescent
- » Excellent resistance towards water-soluble chemicals, acids, alkalis and alcohols
- » Biocompatible
- » Very low water absorption
- » Compatible with various sterilizing processes
- » Excellent mechanical properties allowing more realistic prototype manufacturing

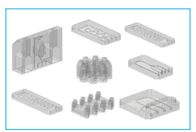
Channel geometries

Circular, triangular or rectangular channel geometries can be printed (dependent on the mode of printing). Other cross-sections are also possible.

Intuitive user interface and workflow

Fluidic Factory features a touch screen and USB drive to enable easy transfer of print files from a PC. Once the USB is inserted into Fluidic Factory, the file becomes available to select and print. Once printing is started, the screen displays the time left to print, real-time status and filament use.

FLUIDIC FACTORY DESIGN LIBRARY*



OWN DESIGN

Export CAD file to a .stl file & import to Fluidic Factory Software.

Process the file in the simple to use Software and save the exported .phff on a USB stick.

Insert the USB stick into Fluidic Factory flash drive - select your design via the touch screen.

PRINT

After printing, Fluidic Factory indicates that printing has completed. The removable print tray enables you to immediately inset another print tray and begin another print while waiting for the just completed one to cool down off the machine.

* Please note, the design library designs may vary

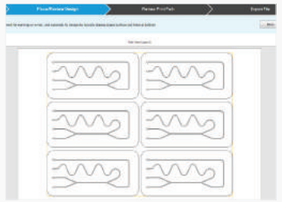
» innovative technology

Print files and Fluidic Factory Software

Print files are open format files and may be downloaded from the Design Library. Designs can also be created by CAD software and then saved as a .stl file, which carries information about the surfaces of the model. The Fluidic Factory PC software accepts .stl files and outputs print files (.phff).

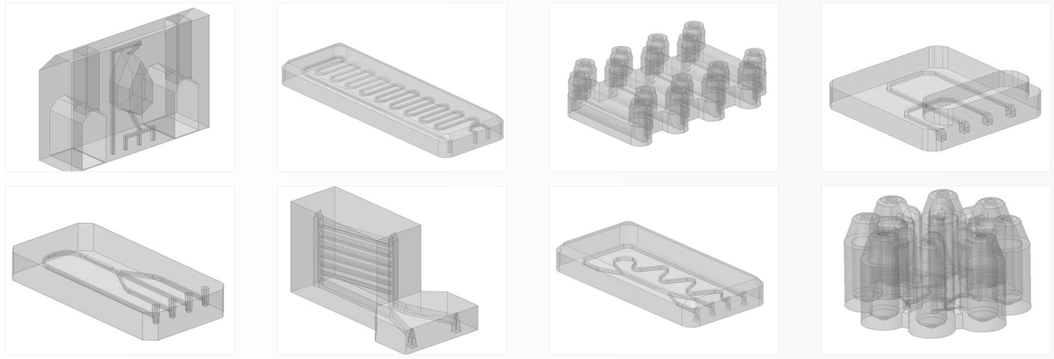
After importing a .stl file, the PC software creates a graphic illustration of the device. It then illustrates 2D slices, a slice at a time, reconstructed from the .stl information. The user is able to visually inspect the 2D slices to understand the print path of the print head. During this stage, the user is also able to adjust the model to decide the print orientation.

The user can scroll through the layers, and once satisfied, finalize the creation of the print file. This file is then copied to a USB flash drive and connected to the PC.



Ideas gallery

Follow some simple rules to optimize your design and the possibilities to create unique fluidically sealed devices quickly and in a cost effective way are endless.



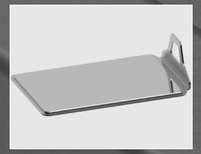
* Please note, the design library designs may vary

» parts list

Fluidic Factory System
Part nr. 3200500
Includes: Core Unit, Print Head, Magnetic Print Bed, Filament Reel Holder, Heated Print Bed, 4 x COC Filament Reels with Nozzle

Fluidic Factory Core Unit
Part nr. 3200524
(Without Functional Head or Bed)

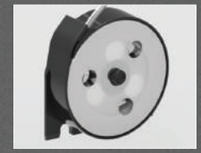
Fluidic Factory Heated Print Bed
Part nr. 3200502



Fluidic Factory Print Bed Insert
Part nr. 3200525

Fluidic Factory COC Filament Reel with Nozzle
Part nr. 3200504

Fluidic Factory Print Head for 3D Printing
Part nr. 3200503
(3D Print Head)



Fluidic Factory Filament Reel Holder
Part nr. 3200501

Dolomite is the world leader in design and manufacture of high quality innovative microfluidic products. We also offer:

- **Modular microfluidic systems, modules and components** such as pumps, chips, connectors, temperature controllers, sensors, accessories and software for analysis or automation.
- **Design, development and manufacture of custom-made components or modules**

Dolomite products are modular, easy to use, innovative and scalable and used in a wide range of applications in biology, drug discovery, clinical, chemistry, food, cosmetics and academia.

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