



MADE FOR
MICROFLUIDICS

3D PRINTERS • 3D MATERIALS



THE CADWORKS3D SOLUTION

OUR MISSION

From the outset, our primary objective has been to develop tools and solutions that meet the needs of researchers in the fields of microfluidics and biotechnology.

We quickly recognized that the 3D printing technologies that were available to microfluidic researchers were often repurposed from other industries, leading to gaps or mismatches between the capabilities of the technology and researchers' expectations.

With our technical expertise in 3D printing platforms and experience in formulating and manufacturing 3D photopolymers, we were able to refine and customize both the technology and materials to develop solutions specific to microfluidic and biotechnology researchers.

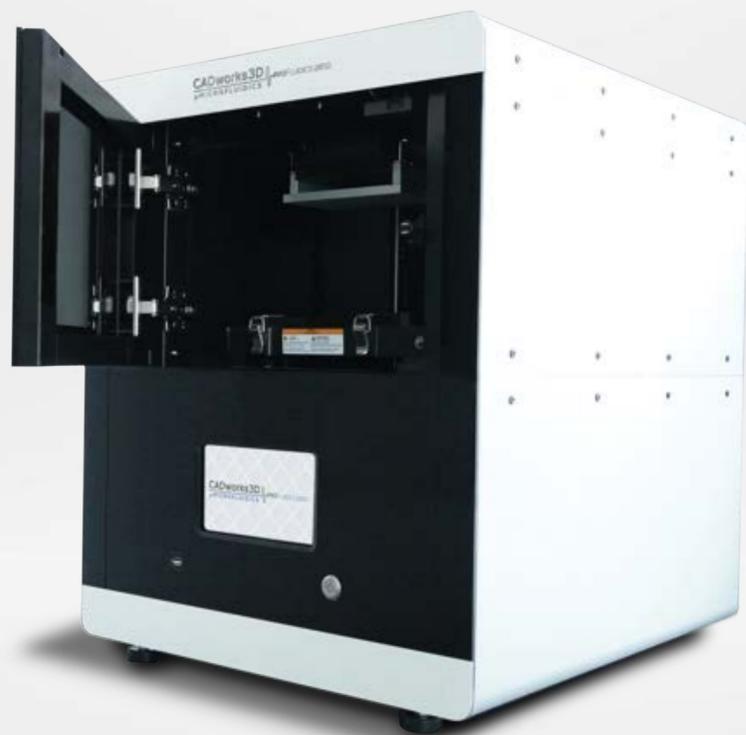
By looking at existing lab workflows, we were able to identify opportunities where 3D printing can improve the design, test and iterate process. Our goal is to create solutions that are faster and more accessible, helping researchers accelerate their proof-of-concept stages and advance their work more efficiently to commercialization.



Hemdeep Patel, Co-founder

PROFLUIDICS 285D

3D PRINTER



28.5µm Dynamic XY Resolution



5µm - 500µm Z Resolution *



Open Material System

Engineered for microfluidic applications. Highly accurate, fine printed details with exceptionally smooth surface finishes.

* Dependent on the 3D material used

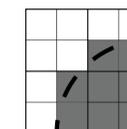
DEVICES AT BENCH SIDE IN A SINGLE DAY

Fabricate complex microfluidic designs on a lab bench. The ProFluidics 285D eliminates the need for an external fabrication facility to produce a single device. Instead, a single round of 3D printing takes just a few hours and can produce multiple devices with slight design variations, reducing lengthy production cycles with swift iterations.

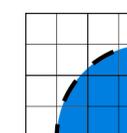
PRECISION-FOCUSED 3D PRINTING

Cutting-edge technology equips the ProFluidics 285D with dynamic pixel activation to produce improved curves and 3D shapes more accurate to the intended CAD. The ProFluidics 285D is able to effortlessly resolve 180-degree turns, complex serpentine channels, helix coils, microwells and domes, as well as other intricate geometries.

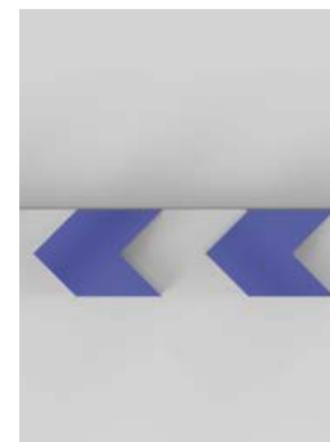
Standard 3D Printers



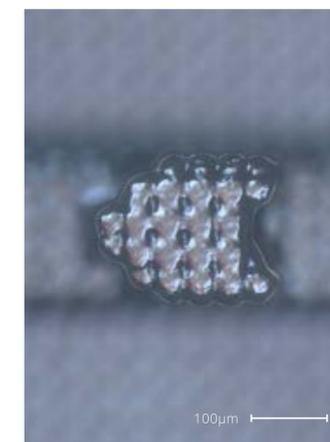
ProFluidics 285D



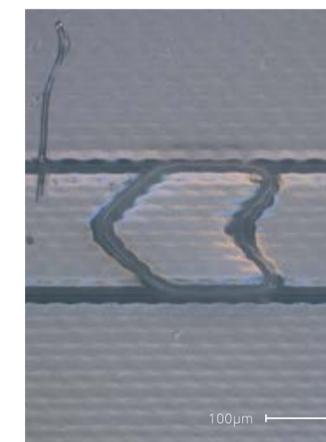
UNDER THE MICROSCOPE: HERRINGBONE MIXER 200µm



CAD FILE



STANDARD HD 3D PRINTER



PROFLUIDICS 285D

NEW

CYTO-CLEAR MONOLITHIC DEVICES

3D MATERIAL



Min 80µm
Closed Channels



Inert under
Autofluorescence



No Coatings or
Polishings

A broad-spectrum biocompatible 3D material with over 90% cell-viability across multiple cell lines. A new generation of monolithic devices.

>90% CELL VIABILITY ACROSS CELL LINES

The Cyto-Clear Photopolymer Resin has been specifically formulated for broad-spectrum biocompatibility and cell viability, undergoing rigorous cytotoxicity testing across multiple cell lines. Validated through live/dead cell staining, successful tests include sperm cells, monocytes, endothelial and epithelial cells, to name a few.

OPTIMIZED FOR IMAGING AND MICROSCOPY

Monolithic devices require high optical transparency to effectively monitor fluid flow and interactions within microchannels, and the Cyto-Clear Photopolymer Resin delivers excellent clarity with minimal haze and no yellow tint. It is non-reactive to fluorescent light, allowing for imaging and microscopy with fluorescent markers.

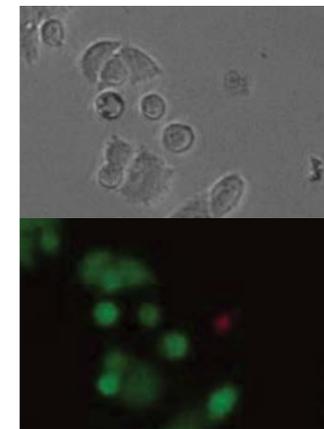
Formulated for Cell Viability



No Internal Channel Supports



3 KEY MATERIAL PROPERTIES



CELL VIABILITY



OPTICAL TRANSPARENCY



LOW AUTOFLUORESCENCE

MASTER MOLD FOR PDMS RAPID HD

3D MATERIAL



Min. 40µm
Open Channels



0.18µm Mold
Surface Finish



No Salinization or
Release Agents

A new standard of 3D printed molds for producing PDMS devices. Our improved formula with superior printed features.

SMOOTH SURFACES & PDMS DEMOLDING

The Master Mold for PDMS Rapid HD (RHD) shows significant improvements in surface finish with a reported Ra value of 0.18µm. The smoothness of master molds fabricated with this resin transfers to the quality of the PDMS, allowing the ease of PDMS demolding from the master as well as the PDMS' attachment to preferred substrates.

SHARP PRINTED DETAILS & MINIMAL PRINT BLEED

During 3D printing, materials often form a concave meniscus, where resin strongly adheres to printed surfaces to fill tight corners and details. If cured, this could lead to inaccuracies in the final geometry. Our Master Mold for PDMS RHD minimizes the concave meniscus effect, enabling greater precision when building finer details.

Other 3D Material



Master Mold for PDMS Rapid HD



OUR SAMPLE DEVICE

Device Size

54mm x 15mm x 7.5mm

Print Time

3 hours

PDMS Cast Time

1 hour

* Reported print and cast times change depending on the device

Feature

Feature	Size		
Channels	X: 40µm	Y: 40µm	Z: 100µm
Serpentine (Inner Radius)	X: 80µm	Y: 80µm	Z: 100µm
Microwells	X: 80µm	Y: 80µm	Z: 100µm
Herringbone Mixer	X: 200µm	Y: 200µm	Z: 200µm
Cross Junction	X: 80µm	Y: 80µm	Z: 100µm



MASTER MOLD FOR PDMS

3D MATERIAL



Min. 50µm
Open Channels



0.18µm Mold
Surface Finish



Non-Cytotoxic
PDMS

A tried and true formula for fabricating Master Molds for PDMS at a fraction of the cost and time of traditional methods.

PDMS DEVICES WITHOUT A CLEAN ROOM

Our methodology offers an accessible solution to labs that may not have easy access to a clean room. Producing master molds becomes a rapid, one-step fabrication process where the removal of multiple handling steps reduces fabrication time to just a single day while minimizing the risk of contamination in non-clean spaces.

ELIMINATE UNNECESSARY PRETREATMENTS

When standard 3D materials are used for master molds, they often require pretreatments prior to casting such as preheating and surface salinization. This can strain or damage the mold and risks cytotoxic PDMS, respectively. The Master Mold for PDMS Resin casts and detaches easily without treatment, and ensures the biocompatibility of PDMS.

Master Mold for PDMS



OUR SAMPLE DEVICE

Device Size

54mm x 15mm x 6mm

Print Time

2.5 hours

PDMS Cast Time

3 hours

* Reported print and cast times change depending on the device

Feature

Channels
Spheres
Microwells
Square Reservoir

Size

X: 50µm	Y: 50µm	Z: 100µm
X: 300µm	Y: 300µm	Z: 200µm
X: 100µm	Y: 100µm	Z: 100µm
X: 3.5mm	Y: 4.0mm	Z: 200µm



CLEAR MONOLITHIC DEVICES

3D MATERIAL



Min. 80µm
Closed Channels



Inert under
Autofluorescence



No Coatings or
Polishings

A low-viscosity photopolymer (~100 mPas) designed for high resolution 3D printing of closed features in monolithic devices.

THE KEY TO FINE CLOSED CHANNELS

Monolithic device with closed channels require adequate resin drainage to minimize the photoexposure of any trapped resin. As such, resin viscosity significantly influences the resolution of internal features. In combination with a high performance printer such as the ProFluidics 285D, this resin achieves channels as fine as 80µm.

NO INTERNAL SUPPORTS NEEDED

Several materials require additional supports within closed channels to prevent collapsing. Removing these can be challenging in smaller channels (<200µm) or those containing turns. The Clear Microfluidic Resin has a proven track record of fabricating serpentine channels (250mm in total length) without the need of supports.

Other 3D Material



secondary material for supports

Clear Microfluidic Resin



OUR SAMPLE DEVICE

Device Size

54mm x 18mm x 11mm

Print Time

1.5 hours

Post-Process Time

30 minutes

* Reported print times change depending on the device

Feature

Serpentine
Micromixer
Helix coil
Weave
Cross Junction
Circular Chambers

Size

X: 200µm	Y: 200µm	Z: 350µm
X: 500µm	Y: 100µm	Z: 100µm
X: 250µm	Y: 250µm	Z: 250µm
X: 200µm	Y: 200µm	Z: 200µm
X: 80µm	Y: 80µm	Z: 250µm
D: 400µm	Z: 250µm	



OUR SAMPLE PACK

WHAT IS INCLUDED?



Master Mold for PDMS

Master Mold for PDMS Rapid HD



Clear Monolithic Device

Clear Microfluidic Resin



Bioscaffold Device

Detax Freeprint Ortho 385nm
(Third-party material)

THE IMPORTANCE OF SEEING REAL DELIVERABLES

Superior 3D printing results depends on the synergy between 3D printer and 3D material. A 3D printer may have great technical specifications on paper, and yet may not fully realize those specifications if the material is not optimized for use with the printer. To accurately assess a 3D printing solution for microfluidics, it is important to see real printed devices.

SEE IT FIRST-HAND REQUEST A SAMPLE PACK



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