

Microfluidics Applications

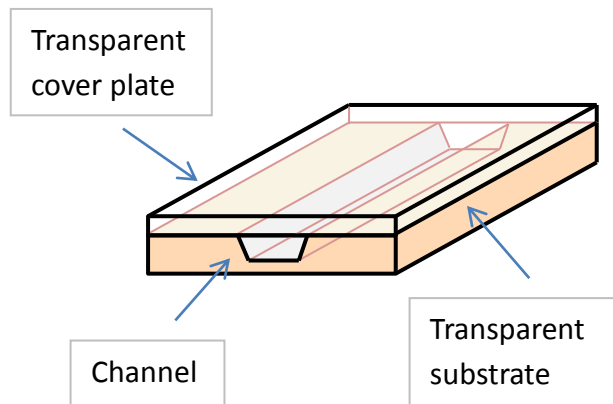
Zeta-200 3D Metrology System



The emerging technology of microfluidics enables the control of very small quantities of liquids. Microfluidics devices have spurred a wide variety of new applications in biotechnology. The devices include channels, wells, and control structures fabricated in materials such as silicon, glass, or polymer.

The Zeta-200 Automated 3D Metrology System makes it easy to image and analyze device features:

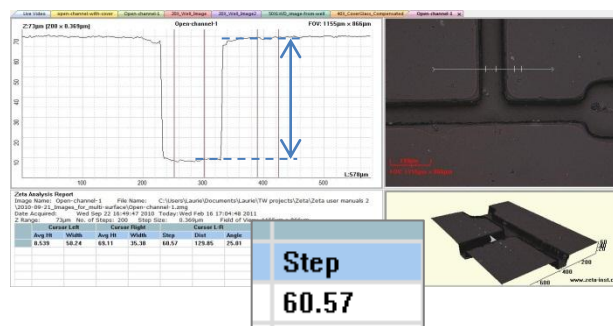
- See through transparent layers to image wells.
- Measure dimensions from sub-micron to over a millimeter.
- Handle high roughness and low reflectivity surfaces.



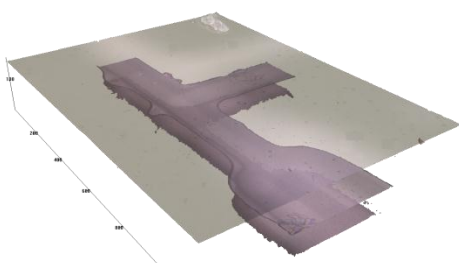
Vertical Dimension Analysis



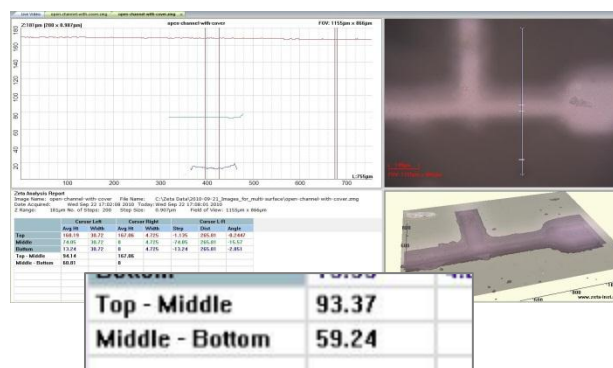
Zeta image of a fully open channel.



Step height analysis of the open channel.

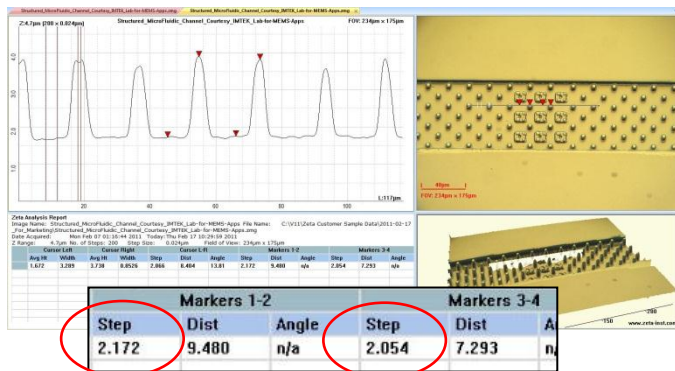


Zeta image of a similar channel with a transparent cover plate, showing top, middle and bottom surfaces.



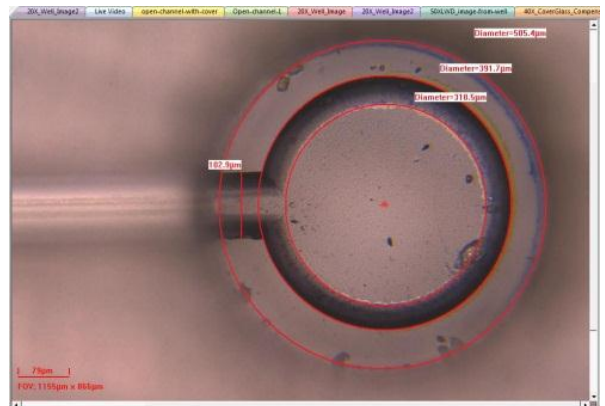
Analysis of the multi-surface image, showing the cover plate thickness (93.4 μm) and channel depth (59.2 μm).

Lateral Dimension Analysis



Analysis of a structured microfluidic channel, showing the heights of two adjacent pyramid structures.

Image courtesy of IMTEK, Laboratory for MEMS Applications, Freiburg, Germany.



Analysis in the X and Y dimensions of an open well structure next to a covered channel.

The well outer diameter is 505.4 µm, inner diameter 310.5 µm, and channel width 102.9 µm.

The Zeta-200 System



The Zeta 200 Automated 3D Measurement System provides true color imaging of complex surfaces in less than one minute per site.

Zeta 3D Software analyzes 2D or 3D images:

- Step height
- Surface roughness
- Feature size, diameter, area, and volume
- Multi-surface analysis for transparent features
- 3D surface visualization
- Statistics

The Zeta-200 supports production use:

- Multi-site measurements with statistics
- Recipe-based measurement definitions
- Automated data and image export

Features:

- High-brightness white LED light source
- XY stage with 200mm x 200mm travel
- 30mm total vertical travel
- Multiple FOV configurations available

Intel Core2 Duo processor with 3GB RAM, 320 GB disk, and widescreen LCD monitor

Optical Specifications					
	5x	10x	20x	50x	100x
Z res (µm)	5.90	1.50	0.50	0.10	0.07
N.A.	0.15	0.30	0.45	0.80	0.90
XY res (µm)	2.20	1.10	0.75	0.42	0.40
FOV 1 (µm)	1920x1440	960x720	480x360	192x144	96x72
FOV 2 (µm)	5029x3771	2514x1886	1257x943	503x377	251x189
Accuracy	±2.5%				
Repeatability	≤ 1.5% (1σ/mean)				

Features and specifications subject to change without notice

