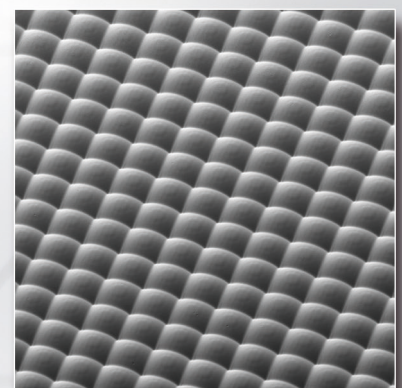


**HEIDELBERG**  
INSTRUMENTS



## ***DWL series***

HIGH RESOLUTION PATTERN GENERATOR



MLA, 20  $\mu\text{m}$  height, 100  $\mu\text{m}$  pitch

# DWL 2000 DWL 4000

## High Resolution Pattern Generator

The DWL 2000 and DWL 4000 laser lithography systems are fast, flexible high-resolution pattern generators for mask making and direct writing. With a write area of up to 400 x 400 mm<sup>2</sup> these systems are the perfect solution for fast patterning of masks and wafers in MEMS, BioMEMS, Micro Optics, ASICs, Micro Fluidics, Sensors, CGHs, and all other applications that require microstructures.

In addition to high-resolution 2D patterns the systems provides a Professional Gray Scale Exposure Mode, which enables it to create complex 3D structures with high quality in thick photoresist. In contrary to other technologies this method enables high throughput formation of 3D microstructures over large areas. Special software tools for optimization and evaluation of Gray Scale exposures have been developed to reduce the cycle time for new products. To ensure lowest surface roughness and shape conformity the systems support up to 4000 gray levels, an unmatched capability in the current market. Most common applications include fabrication of wafer level optics used for telecommunication or illumination market segments where our systems are being used by some of the largest multinational corporations. Other new applications include display manufacturing as well as device fabrication in the areas of biology and life sciences.

A fixed optical setup, a reliable real-time auto focus system and a high precision air-bearing stage system guarantee the quality and position accuracy of the exposed structures. A high-resolution interferometer monitors the position of the stage at all times. To ensure maximum stability, an advanced climate control provides constant temperature stability during operation. Additional software is used to compensate for any remaining variation in the mechanical structures or the environmental parameters.

The operator of the system can choose between four available write modes, making it possible to optimize the performance of the system for different applications. To further increase the efficiency a loading system can be installed, which

loads the substrates automatically from a cassette. According to the setup done by the operator, each substrate can be exposed with an individual design.

The DWL 2000 and DWL 4000 include two CCD cameras used for metrology and alignment purposes. This enables the systems to perform overlay exposures with high accuracy. Arbitrary structures on the substrate can be used for the alignment.

### Key Features and Options

Substrates up to 17" x 17"

Structures down to 0.5  $\mu\text{m}$

Address grid down to 5 nm

Professional gray scale exposure mode

Real time auto focus system

Exchangeable write modes

Camera system for metrology and alignment

Advanced climate chamber

Automatic substrate loading system

Stage map correction

Multiple data input formats

User programming interface

### SPECIFICATIONS

WRITE MODE	I	II	III	IV
Address Grid [nm]	5	10	12.5	25
Minimum Structure Size [ $\mu\text{m}$ ]	0.5	0.7	0.8	1.3
Max. Exposure Speed [mm <sup>2</sup> /minute]	30	115	180	370
Edge Roughness [ $3\sigma$ ,nm]	40	50	60	80
CD Uniformity [ $3\sigma$ ,nm]	60	80	90	120
Overlay Accuracy [ $3\sigma$ ,nm]	160	200	225	350