



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

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Technical specifications for LaserWriter - Maskless Lithography System

RFx No. 6100000831 (Reference No. 1000018341)

1. Key Generic Requirements:

- a. The tenderer must provide an installation scheme showing the physical space (footprint) of the item(s) as well as space required for routine access and all installations including related accessories.
- b. The vendor should have installed at least two similar types of systems in centrally funded technical institutes or government research labs. Purchase order(PO) and user list should be provided as supporting evidence.
- c. The compliance sheet should be provided by the vendor. The absence of the compliance sheet may result in the cancellation of the bid.
- d. For each compliance, supporting evidence such as manuals and other necessary and supporting documents needs to be provided.
- a. The vendor should have an Indian representative which can take care of the urgent troubleshooting or any queries on an urgent basis.
- e. Installation and training of the system should be demonstrated.

2.(a) Technical Specifications (Generic):

- b. The LaserWriter system will be used as pattern generator for microstructures for applications in research areas such as MEMS, micro-fluidics, micro-optics and all other fields. The system should be an affordable, compact system with powerful pattern generator including mask less technology as a new generation table top laser lithography tool. The entire setup for the LaserWriter should include
 - i. Laser

- ii. Optics
- iii. Accessories

All of the above items should be from the same manufacturer.

- c. The footprint required for the optical table-top is as following.
 - i. Width: 630 mm
 - ii. Depth: 850 mm
 - iii. Height: 530 mm

2.(b) Technical Specifications (Specific):

A. Diode Laser source (405)

Following are must-have features:

- Diode Laser (405nm) for Vector Mode Exposure Module
- For exposure of broadband photoresists
- laser wavelength: 405 nm
- output power: 120 mW
- typical lifetime: 20.000 hrs

B. LED Laser Source (365)

Following are must-have features:

- UV LED (365nm) for Raster Scan Exposure Module
- The standard 385nm light source for the Raster Scan Exposure Module is replaced by an UV LED for exposure of broadband and special i line photoresists, including SU-8, AZ-nLOF, TOK IP and others
- - LED wavelength: 365 nm
- - output power: 9 W
- - typical lifetime: >10,000 hrs

C. Optics

Following are must-have features:

- Optical system including highly reflective mirrors and SLM(Spatial Light Modulator) DMD.

D. Greyscale

- 128 grey levels

E. Chuck & substrate size

- Maximum substrate size: 5" x 5"
- Minimum substrate size: 5 x 5 mm²
- Maximum write area: 100 x 100 mm²
- Substrate thickness: 0.1 to 12 mm
- Encoder resolution: 20 nm

F. Write Mode's & Minimum structure size [μm]

- Raster Scan exposure Mode
Minimum feature size of 0.6 μm
- Vector Mode Exposure Module
minimum feature size of 0.6 μm

G. Exposure time

- Raster Scan exposure Mode
10mm²/min at 0.6 μm structure size
20mm²/min at 1 μm structure size
25mm²/min at 2 μm structure size
- Vector Scan Exposure Module
Maximum linear write speed - 200 mm/s

H. Alignment Accuracy

- Raster Scan exposure Mode
2nd Layer alignment over 5x5mm² [3σ , nm] - 500nm
2nd Layer alignment over 50x50mm² [3σ , nm]] - 1000nm
- Vector Scan exposure Mode
2nd Layer alignment over 5x5mm² [3σ , nm] - 500nm
2nd Layer alignment over 50x50mm² [3σ , nm]] - 1000nm

I. Address grid [nm]

- Raster Scan exposure Mode- 20nm
- Vector Scan exposure Mode- 20nm

J. Edge roughness [3σ , nm]

- Raster Scan exposure Mode - 100nm
- Vector Scan exposure Mode - 30nm

K. Edge CD uniformity [3σ , nm] & Line width variation [3σ , nm]

- Raster Scan exposure Mode- Line width variation -200nm
- Vector Scan exposure M- Line width variation -70nm

L. System Dimensions

- Width: 630 mm
- Depth: 850 mm
- Height: 530 mm
- Weight: 100 kg
- Temperature Stability: ± 1 °C
- Humidity: 50% $\pm 10\%$ (non-condensing)
- Clean Room: Class 1000 or better
- Compressed Air: 6 - 10 bar, stability ± 0.5 bar (without oil or other residue)
- Electrical: 230VAC / 6A or 110VAC / 12A

- **Process Demonstration for onsite acceptance**

The LaserWriter should be able to write minimum feature size for standard device and contact pad structures as lines, circles, rectangles, squares with minimum/negligible stitching error and edge roughness within acceptable tolerance values.

- Minimum structure size - 600 nm
- Minimum lines and spaces - 800 nm
- Edge Roughness - 100 nm
- Line width variation - 200 nm
- Global 2nd Layer Alignment [3σ , nm] -1000 nm
- Local 2nd Layer Alignment [3σ , nm] - 500 nm
- Write speed - 10 mm²/min

Warranty: 1 year