



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076

Technical Specification of UV and Thermal Nanoimprint Lithography

A desktop or floor-mounted system capable of operating with 220 volts line power and performing pressure-driven thermal nanoimprint lithography, UV nanoimprint lithography, and hot embossing under vacuum or ambient pressure.

The system should meet or exceed the following minimum specifications. A compliance sheet with respect to our specification and your quoted system should be included while submitting the tender. Please include relevant datasheets/images/plots to support your various compliance claims.

Specifications of substrate and stamps

1. Should be capable of handling up to a 3-inch diameter full wafer as well as smaller substrates of irregular sizes and shapes
2. Must support polymethylmethacrylate (PMMA), cyclo-olefin copolymer (COC), cyclo-olefin polymer (COP), polycarbonate (PC), and UV polymerizable resists SU-82000 and SU-8 2100 as substrates.
3. Must support silicon, fused silica, quartz, nickel, cycloolefin copolymer (COC), polymethylmethacrylate (PMMA) and polydimethylsiloxane (PDMS) as stamp materials.

Thermal and UV operation

4. The system should support an operating temperature ranging from the ambient to at least 240°C.
5. The user should be able to monitor the temperature of the stack in real time.
6. The ramp time from ambient temperature to 200°C should be 10 minutes or less.
7. The system should support operation in air, inert gas and vacuum.
8. An imprint pressure range of 0 to 10 bar over ambient should be supported.
9. The system should support a vacuum of 1.5 mbar or less.
10. The system should support a peak UV nanolithography wavelength of 365 nm.
11. The average UV intensity should be at least 50 mW/cm² or higher at 365 nm.
12. The system should support fabrication of a wide range of feature sizes from 50 nm or lower to 100 micron or higher.
13. The process control between loading and unloading of the sample should be fully automated.



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076

14. The system should provide flexibility in operation to include a minimum of 25 process steps into a program.
15. All necessary electrical cables and two surge-protected extension boards for powering the system. If there are any components that are not directly convertible to 220 volts, the requisite number of power adapters/converters should be included along with the system.
16. All necessary tubing for connecting the system should be included.
17. At least one hard stamp and one soft test stamp with anti-sticking coating to demonstrate (i) hot embossing, (ii) UV nanoimprint lithography and (iii) thermal nanoimprint lithography. The stamp to demonstrate nanoimprint lithography must have a minimum feature size of 500 nm or less.
18. At least 20 pieces of 3-inch diameter COC sheets
19. At least 20 pieces of 3-inch diameter Teflon spacer sheets to be used with the stack
20. At least 100 ml of a UV nanoimprint photoresist and 100 ml of the corresponding developer
21. At least 100 ml volume of the corresponding thinners for the photoresist quoted above
22. At least 100 ml volume of an adhesion promoter for the photoresist

Computer and software

23. A workstation (Dell or Lenovo or HP or equivalent) compatible with the nanolithography equipment and loaded with genuine 64-Bit operating system and pre-installed software for operating the equipment. Please quote for a perpetual license or extended support for the software.
24. At least one standard recipe for each of the following should be pre-installed for initial training and familiarization of the system: (i) hot embossing of COC, (ii) thermal nanoimprint on a resist, (iii) UV nanoimprint with a photoresist for use with hard stamps, (iv) UV nanoimprint with a photoresist for use with PDMS stamps.

Warranty (to be included in the quote)

25. The system should carry 1-year warranty and 4 years of comprehensive maintenance contract (CMC) after the first year of warranty for all spare parts and service— **this is extremely important for us.**
26. Warranty will start from the day of installation of the equipment.
27. Support for spare parts for 5 years after sale and installation should be quoted.

Installation and training



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076

28. Complete installation including demonstration of individual and combined UV and thermal nanoimprint processes with a feature size of at least 500 nm using the test stamp
29. Training for users by the company personnel present 'on site' immediately after the installation. The same should be offered once every year for the duration of the CMC.
30. All pre-installation requirements to have the system installed in ideal room conditions should be included in the quote.

Terms and conditions

31. In case of downtime, the system should be attended to by trained service engineers (at least on Skype) within 48 hours of complaint.
32. Should have installed at least five systems of the same model in reputed institutions all over the world.