

# NPS 300

Nano Imprinting Stepper

## Micro/Nano-Replication at its Best

Optimized for the production of nanostructures, the Nano imprinting Stepper NPS300 is the first ever tool able to combine aligned Hot Embossing and UV-NIL on a same platform. The NPS300 is able to print sub-20 nm geometries with an overlay accuracy of 250 nm.

The NPS300 demonstrates proven cutting-edge technology solutions that meet the economic requirements both for R&D and production. Its flexible architecture offers an excellent process reproducibility and a unique ability to pattern large areas, in a sequential step and repeat mode on wafers up to 300 mm.

The NPS300 is available either as manually loaded or as a fully automated system with wafer loading capability.



## Features & Benefits

- Nanoimprinting lithography tool combining hot embossing (HE) and UV-NIL on wafer in a step & repeat mode
- Possibility to add inert gas for faster print
- High accuracy and low volume fluid dispense
- Automatic stamp pick-up
- Manual or automated wafer loading / unloading
- Air bearing technology and granite structure ensure long-term stability and reliability

## Printing Processes

- HEL (Hot Embossing Lithography) and UV-NIL can be performed on the same platform.
- Innovative Step & Stamp Imprinting Lithography method (SSIL) demonstrated by VTT Microelectronic Center.

## Applications

- Photonic devices
- High precision micro-optical arrays and gratings
- CMOS-MEMS integration
- High resolution OLED displays
- High density HDD's for mobile storage
- Other emerging techniques

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## Technical Specifications

### Process station

#### Component Size

Wafer / Substrate	Up to 300 mm diameter Thickness up to 5 mm
Template / Stamp	50 to 67 mm square standard <i>Option</i> : 100 mm square Thickness up to 6.3 mm

#### Imprinting Arm

Imprinting Resolution	Sub-20 nm (process dependent)
Alignment Accuracy	100 nm (basic version)
Overlay Accuracy	250 nm
Imprinting Force	5 N up to 4kN
Z stage	50 nm step / programmable speed
Motorized pre-leveling	± 1 degree Resolution 4.7 µradian
Self-leveling system	Pivot point at stamp surface

#### Alignment XY Stage

Travel	410 x 395 mm Resolution 10 nm
Theta Control	± 5 degrees Resolution 0.4 µrad

#### Substrate Heating Chuck

Temperature Range	RT to 450°C (350°C for 300 mm)
Sizes Available	Square 50, 100, 150, 200 mm Diameter 300 mm

#### Optics

XY Stage Travel	100 x 80 mm Resolution 10 nm
Autocollimator Sensitivity (Pre-leveling)	20 µrad on mirror
Digital Camera Resolution	0.55 µm per pixel Dark Field and Bright Field Illumination by LED
Field of View	890 x 680 µm
Pattern Recognition System	Cognex™

### Imprinting Head

#### UV-NIL Head

Embossing Force	Up to 200 N
Exposure Area (max)	40 x 40 mm
Exposure intensity	> 120 mW/cm <sup>2</sup>
Exposure uniformity	± 10%
Wavelength	365 nm, ± 15 nm / 375 and 395 nm available

#### Hot Embossing Head

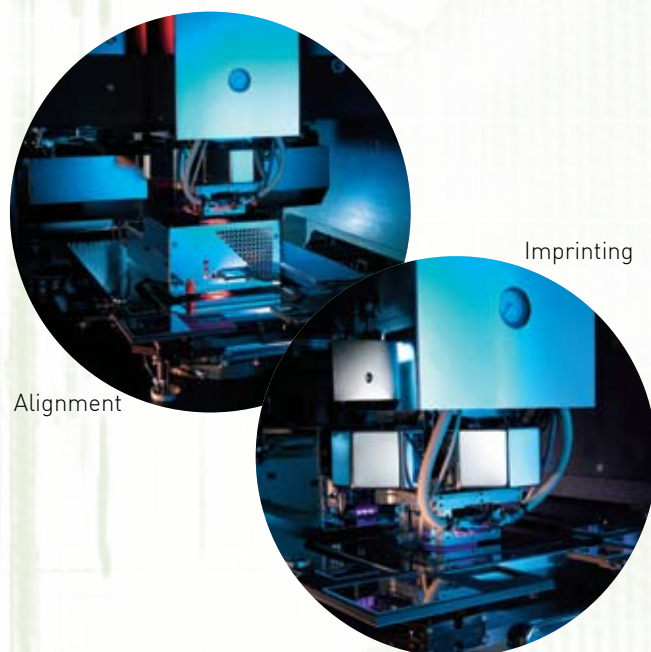
Imprinting Force	Up to 4 kN
Temperature Range	RT to 450°C

#### Options

Wafer Level Hot Embossing Head - 100 x 100 mm  
Automatic alignment for hands-off operation  
Advanced laser-leveling system  
Fluid dispenser for UV-NIL  
Wafer feeding module

#### General Characteristics

Machine Footprint	1960 mm x 2100 mm
Machine Height	2180 mm
Machine Total weight	3000 kg
Electrical Power Supply	240/400 V - 10 kVA 50/60 Hz



\*Process or Configuration Dependent

Data, design and specifications depend on individual process conditions and can vary according to equipment configurations. Not all specifications may be valid simultaneously. Illustrations, photos and specifications in this datasheet are not legally binding. Specifications are subject to change without prior notice.

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