

TWINSCAN NXT:1950i

193-nm Step & Scan

Description

The TWINSCAN NXT:1950i Step-and-Scan system is a high-productivity, dual-stage immersion lithography tool designed for volume production 300-mm wafers at the 32-nm node and beyond.

Building on the successful in-line catadioptric lens design concept of the XT:1950Hi, the TWINSCAN NXT:1950i has a numerical aperture (NA) of 1.35 – the highest in the industry.

In-situ measurement and correction of optic aberrations enable maximum imaging performance for each wafer exposed when imaging at very low- k_1 .

The TWINSCAN NXT:1950i introduces ASML's new generation of dual scanning stage operating concurrently and independently. The innovative magnetic levitation technology allows significant acceleration and precision gain enabling the TWINSCAN NXT:1950i to achieve unprecedented productivity and overlay performance.

Advanced in-situ metrology per wafer together with a comprehensive set of options to seamlessly input off-line metrology data to the scanner enable maximum overlay, focus and CDU performances on product wafers.

By combining enhanced image resolution, unprecedented overlay and productivity performance with CD uniformity and focus performance, the TWINSCAN NXT:1950i will address the challenge of single exposure and double patterning and be a cost-effective solution for the 32-nm node and beyond.

Technical Specifications

Lens	
Wavelength:	193 nm
NA:	0.85–1.35 (variable)
Resolution:	≤ 38 nm
Field size, for reticle with pellicle	
• Max X:	26.0 mm
• Max Y:	33.0 mm
Overlay	
Single-machine (dedicated chuck):	≤ 2.5 nm
Matched- machine (to TWINSCAN NXT:1950i):	≤ 5.5 nm
Production Throughput	
30-mJ/cm ² exposure dose	
• 300-mm wafers, 125 shots:	≥ 175 wph

Key Features and Benefits

1.35-NA 193-nm Catadioptric Projection Lens

Production resolutions down to 40 nm (C-quad) and 38 nm (dipole). In-line catadioptric lens design supporting full 26 x 33-mm field size, 4X reduction and reticle compatibility with existing designs. Lens elements are equipped with manipulators to correct for optical aberrations thus enabling maximum productivity for low- k_1 applications.

Comprehensive Illumination Flexibility for Low- k_1 Imaging

QUASAR XL is a software controlled automatic exchanger of diffractive optical elements (DOE) that provide advanced pupil shaping for low- k_1 imaging.

Extendibility to free form pupil with the next generation of advanced DOE or FlexRay illuminator. AERIAL XP Polarized Illuminator extends the range of conventional and off-axis illumination to reduce the mask error factor and can increase the resolution by up to 5 nm.

New Generation of Dual-Stage Immersion Technology

The TWINSCAN NXT:1950i planar Dual-Stage delivers increased acceleration and eliminates the need for a closing disk during stage swap. Together with faster Step-and-Scan sequence and shorter overhead the new planar Dual-Stage design offers a major step forward in productivity and extendability. Improved immersion hood concept increases immersion meniscus stability and robustness, and reduces susceptibility to contamination.

Unprecedented Overlay Performance

Innovative short beam length position measurement improves overlay performance. Effective wafer table temperature control with multi heaters improves full wafer overlay. Improved reticle alignment with closer to resolution reticle alignment targets and increased number of samples in aerial image further contributes to improved on product overlay.

In-situ Metrology per Wafer Exposed

Off-line Focus Control and Field-by-Field leveling measurement and mapping of each wafer's surface before exposure. ILIAS sensor system measures full field projection optic aberrations and pupil graphs.

Optical aberrations are corrected for each wafer exposed. Dose control and correction for each wafer exposed using energy sensor during exposure.

Increased Productivity

Proven 6-kHz ArF laser technology provides high power to support high throughput and is equipped with novel gas lifetime extensions to reduce downtime. Airdrag immersion hood design and wafer table designs dramatically reduce immersion related defects. Comprehensive service package together with TWINSCAN NXT:1950i maintenance scheduler which takes advantage of system idle time to perform required routine maintenance enables best optimization of system availability.