ASML

ASML Product Catalog

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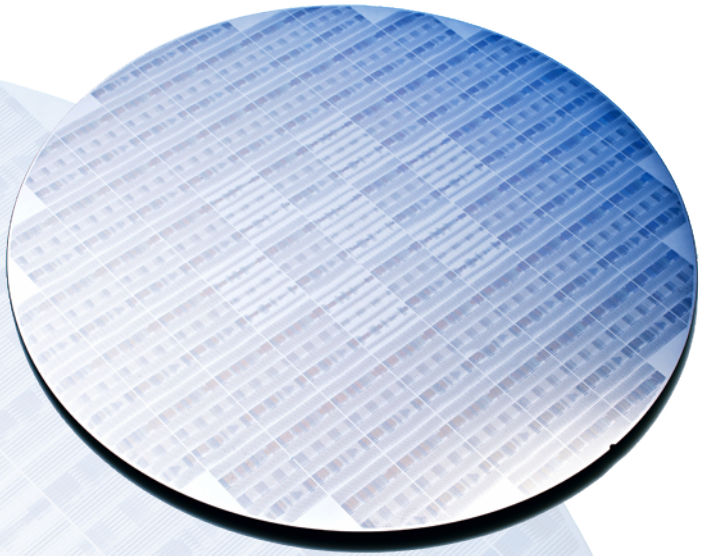

PAS 5500/850C

DUV Step-and-Scan

Order Codes

9428.999.60890

DESCRIPTION

The PAS 5500/850C 248-nm Step-and-Scan system enables 110-nm mass production. Since the initial introduction of the PAS 5500/850, the PAS 5500/850 series have become the worldwide standard for both 110-nm logic and 110-nm memory applications.
The PAS 5500/850C can be configured with a number of options that enable ultra low-k_1 in manufacturing, extending application of the PAS 5500/850C well below 110 nm.

KEY FEATURES AND BENEFITS

Variable 0.8-NA Deep UV Projection Lens

Production resolution down to 110 nm.

AERIAL II Illuminator

Provides the ultimate flexibility in illumination modes at maximum throughput.

PAS 5500 Step-and-Scan Body

Commonality with i-line and 193-nm Step-and-Scan tools for economic mix-and-match.

ATHENA Advanced Alignment Combined With Reticle Blue Align

Increased alignment accuracy for a wide variety of processes. Ultra stable over time.

Includes 20-W KrF Laser Technology with Variable Laser Frequency Control

Combines high laser power for high throughput with efficient use of laser pulses for the lowest possible laser cost of operation.

Batch Streaming with ARMS

Provides continuous-flow manufacturing.

TECHNICAL SPECIFICATIONS

Lens

Wavelength:	248 nm
NA:	0.55–0.80 (variable)
Resolution:	≤ 110 nm

Field size, for reticle with pellicle

• Max X:	26.0 mm
• Max Y:	33.0 mm

CD Uniformity @ 0.11-µm L/S

• BF:	≤ 8 nm
• Over 0.4-µm defocus:	≤ 10 nm

CD Uniformity @ 0.11-µm isolated lines

• BF:	≤ 8 nm
• Over 0.3-µm defocus:	≤ 14 nm
Distortion (Dynamic):	≤ 13 nm

Overlay

Single-machine:	≤ 15 nm
Matched-machine:	≤ 25 nm

Production Throughput

50-mJ/cm^2 exposure dose

• 200-mm wafers, 46 shots:	≥ 135 wph

AERIAL Illumination

Conventional

• Intensity:	≥ 3300 mW/cm^2 (@ NA Max)
• σ max:	0.88
• σ min:	0.31

Annular

• Intensity:	≥ 3300 mW/cm^2 (@ NA Max)
• σ out:	0.40–0.88
• σ in:	0.16–0.64
• Integrated slit uniformity:	≤ 0.7%

Lasers

Type:	Cymer ELS6610
Power:	20 W
Beam Delivery:	≤ 20-m remote capability

KEY OPTIONS

QUASAR Multipole Illumination Module

Combines an automatic DOE exchanger with a family of advanced optional Diffractive Optical Elements (DOEs). The DOEs allow pattern specific illumination optimization enabling low-k_1 manufacturing down to 100 nm.

Multiple Exposure Capability

Ideal for techniques using multiple exposures creating a single image, such as dipole illumination and the use of both a Phase Shift Mask and a binary trim mask.

SECS Interface

Hardware and software based on SECS communication protocol for factory CAM integration; GEM- and SEM-compliant.

PAS 5500/450F

i-Line Step-and-Scan

Order Codes

9428.999.60530-UFR

DESCRIPTION

The PAS 5500/450F is the latest and most advanced addition to the i-line Step-and-Scan family. This mass production tool is the successor of the PAS 5500/400 for non-critical applications. This tool has been extended to critical i-line down to 220 nm. The PAS 5500/450F combines the imaging power of a variable 0.48-0.65-NA Carl Zeiss Starlith 4X reduction lens with a high speed scanning stage to deliver a high productivity tool with a superior value of ownership for maximum yield. The system is fully configurable to meet production requirements and offers both ease-of-manufacturing and cost-effectiveness in a high-volume production environment. The PAS 5500/450F continues to raise the bar for imaging performance and productivity in the 200-mm litho market.

KEY FEATURES AND BENEFITS

Cost-Effective i-Line High Throughput Scanner, Throughput 150 Wafers per Hour

High throughput resulting in superior cost of ownership.

Applications

The world's most successful i-line scanner system used in a wide range of processes from critical to non-critical i-line layers ensuring ease-of-manufacturing and cost effectiveness for layers with feature sizes down to 220 nm.

High Speed Scanning Stages

The latest successful ASML technology with high speed stage innovations are included resulting in the world's highest 200-mm productivity i-line tools.

PAS 5500 Mature Step-and-Scan Body

The PAS 5500/450F is based upon the industry-leading 200-mm PAS 5500 Step-and-Scan body.

Commonality with PAS 5500 DUV and 193-nm Step-and-Scan Tools for Economic Fab Extensions

- Optimized for mix-and-matching
- Modular design allowing future improvements to be integrated in the body

TECHNICAL SPECIFICATIONS

High performance configuration

Lens including High Performance Imaging Pack

Wavelength:	365 nm
NA:	0.48–0.65
Resolution:	≤ 220 nm

Field size, for reticle with pellicle

• Max X:	26.0 mm
• Max Y:	33.0 mm

CD Uniformity @ 220 nm L/S

• BF:	≤ 22 nm
• At ± 0.3-µm defocus (@ max NA):	≤ 35 nm

CD Uniformity @ 220 nm isolated lines

• BF:	≤ 20 nm

• At ± 0.2-µm defocus (@ max NA):	≤ 35 nm
Distortion (Dynamic):	≤ 20 nm
Image Plane Deviation:	≤ 225 nm
Astigmatism:	≤ 135 nm

Production Throughput including PEP 450F

Throughput under ATP conditions 200-mJ/cm^2 exposure dose 16 x 32-mm representative field size

• 200-mm wafers, 46 shots:	≥ 150 wph

AERIAL Illumination including High Performance Imaging Package

Conventional

• Intensity:	> 5500 mW/cm^2
• σ max:	0.85
• σ min:	0.38
• Integrated slit uniformity:	≤ 1.2%

Annular

• σ out:	0.38–0.88
• σ in:	0.16–0.64
• Integrated slit uniformity:	≤ 1.2%

The ASML refurbished system is configured for high performance.

KEY OPTIONS

SECS Interface

Hardware and software based on SECS communication protocol for factory CAM integration: GEM and SEM compliant.

IRIS

Integrated reticle inspection system.

Image Streaming Package

For enhanced productivity on customer jobs.

CLEAR!

Automatic, in-situ detection and cleaning of chuck spots with instant verification of cleaning success.

ATHENA Narrow Marks

Accurate alignment to Narrow Marks that fit into a scribe-lane with a minimum width of 40 µm.
Narrow mark type designs (NSSM, NVSM).

PAS 5500/275D

High Productivity i-Line Stepper

Order Codes

9428.999.60630-UFR

DESCRIPTION

The PAS 5500/275D is an i-line stepper stretching resolution down to 0.28 µm and beyond. It is built on the success of the proven PAS 5500/250C advanced i-line stepper.
The PAS 5500/275D features improved imaging achieved by applying the latest techniques in lens adjustment as well as improved overlay by including phase modulation in the system. In addition to that, Image Quality Control is included as standard. Leadership productivity is improved to more than 100 wph (ATP settings). The PAS 5500/275D uses an AERIAL illuminator, which provides flexible and automated NA/sigma combinations in both conventional and off-axis illumination modes while maintaining high intensities to enable economical mass production of leading-edge devices.

KEY FEATURES AND BENEFITS

Variable, High-NA i-line Lens

Production resolution down to 0.28 µm.

Innovative 3.5-kW AERIAL Illuminator

Maximum throughput over partial coherence and annular range.

Continuously variable partial coherence and annular illumination using AERIAL Optics

Process latitude optimization for different process layers.

Software-controlled Lens NA and Illuminator

Flexible automated imaging optimization in production settings.

Focused Reticle Masking System

Maximizes available reticle area.

Direct Reticle-referenced, Through-The-Lens (TTL) Phase-grating Alignment

Optimum overlay and matching using alignment beam phase modulation.

Advanced High Speed Stage

Precision with high throughput.

TECHNICAL SPECIFICATIONS

Lens

Wavelength:	365 nm
NA:	0.48–0.60 (variable)
Resolution:	≤ 0.28 µm

Field size, for reticle with pellicle

• Diameter:	31.1 mm
• Max X:	22.0 mm
• Max Y:	27.4 mm

UDOF @ 0.28-µm with 10% CD Control (top-down)

• Annular:	≥ 0.8 µm

Distortion:	≤ 40 nm

Overlay

99.7% with 2 pt. global alignment

• Single-machine:	≤ 40 nm
• Matched to PAS 5500/275:	≤ 80 nm

Production throughput

200-mJ/cm^2 exposure dose

• 150-mm wafers, 40 shots:	≥ 120 wph
• 200-mm wafers, 70 shots:	≥ 100 wph

AERIAL Illumination

Conventional

• Intensity:	≥ 2250 mW/cm^2 (@ NA 0.56)
• max:	≤ 0.8
• min:	≥ 0.35
• Uniformity:	≤ 1.4%

Annular

• Intensity:	≤ 1900 mW/cm^2 (@ NA 0.60)
• out:	≤ 0.85
• in:	≤ 0.20
• out-in:	≥ 0.25
• Uniformity:	≤ 1.2%

Batch Streaming with ARMS

Continuous-flow manufacturing.

KEY OPTIONS

Wafer-Track interface

Hardware and software supporting ASML-standard wafer-track interface.

SECS interface

Hardware and software based on SECS communication protocol for factory CIM integration; GEM- and SEM- compliant.

IRIS

In-line reticle particle inspection system (ARMS required to run this option).

ATHENA advanced alignment

Increases alignment accuracy and process latitude.

PAS 5500/100D

i-Line Stepper

Order Codes

9428.999.60230-UFR

DESCRIPTION

The PAS 5500/100D i-line stepper is designed for mass production at 0.4 µm and achieves extremely high throughput while maintaining the utmost versatility with its variable Numerical Aperture (NA). This stepper extends i-line's capability for manufacturing multiple generations of sub-half-micron design rules by optimizing both depth of focus and resolution for critical process layers.

KEY FEATURES AND BENEFITS

Automated Variable-NA i-Line Projection Lens

Lens technology allowing 0.40-µm imaging.

Completely redesigned variable partial Coherence Illuminator

1.5-kW illuminator power results in 900 mW/cm^2 at wafer level.

Broadband Field-by-field Focus Leveling System

Leveling while moving from one site to another.

Advanced Light-weight Stage

High precision combined with high throughput.

Direct Reticle-Referenced, Through-The-Lens (TTL)

Phase-Grating Alignment.
Optimum overlay and matching.

Built-In CLASS 1 Laminar Airflow

Enhances interferometer stability, provides ultra-clean wafer environment.

TECHNICAL SPECIFICATIONS

Lens

Wavelength:	365 nm
NA:	0.48—0.60 (variable)
Resolution:	0.40 µm

Field size, for reticle with pellicle

• Diameter:	31.1 mm
• Max X:	22.0 mm
• Max Y:	27.4 mm
Usable depth of focus:	≥ 1.1 µm
• @ specified resolution of 0.40 µm with 10% CD control and ≥ 85˚ wall angle	
Distortion:	≤ 60 nm

Overlay

99.7% with 2 pt. Global Alignment:	< 60 nm

Production Throughput

With field-by-field leveling, 200-mJ/cm^2 dose and at specified overlay accuracy

• 150-mm wafers, 40 shots:	≥ 100 wph
• 200-mm wafers, 70 shots:	≥ 72 wph

Illumination

Intensity:	≥ 900 mW/cm^2
Uniformity:	≤ 1.5%
Variable coherence range:	σ = 0.3—0.7

KEY OPTIONS

Image Quality Control

Automated statistical process control of wafer stepper to improve stepper use.

Wafer-Track Interface

Hardware and software supporting ASML-standard wafer-track interface.

Automatic On-line Control

Hardware and software based on SECS I & II communication protocol for factory CAM integration:GEM- and SEM-compliant.

Batch Streaming with ARMS

Continuous-flow manufacturing.