

ACME DFO Calibration SOP v1.9 (Tool L-900 EUV)

Revision: 1.9

Date: 2025-10-08

Company: ACME Lithography Systems

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Revision History

Version	Date	Author	Summary
1.9	2025-10-08	Manufacturing Engineering	Periodic update; limits & procedures clarified.

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§1 Purpose & Scope

This Standard Operating Procedure (SOP) defines the daily calibration process for Dose, Focus, and Overlay (DFO) on ACME L-900 EUV scanners.

Scope: Products PX-5 through PX-9; layers FEOL/BEOL as enumerated in Appendix A.

§2 Pre-Checks

Confirm tool interlocks are green; verify reticle ID and lot; ensure stage delta-T < 0.6 °C; source ripple < 2.5% (5-min avg).

If any pre-check fails, follow Trouble Response Playbook §TR-1.

§3 Dose Uniformity Procedure

Expose 25-field wafer using pattern D25. Compute dose uniformity as $(\text{max-min})/\text{mean} \times 100\%$.

Acceptance: $\leq 2.5\%$ unless product-specific override applies (see SPC).

§4 Best Focus (BF) Mapping

Acquire focus sweep across 5x5 grid. Fit quadratic; take BF as vertex. Target BF per layer from Control Plan; tolerance ± 5 nm unless noted.

If BF drift > 6 nm vs. yesterday, create Tier-2 ticket.

§5 Overlay Measurement

Use A5 grid marks, 2-pass alignment. Compute overlay residual $\sqrt{X^2+Y^2}$. Acceptance: ≤ 3.5 nm for standard layers; product overrides in SPC.

§6 Troubleshooting Trees

If dose drift localized: check illumination pupil clipping; verify dose sensor calibration.

If overlay residual > limit with Y-dominant: inspect reticle chuck flatness; run stage thermal compensation routine.

§7 Acceptance & Sign-off

All three metrics must meet limits. Engineer signs checklist C-DFO-19. Attach metrology plots to the Calibration Report.

Appendices & Tables

Table A.1: Layer-Level Targets & Limits (defaults)

Layer	Dose Uniformity (%)	BE Target (nm)	BF Tol (±nm)	Overlay UCL (nm)
Poly	2.5	14	5	3.5
M1	2.5	15	5	3.5
V1	2.5	16	5	3.5

Table A.2: Checklist C-DFO-19

Item	Status	Notes
Interlocks green		
Reticle verified		
Dose uniformity ≤ spec		
BF within tol		
Overlay within spec		