

L32 I-Line Stepper Management Regulations

Revised: July 13, 2026

1. **Equipment Authorization Level:** This equipment is classified as a Class B2 system. Users are authorized for autonomous operation only after completing the designated training program and passing the practical assessment.
2. **Prerequisites for Qualification:** Applicants must pass the TRACK qualification assessment before they are eligible to apply for the I-line stepper assessment. In the event that a user's TRACK access privileges are suspended, their I-line stepper operating privileges will be revoked simultaneously.
3. **Operational Priority:** To ensure the seamless progression of foundry and service commitments, TSRI personnel retain priority equipment access during standard working hours (08:00 AM to 06:00 PM). External users intending to operate the equipment during these hours must obtain prior consent from the on-site foundry staff.
4. **Logbook Integrity:** Users must accurately and thoroughly complete the equipment log sheet for every operation session. Any omissions or falsifications will be subject to disciplinary action in accordance with TSRI internal regulations, depending on the severity of the violation.
5. **Post-Exposure Metrology:** Critical Dimension (CD) measurement after exposure is to be performed by the users themselves using the CD SEM system.
6. **Recipe/Job File Nomenclature:** Exposure job filenames must strictly adhere to the designated naming conventions and correspond accurately to the specific exposure parameters and process contents.
7. **Multi-layer Pattern Alignment:** For multi-layer patterning, if the first layer serves as an ion implantation blocking layer or has an etch depth of less than 100 nm, users must perform an independent zero-layer (L0) exposure using the standard recipe (TSRI 6W(4W/8W)PROD/20MM-STD-L0-6X6 (5X5/7X7)) followed

by an etching process to achieve an etch depth greater than 100 nm.

8. **Substrate and Wafer Specifications:** The system accommodates opaque wafers conforming to SEMI standards in sizes of 4-inch (double-flat), 6-inch (single-flat), and 8-inch (notch), as well as 25 mm square chip fragments. For transparent, semi-transparent, or non-standard alternative substrates, please consult the responsible engineer.
9. **Chuck Configuration:** The system is default-configured with a shared 6/8-inch wafer chuck, with 6-inch exposure services serving as the primary baseline operation. If 4-inch or 8-inch exposure services are required, please contact the engineer.
10. **Fragment/Piece Sample Operations:** Users executing exposure on small chip fragments must pass an additional "Fragment Exposure Assessment" prior to operation. The minimum acceptable size for fragment exposure is 25 mm.
11. **Standard Photoresist Baseline:** The qualified baseline photoresists include PFI38 (850 nm thickness), PFI89 (2100 nm thickness), PFI245 (420 nm thickness), and NLOR5510 (900 nm thickness). PFI38, PFI89, and PFI245 function as positive photoresists, while NLOR5510 functions as a negative photoresist. Any non-standard photoresists must be reviewed with the engineer prior to introduction (Safety Data Sheets/SDS must be provided in advance).
12. **Contamination Control:** Following photoresist coating, all 4-inch, 6-inch, and 8-inch wafers must undergo Edge Bead Removal (EBR) and backside rinsing. The wafer backside must remain completely clean and free of residue.
13. **Lithography Resolution Limits:** The minimum resolution capabilities of this system are 0.35 μm for Line/Space (L/S) patterns, 0.3 μm for isolated Line patterns, and 0.4 μm for Contact Hole patterns. For specific or aggressive process requirements, please consult the engineer.

14. **Process Parameter Windows:** The configurable exposure dose range is 500 to 5000 J/m², and the focus offset range is +2 to -2 μm .
15. **Substrate Thickness Tolerances:** When using the shared 4/6-inch chuck, the allowable wafer thickness range is 350 to 850 μm . When utilizing the shared 6/8-inch chuck, the allowable wafer thickness range is 650 to 1150 μm .
16. **Fragment Exposure Loading:** During fragment/piece exposure, users must ensure that the total combined thickness of the carrier wafer and the fragment sample falls strictly within the system's allowable thickness tolerance.
17. **Optical Settings and Low-Dose Operations:** The default optical configuration is $\text{NA} = 0.63$ and $\sigma = 0.65$, with a standard minimum exposure dose of 900 J/m². If a process requires a dose lower than this limit, notify the engineer to switch the tool configuration to SIA mode.