

TSRI 微縮光阻處理系統

CLEAN TRACK ACT™ 8Z (L33)

塗佈顯影系統 - 技術能力與委託須知

Coating & Developing System - Technical Capabilities and Client Requirements

對外技術資料 / External Technical Information

本文件提供外部委託者快速了解設備可處理之基板、塗佈 / 顯影能力、標準流程及送樣要求。實際可執行條件仍須依樣品、材料與製程需求進行相容性評估。

This document provides an external-facing summary of substrate compatibility, coating/developing capabilities, typical process flows, and sample requirements. Final process acceptance is subject to compatibility review.

1. 基板與晶圓相容性 | Substrate & Wafer Compatibility

- 支援 6 吋與 8 吋晶圓自動化處理。 / Automated processing for 6-inch and 8-inch wafers.
- 適用於標準矽晶圓，並可依製程條件評估 SiC、GaN、Glass、Sapphire 與其他特殊基板。 / Compatible with standard Si wafers and, after evaluation, SiC, GaN, glass, sapphire, and other specialty substrates.
- 可支援透明材質基板之搬送與製程。 / Transparent substrates can be supported under qualified conditions.
- 可搭配專用治具進行小晶片 / 破片樣品處理。 / Small chips or diced samples may be processed using dedicated fixtures.
- 提供 25 mm × 25 mm 晶片之自動塗佈與顯影製程。 / Automated coating and developing are available for 25 mm × 25 mm chips.

重要 / IMPORTANT

非標準尺寸、特殊形狀、特殊厚度或特殊材質基板，必須於委託前由設備工程師確認同意後，方可進入機台。
Non-standard sizes, special shapes, unusual thicknesses, or specialty materials require prior approval by the equipment engineer before loading into the system.

2. 光阻及薄膜塗佈能力 | Coating Capability

- 配置自動旋轉塗佈單元，適用 6 吋與 8 吋晶圓。 / Automated spin-coating units for 6-inch and 8-inch wafers.
- 旋轉速度最高約 6,000 rpm，可依配方控制轉速、加速度與吐液程序。 / Spin speed up to approximately 6,000 rpm with recipe-based speed, acceleration, and dispense control.
- 可執行 Resist Coating、Pre-wet / RRC、Edge Bead Removal (EBR) 與 Backside Rinse。 / Supports resist coating, pre-wet/RRC, edge bead removal, and backside rinse.
- 可依材料相容性評估處理 Positive/Negative Photoresist、BARC、TARC、Polyimide 等薄膜材料。 / May support positive/negative photoresists, BARC, TARC, polyimide, and other qualified coating materials.

- 塗佈結果會受材料黏度、旋轉條件、吐液量、基板表面與環境條件影響；特殊膜厚需求須先評估。 / Film thickness depends on viscosity, spin conditions, dispense volume, substrate surface, and environment; special thickness targets require evaluation.

3. 標準塗佈流程 | Typical Coating Process Flow

步驟	中文流程	English Process
1	基板投入	Wafer Loading
2	脫水 / HMDS (依需求)	Dehydration / HMDS if required
3	冷卻	Cooling
4	光阻塗佈	Photoresist Coating
5	EBR / Back Rinse	EBR / Backside Rinse
6	Soft Bake	Soft Bake
7	冷卻	Cooling
8	完成 / 進入後續曝光	Ready for Subsequent Lithography

※ 實際條件依光阻種類、目標膜厚與基板特性調整。 / Actual conditions depend on resist type, target thickness, and substrate characteristics.

4. 顯影處理能力 | Developing Capability

- 配置自動顯影單元，支援 Spray / Puddle 顯影方式。 / Automated developer modules supporting spray and puddle development.
- 可依配方控制顯影液供應、顯影時間、晶圓旋轉、Rinse 與 Dry Spin。 / Recipe control of developer dispense, development time, wafer spin, rinse, and dry spin.
- 可依需求搭配特殊潤洗液或界面活性劑，以降低超微細圖案乾燥過程中的 Pattern Collapse 風險。 / Special rinses or surfactant-based processes may be used to reduce pattern-collapse risk for fine structures.
- 特殊顯影液、清洗液或添加劑須於使用前完成設備相容性確認。 / Special developers, rinses, or additives require compatibility approval before use.

5. 標準顯影流程 | Typical Developing Process Flow

步驟	中文流程	English Process
1	曝光後基板投入	Post-Exposure Wafer Loading

步驟	中文流程	English Process
2	PEB (依光阻需求)	Post Exposure Bake, if required
3	冷卻	Cooling
4	顯影液供應	Developer Dispense
5	Puddle / Develop	Puddle / Development
6	Rinse	Rinse
7	Spin Dry	Spin Dry
8	Hard Bake	Hard Bake
9	冷卻	Cooling
10	製程完成	Process Complete

※ PEB、Hard Bake 之使用與條件依光阻材料及委託製程需求設定。 / PEB and hard-bake conditions depend on the resist and requested process.

6. 熱處理與溫度控制能力 | Thermal Processing & Temperature Control

- 具備 HMDS / Adhesion、Soft Bake、PEB、Hard Bake 與 Cooling 等熱處理功能。 / Supports HMDS/adhesion treatment, soft bake, PEB, hard bake, and cooling.
- 高溫熱處理能力最高可達約 350°C；實際可用範圍依模組與配方條件而定。 / High-temperature processing capability up to approximately 350°C, depending on module and recipe.
- 透過溫度控制機制穩定基板、製程液與製程環境，以提升膜厚均勻性、顯影重現性與 CD 穩定性。 / Temperature control stabilizes substrates, process liquids, and environment to improve film uniformity, development reproducibility, and CD stability.

7. 自動化與製程彈性 | Automation & Recipe Flexibility

- 支援自動化製程配方，可串接 Coat → Bake → Cool → Exposure → PEB → Develop → Hard Bake → Cool 等流程。 / Supports recipe-driven automated process sequences such as Coat → Bake → Cool → Exposure → PEB → Develop → Hard Bake → Cool.
- 可依設備配置與製程條件執行不同產品與不同配方之自動化處理。 / Different products and recipes may be processed according to equipment configuration and process conditions.
- 具備標準半導體設備自動化與資料通訊能力，可提升製程控制與資料追蹤效率。 / Provides standard semiconductor equipment automation and data communication capabilities for improved control and traceability.

8. 委託樣品要求 | Client Sample Requirements

8.1 基板完整性 | Substrate Integrity

- 晶圓或基板應無破裂、明顯缺角、異常翹曲、黏附或疊片。 / Wafers/substrates must be free of cracks, major edge damage, abnormal warpage, sticking, or stacking.
- 晶背須保持潔淨，並不得有可能脫落之顆粒或污染物。 / Backside surfaces must be clean and free of loose particles or contamination.
- 異常樣品可能造成搬送、真空吸附、破片或污染風險。 / Abnormal samples may cause handling, vacuum-chuck, breakage, or contamination risks.

8.2 特殊規格材料 | Special Substrates

- 非標準尺寸、特殊形狀、特殊厚度、透明 / 特殊光學材料、易碎材料、特殊表面處理、新型半導體材料及其他可能影響搬送或吸附之樣品，均須事前確認。 / Non-standard size, shape, thickness, transparent/optical, fragile, specially treated, new semiconductor, or other handling-sensitive samples require prior review.
- 25 mm × 25 mm 以外之特殊破片尺寸，須由設備工程師確認適用治具與搬送條件。 / Chip sizes other than 25 mm × 25 mm require confirmation of fixture and handling suitability.

委託前必要確認 / Mandatory Pre-Approval

特殊規格材料，必須先由設備工程師完成相容性與安全性評估並確認同意後，方可安排進入機台。
Special substrates require compatibility and safety approval by the equipment engineer before processing.

9. 委託前建議提供資料 | Recommended Information Before Process Request

No.	中文	English
1	基板材質	Substrate material
2	基板尺寸	Substrate size
3	基板厚度	Substrate thickness
4	是否為透明基板	Whether the substrate is transparent
5	光阻 / 薄膜材料名稱	Resist / film material name
6	目標膜厚	Target film thickness
7	曝光方式與波長	Exposure method and wavelength
8	顯影液種類	Developer type
9	所需 Bake 條件	Required bake conditions
10	特殊圖形、高深寬比或 Pattern Collapse 需求	Special patterns, high aspect ratio, or pattern-collapse concerns
11	其他特殊製程需求	Other special process requirements

IMPORTANT NOTICE

設備能力不等同於所有材料皆可直接使用

Equipment capability does not automatically imply compatibility with every substrate or chemical.

實際可執行之材料、基板與製程條件，應以個案之設備與製程相容性評估結果為準。

Final acceptance is determined by case-specific equipment and process compatibility review.