



Edwards Chemical Management Europe Ltd

Silicon Wafer Pre-Clean & De-Glue Station

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The innovative technology behind the Edwards wafer pre-cleaning station ensures consistently high throughput coupled with optimum cleaning results & helps to minimise environmental impact

Using our extensive experience from the last 30 years in the semiconductor, microelectronics and Photovoltaic fields, we have designed a silicon wafer block pre-cleaning and de-gluing system that has been proven to be reliable and cost effective.



Designed using the latest 2D & 3D CAD software, our pre-clean & de-glue stations are designed to run 24 hours a day, 365 days a year, with uptime greater than 95%.

Capable of handling a total block length of up to 2000mm per bath with a max individual block length of 500mm. Numerous block size configurations are possible.

Where consistent loading intervals are not possible, a twin robot version is available that improves repeatability of the batch cycle times

Our environmentally friendly technology helps toward the reduction of chemicals used and the reuse of process water helps reduce even further the impact of the process upon the environment

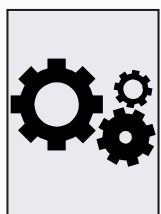


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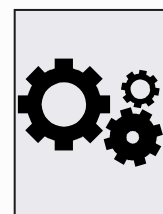
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Wafer Cleaning Process Cycle

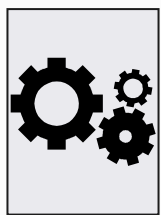
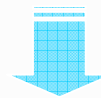
The CME wafer pre-clean & de-glue station sits between the block wire sawing operation and the wafer separation process. This initial cleaning and de-gluing process is vital in ensuring the removal of saw slurry before separation and singulation.



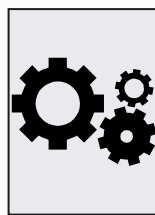
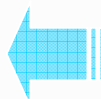
Wire Saws



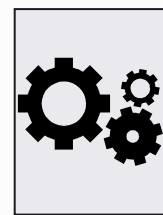
Manual Separation



Test, Wrap
& Pack



Final
Wash/Dry



Wafer
Singulation

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General Specifications

- ▶ Throughput:-
 - up to 8,700 wafers/hour for 2000mm load capacity machine
 - up to 4,300 wafers/hour for 1000mm load capacity machine
- ▶ Typical process water consumption:-
 - 5.8 m³/h* (2000mm load capacity machine)
 - 3.4 m³/h* (1000mm load capacity machine)
- ▶ Accommodates from 125mm x 125mm up to 156mm x 156mm wafers
- ▶ Three pre-wash baths, one de-glue bath and final rinse bath
- ▶ Ultra sonic agitation in first three baths with option of three frequencies settable
- ▶ De-Glue bath chemical concentration constantly monitored and displayed on HMI
- ▶ Fully customisable recipes for each bath
- ▶ Left → Right or Right → Left product flow direction
- ▶ 'on-board' OPC server for easy connection to factory data collection systems

A dedicated cassette handling method and a unique "soft landing" system are used in the de-glue bath, these help keep wafer breakages to a minimum.

Each bath has a fully customisable recipe system that can have up to five independent cycles and covers functions such as:

- cycle time
- ultrasonic control frequency and duration
- block agitation
- process temperature (baths 1-4)
- chemical dosing

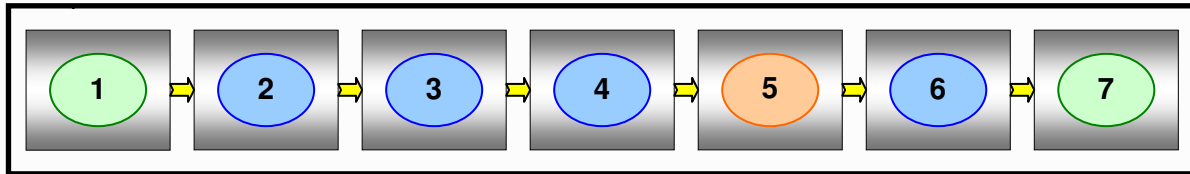
* based on machines processing 156mm 180 µm wafers by 240mm blocks and are for guidance only and are wholly dependant upon specific machine configuration and recipe formulation



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Major Process Components



1 Load-In Station

- ◆ Data matrix code reader for Load In trolley identification and material tracking
- ◆ Dedicated transfer trolley with slurry retainment system
- ◆ Safety light curtain

2 Pre-wash Bath 1

- ◆ Stainless steel bath with auto lid
- ◆ Metered surfactant dosing
- ◆ Tri frequency ultrasonic submersibles with agitation
- ◆ High velocity hot water spray system
- ◆ Submersible wash and bath wash-down
- ◆ Heater element monitoring system
- ◆ Maximum working temp 50° C
- ◆ Re-circulated water function
- ◆ High velocity drain with solids catchment screen

3 Pre-wash Bath 2

- ◆ Stainless steel bath with auto lid
- ◆ Metered surfactant dosing
- ◆ Tri frequency ultrasonic submersibles with agitation
- ◆ High velocity hot water spray system
- ◆ Submersible wash and bath wash-down
- ◆ Heater element monitoring system
- ◆ Maximum working temp 50° C
- ◆ Re-circulated water function
- ◆ High velocity drain with solids collection screen

4 Pre-wash Bath 3

- ◆ Stainless steel bath with auto lid
- ◆ Metered surfactant dosing
- ◆ Tri frequency ultrasonic submersibles with agitation
- ◆ High velocity hot water spray system
- ◆ Submersible wash and bath wash-down
- ◆ Heater element monitoring system
- ◆ Maximum working temp 50° C
- ◆ Re-circulated water function
- ◆ High velocity drain with solids collection screen

5 De-Glue Bath

- ◆ Insulated stainless steel bath with auto lid
- ◆ Bath wash-down
- ◆ 'soft landing' supports for wafer separation stage
- ◆ Teflon heater elements with monitoring system
- ◆ Maximum working temp 85° C
- ◆ Re-circulated water function
- ◆ Dedicated hot process water inlet
- ◆ Built in extract plenum and exhaust fan
- ◆ Lactic Acid Dosing system
- ◆ High velocity drain with solids collection screen

6 Final Rinse Bath

- ◆ Stainless steel bath with auto lid
- ◆ Submersible spray wash and bath wash-down system
- ◆ Continuous spray or weir operation
- ◆ Ambient working temp
- ◆ Gravity drain with particulate collection screen

7 Load-Out Station

- ◆ Data matrix code reader for Load Out trolley identification and material tracking
- ◆ Dedicated transfer trolley
- ◆ Safety light curtain

Other

- ◆ Surfactant dosing systems and reservoirs
- ◆ Lactic Acid dosing system and reservoir
- ◆ Extract fan and plenum for De-Glue bath
- ◆ 2 colour HMI's with 380mm screens
- ◆ MES connectivity as standard via ethernet
- ◆ 2, 4 or 8 block options, (other configurations available up to a max of 2000mm block length per bath)

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Construction

The equipment is constructed using an anodised aluminium framework clad in white polypropylene with clear vision panels. The stainless steel baths are in the front section of the framework with a divider separating the rear section containing pipe work, pneumatics and electrical control systems. Access is via interlocked doors with clear glazing.

The robot mast in the front section is attached to the inside of the frame at low and high level for stability by two runners, whilst the whole assembly traverses the length of the machine. In addition a counter balance unit is fitted to help reduce motor loading in vertical movement. Attached to the carriage via a short cantilever arm is the head mechanism with its block cassette pick-up mechanism.

The de-glue bath and module have integral extract porting to allow removal of fumes from the bath

Chemical dosing facilities can be configured to allow the customer to select various chemical dosing routines and combinations

- 8 x 240mm block version dimensions
- 4 x 240mm block version dimensions
- Electrical requirements

12000 L x 2925 W x 3250 H
8000 L x 2925 W x 3250 H
415V AC 3 phase + Neutral + PE



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Build Options

- ▶ Wash water re-use function saves on process water consumption, which reduces load on waste treatment plant
- ▶ 2, 4 or 8 wafer block baths
- ▶ Washdown hose reels
- ▶ Fully customised HMI displays with various language options
- ▶ Single or twin robot options
- ▶ Remote chemical delivery systems

As each Pre-clean & De-glue station is custom built to suit individual clients requirements, the build options are for guidance only and many configurations can be incorporated in the design phase.



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