

AUTOMATED WAFER BONDING PLATFORM

SUSS XBC300 Gen2 Fully-automated debonder and cleaner







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The SUSS XBC300 Gen2 debonder and cleaner platform is designed for process development as well as high volume manufacturing, handling both, 200/300 mm wafers and the corresponding tape frames. The tool offers module options for mechanical peel-off debonding, excimer laser-assisted debonding and thin wafer or carrier cleaning. The versatile platform stands for process flexibility at full automation and low cost of ownership.

The XBC300 Gen2 is the complementary platform to the XBS300 temporary wafer bonder. Device wafers are bonded to a support carrier in the XBS300 first and then are debonded and cleaned in the XBC300 Gen2, after having gone through backside processing and tape mounting.

The XBC300 Gen2 is a one of a kind room temperature debonding and cleaning cluster which covers a wide range of debonding and cleaning applications for tape mounted 200 and 300 mm thin wafers and carriers. Device wafers can be as thin as $50 \,\mu\text{m}$ or even below. Different carrier materials such as glass or silicon as well as oversized car-riers with 201 mm or 301 mm diameter can be used.

The platform offers two different module options for debonding: mechanical peel-off debonding or excimer laser-assisted debonding.

These room temperature debonding methods represent the state-of-the art solutions for the challenges and requirements of latest generation 2.5 D and 3 D integration processes, enabling high throughput and low cost of ownership.

Thin wafer cleaning after debonding is accomplished with the thin wafer mounted and secured on tape. During the wet chemical cleaning process the mounting frame and tape are covered by a protection ring in order to ensure tape integrity. A dedicated wet cleaning module for cleaning the debonded carrier wafers is available as well.

The patented modular cluster design, featuring Dock and Lock[™] technology, allows process modules to be easily upgraded in the field in order to extend functionality or increase throughput for moving into volume production.



Debonding Flexibility for different process requirements

DB300T - MECHANICAL PEEL-OFF DEBONDING

The DB300T module is compatible with the largest choice of adhesives and release layers for mechanical debonding. A mechanical peel-off process separates the carrier from the device wafer, based on process specific release layers that are applied on either wafer. The propagation of the debond front is well controlled throughout the entire debond process, so that the mechanical stress on the device wafer is kept at a minimum. This method is compatible with different carrier materials, including glass and silicon.



Porous film frame chuck and flex plate

ELD300 - EXCIMER LASER-ASSISTED DEBONDING

The ELD300 module uses excimer laser technology to separate the carrier from the device wafer. As this debonding method is based on UV laser technology only lighttransmissive carriers such as glass or sapphire can be used.

A pulsed, high energy excimer laser breaks the chemical bonds of a UV light absorbing adhesive or release layer close to the carrier interface.

After the laser debonding process the carrier can be liftedoff with almost zero mechanical separation force.



Close-up of stepped line beam used for debonding



Cleaning Post-debond adhesive and release layer removal

AR300TF - THINNED WAFER CLEANING

The AR300TF cleaner module allows wet-chemical removal of adhesive or release layer residues from a thinned wafer that is mounted on tape. The module offers separate dispense arms for cleaning and rinse chemistry and offers a number of dispense options such as puddle, spray or high-pressure, as well as N2 drying. A protective ring covers the tape and frame throughout the entire cleaning process.



AR300TF module with tape protection ring for cleaning thin, tape mounted device wafers

AR300 – CARRIER CLEANING

The AR300 module allows puddle, spray or high-pressure cleaning of full thickness wafers/support carriers and features integrated backside rinse. The same separate dispense arms and chemical options as on the AR300TF are available for this module.



AR300 module for wet chemical cleaning of carrier wafers



Cabinets Flexibility for different process requirements

MEDIA CABINET II EX

The Media Cabinet II Ex is designed for the use in an Ex-Zone 1.

Part of the wafer processing is the media management. The medias are house-supplied and stored in buffer tanks inside the media cabinet. This guaranties a continuous supply. Each tank system consists of two tanks with a switch over system. If one tank is empty, the second will be used and the first will be filled again. The media cabinet is located 8-10m below the main tool in the basement. The media inlet is connected to the customer supply. The media outlet is connected to the main tool with the process modules. The media cabinet consists of two main parts,



Media Cabinet II Ex for media management

SEPARATOR CABINET EX

The Separator Cabinet Ex is designed for the use in an Ex-Zone 1.

Part of the wafer processing is the waste management. The waste is a liquid with solid contend. The liquid is taken into the central house drain. The solid contend is separated with sieves before. The waste is generated during semiconductor wafer processing. The separator is equipped with one buffer tank for each process module and with two sieve boxes. These two sieves will be used alternative. The separator cabinet is located 8-10m below the main tool in the basement. The drain is connected to the customer fa-



Separator Cabinet Ex for waste management



XBC300 Gen2 Technical data

GENERAL FEATURES	
Number of Modules	Up to 6 for mechanical debonding and cleaning Dedicated excimer laser debonder configuration
Wafer Size	200 / 300 mm wafers. Compatible with oversized carriers (201 / 301 mm)
Tape Frame Size	Frames for 200 / 300 mm wafers
Wafer Load Port	Fully automated FOUP, FOSB load port with integrated wafer mapping, RF-ID reader and optional OHT (overhead transport system) compatibility. 200 mm wafer adapter option available
Frame Cassette Load Port	Fully automated load port for 200 mm and 300 mm open frame cassettes (SEMI G77-0699 compliant) or 450 mm MAC load port for closed frame carrier pods and optional OHT (overhead transport system) compatibility. Both load port options are equipped with integrated wafer mapping and an optional RF-ID reader
Substrate Handling	6-axis robot with special end-effector for wafer and tape frame handling, integrated wafer flipping, camera based pre-aligner and optional wafer ID reader. Compatible with glass- or silicon carriers
User Interface	Windows 7 operating system with SUSS MMC (multi-module control) software

DB300T - MECHANICAL ROOM TEMPERATURE DEBONDER		
Substrate Handling	Wafer stack mounted on tape frame	
Debond Process	Mechanical peel-off at room temperature	
Debond Parameters	Programmable debond initiation. Lift-off force and parameters to control debond front propagation programmable in multiple zones. Programmable limits to stop debonding in case adhesion forces are too high to ensure wafer integrity	
Process Monitoring	Carrier peel-off parameters and process data are logged	
ELD300 – EXCIMER LASER-ASSISTED DEBONDER		
Substrate Handling	Wafer stack mounted on tape frame	
Debond Process	Excimer laser assisted debonding at room temperature using glass carriers	
Debond Parameters	Laser fluence, scan pattern and speed, pulse rate / step field overlap program- mable	
Excimer Laser Characteristics	308 nm, fluence up to 400 mJ/cm ² , pulse rate up to 50 Hz	



AR300TF – ADHESIVE REMOVER FOR TAPE MOUNTED THIN WAFERS		
Substrate Handling	(Thin) Wafers mounted on tape frame	
Protection of Frame & Tape	Protection ring covers tape and frame to ensure tape integrity	
# of Dispense Arms	2 dispense arms	
# of Dispense Lines	Up to 3 chemical dispense lines, up to 2 final rinse lines plus N2 assisted drying	
Flow Control	Recipe programmable flow control for all chemical lines	
Dispense Nozzle Types	Puddle Fan spray High pressure (spot or fan spray)	
Options	Dispense line temperature control High pressure dispense system Chemical recirculation system Ultrasonic / Megasonic transducer or dispense system	
AR300 - ADHESIVE REMO	VER FOR CARRIERS	
Substrate Handling	Full thickness wafers / carriers	
Protection of Frame & Tape	See AR300TF	
# of Dispense Arms	See AR300TF Integrated backside rinse	
# of Dispense Lines	See AR300TF	
Flow Control	See AR300TF	

See AR300TF See AR300TF

Dispense Nozzle Types

Options

OPTIONS	
Factory Automation	SECS/GEM OHT (overhead transport system) compatibility
Environmental Air Treatment	Filter units Ionizer bars Local cleanroom
Safety	Fire suppression system
UTILITIES	
Vacuum	Min0.8 bar, ±5 %
N ₂	8 bar, ±10 %
Compressed Dry Air	8 bar, ±10 %
Exhaust	Configuration dependent
Power	Configuration dependent

Data, design and specification of custom-built machines depend on individual process conditions and can vary according to equipment configurations. Not all specifications may be valid simultaneously. Illustrations in this brochure are not legally binding. SUSS MicroTec reserves the right to change machine specifications without prior notice.





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