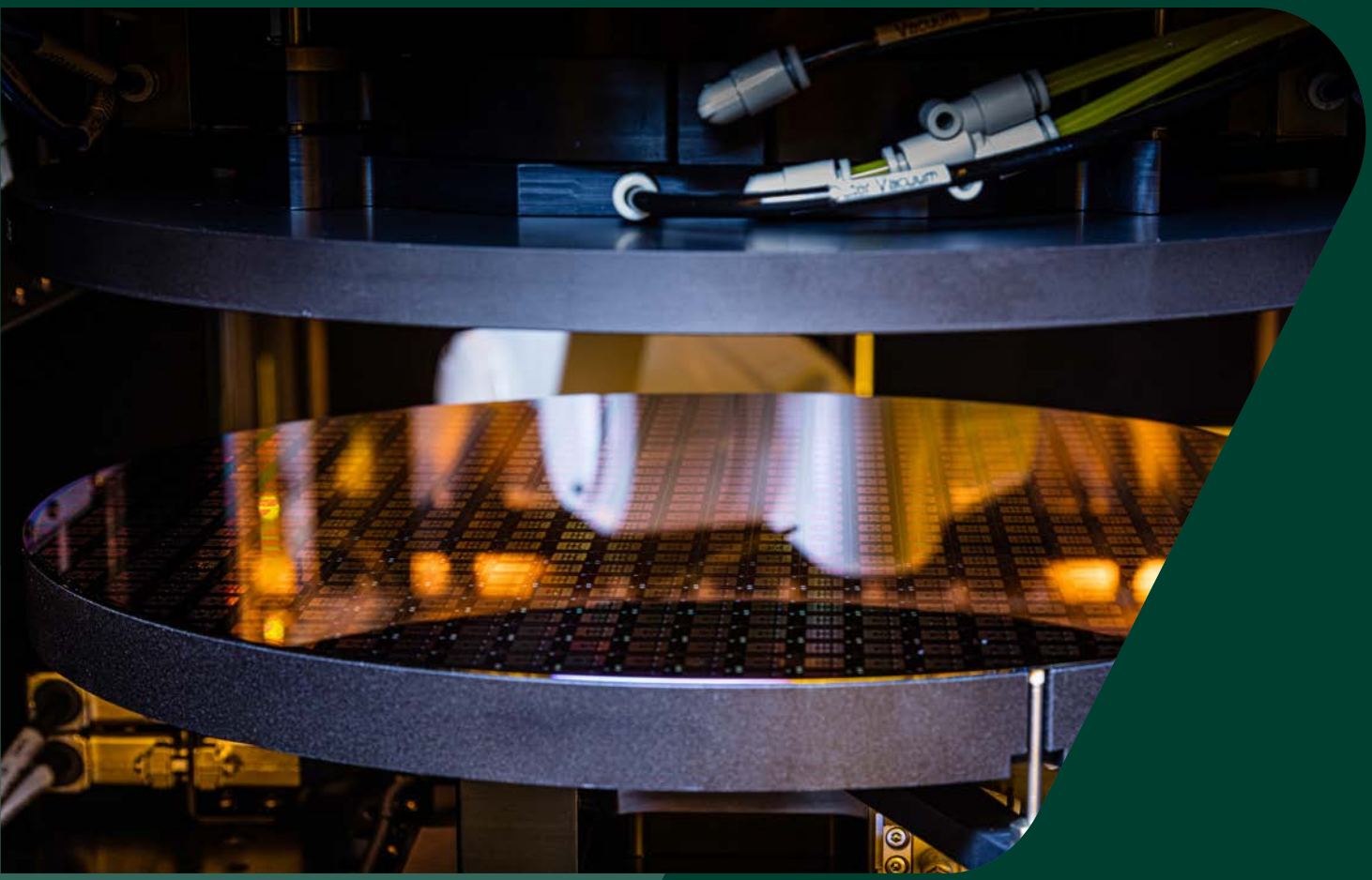
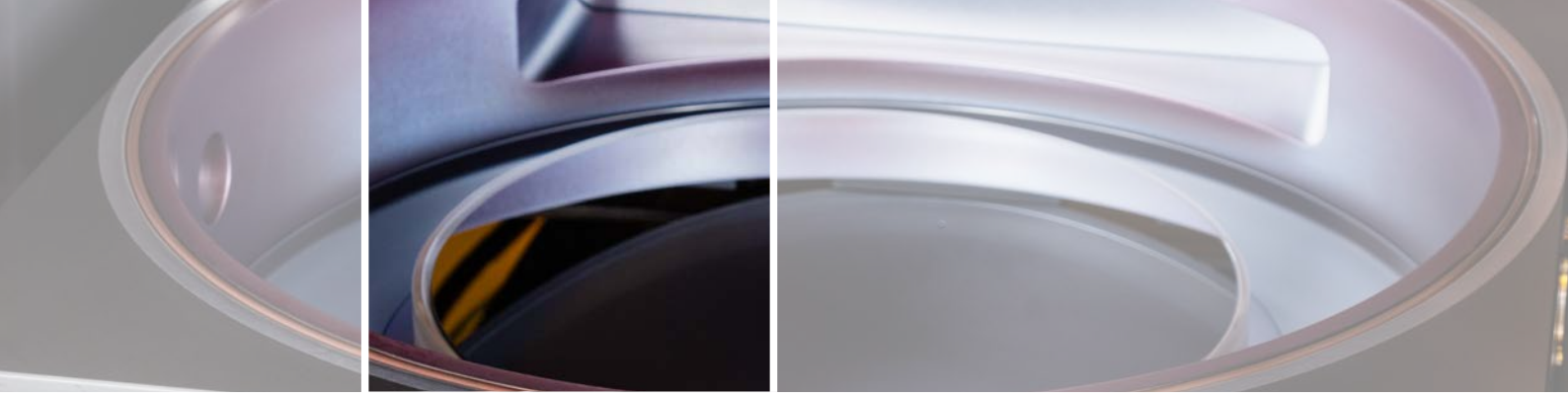


AUTOMATED WAFER BONDING PLATFORM

SUSS XBS300

Permanent bonding platform for 300mm hybrid fusion bonding

SUSS



AUTOMATED WAFER BONDING PLATFORM

SUSS XBS300

Hybrid bonding platform

The universal XBS300 platform is designed for hybrid fusion bonding of aligned 200 mm and 300 mm wafers. Its highly modular design offers maximum configuration flexibility at low cost-of-ownership for customers. Different configurations are available to meet requirements of both R&D and high-volume manufacturing (HVM).

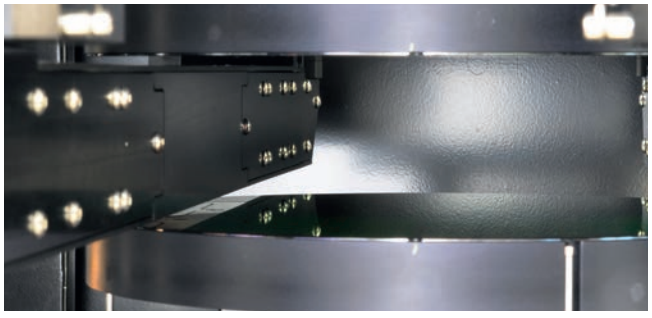
Hybrid bonding as an extension of conventional fusion bonding is a key enabler for the future heterogeneous integration market with respect to advanced 3D device stacking, e.g. for next generation memory or demanding SoC (System on Chip) applications such as backside illuminated CMOS image sensors.
The system allows for both collective die-to-wafer (D2W) and wafer-to-wafer (W2W) bonding schemes and is therefore a versatile platform for “More-than-Moore” devices.

MATERIAL HANDLING UNIT

The XBS300 platform can be equipped with up to four load ports, one bond aligner and up to six process modules addressing potential needs for HVM.
A high-precision and high-throughput 6-axis-robot handles single wafers and bonded wafer stacks. A fully customizable camera configuration monitores all handling or processing activities inside of the platform.

HIGHLIGHTS

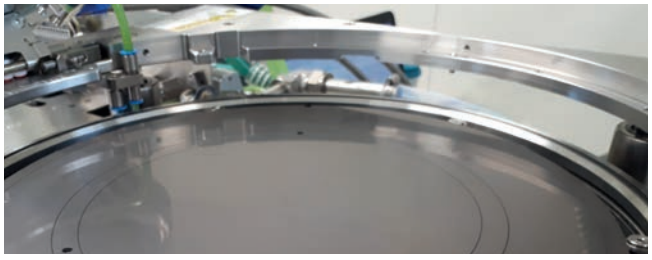
+ Fully automated fusion and hybrid wafer bonder for D2W and W2W applications on 200 mm and 300 mm wafers in a single platform
+ High-accuracy alignment option for most demanding pitch applications (< 100 nm overlay)
+ Integrated metrology option including overlay measurement, void detection and TTV measurement
(for D2W), allowing for multi-point measurement at highest accuracy



BOND ALIGNER

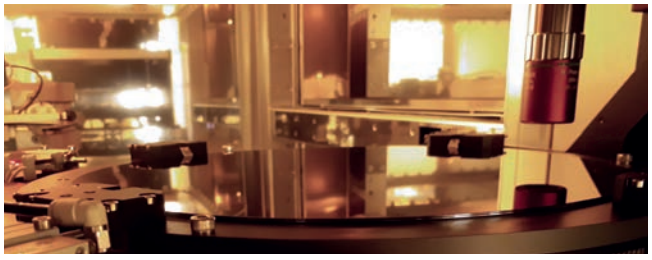
The bond aligner delivers consistent alignment accuracy for transparent or non-transparent wafers by using the SUSS proprietary Inter-Substrate Alignment (ISA) technology. Built-in optical fixed reference, global calibration and overlay verification ensure optimum repeatability. Global calibration wafers are an integral part of the system providing fast and easy automated calibration and overlay verification. In order to address current and future needs for pitch-scaling of interconnects the bond aligner offers < 100 nm overlay capa-

Process modules for
flexible configuration possibilities



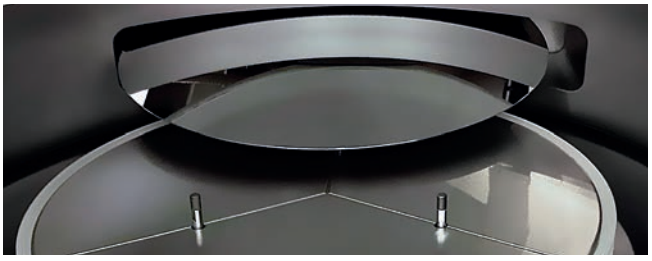
LOW FORCE BOND CHAMBER

Some processes require additional bond force to be applied during annealing. The low force bond chamber produces up to 15 kN of bond force at temperatures of up to 250 °C. An otional cool plate for active wafer cooling can be installed in the same process module.



METROLOGY MODULE

Integrated in-situ metrology functionality allows for fast process feedback. The metrology module is therefore key for increased process control and yield improvement. The module can be configured for full-field IR void inspection and/or IR overlay measurement featuring multi-site capability at high throughput. In-line process control via closed-loop feedback allows to optimize the overlay performance.

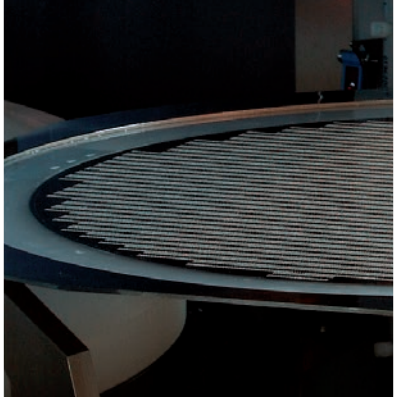
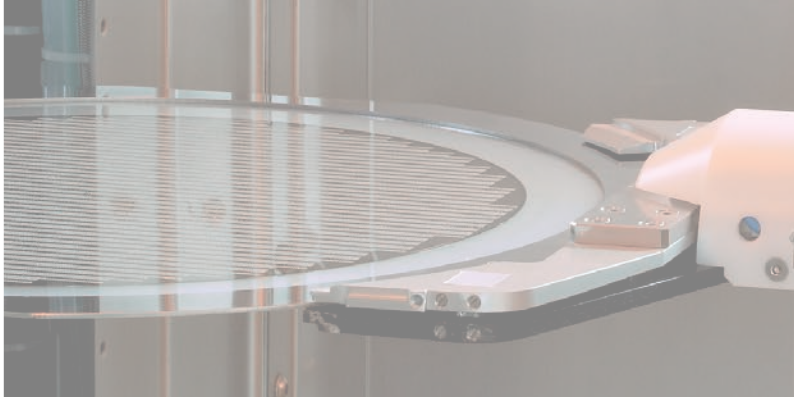


PLASMA CHAMBER

The module offers highest process flexibility and repeatability for plasma-based wafer surface activation. Various process gases such as Ar, O_2, N_2 etc. can be used and are controlled via mass flow controllers (MFCs). The gate-valve loading plasma chamber allows for full CMOS compatibility and can also be used for plasma cleaning of polymer resi-

AQUEOUS CLEANER

The aqueous cleaner module offers various processing options including megasonic assisted DI water cleaning. The module is compatible with diluted cleaning chemistry such as < 2 % NH_4OH and offers optional backside rinse and N_2 assisted spin-drying. Organic removal functionality

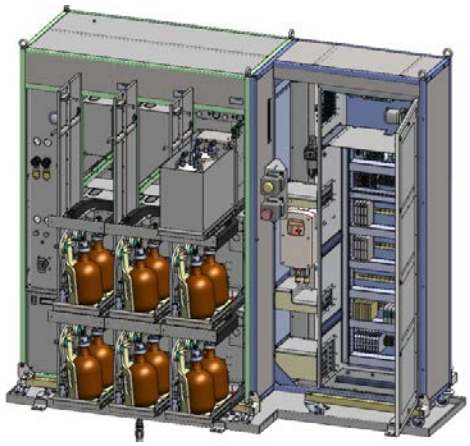




Media cabinet

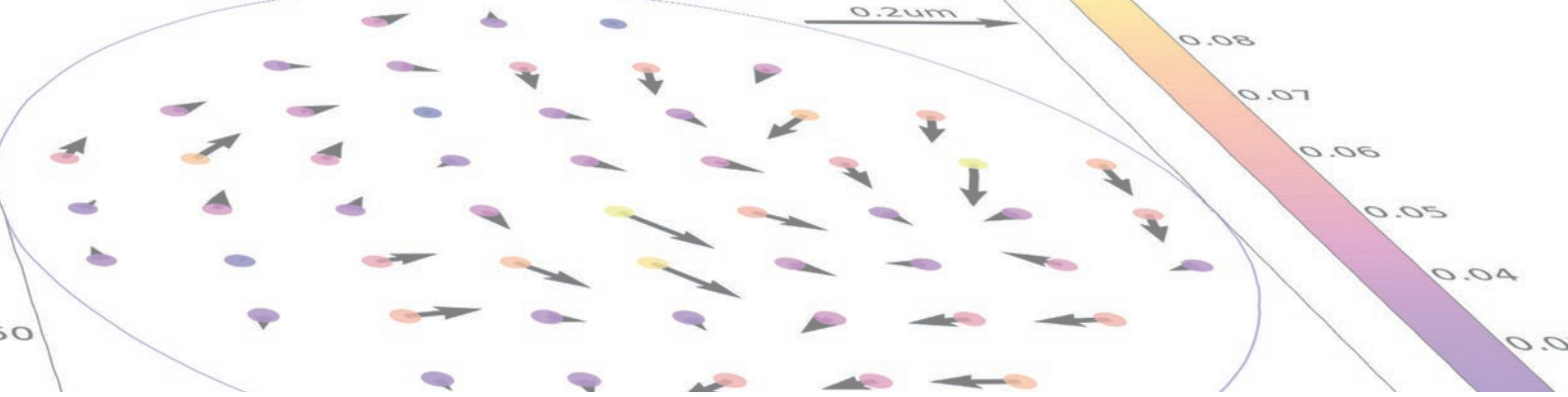
Flexiblility for differnet process requirements

MEDIA CABINET III EX

The Media Cabinet III Ex is designed for the use in an EX Zone 1. The media cabinet consists of two main parts, the media part and the pressurized electrical cabinet.
Part of the wafer processing process 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.
In the cabinet are also switchable bottles arranged. The bottle change will be done manually. This guaranties also a continuous supply. The switch over is based on a Venturi suck system an additional reservoir. The media transport to the process modules is done by a pneumatic transfer system. The delivery pressure of the system can be adapted to the viscosity of the media.



Media Cabinet III Ex for media management



SUSS XBS300

Technical data

MATERIAL HANDLING UNIT	
Substrate Size	200 / 300 mm wafers
Frame Options	Optimized configurations available allowing low footprints both for R&D and high-volume manufacturing
Load Port	Fully automatic FOUP load ports and cassette adapter options (up to 4 loadports)
Wafer Handling System	6-axis robot with integrated wafer flipping Special handlers (e.g. for warped wafers) on request
Pre-Aligner and ID readers	Camera-based pre-aligner and optional wafer ID reader
User Interface	Microsoft Windows10-based operating system with SUSS MMC software
Substrate Processing	Fully programmable cluster tool with factory automation options Drag and drop sequence editor with cyclic scheduler and automated throughput optimization
Options	SECS/GEM and different data logging/ analyzing tools Ionizer bars

BOND ALIGNER	
General	Vibration-isolated alignment stage with contact-less linear motors and air bearings for x, y, z and theta axes Active wedge error compensation function and active isolated granite base structure
Alignment Method	Inter-Substrate Alignment (ISA) with integrated fixed reference targets, built-in global calibration and overlay verification Reflective IR alignment available on request Closed-loop feedback (from metrology module) for automatic offset-correction
Alignment Accuracy	< 50 nm
Overlay Accuracy	< 400 nm (3 sigma) default setup < 100 nm (3 sigma) optional

PLASMA MODULE	
General	Plasma chamber for effective wafer surface activation for (hybrid) fusion bonding

BOND CHAMBER	
Bond Processes	Low-force thermo-compression bonding, adhesive bonding and vacuum fusion bonding
Maximum Temperature	Up to 250 °C
Base Vacuum Minimum	< 5 mbar
Pumpdown	< 60 sec
Bond Force (@ 300mm)	1 kN - 15 kN
Process Gas	N_2, optional 1 MFC
Bond Alignment	Center-to-center alignment: +/- 50 µm Notch rotation: 0.1°

COOL PLATE	
Cool Plate Temperature	15 - 30 °C
Temperature Control	± 0.2 °C
Cooling Method	Programmable proximity with fixed minimum proximity

AQUEOUS CLEANER	
General	Single wafer cleaner with puddle and megasonic DIW rinsing Diluted chemistry (e.g. < 2 % NH_4OH) possible
Options	Back-side rinse N_2 assisted spin-dry SC1 chemistry compatibility

DETACH STATION	
General	Wafer chuck with lift-pins, sealing lip and heater for up to 200 °C Wafer lifting device
Options	Wafer rework option for defect-free separation of pre-bonded wafer stacks

METROLOGY MODULE	
General	Throughput- and footprint-optimized metrology station for high-accuracy overlay measurement and optional void detection Field-upgradable
Measurement Flexibility	No restriction on location or amount of measurement sites on wafer

METROLOGY OPTIONS	
IR Overlay Measurement	Reflective or transmissive mode
IR Void Detection	Automated classification and localization logging
TTV Measurement	Interferometric film thickness measurement

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

Visit **www.suss.com/locations** for your nearest SUSS representative or contact us:
SUSS MicroTec SE
+49 89 32007-0 · info@suss.com

WWW.SUSS.COM

SUSS

XBS300 · 12/2022 · BR_XBS300_2022 · V2