



# VertaBond™

High-Volume Automated Vacuum Anneal System  
for WtW Hybrid Bonding, DtP & PtP Bonding



The YES VertaBond™ is a production-proven automated vacuum anneal system equipped with uniform temperature control and laminar gas flow. This system has an EFEM integrated with two process modules that can accommodate 200 mm and 300 mm wafers, or panel sizes ranging from 400 mm to 550 mm. The VertaBond wafer systems can process batch sizes of 50 wafers (one PM) or 100 wafers (two PMs). VertaBond panel systems can process batch sizes of 12 panels (one PM) or 24 panels (two PMs).

## The Vacuum Cure Advantage

- Void-free hybrid bonding in less time and at lower temperatures using vacuum
- Vacuum anneal provides Cu-Cu bonding without voids, delamination or dishing
- Laminar flow reduces/eliminates particles
- Bonding strength increases 3 - 4.5x under vacuum at temperatures as low as 200°C or 300°C compared to atmospheric anneal
- Vacuum anneal enables 6 µm pitch with no voids or bubbles
- Less film stress and low wafer warpage

## COMMON APPLICATIONS

3D packaging  
CMOS image sensors under panel  
Polyimide bake  
Copper anneal  
Wafer to wafer bonding anneal  
DtP and PtP bonding

**Contact Us:** We offer process demonstrations. If you would like to submit samples, please call us. We can run your samples and provide a detailed process report.

**Yield Engineering Systems, Inc.**

Call: **1-510-954-6889** (worldwide) or **1-888-YES-3637** (US toll free)

[www.yieldengineering.com](http://www.yieldengineering.com)



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## 300 MM SYSTEM SPECIFICATIONS

### SYSTEM / PROCESS

DESCRIPTION	SPECIFICATION
Environment Cleanliness	Class 1 (ISO 3)
EFEM Cleanliness	Class 1 (ISO 3)
Max Temp	450°C
WiW Temp Uniformity	≥ 250°C ± 2.5°C at dwell after temperature stabilization ≤ 250°C ± 1.5°C at dwell after temperature stabilization
WtW Temp Uniformity	± 2.5°C at dwell after temperature stabilization
Ramp-rate	Maximum 8.0°C/min from 150°C to 350°C (slope)
Ramp-down	Maximum 4.0°C/min from 350°C to 150°C (slope)
Up-time	≥ 95%
MTTR	≤ 4 hours
Warpage	≤ 3 mm one side
Process Pressure	Sub-atmospheric and atmospheric pressures
Process Recipe	YES BKM recipe: one-step process
System Footprint	6.5 m <sup>2</sup> (EFEM and one process module); 10.7 m <sup>2</sup> (EFEM and two process modules)
Wafer Size	300 mm
Load Port Quantity	2 or 4
Process Gas Typ	2 gas (preheated) - Process grade N <sub>2</sub> preferred
MFC	N <sub>2</sub> calibrated MFC
N <sub>2</sub> Flow	20 - 200 SLM
Pump	Purchasable option (process-dependent)
Standard Cooling	Forced air cooling outside of chamber
Pump Exhaust	Scrubber-max flow 21 CFM (provided by customer)
Aligner	Purchasable option
Safety Compliance	SEMI S2 and S8, CE and NFPA79 compliance
Chamber Material	Stainless steel chamber 316L
Process Capability	One process module for 50 wafers, Two process modules for 100 wafers
O <sub>2</sub> Concentration	<10 ppm
Warranty	12 months after acceptance

### HARDWARE

### SOFTWARE

SEMI Equipment Communication Standard 2 Message Content (SECS II)	SEMI E5
Generic Model for Communications and Control of SEMI Equipment (GEM)	SEMI E30
High-Speed SECS Message Services Generic Services (HSMS)	SEMI E37
High-Speed SECS Message Services Single-Session Mode (HSMS-SS)	SEMI E37.1
Standard for Carrier Management (CMS)	SEMI E87
Specification for Enhanced Carrier Handoff Parallel I/O Interface	SEMI E84
Specification for Substrate Tracking (STS)	SEMI E90
Specification for Process Job Management (PJM)	SEMI E40
Specification for Control Job Management (CJM)	SEMI E94
Operating System	Windows 10

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