Solutions for Temporary Bonding and Debonding
**Introduction**

Temporary bonding is an essential process that offers mechanical support for thin or to-be-thinned wafers, which is important for 3D ICs, power devices and FoWLP wafers as well as for handling fragile substrates, like compound semiconductors. EVG’s outstanding bonding know-how is also evident in its temporary bonding equipment, which it has provided since 2001.

**Temporary Bonding and Debonding Benefits**

**Adaptness**
- Open adhesive platform
- Modular tool layout – throughput optimized depending on specific process
- Product range from manual to fully automated tools

**Handling**
- Bridge capability for different substrate sizes
- Available with multiple load port options and combinations

**Control**
- Integrated metrology enables feedback loop for high-yield processes in automated tools
- Integrated software for real-time monitoring and recording of all relevant process parameters
- Fully integrated SECS/GEM interface in automated tools

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**Temporary Bonding Principle**

Front side processed device wafer

Flip wafer

Temporary Bonding on carrier wafer with intermediate layer

Back thinning

Device wafer back side processing

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**Debonding Principle**

Mount wafer stack onto film frame

Debond process

Clean process

Thin wafer on film frame
**EVG®805 Debonding System**
- Configurations:
  - Thermal slide off, thermal lift off debonding
  - Mechanical debonding
- Open adhesive platform
- Recipe-controlled system
- Unique features for thin-wafer handling
- Various chuck designs to support wafer/substrates and carriers up to 300 mm

**EVG®820 Lamination System**
- Automated, stress-free and void-free lamination of any kind of dry adhesive film onto the carrier wafer
- Precision-aligned lamination on carrier wafer
- Protective liner peel-off
- The dry film lamination station can be integrated into an EVG®850 TB temporary bonding system
### EVG Debonding Capabilities

<table>
<thead>
<tr>
<th>Laser Debonding</th>
<th>Mechanical and ZoneBOND® Debonding</th>
<th>Slide-Off and Lift-Off Debonding</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ EVG LowTemp™ debonding</td>
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<td>■ Thermal debonding</td>
</tr>
<tr>
<td>■ UV laser release enabling force-free carrier lift-off</td>
<td>■ Mechanical debonding of single- or multilayer adhesive systems</td>
<td>■ Temperature triggered softening or outgassing of adhesive</td>
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<tr>
<td>■ Single- or dual-layer adhesive system (thermo-plast, thermostet, photaset and b-stage adhesives)</td>
<td>■ Predetermined debond start by chemical / mechanical or purely mechanical trigger</td>
<td>■ Single-layer thermoplastic adhesive systems</td>
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<tr>
<td>■ Independent of device wafer type and surface</td>
<td>■ Debond process latitude and thermal stability are linked</td>
<td>■ Invariant to device wafer topography and material</td>
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<tr>
<td>■ UV transparent carrier</td>
<td>■ Debond is often function of carrier material or device wafer surface topography</td>
<td>■ Invariant to carrier wafer material</td>
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</table>

**Software and Support**

The Windows-based, graphical user interface is designed with a strong focus on user-friendliness, and easily navigates the operator through each process step. Multi-language support, individual user account settings and integrated error logging / reporting and recovery can simplify the user’s daily operation. All EVG systems can also communicate remotely. Thus, our service includes field-proven, real-time remote diagnostics and troubleshooting via secured connection, phone or email. EVG’s experienced process engineers are ready to support you anytime thanks to our de-centralized worldwide support structure, including cleanroom space on three different continents: Europe (HQ), Asia (Japan) and North America (USA).
**Modules for temporary bonding**

- **Spin coat module** also with alignment unit for highly accurate edge coat process
- **Mechanical alignment module** for fast center-to-center alignment
- **Optical edge alignment module** for high-accuracy center-to-center alignment
- **Stacked bake modules** with recipe-controlled proximity pins, temperature and time
- **Bond module** with automatic, low-force wedge error compensation, optional with alignment within bond chamber
- **Inline metrology module** for contactless, non-destructive inspection for 100% production inspection

**Modules for debonding**

- **Laser debond module** for high-throughput, room-temperature debonding – footprint efficient and low maintenance
- **Slide off debond module** for thermal, horizontal debonding where the thin wafer is supported during the whole process
- **Mechanical debond module** with self-aligned debond mechanism for high process repeatability
- **Clean module** capable of handling film frame mounted wafers and high-topography wafers
- **Detape module** for removing temporary bonding adhesives by peeling it off with an adhesive tape
- **Film frame mount module** for lamination of thin wafers or wafer stacks with pre-cutted tapes