TWO COMPLETE 60 MW (a-Si/µc-Si) THIN FILM SOLAR PANEL PRODUCTION LINES & R&D TOOLS

BY ORDER OF
SCHÜCO TF AND MALIBU
WE OFFER FOR SALE

www.maynards.com
www.hgpauction.com
www.hilcoind.com
BACKGROUND INFORMATION

• Company activities include research & development as well as production of thin film photovoltaic modules

• Technology is based on thin film silicon tandem junction

• Modules are based on frameless glass-glass laminate with an efficiency of up to 10%

• Possibility to produce different module sizes to address various market segments

The two lines + the tools from the R&D site can be inspected and purchased with immediate effect and are available either as whole lines or individual machine packages.

Single pieces of equipment will be sold individually in online auctions early 2013.
OFFER AND PRODUCT CAPABILITY OVERVIEW

**OFFER 1**: Malibu, Osterweddingen
- Capacity: 60 MW p.a.
- a-Si / µc-Si, tandem junction
- Flexible module size (max. 2.6 x 2.2m)
- BIPV Building Integrated Photovoltaic

**OFFER 2**: Schüco TF, Großröhrsorf
- Capacity: 60 MW p.a.
- a-Si / µc-Si, tandem junction
- Flexible module size (max. 2.6 x 2.2m)

**OFFER 3**: Malibu, Bielefeld
- R&D at substrate size up to Gen 5 size
- Complete tool set for pilot production
- Analytic and test capability

*Buyers have the option to also acquire the current production building and premises.*

**Products**

- Bankable modules
- BIPV solutions

**World class products** with exceptional [high efficiency rates](#) which are applicable to residential, commercial and ground mount markets.
## FACILITIES OVERVIEW

<table>
<thead>
<tr>
<th>Großröhrsdorf (GRD)</th>
<th>Osterweddingen (OWD)</th>
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</thead>
<tbody>
<tr>
<td><strong>Built:</strong></td>
<td>2008</td>
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<tr>
<td><strong>Start of production:</strong></td>
<td>2008</td>
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<tr>
<td><strong>Products:</strong></td>
<td>Standard modules</td>
</tr>
<tr>
<td><strong>Products:</strong></td>
<td>Standard modules</td>
</tr>
<tr>
<td><strong>Size:</strong></td>
<td>39,916 m² production area</td>
</tr>
<tr>
<td><strong>Size:</strong></td>
<td>15,724 m² production area</td>
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<tr>
<td><strong>Current capacity:</strong></td>
<td>60 MW</td>
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<td><strong>Current capacity:</strong></td>
<td>60 MW</td>
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<tr>
<td><strong>Manufacturing facility:</strong></td>
<td>AMAT turn key production line</td>
</tr>
<tr>
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<tr>
<td></td>
<td>4 x PECVD AKT 60</td>
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<tr>
<td></td>
<td>1 x PVD Sputter</td>
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<tr>
<td></td>
<td>1 x Cooling facility</td>
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<tr>
<td></td>
<td>1 x Electrical power installation</td>
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<tr>
<td></td>
<td>4 x PECVD AKT 60</td>
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<tr>
<td></td>
<td>1 x PVD Sputter</td>
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<tr>
<td></td>
<td>1 x Cooling facility</td>
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<td></td>
<td>1 x BIPV laser patterning system</td>
</tr>
</tbody>
</table>
1. Glass Cleaning  
2. Laser Scribe P1 (TCO)  
3. Glass Cleaning  
4. Vapour Deposition of a-Si/μc-Si  
5. Laser Scribe P2 (Silicon)  
6. Vapour Deposition Back Contact  
7. Laser Scribe P3 (Back Contact)  
8. Application Side & Cross Contact  
9. Application PVB and Back Glass  
10. Encapsulation/ Autoclave  
11. Attachment Junction Box  
12. Final Inspection – Flasher  
13. Application Back Bars
PHOTO GALLERY

1 + 3: Glass Cleaning
2, 5 + 7: Laser Scribe
4: Vapour Deposition of a-Si/ μ-Si
6: Vapour Deposition Back Contact
8: Application Side & Cross Contact
PHOTO GALLERY

9: Application PVB and Back Glass

10: Encapsulation / Autoclave

11: Attachment Junction Box

12: Final Inspection – Flasher

13: Application Back Bars
## PRODUCTION PROCESS AND INSTALLED EQUIPMENT

Two Identical 60 MW (a-Si/µc-Si) Applied Materials Turn Key Solar Thin Film Module Production Lines

<table>
<thead>
<tr>
<th>Pre-treatment of F-Size front glass</th>
<th>PECVD and PVD</th>
<th>Quartering of the glass</th>
<th>Application wiring</th>
<th>Intermediate foil &amp; back glass assembly</th>
<th>Heating process</th>
<th>Glue and soldering</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Inserting of front glasses in the production line, first quality testing, cleaning of glasses and first laser treatment</td>
<td>• Deposition of silicon layer and metallic back-contact onto the substrates including laser patterning of silicon layer and back-contact</td>
<td>• Quartering of the glasses into Q-size modules (1.43 m²) including edge processing</td>
<td>• Application wiring for the derivation of the PV-Module</td>
<td>• Installation intermediate foil (PVB-foil) &amp; back glass assembly</td>
<td>• Heating process for connecting front and back glass</td>
<td>• Glue and soldering of the junction box in the module</td>
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<table>
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<tr>
<th>Machines used</th>
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</thead>
<tbody>
<tr>
<td>• Robots (KUKA)</td>
<td>• CVD-Loader (Grenzebach)</td>
<td>• Quartering tool (Grenzebach)</td>
<td>• PVB cutting tool (Grenzebach)</td>
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</tr>
<tr>
<td>• Glass loader (Grenzebach)</td>
<td>• CVD (AMAT)</td>
<td>• Seamer (Benteler)</td>
<td>• Robots (KUKA)</td>
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<td></td>
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<tr>
<td>• ASEM (Benteler)</td>
<td>• Abatement (AMAT)</td>
<td>• Glass washer (Benteler)</td>
<td>• Trimming tool (Grenzebach)</td>
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</tr>
<tr>
<td>• Glass washer (Benteler)</td>
<td>• Quality control (Sentech)</td>
<td>• Laser edge delete (Manz)</td>
<td>• Lamination (Klöpper)</td>
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<tr>
<td>• Laser (Manz)</td>
<td>• PVD (AMAT)</td>
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**IDENTICAL LINES IN GRD & OWD**
PRODUCTION PROCESS AND INSTALLED EQUIPMENT

One site also runs the BIPV – Building Integrated PV process. The production equipment for BIPV is available for sale in connection with the complete line:

<table>
<thead>
<tr>
<th>Performance &amp; quality control</th>
<th>Mounting of back rail</th>
<th>Packaging</th>
<th>Special laser process</th>
<th>Special fitting</th>
<th>Wiring, lamination, testing</th>
<th>Insulating coating &amp; packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Simulation efficiency determination by flashing/review of performance</td>
<td>• Mounting the backs fastening systems</td>
<td>• Packaging of the final modules in standard wooden transport boxes</td>
<td>• Special laser process for structuring the BIPV modules (customized transparency &amp; patterns)</td>
<td>• Special fitting of modules based on customer requirements (size, shape)</td>
<td>• Manual wiring, lamination and testing of the modules</td>
<td>• Insulating coating in cooperation with sub-contractors</td>
</tr>
<tr>
<td>• Label printing with performance test result</td>
<td></td>
<td></td>
<td></td>
<td>• Cut &amp; brake of BIPV modules based on customer requirements</td>
<td>• Flash testing and creation of performance report</td>
<td>• Special packaging according to customer requirement</td>
</tr>
</tbody>
</table>

**Machines used**
- Solar simulator (ATS)
- Label printer (ZEBRA)
- Back bar attach tool (Bystronic)
- Laser (Manz)
- Cutting tool (Hegla)
- Vacuum laminator (NPC)
- Solar simulator
- CNC centre (Benteler)

**Identical Lines in GRD & OWD**

**OWD only**
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