

BY ORDER OF
SCHÜCO TF AND MALIBU
WE OFFER FOR SALE

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

**ONE LINE SOLD – ONE COMPLETE LINE
STILL AVAILABLE**



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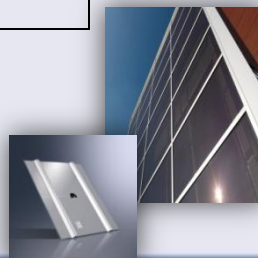
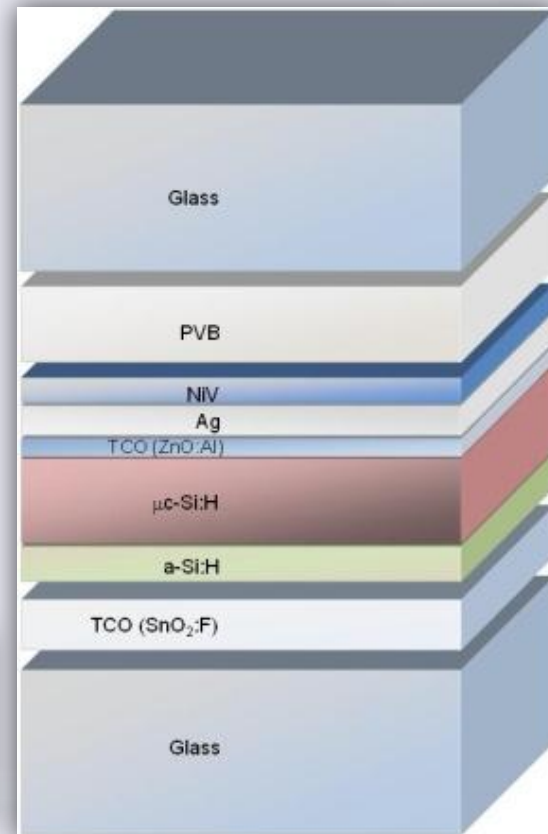
CANADA | USA | EUROPE | JAPAN | CHINA

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 available complete line + the tools from the R&D site can be inspected and purchased with **immediate effect** and is available either as whole line or as individual machine packages.

Single pieces of equipment will be sold individually in an **Online Auction on 21 March 2013.**



OFFER AND PRODUCT CAPABILITY OVERVIEW

OFFER 1*: Malibu, Osterweddingen

- Capacity: 60 MW p.a.
- a-Si / μ c-Si, tandem junction
- Flexible module size (max. 2.6 x 2.2m)

SOLD

OFFER 2*: Schüco TF, Großröhrsdorf

- Capacity: 60 MW p.a.
- a-Si / μ c-Si, tandem junction
- Flexible module size (max. 2.6 x 2.2m)
- BIPV Building Integrated Photovoltaic (located in Osterweddingen)

OFFER 3: Malibu, Bielefeld

- R&D at substrate size up to Gen 5 size
- Tool set for pilot production
- Analytic and test capability

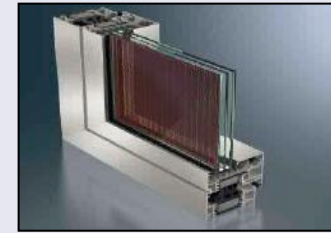
EQUIPMENT PARTIALLY SOLD

Products

Bankable modules



BIPV solutions



World class products with exceptional **high efficiency rates** which are applicable to residential, commercial and ground mount markets

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

FACILITIES OVERVIEW

Großröhrsdorf (GRD)		Osterweddingen (OWD)	
Built:	2007	Built:	2008
Start of production:	2008	Start of production:	2009
Products:	Standard modules BIPV (located in OWD)	Products:	Standard modules
Size:	39,916 m ² production area	Size:	15,724 m ² production area
Current capacity:	60 MW	Current capacity:	60 MW
Manufacturing facility:	AMAT turn key production line	Manufacturing facility:	AMAT turn key production line
	4 x PECVD AKT 60 1 x PVD Sputter 1 x Cooling facility 1 x Electrical power installation		4 x PECVD AKT 60 1 x PVD Sputter 1 x Cooling facility 1 x BIPV laser patterning system
			

Equipment SOLD

GENERAL LAYOUT AND PROCESS FLOW



- | | | |
|--|-------------------------------------|-----------------------------------|
| 1. Glass Cleaning | 5. Laser Scribe P2 (Silicon) | 9. Application PVB and Back Glass |
| 2. Laser Scribe P1 (TCO) | 6. Vapour Deposition Back Contact | 10. Encapsulation/ Autoclave |
| 3. Glass Cleaning | 7. Laser Scribe P3 (Back Contact) | 11. Attachment Junction Box |
| 4. Vapour Deposition of a-Si/ μ c-Si | 8. Application Side & Cross Contact | 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



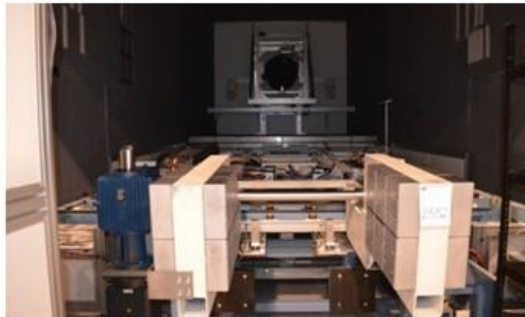
9: Application PVB and Back Glass



10: Encapsulation / Autoclave



11. Attachment Junction Box



12: Final Inspection – Flasher



13: Application Back Bars

PRODUCTION PROCESS AND INSTALLED EQUIPMENT

60 MW (a-Si/ μ c-Si) Applied Materials Turn Key Solar Thin Film Module Production Line

Pre-treatment of F-Size front glass	PECVD and PVD	Quartering of the glass	Application wiring	Intermediate foil & back glass assembly	Heating process	Glue and soldering
<ul style="list-style-type: none"> Inserting of front glasses in the production line, first quality testing, cleaning of glasses and first laser treatment 	<ul style="list-style-type: none"> Deposition of silicon layer and metallic back-contact onto the substrates including laser patterning of silicon layer and back-contact 	<ul style="list-style-type: none"> Quartering of the glasses into Q-size modules (1.43 m²) including edge processing 	<ul style="list-style-type: none"> Application wiring for the derivation of the PV-Module Copper strips & place solder transfer contact paths 	<ul style="list-style-type: none"> Installation intermediate foil (PVB-foil) & back glass assembly 	<ul style="list-style-type: none"> Heating process for connecting front and back glass 	<ul style="list-style-type: none"> Glue and soldering of the junction box in the module
Machines used <ul style="list-style-type: none"> Robots (KUKA) Glass loader (Grenzebach) ASEM (Benteler) Glass washer (Benteler) Laser (Manz) 	Machines used <ul style="list-style-type: none"> CVD-Loader (Grenzebach) CVD (AMAT) Abatement (AMAT) Quality control (Sentech) PVD (AMAT) Laser (Manz) 	Machines used <ul style="list-style-type: none"> Quartering tool (Grenzebach) Seamer (Benteler) Glass washer (Benteler) Laser edge delete (Manz) 	Machines used <ul style="list-style-type: none"> Bus tool (ATS) 	Machines used <ul style="list-style-type: none"> PVB cutting tool (Grenzebach) Robots (KUKA) Trimming tool (Grenzebach) Lamination (Klöpfer) 	Machines used <ul style="list-style-type: none"> Autoclave (Scholz) 	Machines used <ul style="list-style-type: none"> J-Box tool (ATS)

PRODUCTION PROCESS AND INSTALLED EQUIPMENT

OWD site also runs the BIPV – Building Integrated PV - process.

The production equipment for BIPV is available for sale in connection with the complete line:

additional processes for BIPV						
Performance & quality control	Mounting of back rail	Packaging	Special laser process	Special fitting	Wiring, lamination, testing	Insulating coating & packaging
<ul style="list-style-type: none"> Simulation efficiency determination by flashing/ review of performance Label printing with performance test result 	<ul style="list-style-type: none"> Mounting the backs fastening systems 	<ul style="list-style-type: none"> Packaging of the final modules in standard wooden transport boxes 	<ul style="list-style-type: none"> Special laser process for structuring the BIPV modules (customized transparency & patterns) 	<ul style="list-style-type: none"> Special fitting of modules based on customer requirements (size, shape) Cut & brake of BIPV modules based on customer requirements 	<ul style="list-style-type: none"> Manual wiring, lamination and testing of the modules Flash testing and creation of performance report 	<ul style="list-style-type: none"> Insulating coating in cooperation with sub-contractors Special packaging according to customer requirement
Machines used <ul style="list-style-type: none"> Solar simulator (ATS) Label printer (ZEBRA) 	Machines used <ul style="list-style-type: none"> Back bar attach tool (Bystronic) 	Machines used	Machines used <ul style="list-style-type: none"> Laser (Manz) 	Machines used <ul style="list-style-type: none"> Cutting tool (Hegla) 	Machines used <ul style="list-style-type: none"> Vacuum laminator (NPC) Solar simulator 	Machines used <ul style="list-style-type: none"> CNC centre (Benteler)

← OWD only – still available! →

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