



# Press release

Gutmadingen, Germany, July 7, 2009

## The hidden champions from Germany's Black Forest

### Lotus Systems optimizes production processes for the photovoltaics industry

"Every process can be improved." That is the guiding principle for Joachim Mink, CEO of Lotus Systems GmbH, a leading manufacturer of wet process, cleaning, and chemical management systems for photovoltaic, semiconductor, and MEMS production. And "improving" is what Lotus Systems' 110 employees do enthusiastically every day. The vertical spray cleaner is a good example.

Over time, coating solar cells with silicon nitride leads to a build up of nitride on the cell carriers. This build up must be removed periodically. In traditional approaches, manufacturers have an external service clean the carriers in immersion baths and then return them. This takes up an unnecessary amount of time, space, and money: The carriers must be collected, stored, packaged, and shipped. Additional carriers are necessary to continue production. Carriers can break when they are handled. On top of everything, the central problem is that immersion baths are slow and use up a lot of chemicals!

#### **Saving money with intelligent cleaning**

Lotus Systems has developed vertical spray cleaners that allow manufacturers to clean the carriers themselves – quickly, efficiently, and at their own facilities. Spraying ensures that there is always a reactive medium on the surface and makes cleaning two to three times faster. Only about a tenth of the chemicals are needed, since the engineers have developed a special way to position and control the nozzles. At about €20 per carrier, the cost of cleaning and drying is about a quarter of what it has traditionally been. Plus, the carriers are ready for use again after 12 hours. The vertical spray cleaners, with their extremely small base area of 1.8 square meters, can easily be integrated into the established production process.

"Chemistry as an integral part of production helps to increase efficiency and lower costs," says Joachim Mink with conviction. And experience has proved him

right: Since Lotus Systems was founded in 2001, its sales have increased twentyfold, and they are currently showing double-digit growth. A worldwide network of sales and service offices serves not only regular customers from Germany like Deutsche Cell, Deutsche Solar, and Sunways, but also customers throughout Europe, Asia, and the United States.

### **Success through experience**

Lotus Systems has existed for eight years, but its employees' combined experience with wet chemistry totals 750 years. Some of Mink's employees have over 30 years of experience working in the semiconductor industry for companies like STEAG. And they have always been at the forefront. Members of today's core team built the world's first automated solar cell production line in 1989 at Nukem, a company based in Alzenau, Germany.

### **Heat-free drying**

Lotus Systems is a pioneer, one of the first to have applied insights from semiconductor production to photovoltaics and a constant further developer of these insights.

The in-house research team is primarily responsible for pioneering work at Lotus. After doping, for example, solar cells must be separated from phosphorous glass using wet chemistry and then dried – traditionally with hot air. This uses up a great deal of energy, and vibrations generated by the airflow can cause breakage. The resourceful engineers from Lotus Systems have developed a physics-based drying technique for photovoltaics that is extremely fast and does not require heat. The drying is so thorough that no spots can form.

### **The Lotus approach: Think ahead and improve**

"We don't wait for customers to come to us. We go to the customers. We find out about the latest innovations in photovoltaic technology so that we can make even better products." This, says Joachim Mink, is why his employees are always just a little bit ahead of the competition. "I give our developers a great deal of freedom. If they have new ideas, they can try them out. This motivates people. The entire company is like a great brain pool, always thinking ahead, always innovating further."

On a client's request Lotus Systems implemented a new application for thin film solar cells. This technique reduces costs and accelerates manufacturing of thin film solar cells. Details can be provided on request, and the 24<sup>th</sup> European Photovoltaic Solar Energy Conference and Exhibition in Hamburg, where engineers will be available for questions, is a prime opportunity.

### **Putting the customer first**

The Lotus sales and service subsidiary in the Los Angeles metropolitan area is also brand new. Now, it is even easier for customers in North America to take advantage of Lotus Systems consultation services: "We can be there on site to optimize our customers' production facilities," promises Joachim Mink, whose motto goes back to a quote from McDonald's founder Ray Kroc: "If you work

just for money, you will never make it. But if you love what you are doing, and always put the customer first, success will be yours.”

For Lotus Systems, putting the customer first in photovoltaics, means thinking like a photovoltaics manufacturer. The engineers' ambition is to develop products that not only do their job, but also improve the entire production process. Lotus employees honor this ambition in every detail, and custom solutions are no exception. Describing the fundamental approach of his employees, Joachim Mink says, “We deliver top products because we want our customers to be at the top of their industry.” So if you would like to be at the top of the dynamic PV market, it pays to meet the hidden champions from the Black Forest:

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

### **About Lotus Systems GmbH**

With its focus on wet process applications, chemical management, and cleaning applications, Lotus Systems GmbH ([www.lotussystems.com](http://www.lotussystems.com)) is a leading manufacturer in the use of chemical substances to optimize the production process for photovoltaics, semiconductors, and MEMS. The company was founded in 2001; CEO Joachim Mink, who has worked for companies such as STEAG and Mattson, brings more than twenty years of experience to the table. In parts cleaning, Lotus Systems was one of the first to apply expertise from semiconductor production to photovoltaics. The company employs over 100 people and has service branch offices around the globe.

#### **Note**

From September 21-24, 2009, Lotus Systems will be appearing at the 24th European Photovoltaic Solar Energy Conference and Exhibition in Hamburg, Germany, hall B4G, booth 57. Leading engineers will be available to answer specific questions.

The new Lotus Systems sales and service subsidiary in the USA will be directed by Sales/Project Manager Uwe Böisinger. Contact via E-mail:

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#### **Lotus Systems, facts and figures**

Founded	April 1, 2001
Headquarters	Gutmadingen, Germany
Form of business	GmbH (limited company)
Founder/CEO	Joachim Mink
Employees	110
2008 sales	€20 million
Products	Wet process systems Chemical supply and waste systems Cleaning systems
Certification	SEMI, ATEX, NFPA, FM, CE, EC-DoC, WHG, DIN ISO, TÜV
Website	<a href="http://www.lotussystems.com">www.lotussystems.com</a>

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*Vertical spray cleaner (photograph courtesy of Lotus Systems)*



*Fully automatic wet bench for Gemenex PV photovoltaic system (photograph courtesy of Lotus Systems)*



*CEO Joachim Mink (photograph courtesy of Lotus Systems)*

For these and more photos and further information, please contact:  
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