

# Project Report

## Plants for the wet-chemical surface treatment of wafers

- High operational safety and performance
- Media: Potassium hydroxide (KOH), sodium hydroxide (NaOH), hydrofluoric acid (HF), hydrochloric acid (HCl), and more

 Chemical Processing Industry

## Materials for efficient and reliable plants for the wet-chemical surface treatment of wafers

If the sun is shining, it's already a good day for Karsten Robel from a professional standpoint. Sun means energy. More and more **solar power plants** are being commissioned worldwide. Providers are competing for market shares. Companies are developing increasingly efficient technologies.

That's what Karsten Robel does. At his plant in Nowogrodziec, Poland, RENA POLSKA manufactures complex plants for the **wet-chemical surface treatment of wafers** for customers worldwide. In other words, his work contributes to further increase the efficiency of the key element of every solar plant: the solar cell.

The RENA machines clean, etch and dry wafers with wet-chemical processes. The wafers, razor-thin discs of silicon, are the raw material for solar cells. The RENA plants form a surface on the wafers that is able to capture as much light as possible. As a result, efficient machines from RENA mean efficient solar plants.

But the demands on Karsten Robel and his team are high: "We feel that global demand for solar modules is increasing tremendously." This is both an opportunity and a challenge. The order books are filling up and capacities are growing. It's a major chance to develop the market position. But it can only succeed if all the customers' requirements are met. And in a **growth market**, they expect increasingly efficient technology.

### The plant standards of tomorrow

Since the early days of solar cell production, RENA has manufactured process solutions for surface treatment. This experience has made RENA one of the largest providers of process technology for wet-chemical applications for the solar industry and semiconductor, glass and medical technology. "We draw on our experience to develop the global plant standards of tomorrow. We meet the challenges with the right process and automation solutions and develop higher and higher efficiency classes", reports Robel.

### Aggressive chemicals

He and his team must consider two main factors when designing the plants: The types of chemicals that are used and the prevailing operating temperature during the process. RENA's customers use chemicals for the etching process, such as **potassium hydroxide (KOH)**, **sodium hydroxide (NaOH)** – i.e. alkaline chemicals in high concentrations; **hydrofluoric acid (HF)**, **hydrochloric acid (HCl)** – i.e. acidic chemicals in low concentrations. The permanent operating temperature is 80–85 °C.



"Röchling offers a large selection of chemical-resistant and temperature-resistant materials, along with a lot of application expertise. This portfolio gives us a great deal of flexibility."

Karsten Robel, Managing Director, RENA Polska Sp. z o.o. in Nowogrodziec



“Different plants require different combinations of chemical resistance and temperature resistance. That’s why we do everything in close coordination with RENA.”

Jan Michalíček, Technical Marketing at Röchling in Planá nad Lužnicí, Czech Republic

## High requirements

Customers must be able to count on the **reliability and operational safety** of the plants at all times. Robel: “An accident involving aggressive chemicals would be catastrophic. As a market and technology leader, we impose the highest requirements on our plants. Part of our strategy involves the rigorous selection of competent suppliers.”

## Cooperation

For years, RENA has used Röchling materials such as Polystone® P Homopolymer (PP-H), Polystone® PPs (PPs), Polystone® PVDF and Trovidur® (PVC) in the production of wet-chemical process plants. Components such as underbodies, housings and tanks are made from these materials. Karsten Robel: “Röchling offers a large selection of chemical-resistant and temperature-resistant materials, along with a lot of application expertise. This portfolio gives us a great deal of flexibility, which enables us to develop efficient and reliable plants for a variety of applications.”

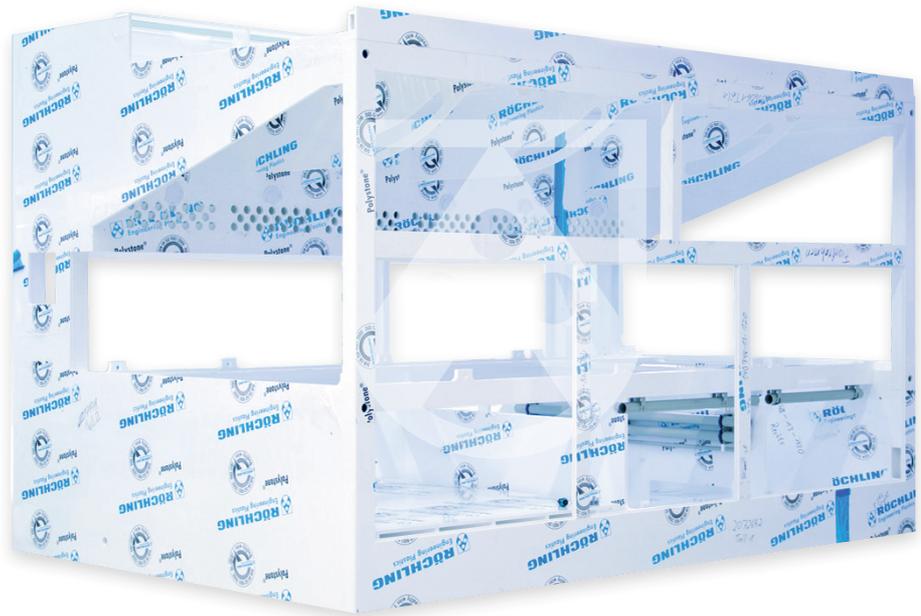
## Site visits

Site visits by RENA are an important aspect of the **close cooperation** between the companies. Jan Michalíček, Technical Marketing at Röchling in Planá nad Lužnicí, Czech Republic, discusses requirements and new projects with Karsten Robel. As he explains, “Different plants require different combinations of chemical resistance and temperature resistance. That’s why we do everything in close coordination with RENA.” At the RENA headquarters in Gütenbach, Germany, where the plants are primarily developed, inquiries are made on a regular basis about the right raw material for chemicals.

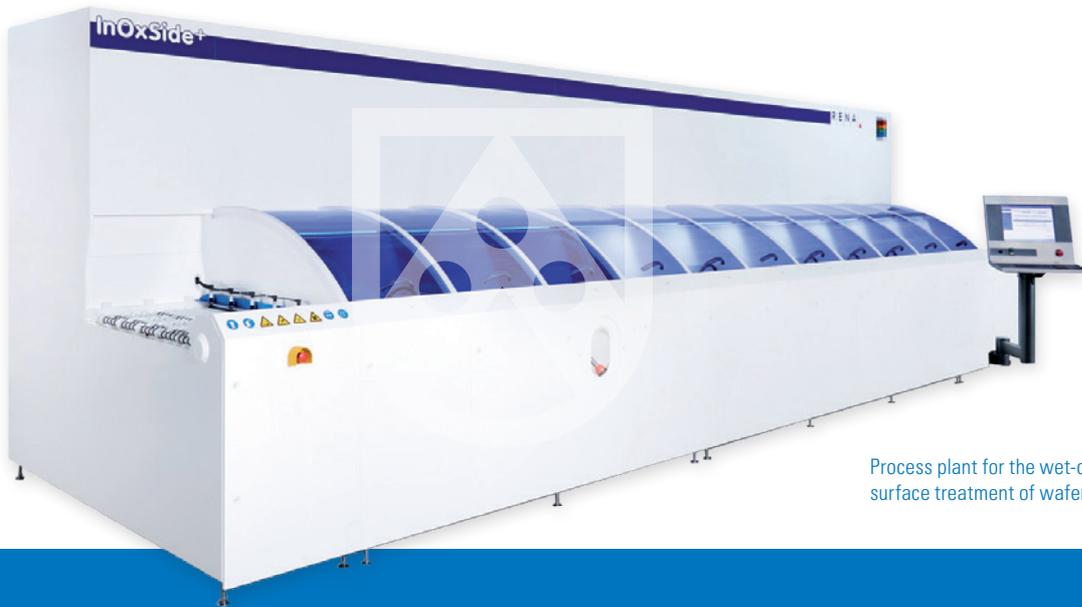
## Training

For that reason, **training** is also **part of the partnership**. “We train RENA employees regularly and invite their engineers to our location in Haren, Germany, where we go into the properties and processing options of our plastics. We are glad that we can support RENA so intensively with our experience”, says Michalíček.

For Robel, a close partnership like this is crucial for playing an active role in facing the challenges of the solar industry. “Partners like Röchling enable us to react flexibly to new requirements, so that we can create the global standards of tomorrow.”



Housings made of  
**Polystone® P Homopolymer**



Process plant for the wet-chemical  
surface treatment of wafers

## Plastics for Chemical Processing Industry

Röchling plastics have been in use for decades in the chemical processing industry as materials for installations and tanks. Röchling provides its customers with a complete product range, from sheet material, round rods and tubes to different welding rods, and assists them in the selection of the right materials with expert advice. In addition, Röchling has extensive databases and many years of experience regarding chemical resistance and the successful use of thermoplastics and composites. The most important areas of use include tanks for the storage of liquids, galvanising systems, steel pickling systems, water treatment plants, exhaust air cleaning plants and ventilation systems.

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

# Projektübersicht

## Anlagen für die nasschemische Oberflächenbehandlung von Wafern



### Ausgangslage

Fertigung von Anlagen zur nasschemischen Behandlung von Wafern für Solarzellen



### Anforderungen

- Hohe Beständigkeit gegen die in den Prozessen eingesetzten Chemikalien
- Hohe Beständigkeit gegen die Dauereinsatztemperaturen von 80 °C bis 85 °C
- Einfache Verarbeitung



### Verwendete Werkstoffe

- Polystone® P Homopolymer grau (PP-H)
- Polystone® PPs (PPs)
- Polystone® PVDF (PVDF)
- Trovidur® (PVC)



### Ergebnis

Leistungsfähige und zuverlässige Anlagen mit einer hohen Betriebssicherheit für unterschiedliche Anforderungen



### Projektpartner

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