

## Case Study: Batch Logistics via RFID at Elmos Semiconductor AG in Dortmund, Germany

### Roth & Rau - Ortner convinces with tailored RFID retrofits at Elmos Semiconductor AG in Dortmund

Elmos Semiconductor AG, manufacturer of mixed-signal semiconductors in Dortmund, Germany, will take the next step to ensure the competitiveness of its production. As part of its automation strategy, a changeover to automated identification via RFID is a major component for optimizing production.

In this context, Roth & Rau - Ortner GmbH was commissioned with retrofitting the 8-inch semiconductor factory at Elmos Semiconductor AG in Dortmund. The project included upgrading existing wafer carriers with RFID transponders (tags), equipping the Elmos factory with RFID racks, supplying RFID trolleys, and retrofitting RFID antennas on the load ports and existing rack spaces upstream of the production systems.



Elmos in Dortmund  
Quelle: Elmos Semiconductor AG

One prerequisite for automated identification by means of RFID is attaching RFID tags to the existing wafer carriers. The requirements for technically implementing the fastening are high: accurate processing, ensuring the carriers are cleaned properly, compliance with the clean room class, resistance to moisture deposits, and last but not least, efficiency. The retrofit solution developed by Roth & Rau - Ortner GmbH featuring ultrasonic welding technology was optimized in collaboration with Elmos AG and has proven successful in daily operation.



Tag fastening to the carrier

The design, electronics, and software of the RFID racks were newly developed by Roth & Rau - Ortner. The racks features 12 spaces each equipped with its own display. Only a single RFID reader is required to record and identify product carriers for every rack thanks to an antenna multiplexer. Rack groups, for example of four racks, can be operated with just one Can2Web box, which controls communication between the readers and the higher-level system. With this technical solution, costs per identification space can be kept low.

As an additional component, Roth & Rau - Ortner supplies newly developed RFID trolleys with a Wi-Fi connection and battery operation. The trolleys serve for manual batch transport while providing for wafer carrier identification. A small display on the trolley handle shows operators configurable features, such as the destination of the batch to be transported.



Operator with RFID trolley at RFID racks



Bulb antenna in vacuum load port

Equipping the system load port in approx. 40 different variants with standardized RFID antennas presented Roth & Rau - Ortner GmbH with a special challenge. Some of the antennas were integrated into bulbs, making them suitable for use in vacuum load ports.

Currently, the RFID components of the retrofit solution are being integrated into the Elmos MES. Automatic identification is paving the way for material flow automation which will enable more efficient, faster production.

#### **About Elmos Semiconductor AG:**

We are a developer and manufacturer of semiconductor-based system solutions. We always offer our customers the product which is the right solution for their tasks. Whether it is a chip which is customized to their requirements (ASIC), a standard product which can be implemented quickly (ASSP), or a complete micro-system as symbiosis of sensor and evaluation electronics.

The core competency of Elmos is the development, production, and sale of mixed-signal semiconductors. Mixed-signal semiconductors represent the intelligence in an electronic system. Among other things, our components evaluate sensor data and convert this analogue information into digital values. Only then can the sensor data be analysed and recorded precisely. With regard to vehicles, this means that a mixed-signal chip makes sense wherever analysis and switching takes place. Thus an integrated sensor can, for example, detect and analyse the rotational speed, acceleration, inclination angle, pressure, or even light. Numerous application opportunities also exist in industrial and consumer goods applications, for example in motion detectors, gesture and movement recognition, smoke detectors, or products with electric motors.

The product portfolio is complemented by MEMS. At Elmos, this primarily involves high precision micro systems - mostly pressure sensors in silicone. These are developed, produced, and sold by the subsidiary Silicon Microstructures (SMI) in Milpitas / USA. More information is available at [www.si-micro.com](http://www.si-micro.com)

Facts about Elmos:

- Leader in the field of analogue mixed-signal semiconductors
- Elmos semiconductors are used in almost all vehicles
- Design resources: Many years of experience (25+ years) combined with young teams
- Long-term customer relationships
- In-house manufacturing
- >300 million semiconductors manufactured per year

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