

## Innovative Technologies for a Sustainable World



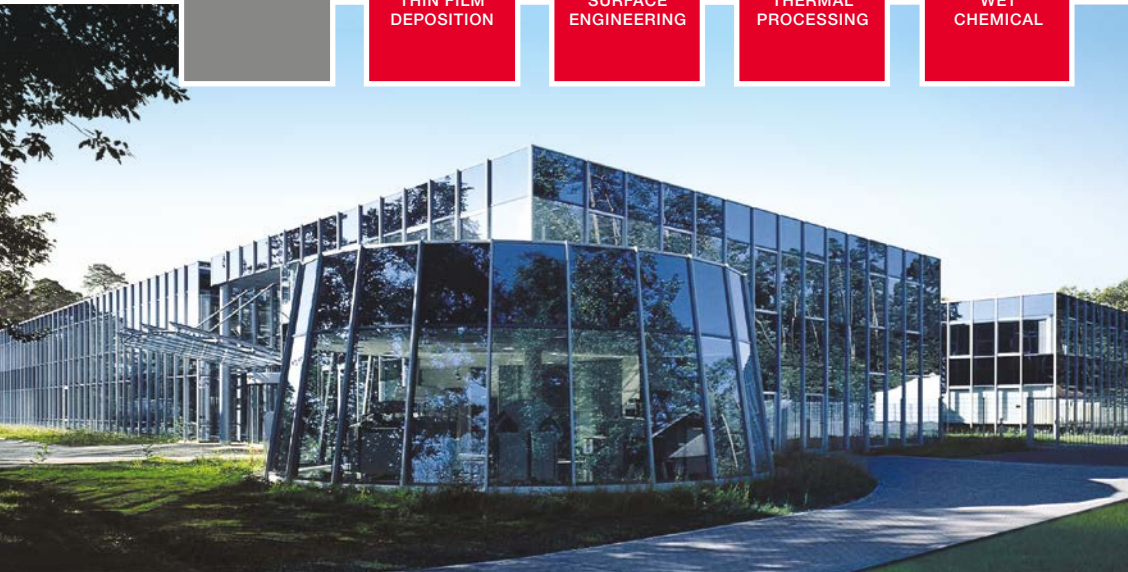
THIN FILM  
DEPOSITION

SURFACE  
ENGINEERING

THERMAL  
PROCESSING

WET  
CHEMICAL

**Innovative  
Technologies**



## Technologies for a Sustainable World

Responsible and sustainable corporate governance is very important to SINGULUS TECHNOLOGIES. SINGULUS TECHNOLOGIES develops and assembles innovative machines and systems for efficient and resource-saving production processes, which are used worldwide in the solar/hydrogen, semiconductor, medical technology, consumer goods and data storage sectors. SINGULUS TECHNOLOGIES regards sustainability as an opportunity to position itself with innovative products that follow this spirit. In the focus are:

- environmental awareness
- efficient use of resources
- avoidance of unnecessary CO<sub>2</sub> pollution

The company's core competencies include various processes of coating technology, surface treatment and wet-chemical as well as thermal production processes.

### KEY DATA

#### Two Decades of Innovation & Diversification

- 1996: Launch of **Optical Disc** solutions
- 2002: Expanding into the **Semiconductor** market
- 2007: Diversification into the **Solar Photovoltaics** sector
- 2015: First **Decorative Coatings** turn-key production system for automotive industry sold
- 2016: Market leader for **Thin-Film Solar** production equipment
- 2017: First order serving the **Medical Technology** field
- 2018: Delivery of inline sputtering machines for **3D Coating**
- 2019: Market introduction inline sputtering machine for **Heterojunction Solar Cells**
- 2020: Inline metallization systems for **Medical Applications** available
- 2021: PECVD System for **AlO<sub>x</sub> and SiN<sub>x</sub> Passivation and Anti-Reflective Layers on PERC Solar Cells**

## SINGULUS TECHNOLOGIES – Innovations for New Technologies in the Energy Sector

SINGULUS TECHNOLOGIES provides technology solutions for both crystalline and thin-film high-performance solar cell platforms including CIGS, CdTe and Perovskite technology as well as PERC, HJT, IBC, HBC & TOPCon. SINGULUS TECHNOLOGIES partners with cell manufacturers worldwide and develops processes, which improve the efficiency of solar cells while reducing production costs.

SINGULUS TECHNOLOGIES' expertise includes vacuum thin-film coating (PECVD, sputtering, evaporation), surface engineering, wet-chemical processes and thermal processing.



1: SILEX II  
wet processing system



2: Large inline sputtering with  
vertical substrate transport



3: PECVD inline system for  
high-performance solar cells



## SINGULUS TECHNOLOGIES – Nano-Coatings for the Semiconductor Industry

SINGULUS TECHNOLOGIES is a renowned manufacturer of advanced thin-film deposition equipment for semiconductor applications. Already established in the field, SINGULUS TECHNOLOGIES recently introduced the second generation of its TIMARIS PVD cluster tool platform, comprising a complete portfolio of process modules for different applications. These include the deposition of ultra-thin metallic and insulating films down to thickness of one nanometer and below, as well as stacks of such films with very precise material thickness and high uniformity specifications.

### Applications:

- Integrated inductors
- MRAM
- Magnetic sensor
- MEMS
- Packaging
- Compound semiconductor
- Power electronics
- LED
- EMI shields



1: ROTARIS  
R&D and pilot system for vacuum deposition



2: TIMARIS II  
ultra-high vacuum deposition system



3: TIMARIS III  
production system for the  
manufacturing of 300 mm wafer



## SINGULUS TECHNOLOGIES – Wet Chemical and Vacuum Deposition for Medical Technology

For medical technology SINGULUS TECHNOLOGIES offers innovative wet chemical and vacuum deposition process solutions. The core competencies of SINGULUS TECHNOLOGIES include various processes of coating technology, surface treatment, wet chemical, and thermal production processes. Certain frequently used surfaces such as door handles, elevator buttons, shopping trolley handrails and light switches as well as masks pose a considerable risk of transmission of bacteria, viruses and fungal cultures. One way to reduce the risk of infection – for example by MRSA (methicillin-resistant Staphylococcus aureus, so-called „hospital bacteria“) and E. coli bacteria – lies in the use of specially coated products with a permanently antibacterial and antiviral surface. This method is available immediately and is especially helpful in times of the COVID-19 pandemic to prevent dangerous infections.



1: Coating of medical devices



2: Large inline sputtering with vertical substrate transport





## Inline Production Systems for Green & Sustainable Metallizing of 3D Parts

Whether in the cosmetics or automotive sectors, metallic quality surfaces are needed more than ever for 3D coatings for decorative purposes. A wide range of enhanced metallic layers on 3D parts for cosmetics, automotive, bottle caps for the eco-friendly and chrome (VI)-free refining of 3D parts are available. SINGULUS TECHNOLOGIES offers the second generation of inline coating solutions for fully automated handling and coating of 3-dimensional parts. From loading to packaging, the process is fully automated and not one manual step is necessary – at a cycle time of only 0.4 seconds per component. In the shape of the new DECOLINE II SINGULUS TECHNOLOGIES is able to offer the industry an environmentally friendly process and significant benefits for simplifying their production processes.



1: DECOLINE II  
inline production system for 3D parts

## Reliable Production of Optical Disc for Data Storage

For optical disc application, SINGULUS TECHNOLOGIES has delivered thousands of replication systems since 1996. In the segment data storage (Optical Disc), machines for the production of the known optical disc formats (CD, DVD, Dual Layer Blu-ray Discs as well as Ultra HD Blu-ray Discs) and discs for data storage applications are offered.

Storing and backing up data on optical media is an easy, secure, and inexpensive option. Blu-ray discs for writing data offer the optimal solution for this. The SINGULUS TECHNOLOGIES BLULINE machine is the only system in the market worldwide that can produce discs for this application.



1: BLULINE replication line for production of writable discs for data storage applications

2: Fast handling of disc

## Innovative Technologies

SINGULUS TECHNOLOGIES –  
Innovations for New Technologies



Energy



Semi-conductor



Medical Technology



Consumer Goods



Data Storage

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