

Customized surface solutions for optimized semiconductor manufacturing

Semiconductor



Coatings are the future for state-of-the-art semiconductor manufacturing

High quality coatings applied over inexpensive substrates are the best solution for demanding next-generation manufacturing needs. Coatings can replace expensive monolithic materials at a fraction of the cost with no

degradation in performance. With ever more stringent demands for reduced metallic contamination and improved cost of ownership (CoO), coatings are the gateway to the future.

Semiconductor capabilities

Semiconductor process support

- PACVD DLN/DLC
- PVD
- RIE
- Wet cleaning
- Class 1000 cleanroom

Support processes

- Fixture design
- Coating characterization
- Decoating/stripping
- Metrology lab
- Incoming/outgoing inspection QC



Oerlikon Balzers is a global specialist for surface treatments in the semiconductor industry. Oerlikon Balzers offers customized surface solutions such as PACVD and PVD.

Oerlikon Metco provides the thermal spray technology.

Our experts will be happy to advise you regarding your individual application requirements.

Expertise and capabilities enabling your success

Providing cutting-edge technical capabilities is only part of the story. In-depth application expertise and understanding the semiconductor industry's mindset are just as important. With over 20 years of experience as a partner and supplier to the industry, we have been on the forefront of supporting semiconductor OEMs. Constantly helping to develop tailored next-generation solutions by partnering with our customers is the main reason for our long-lasting OEM relationships: innovation creates value.

Our team's 'Copy Exact' philosophy along the entire processing chain guarantees to consistently deliver products exactly in line with the customer's individual specifications: from incoming inspection, to cleaning, coating, outgoing inspection and on to final packaging and shipping. We have developed cleanroom facilities, handling practices and a broad technology range to quickly and individually respond to changing conditions – this allows us to constantly keep pace with the varying demands of the industry.

Take advantage of numerous benefits to drive your business

- Longer component lifetime
- Lower CoO
- Reduced particulate and metallic contamination
- Higher equipment uptime
- Reduced ESD



Application examples

Wafer contact components

- Wafer stages
- E-chucks
- Wafer handlers

Front-end applications

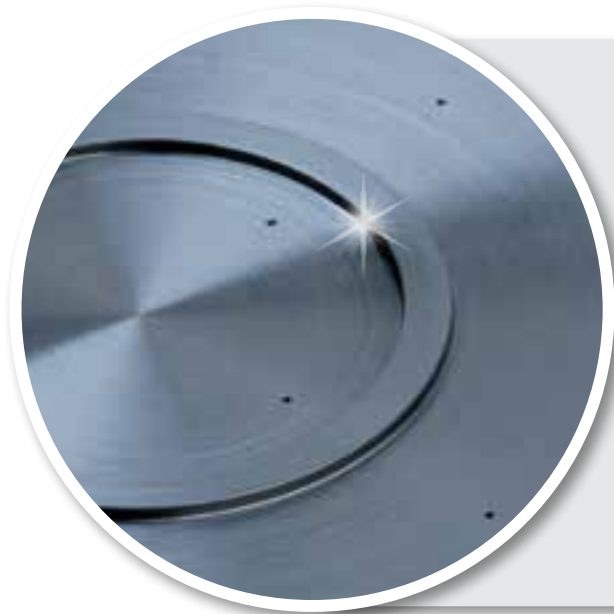
- Docking components
- Grippers
- Showerheads
- Focus rings
- Chamber liners
- Pump components
- Bearings

Back-end applications

- Capillaries
- Packaging stages
- Packaging equipment
- Bearings
- Plates



A wide array of coatings for your needs



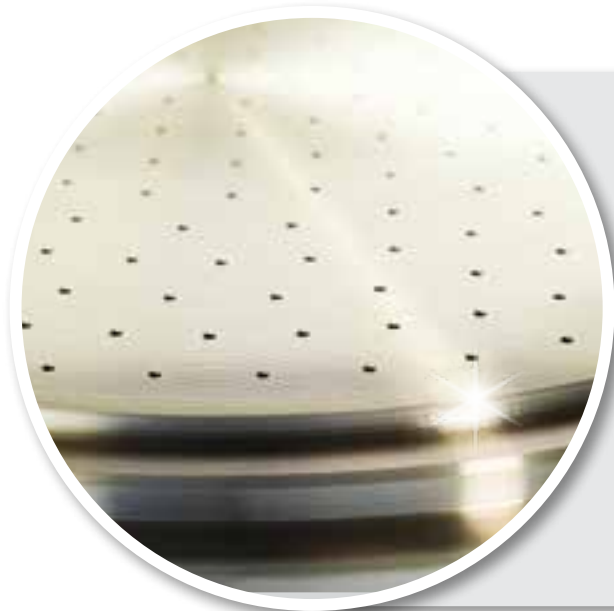
PACVD DLC and carbon-based coatings

The better a DLC coating meets the individual requirements, the lower the total cost of ownership.

Thanks to our capabilities and application expertise, we are able to precisely tailor the properties of our DLC coatings to customer's demands.

A low coefficient of friction and excellent wear resistance help to significantly reduce particle creation and thus enable high yields in manufacturing – a key factor, especially for reduced geometries.

The ability to electrically conduct also serves the back-end customers who have needs for high release and no ESD (Electrostatic discharge).



PVD coatings

In addition to DLC coatings, PVD solutions carry the potential for supporting semiconductor OEMs.

Extensive experience and a broad portfolio of materials from industrial markets enable a rich array of solutions for the current and future needs of our customers.

Solutions for ESD, wear, high temperature processing and plasma etch resistance are a sample of the solutions we have engineered.



Thermal spray coatings

Oerlikon Metco's thermal spray technologies, particularly atmospheric and vacuum plasma spray, are used to apply high purity coatings to semiconductor production tooling.

Oerlikon Metco is a fully integrated solution provider of application equipment, powders and spray services.

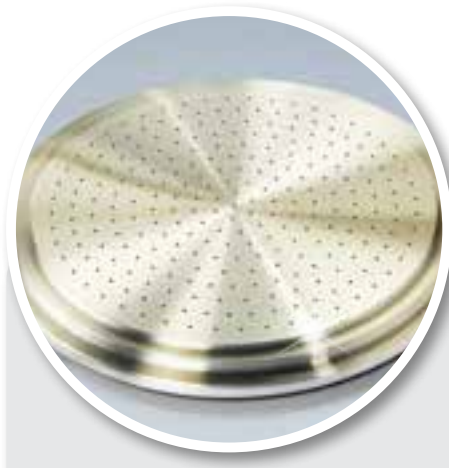
Using our LPPS Hybrid technologies, we can offer the application of high purity oxide ceramic powders with a nearly pore-free coating.

Engineered coatings for your evolving needs



BALINIT® DYLYN

BALINIT® DYLYN is an engineered coating platform of diamond-like nanocomposites (DLN) films. These coatings offer significant advantages over typical DLC coatings. From lowered coefficient of friction (COF) to tuned electrical conductivity, these coatings have applications in both front-end and back-end processes.



BALINIT® HALONA

The BALINIT® HALONA family of coatings was engineered specifically for the difficult process conditions in plasma etching. The tough conditions demand a coating that can withstand both the chemical corrosion and ion bombardment typical in these processes. Also, these coatings offer strong physical properties when wear resistance and optical transparency is required.



BALINIT® A

BALINIT® A is ideally suited for applications that require high temperature, conductivity and wear resistance. These coatings have excellent properties and are commonly used in both front-end and back-end applications.

Typical semiconductor coating properties

| | BALINIT® DYLYN | BALINIT® A | BALINIT® CNI | BALINIT® HALONA |
|---|--|-----------------------------------|------------------------------|------------------------|
| Coating material | Doped amorphous carbon | TiN | CrN | Ceramic |
| Coating thickness [µm] | 1 – 10 | 1 – 10 | 1 – 10 | 1 – 15 |
| Coating hardness H_{IT} [GPa] | 8 – 24 | 23 | 18 | 10 – 25 |
| Coefficient of friction (dry) vs. steel | 0.05 – 0.10 | 0.4 – 0.6 | 0.4 – 0.6 | 0.4 – 0.8 |
| Max. service temp. [°C] | 300 – 600 | 600 | 700 | > 1,000 |
| Resistivity (ohm.cm) | $10^4 - 10^{12}$ | 10^{-6} | 10^{-5} | $10^{11} - 10^{13}$ |
| Applications | Wear, electrical conductance, low metallics, ESD | Wear, electrical conductance, ESD | Wear, electrical conductance | Plasma etch resistance |

The properties of these coatings mentioned above are customized versions for the semiconductor industry

**Benefit from our efficient and environmentally friendly technology
Contact us today!**

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