oerlikon
metco

Surface Platform
Complete Thermal Spray Coating Machines

As the world's first coating machine, Oerlikon Metco's Surface platform brings forth a fresh approach towards thermal spray application technology.

In 2018, Oerlikon Metco pioneered a new approach to thermal spray systems by introducing the Surface One platform — the first in the industry to adopt a CNC-inspired machine bed concept with a relocatable skid design. This modular, production-ready concept brought a new level of process stability, repeatability, and efficiency to thermal spray operations.

Now, we are expanding that vision with Surface Two — a larger variant of the proven Surface platform that extends the same advanced capabilities to bigger parts and broader application ranges. With this evolution, Oerlikon Metco continues to lead the way in bringing scalable, high-performance solutions to the thermal spray industry.
Surface One and Surface Two are functionally identical, differentiated only by the permissible part size, and are both optimized for use across our key industries: aerospace, power generation, automotive, as well as medical and semiconductor applications.

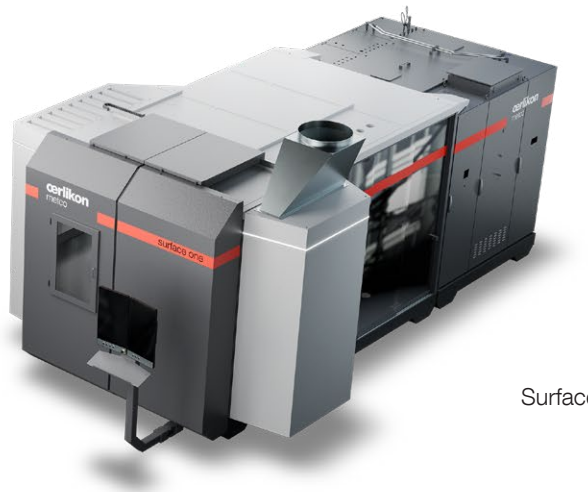
Thanks to their modular structure and standardized components, both systems simplify maintenance and inventory while ensuring process stability and global recipe consistency. Their design enables faster installation, requalification, and revalidation, accelerating return on investment and reducing time to money.
The Surface platform is equipped with the MultiCoat5 (MC5) controller. This advanced controller platform utilizes the latest PLC technology to deliver enhanced reliability and performance.

With embedded Metco IIoT Insights, both platforms are ready for data-driven operations and future automation, including smart part handling and production integration. The skid-based architecture allows for easy relocation across sites — reducing risks associated with SOP timelines and maximizing production flexibility.

- Fastest delivery time
- Fastest commissioning than comparable thermal spray systems, thereby reducing shop floor disruption
- Rapid relocattion, if needed
- A cleaner, safer operating environment as a result of CFD optimized more efficient air flow design
- Cabin door configuration that allows for part loading from the front or from overhead
- Our new Clarity2™ user interface that significantly improves productivity and efficiency
- Reconfigurable, should your needs change
- Ready for Industry 4.0 and IIoT

Scalable. Smart.
Ready for the Future of Thermal Spray.

Surface Two



Surface One

1 General Description

The Surface One coating machine consists of two main modules that contain all necessary components and sub-systems for a complete thermal spray coating machine:

- Coating Module
- Process Module

If desired, the coating module and process modules can be purchased separately. Please contact your Oerlikon Metco Account Manager for more information.

1.1 Coating Module

The Coating Module is comprised of:

- Clarity2™ user interface
- Spray gun(s)
- Material Feeder(s): up to 4
- Robot for gun handling
- Turntable for part handling
- Venturi air lines for part cooling
- Part loading / unloading doors: from front or overhead
- Air intake vents
- Exhaust plenum and duct

1.2 Process Module

The Process Module is comprised of:

- MultiCoat5 Controller
- Process Management
- Power supply
- Universal Junction & Monitoring Unit (Plasma spray only)
- Gas Management
- Electrical Distribution (customer supplies power to the process module)
- Heat exchanger with two gun-cooling water circuits
- Maintenance access door

1.3 Coating Processes

A single Surface One coating machine can be equipped with up to three thermal spray spray processes:

1. Plasma Spray (single or triple cathode)
2. HVOF Gas Fuel or Liquid-Fuel
3. Flame (Combustion Powder Spray)

Surface One coating machines ordered with less than three spray processes can be easily upgraded with additional spray processes or software functionality at a later time.

Surface One

2 Technical Specifications

Machine Platform	Surface One		Surface Two	
Machine Dimensions				

Platform Configuration	Surface One	Surface One K2	Surface Two	Surface Two K2
Part Size max. mm	Ø1000 / Height 800	Ø600 / Height 600	Ø2000 / Height 1500	Ø1000 / Height 1200
Part Weight max. kg	1000	500	5000	500
Gun Handling				
ABB IRB 2600	●	●		
ABB IRB 4600 / Fanuc M710iC	●	●	●	●
Part Handling				
Robax 500	●		●	
Robax 1000	●		●	
Robax 1000-12 Satelite			●	
UT 1000			●	
UT 5000			●	
K2 Robax 500		●		●
K2 Robax 1000		●		●
Thermal Spray Processes				
Process Controller	MultiCoat5			
APS 1C or 3C	●	●	●	●
HVOF-GF or LF	●	●	●	●
CPS	●	●	●	●
Feeders	Single Pro Feeder family (volumetric, gravimetric, with or without heating)			
Gun Cooling	Integrated heat exchanger, dual circuit for both plasma and high velocity oxy fuel process (flow control, pressure control, water temperature, conductivity sensor for APS circuit)			
Chiller	Optionally available			
Dust Collector	Optionally available			
Diagnostics	Optionally available(Accuraspray 4.0 / Pyrometer)			

2.1 Specifications [a]

Power Requirements					
Input Voltage	3Φ	200 V, 400 V, 480 V or 575 V			
Frequency		50 / 60 Hz			
Current	max	590 A			
Cabinet Protection Ratings					
Electrical Enclosures		IP 54			
Gas Enclosures		IP 43			
Environment					
Temperature		10 to 40 °C	50 to 104 °F		
Humidity		< 75%, non-condensing			
Floor Load Capacity [b]	min	1000 kg/m^2	205 lb/ft^2		
Noise Level	max (APS)	75 dBA @ 1 m	75 dBA @ 3.3 ft		
Compressed Air Requirements[c]					
Dust Allowance	particle size	< 0.1 µm	< 4 µin		
	max	0.1 mg/m^3	6.2 E-09 lb/ft^3		
Oil	max	0.01 mg/m^3	6.2 E-10 lb/ft^3		
Machine Color Code					
Machine Floor Frame		RAL 9005			
Machine Walls		RAL 7021			
Air in/outlet		RAL 9002			
Process Media [d]					
		APS	**HVOF-GF**	**HVOF-LF**	**CPS**
Argon	Ar	99.998 %			
Nitrogen	N_2	99.999 %			
Hydrogen	H_2	99.998 %	99.9 %		99.998 %
Helium	He	99.998 %			
Oxygen	O_2		99.9 %	99.9 %	99.9 %
Methane	CH_4		99.9 %		
Propane	C_3H_8		99.9 %		
Propylene	C_3H_6		99.9 %		
Ethylene	C_2H_4		99.9 %		
Acetylene	C_2H_2				99.9 %
Natural Gas			Methane quantity: min. 93% [Vol.-%]		
Kerosene				Flash Point: 43°C to 61°C Calorific Value: min. 42.8MJ/kg Density (20°C): <0.79g/cc Sulphur max: 0.3%	

[a] See component data sheets for further specification.
[b] Depending on machine configuration.
[c] According to Pneurop / ISO 8573-1, classification 1.4.1. is required
[d] Required gases dependent on spray processes and customer gas configuration(s) chosen.

3 Available Configurations

The Surface platform is available in four distinct configurations — Surface One, Surface One K2, Surface Two, and Surface Two K2 — each tailored to specific customer needs based on part size, production volume, and handling approach.

■ Surface One

Designed for **individual processing of small to medium parts,** making it an ideal solution for **low to medium volumes**. It offers a compact footprint and high precision.

■ Surface One K2

Engineered for **continious production of small parts** — typical in the **aerospace industry** for components like airfoils. The **K2 variant enables automation** and **reduces operator exposure** by eliminating the need to enter the spray cabin, supporting safer and more consistent production.

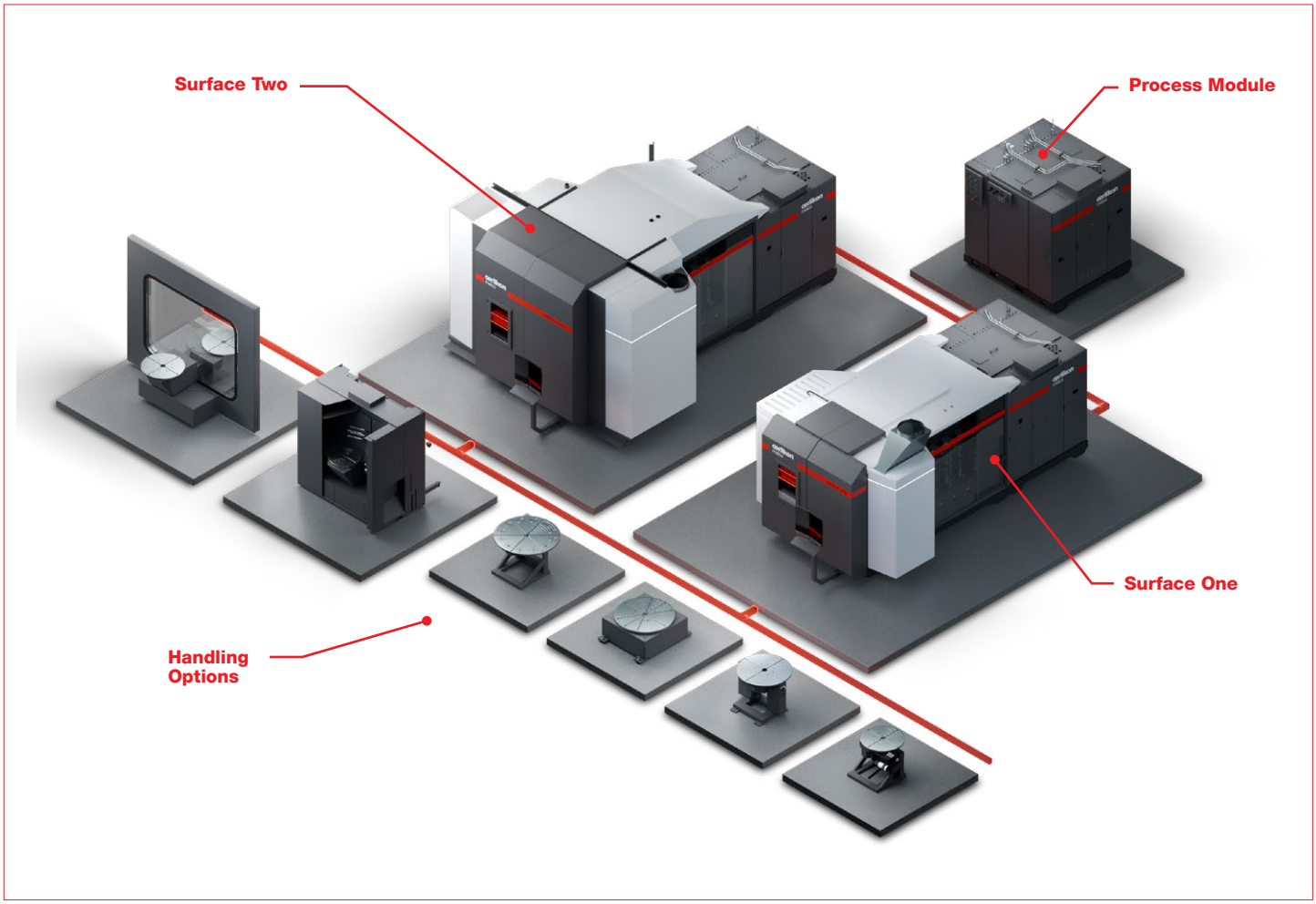
■ Surface Two

Targets **medium to large parts** processed individually, such as **blisks, vanes, blades,** and **transition ducts**. It offers greater working envelope flexibility and is ideal for customers requiring **scalable, high-performance production** without the need for full automation.

■ Surface Two K2

Offers the **greatest flexibility** in the platform, combining a **large working volume** with **automated handling capabilities**. Perfect for customers pursuing **fully or semi-automated production** and aiming to **minimize operator exposure** to thermal spray environments and dust.

Both **K2 variants** are designed with **automated loading and unloading** in mind and help customers improve operator safety, process consistency, and future-proofing for smart manufacturing.

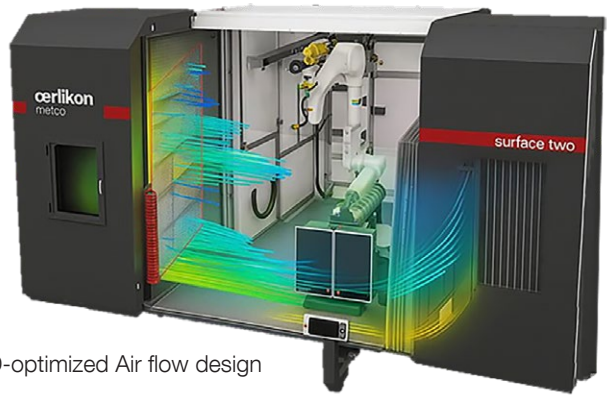


4 Features and Benefits

The Surface platform was developed with a clear focus on **process consistency, operator safety, ease of maintenance, and production scalability.** Its CNC-inspired design combined with advanced airflow, modular components, and automation readiness make it the most forward-looking thermal spray system in the industry.

Advanced Airflow Design

- Revolutionary **air channel layout** minimizes turbulence, ensuring stable process conditions.
- Oerlikon's proprietary **air inlet** ensures a **homogeneous airflow**, optimizing overspray capture and reducing airborne dust.
- Controlled airflow speeds are calibrated to efficiently remove particles and maintain clean working conditions.
- **Reduced overspray** directly improves **coating quality** and minimizes rework.
- **Modular exhaust grid** can be replaced individually **without tools**, reducing maintenance time and cost.
- The system design prioritizes **health and safety**, supporting clean-room adjacent environments.



CFD-optimized Air flow design

Simplified Cleaning & Maintenance

- The interior is free of cable trays and jamboxes, reducing areas where dust can accumulate.
- The result: **significantly reduced cleaning efforts** — what used to take hours now takes minutes.
- **Optimized equipment layout** with designated spots for compressed air pistols and vacuum cleaners.

Consistency, Repeatability, and Robustness

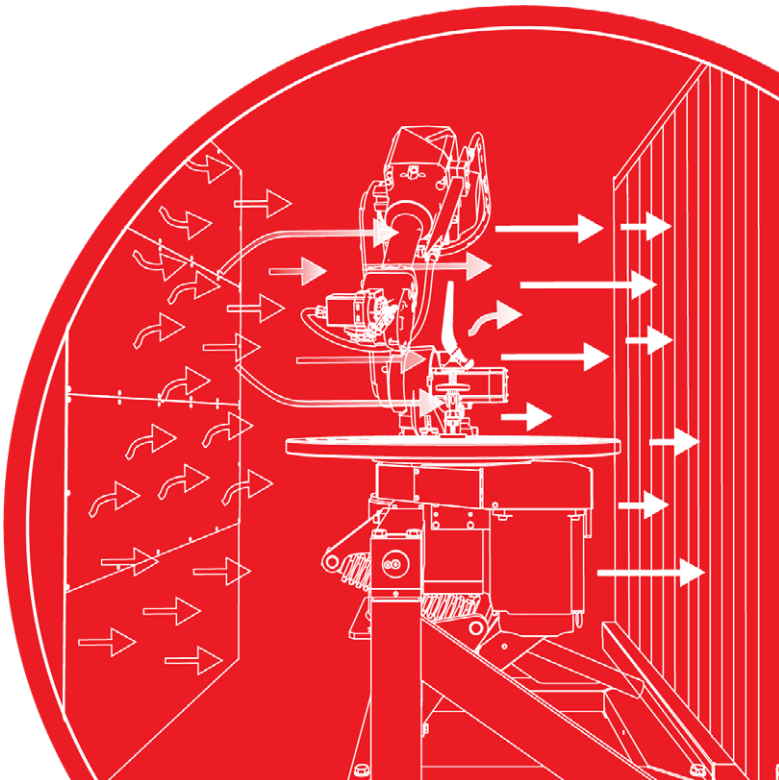
- All machines follow a **standardized layout, footprint, and electrical architecture** to ensure repeatable performance across multiple installations.
- **100% documented mechanical and electrical assemblies** guarantee spare part availability and serviceability, even years into operation.

Flexibility & Scalability

- Supports both **conventional batch processing** (Surface One/Two) and **automated carousel handling** (K2 variants), depending on volume and operator safety needs.
- Compatible with a wide range of **Part handling systems** such as:
  - **Robax 1000 family, UT1000/UT5000 family** for rotational coating tasks
  - **Robax 500** for dynamic, high-precision positioning of complex parts
- Modular **powder feed system** with up to **four individual powder lines,** supporting both **volumetric** and **gravimetric feeding**.
- True **CNC-like machine design,** enabling **fast installation** and **ramp-up** and making **relocation feasible within days**, not weeks or months.

Process Versatility

- Supports all major thermal spray processes:
  - **Plasma spray** (single or triple cathode)
  - **HVOF-GF or HVOF-LF**
  - **Combustion Powder Spray**
- Designed to **grow with your business:** start with Plasma and later expand with HVOF or Flame, all within the same system platform.



5. Options & Accessories

The Surface platform is delivered with a comprehensive set of standard features to ensure immediate productivity, safety, and future scalability — while offering optional enhancements for diagnostics, automation, and process optimization.

Standard Features

All Surface One and Surface Two systems are equipped with:

- MultiCoat™ 5 thermal spray controller, supporting both single- and multi-process configurations
  - Intuitive user interface with modern software features
  - Advanced user management with profiles and access levels
  - Maintenance tool for scheduling and tracking system maintenance
  - Metco IIoT OPC-UA interface for real-time machine data acquisition and system integration
- Fully equipped thermal spray booth, including:
  - Video surveillance camera for live process monitoring
  - Compressed air pistol, vacuum cleaner and powder Fill-In funnel for regular booth cleaning and maintenance

Optional Enhancements

Customers can further enhance their Surface system with:

- Advanced diagnostic tools, integrated at predefined locations within the booth:
  - Pyrometer for real-time temperature monitoring during spray processes
  - Accuray Spray for flame spray process diagnostics and optimization
  - Automation-ready interfaces and support for robotic integration
  - Seamless add-on of part handling and gun-handling solutions (see Chapter 2 for details)
- Scalable process configurations, enabling upgrades from initial plasma setups to full multi-process capabilities, including HVOF-GF or HVOF-LV and Combustion Powder Spray

The Surface platform is designed to scale with your operations, giving you the freedom to start lean and expand capabilities as your production needs grow.

www.oerlikon.com/metco
info.metco@oerlikon.com

6 Life-Cycle Status and Support Options

Our four-phase life cycle model keeps you informed about available services and support options throughout the life span of your equipment

6.1 Surface One & Surface Two

- Current Life Cycle Status: Active
- Inception Date Surface One: June 2018
- Inception Date Surface Two: April 2025

During the Active phase, you have our full sup-port and range of services. Using our life-cycle services will keep your equipment in the best operating condition

.

6.2. Keeping You Informed

We will notify you early and transparently about your options as your equipment enters into the next life-cycle phase, pro-viding your equipment is registered with Oerlikon Metco

6.2.1. Life-Cycle Notification

Provides early information about the upcoming life-cycle phase change and how your equipment can be best sup-ported.

6.2.2. Life-Cycle Status Statement

Provides information about the current life-cycle status and all available options and services to maintain your equipment in best condition.

6.3. The Oerlikon Metco Difference

Benefit from our selection of comprehensive services de-signed to ensure:

- Consistent spray quality, with little to no parame-ter shift
- Compliance with your ISO quality requirements
- Maximized equipment uptime
- Extended overall equipment lifetime
- Fast availability of spare parts

6.4. Your Best Value for Peak Performance

Choose from our broad portfolio of services to keep your equipment in top condition now and in the future

- Spare parts
- Preventive maintenance
- Repair Service
- Customer training

Take advantage of an Oerlikon Metco Service Agreement tai-lored to your specific needs!

For more information on your service and support options, please contact your Oerlikon Metco Account Manager.