oerlikon
balzers

METAPLAS.DOMINO

THE FLEXIBLE PVD PLATFORM FOR YOUR NEEDS

METAPLAS.DOMINO PLATFORM

Our market knowledge:

More than 30 years of experience and know-how in coating combined with the highly innovative technology portfolio of the METAPLAS.DOMINO platform is the key for customised coatings.

Automotive components

Whether engines or drive trains, oil pumps or brakes, headlights or rims, body-work or interior: in modern cars, motorbikes, trucks, ships and trains there is hardly anything, in manufacture or in operation, where Oerlikon Balzers coatings are not involved.

Consumer goods and decorative parts

Whether household appliances, consumer electronics or sports equipment - most things we use today are made of metal or plastic. Decorative coatings from Oerlikon Balzers improve the design, performance and service life of modern consumer goods, and make their production more efficient.

Aircraft parts

Aerospace components must withstand extremely demanding conditions and comply with strict safety and environmental regulations. Oerlikon Balzers coatings are designed to meet these challenges - during the production of components and tools and throughout their service life.

Medical components

Coatings provide a unique combination of extreme surface hardness, low friction coefficient and anti-corrosion properties. In addition to uncompromising quality, the medical industry requires equipment that complies with biocompatibility regulations.

Energy Industry

Continuous operation and extreme environments place extremely high demands on the individual parts of windmills and turbines, on components used in oil & gas exploration, and on the processes used to manufacture these parts and components. Oerlikon Balzers can provide the optimum solution in each case.

ALMOST UNLIMITED COATING PORTFOLIO FOR YOUR APPLICATIONS

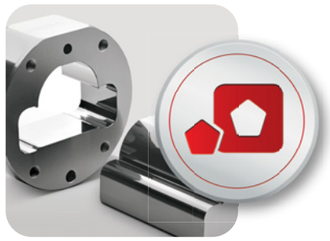
Metaplas coatings improve how components behave in a wide range of applications. They can increase abrasive and/or adhesive wear resistance, reduce friction or sticking behaviour and increase erosion and corrosion resistance. The oxidation resistance of surfaces can be improved, electrical conductivity can be enhanced, and an attractive, decorative appearance can be designed.

Cutting tools

Whether through higher productivity, more reliable production or increased efficiency – wear protection coatings offer huge potential savings. We offer the ideal coating for your application, depending on the material to be machined and the processing involved. So if it's turning, milling, drilling, reaming, threading or gear cutting - our high-quality coatings will make your production faster, more efficient and more reliable.

Engineering

Oerlikon Balzers offers a broad range of surface solutions that significantly improve the performance and durability of parts, manufacturing tools and precision components used in a wide range of engineering applications.



Metal forming

Metal forming tools require long-lasting, high-quality, reliable and robust surface solutions to ensure high productivity in the stamping press. Oerlikon Balzers solutions are essential for applications such as deep drawing, blanking, trimming or punching and are used in special tooling and small or large batch production.

Die casting

The die casting industry is constantly facing new challenges in terms of die-cast part tolerances and cycle times. The exceptionally hard, extremely erosion and wear-resistant coatings from Oerlikon Balzers are a significant factor when it comes to protecting the mould from soldering and premature fire cracks.

Packaging and plastic processing industries

Hygiene and safety are of the utmost importance for the food processing industries. Uncompromising high quality, extreme cleanliness, compliance with bio-compatibility regulations and easy-to-clean components are crucial.

BENEFIT FROM THE FLEXIBILITY

One technology platform – a wide range of possibilities

Designing modules and creating the perfect system to meet your individual needs is the basis of the METAPLAS.DOMINO ThinFilm equipment for production and R&D. Our state-of-the-art ThinFilm equipment has been developed using the expertise that comes from nearly 30 years' industrial experience. For Oerlikon Balzers, this means offering efficient system solutions and even setting trends in surface treatment.

Our METAPLAS.DOMINO platform offers different technology modules as well as individual solutions based on our know-how and expertise. This platform is highly flexible to meet your requirements - today and tomorrow. The modular and flexible concept of our ThinFilm equipment allows further expansions and upgrades.

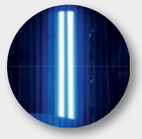
Technologies

Our coating technologies offer a wide range of possibilities for developing new layer architectures

Arc

The innovative APA Arc evaporator technology (Advanced Plasma Assisted) is based on our vacuum arc technology.

- High target utilisation results in low target costs
- High deposition rates
- Excellent coating adhesion
- Reduced droplet evaporation



HiPIMS

HiPIMS stands for our High Power Impulse Magnetron Sputtering technology.

- High ionisation rate (similar to Arc)
- Variable frequency and reverse pulsing
- Deposition of extremely dense and smooth coatings
- Syncronisation with bias and arc management
- Excellent coating adhesion

HI3 – High Ionisation Triple

HI3 is our hybrid technology (APA Arc+HiPIMS) combined with AEGD plasma etching.

- Combined strength of 3 processes in one PVD system
- Excellent adhesion, high deposition rate, smooth coatings, economical production
- Innovative approach to the next generation of PVD coatings for various applications
- HI3 technology allows coatings to be adapted with a wide range of materials, with micro alloying, with doping, and with layer architecture design – with economical production!

Technical features

APA Arc, steered Arc, filtered Arc

- Allows various types of arc setups in combination with different power supplies.
- Manual or automatic magnetic field setup for arc control (steered arc).

Sputtering (DC, HiPIMS, MF, RF, superposition etc.)

- Various magnetron setups with individual power supplies and pulsing units up to 2 MW.
- HiPIMS with synchronised bias and reverse pulsing.
- Sputter magnetrons with variable and adjustable magnetic fields.
- Superposition of different sputter modes in order to increase coating rate.

Bias

- individual bias setup. DC / Pulsed / MF / RF
- Bipolar pulsed asymmetric
- Arc management

PACVD (Plasma-Assisted CVD)

- DLC (Diamond-Like Carbon) coatings
- Use of precursors such as HMDSO, etc.

AEGD / advanced AEGD (Arc Enhanced Glow Discharge)

- Excellent uniformity by adjustable etching technology
- Powerful etching rates up to 2000 nm/h

Combination of plasma nitriding and PVD

- Within one cycle

Temperature control

- Various options with multiple thermocouples and / or pyrometer as well as direct temperature measurement at substrate.

Automation (2-door chamber)

- Automatic door operation, substrate holder loading and unloading
- Reduced maintenance in automatic mode
- Easy to maintain

YOUR THINFILM EQUIPMENT

Versions and features of METAPLAS.DOMINO equipment

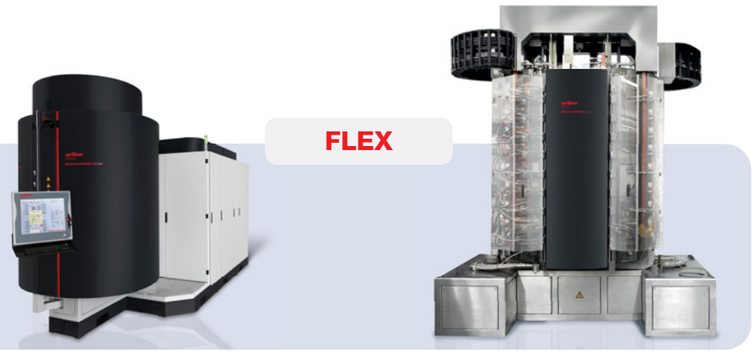
Equipment with integrated chamber

Compact equipment in different sizes for all production needs.

Properties	METAPLAS.DOMINO pica	METAPLAS.DOMINO micra	METAPLAS.DOMINO kila
Usable coating volume	Ø 330 mm x 300 mm	Ø 450 mm x 500 mm	Ø 620 mm x 700 mm
APA arc evaporators	2 to 6	3 to 12	4 to 16
Magnetron sputter sources	1 to 3	1 to 4	1 to 4
Standard substrate table (others upon request)	5 shafts	6 shafts	9 shafts

Equipment with free chamber and two doors

The flex versions are perfectly designed for future integration of newly developed technology and for potential incorporation into automated production processes.



FLEX

Properties	METAPLAS.DOMINO kila flex	METAPLAS.DOMINO giga flex
Usable coating volume	Ø 620 mm x 700 mm	Ø 1,200 mm x 1,500 mm
APA arc evaporators	4 to 16	8 to 32
Magnetron sputter sources	1 to 6	1 to 4
Standard substrate table (others upon request)	9 shafts	Up to 32 shafts

Available for all sizes ▶

Available coating modules: Arc, Sputter, HiPIMS, HI3, Nitriding, DLC, ta-C
Available power supplies: DC, DC pulse, HiPIMS, bipolar pulse, MF, RF (upon request)
Plasma cleaning: All systems equipped with AEGD

HIGH CAPACITY AND PRODUCTIVITY

The costs per piece of a coating process are mainly determined by the loading capacity of the equipment. A high loading capacity also influences the plasma conditions, which in turn affects the quality of the coatings.

We offer a wide range of standard substrate holder solutions to increase loading capacity and ensure high-quality coatings. The table below shows some examples of different tools with 3-fold rotation on a standard substrate holder. We also offer customised substrate holders for optimised loading capacities.

Tool dimension	METAPLAS.DOMINO pica	METAPLAS.DOMINO micra	METAPLAS.DOMINO kila
End mill Ø 6 x 55 mm	400	720	1296
End mill Ø 10 x 70 mm	240	480	900
End mill Ø 14 x 100 mm	120	384	720
End mill Ø 20 x 120 mm	90	180	360
Hob Ø 100 x 100 mm	15	30	63

Additional factors in high-efficiency production

- High target utilisation – up to 60%
- High deposition rates
- Systems are designed for high temperature processes up to 650°C and low temperature processes less than 150°C
- Low maintenance costs (e.g. long term maintenance free turbo pumps and quick-change parts)
- Easy access to all equipment areas
- 2-door model for kila flex and giga flex

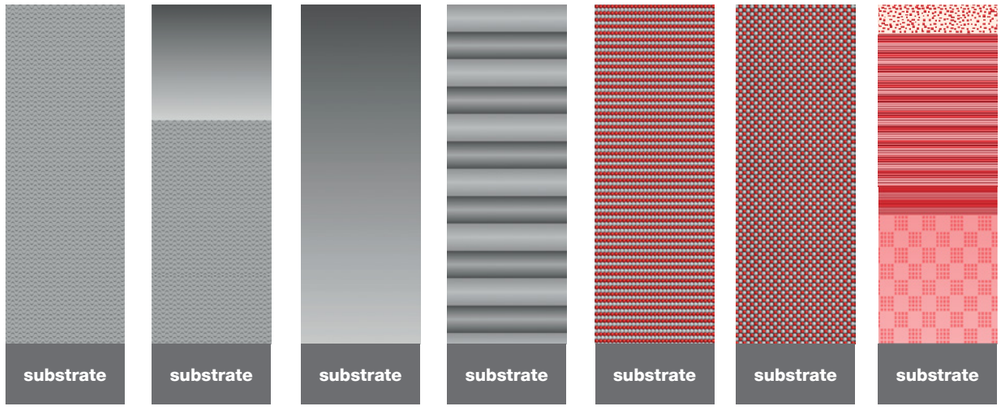
METAPLAS.DOMINO COATINGS

A wide variety of solutions

Coating types, architectures and designs

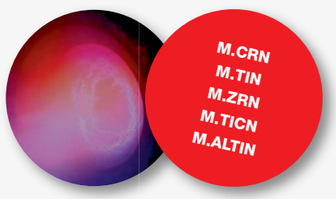
Different combinations of materials, technologies and modules allow a wide range of coating architectures.

With METAPLAS.DOMINO equipment, you can adjust and enhance the coating properties to meet your needs and to suit the application.



monolayer | hard/soft combination | gradient | multilayer | nanolayer | nano composite | designed layer

Basic Arc coatings



Arc coatings offer highly economical deposition of a variety of materials combined with high coating density, hardness and excellent adhesion. They are typically used in metal processing for machining, forming and stamping, in plastic processing, in decorative and medical applications and in various component applications. Typical coatings in these applications are metal nitrides and carbonitrides.

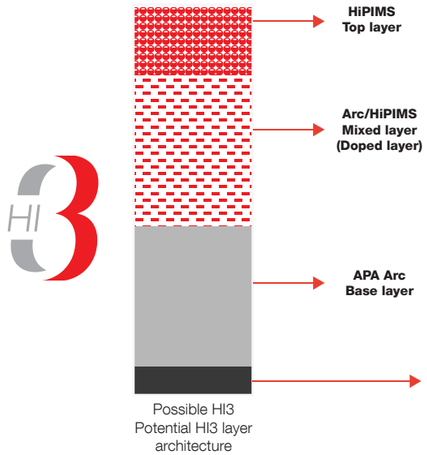
Sputter / HiPIMS coatings

Sputter coatings are typically used for deposition of very smooth coatings and for materials which cannot be evaporated with Arc technology. Sputtering technology is particularly useful when working with highly polished surfaces and basic metal carbon coatings.

HI3 coatings

Pioneering PVD technology is pointing the way towards innovative new coating solutions.

The latest innovation HI3 (High Ionisation Triple) combines 3 highly ionised processes within one PVD system:

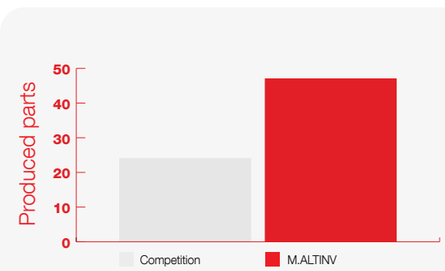


HiPIMS + APA Arc + AEGD plasma etching

- Excellent adhesion
- High deposition rates
- High ionisation rates
- Smooth coatings
- Very dense coatings
- Economic production
- Doping and micro alloying of coatings
- Design of layer architectures

HI3 technology allows coatings to be adapted with a wide range of materials, with micro alloying, with doping, and with layer architecture design – with economical production!

Outstanding initial results with HI3 technology

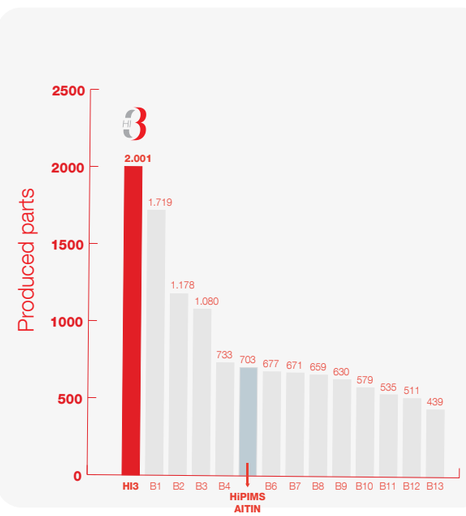


Benchmark test for M8 tap drills with 15 m/min in C45 steel carried out by a large tool manufacturer

Application
Grooving operation

Workpiece
42CrMo4
toughness 700 MPa

Cutting data
V = 200 m/min
f = 0.075 mm
a = 9 mm
a = 10mm



METAPLAS.DOMINO coatings

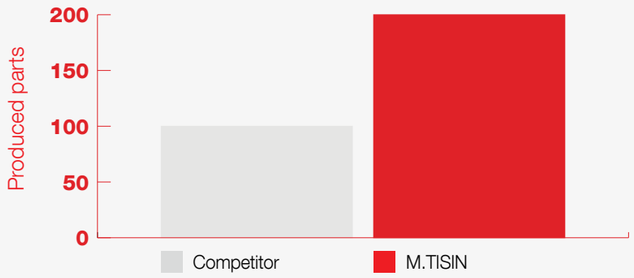
For high performance

High-performance coatings

In contrast to general-purpose coatings, high-performance coatings are developed with special applications or coating properties in mind. For example, coatings with very high oxidation resistance and/or high hot hardness are needed for high-speed or dry machining and for machining special alloys in the aerospace industry. In other applications the focus is more on the elastic properties or friction behaviour. For high-performance coatings the parameters such as composition, atomic structure, crystallinity and morphology are designed at nano level. So the METAPLAS.DOMINO platform gives you the advanced, pioneering coating designs you need.

DLC/carbon coatings

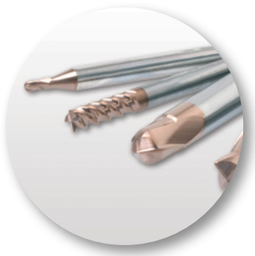
The METAPLAS.DOMINO platform allows you to produce various DLC (diamond-like carbon) coatings and combine PVD and PACVD processes.
DLC coatings are mainly used for components to reduce friction and wear, e.g. on engine components, but they are also the ideal solution for special tool applications such as machining aluminum alloys, non-ferrous metals and composites like FRPs and CFRPs. Hydrogen-free tetrahedral amorphous carbon (ta-C) coatings offer exceptional performance in high-temperature environments and with extremely high hardnesses in particular.

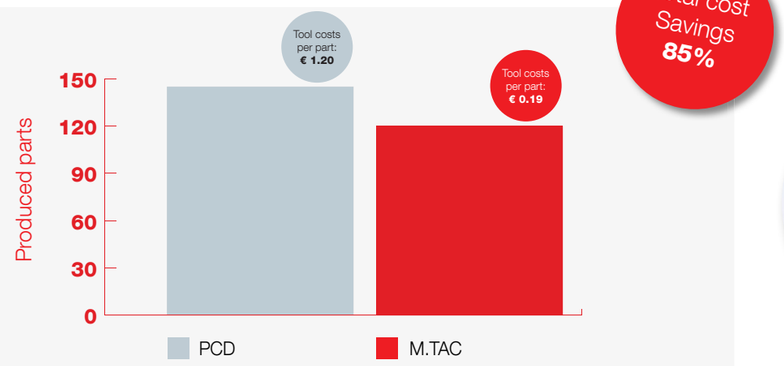


Source: German tool manufacturer

Dry cutting of 1.2343 ESU (X38CrMoV51), 58 HRC

Vc = 226 m/min, vf = 1920 mm/min
Fz = 0.08 mm, ap = 0.25 mm
ae = 0.15 mm, n = 12 000 U/min,
Service life criteria: surface quality/wear





Source: German tool manufacturer

Tool	**Cutting**
Carbide end mill	n=40,000 U/min
Ø8 mm	v=2.4 mm/min
Workpiece	**Benefit**
High-end car interior	Significantly reduced tool costs
Al-ABS-Pc	PCD end mill: € 180
GF 20 Sandwich	M.TAC: € 23

METAPLAS.DOMINO coatings

Properties for your success

Upon your request we develop modifications of existing M. Coatings, and individual new solutions for you. Please contact us for more details.

Create your individual portfolio

Stand out from the competition: we can work with you to develop customised coatings for your specific applications.

	Our coating portfolio Product name	*Former name	Recommended applications	Basic coating composition	Coating architecture	Hardness (HV0.05)	Max. working temp. (C°)	Colour
APA Arc	**M.TIN**	M.TIN	Standard applications in machining, forming, components, deco	TiN	Monolayer	2500 ± 200	600 C°	Gold
	M.TICN	M.TICN	Cutting, threading, stamping, deco	TiCN	Multilayer	3500 ± 300	500 C°	Red Brown
	M.CRN	M.CRN	Forming, plastic processing, hot forging, components	CrN	Mono-/Multilayer	2200 ± 200	700 C°	Chromium
	M.CRON	M.CRN/CRON	Plastic processing, cutting Cu/Al alloys	CrN/CrON	Multilayer	2400 ± 200	700 C°	Rainbow
	M.ALTIN	M.TEC	General cutting applications (milling, drilling, reaming, sawing)	AlTiN	Mono-/Multi-/ Nanolayer	3200 ± 300	900 C°	Anthracite
	M.ZRN	M.ZRN	Cutting non-ferrous metals, deco	ZrN	Monolayer	2300 ± 300	700 C°	Light Gold
	M.ALTISIN	M.POWER	(Dry) cutting, milling steel 45-60 HRc, stainless steel, Ti alloys; drilling, gear cutting	TiAlSiXN	Mono-/Multilayer	3500 ± 300	1100 C°	Copper
	M.TISIN	M.POWER nano	(Dry) hard cutting, milling steel 60-70 HRc, stainless steel, Ti alloys; drilling	TiSiXN	Nanolayer	3500 ± 300	1100 C°	Copper
	M.ALCRN	M.FORCE	Cutting steel <45 HRc, (exhaust) valves, components	AlCrXN	Multilayer	3300 ± 300	1100 C°	Light Grey
	M.CRALSIN	M.FLEX	Cutting steel <45 HRc, (exhaust) valves, components	CrXAlSiN	Multilayer	2500 ± 250	900 C°	Silver Grey
	M.VN	M.FUSION	Aluminum die casting, forming at elevated temperature	VXN	Monolayer	2400 ± 300	600 C°	Light Brass
	M.MON	M.MON	Precision components, automotive applications at elevated temperature	MoN	Monolayer	2400 ± 250	800 C°	Silver steel
	M.TAC	M.TAC	Cutting non-ferrous metals, wood-based and fibre-reinforced materials; forming; automotive components	ta-C	Monolayer	4000 - 5000	400 - 500 C°	Anthracite
Sputter/ PACVD	**M.DLC**	M.DLC	Components, automotive, forming, plastic processing	Cr/a:C-H (-Si)	Multilayer	1500 - 2500	300 C°	Anthracite
	M.WCH	M.WCH	Precision components	Cr/a:C-H-W	Multilayer	800 - 1800	300 C°	Anthracite
	M.CRN	M.CRN	Precision components, automotive application	CrN	Monolayer	2000 ± 200	700 C°	Silver Grey
HiPIMS	**M.CRN**	M.CRN	Minting dies, forming and plastic processing tools for mirror-polished surfaces	CrN	Monolayer	2300 ± 200	700 C°	Silver Grey
	M.ALTIN	M.ALTIN	Turning, minting dies	AlTiN	Monolayer	3200 ± 300	900 C°	Anthracite
	M.TIN	M.TIN	Minting dies, threading	TiN	Monolayer	2400 ± 250	600 C°	Gold
	M.TISIN	M.TiSiN	Micro stamping, cutting	TiSiN	Monolayer	3700 ± 300	1100 C°	Copper
	M.TIB	M.TIB	Cutting AlSi alloys, non-ferrous metals, fibre-reinforced materials	TiB2	Monolayer	4500 ± 300	900 C°	Silver Grey
HI3	**M.ALTINV**	M.MOTION	Stamping, cutting, metal forming, die casting, threading	AlTiN/VXN	Multilayer	2800 ± 250	600 C°	Light Brass
	M.ALTINSIB	M.SIBONICA	High oxidation resistance applications	AlTiN/SiBNC	Multilayer	2000 ± 250	1200 C°	Red Green
	M.TISINTIB	–	Cutting	TiSiXN/TiB2	Multilayer	3800 ± 200	900 C°	Silver
	M.ALTINSI	–	Cutting	AlTiN/AlTiSiN	Multilayer	3200 ± 200	900 C°	Anthracite

* We have simplified the naming of our METAPLAS.DOMINO coating portfolio. It consists of four main coating families based on the applied coating process.
The individual coating names are defined by their main composition. If you, as a long-standing customer, are familiar with the previous coating names, for now you will find them right next to the new names.

THE TOTAL COATING SOLUTION

Oerlikon Balzers ThinFilm Equipment

Oerlikon Balzers is more than just coatings: as “Surface Engineers” the company views coating as a continuous, integrated process combining systems engineering, pre- and post-treatment of tools and advanced coating technology. The only way to achieve optimum results and maximise tool performance is to take an all-round approach, and as a solution provider Oerlikon Balzers offers state-of-the-art technologies for every step in the process and consultation and support with project planning and implementation.

1
Cleaning

Clean surfaces are essential for coating adhesion. So Oerlikon Balzers invests a great deal of effort in surface preparation for PVD and offers multi-stage ultrasonic cleaning lines using aqueous alkaline baths with no environmentally harmful additives.

2
Pre-treatment

If additional pre-treatment is required, Oerlikon Balzers always uses the right technology. We offer various edge preparation and surface treatment technologies depending on your needs.

3
Coating

A broad range of coating technologies is available for almost unlimited cutting, forming, punching, metal die casting or plastics processing applications. Working in close collaboration with our customers around the world, our specialists are continuously opening up new applications. Customised coatings are available on request.

START

END

oerlikon balzers

PARTNERSHIPS & SERVICES

From our After Sales bases in Europe, America and Asia, we give you the products and services you need. Our service and application engineers around the world help you keep your equipment up and running, and our parts warehouses in Germany, Japan, China and the USA are committed to maintaining the productivity of your equipment.

Consistently High Quality

Our After Sales team is committed to providing consistently high-quality support around the world.

6
After Sales

Technical support and advice via telephone, service hotline and email. Remote diagnostics and control for even faster troubleshooting. Professional on-site support for installations, upgrades, repairs and maintenance. Engineer dispatch within 24 hours. Service agreements. New and second-hand parts, as well as consumables. Upgrades, including the latest technologies and coatings. Standard and customer-specific graphite parts.

5
Quality control

The success of a coating also hinges directly on the condition and quality of the tool. We use visual and mechanical methods to assess the coating compatibility of incoming items and to determine coating quality. As our technologies are used in a wide range of industries, we are in the perfect position to offer consultation on which quality control resources you need.

4
Post-treatment

Numerous methods are applied to give tools the finishing touches. Over the years, Oerlikon Balzers has gained the extensive experience needed to come up with the best solutions and equipment to meet your needs.

BENEFIT FROM OUR GLOBAL EQUIPMENT SALES AND AFTER SALES ORGANISATION

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