



Solutions for Metalizing.

- Lighting
- Trim-parts
- Decorative

Metalizing.

First-class industry solutions since decades.

Originally, the foundation for the Bühler Leybold Optics company's present-day success was laid by inventors Ernst Leybold and Wilhelm Carl Heraeus 160 years ago. Today, we are a globally active high-tech company, with the business area's headquarters in Alzenau (Germany) and subsidiaries in Cary (USA) and Beijing (China). Worldwide, we employ over 300 employees dedicated solely to thin-film coating applications. A top priority for us is innovation leadership in key areas such as sputtering, PECVD, plasma-assisted evaporation, machine automation and related software, as well as world-class customer service.

Bühler Leybold Optics – milestones at a glance:

- 1950's Application of metalized coatings
- 1960's Industrial applications through bell-jar batch systems
- 1970's AluMet evaporative batch metalizing system
- 1990's Development of DynaMet sputter metalizing system
- 2000's Development of PylonMet for metalizing large complex parts
- 2006 Development of DynaLine inline sputter metalizing system and vertical AluMet batch metalizing system
- 2007 Development of PylonMet for color process
- 2008 Development of CompactMet evaporation metalizing system
- 2011 Development of Atalanta evaporation system for easy-to-clean processes
- 2016 Development of DynaJet SP 710 sputter metalizing system
- 2016 Development of new generation AluMet evaporation metalizing system
- 2017 Development of DynaJet TE 540 evaporation system
- 2018 Development of DynaJet TE 800 evaporation system





As Bühler Leybold Optics we center our efforts on ensuring customers' success!



With over 160 years' experience, Bühler Leybold Optics is a leading supplier of vacuum thin-film coating technology. Our state-of-the-art solutions include: precision; ophthalmic and automotive optics applications, architectural and automotive glass for a wide range of energy saving applications, and roll-to-roll plastic film coatings for packaging, electronic and safety applications. All of our solutions are tailored for our customers' specific market demands.

We are continuously improving our core-component technology and know-how to offer 1st class coating solutions, process expertise and customer services. Presently digitalization of our products offering best solutions, as well as digitization our company to continue offering the best solutions and serving our customers most efficiently.

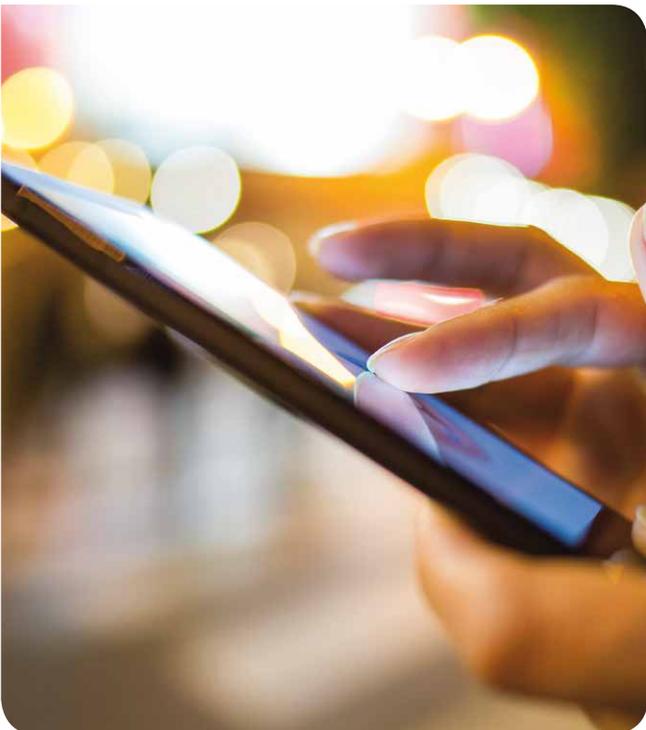
From anti-reflection coatings to complex interference filters, we support in the development of new products with optics technology. Every year we invest a significant amount on research and development to improve further our technology concerning quality, precision, sustainability, serviceability and the ecological footprint of our processes and machines. We like to welcome you in our state-of-the-art Application Center where you can test samples and processes to find the most suitable solution for your needs together with our experts.

We strive to maintain our benchmark position and to be an innovative and reliable partner for our customers.

I am looking forward to work together with you!

Sincerely yours,

Antonio Requena
Managing director
Bühler Alzenau GmbH
Business Area Leybold Optics



Leybold Optics – portfolio overview.

Solutions for every challenge.

Leybold Optics evaporation systems.



CompactMet

The CompactMet is a high-vacuum metalizing system designed for batch production of complex plastic, metal, glass and ceramic substrates.

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AluMet

The AluMet coats a high volume of complex parts in one batch with high, precise requirements for quality.

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DynaJet TE series

The DynaJet TE is a evaporation batch system for 3D coatings. The frame mounted system with its small footprint assures best production space utilization.

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Leybold Optics sputter systems.



DynaJet SP 710

The DynaJet is a sputtering batch system for 3D coatings. It is designed to achieve the lowest cost per piece, also by minimizing energy consumption. The container size mounted system optimizes your production space.

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DynaLine

DynaLine is designed for fully automated manufacturing lines with high throughput for reflectors, bezels and other parts with complex 3D geometries.

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Leybold Optics system for special applications.



DynaMet 4V

The DynaMet 4V is a fully automated, ultra-fast, load/lock type sputtering machine, which can be integrated into fully automated conveyor systems.

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PylonMet

The PylonMet combines high throughput with excellent coating results and is of particular interest for industries with demanding requirements.

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Atalanta

The Atalanta batch system is designed to meet the individual market's requirement for easy-to-clean coactions in mass production.

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ChromeLine.

The new ChromeLine system is the in-line sputtering system for electroplating-replacement.

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CompactMet. High quality metalization for complex parts.

The CompactMet is a high-vacuum metalizing system designed for batch production of complex plastic, metal, glass and ceramic substrates mainly used in the automotive industry.



1 Ergonomic human-machine interface

3 Fixtures for substrates

5 Proprietary MF-powered Electrodes

2 Door contacts

4 High-rate thermal evaporator

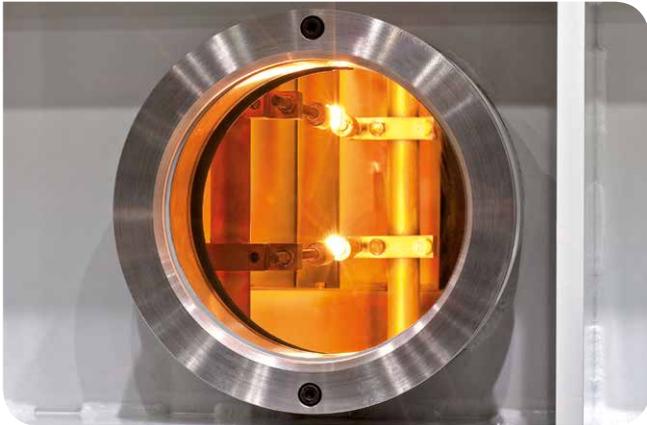
Applications:

Coating of complex plastic, metal, glass and ceramic substrates, like:

- Reflectors for automotive and vehicle lighting
- Reflectors for interior and exterior lighting
- Decorative coatings for parts like perfume bottles

Key benefits:

- Extremely reliable and low maintenance effort needed due to smart and robust design
- Efficient processing thanks to the double-door "clam shell" configuration with 2 substrate holders per door
- Well-proven key components ensure high quality end products
- Fast and easy machine transportation

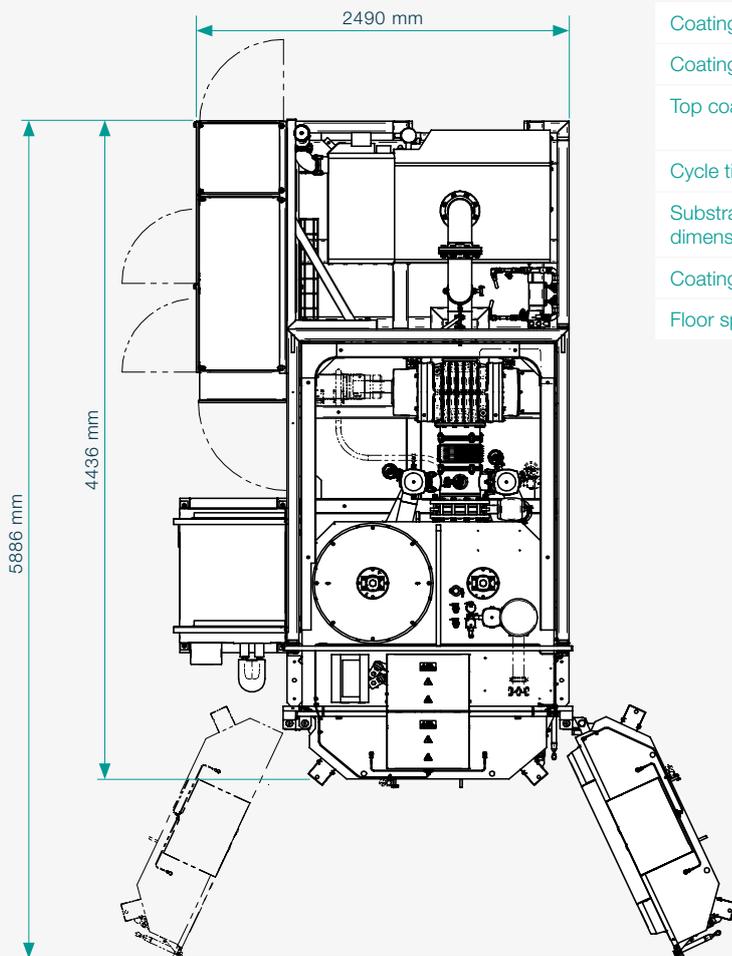


Evaporation in process



Evaporator and substrate inside the chamber

CompactMet



Technical data

Coating materials	Al
Coating technology	Evaporation
Top coat layer	Aluminium and siloxane-based polymers
Cycle time [min]	5–7
Substrate holder dimensions [mm]	1,500 × 540
Coating area [m ²]	5.1
Floor space [m ²]	30

AluMet. For a high output of complex parts.

The AluMet Batch Coater is the perfect solution for complex parts with high demands on quality. The system consistently guarantees high throughput with precise results thanks to its intuitive state-of-the-art HMI and fully automated process control.



- 1 Seven fixtures per door
- 2 Highly efficient thermal evaporators
- 3 Door contacts
- 4 State-of-the-art HMI
- 5 Double-door design

Key benefits:

- Highly efficient processing possible thanks to double-door design in vertical orientation
- Low production costs due to optimized aluminum evaporator geometries for high utilization
- High machine uptime possible due to easy accessible key components and simple maintenance
- Flexible planetary substrate holder system for a wide range of substrate types and sizes
- Ergonomic design of pylon holder system for fast and easy handling during loading/unloading of substrates
- Single-frame mounted design for fast and straight-forward installation and relocation of the system

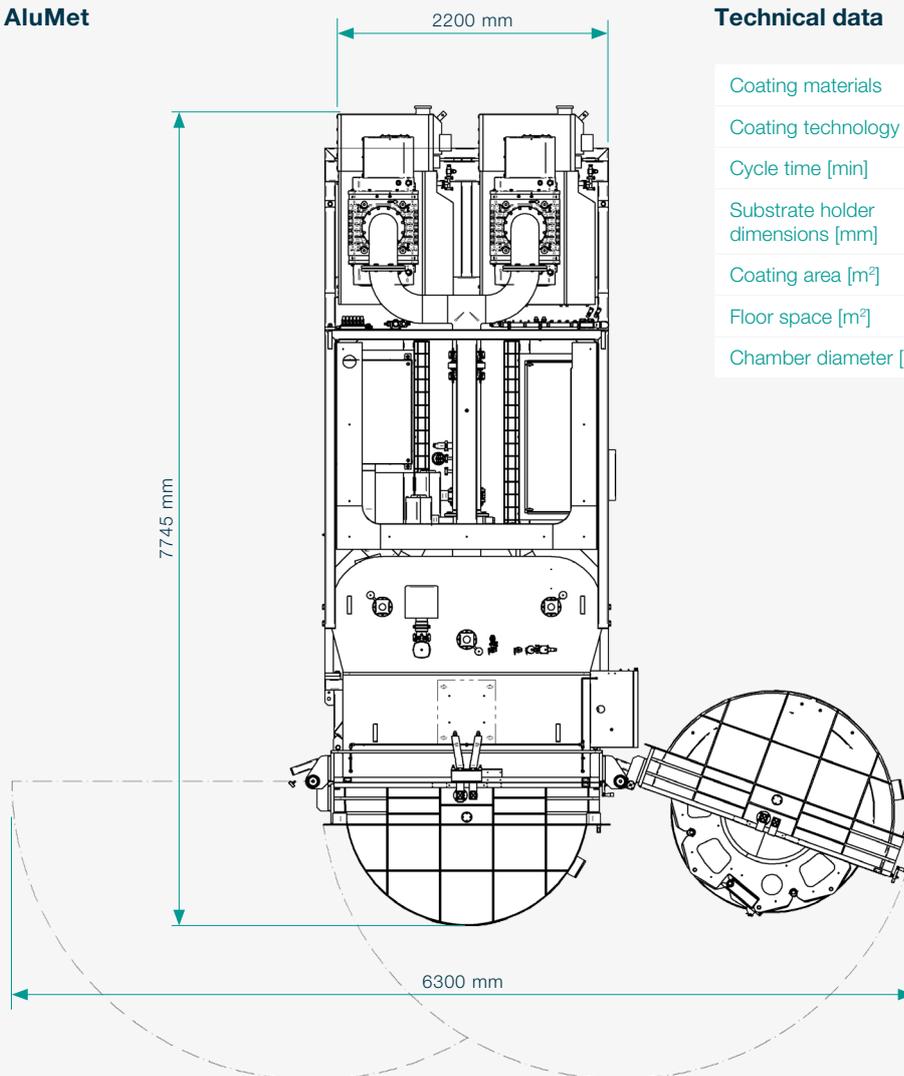


Door fully loaded with substrates

Applications:

- Reflectors for automotive and vehicle lighting
- Reflectors for interior and exterior lighting
- Decorative coatings for parts like perfume bottles

AluMet



Technical data

Coating materials	Al
Coating technology	Evaporation
Cycle time [min]	15–25
Substrate holder dimensions [mm]	1,500 × 540
Coating area [m ²]	17.8
Floor space [m ²]	49
Chamber diameter [mm]	1,900

DynaJet series – the choice is yours. **Sputtering or Evaporation?**

DynaJet is the advanced batch metalizer for all of your high quality PVD and PECVD coatings, bringing you remarkable results for various metals and alloys with low energy usage and reduced environmental impact.



Our evaporation solution. DynaJet TE 540 / 800

Applications:

- Reflectors for automotive and vehicle lighting
- Interior and exterior parts
- Color coatings by sputter processes
- Semi-transparent layer coatings
- NCVM
- Mirror coatings
- Decorative coatings for parts like perfume bottles

Key benefits DynaJet series:

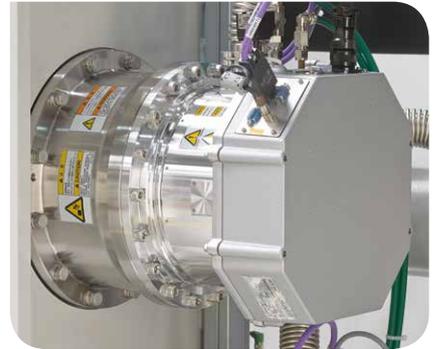
- High throughput and lower production costs
- GoGreen, save energy cost up to 80.000 kWh per year and invest in a clean future
- High production security due to redundant fore and high vacuum pumps.
- Saving floor space and transportation costs due to compact design



Modified IPT cathode

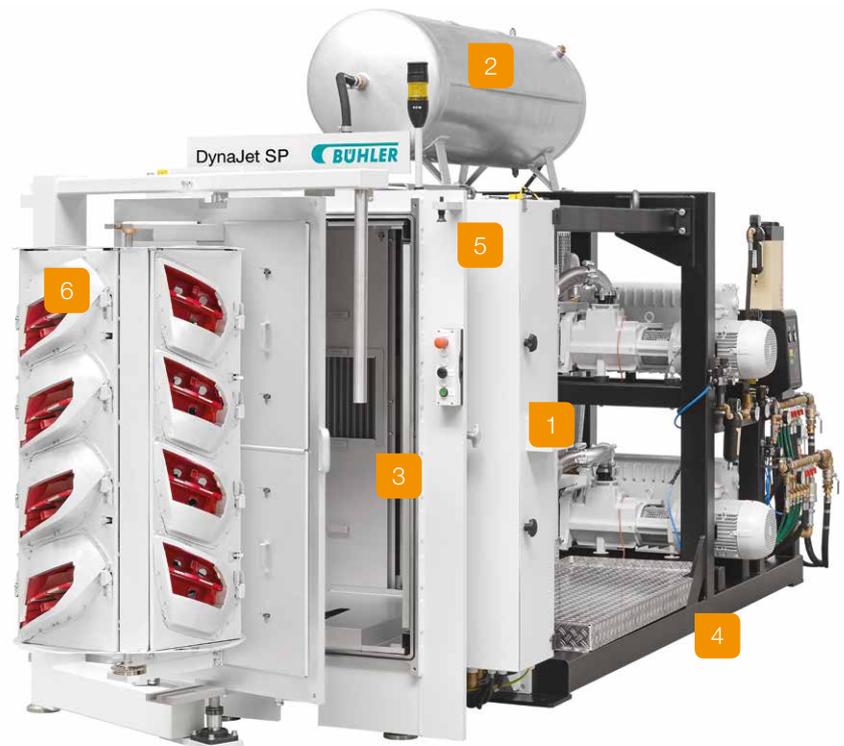


Turbomolecular pump behind cold trap



Energy saving turbomolecular pump

- 1 Two fore pumps
- 2 Dry air venting system
- 3 Electrodes
- 4 Frame mounted system
- 5 IPT cathode for sputter version
- 6 Automatic door movement (option)



Our sputtering solution DynaJet SP 710

Further Key benefits DynaJet series:

- Higher throughput due to automatic door movement for substrate load- and unloading
- Easy transport because of compact container-size layout
- Reduce maintenance efforts and service cost

Key features DynaJet SP:

- High flexibility due to sputtering of various metals, alloys, semi-transparent layer and NCVI.
- Highest Al brightness and high life time due to proven high power IPT cathode.

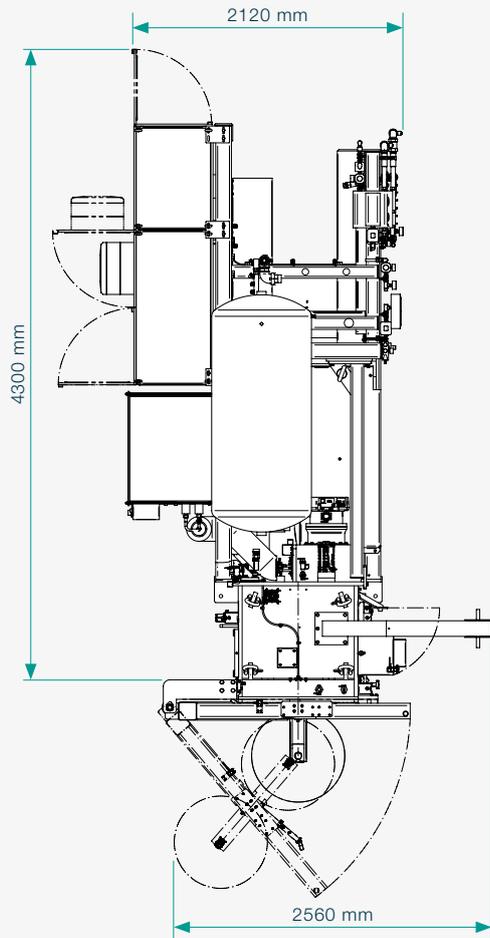
Option DynaJet:

Full automated Fixture loading – allows single-point human or robot loading of the system which enables higher throughput and lower manpower costs

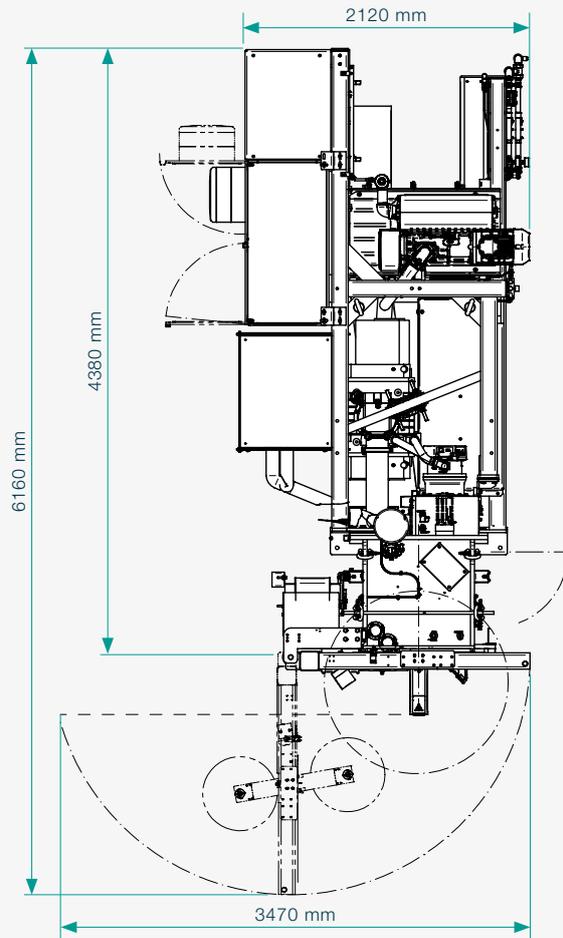
Technical data

Systems	DynaJet SP 710	DynaJet TE 540	DynaJet TE 800
Technology	Sputtering IPT	Evaporation	Evaporation
Cycle Time* [min]	3–5	3.5–5	4–7
Fixture Size [mm] [inch]	Ø 711 x 1219 Ø 28 x 48	Ø 540 x 1500 Ø 21 x 59	Ø 800 x 1560 Ø 31 x 61
Coating Area [m ²]	2.7	2.5	3.9
Coating Materials	Al, Cr, SS, Ti, Cu, Sn and many further alloys	Al	Al
Number of sources (basic configuration)	1 cathode (120 kW)	16 filaments	16 filaments
Deposition performance	Very suitable for semi-transparent coatings and complex geometries	Recommended for low to medium complex geometries	

DynaJet SP 710



DynaJet TE

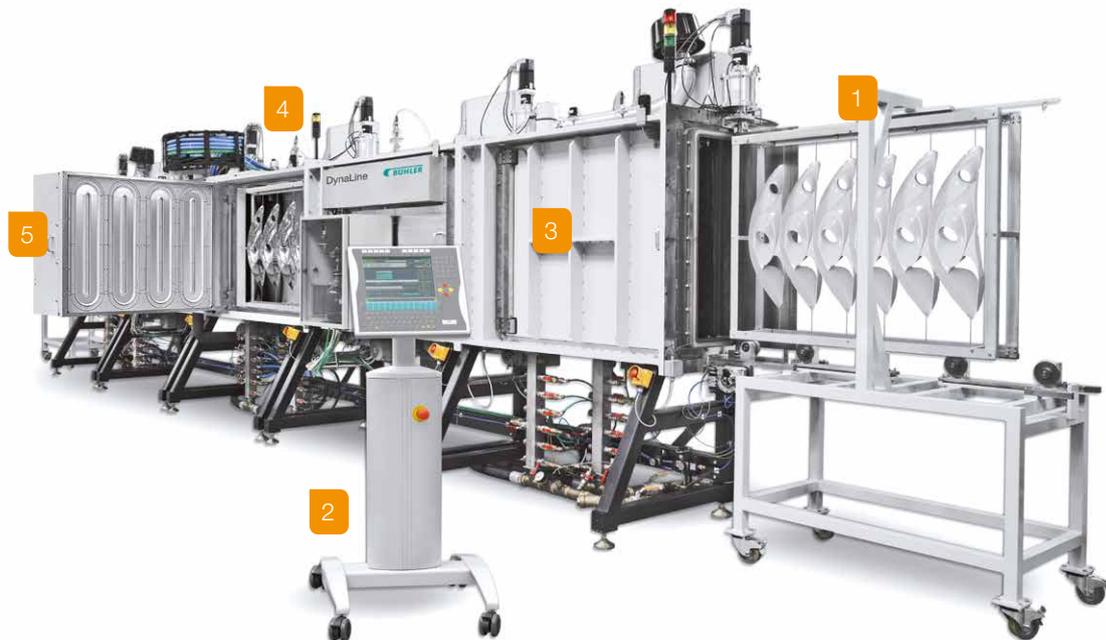




DynaLine series.

Inline sputtering for large and small parts.

The DynaLine series is a fully automated modular inline sputtering machine and is the perfect solution for coatings of complex, small or large 3-dimensional parts with high throughput. The backbone of the system is the magnetron sputter deposition with IPT (Inter Pole Targets) for the high-rate deposition of metals and the advanced MF (Mid-Frequency) PECVD (Plasma Enhanced Chemical Vapor Deposition) for the deposition of siloxane top coat.



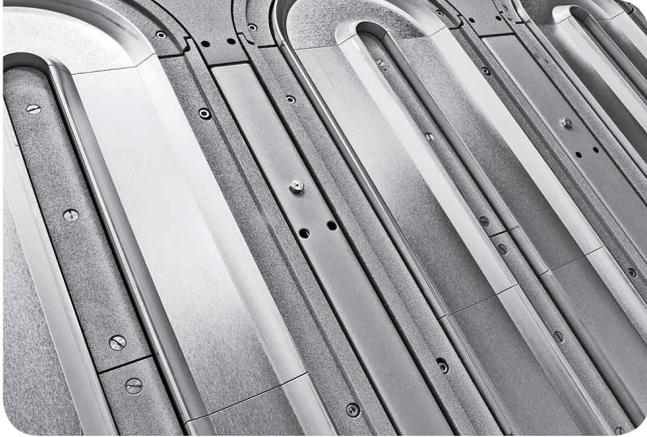
- 1 Robust carrier drive
- 2 Moveable HMI
- 3 Vacuum lock system
- 4 PECVD vacuum chamber
- 5 Worldwide proven IPT (Inter Pole Targets)

Applications:

- Large or small 3D dimensional parts with complex geometries, e.g. reflectors, bezels

Key benefits:

- High throughput production because of fully automated conveyor system
- High flexibility in machine configuration due to modular concept and flexible expansion options
- High-speed, plasma-assisted metalization with protective polymer coating of plastic and glass substrates

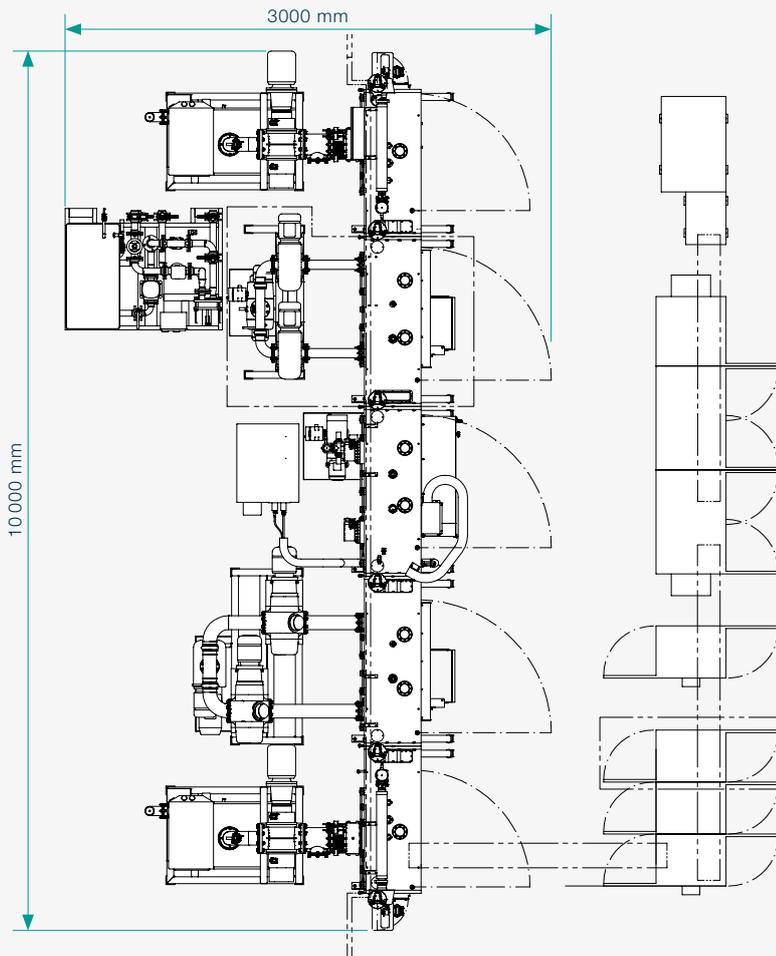


Metalization module with IPT cathodes



PECVD station with electrodes

DynaLine



Technical data

Coating materials	Al, Cr, Sn V2A, Cu, SS metal alloys
Coating technology	Sputtering
Cycle time [min]	1
Substrate holder dimensions [mm]	1,200 × 900
Coating area [m ²]	1.08
Floor space [m ²]	30 + electrical cabinet
Depth [mm]	250

Further key features:

- High-speed carrier movement between process stations
- Data logging of process data with individual carrier tracking
- Rectangular carrier for substrate transport
- Plasma polymerization assisted by MF glow system in PECVD chamber
- Al metallization by high-rate magnetron sources (IPT) in sputter chamber

Coating machines for special applications. Further sputtering and evaporation systems.

DynaMet. Fully automated vertical sputtering system.



Technical data

Coating materials	Al, Cr, Sn, Cu, Ag, SS metal alloys
Coating technology	Sputtering
Cycle time [s]	36
One carrier per cycle, usable coating area [mm]	840 × 440
Coating area [m ²]	0.39
Floor space [m ²]	30
Depth [mm]	250
PECVD	RF 13,56 MHz

Key benefits:

- Very fast cycle times, resulting in high productivity
- Sequentially substrate processing and static deposition processes
- Substrate carrier configuration -integrable into a fully automated conveyor system
- Quasi inline process approach ensures reliable and stable processes for constant layer quality

PylonMet. High-end color sputtering for just-in time processes.



Technical data

Coating materials	Al, Cr, Sn, Cu, Ag, SS metal alloys
Coating technology	Sputtering
Cycle time [min]	4–7
One carrier per cycle, usable coating area [mm]	1,270 × 750
Coating area [m ²]	3
Floor space [m ²]	14

Key features.

- High productivity due to swivel-type front door design
- 1 or 2 high performance IPT cathodes
- Shutter for cathodes
- Chamber tempering (optional)

Applications.

- Deposition of metals, metal-nitride or metal-oxide layers
- Transparent top coats
- Wipe-resistant layers
- Different color coatings

Atalanta special application system. Combining hydrophobic and oleophobic features for best easy-to-clean properties.



Technical data

Coating materials	SiOx base-coat
Coating technology	Evaporation
Cycle time [min]	8–10
One carrier per cycle, usable coating area [mm]	1,500 × 540
Coating area [m ²]	5
Floor space [m ²]	30



Anti-fingerprint coatings and easy-to-clean coatings (ETC) to complex plastic, metal, glass and ceramic substrates

Key benefits:

- High productivity thanks to flexible double-door design
- Outstanding and consistent quality of the deposited anti-fingerprint coating due to high-performance PECVD station
- Robust and smart design for high machine uptimes and reliability
- Minimum facility floor space needed

ChromeLine. In-line sputtering system for electroplating-replacement.



Technical data

Coating materials	Al, Cr, SS, Ti, Cu, Sn and many further alloys
Coating technology	Sputtering
Cycle time [sec]	150–160
Usable coating area	Ø 381 x 914 mm Ø 15" x 36"
Coating area [m ²]	1.1
Floor space [m ²]	25 + electrical cabinet

Key features.

- High productivity due to short cycle time and high throughput
- Integrated into a fully automatic conveyor system
- Go green and reduce environmental impact

Applications.

- Electroplating-replacement for plastic substrates, (which is) proved and for further materials metal, glass and ceramic prepared.
- For additional info please contact us.

Leybold Optics metalizing solutions. **Technologies at a glance.**

Evaporator systems



Screw filaments loaded with Al coils



Spring filament holder inside process chamber

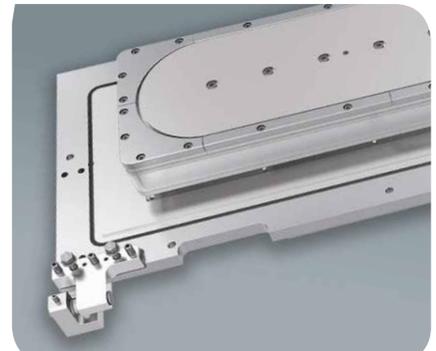
Sputter cathode systems



IPT cathode



Rotary cathode



HLK cathode

PECVD systems



High speed PECVD provides best results for distribution over the length and depth:

- Large electrode surface in optimized position
- Optimized power-electrode relationship
- Electrical supplies are available for
 - DC
 - AC
 - MF 40 kHz
 - RF 13,56 MHz

Treatments

Plasma pre-treatment, glow discharge

This process increases the adhesion by cleaning and activating the substrate surface.

Plasma Basecoat

This process improves the quality of the surface and prepares the growth of the subsequent metalization.

Metalizing by evaporation or sputtering

This process transfers the metal onto the substrate to form an optically reflective layer. Alternatively reactive sputtering can be used to modify the characteristic properties such as transparency, conductivity, hardness and color.

Plasma post-treatment, topcoat

Metal reflectors – especially aluminum – require a transparent protection layer against corrosion. Such a layer is made by plasma-polymerization of silicones such as Glipoxan™.

Surface energy adjustment by plasma post-treatment

Depending on application requirements, a high (hydrophilic) or low (hydrophobic) surface energy is required. This is reached by plasma post-treatment steps.

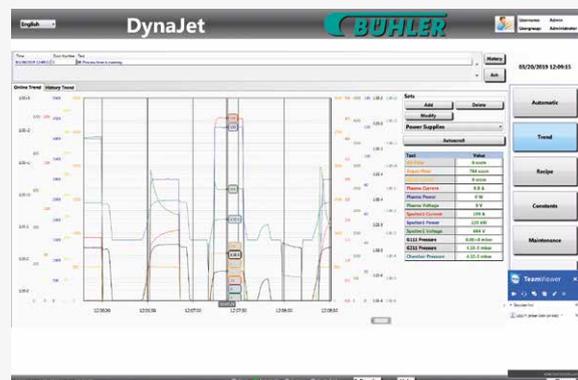
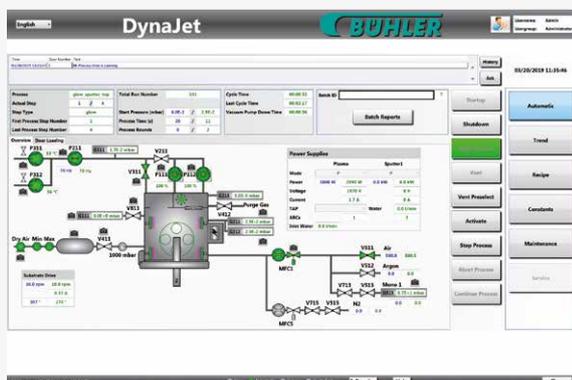
Software features

Process control software (PLC)

Configurations are available with modules of Beckhoff, Siemens and Allen Bradley.

Human machine interface visualization

- Touch screen monitor for quick operation
- Batch report for fast production overview
- Trend view to visualize both historical and actual data as graph
- Data logging for complete analysis



CS 4.0 – from customer support and service to customer solutions.

Bühler is where the customer is – connecting machines worldwide to our specialized centers.

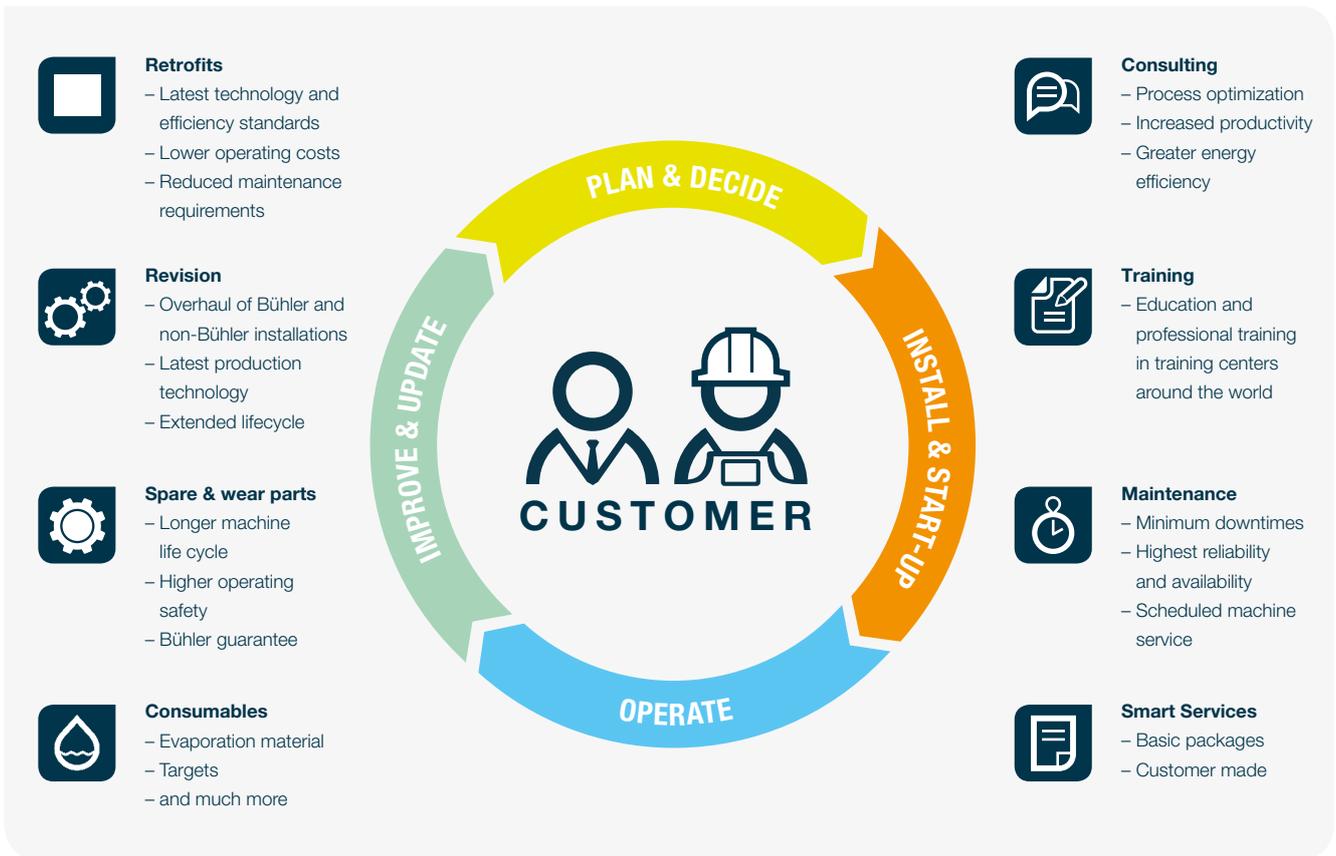


Bühler Leybold Optics' relationship with its customer does not end when the machine is delivered, this milestone is the start and continuation of a close partnership. Wherever our customer is, there is Bühler to provide the best services to keep the machine running attending customer specifications. With a constant roll out of unique and innovative solutions, Bühler helps customers achieve success in the marketplace.

Bühler's commitment to its customers:

- Ensuring right support by running your machine in the most efficient way
- Creating customers experience
- Designing customer solution
- Creating customer success





Smart Service Packages
 Bühler Leybold Optics has smart packages adapted to your needs.

We offer annual contingency allowance of hours, which can be selected in different packages: Bronze, silver and gold or even total care.

Need something different?
 We will design the ideal service contract to fit your requirements.

Helpdesk – Follow the sun
 Always available during business hours. Contact the Helpdesk of your local service or at headquarters. Problems are analyzed immediately via remote diagnosis.

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IoT – CS 4.0
Anytime and anywhere
 Optimize your production by using our IoT solution.

Connecting your machine to the cloud can give you the possibility to verify machine status and adjust problems.

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