SAFECHEM
be responsible

COATING SPECIALIST WOHLRAB ACHIEVES HIGH-PRECISION OPTICS CLEANING

Customized ultrasonic cleaning processes as a critical enabler

CONTEXT

Wohlrab Aufdampftechnik GmbH is a specialist of advanced coating technologies. With decades of coating experience, the German company is known for its expertise in Physical Vapor Deposition (PVD) and Plasma-Enhanced Chemical Vapor Deposition (PECVD) coatings.

Wohlrab offers a broad range of coating solutions across different industries, including biocompatible coatings for medical devices, decorative automotive coating, and functional coatings for precision optical components like lenses and mirrors.

Their services also extend to sophisticated robotic painting, pad printing, and nano-coating techniques, which are used to meet stringent industry requirements.

wohlrab
Tailored Coatings

COMPANY

- Wolhrab – Specialist of advanced coating technologies

CHALLENGE

- To clean various optical components to the highest standards within a single system, ensuring readiness for subsequent coating processes

SOLUTION

- Multi-stage automated ultrasonic cleaning system (PerformanceLineS) from UCM
- Customized cleaning processes developed by SAFECHEM, based on its portfolio of aqueous cleaning agents (HYDRENE™)

RESULTS

- Reliable and fully adaptable cleaning processes for a wide range of optical applications
- Effective cleaning of various optics including float glass, quartz glass as well as sensitive lenses such as heavy flint and heavy crown glass

CHALLENGE

For the optical sector, Wohlrab offers tailored technical solutions including:

- Optical coatings
- Anti-glare coatings
- Highly reflective coatings (e.g. enhanced aluminium, protected silver)
- Scratch resistant coatings of plastic panels (sol-gel coatings)
- Easy-To-Clean coatings (nano coating)
- Semi-transparent coating

Example application areas include anti-glare technology for displays, high-reflective coating for LED-lighting, UV mirrors for measurement instruments as well as IR mirrors for gas detectors.

As a job coating contractor, Wohlrab handles a wide range of delicate optical objects, such as laser optics, lenses, prisms, mirrors, quartz and IR glass. These components require stringent cleaning to ensure coating performance and adhesion. Any residual contamination, including particles (e.g. dust, dirt), organic contaminants (e.g. fingerprints, oils) or inorganic deposits (e.g. polishing agents, residues from storage) can lead to coating defects, delamination or non-uniformity.

Moreover, the cleaning process must avoid any surface damage and be compatible with the substrate materials.

Wohlrab needed a reliable and flexible cleaning set-up capable of servicing their diverse optical components within a single system, while meeting stringent cleanliness standards suitable for subsequent coating processes.

SOLUTION

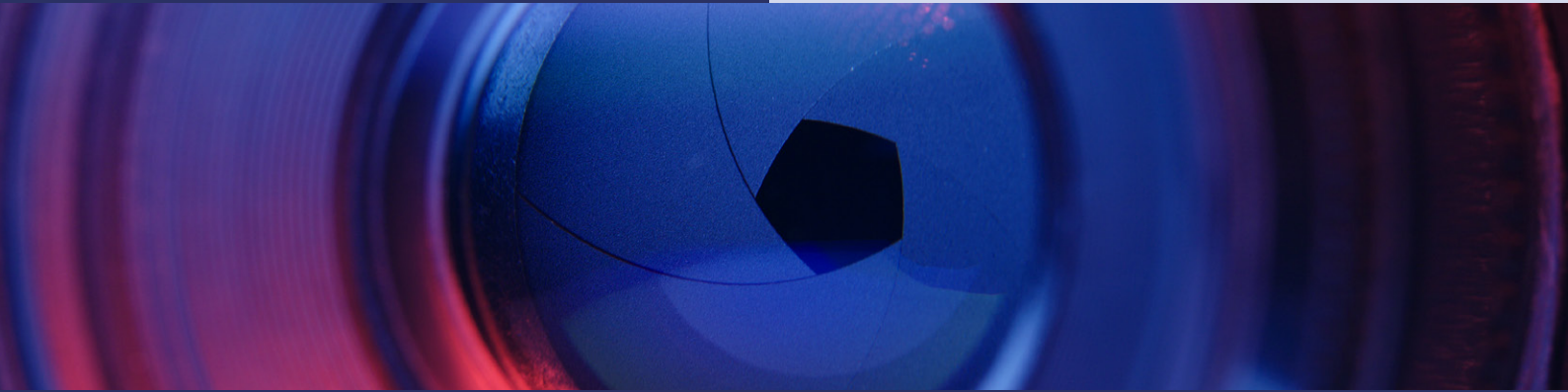
Given the highly demanding nature of optics cleaning, achieving optimal results requires a precise combination of advanced machine technology, appropriate cleaning media and tailored processes.

To meet these requirements, Wohlrab invested in a state-of-the-art, multi-stage ultrasonic cleaning system (PerformanceLineS) from UCM, a renowned manufacturer of cleaning machines for precisions optics.

Installed in a cleanroom, the fully automated cleaning line features a total of 9 immersion tanks for cleaning and rinsing. The sophisticated modular design enables the system to be uniquely adapted to meet any application or requirement.

Various treatment parameters such as ultrasonic cleaning, DI rinsing as well as different drying methods (e.g. HEPA-filtered hot air, vacuum, infrared) can be flexibly selected and applied to address specific tasks.

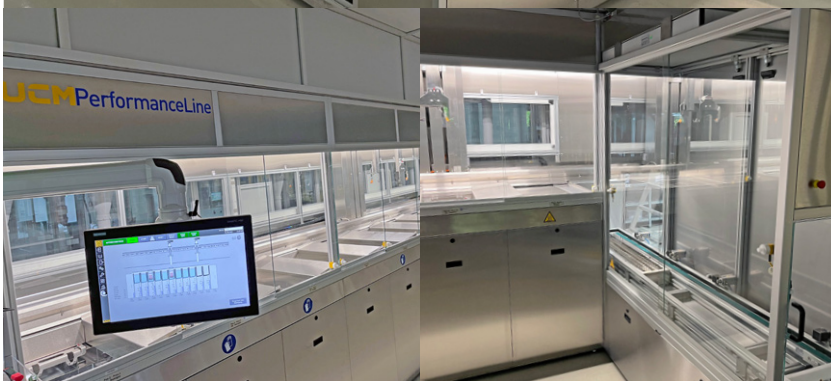
The tailored cleaning processes have been devised through meticulous consideration of various factors, including cleanliness standards, substrate materials, types of contaminants and required throughput, ensuring the precise selection and combination of cleaning media.



Leveraging the versatility of the machine, cleaning solution specialist SAFECHEM together with the industry expert Dr. Quintus Khuen collaborated closely with Wohlrab and UCM to develop a number of customized cleaning processes utilizing its aqueous cleaner portfolio (HYDRENE™). These tailored processes differ in their choice of cleaning solutions and the number of process steps involved. They have been devised through meticulous consideration of various factors, including cleanliness standards, substrate materials, types of contaminants and required throughput, ensuring the precise selection and combination of cleaning media.

Thanks to the flexible programming capabilities of the UCM's machine, Wohlrab can select the most appropriate cleaning process to meet the specific application requirements.

Multi-stage automated ultrasonic cleaning system (PerformanceLineS) from UCM.



EXAMPLE CLEANING PROCESSES

FINE CLEANING / READY FOR COATING

Ultrasonic cleaning HYDRENE™ PC 12.04	Ultrasonic cleaning HYDRENE™ PC 09.01	Rinsing	Ultrasonic cleaning HYDRENE™ PC 06.05	Rinsing	Rinsing with deionized water	Rinsing with deionized water
	Ultrasonic cleaning HYDRENE™ PC 12.03	Rinsing	Ultrasonic cleaning HYDRENE™ PC 10.06	Rinsing	Rinsing with deionized water	Rinsing with deionized water

SHORT FINE CLEANING / FINAL CLEANING

			Ultrasonic cleaning HYDRENE™ PC 10.06	Rinsing	Rinsing with deionized water	Rinsing with deionized water
				Ultrasonic cleaning HYDRENE™ PC 10.06	Rinsing	Rinsing with deionized water

RESULTS

The consultative and collaborative approach between Wohlrab, UCM and SAFECHEM resulted in a high-performing cleaning operation with efficient, customized and fully adaptable processes for a wide range of optical applications.

The leading-edge machine technology, complemented by the refined combination of cleaning agents, now enables the effective cleaning of various optics, including float glass, quartz glass as well as sensitive lenses such as heavy flint (SF, etc.) and heavy crown glass (SK, SSK, PSK, etc.).

BEFORE AND AFTER CLEANING

SENSITIVE GLASS (E.G. SF6)

BEFORE AND AFTER CLEANING

QUARTZ GLASS

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