Optics Balzers

The innovative and independent industry partner for the development and production of coated optical components and subassemblies.

In close collaboration with our customers, we design and manufacture optical coatings and components by adhering to strict specifications and maintaining high quality standards. Following market and technology trends in the photonics industry, we develop and offer advanced thin-film coating solutions for novel customer products and applications.

Pursuing this strategy for over 70 years has made Optics Balzers a worldwide market and technology leader for optical thin-film coatings.

Production Balzers, Liechtenstein
Production Jena, Germany
Production Penang, Malaysia
2016  – 70th Anniversary of Optics Balzers
2015  – Transfer to new production building Otto-Eppenstein-Strasse in Jena
2012  – Transfer to new production building Neugrüt in Balzers
2010  – Notch and steep edge bandpass filters for biophotonics and space applications
   – Acquisition of mso jena Mikroschichtoptik GmbH New brand: Optics Balzers Jena GmbH
2009  – Incorporation of Optics Balzers AG
   – B-stage Epoxy sealing solution for sensor lids
2005  – Wafer Level Optical Packaging solution for low-defect sensor lids
   – Grating based Planar Waveguide Biochip sensors
2000  – Start of production of low-defect sensor lid coatings
1998  – Founding of mso jena Mikroschichtoptik GmbH by former staff of the Fraunhofer Institute
1995  – Introduction of Magnetron Sputtered optical filter coatings
1990  – Corrosion resistant Silflex™ silver mirrors with enhanced reflectivity
   – Production of laser mirrors with Ion Beam Sputter Deposition
1979  – Low-defect chromium coatings for semiconductor mask blanks
1975  – Start of production of conductive transparent coatings
1965  – Market introduction of Iralin™ broadband antireflection multilayer coating
1955  – Patent for reactive evaporation process for multilayer optical coatings
   – Market introduction of Transmax™ double-layer anti-reflection coating
1946  – Founding of Balzers company for production of optical thin-films by Dr. Max Auwärter, Prince Franz-Josef II of Liechtenstein and Emil G. Bührle

Prince Franz-Josef II of Liechtenstein  Emil G. Bührle  Dr. Max Auwärter
Optics Balzers

Enabling Innovative Optical Solutions
Innovation is part of our tradition

It was at the suggestion of reigning Prince Franz Josef II of Liechtenstein that Dr Max Auwärter – in cooperation with Emil G Bührle – founded the company Balzers in the village of Balzers, in the Principality of Liechtenstein, in 1946. At that time, the technology of vacuum deposition was still in its early stages. With very few exceptions, high vacuum systems were being used only in research laboratories.

Due to the lack of commercially available high vacuum equipment, Balzers had to design and build most of the required vacuum components, equipment and systems necessary for the development of its novel and proprietary thin-film coating processes.

Today, Optics Balzers is a globally recognized leader in customized optical thin-film coatings and components for the photonics industry. The company possesses broad and in-depth know-how in optical thin-film coating processes, complemented by sophisticated patterning, glass bonding and sealing, and further processing capabilities necessary for producing optical thin-film coated components up to optical subassemblies. Highly experienced and skilled development and engineering teams collaborate closely with customers to develop innovative solutions meeting their specific requirements. The combination of these capabilities and skills places Optics Balzers at the forefront of markets in the photonics industry such as Automotive, Biophotonics, Laser, Space & Defence, Lighting & Projection, Industrial Applications, and Sensors & Imaging.

The continuous innovation, quality improvements and additions of expertise and production sites in Liechtenstein, Germany and Malaysia by Optics Balzers, will continue to support customers’ innovative product development efforts with Optics Balzers as a trusted, reliable, and innovative partner.
Optical Coating Technologies
Manufacturing high quality optical coatings requires sophisticated process technology combined with in-depth process know-how.

Optics Balzers utilizes several advanced coating technologies for all major thin-film coating types used in the precision optics and photonics industry. A broad range of processes individually optimized for the various coatings and the customer’s specific requirements are used for manufacturing of optical components. State-of-the-art facilities with clean room environments together with tailor made cleaning technologies to prepare the surfaces ensure high quality and consistency of the coatings. Spectral photometry and various other inspection methods are used to ensure that all customer specifications and requirements are met.

All these processes are operated by skilled and well trained operating personnel, supervised by experienced engineering staff.

Evaporation (e-beam and boat sources)
- Highly versatile in materials
- Flexible in substrate shapes
- High quality for antireflection coatings
- High quality for metal coatings
- Medium quality for demanding dielectric filters

IAD Evaporation (Ion Assisted Deposition)
- Evolution of evaporation technology combining the advantages of evaporation technology with plasma processing
- High quality precision filter and antireflection coatings
- Reduced process temperature
- Low-defect optical coating processes
- Plasma pretreatment of substrate surface

IBS Deposition (Ion Beam Sputtering)
- Highest quality coatings for laser mirrors and filters
- Very smooth and dense layers with minimum optical loss
- Very good reproducibility and consistency of coating quality and optical performance
**Magnetron Sputter Deposition**
- High quality dielectric filter coatings in volume manufacturing
- High precision and consistency allowing demanding spectral characteristics with narrow spectral tolerance
- Excellent spectral stability and durability
- Optimized for standard sheet substrates
- Low process temperature < 100°C

**Plasma-Assisted Reactive Magnetron Sputter Deposition**
- Increased process stability, layer thickness accuracy, and index homogeneity compared with the standard Magnetron Sputter Technology
- High LIDT laser coating
- Suitable for thicker coatings with up to 30 µm overall physical thickness and 300 layers
- Lowest achievable micro roughness
- Rapid-prototyping regime applicable for very complex coating designs, too
- Low surface contamination by load lock concept
- High environmental stability
CoatingPlus™: More Than Just Coating
Sophisticated optical thin-film components and sub-systems require additional process steps beyond coating.

Most advanced thin-film optical components require various additional process steps beyond dedicated coating processes to achieve their full functionality and performance in customer specific applications.

**Patterning Solutions**
Optics Balzers offers patterning solutions for high quality optical components. Depending on the product and its applications, various patterning techniques such as photolithography, laser ablation or masked coatings are available to meet a broad range of customer requirements for feature sizes and shapes. The lift-off technology allows the deposition of filter arrays onto cover glasses or directly onto photodetector wafers.

**Marking Solutions**
Application of thin-film optical components may require unambiguous marking and labeling, either on the substrate surface or on the coating. The pattern can be generated according to customers’ specific needs.
Bonding and Sealing
In various applications, thin-film optical components need to be precision-mounted on other components such as sensors or subassemblies. Optics Balzers offers both epoxy bonding patterns as well as solder seed layers with a hermetic sealing quality.

Glass Processing
Efficient light management requires ultra precise surfaces. Therefore, Optics Balzers continuously extends the limits of its polishing and glass handling capabilities. Our experience is based on the manufacturing of products where exceptional surface quality is essential. Further, Optics Balzers applies semiconductor cutting technology on coated glass wafers. This is the way to provide cost effective high volume components with small dimensions.

Varnishing
High-accuracy dispensing technologies enable continuous or selective blackening of optical parts and complement the low reflection, high absorption coating portfolio from Optics Balzers.

Subassembly
Optics Balzers offers customized optical subassemblies to support its customers’ ever increasing demands. We develop individual solutions for and together with our customers.

Volume Production
The utilization of high-tech singulation equipment paired with sophisticated manufacturing processes allow for a cost-effective mass production of optical parts with small physical dimensions.

Packaging and Handling
Customized packaging and shipping ensures top quality in surface protection and cleanliness during transportation and in subsequent process steps at the customer’s site.

Development Partners
Optics Balzers relies on strong partnerships. Therefore our competence centers in Liechtenstein and Germany count on the close cooperation with scientific institutes, universities, and colleges. Those partnerships allow our teams of engineers to develop innovative solutions, tailored to the individual requirements of our customers.
We possess comprehensive know-how in optical thin-films, glass processing, photolithography and the production of multiple part components up to optical subassemblies. Our complete range of products and services caters to the precision optical industry and related fields in other application markets, including all the required optical components and assemblies as well as engineering assistance. As a fast, flexible and reliable supplier, we are eager to fulfill or even exceed your demanding requirements for quality, performance and delivery schedules.

Our optical components are manufactured in clean room environments with adapted state-of-the-art vacuum evaporation equipment or advanced high throughput sputter coating systems. A large variety of backend processes for patterning, shaping and dicing complement our manufacturing technology portfolio.
Coating Service
Your preferred supplier for precision optics and more

Optics Balzers has combined reliable coating services with a full range of technology and solutions to support your business needs for over 70 years. Make the Optics Balzers coating center your preferred supplier for up-to-date thin-film technology for precision optics and more.

Typical Coatings
- Iralin™: an antireflection coating to minimize reflection loss
- Broadband-AR: for example Triolin™
- Laser-AR: for example Laser Transmax™, Duolin™
- Metallic coatings: Silflex™, Alflex™, Goldflex™, etc.
- Black-Chrome: absorbing layer for the visible range
- Gelot™: a solderable gold coating, either patterned or on the whole substrate
- Patterning: all the various coatings can be patterned as well

Our strengths in the field of coating services
- Fast turnaround
- Very extensive know-how in the field of substrate cleaning and application of advanced cleaning processes
- Continuous monitoring of reliable coating processes by experienced coating engineers
- In-house tool design and specialized tool manufacture using CNC-controlled equipment
- State-of-the-art systems engineering and advanced measurement processes
Attractive Markets
Unlimited applications for your high-tech markets

Are you looking for a concrete solution for optical components and their coatings to increase the performance and reduce the manufacturing cost of your products? Your challenge is our motivation! Our extensive expertise in a wide variety of high-tech markets simplifies the transfer of technology to ever-new segments.

Automotive

- Optical Sensors
- HUD

As requirements for road safety and vehicle comfort increase, the demand rises for driver assistance systems based on intelligent high-tech sensor and camera technology. With precision optics from Optics Balzers innovative systems become a reality. Filters for optical sensors and ultra-thin high performance coatings are key components for the latest generation of near infrared-based active night vision systems, lane departure assistance, adaptive cruise control and head-up displays.

Biophotonics

- Biochips
- Fluorescence Filters
- MedTech
- Endoscopes

Optics Balzers provides BioChip substrates for a broad application range both in fluorescence as well as label-free detection platforms. Our products include low defect glass substrates with customized metal or dielectric coatings as well as photolithographic patterning in the micro and nanometer range. Steep-edge bandpass and notch filters are key factors for highly-sensitive fluorescence detection. Optics Balzers designs sophisticated interference filter and precise coating processes for demanding customers. Customers use Optics Balzers’ components in their systems to guarantee homogeneous and accurate illumination, effective temperature control and correct color rendering. Safety filters for ophthalmologic surgery stand out by narrow-band blocking of the laser wavelength and by optimized color rendering.

Combiner Head-Up Display

Fluorescence Microscopy
Emerging Markets
Shaping the century of the photon
Photonics is one of the most important key technologies for markets in the 21st century. The marriage of photonics with other technologies, including electronics, materials science, manufacturing and biotechnologies, has enabled a vast and ever-expanding array of components, devices and processes that are key enablers of larger systems. Optics Balzers has a more than 70 year old history showing innovative contributions and solutions for emerging markets. Our marketing, engineering, and R&D teams are committed to continuing this tradition.

Industrial Applications
- Automation
- Instruments
We develop a close working relationship with our clients, creating a better understanding of customer needs. This deep insight enables our engineering team to deliver powerful, customized, comprehensive solutions for a surprisingly large number of different market segments and applications. Our coated optical components enable Photonics to work for industrial automation, analytical and measurement instruments, and countless other applications.

Laser, Space & Defence
- Laser
- Space
- Defence
In laser, space & defence applications highest optical spectral performance in combination with outstanding stability requirements are frequently needed. Optical components are designed specifically to meet these demanding requirements, using state-of-the-art coating technologies such as IAD, IBS and advanced magnetron sputtering. For these demanding applications Optics Balzers develops and manufactures a wide variety of product groups according to customer specifications, such as multiband filters and AR windows, precision optics and laser components with high laser damage threshold, as well as display windows.

Machine Vision
Micromachining
Attractive Markets
Unlimited applications for your high-tech markets

Lighting & Projection
- Projection
- Near-Eye Displays
- Micro Displays

Consistent, exact colors, special effects and best heat-light management in every possible environment have become a vital part of digital projection, 3D cinemas, home entertainment, shows, events, surgical lights, product presentation and several other technical applications. Leading projector, entertainment, architectural and surgical light manufacturers rely on Optics Balzers’ color filters, patterned filters, hot mirrors and UV blockers to provide reliable, durable and precise colors, and to ensure moderate temperatures in every application. The integration of Optics Balzers’ customized as well as standard optical components will result in an efficiency and quality boost.

Sensors & Imaging
- Sensors
- Moving Heads

Silicon based devices such as MEMS, CCD/CMOS sensors or LCOS microdisplays are packaged with cover glasses. These cover glasses consist of clean surfaces plus functional coatings – such as AR coatings, bandpass and edge filters, NIR blocking filters or index matched ITO. These functional coatings can be patterned according to customer specification, e.g. for spectral masking of photo detectors.
Optics Balzers also supports packaging solutions by applying chrome apertures, solderable or b-stage epoxy frames. A key factor of sensor lids is superior low defect properties of the coatings as they define the quality of the device. Sealing or bonding solutions for the subsequent assembly process are an integral part of the products offered.

Near-Eye Display

Camera – Optical Imaging
Customer satisfaction is our most important yardstick for measuring the quality of our work. We therefore give a high priority to customized solutions. Our customers define the product quality they need down to the last detail in cooperation with our interdisciplinary teams. These requirements govern the development of our products and services. This close cooperation ensures that we deliver what our customers need – helping make them more competitive in their own markets. Of course, we also guarantee our customers a high level of supply readiness and absolute on-schedule deliveries.

In addition to general standard requirements (e.g. ISO 9001, 14001), we also fulfill customer-specific requirements in the fields of automotive and medical technology.
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