Individual coating solutions for your optical components
Our innovative ideas and applications allow us to respond to our customers’ challenges. We see ourselves as a reliable and professional industrial partner. We not only know how to transfer technical requirements into final products, but also how to provide our clients with in-depth consultation to achieve the most economical solution.

Reliable order processing, a high degree of flexibility and comprehensive specialist knowledge are all a guarantee for a long-term, cooperative partnership.

We will take your idea and find the right way to turn it into a finished product.

Philosophy

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What we can do for you

S1 Optics GmbH is both a supplier of high-quality coatings and a provider of complete solutions. We develop and produce optical functional layers on glass, metal and plastic substrate materials – and we can offer you dielectric and metallic coatings alike.

Moreover we provide our customers with the complete process chain: From advising you and designing a tailor-made solution right through to procuring and coating materials and providing optical measurement technology for your individual items or series products.

We make your product vision a reality!

In doing so, we supply you with components which are optimised to your requirements, fulfills the desired reflection and transmission specifications with its functional layers and thus achieves the desired operational capability.

3
As a service provider, we place great emphasis on tailored, customer-specific coating solutions. Various substrate sizes, shapes and materials open up a wide range of new product possibilities with a vast spectrum of optical functional layers.

By the optimum combination of all components, we realise high-quality coatings for you on optical and technical glasses, plastics and metals.

We use our qualified cleaning processes when doing so, not to mention our expertise in the field of PVD-coating and ion-beam sputtering (IBS). This guarantees the very highest quality and operational reliability of your products, even for particularly demanding requirements such as laser, diagnostic and measurement applications.

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**Quality management**

S1 Optics designs and produces application-oriented, state-of-the-art technical solutions which aim to bring customer-specific benefits. To do so, we use our long-time experiences and qualifications:

- Certification according to DIN EN ISO 9001:2008
- In-house research and development
- Measurement laboratory for quality assurance and qualification
- Intensive cooperation with partners, universities and institutes for continuous technological improvements

The ongoing enhancements of our technology and consequent cooperation with our customers and business partners are a cornerstone of our success.
The use of dielectric - and therefore almost absorption-free - coatings allows the production of mirrors having a reflection level of more than 99.99%. Such dielectrically coated mirrors are further characterized by a high laser-damage threshold, in addition to increased hardness and good chemical resistance.

Metal mirrors are manufactured in a high vacuum by evaporation of a highly reflective material such as aluminium, silver or gold, to form a thin metallic layer at the substrate material. The substrates generally consist of glass or ceramic, although other materials can also be coated. The optical properties of metal mirrors are constant over a wide spectral range. They are only marginally dependent on the angle of incidence and have a low polarisation effect.

Anti-reflective coatings, also known as AR or anti-glare coatings, are used to minimise the reflection on the surface of an optical medium for a specific wavelength or wavelength range. The manufacturing process for reflection-minimising coating systems involves the application of dielectric - and therefore almost absorption-free - coating layers in a high vacuum using the PVD process. This enables residual reflection values of < 0.5% to be achieved. Even lower residual reflection can be achieved by the use of the ion-beam sputtering (IBS) technology. AR coatings manufactured in this way are very dense and even show broadband reflection values of < 0.2% – and even as low as < 0.05% for individual wavelengths.

The benefits of anti-reflection coatings on optical components include the following:

- Increase in the transmission of optical systems due to minimisation of energy losses
- Suppression of stray light and interfering reflections in imaging systems
- Avoidance of double images caused by multiple reflections, for example on window or prism surfaces

Optical functions

- HR
- Selective mirror

Examples of applications

- Dental mirrors for medical applications
- Laser applications
- Measurement technology
- and many more.

Optical functions

- AR

Examples of applications

- Sensor systems
- Protective windows
- Laser windows
- Optical components
- and many more.
At S1 Optics, the metallisation of substrate surfaces takes place by vapour-depositing metals such as aluminium, silver or gold in a high vacuum to build a thin layer on the substrates. These layers are less than 1 µm thick, meaning that the parts are still accurate to shape after the coating process.

Here, the substrates which are to be metallised usually consist of glass or glass-ceramic material. However, metals, ceramics or certain plastics can also be coated in this manner.

The broadband reflective properties of metallised parts mean that they can often be found in very large mirrors, such as those used in astronomy. However, metallisation is also used to enhance the value of products by improving their reflective properties or applying decorative surface effects.

For producing:
- Short-pass filters
- Band-pass filters
- Notch filters
- Long-pass filters
- Multi-band filters
- Beam splitters

Ion-beam sputtering (IBS) is used to achieve extremely steep filter edges, excellent blocking properties, or for Multi-band filters.

For this purpose, we use state-of-the-art IBS technology, which facilitates the production of very dense, smooth and defect-free layers for high-end optical applications.

The coatings realised using this process offer advantages such as the lowest possible losses due to scattered light, very high thermal and climatic stability of the optical parameters in addition to a high degree of mechanical stability.

Highly reflective coatings produced using the IBS technology are able to achieve a blocking level of up to OD 6 and also gives the advantage of high laser-damage thresholds.

Furthermore, highly efficient beam splitters can be realised – for example beam splitters with 50% / 50% +/-1%.

**Optical functions**
- Absorber
- HR

**Examples of applications**
- Laser scanners
- Mirrors for use in astronomy and space-based applications
- Automotive sector
- and many more.

**Optical functions**
- Band-pass
- Short-/Long-pass
- Beam splitter
- Notch filter

**Examples of applications**
- Beam splitters for automated quality assurance in production
- Band-pass filters for various laser wavelengths, for biomedical sciences
- Measurement technology
- Video projectors
- and many more.
Consultation
We define the required properties in coordination with you and suggest suitable substrate materials and layer systems.

Simulation
Before manufacturing prototypes, we show you which properties you can expect your chosen configuration to exhibit.

Development of layer systems
We design and simulate the properties of a layer system in accordance with your requirements.

Sample coating
Practical evaluation is conducted after the layer development process. The substrate materials you have chosen are coated and measured in the course of a sample run to verify the specified properties.

Coating
We undertake series-production coating of the optical components on your behalf – including all accompanying processes that may be required.

Analytics
We offer analysis of optical coatings in accordance with customer requirements or common quality standards. Our measurement methods and tests include:
- Spectroscopy
- Optical microscopy
- Climate tests conforming to DIN/ISO standards
- Layer quality conforming to DIN/ISO standard 9211

Customer service
We aim to provide the very best service, starting with our initial contact with you: We examine your request in order to identify how to realise the best solution beside an optimum cost-benefit ratio and will suggest alternative solutions if required. Alongside our core area of expertise in coating technology, we develop and design the layer system, conduct sample coating leading to the qualification of your product and provide all technical processes required for coating in series production.

Services
We offer you a wide range of measurement services beside our portfolio of coating services.

Additional services
- Procurement of substrate material
- Qualified cleaning processes
- Machining tasks (cutting, engraving, marking)
- Special packaging
- and many more.

www.s1optics.com

Come and talk to us about your requirements - we love a challenge!