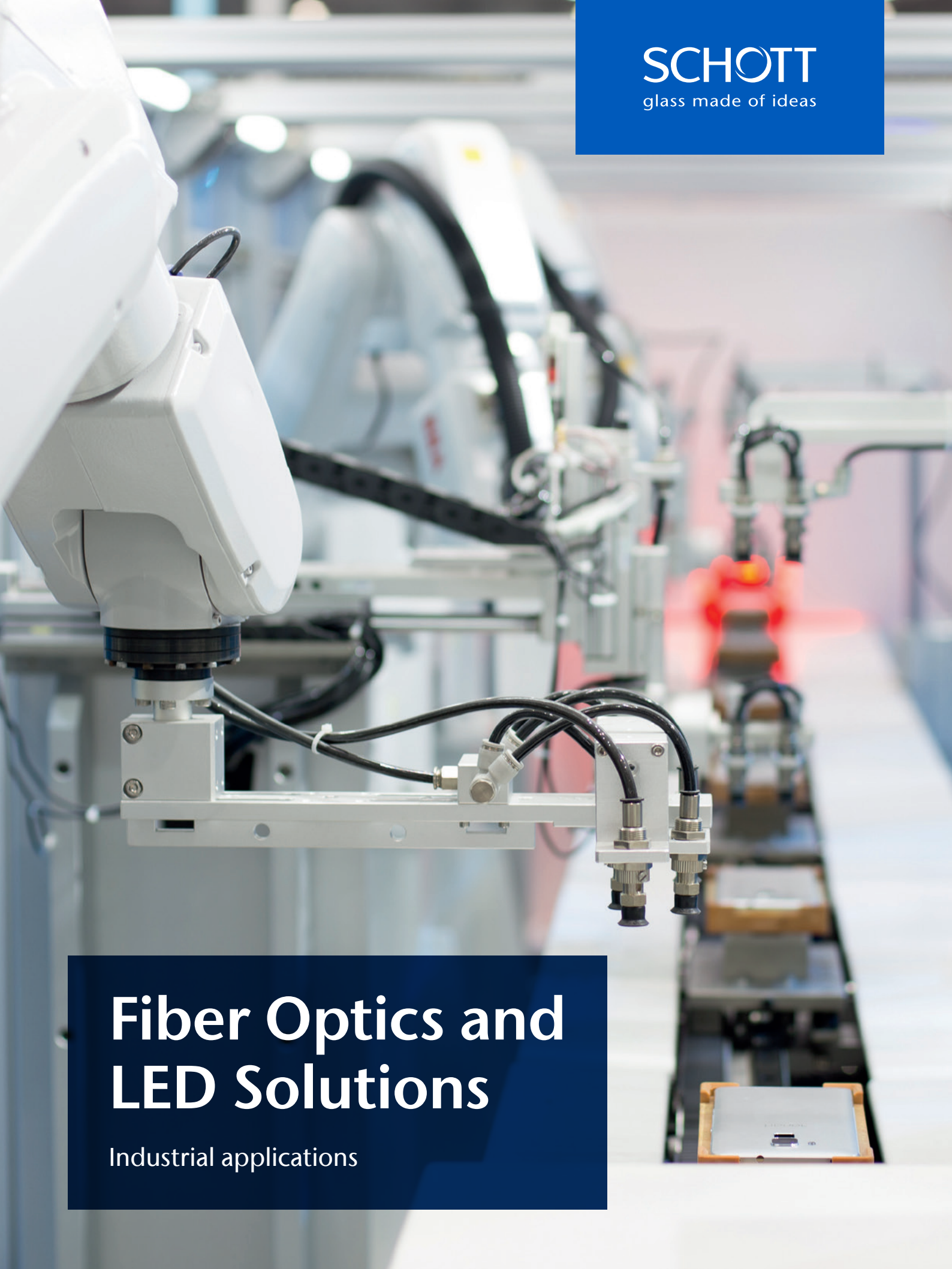


SCHOTT
glass made of ideas

Fiber Optics and LED Solutions

Industrial applications

Let’s create new values.

Empowering engineers with our fiber optic lighting and imaging solutions

Whatever your challenge, we apply our deep expertise and creative approach to find a solution. We work with you side-by-side to provide new, future-proof answers to development needs while also creating added value for your product.

From idea to high-volume production, our leading-edge product and engineering solutions create unique opportunities. We offer more efficiency and a competitive edge that improves your development process while boosting product performance.

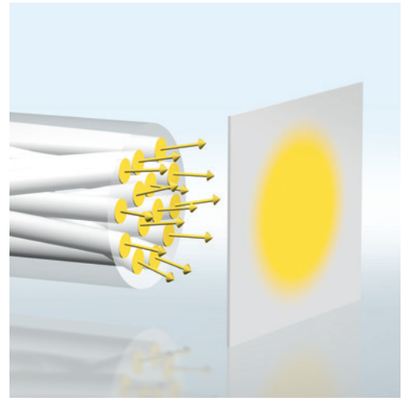
As a trustworthy, flexible partner with advanced capabilities, we provide fresh impetus that helps you reach your goals. Working with us gives you access to a knowledgeable team with years of experience in complex processes. Our solutions are customized to adapt seamlessly into your engineering process.

Discover new application possibilities and learn how our high precision glass fiber optic guides can evolve your business, helping you develop a high-performance product on time.

Content

What we do:
Fiber Optics and LED Solutions

We offer light and image transfer for highly accurate measurements in challenging industries. Using the latest fiber optic and electronic solutions, we can meet the needs of a variety of applications.



Light guides for sensors and control applications

Light guides carry light from one end to the other. The arrangement of SCHOTT's fibers can be randomized to create very homogenous illumination.

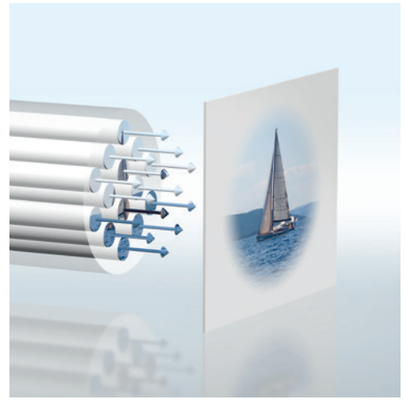
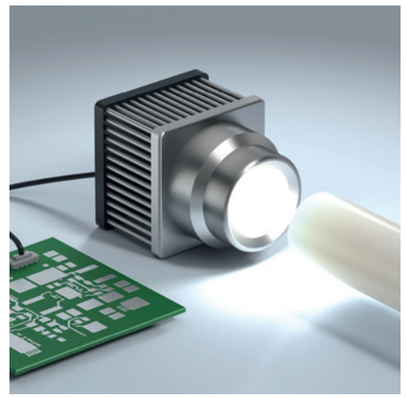


Image guides for imaging applications

Image guides can transport images over a long distance and magnify, reduce, or invert them. Each fiber in the image guide can be seen as a single image pixel, making end-to-end fiber alignment critical.



Light sources for industrial lighting applications

Special lighting techniques can enhance the contrast of a sample so that details become more visible.

Optical Guides
Basic Knowledge

SCHOTT's flexible and rigid glass optical guides are the enabling technology for many applications where images or light must be moved over distances from millimeters to meters. Whether using rigid or flexible guides, we can help you choose the right end terminations, sheathing, and fiber type to achieve the highest performance possible.

Depending on your application needs, we can make optical guides from bundles of fibers that are glued or hot fused together or that allow individual fibers or groups of fibers to be used in isolation.

From single fibers to light and image guides

Bundles of optical fibers can be combined with end terminations and protective sheathing to form light or image guides. With well-proven materials and top-of-the line technology developed in house, SCHOTT can modify the properties of these fiber bundles to make them suitable for incorporating into engineered components used for a variety of applications.

Guide types

Optical guides based on glass fibers are available in flexible or rigid formats. Flexible light or image guides are often longer than rigid guides and are typically used when the target lies around a corner or in a narrow space. This type of application requires a guide that can be bent repeatedly and is very flexible for use in moving setups.

Rigid fiber optic rods are solid fiber optic elements that can be used to transmit light, images, or signals over short distances when flexibility is not required.

Variants that combine flexible and rigid properties are also available as well as single, dual, or multibranch options.

Fiber types

The type of fiber used to make an optical guide depends on the demands of the application. Some of the most important characteristics of an individual fiber are its diameter, numerical aperture, and spectral transmission. SCHOTT offers fibers with various optical characteristics that cover the spectral range from UV to NIR. In addition to classic end-emitting fibers, we also offer fibers that emit light from the side.

Sheathing

Sheathing is more than simply packaging for fiber bundles. It is an integral structural component that can be used to meet specific application needs.

If, and for how long, a light or image guide operates reliably depends to a large extent on the protective sheathing used.

SCHOTT offers many different types of sheathing, so that fiber bundles can be protected in various challenging mechanical, physical, and chemical environments.

A standard range of protective sheathing is available, including metal, polymer, and mixed materials.

Ferrules

End ferrules for bonded/epoxied light guides are made of aluminum, brass, stainless steel, nickel silver, or other materials. For hot fused components, the end ferrules are made from stainless steel.

Housings

If requested, we can manufacture customized housings in various shapes, forms, and materials.

Light Guides

Flexible and rigid

SCHOTT fiber optic light guides can be as specific as your market. When more demanding applications are involved, our range of complex light guides are ideal. High thermal and chemical resistance makes them suitable for high-temperature and hazardous environments. Our fibers also offer small bending radii, which helps them squeeze into tight spaces.

Outstanding optical properties for the highest reliability and performance

Solutions with high transmission for white light, UV, and NIR are available.

Temperature and pressure resistance for use in extreme environments

Light guide designs include protection against pressure and other mechanical challenges for improved fiber longevity. Hot fused ends used with different types of sheathing allow light guides to withstand temperatures up to 350°C.

Our flexible light guides include multibranch designs for mixed light sources as well as designs made for light detection. They can also be made with specialty fibers for sensing applications such as spectroscopy.

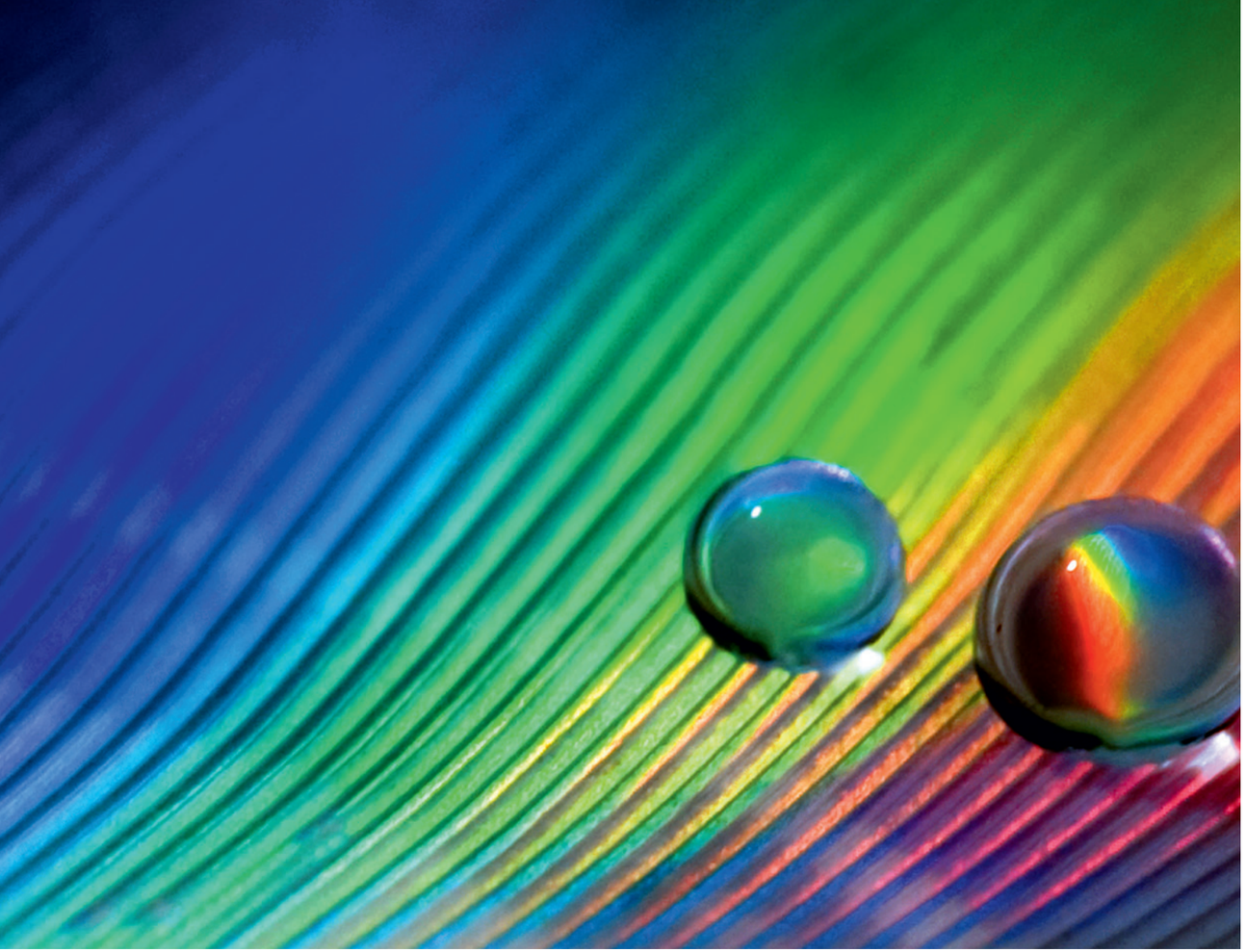
SCHOTT Light Guide Rods can be shaped into complex 2D and 3D geometries that precisely fit into the instrument for which they were designed. During production, special forming processes can be used to create rods with cone shapes and bent geometries. In addition to the standard round rod, flat, semi-circular, and kidney shapes are also available.

Mechanical flexibility for use in narrow spaces

Glass optical fiber bundles have extremely small bending radii compared to fused silica solutions. They also have high flexural capabilities.

Complex geometries and shapes for customized designs

Our fiber optic assemblies are available in complex geometries to meet the requirements of advanced sensing and measurement devices.



Applications for Light Guides

Spectroscopy

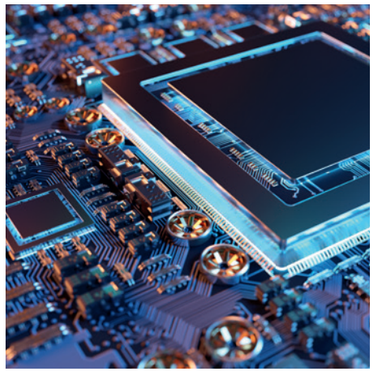
Spectroscopy uses the absorption, emission, and scattering of light to reveal the molecular structure and dynamics of a sample. It has helped achieve major scientific breakthroughs and is used for analysis in many areas, including food, chemical reactions, pharmaceuticals, medical diagnoses, and planetary exploration. A broad portfolio of glass types with transmission from the ultraviolet to near infrared enables customers to design unique, high-quality analytical instruments that can increase our knowledge and make our lives safer.

Pyrometry

Pyrometers – which use light emission to determine temperature – are indispensable in steelworks and other metal processing facilities. Our light guides offer a highly heat resistant option for pyrometry.

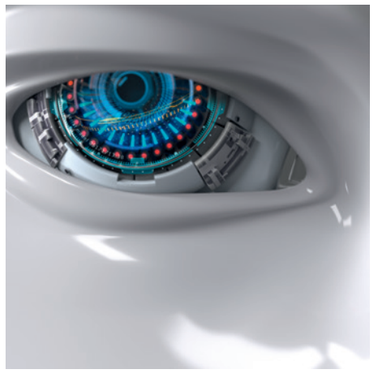
Microlithography

In semiconductor manufacturing, microlithography is used to transfer a circuitry pattern from a photomask to a wafer. Lithography systems must position the wafer against the camera in a way that is fast, accurate, and repeatable. To measure the wafer and process it field-by-field requires light guides with the highest precision.



Industry 4.0

Sensors and robots are being combined with artificial intelligence to create smarter manufacturing processes. Our flexible and rigid light guides enable sensors to be placed away from the target object, allowing sensing in harsh environments.



Sensing and metrology

Sensing and metrology relies on highly accurate measurement in limited spaces and harsh environments. Our fiber optic light guides play important roles for customers in most demanding markets.

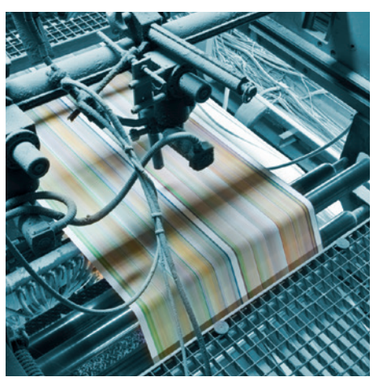


Image Guides

Flexible and rigid

SCHOTT fiber optic image guides offer a completely passive way to transfer images from remote locations, providing a reliable view even when power isn't available. They can be used with an eyepiece and objective lens for passive imaging or connected to a remote sensor or digital camera.

Individual imaging arms can be bonded together to create a common end. This reduces system complexity, costs, and electronic risk.

An inverter twists an image by 180°.

Image guides are available with different diameters and protective sheathings.

SCHOTT fused imaging fiber optics can be designed to magnify, minify, invert, or simply transfer an original image 1:1 to anywhere needed.

Small fiber size creates high-resolution images

Fiber sizes down to 2.5 µm enable detailed images with high resolutions.

Options for environments where electronic interference is a concern

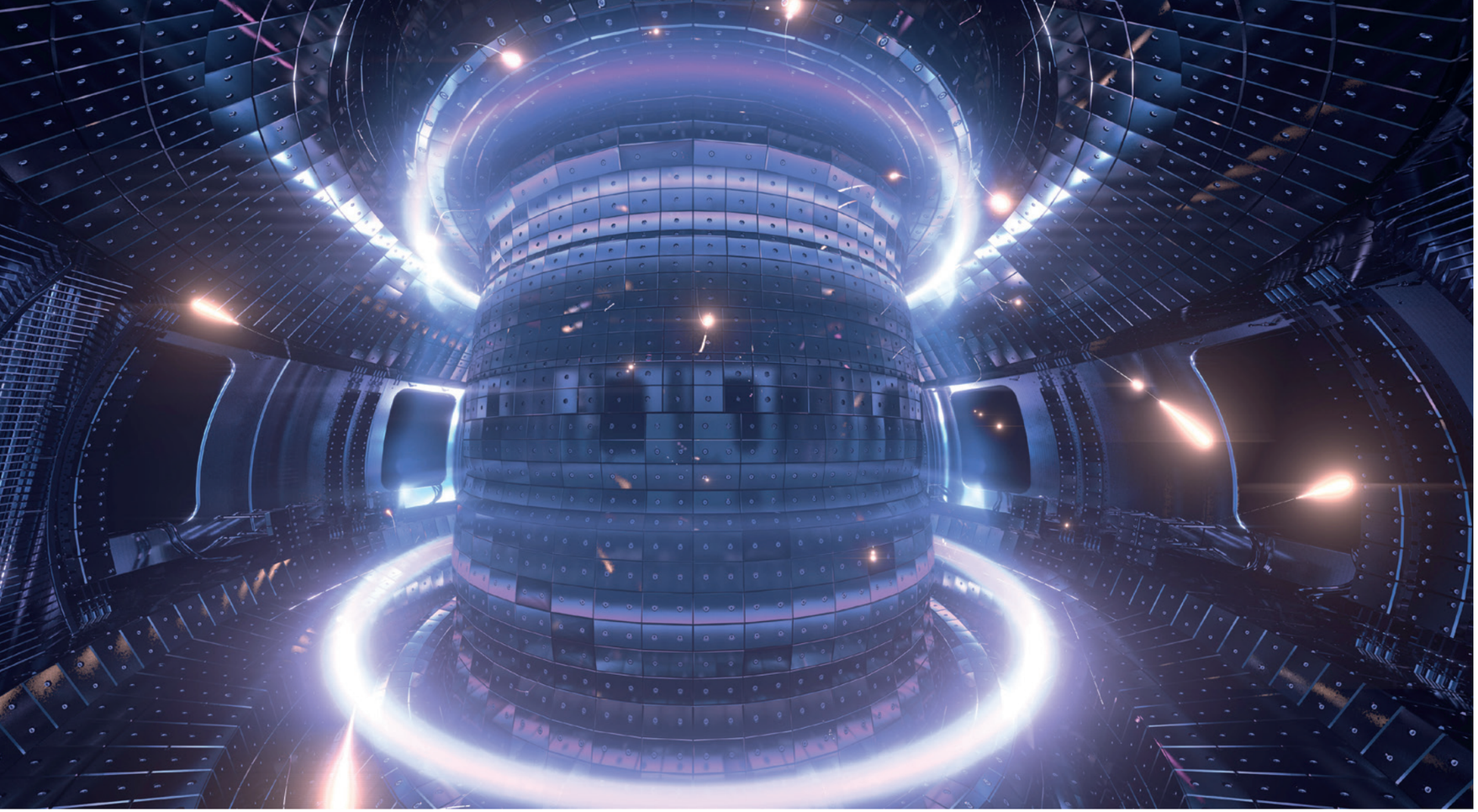
Fiber bundles can be built with non-metallic components and combined with other camera components, allowing them to operate in high magnetic fields and without creating or being influenced by electronic interference.

Temperature and pressure resistance for extreme environments

Image guides in industrial remote vision systems can be designed with ferrules and sheathings to withstand a variety of harsh environments.

Mechanical flexibility for imaging in otherwise inaccessible spaces

Image guides can be used to position the camera where it is best in terms of safety, space, and usability.



Applications for Image Guides

Seeing into places cameras can't withstand, glass imaging fibers offer a robust and flexible way to transfer images from a hazardous environment to the digital chip of a camera or monitoring device that can be kept in a safe location.

Electronic interference and magnetic field applications

Today's scientific research facilities and manufacturing floors often feature high levels of magnetic fields and power dependencies. The presence of so many electronic devices can lead to electrical interference. Because imaging fibers are completely optical, there's no risk of causing electrical interference or being affected by it.

Vacuum and high-pressure applications

While cameras could be damaged in a vacuum or high-pressure environment, image guides can be placed inside a chamber and used to transfer images to a camera outside. This is possible because image guides have a stable mechanical structure and, when combined with adequate sheathings, exhibit a low level of outgassing.

Extreme temperature applications

Made primarily of glass materials with some epoxies, image guides can be used at extreme temperatures that aren't suitable for cameras. We offer various image guides that can operate from about -273°C to about +400°C.

Light Sources

Fiber Optic Illumination for Stereomicroscopy and Machine Vision

SCHOTT's ColdVision and KL series combine fiber optic light sources with a broad range of light guides to offer high levels of flexibility and light quality. The robust design of the ColdVision series makes it ideal for harsh industrial environments while the KL series is designed for demanding microscopy applications.

Fiber optic light transmission for heat sensitive samples

SCHOTT launched its first cold light source in 1970, and these sources were quickly established as a market standard. Because the light is guided from the cold light source via light guides, heat at the sample is kept to a minimum.

High light intensity for high magnifications

Combining the high light output of SCHOTT's light sources with our efficient light guides offers significantly higher intensities compared to direct LED illumination. Our fiber optic models are useful for magnifications over 30x.

Halogen light sources for natural colors

With halogen light options, natural color reproduction is available across the full spectrum.

Robust design for use in harsh environments

The robust metal housing, high quality components, and long lifetime of the ColdVision series make it ideal for harsh environments in industrial applications.

LED Illumination for Stereomicroscopy

SCHOTT's VisiLED and EasyLED series for stereo microscopy deliver precise LED lighting for a wide variety of applications. In addition to offering powerful light heads, there are also darkfield options and ways to control of individual ring light segments. These capabilities can be used to enable various contrast methods that make the invisible visible.

Advanced control options for specialized tasks

With a broad range of control options, you can select exactly the right product whether you have a basic lighting need or require two computer-controlled light heads for more specialized lighting.

Fanless for clean room or sterile hood use

In general, no fan is used for direct LED lighting, which can be advantageous if you are performing stereo microscopy in a clean room or under a sterile hood.

50,000 h

LED lifetime of 50,000 hours for work without maintenance

LEDs that last 50,000 hours provide maintenance-free lighting for years.

Compatible with all OEM designs for use in a wide range of systems

Mounting adapters are available for all common microscopes, making the series suitable for a wide range of systems.

Applications for Fiber Optic and LED Illumination

Two of the main application areas for SCHOTT illumination systems are stereo-microscopy and machine vision. While machine vision demands precise and efficient illumination in challenging environments, stereo microscopy requires versatile and compatible lighting systems that deliver consistent results.

Laboratory and diagnostics

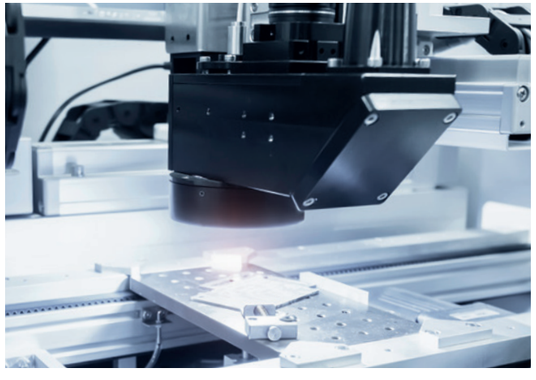
SCHOTT illumination systems are essential for the laboratory and diagnostics industries, delivering intense, homogenous light for stereo microscopy. Accurate results depend on the tiniest of detail, and our portfolio delivers the illumination that provides the medical evidence, no matter how simple or complex the system.

Quality control

Effective industrial analysis and product development relies on knowledge and information. SCHOTT offers highly controllable illumination systems that provide all the information you need. Our products have the quality and reliability for a lifetime of performance.

Education

SCHOTT understands the value of education. Whether in a school laboratory or at a top university, our complete range of light guides, sources, and accessories are opening young minds to the thrill of scientific investigation. With easy-to-use products and the latest technology, our light guides are reliable partners in classrooms all over the world.



Machine vision

Industrial machine vision, process control, automated inspection systems, and robotic analysis rely on effective lighting systems to deliver powerful and precise illumination for optimum performance. Applications include wafer inspection, coaxial lighting with high intensities, and failure analysis in glass with extreme homogeneous line light.

Why SCHOTT?

The SCHOTT Lighting and Imaging team has 60 years of experience in developing and producing advanced glass optical fiber solutions. With our know-how in fused silica and polymer fibers as well as mechanical, thermal, optical, and electronic engineering, we offer you the ideal partnership for designing new, future-oriented products for challenging fields and markets.

Deep engineering expertise and strong R&D support for innovative, customized products with a competitive edge

Our global team of experts offers comprehensive technical know-how in fiber optics, optical glass, and lighting and imaging system design. As a team, we can turn your bright idea into a manufacturable, successful product. We provide smart, cutting-edge technology and solutions that fit seamlessly into your engineering process.

Collaborative approach for a dynamic partnership with creative impact

Our experts are solution-oriented, open-minded, and work with team spirit. This provides new impetus and an agile, productive workflow for an advanced process that benefits from progressive ideas at every stage. Our approach enables successful development of an optimized final product.

Large resources and stable structure for 100% reliable supply

Our locations in more than 30 countries and automated processes, give us the flexibility to scale from making a few pieces to mass production. With fast, flexible responses, we adapt efficiently to your needs, offering new opportunities for on-time development.

Stable processes for consistent product quality

SCHOTT tracks all relevant production parameters, allowing traceability and transparency. Our experienced teams carry out their jobs with the highest precision. We use an ISO class 7/8 cleanroom and follow global standards like ISO 9001, ISO 14001, and ISO 13485.

Contact us to learn more about new opportunities.

schott.com

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