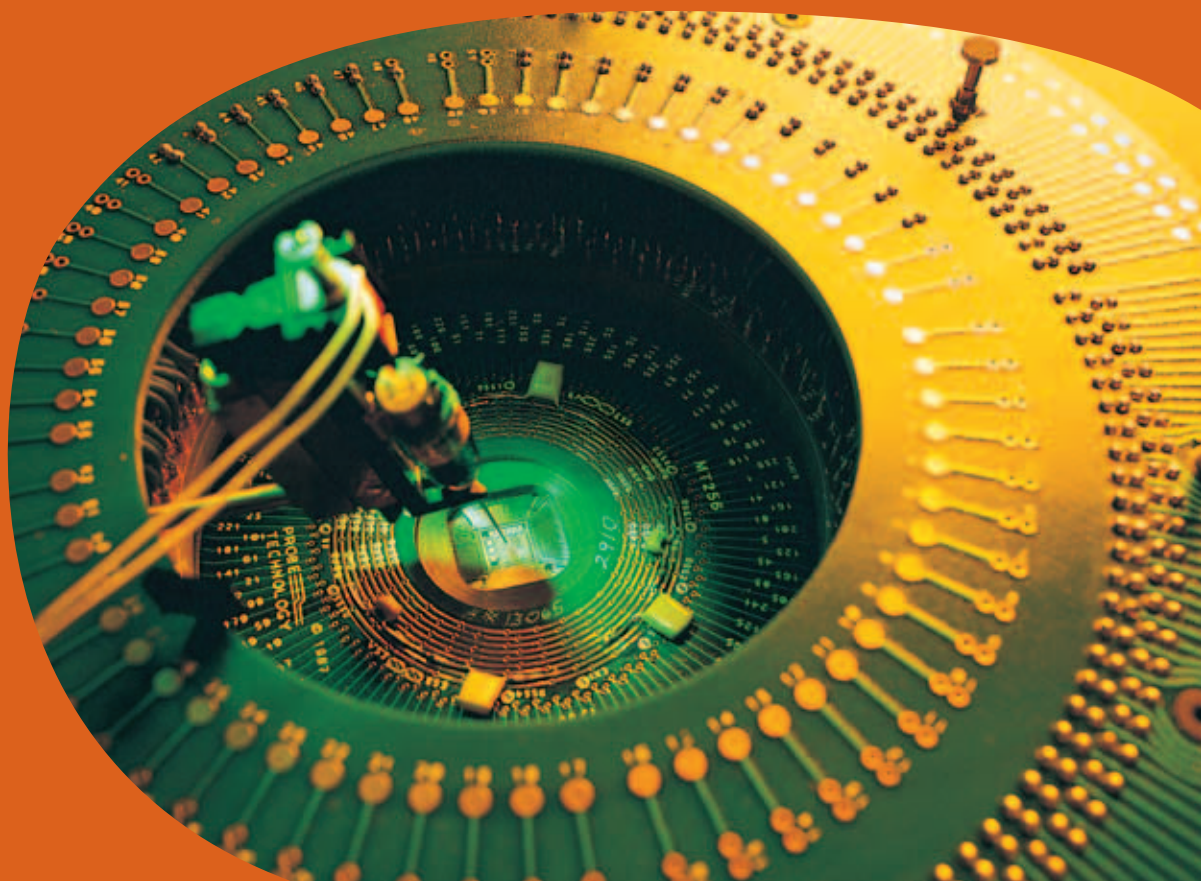
QIOPTIQ
Photonics for Innovation

Industrial Manufacturing



Company Profile

Qioptiq designs and manufactures photonic products and solutions, serving a wide range of markets and applications in the medical and life sciences, industrial manufacturing, defense and aerospace, and research and development sectors.

The company is known for its high-quality standard components, products and instruments, custom modules and assemblies, leading-edge innovation, precision manufacturing and responsive global sourcing. Due to a series of acquisitions, Qioptiq has an impressive history and pedigree, benefiting from the knowledge and experience of LINOS, Point Source, Rodenstock Precision Optics, Spindler & Hoyer, Gsänger, Optem, Pilkington, Avimo and others. With a total workforce exceeding 2,300, Qioptiq has a worldwide presence with locations throughout Europe, Asia and the USA.

1877 — Rodenstock founded

1898 — Spindler & Hoyer founded

1966 — Pilkington PE Ltd. founded, which later becomes THALES Optics

1969 — Gsänger Optoelektronik founded

1984 — Optem International founded

1991 — Point Source founded

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1996

LINOS

LINOS founded through the merger of Spindler & Hoyer, Steeg & Reuter Präzisionsoptik, Franke Optik and Gsänger Optoelektronik

2000

RODENSTOCK

Rodenstock Präzisionsoptik acquired by LINOS

2001

AVIMO

AVIMO Group acquired by THALES

2005

Qioptiq founded as THALES sells High Tech Optics Group

2006 / 2007

QIOPTIQ Optics with Intelligence

Qioptiq acquires LINOS and Point Source as "members of the Qioptiq group"

2010

QIOPTIQ Photonics for Innovation

The new Qioptiq consolidates all group members under one brand

Core Competencies

Qioptiq offers the most comprehensive set of technologies and knowledge to fulfill the demands of almost any modern application in the field of photonics.

Our decades of interdisciplinary experience in many markets enable us to provide a portfolio of design, technologies and manufacturing capabilities suitable for your specific application. We can supply a solution that will boost your competitive edge and support your efforts to optimize your products. Our components, modules and systems have superior specifications – such as optimum optical resolution, highest transmission, superior beam quality and much more.

Design

- Optical system design
- Mechanical design
- FEM-analysis including thermal and magnetic effects
- Electronic and software design
- Illumination design
- Stray light analysis
- Advanced tolerance analysis and yield simulation
- Coating design including process development
- Lasers for biotechnology and metrology

Assembly Technologies & System Integration

- Development of in-house processes for precise assembly of optical elements
- Bonding, optical contacting and gluing procedures
- Fit mounting and self-centering techniques
- Active positioning and gluing technologies
- Diamond adjustment turning
- Active adjustment during online quality measurement
- Built to Print assembly

Cleanroom Facilities

- Seven locations worldwide with cleanroom facilities
- Flow box assembly
- Certified class 10,000 and class 1,000 clean rooms
- Double wall clean room packaging class 100 compatible
- Cleaning procedures for components in DUV environment

Core Competencies

Coating

- Coating design and process development
- From conventional deposition up to ion-beam-sputtering
- In-situ monitoring of deposition process
- Spectral range: DUV, UV, VIS, IR and NIR
- Broad and narrow band coatings
- Polarizing and non-polarizing beam splitters
- High laser induced damage thresholds
- Dielectric and metal mirror coatings
- Filter coatings

Manufacturing Capabilities

- 11 production sites in US, Western and Eastern Europe and Asia
- State-of-the-art machinery for optics including MRF and fluid jet polishing
- CNC, diamond turning, aspheres, freeform and micro-optic capabilities
- Mechanics production including precision anodizing
- Precision injection molding of polymer optics
- Flexible production from fast prototype to high volume
- ISO certification: 9001, 14001, 13485

Materials

- All materials for UV to IR applications
- All types of glasses (Schott, Ohara, Desag, Pilkington and others)
- Crystalline optics such as fused silica, quartz, CaF_2, MgF_2, ZnS, ZnSe, Ge, Si, sapphire, $CaCO_3$, KRS5 and others
- Metal optics (aluminum, brass, copper, steel)
- TGG, BBO, RTP, KD*P and others
- A variety of polymer materials (PS, PC, PMMA, COP and others)

Quality Control and Metrology

- Automated equipment for optical parameter measurements
- Surface metrology
- UV to IR interferometry
- MTF testing at various wavelengths
- Broadband spectrometers down to 130 nm
- White light interferometry
- Scattered light measurement
- Dedicated application and customer specific test equipment

contact

- www.qioptiq.com/machine-vision
- photonics@qioptiq.com

Machine Vision

The number of machine vision applications is growing, and they are also increasingly diverse. Today they include traffic and speed surveillance, packaging control of pharmaceuticals, inspection and process control (e.g. quality control, failure analysis), visual inventory management and management systems (e.g. counting, barcode reading, store interfaces for digital systems), semiconductor fabrication and much more.

From lenses to cameras...

...from illumination to controls, Qioptiq provides solutions for almost any machine vision application, ranging from short-run unique object manufacturing to large scale industrial production. We specialize in technology to meet your exacting requirements, whether using one of our standard products or with a fully customized solution.

Our optical, mechanical and electrical engineers, project managers and service personnel work together to offer extensive experience across a wide range of industries and applications. Our efforts are built upon the foundation of over 100 years of Rodenstock, Optem and LINOS machine vision history.

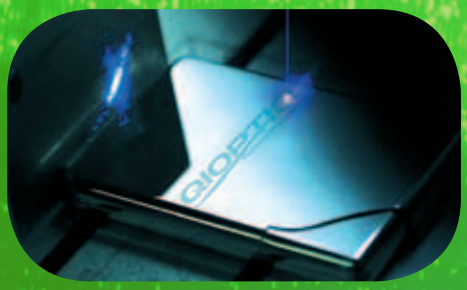
Designed and built by Qioptiq:
LINOS RGB camera for particle detection
in textile manufacturing

Your demands:

- High imaging quality
- Robustness and reliability for rough industrial environments
- System integration capabilities
- Compact optical modules
- Camera integration and sensor optimization
- Long-term delivery guarantee
- Service & support

Qioptiq can help you!
Our solutions for Machine Vision are:

- High resolution lenses
- Large format lenses
- Micro-inspection lenses
- Line scan lenses
- C-Mount and F-Mount lenses
- High-performance zoom optics
- Telecentric optics
- Megapixel lenses
- Reflective objectives
- Long working distance objectives
- Electro-optic integration
- Compact optical packaging
- Specialized illumination
- UV / Visible / IR wavelength
- Precision alignment optics
- Low distortion imaging
- Vision based metrology



contact

- www.qioptiq.com/laser-industry
- photonics@qioptiq.com

LINOS F-Theta lens
for laser material
processing applications

Laser Industry

When lasers were invented in 1960, they were described as "a solution looking for a problem". Since then, they have become universal, finding uses in thousands of highly varied applications in every section of modern life or industry, including consumer electronics, information technology, scientific research, medicine, industrial manufacturing, law enforcement, entertainment, and defense.

Qioptiq provides a full range of services and products for lasers, laser material processing, laser-based machinery, metrology and process monitoring systems. We will support you from the initial concept to development, prototyping and volume production. This makes Qioptiq the ideal partner for your OEM lasers and fiber coupler needs.

Qioptiq´s product portfolio for the laser industry includes components, subassemblies and devices which are needed to develop and produce lasers and laser-based equipment. This includes electro and magneto optics like laser modulators, Pockels cells and Faraday isolators. Moreover, our optics cover a broad range of standard products as well as OEM solutions for laser material processing. Our renowned LINOS F-Theta Ronar scan lenses and LINOS beam expanders set international standards. Well-known manufacturers of lasers, laser material processing and laser marking systems use our optics for their systems worldwide.

LINOS Pockels cells
for pulsed laser systems

The iFLEX-VIPER™ Laser Engine produced and manufactured by Qioptiq

Flexible Laser Technology™

Based on the expert knowledge of Point Source, which was acquired by Qioptiq in 2008, we design and manufacture diode and solid state lasers coupled to fibers to meet your high specifications. Our lasers are used in the most demanding metrology and lithography applications, developed with the highest reliability, stability, beam quality and lowest noise in mind.

The iFLEX-Viper™ Laser Engine

The iFLEX-Viper™ combines up to five lasers in one instrument and delivers each wavelength simultaneously or individually via one singlemode, polarization maintained fiber optic delivery system. The beams are co-linear and can be customized to include focusing optics in the collimator assembly, removing the need for complicated optics in the light path.

Your demands:

- **High reliability and superior beam quality**
- **Broad wavelength range from UV to NIR**
- **Sophisticated OEM solutions**
- **Compact design**
- **High power optics**

Qioptiq can help you!
Our solutions for Laser Industry are:

- **Electro & magneto-optics such as Pockels cells, laser modulators and Faraday isolators**
- **Optical components and subassemblies, optoelectronics and optomechanical systems**
- **Customized products and solutions**
- **Optics for lasers and laser material processing**
- **Diode and solid state laser coupled to fibers**

contact

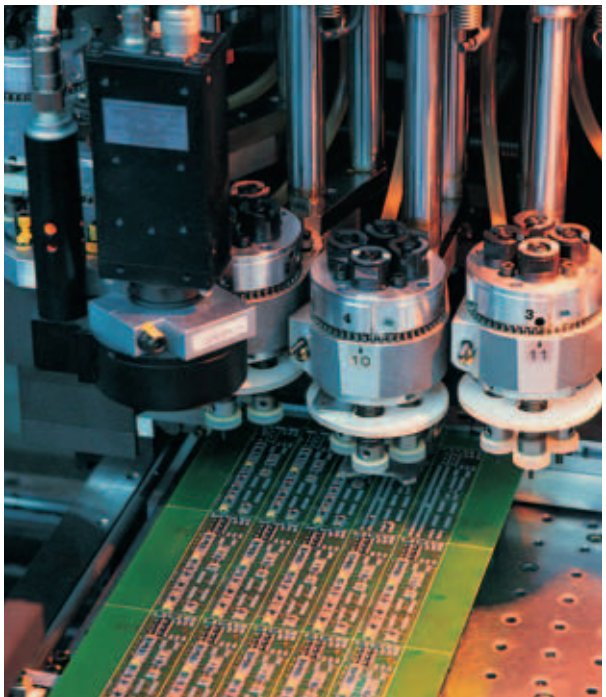
- www.qioptiq.com/semiconductors
- photonics@qioptiq.com

LINOS High NA 266 nm micro-inspection lens, designed and manufactured by Qioptiq

Semiconductors & Microelectronics

Semiconductors and microelectronics are widely recognized as drivers for economic growth in their role as technology enablers for the whole electronics value chain. As a result, this industry has the highest demands on flexibility, accuracy, innovation and technology.

With a rich history and more than 25 years of experience in designing and producing optics and assemblies for semiconductor production equipment, Qioptiq's teams of experts can deliver the wavelength, resolution performance and opto-mechanical precision you need.



From design and prototyping through to volume production, in the fields of lithographic production, wafer inspection, chip bonding and packaging, Qioptiq has the required high-end optical modules, components and systems.

Our systems and modules enable the ever-decreasing feature sizes necessary for mission critical inspection, testing and packaging processes of integrated circuits. From DUV through IR, our customers turn to us for a range of microscopy, machine vision, illumination, beam delivery and electro-optic solutions.

Your demands:

- Cutting-edge technology
- Complex plano optics
- UV and DUV compatible components
- High resolution surface inspection
- Low-distortion and telecentric imaging
- Homogeneous broad and narrow band illumination
- Ultra-high cleanliness
- Turnkey modules

Qioptiq can help you!
Our solutions for Semiconductors & Microelectronics are:

- Concept, development and production of turnkey solutions
- Experience in UV-design, production, measurement and packaging
- Complex 3D shaped optical components
- DUV and broadband micro-inspection lenses
- Diode and solid state laser coupled to fibers
- Custom laser beam shaping
- Vacuum compatible fiber optics
- Enhanced contrast confocal imaging
- Analytical probing microscopes
- Emission microscopy setups
- Precision placement

contact

- www.rodenstock-foto.de
- info@rodenstock-foto.de

Photography & Cinematography

Rodenstock Photo Optics

Qioptiq is proud to have Rodenstock Photo Optics as part of its global offering. For almost a century Rodenstock camera lenses and precision optical lens elements and components have enjoyed a worldwide reputation.

The R&D teams at Rodenstock Photo Optics are constantly working on the latest innovations in lenses for high-resolution digital photography, videography and cinematography, as well as aerial photography and mapping.

Rodenstock lenses come in standard models, developed and made in Germany, or can be customized to meet your specific needs.

Your demands:

- **Highest imaging quality and resolution for professional applications with most recent digital sensors**
- **Reliability & high-end performance**
- **Optics for special extreme high-resolution cameras (e.g. aerial images)**
- **Long-term product support and service**

Rodenstock design,
manufactured by Qioptiq:
HR Digaron®-W lens
for the largest sensor and stitch formats

Rodenstock design,
manufactured by Qioptiq:
Rodenstock Photo products

Our Rodenstock Photo Team at Qioptiq can help you!
Our solutions for Photography & Cinematography are:

- High resolution lenses for digital professional photography (HR Digaron)
- Taking lenses for digital videography and cinematography

- High end filters for photographical lenses
- Accessories including lens control, shutters, software and more
- OEM lenses for special cameras
- OEM lenses for aerial photography
- OEM optics and assemblies for high resolution scanners
- After sales service

Projection & Prepress

"A picture is worth a thousand words." Applications to visualize this on a large scale require advanced technical solutions including sophisticated, high-performance optics provided by Qioptiq.

Prepress

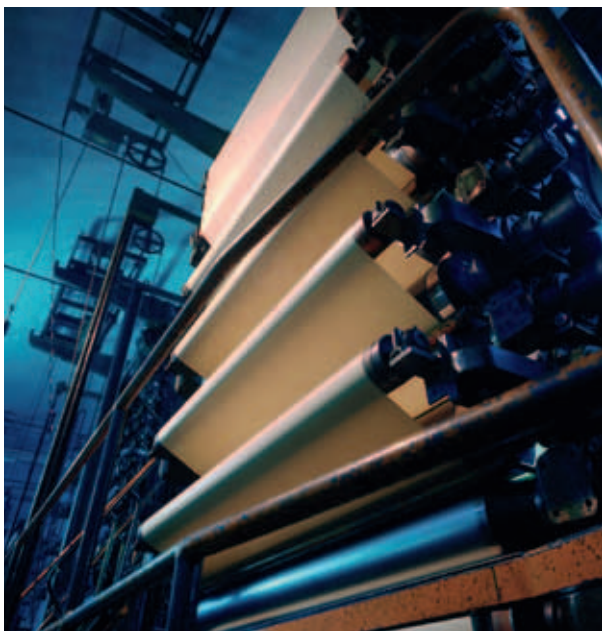
The printing industry uses a wide range of technologies to create appealing products. High-speed newspaper printing, high-quality commercial printing or digital printing systems: each application has its own specific technological requirements to generate the image on the print media.

Qioptiq offers you long-term experience for imaging optics in the printing industry. We have accompanied the development of prepress devices from the first large-format cameras to the latest high-power CtP systems with water cooled optics and FEM aided lens design.

Our specialists will be pleased to support your team with our expertise in optics to create tailored solutions and boost the success of your product.

Projection

For lightweight presentation devices or digital cinema projectors, Qioptiq can provide high performance optics and components.



contact

- www.qioptiq.com/projection-prepress
- photonics@qioptiq.com

Designed and manufactured by Qioptiq: LINOS Zoom lens for exposure of photographic material

Our portfolio comprises light engines, integrators, combiner prisms, beam splitters, imaging optics and advanced color management filters. With our proven experience in high-quality coating technologies, optomechanical assembly and glass bonding we will be pleased to support your projects.

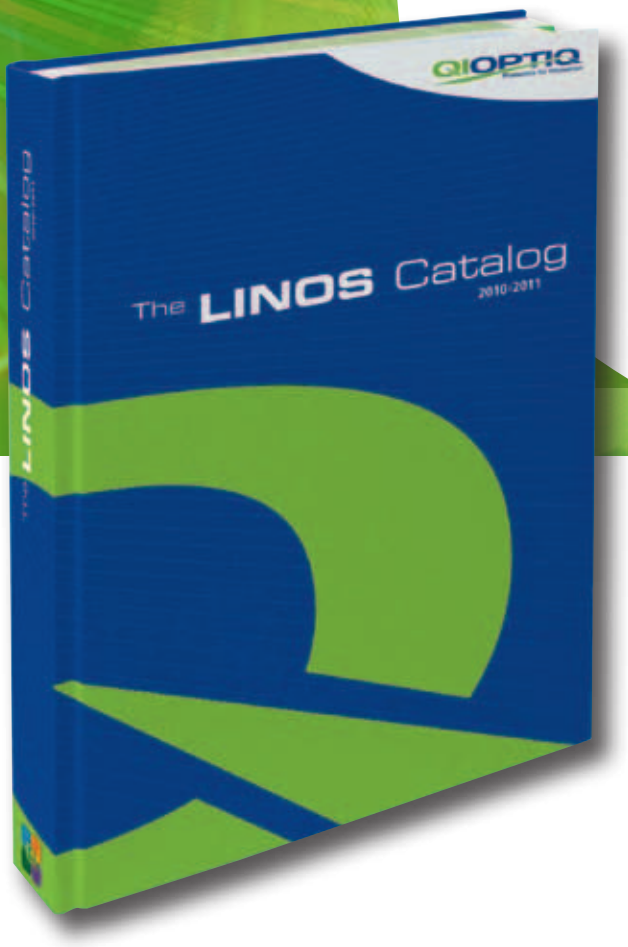
Your demands:

- **Optics for CtP or projection**
- **Solutions for high-power exposure and imaging**
- **Optics for precise and aberration free reproduction**
- **Optical solutions for web inspection and quality monitoring**
- **High and constant quality level**

Qioptiq can help!
Our solutions for
Projection & Prepress are:

- **Illumination and imaging optics**
- **Opto-mechanical systems**
- **Optics for exposure of CtP, violet CtP, thermal CtP plates or OPC drums**
- **Optical solutions for drum, flatbed, laser scanning systems or direct engraving**
- **Laser modules and laser optics**
- **X-cubes, TIR-prisms, Philips prisms**
- **Beam splitters and combiners**
- **Light engine integrators**
- **Color management filters**
- **Projection lenses**
- **High-quality standardized products**
- **Customer specific designs**

contact
www.qioptiq-shop.com
photonics@qioptiq.com



The LINOS Catalog

Qioptiq's world-renowned LINOS catalog and online Q-Shop offers a wide selection of high-quality lab equipment and accessories for customers operating in scientific research and industrial laboratories.

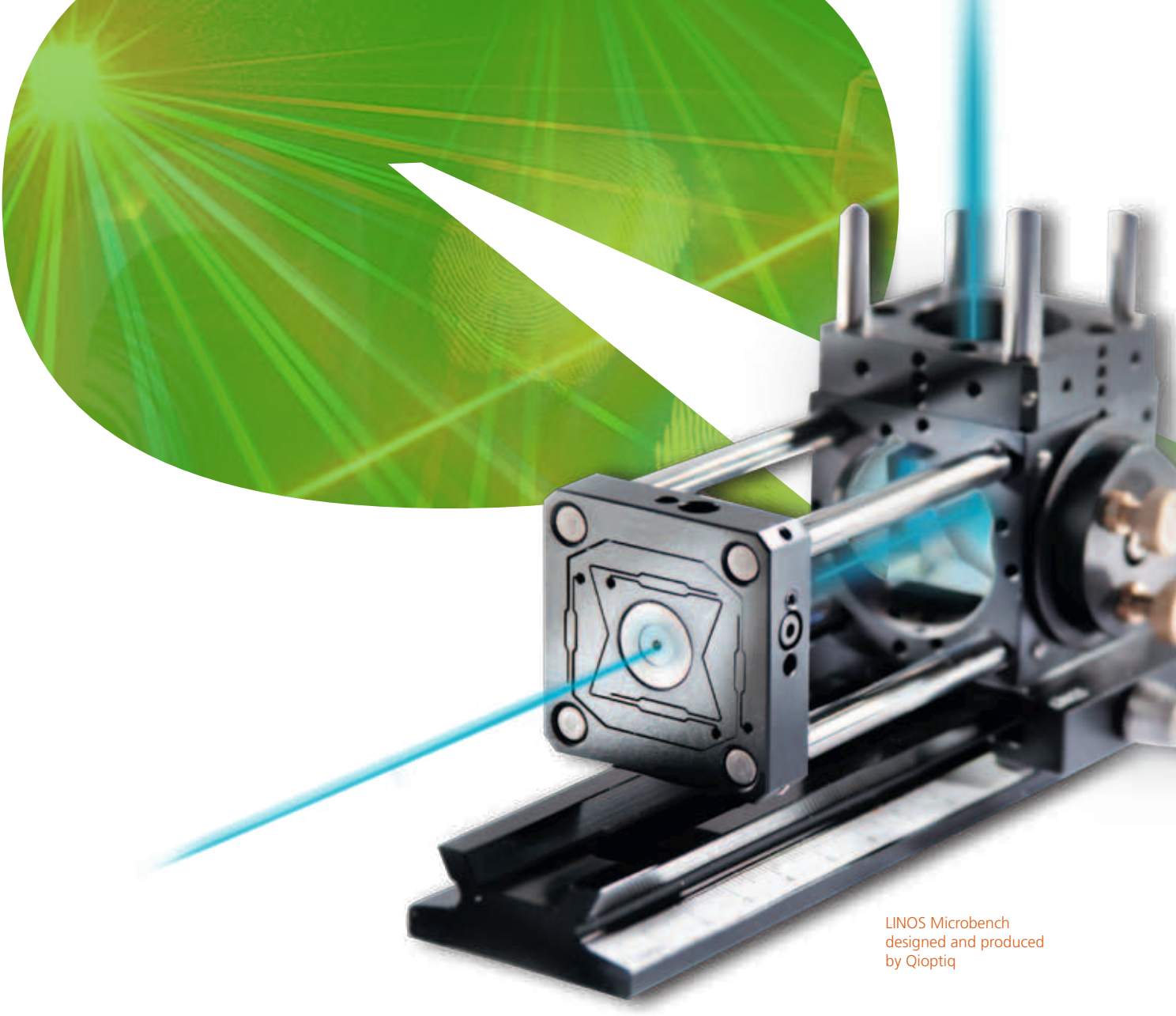
Off-the-shelf products for Industry

Our customers from industry rely on our exceptional quality and batch-to-batch uniformity. Besides the catalog's off-the-shelf solutions, we offer all levels of customization: Our customers benefit from the Qioptiq group's highest competence in design and manufacturing, from prototyping to serial production.

inspec.x UV/VIS

Light Sources

Achromats



LINOS Microbench
designed and produced
by Qioptiq

Off-the-shelf products for Research & Development

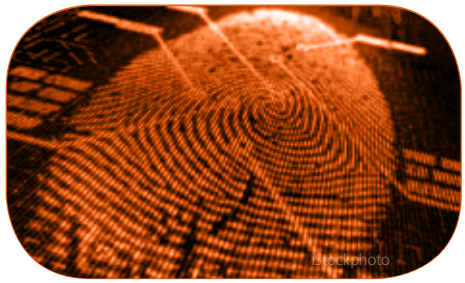
Our customers in scientific research rely on our highest quality, set by world-leading products like the Microbench, the Rail systems, LEES mirror mounts, and Optics/Coatings. Qioptiq offers solutions at a quality level essential for research at the edge of what is technically feasible.

Microbench
Railsystems

NANO 250 Lasers

LEES
Mirror Mounts

Laser Mirrors
Beam Splitters

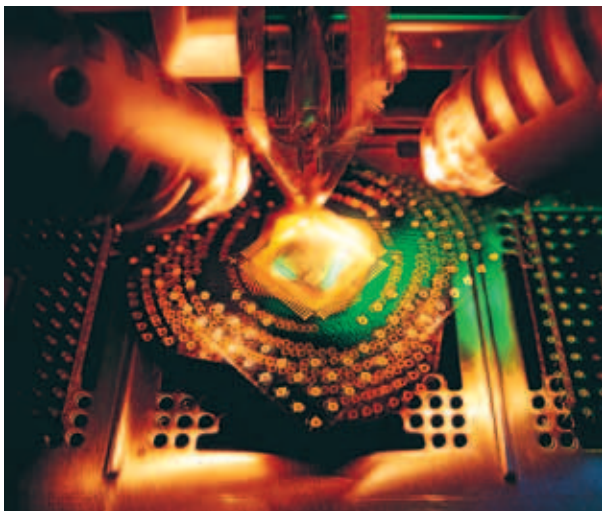


Other Industrial Applications

In addition to the applications presented in this brochure and on our website, Qioptiq also offers services and products for nearly every other industrial application that requires or uses optics or lasers.

Polymer Optics

Over 20 years of experience in polymer optics injection molding have resulted in creative solutions which require multiple optical elements. Integrated mounting hardware simplifies product assembly, improves alignment and reduces cost.



Qioptiq polymer optics are widely used in industrial applications including barcode, security and fingerprint scanners, motion and presence sensors, CCD cameras, laser collimation and illumination.

Micro-Optics

You will find Qioptiq micro-optics in industrial applications such as technical endoscopy and other tasks where small size and renowned high quality optical imaging are of importance.

Optical Components

The range of products we offer includes all known component types (as plano optics, windows, filters, mirrors, prisms, beam splitters, spherical optics, aspherical lenses, polarizing optics, domes, molded glass optics, custom fiber optics) and a wide array of materials.

Your demands:

- High imaging quality
- Long-term relationship
- Solutions to meet your specific requirements
- Production capabilities for quantities from prototype to high volume

Qioptiq can help you!
We offer solutions for:

- Optical devices for production equipment
- Illumination and lighting
- Spectroscopy
- Imaging
- Civil security
- Assembly equipment
- Security and construction
- Surveillance
- Optical recognition
- Food inspection
- Fabric and tissue production
- Free space optical communication
- Biotech lab instruments
- Solar cell inspection and manufacturing

contact

- www.qioptiq.com/built-to-print
- photonics@qioptiq.com

Built to Print

In addition to our global expertise in developing OEM products for our customers, Qioptiq also possesses broad capabilities in the design and manufacture of "Built to Print" products that are perfectly suited to your specific needs in the medical, life sciences or industrial manufacturing sectors.

Built to Print components

In today's highly competitive markets, Qioptiq offers you something different: We have cutting-edge design, the latest technology, and top-end manufacturing in Western Europe and North America, using also low-cost yet high-quality manufacturing in Eastern Europe and Asia according to your needs.

All known component types

Our teams of experts have managed Built to Print projects for clients in the semiconductor industry, biotechnology and industrial inspection sectors - just to name a few! Besides spherical and plano optics, we are particularly skilled in manufacturing:

- Aspheres
- Free form optics
- Diamond-turned polymer and metal optics

Built to Print modules

Our capabilities also include assembling sophisticated modules that match your unique drawings. We are particularly skilled at assembling modules for:

- Semiconductor industry
- Analytical instrumentation
- Medical technology
- Ophthalmology
- Dental imaging

Discover the capabilities, knowledge, equipment and technology of Qioptiq!

High quality:
Off-the-shelf products by Qioptiq

Have a look at our wide selection of high-quality lab equipment and accessories in our world-renowned LINOS catalog and in the online Qioptiq Q-Shop. More than 4,800 items are available for immediate purchase.
www.qioptiq-shop.com

Discover the Q!

Qioptiq supplies cutting edge technology for all optical requirements of Industrial Manufacturing. Worldwide production capacities and state-of-the-art manufacturing plants guarantee an impressive portfolio of photonic products and solutions.
Join us on a journey of discovery in our Industrial Manufacturing brochure!

Photonics for Innovation

For technical information contact:
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