

# Newsletter

Advanced Solutions for Optics, Lithography & Science

**SCHOTT**  
glass made of ideas

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## High Homogeneous Large Optical Glass Blanks

The future generation of giant observatories such as the European Extremely Large Telescope (E-ELT) or the Thirty Meter Telescope (TMT) are not only comprised of very large segmented telescope mirrors composed of a huge amount of zero expansion glass ceramic substrates, such as ZERODUR®, but also of high sophisticated instruments with the need of large optical materials in outstanding quality.

The huge variety of modern optical materials from SCHOTT covers almost all areas of specification needs of optical designers. Many of those interesting optical materials are restricted in size with respect to the achievable quality. However, there is a variety of optical materials that can be produced in large sizes, with excellent optical homogeneity, and a low level of stress birefringence and, therefore, are suitable for the applications mentioned above. Recent examples are high homogeneous N-BK7 and LLF1 blanks with a diameter of up to 1000 mm, LITHOTEC® CaF2 blanks as large as 300 mm useable for IR applications and Fused Silica

LITHOSIL® blanks with dimensions up to 700 mm which are used for visible applications. Refractive index homogeneities of up to H3 quality on 500 mm aperture and even H4 quality after subtraction of focal aberrations have been achieved.



*Think Big – blanks from SCHOTT with diameters up to ø 1000 mm*

If large optical materials with dimensions >500 mm are needed for an optical design, the optical designer should focus on N-BK7, LITHOSIL®, F2, LLF1, N-FK5, LF5 and SF6. Our experienced application team can support you in glass selection issues already in the early design state.



## SCHOTT as supplier of high end materials for microscopy

SCHOTT offers a variety of optical glasses fulfilling tight specifications regarding optical position, dispersion and fluorescence. Those glasses are especially suited for the designs of state of the art microscopy applications. The special short flint glasses N-KZFS4, N-KZFS5 and N-KZFS8 are among those glasses and offer a unique pronounced deviation of the partial dispersion from the normal line. These glasses from SCHOTT, alternatively named "true color" glasses, are particularly suitable for use in high end apochromatic lens designs. They have been specifically developed to highly transmit light in the blue violet range in combination with a remarkable low fluorescence at 365 nm excitation

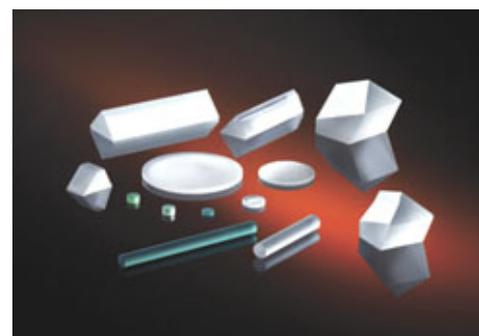
wavelength, which makes them perfect candidates for fluorescence microscopy. "True color" glasses are frequently used in combination with our low dispersion Fluoro/Phosphate glass types like N-FK51A or N-PK51. With modern melting technologies SCHOTT has the strong capability to purposely reduce the fluorescence of selected glass types like it has been achieved for our N-LASF44. SCHOTT is able to determine fluorescence for a wide range of excitation wavelengths between 200 nm and 1500 nm, thereby characterizing materials for a broad range of biotech applications on individual customer request.

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## New Product Information for Pressed Blanks

For our customers to have a better overview and better understanding of the SCHOTT optical products, we constantly update our product information range for the most important products. The latest amendment is the product information for Pressed Blanks from SCHOTT, which summarizes the basic specifications and gives a basic insight into possible applications and available materials. In general, Pressed Blanks are always attractive as preforms for an efficient production of lenses, prisms, ball lenses or other structures. For urgent development projects, we offer an express service with a turn around time

of approximately 3 weeks. The product information is available on the internet ([http://www.schott.com/advanced\\_optics/english/our\\_products/materials/optical\\_glass.html](http://www.schott.com/advanced_optics/english/our_products/materials/optical_glass.html)) and in our regional sales offices. Feel free to contact us for further details.



*A selection of pressed blanks offered by SCHOTT*

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## Expert Workshops Held at Customer Sites

During this past year, SCHOTT sales and product management personnel conducted 19 workshops at customer sites with topics ranging from New Optical Glass; IR Material; ZERODUR® Overview, etc.. If you would like to have

a workshop conducted at your site, please send an email to [opticsnewsletter@us.schott.com](mailto:opticsnewsletter@us.schott.com) and a member of our sales team will contact you regarding a time, place and subject matter.

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## Forty Years of Excellence in Optics in Duryea, PA

**Celebrating 40 Years of Optical Glass Manufacturing in the United States**

The Advanced Optics business segment operation in Duryea, Pennsylvania USA will be celebrating 40 years of continuous operation this coming June. The Duryea operation was constructed in 1968 with first production in 1969. This was SCHOTT's first manufacturing facility in the States and it is the only melting facility for optical glass in the US today. The mission of the Duryea facility is to provide a reliable U.S. source of the highest quality optical materials and components and to enable our customers' success. Our focus is on continuous product and customer service improvements. The broad range of optical materials and components produced at the Duryea facility is used in a wide array of industrial, scientific, medical and defense applications. The Duryea facility also provides secondary operations for those customers that request that service.

The Duryea facility is not just comprised of manufacturing but also is the location for the Advanced Optics North American sales force, product development, business development, engineering and the SCHOTT U.S. Regional Research and Development facility. A core competency of the Duryea facility is to quickly convert a demanding requirement into a solution for the customer.

There are many unique skills, experiences, capabilities and technologies at the Duryea facility. When combined with the resources of the world wide SCHOTT organization, this has allowed Duryea to be a science contributor and to provide products that enable some of the world's greatest scientific achievements. Duryea's product and process developments that allowed a supply of active and passive optical glasses to the fusion facilities being developed by Livermore in the U.S. and CEA in France is particularly rewarding. These facilities will pave the way for energy production technologies for the future. It is unlikely that there is an optical device that is under water, on land, in the air or in space where SCHOTT Advanced Optics does not have some product in the system.

In the end Duryea is successful due to the loyal customer support and the dedication of our employees. Our customers' success is key to the success of Duryea. We clearly



*40 years SCHOTT in Duryea – 40 years of Excellence in Optics*

To accomplish this mission Duryea has had several expansions and has continuously upgraded products, equipment, facilities and services.



understand this point and are fully dedicated to continuous improvement and to the support of the optical industry overall.

Thanks for all your years of support and we look forward for many more exciting years to come.



*SCHOTT in Duryea – a facility with 40 years of history*

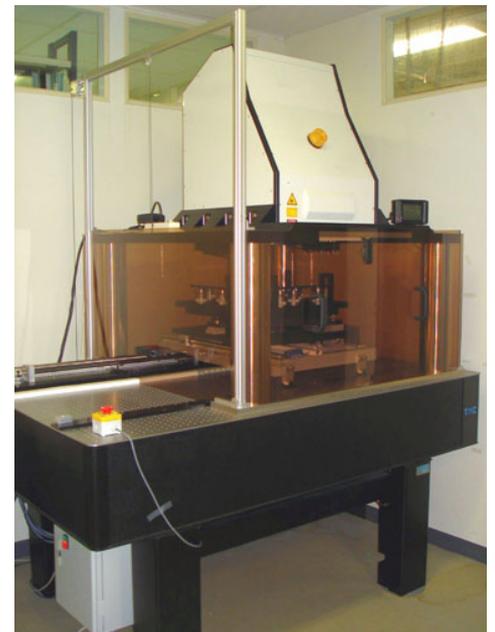
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## Inspecting large optical components with Stitching Interferometry at SCHOTT Suisse SA, Yverdon

Large optical components are more and more required in modern industrial applications with accurate high-end specifications. The ability to manufacture such big and complex optical parts is closely related to having good metrology tools. Interferometry offering a good measurement resolution is widely used for inspecting the quality in the production line. However, interferometers are limited by the size of their lenses. In spite of prices higher than one million €, 600 mm diameter interferometers are available on the market.

Besides solutions such as large interferometers and other expensive techniques, Stitching Interferometry offers a good compromise between the measurement resolution, the inspection size and the speed of imaging. Such an approach gives a good price performance ratio. It offers wide capabilities of checking any kind of optical flat components from small to large sizes. A stitching system, based on a commercial Twyman-Green phase-shifting 300 mm aperture interferometer, a 4-axis sample positioning stage (2 in-plane axes  $\bar{x}\bar{y}$  and 2 tilt alignments ( $\alpha$ - $\beta$ )) and customized software, has been developed at

SCHOTT Yverdon. This well-known technique consists of taking several individual images of the surface of the optical part at different positions, and then, recombining all of them in one single picture. This can be assimilated to the panoramic view assembly of your digital home pictures. The overlapping error is here only a few nanometers. Our system has been fully automated in order to obtain an automatic positioning and fringes tilt alignment. We successfully obtained highly accurate flatness measurements on 500 x 500 mm ZERODUR® plates. If you are interested in such measurements or need our support, please contact our sales team.



*Our interferometer with stitching system*



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## Less is more...and simpler!

“Advanced Optics Lithography” is streamlining its customer relation management processes by bundling various management systems.

In the interest of fulfilling our customer needs on an ongoing basis, our Lithography division meets ever growing market challenges and the urgent need for environmental protection and work safety.

Towards this end, the division's processes are being greatly simplified and complexity is being substantially reduced by consolidating the various ISO management systems. The new and integrated management system engendered by this process meets all requirements in respect to quality, environmental management systems, work safety and health maintenance in

accordance with (respectively) DIN EN ISO 9001:2000, DIN EN ISO 14001:2004 and OHSAS 18001:2007.

Hence, thanks to a transparent and simple process, all employees are now carrying out their work in compliance with the applicable quality management, environmental protection, work safety and health maintenance standards, thus allowing for optimized, more concrete and more direct customer care.

This integrated management system is slated for certification by Lloyds Register (LRQA) in mid 2009.

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## Upcoming SCHOTT Events

*Here we are listing the events where “Advanced Optics” proactively attends such as tradeshows, technical conferences and other occasions.*

SPIE Microlithography, February 22-27, 2009, San Jose, CA - *technical speech*

SPIE Defense, Security and Sensing, April 14-16, 2009, Orlando, FL

Lens Design & Manufacturing Expo, April 22 - 24, 2009, Yokohama, Japan

Optifab, May 12-14, 2009, Rochester, NY

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