

News from "Your Partner for Excellence in Optics"

SCHOTT
glass made of ideas

Advanced Optics – Newsletter 02/2014

TRADE FAIRS

Optatec in Frankfurt: Advanced Optics presented new products in the areas of optical glass and expanded coating expertise



The Optatec in Frankfurt, which alternates every other year with the Laser World of Photonics in Munich, is Europe's most important trade fair for Advanced Optics in the areas of optics, photonics and laser applications. The exhibition set a new record by attracting 570 exhibitors from 27 countries and more than 5,200 visitors. The SCHOTT event team had a lot of good meetings with customers from the trade, but also had the chance to mingle with interested parties and visitors

while enjoying live music and finger-food at its booth party.

This year, SCHOTT's participation in the exhibition centered on the topic of Tolerance Level 0.5 of optical glasses and preforms. In the new quality level of 0.5, the maximum deviation from the nominal values listed in the data sheet is only ± 0.0001 with the refractive index n_d and $\pm 0.1\%$ with the

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Abbe value v_d . SCHOTT glasses thus offer the narrowest optical tolerances available on the market. This helps to improve the quality of high precision lenses for use in inspection systems in the industrial market or microscopy. Dr.-Ing. Ralf Jedamzik, Application Manager at SCHOTT Advanced Optics, additionally gave a technical presentation at the exhibitor forum at the show entitled "From the tightest tolerances to the highest homogeneity."

Presentation of new products

On the three days of the exhibition held in Frankfurt that the international optics world traditionally meet on, the audience showed particular interest in one new product. The optical glass N-FK58 XLD

features an extremely low dispersion (XLD = extremely low dispersion) and very good processing characteristics. It is used in the high-quality lenses of single lens reflex cameras in which apochromatic correction of chromatic aberration is indispensable. N-FK58 XLD offers high performance, especially in combination with anomalous dispersion glasses such as the short flint glasses from SCHOTT. The N-FK58 XLD data sheet was made available at the beginning of July 2014. N-FK58 XLD further strengthens SCHOTT's portfolio of low dispersion glass types which already comprises of N-PK52A and N-FK51A. Overall, SCHOTT offers a wide variety of optical glasses with low dispersion of the refractive index level 0.5.

Advanced Optics also announced that it has extended its coating expertise quite significantly at its plant in Yverdon, Switzerland. As a result, SCHOTT will now be able to offer the complete spectrum of interference filters to meet customer specifications. The range includes everything from sophisticated fluorescence filters and Raman filters for medical diagnostics to filters for use in astronomy. The product range also includes coatings for high-performance high energy lasers. Further information according to the expanded coating expertise can be found on [page 5](#).

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In the land of the rising sun

Finetech, Lens Expo, NanoMicro biz: SCHOTT Advanced Optics scored points at three different trade fairs in Japan in April

The products and technologies that SCHOTT Advanced Optics offers on the Japanese market have had an excellent reputation for many years now. Therefore it only seemed logical to offer visitors to the various exhibitions the chance to form their own opinions of the latest innovations made in Germany.

For instance, the attendees were given the opportunity to take a closer look at the main highlight at SCHOTT Advanced Optics' booth: ultra-thin glass on roll, at Finetech, one of the world's largest trade exhibitions on flat-screen monitors. Nevertheless, the unique coating for touch applications CONTURAN® DARO met with great interest from the international audience.

Many people also participated in the press meeting that SCHOTT held at its office in Tokyo the day before the exhibition opened. From there, the company traveled to Yokohama where both the Lens Expo and the NanoMicro biz were held simultaneously as part of the OPIE (International Exhibition on Optics and Photonics). High homogeneity glass types up to the quality levels H4 and H5 that are in ever greater demand, but also wafers and ultra-thin glasses were the main highlights of the successful presentations held at this event. "Attending three trade fairs inside of two weeks definitely put a strain on us," explained Uwe Wilkens, Vice President of Sales for Asia at SCHOTT Advanced Optics. "Nevertheless, the effort was more than worth it considering the strong interest that more than 300 visitors showed and all the positive feedback we received," he added.



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Ultra-thin glass in the star-role

Printed Electronics Europe 2014: Roll-to-roll demonstrator for ultra-thin glass impresses exhibition visitors

SCHOTT Advanced Optics really amazed people with its presentation at Printed Electronics Europe 2014 in Berlin. The roll-to-roll demonstrator for rollable ultra-thin glass that was shown here for the first time ever apparently hit a nerve with the companies and research institutes that work with printable electronics.

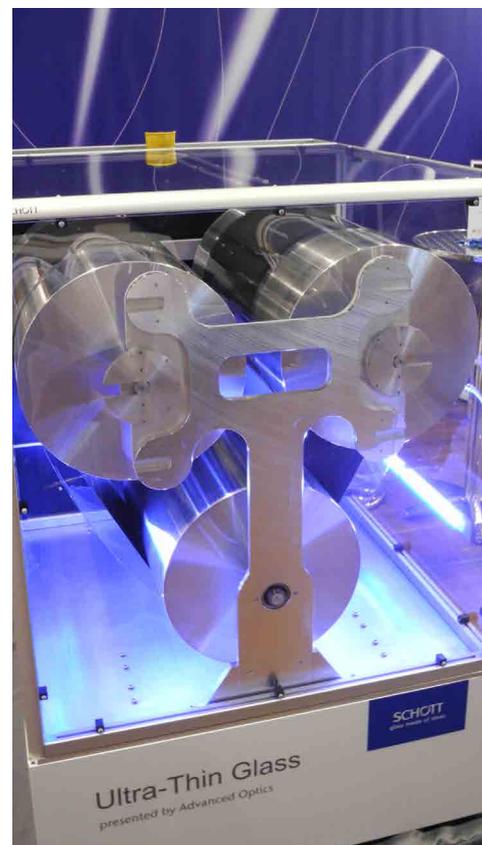
Coated polymers have often been used in flexible displays, OLEDs and organic photovoltaics, in the past because they are thin, light and flexible. Compared to these polymers, however, glass offers significantly improved barrier properties which are essential for many electronic components.

Ultra-thin glass that is just as thin as a polymer foil offers a unique new solution. The booth was always full too because SCHOTT Advanced Optics

was the only glass manufacturer that attended the exhibition. The presentation held by Dr. Elmar Günther, Global Business Development Ultra-Thin Glass, also met with great interest. The many people who listened in wanted to experience live the application possibilities of flexible glass and find out about SCHOTT's support for customers.

It immediately became clear to them that ultra-thin glass from SCHOTT Advanced Optics is not a vision for the future, but an immediately available alternative for various applications in manufacturing and product design. "Printed Electronics Europe clearly showed that companies with promising product developments for the future will find a highly qualified technology partner in SCHOTT," Dr. Günther noted.

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GENERAL INFORMATION

Fraud with fake bank data

SCHOTT Advanced Optics asks customers and suppliers to be very careful

If you ever receive a letter in which you are asked to change the bank data for engaging in electronic banking with a customer or supplier, you should definitely look into the matter more closely. If, for example, the company logo printed on the letter is blurred, this should make you feel suspicious. The reason is that forged invoices and accompanying letters are often printed on scanned copies of company stationery. Furthermore, the contact details can differ slightly from the known data you have been using, if, for instance the end of the e-mail address has been changed to .org or co.uk.

You can lower the risk of fraud by taking the following precautions:

- Arrange to have a personal contact with companies you deal with on a regular basis just in case you have any questions.
- Have your personal contact confirm that the bank data has actually been changed before you make any changes.
- Also instruct employees who are authorized to make payments to carefully check invoices for possible changes in the bank data. If in doubt, contact your personal contact immediately.

- Look into previous requests to enter new bank data to make sure that these were not fraud attempts.

Please also keep in mind that electronic payments can often be made using only the bank code and account number. The name of the owner of the account is not checked on a routine basis as part of the automated payment process, therefore it is up to the person making the payment to make sure the account details used to transfer payment are in fact correct.

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There were a number of cases of invoice fraud in the UK only recently. And they certainly didn't involve peanuts. According to the British National Fraud Intelligence Bureau (NFIB), the damages amounted to more than 150 million British pounds. So, please take precautions with the electronic payments you make!



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Update: Optical filters can now be calculated much easier

The customer's own light sources can be included in the calculation with optical filter glass

We have updated our tried and tested calculation program for optical filter glass. It is now possible to define not only standard light sources, but also the customer's own light sources during color analysis of an absorption filter. This means you can calculate just

the right color for the desired filter for any type of light diode. Thanks to an updated database and inclusion of new glass products, this useful helper will once again prove to be an indispensable tool in your everyday work.

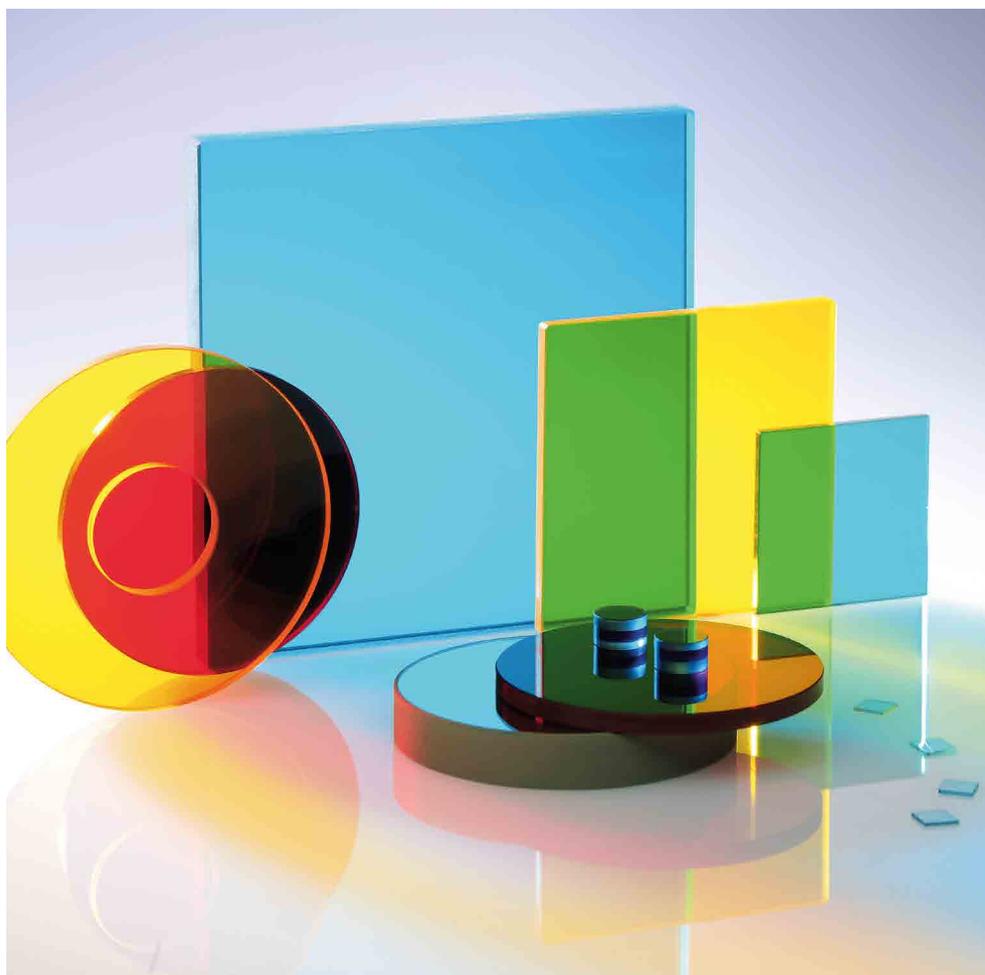
The [Online Catalog](#) joined the tool in 2004. For most of SCHOTT Advanced Optics' customers, this is the fastest way to find the right filter solution. The tool that SCHOTT developed on its own and continues to support can be downloaded as an Excel file. This format makes it possible to include customer requests in calculations, if necessary.

The program provides all of the data needed to find just the right volume filter to suit a specific application. Now, the transmittance factor, internal transmittance, extinction and optical density can be calculated for any filter glass thickness. Furthermore, new types of filters can be created by combining up to five filters. All of the internal transmittance data calculated can be copied out of the tool as a list.

The calculation program is available in the SCHOTT Advanced Optics Knowledge Center:

http://www.us.schott.com/advanced_optics/english/knowledge-center/index.html

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EU regulations threaten the availability of raw materials for the optical industry

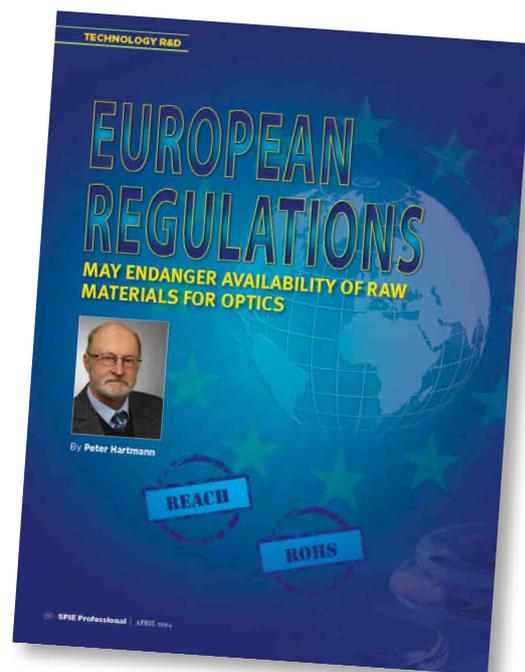
Just published: strong plea to assume responsibility and exercise discretion in assessing potentially hazardous substances

The date for the ban on “substance of very high concern (SVHC)” from the EU regulation REACH is approaching. For instance, the deadline on the use of arsenic oxide by European manufacturing companies has now been set: May 21st, 2015. Furthermore, the RoHS regulation also controls the use of certain hazardous substances like lead and mercury in electric and electronic devices.

Reason enough for Dr. Peter Hartmann, Director of Market and Customer Relations at SCHOTT Advanced Optics and Fellow of the SPIE (International Society for Optics and Photonics), to cite how important these raw materials are for the sciences, industry and society. In the tension field of photonics as a key technology on the one hand and

dealing with hazardous substances in a responsible manner on the other hand, he noted that optical materials for use in high-end systems are strongly dependent on a wide range of substances in order to be able to achieve the desired properties. Whether it is camera lenses, microscopes or endoscopes, intensive research has shown that there is no substitute for the additives needed without negatively affecting transmission, contrast etc..

Furthermore, a new chemical substance is produced during the melting process that exhibits completely different properties than the original materials. The vast majority of optical glasses can therefore be classified as harmless. Dr. Hartmann analyzes the conflict



between the photonics industry and the EU and then comes up with recommendations on how this alarming situation can be resolved from the industry's vantage point. The complete article is available here:

<http://spie.org/x106780.xml>

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PRODUCTS

SCHOTT now offers an even broader range of filters after expanding its coating expertise

Highly advanced interference filters for medical diagnostics now available in accordance with customer specifications

The international technology group SCHOTT has significantly extended its coating expertise at its plant in Yverdon, Switzerland. As a result, the special-purpose glass company now offers a full range of interference filters that meet customer specifications. Its selection spans everything from sophisticated fluorescence and Raman filters for use in medical diagnostics to filters for astronomy. In fact, its product line also includes coatings for high-performance, high energy lasers.

“We made several investments at our plant in Yverdon in order to be able to offer this spectrum of coatings and thus expanded our manufacturing expertise and production capacities quite significantly. We develop, design and manufacture completely on the basis of customer specifications,” explains Prof. Dr. Steffen Reichel, application engineer at SCHOTT Advanced Optics.

Thanks to the optimal matching of the development and usage of the new coating possibilities, SCHOTT offers extremely smooth surfaces with a low surface roughness. The coatings are also known for their high quality and durability. Fully automated manufacturing, including optical online monitoring, also ensures high reproducibility and process stability.

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Coatings for a wide range of applications

The highly advanced fluorescence and Raman filters that SCHOTT offers according to customer specifications are used in the area of medical diagnostics. The fluorescence filters for analyzing fluids are actually bandpass filters.

In fact, a microscope used to analyze fluorescent dyestuffs contains a set of components that consist of three filters which are each made up of as many as several hundred layers. Excitation bandpass filters, dichroic filters and emission bandpass filters are precisely tailored to match each other. Only then can exact diagnostic results be guaranteed. Several different types of filters are used in filters for Raman spectroscopy, including bandpass,

short pass, long pass and notch filters. Monochromatic light from a laser is usually used in this diagnostic method to analyze a sample.

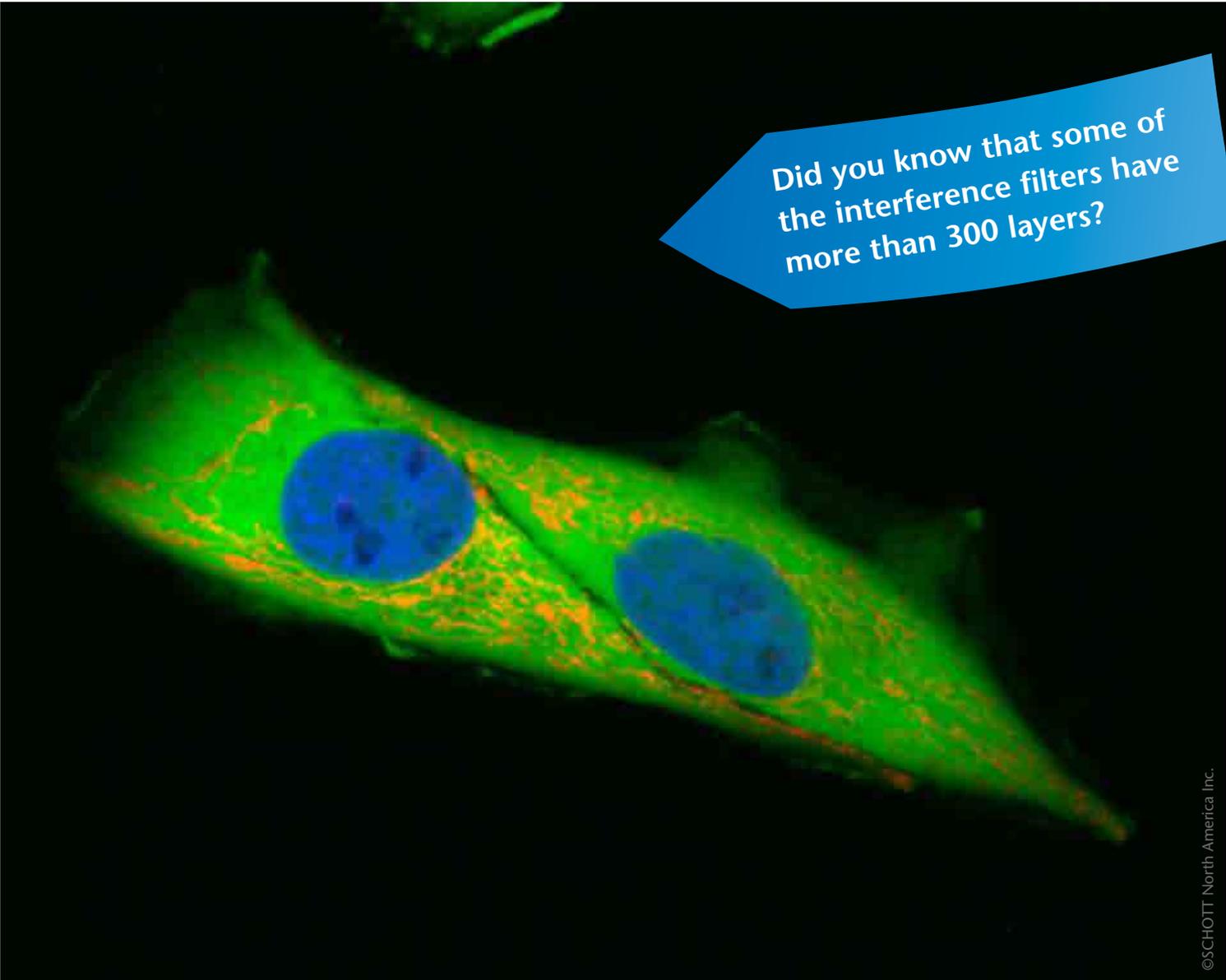
The high-quality filters that SCHOTT offers are also used in astronomy: steep edge and narrow-band bandpass filters with an extremely broad blocking area that ranges from the UV all the way to the near IR range. These filters are typically used to perform spectral analysis of the universe in satellites and in the instruments of ground-based telescopes.

SCHOTT also offers coatings for use in high energy lasers. Research laboratories and material processing lasers depend on them to achieve the maximum, extremely high laser damage threshold.

Broad range of product properties possible

SCHOTT offers a wide range of hard coatings, from laser and scratch-resistant, anti-reflective coatings like those that are used in the cover glasses of high-quality wrist watches to laserhard laser mirrors or dichroic filters such as beam splitters and polarizers. Furthermore, these coatings enable many other different product functions: density and climate resistance, high temperature stability, low transmission losses, better adhesion, thermal stability of spectral performance and the slightest inclusions of water inside a coating.

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Did you know that some of the interference filters have more than 300 layers?

Facing the light

SCHOTT manufactured a mirror substrate from the high-tech material ZERODUR® glass-ceramic for the world's largest solar telescope

In mid-March, the US research organization AURA (Association of Universities for Research in Astronomy) accepted delivery of the most important component of its new solar telescope Daniel K. Inouye Solar (DKIST, formerly known with the project name ATST). In order to be able to better understand the complex processes on the sun, the \$300 million telescope will begin reflecting its first light on Hawaii in 2019 after it has been polished and mounted.

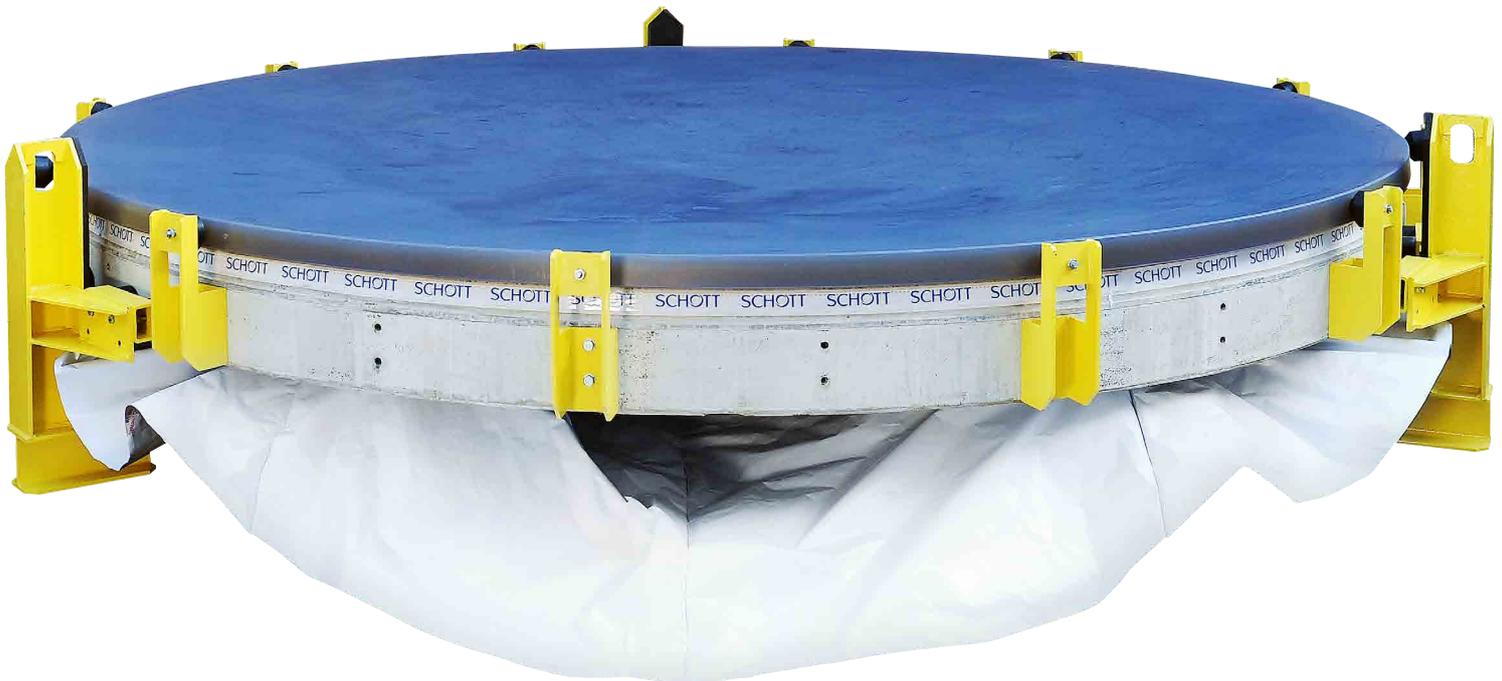
Its 4.26-meter monolithic mirror made of ZERODUR® glass-ceramic will make the telescope the largest of its kind. As it gets pretty hot when you look into the sun and the imaging characteristics

of the center mirror must not change, it is made of ZERODUR® glass-ceramic from SCHOTT, which has extremely low thermal expansion. The DKIST mirror is only 2.9 inches thick so that it is easy to cool from behind, yet bears nearly three tons of weight without changing its shape. It is supported by 120 actuators on its back, which compensate for the deflection that inevitably occurs.

The glass-ceramic needs to be extremely homogeneous; for example, because bubbles and inclusions would result in scattered light that reduces the contrast. SCHOTT has succeeded in manufacturing a mirror substrate in which the maximum number of bubbles per unit

volume was one order of magnitude lower and the bubble size permitted in the critical layer was undercut by a factor of 2.5. "Since the 8-meter project that required manufacturing four primary mirrors that were each 8.2 meters in diameter, the largest monolithic mirror substrates ever cast, no other job has challenged us and helped us to achieve advances in terms of technology as much as this project," says Dr. Thomas Westerhoff, Senior Manager Strategic Marketing of the ZERODUR® product group. „We will be able to use the technologies we developed to meet many more customer requests.“

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EVENTS

Trade fairs and events

Here we are listing the events where "Advanced Optics" proactively attends as an exhibitor, speaker or has an active part such as "chair of technical conferences," etc.

Sep.
02

Location: Shenzhen Convention & Exhibition Center
Country: China
Booth: 9D29
Date: September 2nd – 05th 2014



Sep.
08

Location: Teruel
Country: Spain
Date: September 08th – 12th 2014



Sep.
16

Location: Paris Expo Porte de Versailles
Country: France
Booth: 7.2, C17
Date: September 16th – 18th 2014



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