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Glasses from SCHOTT with "Ultra High Transmittance"

SCHOTT has expanded the portfolio of optical glasses with outstanding internal transmittance.

The transmittance is one of the most important properties of optical glass. It is especially important at the blue violet spectral range of such glasses due to the fact that high refractive index glasses usually lack a good transmittance in this region purely due to physical reasons. Nevertheless, even if there are physical limitations given by the chemical composition of the optical glass, it is still possible to stretch those limits by optimizing the melting conditions and the purity of the raw materials.

Several years ago SCHOTT improved the internal transmittance of high refractive index glasses and released new glass types with the suffix HT for "high grade transmittance." N-SF6HT and N-SF57HT are two examples from this product line. Whereas the internal transmittance curves of standard optical glasses in the datasheets comprise median values for the glass types, HT glass internal transmittance curves show limit values for the internal transmittance in the visible spectrum.

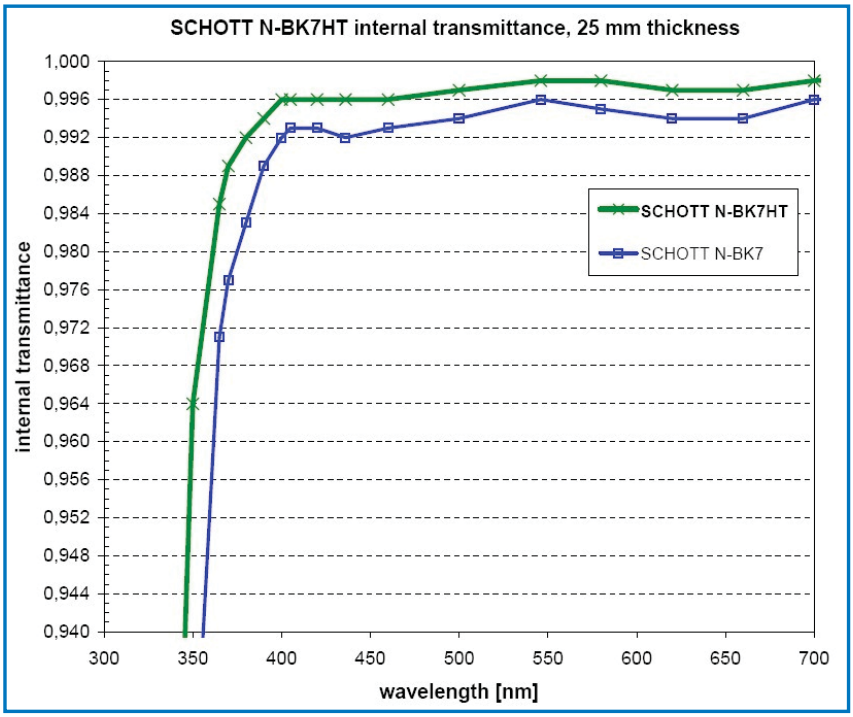
Since then SCHOTT has continuously worked on the expansion of its offering on glasses with high transmittance and since October, SCHOTT has released a set of new HT glasses and additionally introduced a new suffix "HTultra" for glasses with outstanding transmittance behavior compared to other glasses offered on the market. These new "HTultra" glasses are N-SF57HTultra and N-SF6HTultra with improved transmittance compared to the HT versions and to competing glass types. Thus the glass type will be renamed from SF57HHT to SF57HTultra. Other new high refractive index HT glasses are N-LASF45HT and N-LASF9HT.

The melting technology of optical glasses has advanced over the years, therefore SCHOTT has improved and adapted the catalog transmittance curves of several optical glasses. These glasses are: N-LASF31A, N-LAF21, N-LAF33, N-LAF34, N-SF4 and N-LAK7. The relevant data can be found on our website: http://www.schott.com/advanced_optics/english/our_products/materials/data_tools/index.html

Optical glasses with improved transmittance in the blue violet spectral range are suitable for large tele zoom lenses in cinema, broadcasting and dslr applications. They also improve the image quality of sports optics applications like binoculars. In cinema digital projection applications with increasing light fluxes, the internal transmittance is important for prisms

with long optical path length to reduce heating induced image aberrations. For such applications SCHOTT developed the prism glasses N-BK7HT and N-SK2HT with an improved transmittance compared to the standard glass type.

In general all applications with long optical path length inside can take advantage of the improved transmittance. HT and HTultra glasses from SCHOTT are the enablers of high quality products now and in the future.



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High-precision reflectors

Drawing on years of experience in thermally working flat glass, Advanced Optics has developed a process for manufacturing high-precision reflectors.

This procedure involves subjecting flat glass to a thermal forming process to produce a spherical or elliptical reflector that meets stringent technical requirements. A stable production process ensures that the light gain is consistently high. The use of SCHOTT Borofloat 33 borosilicate glass provides high temperature stability, enabling the reflector to be used to observe powerful light sources. Serial production of this type of reflector for use in digital movie projectors has already been successful. Due to the flexibility of the process, a wide variety of contours using different types of glass are possible.

In the future, this newsletter will include articles and reports on a broader range of activities, covering products and applications within the Electronics & Biotech sector, as well as demonstrating our expertise in glass processing in a similar vein to this article. The extension of our capabilities and competences underlines our role as your partner for Excellence in Optics. We provide customized solutions for a wide range of applications all over the world.

High-precision relfectors offered by SCHOTT

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EU-RoHS: Exemption for optical glass and filter glass extended until 2014

Planning reliability for our customers

The exemption for lead and cadmium in optical and filter glasses effective July 2006 has been extended until at least 2014. With this EU Commission decision, published on September 25, 2010, all optical glasses, filter glasses and the glass ceramics ZERODUR® and ZERODUR® K20 delivered by SCHOTT will continue to be RoHS compliant.

The EU-Directive RoHS serves to reduce hazardous substances in electric and electronic waste in order to enable and foster recycling. Its prohibition list contains the chemical elements lead, cadmium, mercury and chromium VI, as well as polybrominated byphenyls or polybrominated diphenyl ethers.

While glass and glass ceramics contain no organic substances at all, some optical and filter glass types containing lead or cadmium are essential for the outstanding performance of high-end cameras, microscopes, endoscopes, digital projection and many other important applications in medicine, research, safety and general technologies. In order to ensure the continuation of these technologies in the mentioned fields, the glasses have to be available for long periods of time. Therefore, the industrial federation SPECTARIS, representing many German optical companies, has applied for the exemption strongly supported by technical expertise from SCHOTT. Detailed reports submitted with the application were evaluated by the Oko-Institute Freiburg, Germany, as an independent consultant of the EU, resulting in an extension of the exemption by the European Commission.

The extension has become effective with the publication of the EU Commission Decision 2010/571/EU in the official journal of the European Union on September 25, 2010. For the original document, please refer to : http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:251:0028:0034:EN:PDF.

The exemptions for the optical and filter glasses are listed in the attachment under the clauses 13(a) Lead in white glasses used for optical applications and 13(b) Cadmium and lead in filter glasses and glasses used for reflectance standards.

The revision of the directive RoHS itself, also called RoHS recast, is expected to be released late autumn 2010. One of the topics still not decided is the length of the exemption periods. In discussion are four and six years. Advanced Optics will inform accordingly.

SCHOTT will continue to provide, together with SPECTARIS, expert knowledge for RoHS recasts in the future. It is one of our main goals to provide our customers a long term planning reliability regarding our glass.

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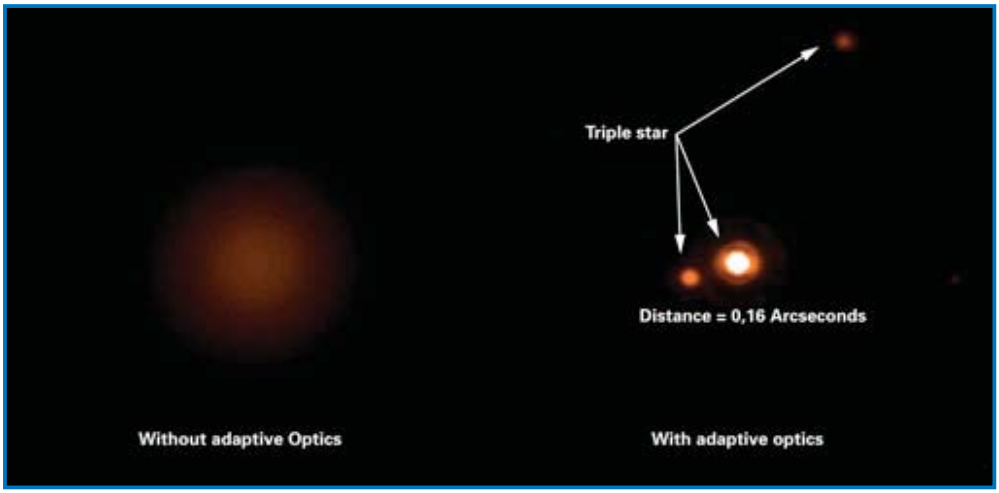
ZERODUR® enables major breakthrough with adaptive optics at Large Binocular Telescope

New Technology Brings Space Telescope Image Quality Down to Earth, Offering Astronomical Image Clarity Never Seen Before

Until recently, ground-based telescopes had to live with wave front distortion caused by the earth's atmosphere that significantly blurred the images of distant objects (this is why stars appear to twinkle to the human eye).

The new adaptive optics system at the Large Binocular Telescope (LBT) in Arizona succeeded to deliver an image quality three times sharper than the Hubble Space Telescope in its very first operation.

This outstanding success was achieved through the combination of several innovative technologies. Key element is the concave secondary ZERODUR® mirror with 0.91 meters in diameter (3 feet) and a thickness of only 1.6 millimeters. The mirror is so thin and pliable that it can easily be manipulated by actuators pushing on 672 tiny magnets, which are glued to the back of the mirror and rest on a ZERODUR® support plate serving as precise reference surface. A sensor detects atmospheric distortions and manipulates the mirror in real time to cancel out the blurring, allowing the telescope to literally see as clearly as if there were no atmosphere. The mirror is capable of making adjustments every one thousandth of a second, with accuracy to better than ten nanometers (a nanometer is one millionth the size of a millimeter).



A double star as observed with the LBT in standard mode (left) and with the activated adaptive correction (right). Because of atmospheric blurring, the fainter companion of the star cannot be identified in the images taken in standard mode, while it is easily visible when the adaptive module is activated. A third faint star also becomes visible in the upper right part of the frame, thanks to the increased sensitivity of the telescope in adaptive mode.

Development of the LBT's adaptive optics system took more than a decade through an international collaboration. INAF, in particular the Arcetri Observatory in Italy, conceived the LBT instrument design and developed the electromechanical system, while the University of Arizona Mirror Lab created the optical elements.

A picture of the movable secondary ZERODUR® mirror during its installation in the Arcetri lab. The image shows the 672 tiny magnets spread over the back of the mirror. The reflecting face of the mirror is face down. The upper portion contains the electro-mechanical devices that control the magnets. Also the support plate serving as precise reference surface for the thin shell is made from ZERODUR®.
Source: R. Cerisola

Progress in light weighting of ZERODUR® will be displayed at Photonics West 2011

SCHOTT's Advanced Optics group has improved its CNC machining capabilities for ZERODUR®. The 700 mm diameter ZERODUR® light weighted mirror incorporates 2 mm thick ribs with a height up to 200 mm. Light weighting factors from 80 to 90% are now achievable. The Advanced Optics Application and Product Management Team are eager to discuss our new challenging light weighted ZERODUR® designs with our customers during Photonics West 2011. Stop by our booth 1601 to discuss your needs.

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Cool Gaze, Hot View – SCHOTT produces ZERODUR® mirror substrate for ATST: The World's Largest Solar Telescope

The Association of Universities for Research in Astronomy (AURA) has chosen SCHOTT to supply the four-meter primary mirror substrate for the Advanced Technology Solar Telescope (ATST). It will be the largest solar telescope in the world and is due to be erected on Haleakalâ, Maui, Hawaii at some 3,000 meters above sea level.

The convex ZERODUR® primary mirror measures 4.25 meters in diameter, is approximately 76 mm thick and has a clear aperture of 4 meters. It focuses the incoming sunlight onto a heat stop, from where the light passes through the telescope's optical system. This allows exact measurements and precise images to be taken and electromagnetic activity on the surface of the sun to be observed.

Following AURA's decision to choose SCHOTT as the mirror material supplier, the world's largest and most modern solar observatories currently all feature mirror substrates made from ZERODUR® glass ceramic (Swedish Solar Telescope on La Palma; New Solar Telescope, Big Bear Lake, California; the balloon-carried "Sunrise"; the about to be commissioned German GREGOR telescope on Tenerife).

The Advanced Technology Solar Telescope (ATST) is being built on the Hawaiian volcano Haleakal ("House of the Sun"). The "first light" is scheduled for 2018.

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Advanced Optics chooses LRQA as ISO Auditor

Advanced Optics serves markets in which the product portfolio, optical raw glass, ZERODUR® glass ceramic, high precision finished and coated components, filters and advanced materials, are produced with a deep vertical integration of processes and more frequently customized. Sustainability of production and service is our highest priority. Advanced Optics' production system is not only based on, but will be continuously improved according to the principles of Business Excellence. "Our customers should experience the highest quality in service and products of Advanced Optics", emphasizes Dr. Kristian Eichgruen, Director of Quality Management. Due to the fact that our production plants work in a flexible network, the implementation of international standards is a living thing. Therefore, Advanced Optics will change from five local to only one global partner for external certifications: Lloyds Register Quality Assurance (LRQA).

Advanced Optics chose LRQA due to its renowned reputation and sophisticated requirements on Management Systems and Auditing which will accompany our continuous improvement process and thus fits to our QM-Strategy. The changeover started in March 2010 and the external certification according to :2008 and ISO14001:2009 will be finished in the current fiscal year. All customers will be informed accordingly. This is what our Sales and Operations Teams are working for: Stay advanced with product solutions of Advanced Optics - worldwide.

LRQA
Measure the Difference

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Advanced Optics proves its innovation power

For 125 years SCHOTT has been shaping the future of glass technology. Still today Research & Development is one of the main pillars of the company. Thus, the company advertises an internal research prize and awards the most innovative developments and patents.

This year Advanced Optics proved its innovation power and the development group was awarded with both the SCHOTT patent prize and the innovation award 2010 for achievements in production as well as for special material understanding. The SCHOTT patent prize was awarded for the development of a process for the reproducible production of large format ZERODUR® parts with extraordinary homogeneity and quality in industrial scale. The SCHOTT innovation price was awarded for the development of a model approach to describe the structural relaxation behavior of ZERODUR®. With this model it is possible to accurately predict the thermal expansion of individual ZERODUR® material batches at any application temperature profile. Both innovations are key factors for the continuing success of ZERODUR® in industrial and astronomical applications presently and are enablers of the readiness for the next century of high performance Extremely Large Telescopes.

We congratulate our development team and accept these awards as an encouragement to continue with the research work along the entire product portfolio.

Innovation- and Patent Price for Advanced Optics

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SPIE announces newly elected Society Directors

Dr. Peter Hartmann, Director Market and Customer Relations, Advanced Optics of SCHOTT, was recently elected to serve a 3-year term as a Society Director for SPIE.

SPIE, the international society for optics and photonics, was founded in 1955 to advance light-based technologies. Serving more than 180,000 constituents from 168 countries, the Society advances emerging technologies through interdisciplinary information exchange, continuing education, publications, patent precedent, and career and professional growth. SPIE annually organizes and sponsors approximately 25 major technical forums, exhibitions, and education programs in North America, Europe, Asia, and the South Pacific, and supports scholarships, grants, and other education programs around the world.

Dr. Peter Hartmann of SCHOTT – newly assigned Director of SPIE

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Congressman Paul E. Kanjorski announces $2.8 Million for joint project of SCHOTT and the University of Scranton

Congressman Paul E. Kanjorski announced $2.8 million in federal funding for SCHOTT Advanced Optics' facility and the University of Scranton enabling them to do the research and development necessary to create the Exawatt laser, one of the world's most powerful lasers. SCHOTT will further grow its facility in Northeastern Pennsylvania, and this funding will support the company to successfully continue its initiatives while positively impacting the area's economy and workforce. SCHOTT in Duryea partnered with the University of Scranton in the field of research to provide the needed expertise for the further development of the Exawatt laser.

The powerful Exawatt laser has the ability to destroy cancer tumors using a laser to focus specifically where the tumor is located. Similar procedures have been particularly successful in reducing and abolishing brain tumors in afflicted patients. Chemotheraphy and other radiation therapies attack and eradicate tumors, but also indiscriminately destroy non-targeted healthy tissue. This laser will create a more manageable and focused technology, enabling it to precisely target and destroy just the tumor, while minimizing the negative and unhealthy impacts of tumor treatments on the patient. SCHOTT and the University of Scranton also envision a more affordable and compact version of this laser to make it more accessible to many more patient treatment facilities.

Gerry Fine, Heather Rayle, and Steve Krenitsky with Congressman Paul E. Kanjorski (second right)

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Upcoming SCHOTT 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.

COMPAMED – November 17 - 19, 2010, Düsseldorf – Booth #8bH08

SPIE BiOS – January 22 - 23, 2011, San Francisco, CA – Booth #8414

SPIE Photonics West 2011 – January 25 - 27, 2011, San Francisco, CA – Booth #1601

Various "Product Demos" at BIOS and at Photonics West

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