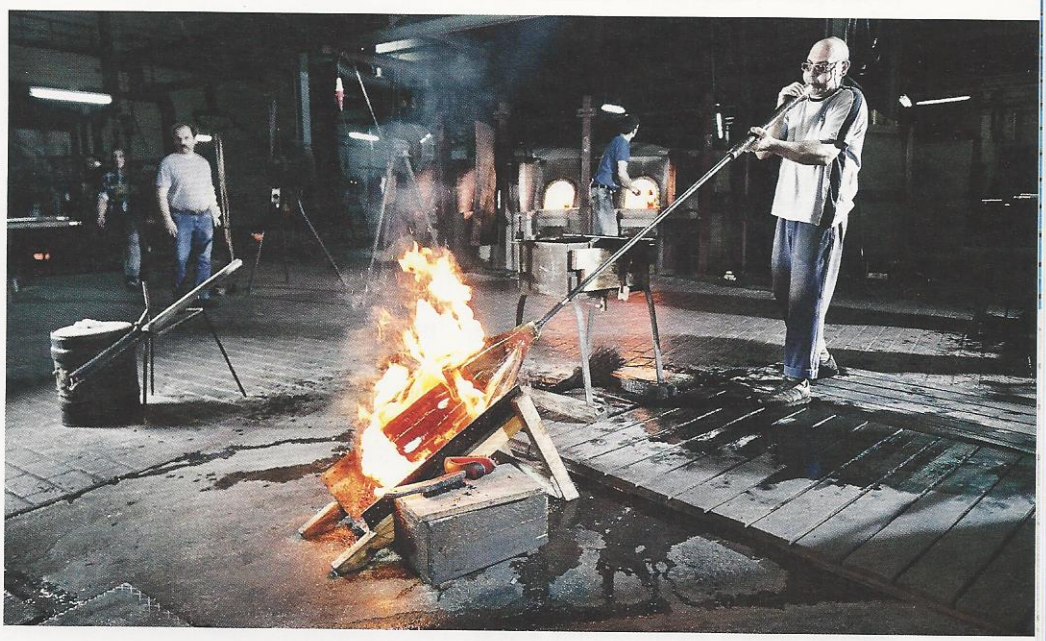
Mouth blown UV glass: a world first

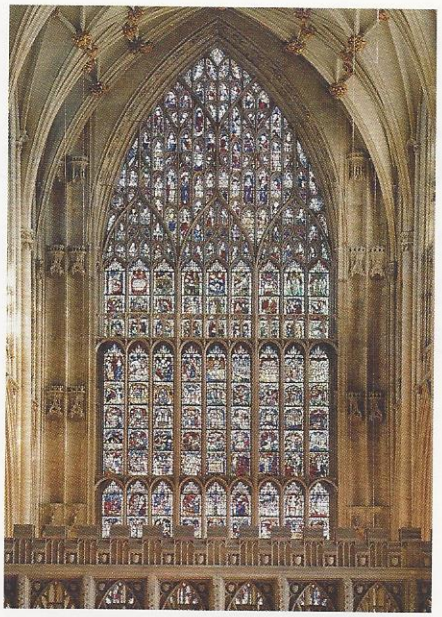
Demand for UV protective glass for valuable art objects and historical furnishings has increased. Glashütte Lamberts Waldsassen has developed the first UV protective glass that can be mouth blown, 'restauro-UV', in collaboration with Dr. Drexler Glasservice and the IGR Institute for Glass and Raw Materials Technology.

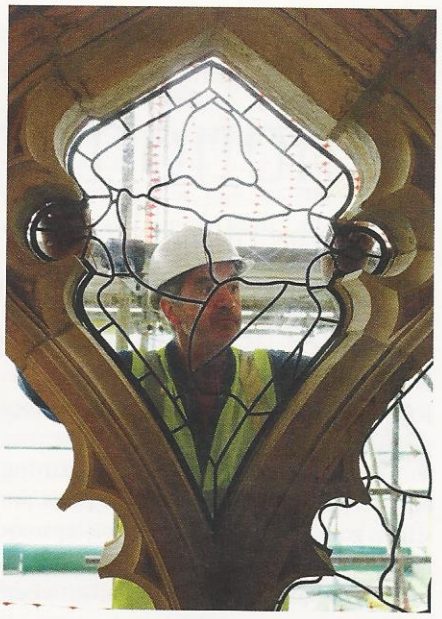


UV rays damage organic material such as textiles, wood and paper, but also modern adhesives, which are based on organic materials. Thus, the east window of York Cathedral, UK (***Figs. 1 and 2***) was fitted with a protective glazing of restauro-UV to protect the adhesives used during the repairs from UV rays. By using restauro-UV, the regular replacement of repair materials and the expensive construction of scaffolding for the 300m² window could be avoided.

Until now the only solutions available were based on organic foil material or a coating of nanoparticles. The coating on the glass was not scratchproof, and over time the foils aged and lost their effect.

Against this backdrop, Glashütte Lamberts Waldsassen developed a glass in which the UV protection was integrated and was not subject to aging. During the development, cooperation was established with Dr. Drexler Glasservice, and the IGR Institute for Glass and Raw Materials Technology, which accompanied the process with metrology and analyses.





▲ Fig. 1 and 2. The east window of York Cathedral has been fitted with a protective glazing of restauro-UV.

The process

The Lamberts glassworks continues the tradition of the 'Neuen Glashütte' established in 1906 in Waldsassen. Today, Lamberts is the only company in Germany and worldwide is one of three companies that produce mouth blown sheet glass. Its products include coloured antique glass, mouth blown window glass (restauro light and strong), Crown glass, dalle glass and other special types of glass for restoration. As with most coloured glass the restauro-UV was manufactured as flashed glass.

The production of UV protective glass begins with the gradual mixing of specially selected glass ingredients in a glass batch facility. The melting process is done in a ceramic pot at temperatures of up to 1420°C. One feature of the process is that, in the classic way, i.e. with the help of a glassmaker's blowpipe, the functional glass is combined with

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another sort of glass to a flash, which is then formed to a larger cylinder.

After scoring and laying open the cylinder, the result is finished glass plates, which are subjected to a defined temperature treatment in a subsequent toughening process step.

After the toughening process the glasses are assembled depending on the size and design.

Mouth blown UV protective restauro-UV glass is a new development that allows UV protection to be integrated directly into the glass without any kind of surface coating, whilst offering 100% UV protection (less than 380nm) and an almost 100% protection for short wave, visible light up to 405nm.

In the context of the German norm (DIN 5031-7: UV-range 100–380nm) the glasses manufactured are almost colourless and thus suitable for windows in museums.

If the protective properties exceed the UV range with a tendency towards visible light, then the glasses, for physical reasons, colour slightly yellow. In comparison to foil solutions, restauro-UV achieves a higher colour neutrality.

During production, each sheet undergoes an on-site quality control before shipment. In addition, samples from each batch are checked for transmission by an independent laboratory.

A successful partnership

Dr. Drexler from Dr. Drexler Glasservice, a graduated chemist with years of practical experience in the glass and raw materials industry, contributed his knowledge of process optimisation techniques using six sigma, analyses, raw materials for glass and glass characteristics, and significantly shaped the development of this UV protective glass by optimising the mixtures and accompanying the manufacturing process.

His scientific education and know-how gained during many successful research projects at renowned industrial companies proved to be valuable.

His knowledge of the transmission spectrums for coloured glasses formed the basis for a systematic report on the correlation between the UV protective properties of the functional glasses manufactured and the relevant parameters in the manufacturing process.

The IGR Institute for Glass and Raw Materials Technology is a neutral service company and has a global focus on the analytical quality assurance of glasses, raw materials and recycled products - in this case explicitly recycled glass - and has a modern laboratory where the equipment includes REM-EDX, ICP-OES, FT-IR and UV-VIS. The IGR also works on the raw material supply, optimisation of manufacturing processes and the training and education of employees from external companies.

The IGR has made a name for itself in the areas of detecting glass fragments in food, analysis of heavy metals, definition of the origin of glass cords and remnants, as well as Fe2+ analyses.

The development and manufacturing process of restauro-UV was accompanied analytically by the IGR in Göttingen.

The main task was the chemical analysis of the glasses produced with the ICP-OES and the measurement of the UV protection with the UV-VIS. Furthermore, extensive toughening experiments were conducted.

Restauro-UV has been submitted for a European patent and can be purchased from the manufacturer. ■

www.lamberts.de/restauroUV
www.igrgmbh.de
www.drexler-glasservice.de

Simotion maximises performance

Operators of glass container factories are constantly searching for opportunities to maximise plant performance, while reducing downtime. Heye International's Simotion Servodrive Compact upgrade kits provide a solution.

An easy way to keep pace with rising efficiency pressures is to modernise a glass factory's manufacturing equipment. Often, mechanical parts are still in good condition, but the electronics are out-of-date. This, invariably, results in long downtimes, especially when spare parts are unavailable.

A solution is Heye Simotion Servodrive, a control concept based on the multi-axis System Simotion from Siemens.

The Heye Simotion upgrade package comes with servo motor, servo inverter, cables and control panel, depending on the specific mechanism.

This technology is used to upgrade equipment such as feeder stirrers and plungers, dual motor shears, gob distributors, machine conveyors, ware transfers, cross conveyors and lehr loaders. Benefits include: Good usability through visualisation with simplified parameter setting; shorter job-change times; reduced downtime through the rapid replacement of parts and configuration data saved on memory cards; and the use of standard components to reduce spare parts stocks.

Upgrade kits are available for many existing systems. The modular design allows for a simple and cost saving upgrade of existing systems. ■

Heye International, Germany,
www.heye-international.com