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## Glasstec 2016: sedak Presents Curved Multiple Laminate at glass technology live

# Cold Bent During Lamination - Glass Laminates for Shipbuilding

**Extremely heavy, extremely thick and processed with an extreme precision – with its multiple, elliptical laminates cold bent during lamination, sedak (Germany) shows, what can be done with glass. At the special show “glass technology live”, the leading fabricator of (functional) glass in maximum formats up to 3.2m x 16m, presents a triple laminate. The glass expert shows a pioneering solution that opens new possibilities also for the shipbuilding sector.**

The exhibit exemplarily shows a 20mm thick triple laminate in the dimensions of 1.3m x 3.7m in a way it has already been installed in a yacht's hull. The glass pane was cold bent during lamination with a rise of 120mm and a diagonal bending line. It therefore nestles perfectly against the ship's spherically shaped hull. The edge has been ceramic-ink printed to protect the bonding against UV radiation and to ensure a flawless visual quality. “Besides this glass pane, 39 elliptical glass laminates with 15 different bending radii were installed in the mega yacht,” says Ralf Scheurer, project manager at sedak. The single laminates have a weight between 85kg (double laminates) and 1,250kg (10-layer laminates). The latter ones are 12.8cm thick and were installed in the yacht's lower bow. Despite different dimensions, each of the 40 glass panes has an area of about 4.0sqm.

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The 10-layer laminate passed the required leak test 50m under water (load pressure: 50t/m<sup>2</sup>). The glass has been registered as a trademark for the shipbuilding industry.

sedak supplies monolithic glass, multi-layer glass units, and functional insulating glass in dimensions up to 3.2m x 16m: processed, tempered, laminated, printed, coated, and cold bent. The manufacture of glass up to 15m is fully automated thanks to the world's largest insulating glass line.

“glass technology live” is a joint exhibition of 30 participants under the leadership of the University of Stuttgart (graduated engineer and architect Stefan Robanus). It takes place from 20th to 23rd September 2016 in Düsseldorf within the scope of glasstec (hall 11/ D42).

*37 lines / approx. 2.000 characters*

**Information: cold bending during lamination**

This cold bending technique has been optimized by sedak. Prior to lamination, the glass lay-up is bent to the required shape on a bending rig. Afterwards, the lay-up is bonded together in the autoclave.

That process requires clean-room conditions under which the fully tempered or heat-strengthened glass panes are assembled to form the laminate. In order to avoid air bubbles and to ensure a high-quality product, the glass lay-up is laminated in a vacuum bag. sedak uses a shear-stiff SentryGlas® inter-layer so that the glass maintains its curved shape after the lamination process in the autoclave.

The advantage of cold bending during lamination: no surface deformation and therefore the best visual quality that a bent glass can offer.

### Picture Caption

*[16-05\_hull\_glazing]*

*Impressive: The 10-layer laminate with a weight of 1.2 tons has been used for a mega yacht's hull glazing.*



*[16-05\_leak\_test]*

*Leak test: 50m under water, the elliptical, bent glass pane withstood a load pressure of 50 t/sqm (equal to a weight of 19 elephants). The test was carried out at Lake Constance.*



All photos: sedak GmbH & Co. KG

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**Leading glass**

sedak, the glass manufacturer in Gersthofen, Germany, was founded in 2007. With its 150 employees, the world's leading glass fabricator produces insulating and safety glass in dimensions up to 3.2m x 16m: processed, tempered, laminated, printed, coated, and cold bent. The core capabilities are the lamination of glass, edging, and the company's know-how of producing glass components with additional functional and decorative elements. sedak's production has been optimized for extraordinary glass sizes; the level of automation for such glass dimensions is unique. All finishing steps are handled in-house e.g. with the new, fully automated insulating glass line. As a full supplier for large-size glass units, sedak sees itself as a partner for architects, designers, and façade constructors. Outstanding references are for example the Apple Cube and the Lincoln Center Canopies in New York, the Städel Museum in Frankfurt, and the Tottenham Court Road Station in London.

**Applications**

- glass façades
- glass roofs
- glass stairs
- glass balustrades
- ship building
- safety glazing
- all-glass constructions
- interior design
- custom-made glass units