

In-line Inspection of Laminated Glass for Highest Quality Standards and Optimized Yields



Dr. Schenk's GlassInspect for laminated flat glass is an inspection solution focusing on the quality assurance and process control for the production of automotive and architectural glass with functional features, like fire protection glass, safety glass or glass with special noise reduction capabilities.

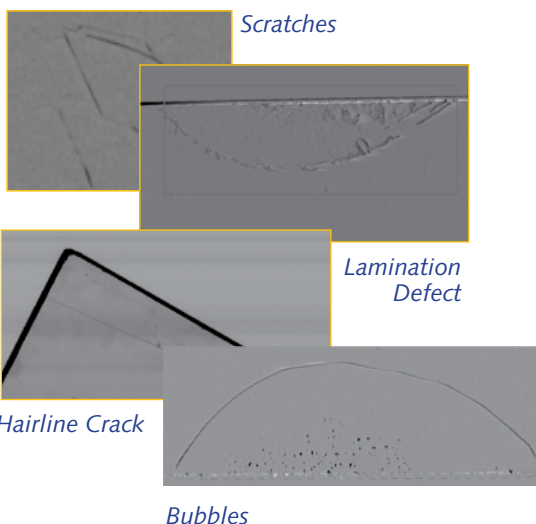
APPLICATIONS OF LAMINATED GLASS

Laminated glass is produced by bonding two or more glass sheets together with an interlayer, usually Polyvinyl Butyral (PVB). The interlayer(s) will prevent the glass panel to shatter into small glass pieces when breaking, which gives the glass application its safety character.

The interlayer of a car windscreen stops broken glass from bursting inside the car when breaking and has an important safety functionality.

The lamination layer of bullet proof glass has a similar function. This glass is additionally hardened by the in-between material and is therefore also used in airliner front windows.

Fire protection glass prevents the glass panels to break into pieces under enormous heat exposure. In addition the lamination provides a barrier for the heat radiation.



LAMINATION DEFECTS

Due to the complex production processes of laminated glass there are several possible sources for defects in the final product.

Typical lamination defects are:

- Bubbles
- Particles
- Edge cracks
- Laminating faults
- Misalignment of edges

QUALITY ASSURANCE STARTS AT THE FLOAT LINE

Although glass panels for laminated products are already inspected in the float glass production line, for high end applications the single panels are checked again before bonding together. Imperfect glass sheets can be rejected from the line before the costly laminating process starts.

The main focus of quality control, however, lies on the inspection of the final product - the laminated glass panel coming out of the autoclave. GlassInspect detects defects and irregularities that occur within the lamination layer(s) and on the glass substrates while being processed. The system's innovative optical set-up and its image processing and visualization software have been adapted to the high requirements of laminated glass.



Panels can also be inspected in their vertical transport orientation



KEY FEATURES

- High-speed camera with up to 320 MHz and 70.000 Hz line frequency and dual-line CMOS sensor (TDI); highly dynamic grey scale image @ 4096 grey level (12 bit)
- Twin-line illuminations to switch between different wavelengths (red, blue, white, infrared etc.) and optical setups
- Reliable and accurate classification of lamination defects
- Easy integration into production lines up to GEN 10
- Ideally adjustable to glass processing lines using modular components for an optimal price / performance ratio



About Dr. Schenk

Dr. Schenk GmbH, established in 1985, is a globally active, innovative high-tech company based in Munich, Germany. For the third decade now Dr. Schenk offers comprehensive solutions for automated quality assurance and production process monitoring for the solar, flat glass, film and foil, converting, optical media and semiconductor industries.

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