New heights in added value with HEGLA's laser processing

The processing of glass with lasers is no longer a niche service. While the novel technology once had the reputation of being an experimental application with the character of a start-up, the possible finishing treatments and laser-supported functionalisation options have expanded as it has become more developed. Bird protection glass, RF-transparent glass and non-destructive edge deletion are all among the best-known applications. Hegla boraident, one of the pioneers of laser processing, offers two system types that are adapted to customer requirements.

From a standard product to a product with added value: The Laserbird enhances the functionality of standard products. Carried out without tooling times, laser processing is economical for a batch size of one or in serial production. In the classic version, a feeding table is part of the system. It positions the next glass product while the preceding one is still being processed.

Offering both non-destructive techniques and high automation, HEGLA's laser solutions are revolutionising glass processing. Here such applications as bird protection, RF-transparent glass and edge deletion all showcase the company's versatility. Meeting diverse industry demands, system flexibility ensures efficient production with minimal operator intervention.

NON-DESTRUCTIVE: THE STRUCTURE OF THE GLASS REMAINS UNTOUCHED

Principally, there are two different types of laser processing. In classic engraving with a CO2 laser, a minimal amount of material is removed from the glass surface of the pane to create the required functionality. "With the Laserbird, we rely on an alternative, non-destructive method with a short-wave laser beam. Both the glass surface and the tensile structure remain untouched, and therefore the quality features do not change," said Dr Thomas Rainer, Head of Development and authorised signatory at Hegla boraident.

LASER FINISHING WITH A HIGH LEVEL OF AUTOMATION

As early as 2012, the company presented a system for laser-supported finishing treatments. Two variants with different levels of automation and space requirements emerged from the original system. The classic version can be loaded automatically or manually. The glass is fed in on a load conveyor or positioned by the operator. Next, it is conveyed to the safety zone for laser processing. To save time, the next pane can be positioned on the conveyor and readied for processing while the preceding one is being conveyed. The Laserbird smart was developed for smaller production facilities and medium-sized

Laserbird smart: There is room for the laser system with a space-saving design almost everywhere. It can be used for a batch size of one and small-series production.

quantities. It is manually loaded in the processing zone, so the system has a smaller footprint without the extra loading surface.

BATCH SIZE 1 AND SMALL SERIES WITHOUT TOOLING TIME

The required finishing treatments can be selected via an app controller on a PC, and a single pane, jumbo sheet or an IG unit can be processed, depending on the size of the systems. In the fully-automated alternative, processing is controlled via the ERP of the glass processing company. Here, the glass ID and the requirements of the processing data set must be imported from the ERP before the glass is processed. “Laser processing is very flexible and provides the opportunity to produce different products alternately and spontaneously as well,” explained Dr Rainer. “Therefore, it is not unusual and actually

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desirable that a heatable pane or RF-transparent glass follows the processing of a bird protection glass product."

BIRD PROTECTION GLASS

Bird protection glass is the most in-demand laser application. For maximum bird strike avoidance, a dot pattern is printed on the outer surface of the glass product in position 1 using the patented UniColor laser printing process. The wafer-thin layer this creates -paque or semi-transparent, as required- is resistant to scratches, light and weather. Birds perceive it as an insurmountable obstacle. As a second effect, any mirroring of trees or bushes on the glass surface is effectively broken up, rendering an approach that's unattractive to birds. A slight reflection and strong light diffusion are additional warning signals. Its efficacy was documented by the American Bird Conservancy (ABC) using a range of glass coatings and pane compositions. "For buildings in the public sphere in particular, we are experiencing a high level of interest, as dead birds are neither appealing nor in keeping with the times," said Dr Rainer.

FULL DATA AND SMARTPHONE RECEPTION

Modern triple-insulated glass and metallic functional coatings have multiple effects: as the amount of insulation increases, RF transparency decreases. Here, a fine, dodecagonal pattern ensures full reception. To create it, the low-e layer is removed in an ultra-thin line thickness of 50 µm or physically transformed to enable radio waves to penetrate into the interior. In particular, the patented layer transformation process enables the functionalisation of finished IGUs. The texture generated by laser is virtually undetectable and has no significant impact on the Ug value.

AESTHETICALLY APPEALING EDGE DELETION

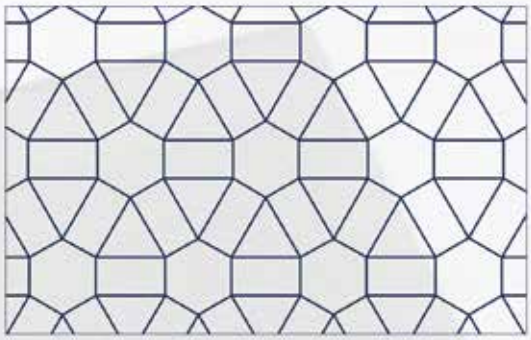
What works on a small scale for radio can also be used for large-scale applications. Crystal-clear and without adverse visual effects, the laser removes the coating from mirrors, warm edge spacers or glass products in the required area for structural glazing. "The surface remains undamaged and the result is aesthetically appealing," explained the Head of Development.

FOR CONDENSATION AND SNOW LOAD

Reducing snow load on glass surfaces and preventing condensation build-up on glass surfaces due to moisture are both requirements that frequently get specified, especially in Scandinavian countries.

With opaque or semi-transparent dots on side 1, the treated glass provides maximum protection against bird strikes. The process was tested by the American Bird Conservancy (ABC) using a range of coatings and glass structures.

Full reception, thanks to invisible decoating in ultra-thin line thickness: the partial removal of the coating enables full smartphone and data reception.



In this case, a texture can be generated on the pyrolytic layer to create a conductor circuit that can be slightly heated. The same procedure is used for protection against burglary: interrupting transmission triggers an alarm.

NO MORE BACTERIA

Bacteria and germs don't stand a chance if silver ions are applied to the glass with a patented laser printing process. When they come into contact with the surface, the pathogens die. This long-term finishing treatment is used on surfaces and doors, for example, in areas where high levels of hygiene are required, as with kitchens, refrigerated warehouses or hospitals.

FLEXIBILITY AT THE END OF THE PRODUCTION LINE

"Flexibility is one of the major strengths of laser finishing," said Dr Rainer. "This is why I recommend locating the Laserbird at the end of the production chain." This way, the processes on the cutting and insulated glass lines can take place independently of the finishing treatment and be adjusted at any time. On the system, glass is transferred either manually from a glass rack or automatically via harp rack feed-in. If the glass products are also identified with a marking and a QR code, the required finishing treatment can be triggered by the system. No operator required. "The lack of tooling time and series requirements makes products with added value possible that could otherwise only be manufactured with long delivery times or purchased products," added the Head of Development.

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The laser textures the pyrolytic low-e layer to create small conductor circuits. When slightly heated, the functionality ensures unobstructed views and keeps snow loads manageable.

With silver ions embedded in the glass using laser technology, germs and bacteria have no chance of survival on the surface. Suitable for applications in any environment where hygiene plays an important role.