
Release: No. 614, 20.09.2016

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3D measurement technologies are the key to success in glass production

3D shape and curvature measurement for increased process stability and reliable quality

Automated 3D measurement technologies are increasingly used in the glass industry to ensure optimum quality and maximum efficiency during production. Innovative technological solutions ensure quick, contact-free, full-area 3D quality inspection of the shape, flatness and surface quality of glass panes. With aggregated and clearly-displayed quality information, the assistance systems help users make process decisions more efficient.

Highly-robust measuring methods – such as ISRA's patented stereo deflectometry – are the only way to obtain customer-specific data on the shape, flatness, curvature and changes in curvature of glass panes and on the efficiency of parabolic mirrors. Stereo deflectometry uses stripe projection to inspect specular surfaces such as glass, mirrors and ceramic cooktops, ensuring precise measurements that are both consistent and objective from any viewing angle. Deviations in the height, tilt, rotation or shifting of the measured object become virtually irrelevant, allowing exceptionally quick measurements.

Measuring technology for customer-specific solutions and applications

ISRA offers various product solutions for 3D measurements that are perfectly tailored to the specific application and suitable for a great variety of shapes and materials. Thanks to various system designs and

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sophisticated algorithms, the solutions are designed specifically for the application in question and offer excellent accuracy and reproducibility.

The shape of automotive glass is determined using FORMSCAN Automotive. The measuring system combines stereo deflectometry and triangulation, making it suitable for measuring screen-printed areas as well. Furthermore, FORMSCAN Automotive detects serial defects in print inspection reliably and immediately.

Reflection optics of automotive glass panes, for example, can be measured using SCREENSCAN Reflected Distortion. Accuracy is of utmost importance in 3D measurements of glass surfaces, as both the visual appearance and the functional and safety features are inseparably linked to the quality of the material. Undesired curvature in the surface of windscreens, for example, not only impairs the visual appearance, but also compromises the function of the wipers. In the head-up display of the windscreen, undesired curvature can inhibit the normal function of the camera in its field of vision. The system is certified by a major German car manufacturer.

The POWERPLATE 3D system is used to inspect the flatness and planarity of ceramic cooktops, for example, with the highest accuracy down to the micrometer range. SpecGAGE, on the other hand, is perfectly suited to measuring the shape, curvature and flatness of small objects with specular surfaces, such as tablets, smartphones or glass lenses.

FORMSCAN Solar measures the efficiency of solar reflectors. One major glass processing company uses the solution not only because it offers the "best value for money, but also based on its fast online measurement, combined with the ability to correct defects immediately." According to the customer, the system proves "highly

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effective in differentiating between the various quality grades of individual solar reflectors.”

Simple, cost-efficient and robust system design

All ISRA solutions feature a simple, cost-efficient and robust system design that is perfectly suited to both online inspection during production and offline inspection in the laboratory. The two-camera system also makes the solutions very easy to configure. They enable extremely fast and accurate measurements, without the need to prepare the measured objects first.

ISRA's solutions unlock tremendous customer benefits by combining maximum product quality with minimal operating and maintenance costs while guaranteeing fast return on investment. In addition to providing the basis for 100% quality control, the measurement systems pave the way for increased process efficiency and advanced production processes. The connected measuring systems provide valuable information for process analysis and assistance systems that boost process efficiency even further. Assistance systems support manufacturers by providing intelligently aggregated information and displaying it clearly. ISRA has made a significant contribution toward Industry 4.0 with these systems, enabling users to benefit from a substantial competitive edge.

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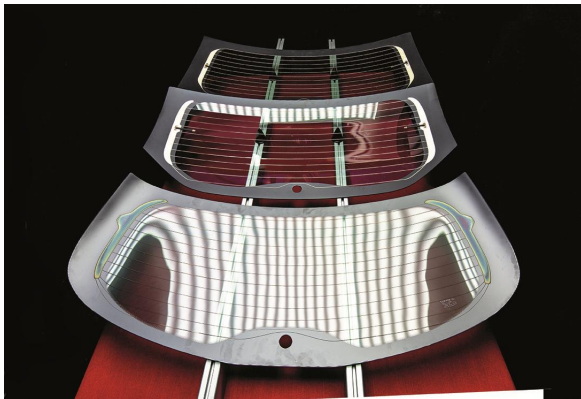
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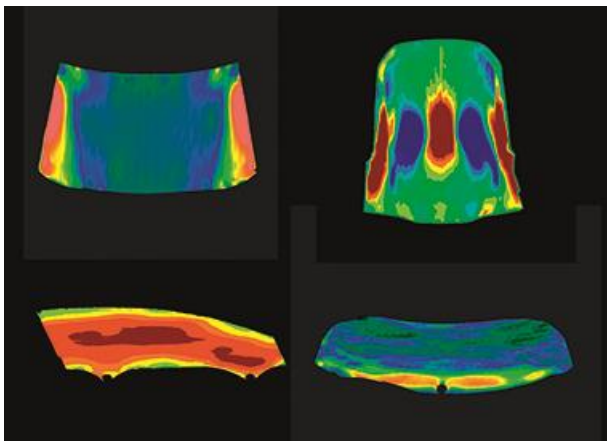
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Images



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Fully-automated 3D inline measurement of curved glass panes – comprehensive and contact-free.



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Reliable and fully-automated 3D measurement of specular and reflective surfaces such as windscreens.

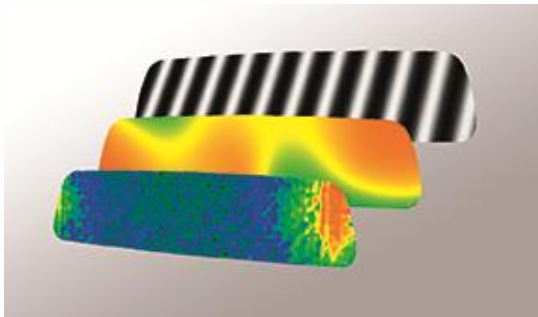
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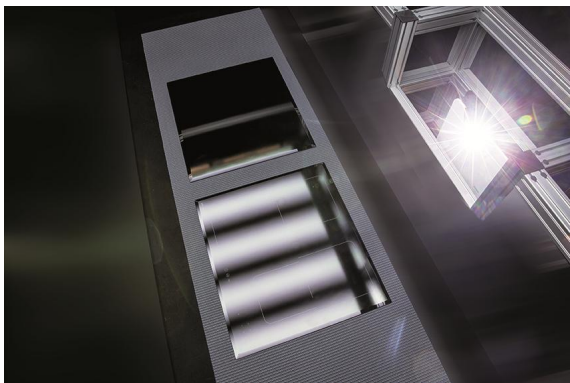
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The 3D measurement method is also suitable for reliably inspecting the size, curvature and flatness of highly complex objects such as small parts with specular surfaces.



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In the inspection of ceramic cooktops, for example, factors including flatness and planarity are becoming increasingly important and are now inspected inline.

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