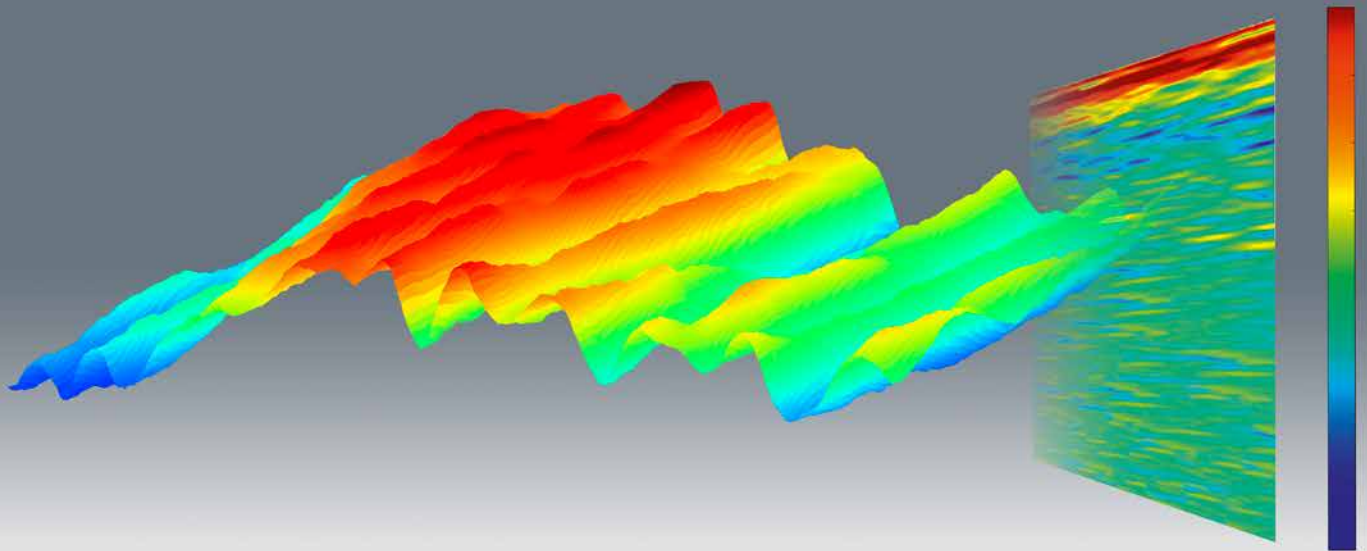*Product Info*

ISRA
VISION

Automatic Full Surface 3D Measurement for Float Glass
World´s First Solution for Flatness and Waviness in <10 s

High Precision. Fully Automated.

Analysis of the flatness, waviness and reflected distortion properties is crucial for the production of high quality glass in automotive and architectural applications, as well as for overall improvements of the float glass production process.

Current measurement methods are based on point-by-point analysis: Glass sheets are placed on a flat table and the edge flatness is inspected with a feeler gauge. This test method is time-consuming, results are subjective and unprecise as only the edges of the sheets can be measured. A coordinate measurement system/arm provides more accurate results, but the measurement is still slow and only few points per sheet are measured.

With ISRA's P²-3D – based on the patented stereo-deflectometry technology – the flatness and shape of glass sheets can be measured reliably down to the µm-range within less than 10 seconds.

Utilizing the P²-3D technology the measurement result is presented as a full surface height map and additionally as a vertical and horizontal curvature map. Curvature maps are a highly sensitive tool to improve the process quality as they visualize float lines and local waviness, especially near the ribbon edge, which can be critical for the grinding quality.

Application
- Measurement of glass sheets after cutting
- Suitable for all glasses

Advantages
- Measurement time <10 seconds per sheet
- Full surface contact free measurement
- Reproducible objective results
- Independent of operator
- Independent of glass positioning, or rotation
- Process information from
  - Height map
  - Vertical and horizontal curvature

Benefits
- Fast results at the beginning of each campaign
- Immediate feedback on sheet flatness, waviness and quality
- No manual inspection
- Detect all 3D shape defects and reduce claims
- Avoid further processing of defective glass
- Optimize production process

Why Reflected Distortion Matters

Highest glass quality does not only depend on transmission optics. Reflection optics play a crucial role for the esthetic (example image a)). Additionally non-flat sheets can lead to quality problems during the cutting, grinding and after the laminating processes. Moreover, after lamination the waviness can lead to strong lens effects and problems in transmission, if glass sheets with uneven surfaces are laminated together (see image b)). To ensure only suitable glass is processed, not only transmission optics, but also the flatness and waviness of the glass have to be tested.

BAD

GOOD

image a)

Single Glass Sheet
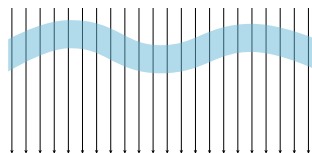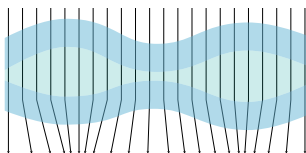Surface not flat, but no optical distortion in transmission

After Laminating
Strong lense effects, transmitted distortion

image b)

Measurement Principle

The measurement methodology is based on ISRA´s patented stereo-deflectometry technology: Glass sheets from the float line are placed on a marble table for immediate inspection. The measurement itself takes less than 10 seconds.

Result

Analyzing ongoing product quality with this fast, reliable and precise measurement system gives immediate feedback at the start of a new campaign or after a change of the glass thickness.

The result: Optimized production process. Reduced operating costs. Only best quality delivered.

ISRA VISION

Optimize your ROI with the technology leader ISRA
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