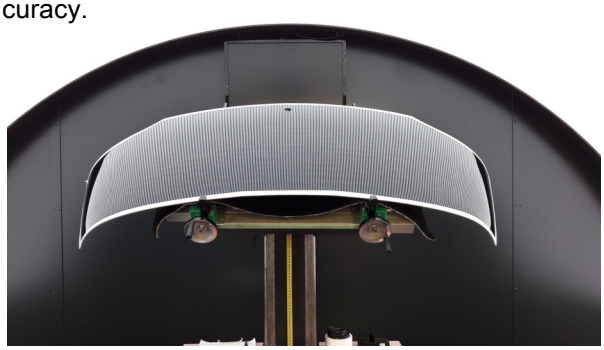
OptiGlass

Surface Appearance Quality Control

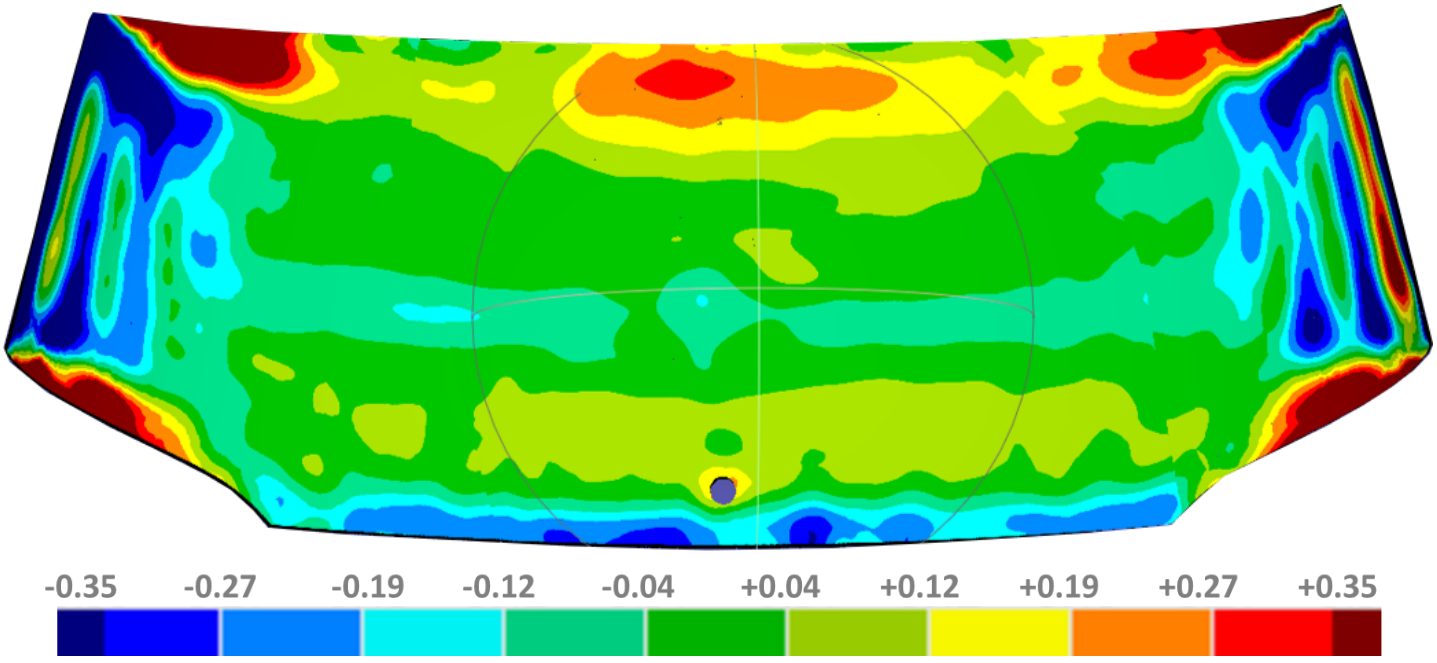
Measurement of Glass Quality Appearance

OptiGlass is designed to measure the reflective optical properties in automotive glass which directly impact the perceived appearance (read aesthetic) quality.

The system provide reliable and objective judgement of the reflected distortion based on absolute 3D Deflectrometry for 3D shape of the glass and absolute curvature results with highest accuracy.



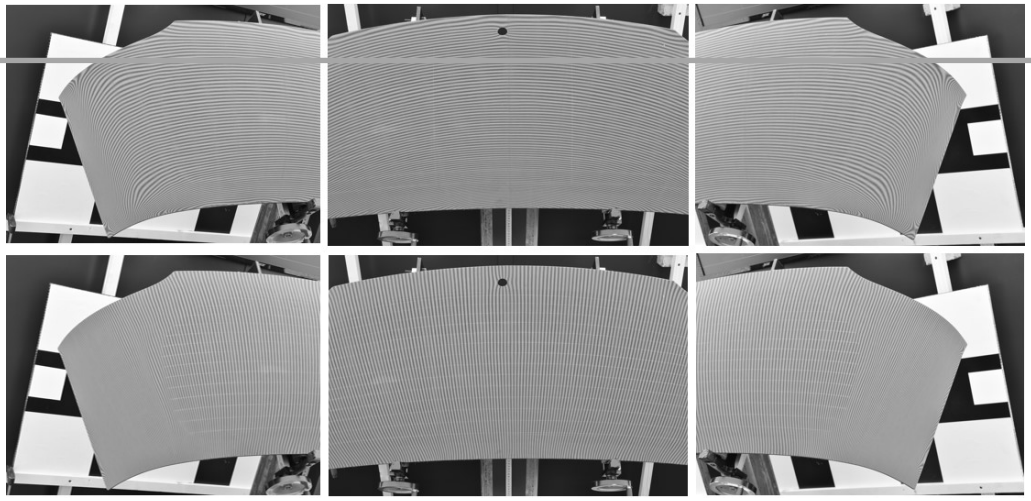
A further advantage is the compactness design based on our own curved screen LED technology. The solution can be provided as a standalone equipment or as a dual station that integrate both the OptiGlass and OptiFrag technologies into one common Audit Station generating cost-savings for client by regrouping two distinct and complementary solutions into a single hardware equipment.



Hight performance in glass Appearance

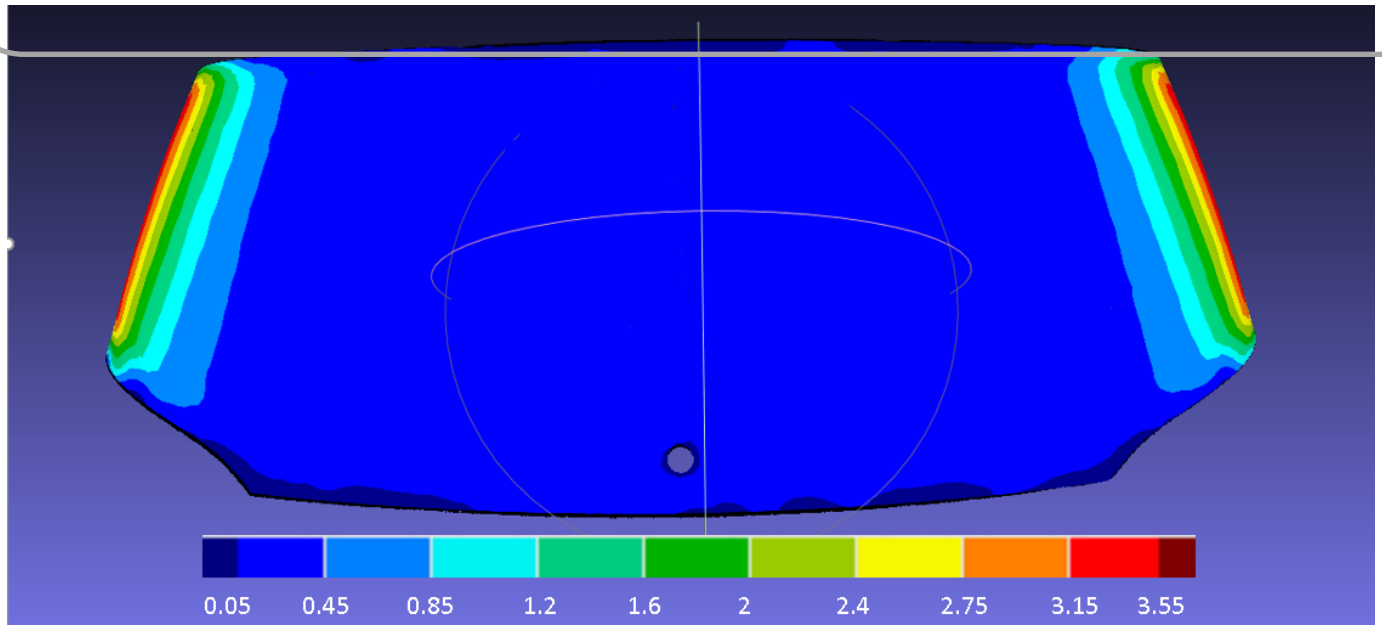
- ⇒ **Curved screen technology --> Compactness of the equipment**
- ⇒ **Better distribution of reflected fringes --> uniform sensitivity**
- ⇒ **Absolute measurement of 3D Shape and Curvature**
- ⇒ **Same hardware for 2 different applications (OptiGlass & OptiFrag)**
- ⇒ **Automated calibration for absolute measurement with optimal signal-to-noise ratio**
- ⇒ **Fast and reliable measurement**
- ⇒ **Compliant with VW-PV 8203 specifications**

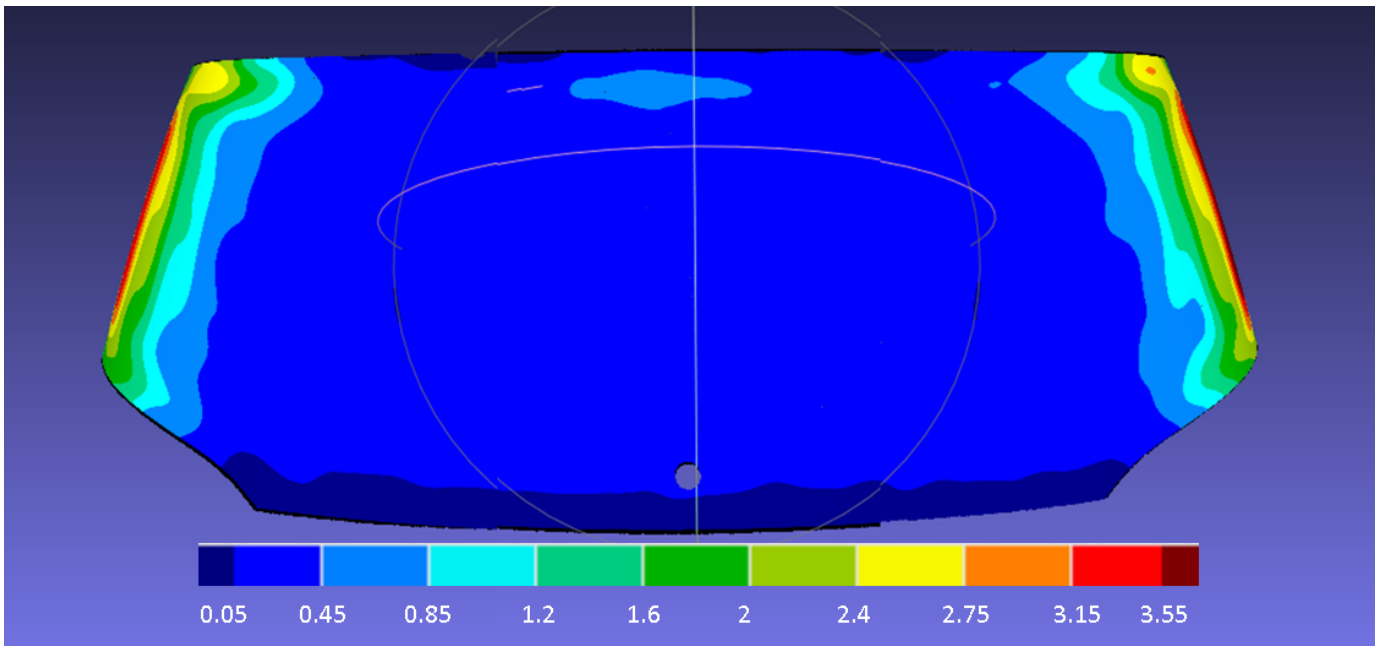
Breakthrough solution for Autom



Absolute 3D s
curvature mea

OPTIGLASS provides 3D abs
measurement that can be direct
data. As an example an auto
and display between the CAD
shape measured (green colo
data of the glass is automatica
compare with de 3D curvature
the VW-PV8203 specifications.

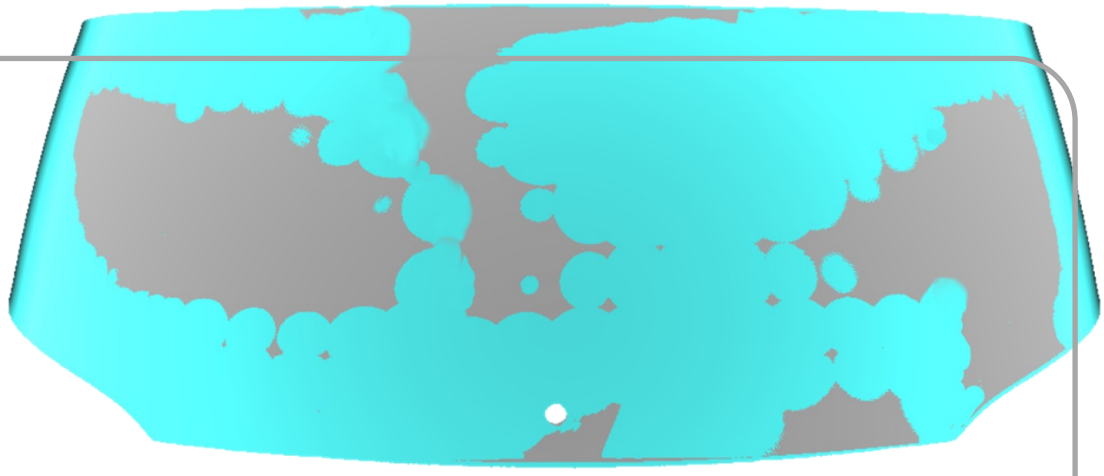


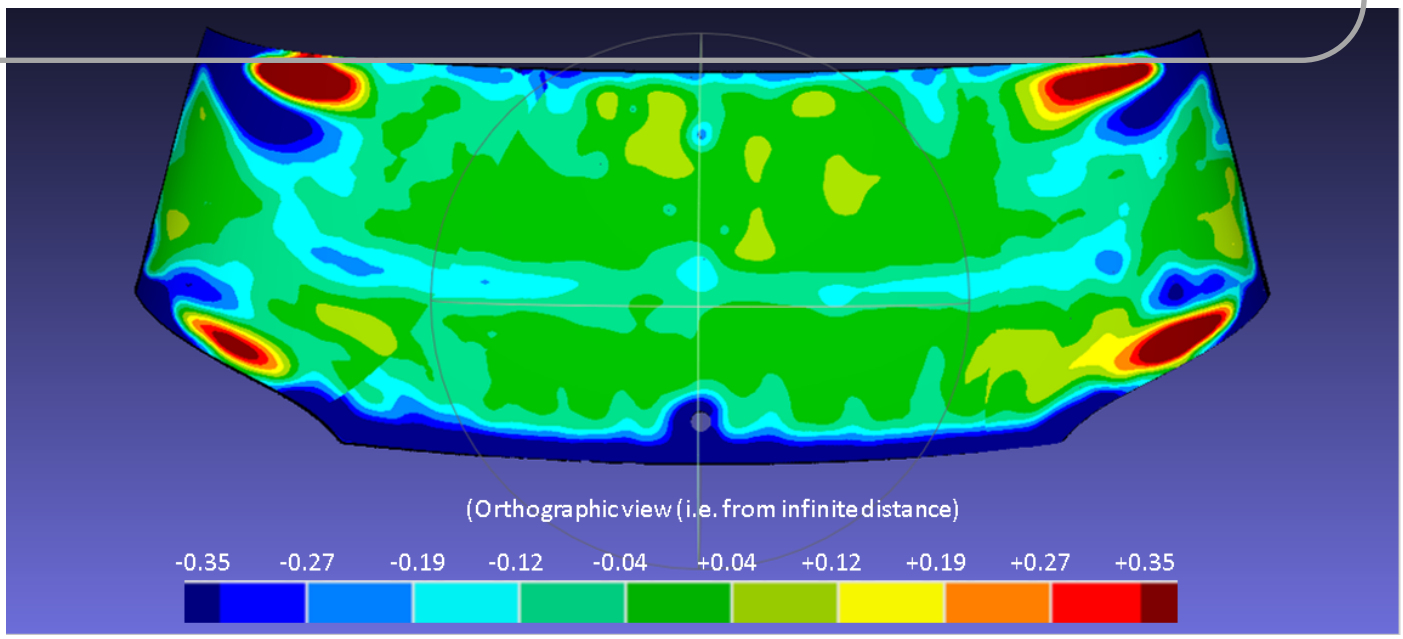


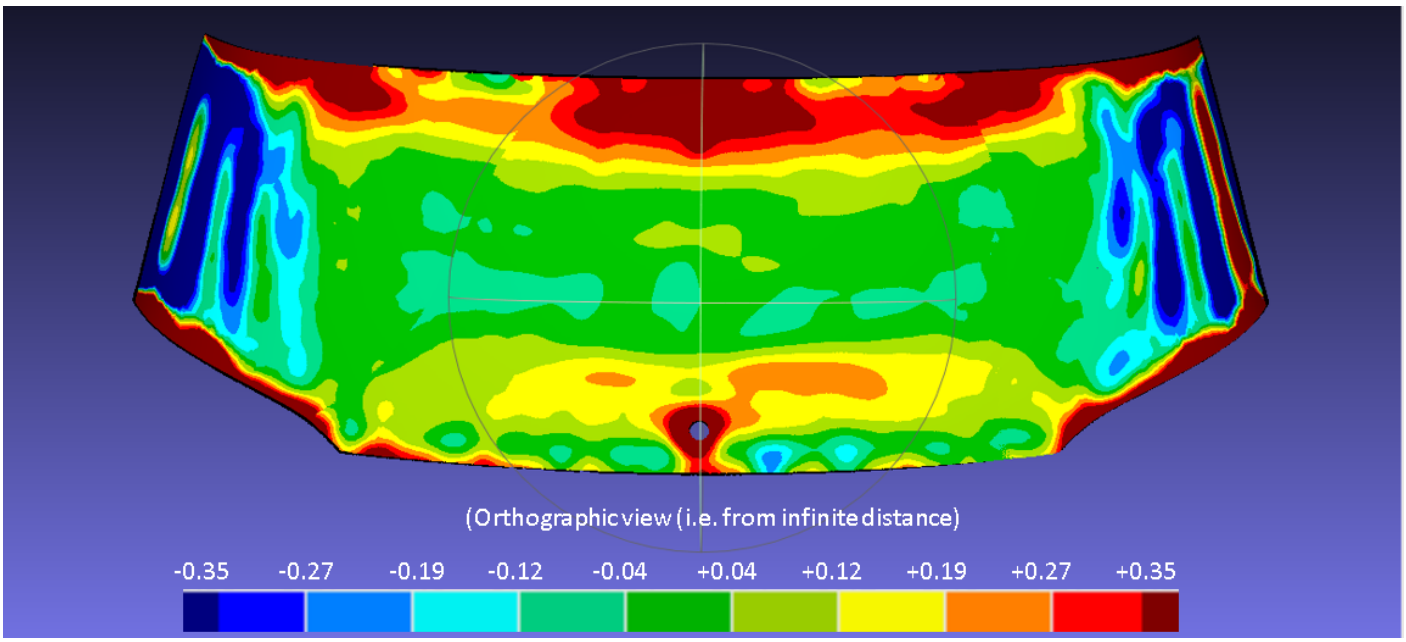
ated Optical Inspection of Glass

shape and asurement

solute shape and curvature tly compared to nominal CAD matic better fit is calculated data (Grey color) and the 3D r) by the system. The CAD lly calculated in curvature to measurement as requested in

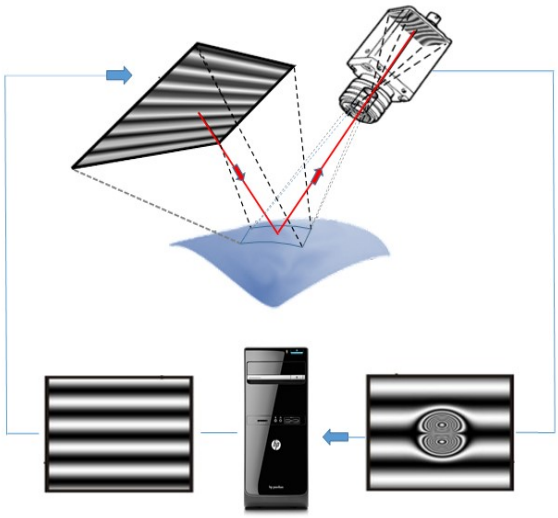






Absolute 3D deflectometry apply to glass appearance

Principles of measurement:



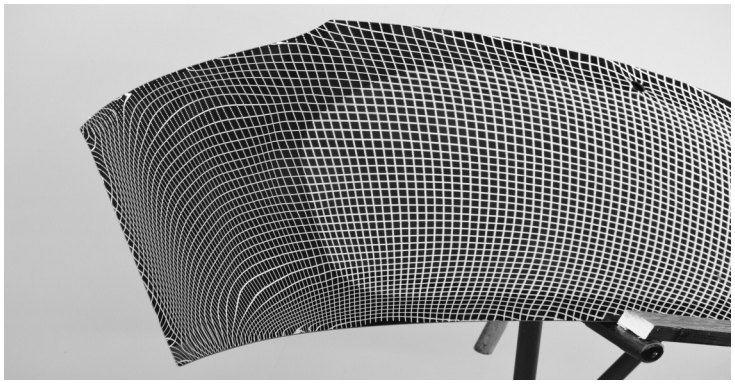
The applied technology is based on advanced reflective Deflectometry. The measurement setup requires a dynamic screen to display periodic fringes using structured light. As well as a high resolving camera set observing the reflected light on the measured surface (near the center of curvature of the tested sample).

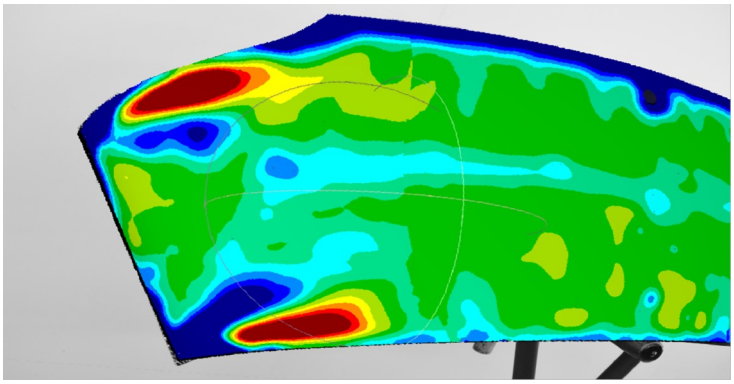
Since light rays are reflected by the surface with an angle of incidence equal to the angle of reflection. The measured surface slope will be distorted where a local slope variation suddenly modifies the path of the reflected image. Deflectometry provides an accurate solution to measure the local slope map and, with the help of digital derivation, enables the quantification of the local curvature variations.

A possible surface defect is described as a rapid and sudden change in the surface's local slope. The relevant information for defect visualization and quantification is found in the slopes' gradients.

Deflectometry analysis can either be applied through a temporal (phase-shifting) mode or through a spatial mode, the latter method requiring only a single image. The applied principle varies in relation with the environment and needed spatial resolution.

The "reflected fringe technique" is used to gauge objects with specular reflective surfaces, with the specular surface acting as mirror. A computer-generated fringe pattern is displayed (using a dynamic screen), the pattern being reflected on the inspected surface. The reflection feeds a virtual image of the fringe pattern to a dedicated camera, digitalizing the image as a result. The acquired fringe pattern reflection will be distorted according to changes in the slope of the measured surface, highlighting quality defects





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