

Planness measurement of display glass

Thinnest glass of outstanding flatness is required for the production of displays for telecommunication equipment. During glass production measuring and monitoring of the flatness is a decisive factor for quality inspection. The results of these measurements can be used for optimising the production process. On a high-precision hard rock table in the measuring room samples of these thinnest glass plates are measured by laser-optical triangulation sensors with an accuracy of $5\ \mu\text{m}$. For this purpose a stable, torsion-proof portal with 6 to 12 optical displacement sensors optoNCDT is moved in a non-contacting way (on air-cushion bearings) across the measuring table (hard rock plate), thereby scanning the complete glass plate. A PC software processes and analyses the measurement data, and calculates the flatness values. The hard rock plate, which serves as a reference, features a flatness of $4\ \mu\text{m}$ (optically flat).



Mechanical unit of the measuring system

- Measuring table made of impala
- Flatness of the contact area: $4\ \mu\text{m}$
- Dimensions: 2180 x 1619 x 320 mm
- Weight: 3000 kg
- Measuring portal of box-frame design, extremely torsion-resistant, 4-point air-cushion bearing with individual pressure monitoring (floating height $6\ \mu\text{m}$), max. traversing distance: 1400 mm
- Complete system clean roomclass

Sensor unit of the measuring system

- 6 pc. laser-optical displacement sensors ILD 2000-6.15
- 2 pc. capacitive displacement sensors S 601-0.5 with 2 pc. single-channel electronic units DT 610
- 1 pc. draw-wire sensor WDS 2000-P80

Software of the measuring system

- Application generated with graphical program development environment ICONNECT
- Size: Approx. 1000 modules, structured with macros
- 4 concurrent signal graphs
- Operating system: Win 95

Application

Measuring System requirements

Software:

Routine measurement:

- Measurement data acquisition and visualization (see pic. 1)
- Control of traversing
- Calculation of the measured variable
- Archiving of the measurement data
- Data transfer to the SPC system
- Generation of a measurement record (see pic. 2)

Set-up operation:

- Measurement data acquisition
- Positioning of the portal
- Generation of a measurement record

Parameter database:

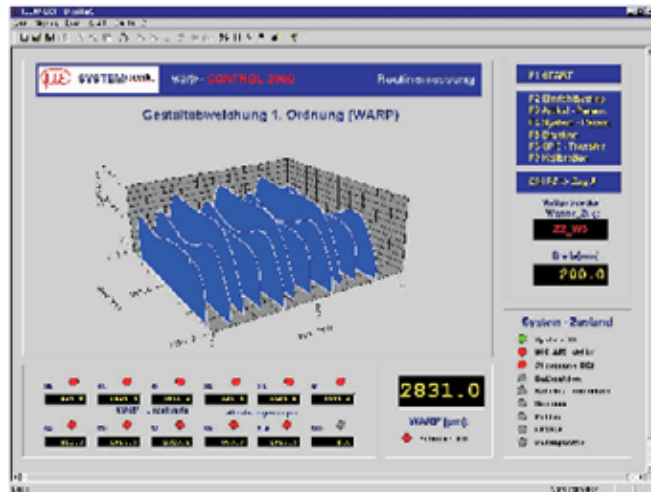
- Definable hot-keys for easy access by the measurement personnel
- Parameter editor protected by different access levels

Statistics:

- Automatic calculation of test equipment capability

Sensor unit:

- Measuring range: 6 mm
- Absolute measuring accuracy (with software linearization): $\pm 2 \mu\text{m}$
- Reproducibility (static): $0.2 \mu\text{m}$
- Environmental conditions: Air-conditioned measuring room



Pic. 1 Visualization - Routine measurement



Pic. 2 Measurement record - Routine measurement