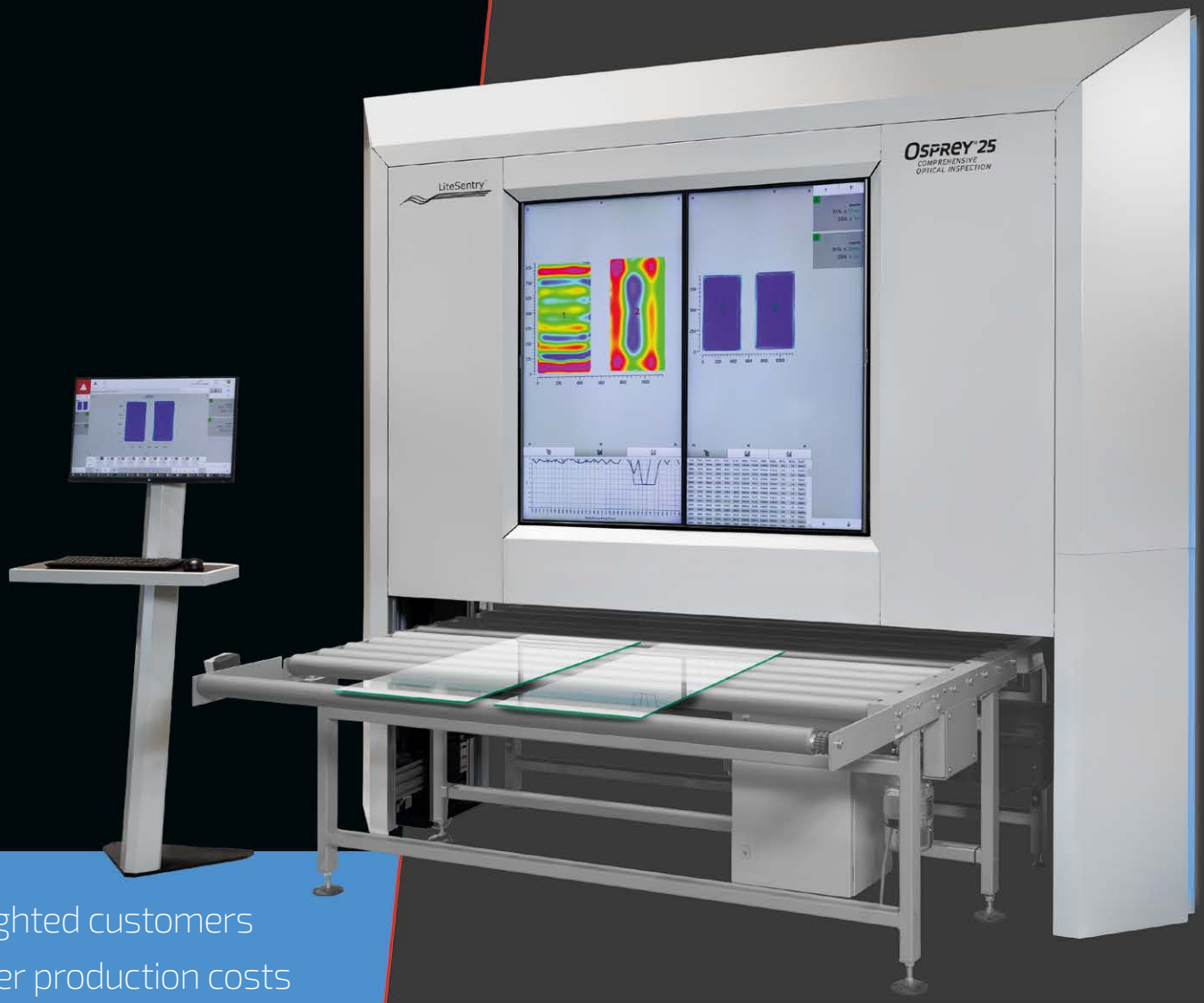
LiteSentry™

OSPREY® 25

COMPREHENSIVE
OPTICAL INSPECTION



- delighted customers
- lower production costs
- increase profits
- rapid ROI – less than 12 months
- fast deployment – installed and measuring faster than you can train manual inspection
- win new business – gain higher margins

THE PREMIER DISTORTION, ANISOTROPY AND SURFACE INSPECTION IN A SINGLE FOOTPRINT

www.glassquality.com

The ONLY OPTICAL TECHNOLOGY that measures all forms of distortion in all directions

With 25 years of continuous development, our cutting-edge technology automates flatness inspection, enables process control, and measures types of distortion that manual methods can't detect.

With optional best-in-class anisotropy and surface quality inspection, all results are combined in an intuitive, fully customizable user interface and stored securely in an SQL-based database.

OSPREY® 25
COMPREHENSIVE
OPTICAL INSPECTION

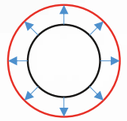
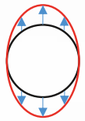
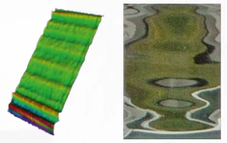
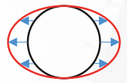
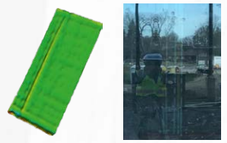
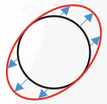
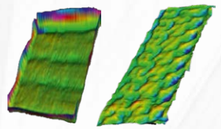
- 100 % online automated measurement of glass flatness
- archives quality data and statistics
- measures types of distortion other technologies cannot
- immediate feedback gives unprecedented process control of tempering condition
- precise distortion measurements of any shape or form
- identifies maintenance issues before producing rejectable product

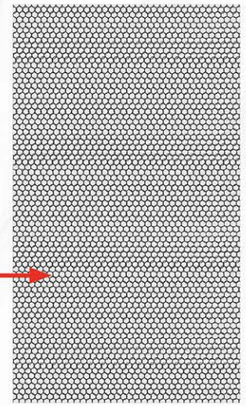
Distortion Check	●
Anisotropy Check	●
Quality Check NEW	●
Edge Chips NEW	●
Sight Line Check	–
Dimension Check NEW	●
Logo Position & Quality Check NEW	●
White Haze NEW	●
Load Control	–
Overall Bending Check	–
Glass Thickness Check	●
Glass Type Recognition	●
Data Matrix Code Interpretation NEW	●
Break Pattern Check	–

▲ *The Osprey® 25 detects what others miss and scales with your business!*

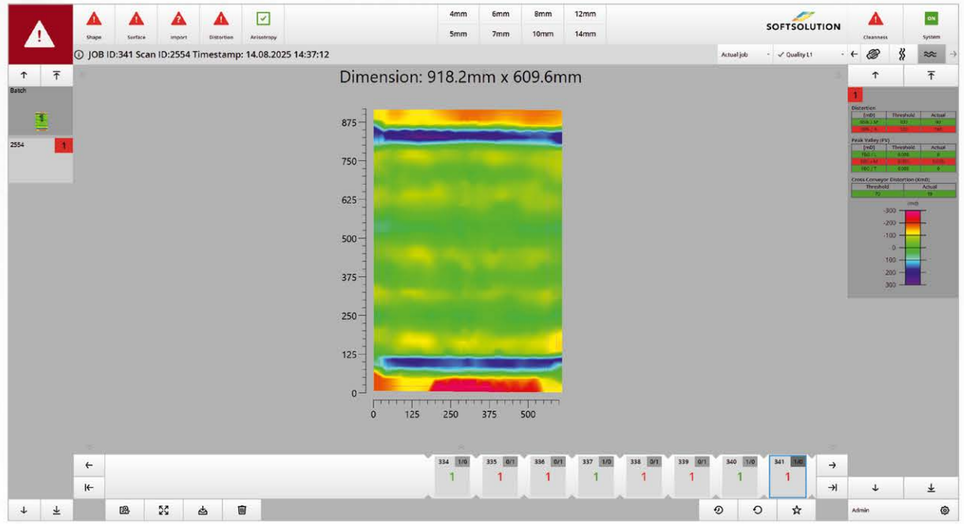
UNIQUE TECHNOLOGY: Distortion360

- omnidirectional optical power measurement
- distortion is measured in all directions simultaneously
- measurement to all edges

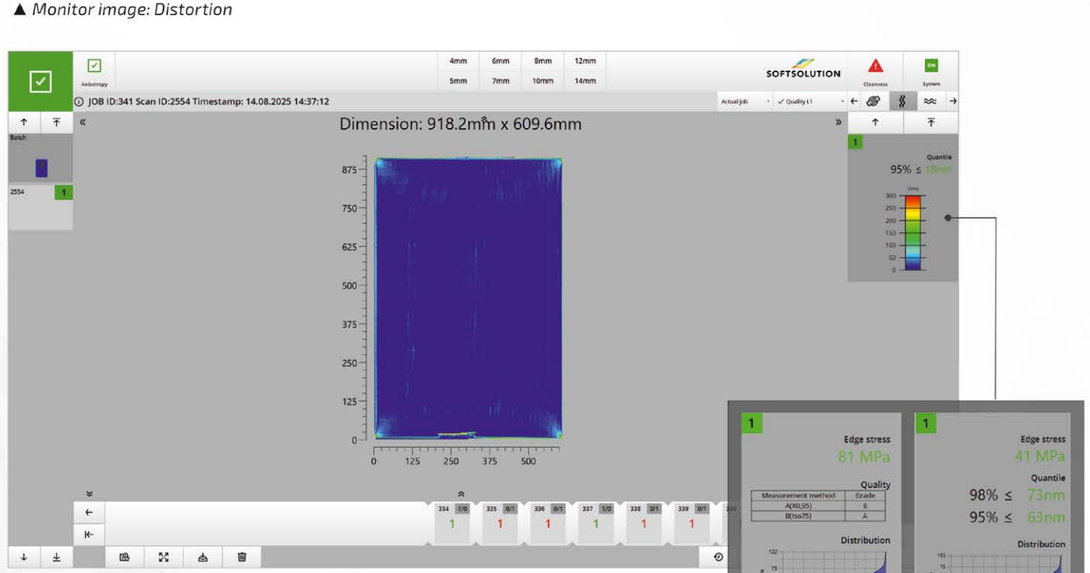
Distortion Type	Optical Power +	Optical Power −	Example
Spherical Power is equivalent along all axes—often a component of pocket distortion			
Rollwave Historically measured with 1D flatbottom gauge along travel direction (sole RWE type)			
Centerkink *aka Cross-conveyor or XmD distortion* This is very hard to see with standard zebra board and will not be measured with roller wave or single 1D measurement systems			 Photo courtesy of RosenBEC
Mixed Power varies over all axes—often a component of pocket or picture framing distortion			



Redesigned user interface

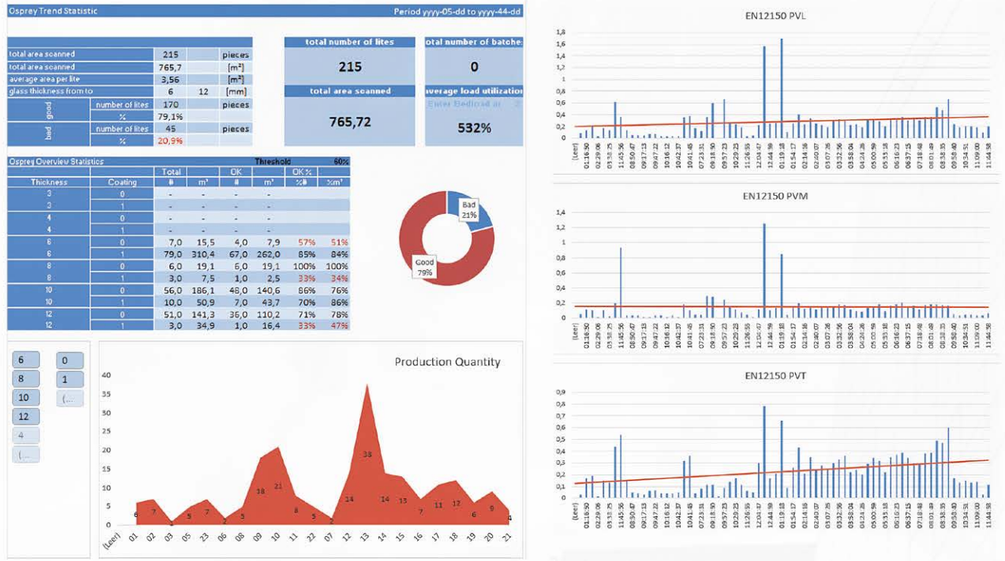


▲ *Monitor image: Distortion*



▲ *Monitor image: Anisotropy*

Statistics
Osprey & Production PV Trend



Archiv allows 3 different outputs

Certificates

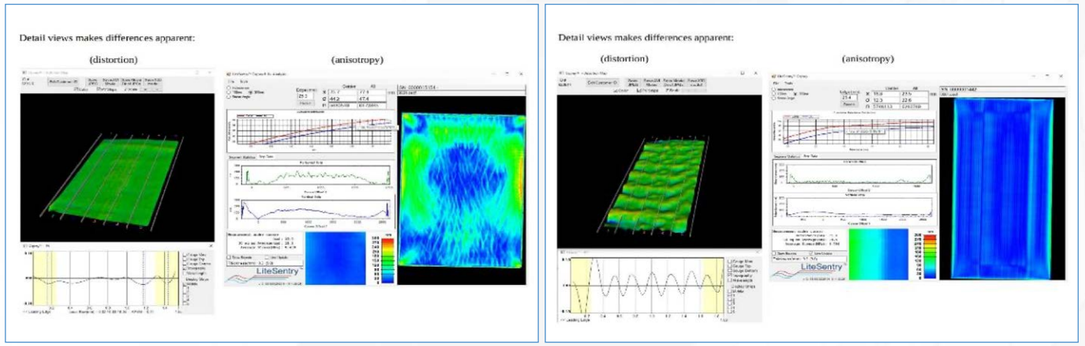
- Different reports to be used for certificates to be given to the client

Excel based statistics

- Excel statistics based on templates; can extended by the customer individually

Mass data export

- Data export in Excel or CSV format; available to be used for individual requirements

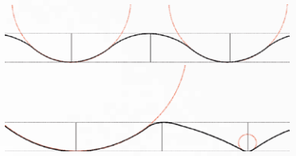


▲ *Anisotropy and distortion are distinct properties. You better MEASURE BOTH!*

Osprey® 25 measures all types of distortion in millidiopter as well as peak-to-valley in mm or inches

ALL TYPES OF DISTORTION
in millidiopter as well as peak to valley in mm

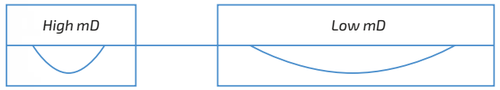
Top glass fabricators use mD to produce flat glass because it is a better representation of distortion as shown below. The Osprey provides accurate results for both mD and peak-to-valley in mm or inches.



In addition to the peak-to-valley measurement, our Osprey will also take a millidiopter measurement of your glasses.

Difference between peak-to-valley measurement (in mm) and millidiopter measurement (in mD):

- peak-to-valley measures the *depth* of distortion
- millidiopter measures the *shape* of distortion

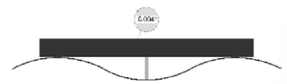


▲ *The shape of distortion is what causes the human eye to see distortion, not the depth.*

Roller wave PV gauges

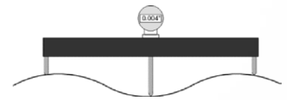
ASTM 1651 – Flat Bottom Gauge

- only measures valleys (peaks are zeroes)
- only measures top side
- does not measure edge lift (lead/trail 6" skipped)



ASTM 1651 – Three Point Gauge

- measures both peaks and valleys
- only measures top side
- does not measure edge lift (lead/trail 6" skipped)



EN1250 – Bar and Feeler Gauges

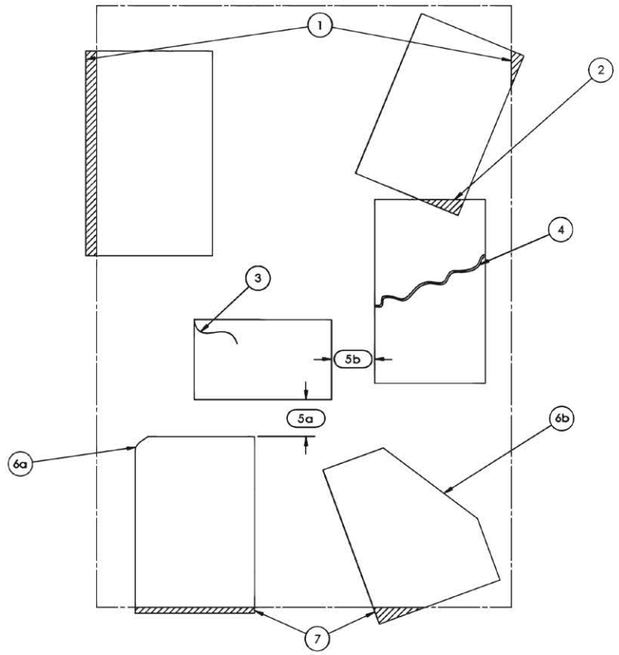
- measures both peaks and valleys
- measures both sides
- measures edge lift

Load Validator™

GEOMETRY AND FAULT DETECTION

PREVENTS BREAKAGE IN THE FURNACE AND QUENCH

- ensures correct load geometry
- detects long load, overlapping, broken corner, wide load, minimum distance
- non-conforming loads or defective glass triggers
- alarms that stop the conveyor system



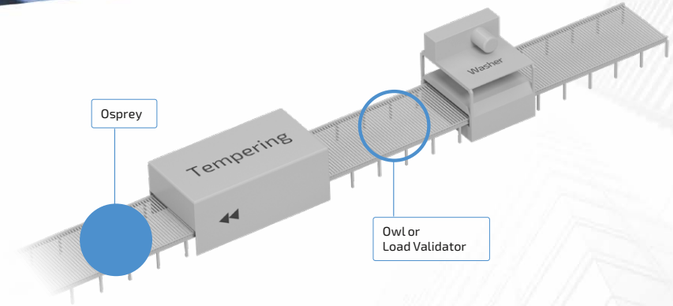
LOAD VALIDATOR CAN BE INTEGRATED INTO LINESCANNER

▲ *Different types of load errors:*

(1) wide load
(2) overlap
(3) broken glass
(4) broken glass
(5a) + (5b) minimum distance
(6a) + (6b) broken corner
(7) long load

Owl®

RECIPE SELECTION AND FAULT DETECTION SYSTEM



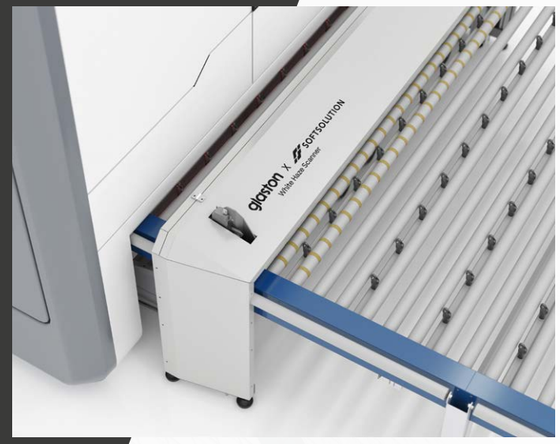
- automatic furnace control
- optimize heat time and other furnace parameters by coating, thickness, glass color, bed utilization and location of parts
- ensures correct load geometry
- glass thickness, color and coating automatically measured
- detects long load, overlapping, broken corner, wide load, minimum distance
- eliminates operator errors
- communicates with an Osprey to confirm all parts in a load are present

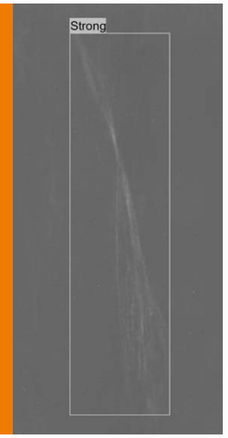
White Haze detection

LineScanner WHITE HAZE

DETECTING WHITE HAZE ON TEMPERED GLASSES

- self cleaning system with integrated blow-off function
- white haze detection in different levels
- unique reflection-based scanning
- focus on bottom surface
- AI based software algorithm
- invented and developed in cooperation with glaston
- smallest footprint ever

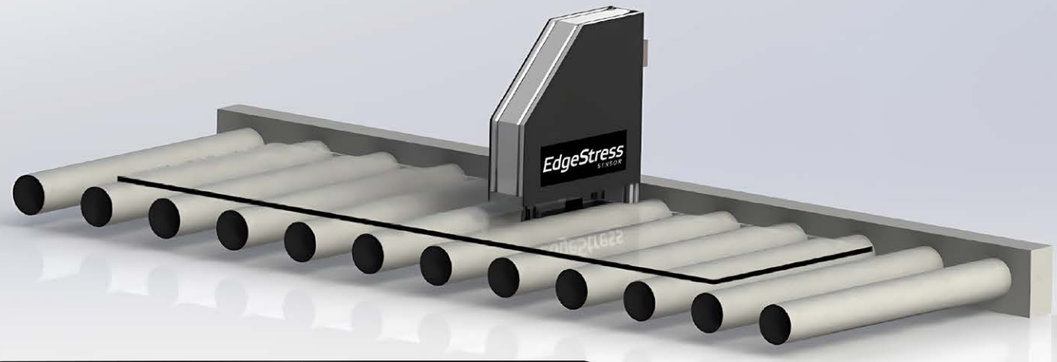


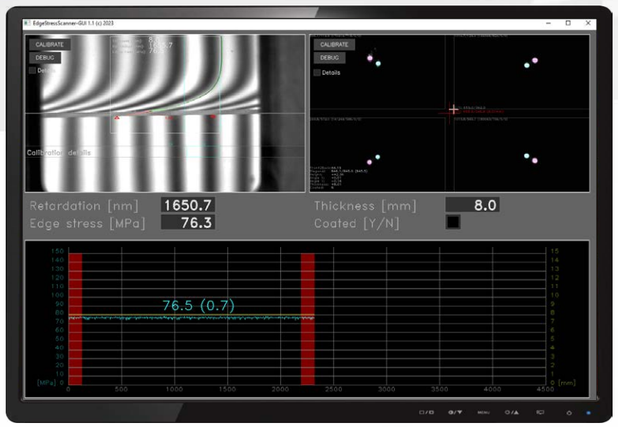
WHITE HAZE SCANNER – CLASSIFICATION	MILD	MEDIUM	STRONG	
	Visible with external light source	*Visible haze with closer inspection*	*Visible haze*	
	Not considered a problem in glass industry, can often be easily rubbed off the glass surface.	Can be unqualified especially for quality oriented customers.	In many cases categorized as unqualified, especially in high value installations.	

WHITE HAZE

EdgeStress SENSOR

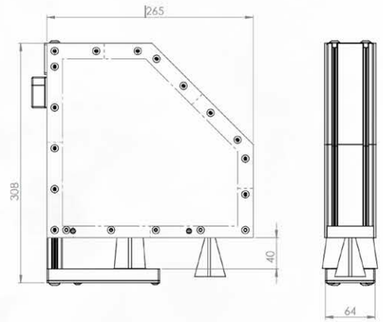
PRECISION EDGE STRESS AND THICKNESS INSIGHT, INLINE AND IN REAL TIME





▲ *The EdgeStress Sensor's user interface*

- inline capable
- integrated glass-thickness measurement
- variable evaluation options
- free of manipulation
- record, archive, trend, …



GASP® POLARIMETERS

PREMIER NON-DESTRUCTIVE OPTICAL STRESS INSPECTION

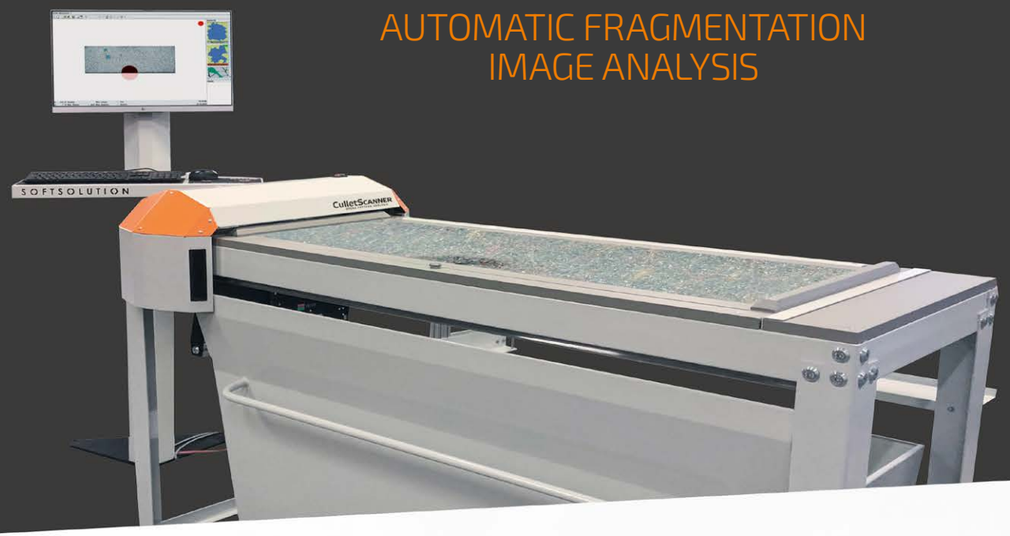
- non-destructive surface stress measurement for heat treated glass
- confirm if glass is properly tempered or annealed per industry norms and regulations
- fast and easy to operate
- suitable for flat and curved surfaces
- compliant with EN-12150, EN-1863, ASTM C1048, and ASTM C1279 standards
- measures up to 25,000 psi (180 MPa) surface stress
- robust field and production environment performance

	Laser GASP	**LCD-GASP** MOST POPULAR	**GASP-Pro**
			
STRESS RANGE	0 – 25,000 psi (0 – 172 MPa)	0 – 25,000 psi (0 – 172 MPa)	> 10,000 psi (> 69 MPa)
OPERATION	Manual	Manual	Semi-automatic
INTERFACE	Eye piece	LCD screen	Mobile device(s)
COST	●	●●	●●●

CulletScanner

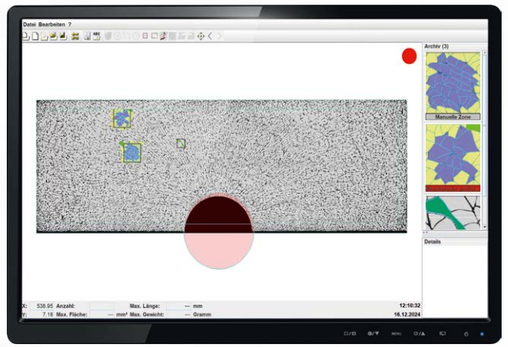
BREAK PATTERN ANALYSIS

AUTOMATIC FRAGMENTATION
IMAGE ANALYSIS



- automatic break pattern analysis
- standard size for 1100 x 360 mm
- full automatic fragmentation test for various glass types (up to 14 mm)
- precise calculation of length, area, weight of every single cullet
- detection of longest, largest, smallest cullet – all standard norms
- only system which checks the entire part
- automatically finds worst areas
- prevents operator errors
- 3 sizes available
- several norms available
- certificates and digital images

Watch the CulletScanner video online ►



▲ *The user interface shows every break pattern in detail*

glassquality LiveView

Real time machinery status

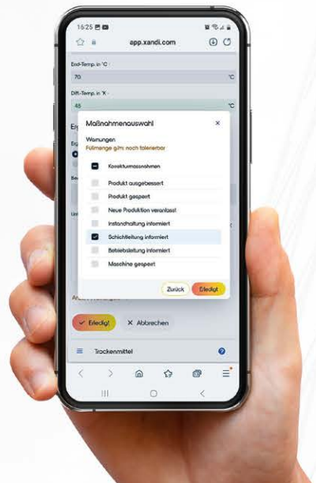
LIVEVIEW

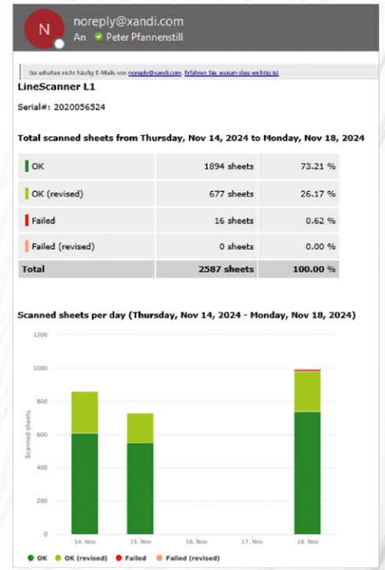
Name	Width	Serial	Status	Cleanliness	last hour	this hour	scans Nov 19	OK %	not OK %
L1	2300	2020056524	ONLINE	Cleaning required	0	0	978	99.28	0.72
L2	2700	2020059352	ONLINE	None	110	79	755	99.34	0.66
L4	2300	2018048018	ONLINE	Cleaning recommended	156	100	1291	98.06	1.94

- accept data from LineScanner and Osprey
- real-time status of numerous inspection systems
- accessible via any mobile device — worldwide
- production overlook
- good / bad information

LiveView realized with XANDI

Web application that digitizes in-house production control





Inspection Capabilities of Our Systems by Glass Type

TSG / HEAT TREATED GLASS

White Haze
Anisotropy
Distortion
Optical Distortion
Overall Bending
Edge Stress

Load Control
Glass Thickness
Coating Side and Type
Recipe Selection

Break Pattern

IGU

Buildup
Frame Offset
Muntin Bars
Butyl Defects
Desiccant

Glass Thickness
Coating Side and Type
Pillar Position

LAMINATED GLASS

Glass Thickness
Coating Side and Type

AUTOMOTIVE SPECIAL

Logo Position and Quality
Pinholes
Screenprint Position
Heaterline Check

Scratches
Coating Voids
Inclusions
Bubbles
Fingerprints
Dirt
Edge Defects
Logo Position
Logo Quality
Sight Line Check

Dimension
Drillhole Position
Drillhole Diameter
CutOut Location and Layout
Data Matrix Code

All Technologies Available

- 90° parallel-light system with sensor based technology
- bright-field & dark-field technology with camera-technology
- reflexion-technology with sensor and stray-light technology
- spectrometer, sensor-technology with polarized filters

Watch the LineScanner video online

Together, we are
www.glassquality.com

LiteSentry™

SOFTSOLUTION

Strainoptics

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