

FLOAT GLASS | PATTERNED GLASS | COATED GLASS |  
CUTTING LINES



# Glass Inspection Technology

## A company introduces itself



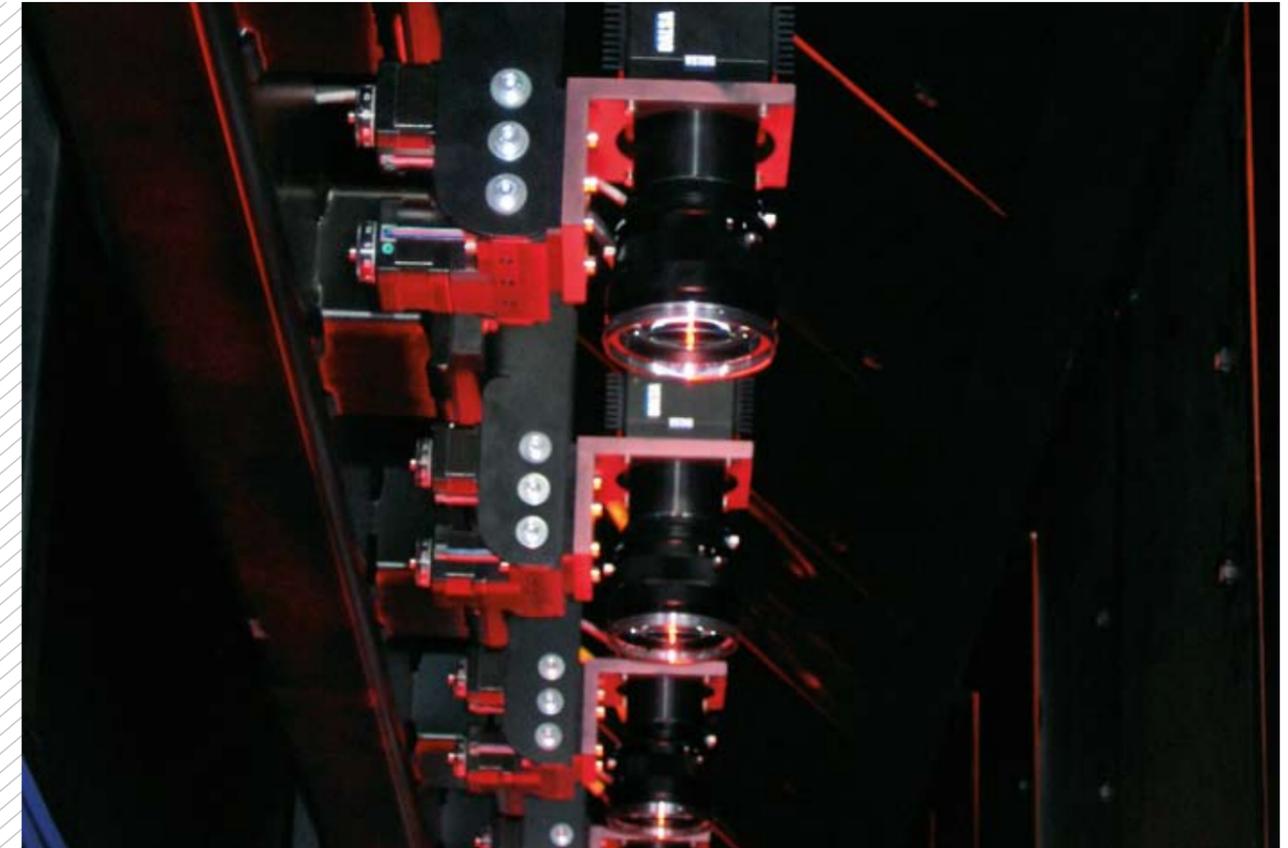
**Grenzebach has achieved its leading position as an acknowledged specialist in handling and processing technology** through intensive know how and long experience in the construction of processing equipment for material flow.

From a single machine to a complete production line – with its efficient process controlled equipment we are the trend setter for the flat glass industry. Working in close communication with our customers all over the world we design, manufacture and deliver project technology that is precisely designed for individual production needs. Just as recognised as its flat glass technology, the Grenzebach overall concept of manufacturing lines combined with good

find innovative solutions and to implement them successfully is our task. Grenzebach place great emphasis on maintaining cooperative partnership with its customers and business partners. While taking full advantage of modern communications technology, the direct and personal contact is especially important to us. With our affiliates and representation offices throughout the world we are always close to your vicinity.

control technology is successful in the production and processing of building panels, in the processing of gypsum from raw material to finished plaster board and in cutting and drying of veneers. “Open to new ideas” provides the basis for continuous new development in all aspects of our business. The capability to

## Glass Inspection by Grenzebach



**Grenzebach ALGOSCAN is the preferred partner, when optical glass inspection is needed.**

Technical innovation is the mainspring for rising demand of more precise and faster inspection systems.

Different glass manufacturing and processing branches rely on us because of our considerable experience in this field. Based on 50 years continuous advancement our technology enables our customers to detect the tiniest defects inline, and also to measure different glass parameters. We use the best and fastest new technology in optics, software, hardware and mechanical components.

Grenzebach ALGOSCAN stands for high quality products and services. We are up to date with the

latest technology. More than 650 of our systems are operating worldwide.

Our success is based on two factors: delivering outstanding quality and providing on-site support and service to our customers worldwide – in cooperation with our partners.

We integrate our systems directly into the production process. Smallest defects in the  $\mu\text{m}$ -range can be detected. This also applies to high production speeds.

## Float Glass Inspection



### The float glass process dominates the production of flat glass

used for architectural applications, like windows, mirrors and furniture.

Optimum quality is of key importance for every application of glass in downstream operations. The float glass runs on the conveyor through the camera inspection system IQLine G, which detects all typical float glass defects.

CCD- Cameras with an intelligent LED-Illumination detect defects in the material. This information is processed by a high speed evaluation system for use by the operator, PLC, Optimizers and further peripheries. Automatic inspection is essential for each float glass line, as a constant high quality is needed to ensure maximum yield of the production itself and for the quality of the final product.

#### Float Glass Inspection

Inspection width: up to 6000mm

Material speed: max. 25 m/min

Material thickness: 1 – 25.4 mm

Optics: CCD-Cameras with intelligent  
LED-Illumination in Transmission  
(Option: Reflection)

Optical resolution: 130µm

Detected defects: Bubbles, Inclusions, Scratches,  
Cracks, Particles, Inclusions, Drips,  
Tin spots

Defect Classification: Automatic

Communication: Visualization of defects, Statistics.  
All common interfaces for printer, marker, Cutting,  
Database, remote diagnosis and maintenance via  
Internet

## Patterned Glass Inspection



### Patterned glass with the structure on one or both sides is mainly used in housing and solar applications.

Conventional inspection systems fail, because the structure of the glass often covers many defects. However, the unique optical design of the IQLine G suppresses the structure of the glass. All typical glass defects will be detected even in cases of low contrast. The high-performance hard- and software is specially-designed to report all defects online. Additionally, the classification clearly separates embedded defects and surface defects, so you will see whether a bubble is in the glass volume or split open on the surface. A small defect, if embedded in the glass of a ceramic hob, for example, can mostly be ignored, but a bubble on the surface will make it unsaleable. For that reason, a clear identification of the kind and position of defects is essential if an increase in production yield is to be ensured.

#### Patterned Glass Inspection

Inspection width: up to 6000mm

Material speed: max. 25 m/min

Material thickness: 1 – 25.4mm

Optics: CCD-Cameras with intelligent  
LED-Illumination in Transmission  
(Option: Reflection)

Optical resolution: > 50µm

Detected defects: Bubbles, Inclusions,  
Scratches, Cracks, Particles, Inclusions,  
Surface Deformations

Defect Classification: Automatic

Communication: Visualization of defects, Statistics.  
All common interfaces for printer, marker, Cutting,  
Database, remote diagnosis and maintenance via  
Internet

## Coated Glass Inspection



**Over a wide area of technical applications,** float glass sheets are coated with thin layers.

There are many different kinds of coatings, including mirrors, filters, electrical conducting or anti reflective coatings. Mostly, the quality of the coating is very important because each kind of defect can influence the functionality negatively. So it is necessary to spot defects and their location accurately. An automatic inspection directly after the coating process ensures the detection of all typical defects. This is the only way to notice problems with coating in time and to take immediate countermeasures in the process control. Since a consistently high quality is needed for maximum yield of the final product, an automatic inspection system is absolutely essential for each coating line.

### Coated Glass Inspection

Inspection width: up to 6000 mm  
 Material speed: up to 120 m/min  
 Material thickness: 1 – 25.4mm  
 Optics meras with intelligent LED-Illumination in Transmission (Option: Reflection)  
 Optical resolution: > 100 µm  
 Detected defects: Debris, Stains, Voids, Tin spots, Residues, Arcings, Scratches  
 Defect Classification: Automatic

Communication: Visualization of defects, Statistics.  
 All common interfaces for printer, marker, Cutting, Database, remote diagnosis and maintenance via Internet

## Shape and Edge Inspection



**Glass panels leaving cutting lines** have to be inspected especially for the correct sizes, rectangularity and edge damage.

Furthermore there might be additional grinding lines and other process steps which require inspection. Grinding defects are mostly inaccurate C- or K-shapes, shiners, burns and edge chips. Also additional handling scratches will be detected by using our inspection solutions for glass cutting lines. The systems are intended for high production speeds, acceleration and deceleration of the glass panels.

### Glass Inspection for Cutting Lines

Inspection width: up to 6000mm  
 Material speed: up to 90 m/min  
 Material thickness: 1 – 25.4 mm  
 Optics: CCD-Cameras with intelligent LED-Illumination  
 Optical resolution: > 100 µm  
 Detected defects: Chips, Cracks, Sizes\*, Rectangularity\*

### Edge Scanning System

Inspection width: up to +/- 25mm  
 Material speed: up to 60 m/min  
 Optical resolution: > 60 µm  
 Detected defects: Chips, Cracks, Burns, Shiners, Scratches  
 Defect Classification: Automatic  
 Communication: Visualization of defects, Statistics.  
 All common interfaces for printer, marker, Cutting, Database, remote diagnostics and maintenance via Internet

\* Accuracy depends on the conveying system



**GRENZEBACH Automation GmbH**

Wikingerstraße 11  
76189 Karlsruhe, Germany  
Phone: +49 721 95240-4000  
Fax: +49 721 95240-50  
e-mail: info.ga@grenzebach.com

**GRENZEBACH Corporation**

10 Herring Road  
Newnan, Georgia 30265, USA  
Phone: +1 770 253-4980  
Fax: +1 770 253-5189  
e-mail: info.gn@grenzebach.com

**GRENZEBACH Machinery (India) Pvt. Ltd.**

Devdar 4th Floor, Plot No. 83, S.No. 98  
Bhusari Colony, Poona 411038  
Maharashtra, India  
e-mail: info.gpun@grenzebach.com  
e-mail: amod.patwardhan@grenzebach.com

**GRENZEBACH Maschinenbau GmbH**

Albanusstraße 1-3, Hamlar  
86663 Asbach-Bäumenheim, Germany  
Phone: +49 906 982-2000  
Fax: +49 906 982-2108  
e-mail: info@grenzebach.com

**LJU Automatisierungstechnik GmbH**

Am Schlahn 1  
14476 Potsdam, Germany  
Phone: +49 33201 414-16  
Fax: +49 33201 414-19  
e-mail: info.glju@grenzebach.com

**GRENZEBACH Machinery (Shanghai) Ltd.**

388 Minshen Road, Songjiang Industrial Zone  
Shanghai 201612, P.R. China  
Phone: +86 21 6126-8000  
Fax: +86 21 57685220  
e-mail: info.gs@grenzebach.com

**GRENZEBACH Mashtech Ltd.**

No. 61 Novocheremushkinskaya Street  
Moscow 117418, Russia  
Phone: +7 495 626-5881  
Fax: +7 495 626-5882  
e-mail: info.gmos@grenzebach.com

**GRENZEBACH BSH GmbH**

Rudolf-Grenzebach-Straße 1  
36251 Bad Hersfeld, Germany  
Phone: +49 6621 81-3000  
Fax: +49 6621 81-93613  
e-mail: info.gbsh@grenzebach.com

**GRENZEBACH Algoscan GmbH**

Machtlfinger Straße 21  
81379 Munich, Germany  
Phone: +49 89 748558-0  
Fax: +49 89 748558-599  
e-mail: info.gal@grenzebach.com

**GRENZEBACH Machinery Taiwan Ltd.**

No. 38, 2F, Keya Rd., Central Taiwan Science Park  
Taichung 428, Taiwan R.O.C.  
Phone: +886 4 25667796-101  
Fax: +886 4 25687896  
e-mail: info.gtai@grenzebach.com

**GRENZEBACH Machinery S. r. L.**

Via Savona 11  
12045 Fossano, Cuneo, Italy  
Mobile: +39 348 6042740  
Fax: +39 0172 630716  
e-mail: info.gfos@grenzebach.com