VISION INSPECTION SYSTEMS FOR GLASS

DELTAMAX
AUTOMAZIONE
After a long and fruitful collaboration, in 2010 Virmax and Delta Automazione decide to join forces to create Deltamax Automazione, a new company that aims to be a single partner for the improvement of production standards of its customers. With more than 25 years of experience in their respective fields and various installations made in Italy and in several other countries in the world, Deltamax Automazione offers to its customers a strong and technically prepared team to follow all the stages of each project, from technical specification definition to installation, including the training of personnel and an efficient after sales service. These features, combined with the important research work done to renew the systems with higher performance and find new solutions to meet customers increasingly demanding, allowed Deltamax Automazione to plan an important growth path. Growth path which also led to the displacement to the new plant in Spini di Gardolo, where more spaces and equipped laboratories allow the Deltamax Automazione team to properly test the new products developed.

By its nature, glass is an item in which it is easy to find defects: to satisfy their customers and reduce claims and substitutions, without changes in the production process or increasing its cycle time, manufacturers nowadays need the support of automatic visual inspection systems. Responding to this need Deltamax Automazione has developed various systems for the quality control of flat glass: usually installed online, these systems permit the inspection of the whole production with detection of various type of defects, evaluating them according to the rules defined by the quality department. The performance and reliability of the solutions developed by Deltamax Automazione are witnessed by a growing number of satisfied customers: the collaboration with the main manufacturers of tools and machineries for glass production ensures constant developments aimed at continuous innovation and performance improvement of all glass related products.
GlassInspector detects the typical defects of double glazing unit production process, and evaluates them according to the quality standard easily set by the Customer with the recipes management tool. Since the first installation done in 2007 in Finstral SpA, one of the most important Italian windows and door producer, GlassInspector is the more effective tool to support the operators to find and repair glass defects or reject the single plate.

With the exclusive inspection method developed by our technical team, GlassInspector increase the performance in surface defects detection. Its software could be interfaced with most common ERP, thus facilitating data and images storage for statistical analysis and report about the trend of the production process. Adaptable to all insulating glass line without modification, GlassInspector required reduced space and limited maintenance.

**TECHNICAL FEATURES**

- Suitable for all types of transparent glass (low E included);
- Customizable quality level with parameters regulation;
- Classify defects depending on their characteristics;
- Minimum detectable defect: 0.1 mm;
- Maximum line speed: 40 m/min;
- Maximum glass thickness: 40 mm;
- Support services with continuous software upgrade.

**DETECTABLE DEFECTS**

Typical defects detected by the system are:
- glass defects like bubbles, inclusions, dots, etc;
- coating defects like lack, scratches, burns, abrasions, etc;
- process defects like scratches, blunts, fingerprints, dust, etc.

**MEASUREMENT & SHAPE CONTROL**

GlassInspector could be used to:
- measure the plate and send its dimension to the machines on the line;
- detect the plate shape and compare it with ERP schedule.

**IG UNIT CONTROL**

GlassInspector could be used to control the IG unit at the end of the process to evaluate the presence of defects like:
- frame misplacement;
- residues of butyl.

**COATING DETECTOR (OPTIONAL)**

Interfaced with GlassInspector or used stand-alone, CD is the tools developed to check the presence of coating on glass surface and measure the plate thickness. It could be used also to check coating presence on both external surface of IG unit.
The most versatile system: with this simple words we can define GlassInspector EVO. Developed as the evolution of GlassInspector system, it is easily adaptable to all the production lines requiring reduced space and limited maintenance.

GlassInspector EVO is the answer that fit the requirements of the modern production process in term of quality control: apart from typical glass defects detection, the system uses the comparison method to check if the acquired glass plate match the model defined by the Customer.

For a fully automated solution, GlassInspector EVO could be interfaced with the line to manage non-compliant glasses rejection. With the aim of developing a complete and functional tool for production manager EVO could be completed with Production Analyzer, a software that use all the data elaborated by the system to analyse production process to find repetitive defects, typical defects and their position on glass plate, produce report and graphics about production trend.

TECHNICAL FEATURES
• Suitable for all lines (horizontal and vertical);
• Multiple control with the same system;
• Customizable quality level with parameters regulation;
• Classify defects depending on their characteristics;
• Minimum detectable defect: 0.1 mm;
• Maximum line speed: 40 m/min;
• Maximum glass thickness: 40 mm;
• Support services with continuous software upgrade.

DETECTABLE DEFECTS
Typical defects detected by the system are:
• glass defects like bubbles, inclusions, dots, etc.
• process defects like scratches, blisters, fingerprints, dirty, etc.
• edge defects like chips, breakages, etc.
• grinding control like reduction or increase.

MEASUREMENT & SHAPE CONTROL
Comparison with model is used to:
• measure the plate;
• control the shape of the border;
• control the position and dimension of its machining.

SCREEN PRINTING CONTROL
Using comparison with model to:
• verify the printing completeness;
• check for defects in the printing like holes, scratches, etc;
• control the position to find rotation or shifts;
• check for drops of ink in the transparent area.

GlassInspector EVO could also control the completeness, position and rotation of the logo.
DELTAMAX - GLASSINSPECTOR OPT

Developed to be installed on all cutting tables and easily interfaced with all the optimization/cutting software, GlassInspector OPT inspect float glass to find unrecoverable faults, returning as a result a map of the inspected sheet with the gravity and position of the detected defects. This map could be used by the operator to verify the detected faults and sent to the optimization software (semi-automatic usage) or sent directly to the optimization software (fully automatic version), that have to exclude the non-compliant areas and prepare a new cutting program.

This guarantee the minimization of glass scrap and avoid to process sheets which have to be rejected later in the production process, or could generate Customer claim if not founded. This benefits ensure a fast return of the investment, the optimization of the whole process and an increase of the production quality.

TECHNICAL FEATURES
• Suitable for all cutting table;
• Control all types of transparent glass;
• Easy interface with all optimization/cutting software;
• Semi or fully automatic version;
• Bubbles and inclusions detection;
• Glass scrap minimization;
• Avoid processing of non-compliant glasses;
• Support services with continuous software upgrade.

IMAGE ACQUISITION
GlassInspector OPT acquire the image of the glass and elaborate it providing as a result the map of the defects with their position on the sheet. In the semi-automatic version operator use the map to verify the defects on glass plate.

IMPORT OF DEFECTS MAP
The optimization/cutting software use the information elaborated by GlassInspector EVO to check where the defects are and if they will affect glass sheet.

OPTIMIZATION PROCESS
The optimization/cutting software elaborates a new program excluding areas with defects.
FRAGMENTATION ANALYZER

FROG is the easier way to perform the fragmentation analysis required by the safety regulations and verify if the inspected glass respect the tolerances set by any specific field of production. This semi-automatic system allow the operator to choose the area and analyse it in real time to obtain information like the number of fragments and the characteristics (area, length, weight) of the largest ones. Data and images are thus automatically stored in a database.

ANALYSIS

FROG can perform the control in two different way:
• Single shot with one picture analysis;
• Sample analysis with evaluation of various images of different area on the same glass sheet.

DATA STORAGE

Both images and data elaborated are stored on user Pc. It is possible to choose the path and define the name of their directory. Additional information inserted by the user before starting the control are stored in the same place.

REPORTS

Customizable reports could be defined to summarize the result of the analysis, including images and the most interesting data, even among those inserted by operator.

Portable, fast, precise and reliable: four reason to choose FROG to automatize the fragmentation analysis of toughened glass, thanks to the database developed to manage the safety regulations sets for each field of production. With the user friendly environment operator can easily find the area to control, and perform it with real time result like fragments number and all the information about the largest ones.

FROG allows multiple images acquisition for each sheet, managing all the information elaborated to find out the bigger ones and their characteristics. It is possible to input additional data like the production shift, glass supplier, etc and the glass thickness, used to evaluate the fragments weight. All these information, along with images and data elaborated by the system, are automatically stored in a database and could be used to produce statistics or customizable report.

TECHNICAL FEATURES

• Suitable for any Pc (USB 3 connection required);
• User friendly Windows environment;
• Database for safety regulations management;
• Inspected area: 5x5 cm;
• Real time result according to the tolerances;
• Automatic data and image storage;
• Statistics and customizable report production;
• Support services with continuous software upgrade.

ANALYSIS

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