



LOOKING INTO THE GLASS FACTORY OF THE FUTURE



Tomorrow's glass production

Digital glass production enables us to behave proactively and with confidence and to quickly integrate new technologies and products into the overall system. Smart procedure for smart glass.



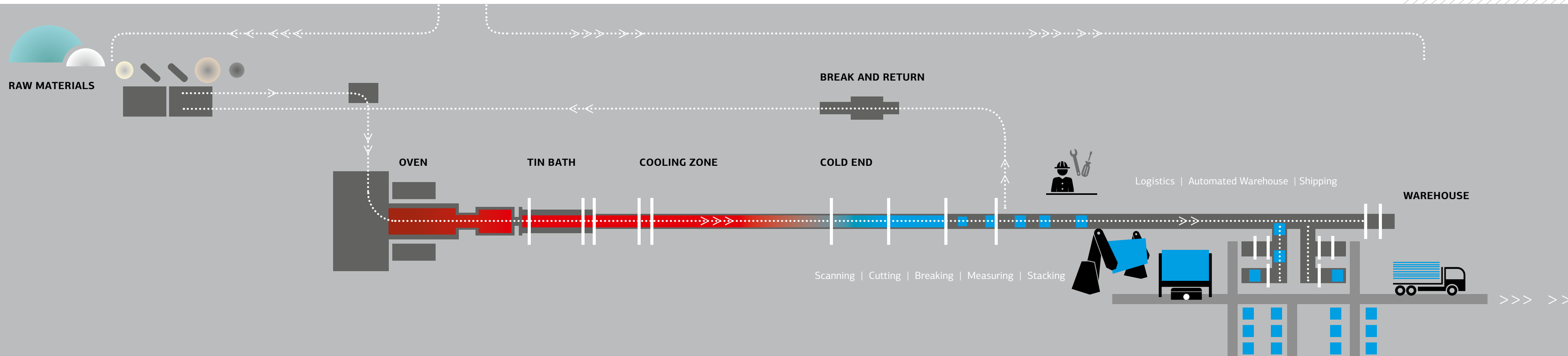
SERICY.

DIGITIZATION PLATFORM

The complete process from production to the warehouse to the user is digitally displayed. All information and data generated in the value chain of glass production can be used and analyzed, creating a tremendous benefit for continuous improvement.

Factory of the future means collaboration of people and machines. People lead and dictate the rhythm. Intelligent systems, machines and robots analyze processes and constantly optimize them. This encompasses the entire value chain from the mixing system to the oven and the cold end to the warehouse and further processing.

At Grenzebach we ensure that all players can communicate through the entire value chain – people, plant components, robots, and Automated Guided Vehicles. In the era of industrial internet, all digital resources are used in such smart ways as to create multiple added value for our customers.

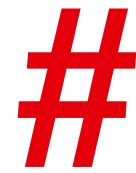
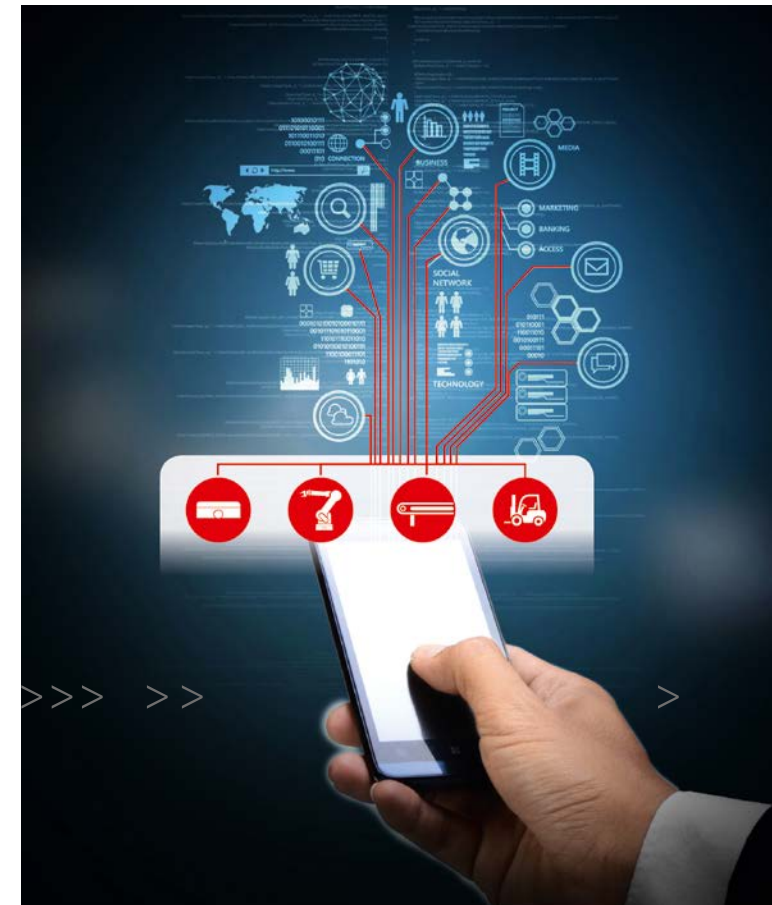


What the revolution aims to achieve

Digitization offers glass manufacturers the opportunity to revolutionize production processes. Intelligent Industry 4.0 means more efficient production providing higher quality and sustainability, and higher revenues.

In addition to the physical facilities for production, processing and logistics, digital assistance systems and services play a crucial role. Everything interlocks. Digital resources become real added value. Intelligent systems provide a platform for innovation that is yet unrealized.

Grenzebach can be a partner for the entire life cycle for a complete system, always focusing on real added value for our customers.



**BENEFITS
IN FOCUS**

- » Relieving staff
- » More robust processes
- » Better quality
- » Higher revenue
- » Mindful resourcing
- » Predicting maintenance needs
- » Data usage and analysis
- » Flexible and modular expansion
- » Generating new business models
- » Safe data handling
- » Using cloud services

CONNECTIVITY as the unifying medium of all plant components – the basis for consistent, far-reaching communication.

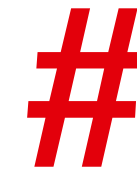
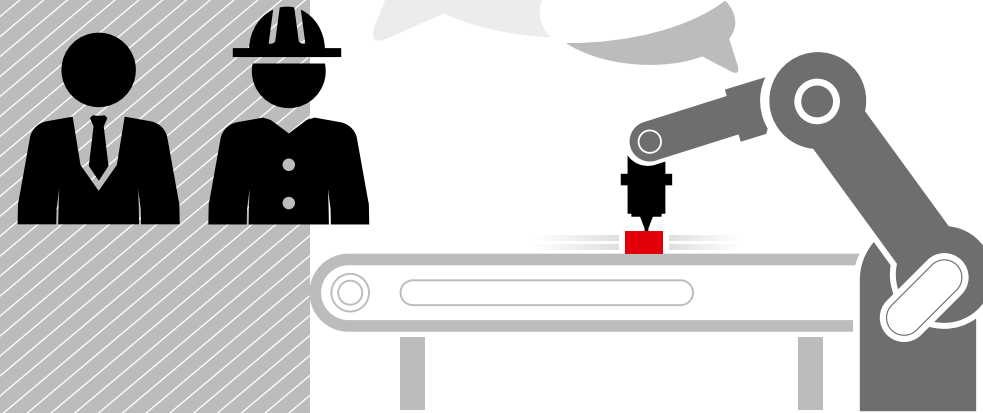
One platform, limitless possibilities

The control center for the glass factory of the future is the digitization platform SERICY. An IIoT platform developed in-house which coordinates all processes from glass production through the warehouse and on to the end customer, integrating all devices and systems from multiple sources.

This platform enables people, mobile robots and machines from all integrated manufacturers to communicate with each other. Using SERICY is as easy as using a smartphone; freely configurable, easily expandable and just the right app available for production at any time, future-proven for applications that are yet unknown.

The IIoT platform provides a unique way to integrate hardware and software across vendor boundaries and connect everything to the existing IT structure. An environment that enables data and information to be used for many departments and decision-making processes within the company.

Grenzebach provides a powerful and flexible IIoT platform to ensure that within the factory of the future everyone speaks the same language. Big Data turns into recommendations for action and information turns into tangible value for our customers.



**SERICY
IIOT PLATFORM**

Added value for users

CONNECTIVITY: SERICY is equipped with communication adapters for data-generating devices, sensors and actuators in the production environment. This creates a smooth connection between the Grenzebach IIoT solution and the global data world of the operator, both via cloud and on premises.

USING BIG DATA: SERICY collects, stores and prepares data, acting as an enabler. Data turns analysis into exact recommendations for action.

ANALYSIS WITH NO LIMITS: Analysis modules can be integrated according to individual requirements, for forecasts, preventative actions or for the establishment of a self-learning system. The motivators are always the achievement of an increased quality, quantity and resource efficiency level within glass production.

INCREASE EFFICIENCY: SERICY enables an integral process analysis which is supported by a large number of assistance systems.

SECURE WORK: SERICY has been developed on basis of the latest security requirements for industrial IT landscapes. This includes a secure architecture, authentication systems, firewalls, and encryption.

INDIVIDUAL INFORMATION: Reports can be created individually for the respective target group within the company – tailored KPI evaluations (Key Performance Indicator) are always up-to-date locally and on mobile devices.

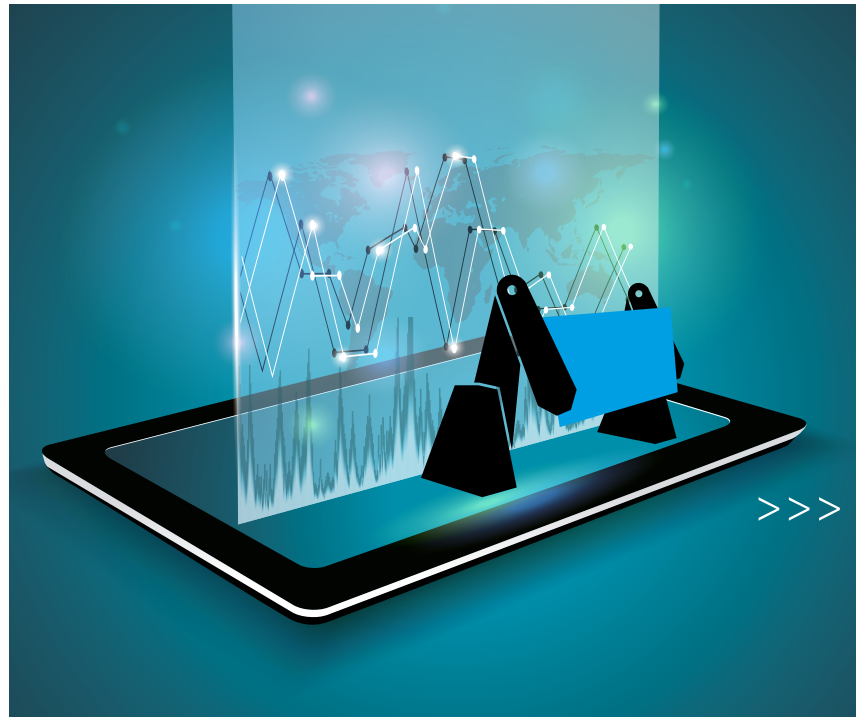
MODULAR AND SCALABLE: Expansion as needed: Via Grenzebach App-Shop further applications can be added at any time. Customers only pay for what is really needed within their factory of the future.

Stationary or mobile – flexible and intuitive

Within the factory of the future, employees are able to complete their tasks from almost any location: In addition to stationary control panels, the applications are available on mobile devices. So any place can be the right place to access information about the site and perform operator operations on a web platform.

Who is allowed to carry out what and when? The operator of the system individually decides via the integrated user administration.

We ensure that users of the system can access relevant information at all times – and can intervene when working remotely.



- » Mobile and flexible
- » Intuitive and convenient
- » Dashboard, self-customizable
- » Affordable
- » Expandable

MOBILE OPERATION



Assistance systems for users

Predictive Alert

WARNING MESSAGE TO THE OPERATOR: The system generates specific assistance and warning information to the operator. The operator receives all relevant facts and information to make decisions – and it shows how much time is left to take actions. This app helps to avoid a loss of production in the glass manufacturing or to significantly minimize down-time. Localizing areas of failure, identifying causes, informing maintenance personnel at an early stage and having spare parts ready provide the decisive advantage.

Task Manager

EFFICIENCY ON TOUR: The Task Manager, for example, provides the driver of a fork-lift truck with information about an upcoming driving job early via tablet or smartphone, including all necessary data and connection to the optional warehouse management system.

Settings Manager

GUARANTEED QUALITY: Within the Settings Manager, machine settings and recipes are saved and time-stamped. This makes it possible to track at any time with which settings individual production runs took place, directly linked to the product ID. Process data can be documented precisely – this is crucial to ensure product quality and comprehensibility. Successful settings are available directly for the start of the next production batch.

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With digital fingerprint

Digital production allows for complete tracking of individual glass sheets. Cut, edge grind, coated, laminated etc.: at all stages of the value chain countless product data is created – a wealth of information. This benefits most players, such as manufacturers, processors, planers or users.

Grenzebach offers a wide range of technologies to the glass industry that make the digital fingerprint possible, temporarily or undetachable via imprint, label, laser engraving or transponder; data that can stay with the product or in an external storage.

With RFID technology (Radio Frequency Identification) products can be recorded via radio, from the individual glass sheet to the finished product. Reading and writing data is possible at any time.

At Grenzebach we make sure that glass products are moving with the digital fingerprint. The information provided strengthens the trust between the different players along the value chain.

CODING DATA

- » Identification numbers
- » Product information
- » Order data
- » Time stamp

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Closely integrated

The factory of the future demands automation concepts that are constantly learning and optimizing themselves. Traditional conveying technology is expanded with modern robotics and Automated Guided Vehicles (AGV) that are on the go independently and highly available. Using AGV technology allows for lasting flexible processes. Stationary, mobile – plus robotics: combining all disciplines creates the perfect solution at any time. Controlled self-optimized by the fleet manager, an app of SERICY.

Overview of glass formats and qualities in the storage facility as well as the warehouse: for the intelligent networking of production, storage and shipping it is important to know which racks, pallets and goods can be moved and where exactly they are located. The warehouse control system provides information about this. It is the interface to the fleet manager.

- » **Managing inventory and storage location**
- » **Automated and optimized transport**
- » **Flexible and scalable**

At Grenzebach we make sure that the right products are available and handled intelligently, contributing to gains in efficiency.

4.0

Digital Service

SERICY is at the heart of the digital service. It offers a range of different applications:

ONLINE DOCUMENTATION: Everything from important procedures to manuals and detailed information is stored.

GUIDED TROUBLESHOOTING: The online documentation takes you directly to a troubleshooting guide.

DIGITAL SPARE PARTS CATALOG: The necessary parts are easy to identify – via 3D-model, keyword search or system labeling – and are ordered online. This service is interconnected with the Maintenance Manager (App).

IDENTIFICATION OF SYSTEM PARTS via QR-Code.

LINESYN RECORDER: Record material flow data and use for analysis.

PREDICTIVE ALERT: Early warning for future problems.

REMOTE SUPPORT: Experts that are readily available to assist remotely.

With our digital service at Grenzebach we increase system availability and process robustness for our customers.

SERICY
DIGITIZATION PLATFORM

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Secure in all dimensions

Perfectly clear: glass production must only be transparent for authorized users. Data protection and data security are our number one priority which is reflected in our responsible conduct, our products and services on a daily basis. We appreciate the trust from our customers and act accordingly.

Industry 4.0 opens many new dimensions – and nowadays security within a production facility goes far beyond data security.

Created via positive relations between

- » **Data availability**
- » **Data integrity**
- » **Maintainability**

Only with a multiple dimensional solution in this environment, security remains practice and customer-oriented. With high expertise in-house we design the necessary tools and services for the communication within the system to be manageable and transparent at all times.

At Grenzebach we develop security solutions for our customers that at all times keep pace with digital innovations. Procedures that are smart, robust and secure – and in exchange with our customers are constantly refined; this is what our experts passionately strive for.

IN FOCUS:
GRENZEBACH SECURE PLANT

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