

INTRALOGISTICS



TRANSFORMING INTRALOGISTICS

WE KEEP YOUR BUSINESS MOVING FORWARD

Intelligent intralogistics in just three letters: AGV

Seamlessly functioning intralogistics is the be-all and end-all for trading and manufacturing companies that want to stay competitive. Automation is the key.



There are plenty of good reasons for automating intralogistics, and many of them will apply to you:

- » **Safe process with high reliability – the goods always remain under the system's control.**
- » **High availability and flexibility – unlike the human workforce, the system is immediately scalable at peak times, and the goods carriers can be easily adapted to changing requirements.**
- » **Better and healthier working environment – the processes are more ergonomic, the strain on employees is reduced, so staff turnover decreases too.**

In the rapidly growing eCommerce sector, where order picking is becoming increasingly challenging, this challenge can be easily mastered with automated Goods-to-Person solutions. In manufacturing, where processes are becoming increasingly complex, solutions for Automated Goods Transport allow for a perfect interaction of all components involved in the process – your guarantee for flexible but reliable manufacturing.

In this respect, our Automated Guided Vehicles (AGV) are clearly superior to other solutions such as conveyor belts or vertical lift modules.

Only AGV can offer this package of benefits:

- » **Speed to market – the system is typically installed 30 to 40 percent faster than other automation solutions; employees can be trained quickly.**
- » **Parallel ramp-up possible – the technology can be set up in parallel to ongoing manual processes.**
- » **Unique reliability – for example, manual operation is possible in case of a power outage.**
- » **Flexibility and scalability – the system can be moved and expanded quickly and easily.**
- » **Ideal solution for urban areas – allows to be faster and closer to the consumer.**



GRENZEBACH – transforming how you do intralogistics

Investing in a Grenzebach automating solution means profiting from the best intralogistics competence.



We literally keep your business moving forward by automating your systems and processes – helping you grow and remain competitive even in a changing technical and social environment.

Our approach: holistic solutions that are configured to your needs. To do this, we carry out a detailed analysis of your current situation and, on this basis, develop a specific, well-designed solution package – including hardware, software and service. Trust our 60 years of experience in the automation of industrial processes: whatever we do, we do it for the right reasons and in the right way.

An additional benefit for you: we manufacture our vehicles ourselves and respect work, fire and health protection regulations so that we can promise you the highest industrial quality.

From the very beginning, we are considering and constantly developing work, fire and health protection: Since 2019, the control elements of our automated guided vehicles are galvanically isolated from the battery voltage and 360° person-safe due to a Lidar laser scanner.

With Grenzebach, you can feel secure.

- » **Independent, family-owned company with direct access to your contact person**
- » **Sourcing from some 650 engineers**
- » **Strong innovative power and rapid prototyping**
- » **References from numerous Blue Chip/Fortune 100 customers around the world**
- » **Manufacturing and Service locations on three continents mean we're available worldwide to provide global customer service.**

Plus, you benefit from our software advantages.

Our AGV technology is supported by state-of-the-art software solutions, which add real intelligence to your intralogistics operations. These include, among others:

- » **Lightweight Warehouse Execution System (WES)** to optimize fulfilment.
- » **Warehouse Control System (WCS)** with an integrated fleet manager (FMS) to coordinate the routes and delivery locations in industrial production.
- » **Virtual Reality (VR)** applications for training and projecting.

You want a warehouse that thinks for itself? Here it is.



GOODS TO PERSON SOLUTIONS

Work should be productive, and that includes logistics. Machine intelligence by Grenzebach can make a decisive contribution to productivity in order picking.

E-commerce is booming, and with the flood of new orders and same-day-delivery expectations, commissioning is becoming more and more challenging. Today, most related tasks are still performed by people. That means, for example, warehouse staff constantly walking around the warehouse with items on shelves or trolleys in order to collect products. This “walking time,” of course, is lost working time. If this is how your business works, the bottom line is: you're slower, less efficient and less competitive. And that means less profitable. So there are many good reasons to do things differently.

Our solution: Goods-to-Person – fully automatic

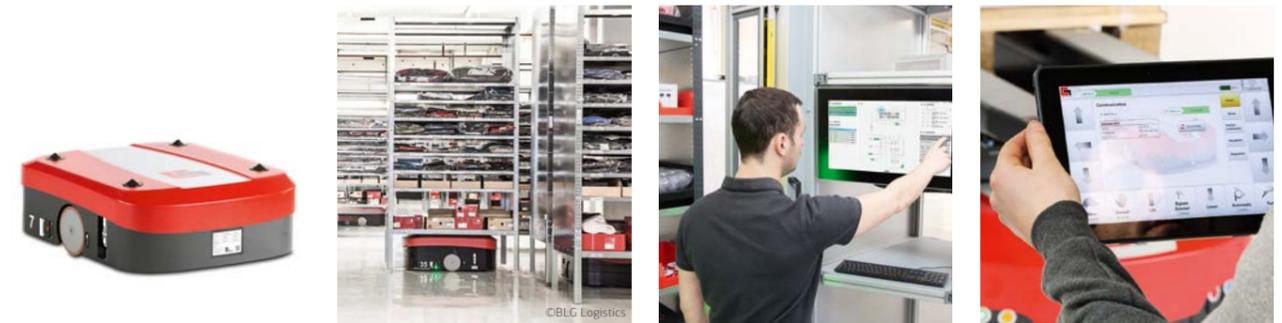
What if you could intelligently network incoming goods, warehousing and dispatching by automating the entire material flow? This is exactly what our Goods-to-Person solution allows. Within a secured area, Automated Guided Vehicles (AGV) – type L600 – transport goods carriers to their destination, autonomously and accurately. Carriers are picked up and transported to a pick

station to present the requested goods to the warehouse staff outside the storage cell. The whole process is coordinated by a software ecosystem that not only controls the transport vehicles but also ensures a maximally efficient workflow.

THE BENEFITS ARE OBVIOUS:

- » **Optimized warehouse operation and order picking as well as safer, more reliable processes.**
- » **Space-saving storage – automatic vehicles require less room to move than people.**
- » **24/7/365 days of dependable performance.**
- » **Faster processing and shorter delivery times – a clear competitive edge.**
- » **Scalability – grows flexibly with your business or during peak times.**
- » **Safe and ergonomic work environment.**

System components



GRENZEBACH L600

- » Lifts up to 600 kg
- » Wireless emergency stop
- » Up to 100 AGVs in one plant
- » Various energy management strategies available

GOODS CARRIERS

- » Shelf racks and racks
- Choose from our standard models or ask for customized solutions.

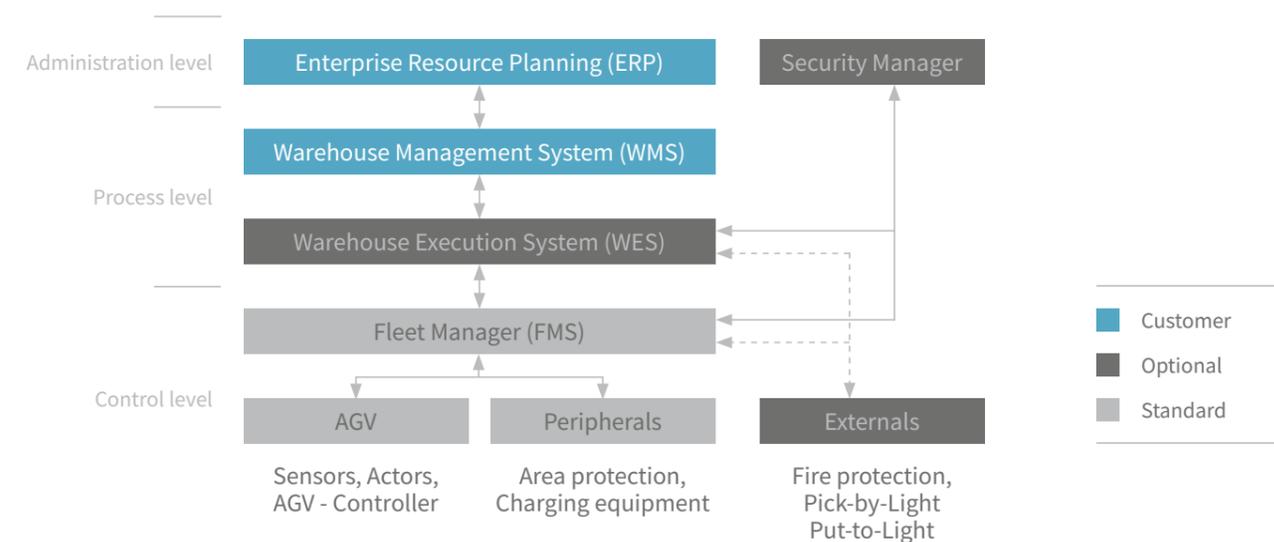
PERIPHERAL EQUIPMENT

- » Ergonomic Picking Station including Pick Gate, Put Wall, quick and easy commissioning with Pick-by-Light and Put-to-Light systems
- » Safety equipment and concept

SOFTWARE

- » Fleet Manager Software for optimal transportation
- » Warehouse Execution System for maximum storage efficiency and throughput
- » SERICY platform to control, monitor and optimize all of your processes

Software ecosystem



Need more flexibility and reliability? Smarter production can help.



AUTOMATED GOODS TRANSPORT SOLUTIONS

Production environments are becoming increasingly complex. Their handling doesn't have to be: our automation solutions help your plant become a Smart Factory.

Automated goods transport holds enormous potential for increasing efficiency compared to manual processes. With Grenzebach, you can tap the full potential, simply by bringing technical brain power into your processes.

Just go with an intelligent swarm

We transform your existing intralogistics operation in networked thinking and acting: our Automated Goods Transport solution intelligently interconnects goods receipt, production, warehousing and dispatching. This is done by expanding and replacing classic conveyor technology with modern robotics and type L1200S Automated Guided Vehicles (AGV) that are autonomous and highly available.

The L1200S moves under almost all common load carriers (tables, trolleys, racks, shelves), lifts them and transports them to any destination. It's the perfect solution for any type of production or manufacturing, regardless of industry, product or company size.

BENEFITS THAT KEEP YOU AHEAD OF THE COMPETITION:

- » More efficient material flow – shorter cycle time, Just-in-Time/Just-in-Sequence delivery.
- » Faster reaction in critical processes.
- » Easy, space-saving integration into existing environments, such as elevators, robot cells, conveyors and strapping systems.
- » Scalability – grows with your business.

System components



GRENZEBACH L1200S-LI

- » Lifts up to 1200 kg
- » People-safe
- » Area monitoring

GOODS CARRIERS

- » Table trolleys or racks
- Choose from our standard models or ask for customized solutions.

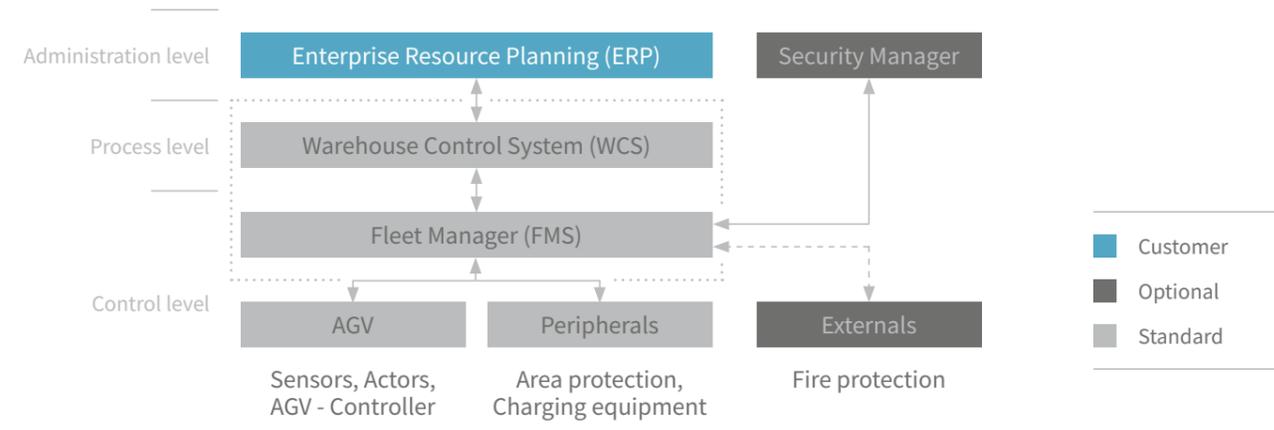
PERIPHERAL EQUIPMENT

- Whatever you need, e.g.
- » Shared Areas
 - » Stations
 - » Robot Cells

SOFTWARE

- » Fleet Manager Software for optimal transportation
- » Warehouse Control System for maximally efficient goods transport
- » SERICY platform to control, monitor and optimize all of your processes

Software ecosystem



Getting it right the first time: an achievable goal in eCommerce.

The general challenge

Often eCommerce customers are experiencing high rework rates due to wrong picks, too few order lines per hour and increased staffing requirements especially challenging during peak times.



HOW WE SOLVED THIS CHALLENGE TOGETHER WITH OUR CUSTOMER

Together with a global 3PL logistics provider – one of the leading companies in Europe – and its customer, a German workwear specialist, Grenzebach solved these challenges by implementing a holistic Grenzebach Goods-to-Person solution.



THE GRENZEBACH SOLUTION SET

- » 75 Grenzebach L600 Automated Guided Vehicles
- » Five Picking stations with Pick-by-light/Put-to-light system
- » 800 customer specific racks
- » Holistic safety concept
- » Customer-individual service agreement



SOME OF THE BENEFITS FOR OUR CUSTOMER

- » Up to 100% inventory accuracy during the storage, retrieving and picking of their product.
- » Transparent warehouse process due to a fully integrated software platform (WES and WMS).
- » Boost in pick-rates as staff uses a maximum of the working time for picking-process.
- » Safer and more ergonomic working environment.

No two car orders are exactly the same. No problem for us.

The general challenge

The complexity of car manufacturing is increasing because cars today are highly individualized, rather than standardized models. Consequently, manufacturing requires in-time delivery of custom-fit components to workers and assembly robots at flexible manufacturing islands.



HOW WE SOLVED THIS CHALLENGE TOGETHER WITH OUR CUSTOMER

Together with a well-known German premium car manufacturer, we increased the reliability of just-in-sequence manufacturing of their new flagship model by implementing a Grenzebach Automated Goods Transport solution.



THE GRENZEBACH SOLUTION SET

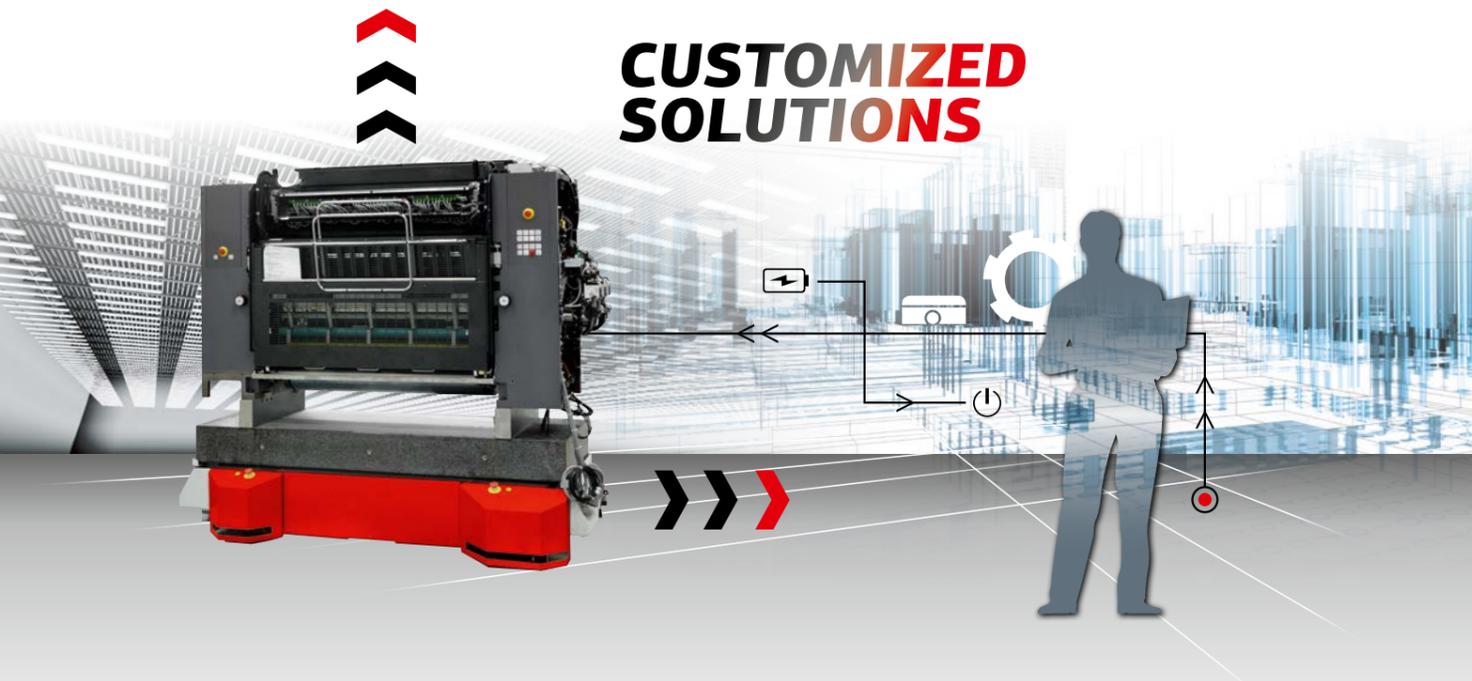
- » 30 L1200S Automated Guided Vehicles that can even communicate with elevators (production on three levels)
- » Grenzebach Fleet Manager System (FMS) acts as control center
- » Safety concept in accordance with the customer's employee safety requirements
- » Customer-individual service agreement



SOME OF THE BENEFITS FOR OUR CUSTOMER

- » Ramp-up during current model change on double shift operation.
- » Smooth integration into the customer's software ecosystem, e.g. ERP system
- » Up to 99.5% availability, making it more reliable and ergonomic than the previously used system.
- » Optimal transport routes across three floors, coordinated by the Grenzebach FMS.

You run faster in made-to-measure shoes. So does your logistics.



CUSTOMIZED SOLUTIONS

Off-the-peg solutions aren't for you? No problem: For specific requirements, we can engineer and manufacture customized automated guided vehicles.

With Grenzebach AGVs, you always get a solution that exactly fits your needs – whether you must face an unconventional, difficult or hazardous production environment, cope with hot working conditions, handle toxic chemicals or even nuclear materials, or simply demand maximum cleanliness.

Professionals you can trust.

With 650 highly qualified and specialized engineers, we are a reliable development partner who can collaborate with you on equal terms. Just tell us what challenges need to be solved, and we'll set up the appropriate equipment – no matter how difficult your operational conditions are or how demanding the specifications of your logistic tasks may be.

Design and technical development take place in close interaction with you, which guarantees that you get the right solution for your company: a tailor-made fleet of AGVs that unquestionably make you more productive.

SOME EXAMPLES

- » Heavy-duty AGVs for loads such as engines, drive trains or aircraft modules
- » Long-load AGVs for transport of oversized goods and production parts
- » AGVs for handling of sensitive IT infrastructure

Since our projects are customer-individualized, they're top secret, so we can't disclose any further details here, but we can tell you one thing: so far, all our customers have been highly satisfied with our solutions.



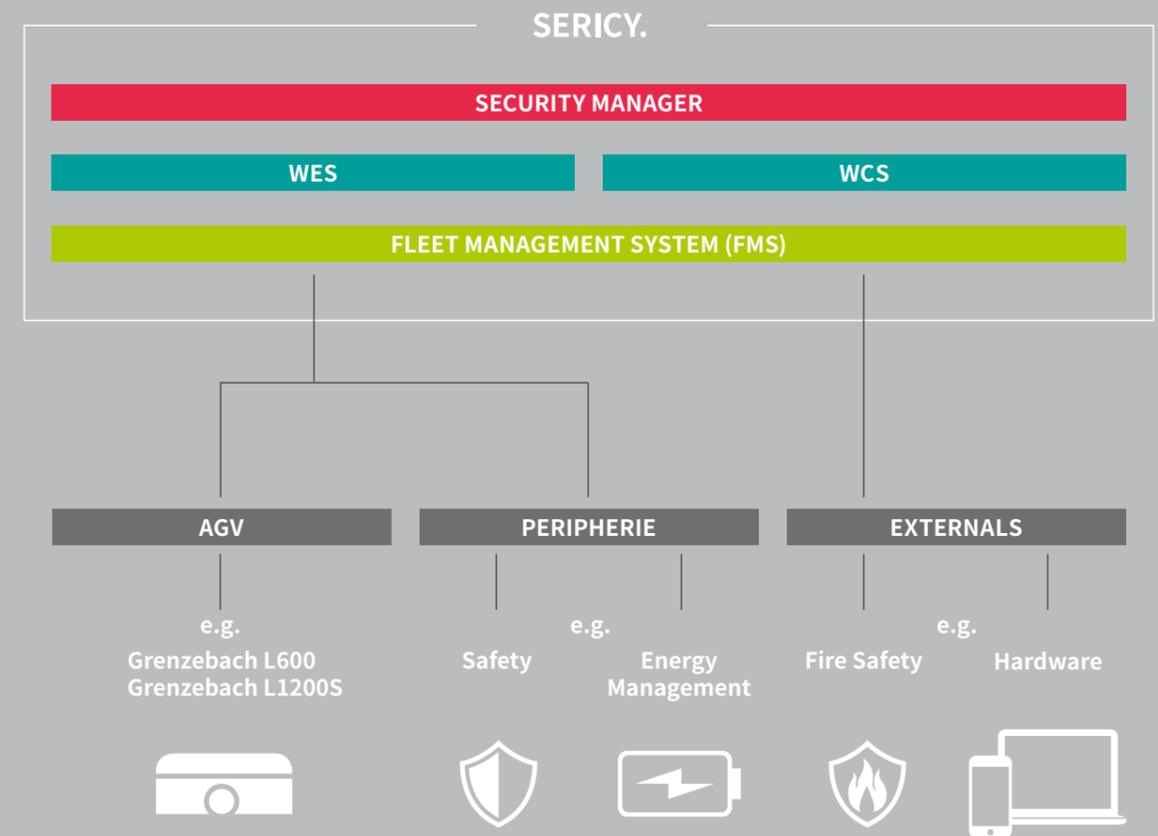
Digitally integrated intralogistics

**ACCELERATE PROCESSES.
REDUCE COSTS. INCREASE PROFIT.**

SERICY.

With SERICY Grenzebach offers an IIoT platform based on a highly flexible micro services architecture. The modular platform includes apps preconfigured for intralogistics that enable a holistic digitization. As a result, you are able to monitor, control and optimize your logistics in a transparent and reliable way while your developers can fully focus on their core process. If desired, you can additionally use our development environment to adapt existing software modules independently and specifically for your needs or to develop further ones from scratch. Thus, your data and know-how remain safe and secure with you.

- » **SERICY brings the process data of all machines together to use in all departments within the company.**
- » **SERICY links the historical information system of the company by using standardized interfaces.**
- » **SERICY contains reusable micro services that can be adapted quickly and easily for customer specific automation solutions.**
- » **SERICY can be used on-premise, in a private cloud or cloud and is arbitrarily scalable due to its architecture.**



■ Security Manager

Manages authentications and authorizations for all applications and users.

■ FMS (Fleet Management System)

Coordinates all vehicle movements and continuously optimizes the transportation schemes to cover all possible operations. Coordinates energy management. Interface to peripheral equipment.

■ WES (Warehouse Execution System)

Manages the Goods-to-Person Warehouse, optimizes the orders from the WMS and translates orders to tasks for the FMS.

■ WCS (Warehouse Control System)

Controls smart warehouse functionality in Automated Goods Transport Solution. Optimizes and generates tasks for FMS.

Future-proof solutions



Our professionals provide single source solutions and have extensive experience with a variety of projects in different industries. They develop your individual automation concept and implement it using both Grenzebach equipment and third-party systems.

Holistic solutions



Consulting and analysis of requirements



Simulation and software development



Project management and training



Worldwide implementation and commissioning



Flexible worldwide service and support

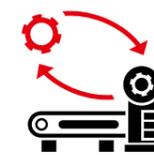
We are certified

- » **DIN EN ISO 9001**
Quality management system
- » **UNDERWRITERS LABORATORIES**
UL safe control cabinets
- » **EN 1090-2**
In-house production control - steel
- » **EN 1090-3**
In-house production control - aluminium
- » **ISO 3834-2**
Quality assurance for welding technology
- » **DIN EN ISO 14001**
Environmental management system
- » **BS OHSAS 18001**
Occupational health and safety management system

Service is what we live for – worldwide, 24/7

With our solutions, not only will you master the challenges of intralogistics but also benefit from our broad range of service offers. We ensure that the technology you invested in delivers what we promise. Count on value and longevity with Grenzebach – because we live service. Ask us for your individual service offer.

Original Parts



Safeguarding maximum performance, preserving value through long lifespans, reducing downtime:

- » Excellent quality
- » One stop shopping
- » Maximum production reliability
- » Highest availability
- » Optimum customer support
- » Long service life
- » Worldwide delivery

Excellent Services



Optimizing technology availability, keeping output constant at a high level, strengthening sustainable use:

- » 24/7 hotline
- » Tele remote support
- » Health checks
- » Preventive maintenance
- » Customer training
- » On-site service assignments
- » Flexible service contracts
- » Warranty extension

Rolling Upgrades



Increasing the output, enhancing productivity of the plant and extending its service life:

- » Process optimization
- » Plant overhauls
- » Hardware and software modifications
- » Technical consulting

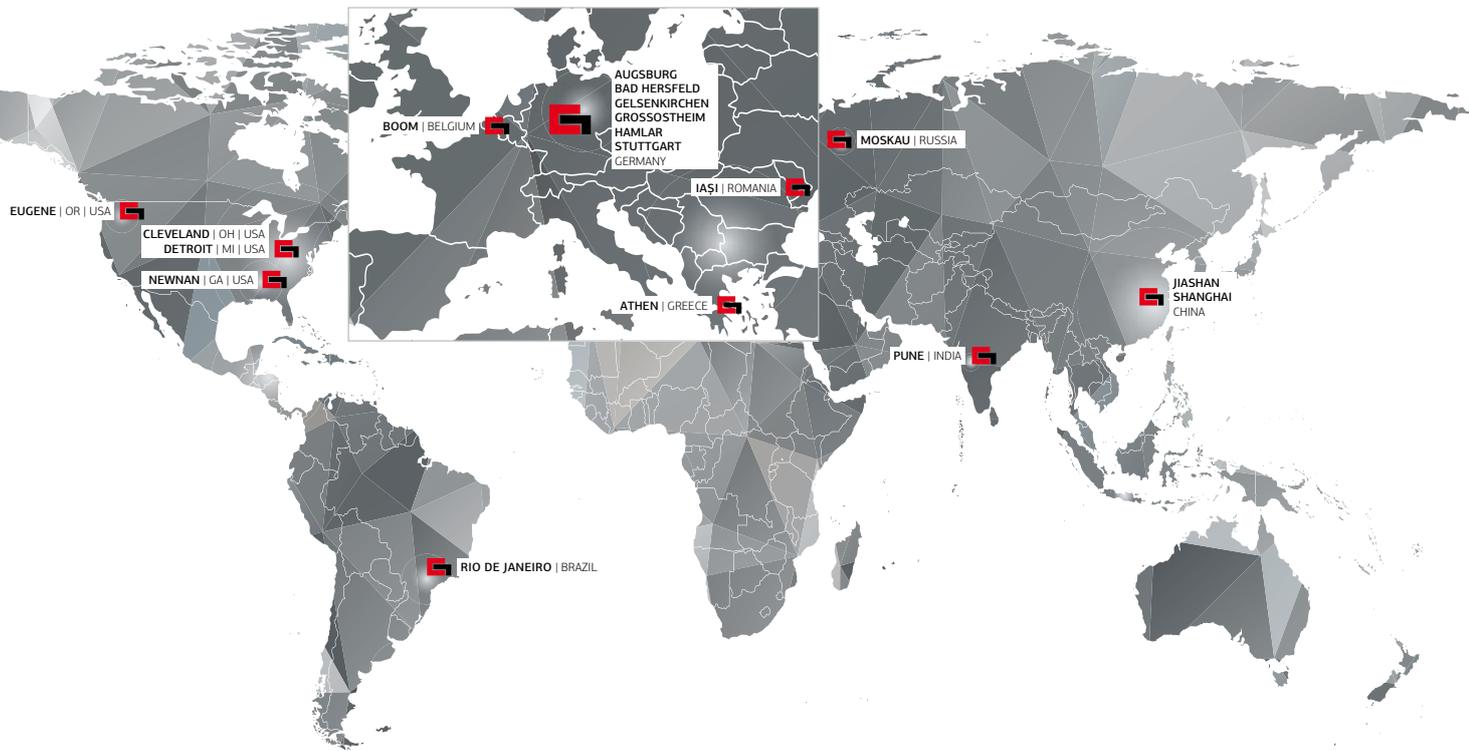
Future Services



Using the Grenzebach SERICY digitization platform, benefiting from smart and robust processes:

- » AR/VR supported maintenance
- » Predictive maintenance
- » Electronical parts catalogue
- » Online documentation
- » Collaboration app
- » Comprehensive reporting
- » Detailed statistics
- » Advanced analytics

GRENZEBACH WORLDWIDE



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