

HOT END | COLD END



# Stone Wool Production Lines

# Grenzebach – the name for high-tech solutions



# Your solution provider for the stone wool industry



## Grenzebach stands for intelligent handling, processing and automation technology focused on quality & performance.

We are an internationally operating, expanding family-owned company focusing on plant engineering, construction and automation and provide customized equipment based on cutting-edge technologies designed to perform highly sophisticated processing and automation tasks.

The Grenzebach Group encompasses the four business units "Glass", "Building Materials", "Intralogistics" and "Service" to serve glass makers, building material producers, international logistics groups as well as the automotive, the aviation and the food industry. Other areas of expertise are mechanical and thermal process engineering. At locations in Europe, America and Asia more than 1600 Grenzebach employees develop high-tech solutions for the complex manufacturing needs of our customers.

Grenzebach is the world's leading supplier of equipment and systems for the building materials industry. Whether gypsum, wood, mineral wool or thermal process engineering

– Grenzebach customers everywhere benefit from the expertise and more than 90 years of experience the specialists in Bad Hersfeld can look back on. The former Babcock company has been a member of the Grenzebach group since 2002.

High reliability, low operational cost, optimal energy efficiency. In stone wool processing. Grenzebach systems stand for highest quality standards. Grenzebach designs, manufactures and supplies production lines for stone wool boards and mats. Our reputation for reliable equipment and special purpose machinery satisfy the high expectations of our customers.

Grenzebach places great emphasis on maintaining cooperative partnerships with its customers. With production facilities in Germany, the USA and China we are always close at hand. Our representatives provide on-site support and service around the world.

The Grenzebach mineral wool specialists offer our customers a **comprehensive range of both standard and specialist equipment** from rock handling to packaged stone wool boards and mats.

### We offer

- Consulting
- Engineering
- Optimization
- Project handling services

### Support services

- Feasibility studies
- Raw material analyses
- Upgrades of existing equipment
- After sales services
- Service and maintenance contracts

### Our product portfolio

includes individual components as well as complete production lines for stone wool products - boards and mats, without lamination or laminated with fleece, film, paper, with or without coating.

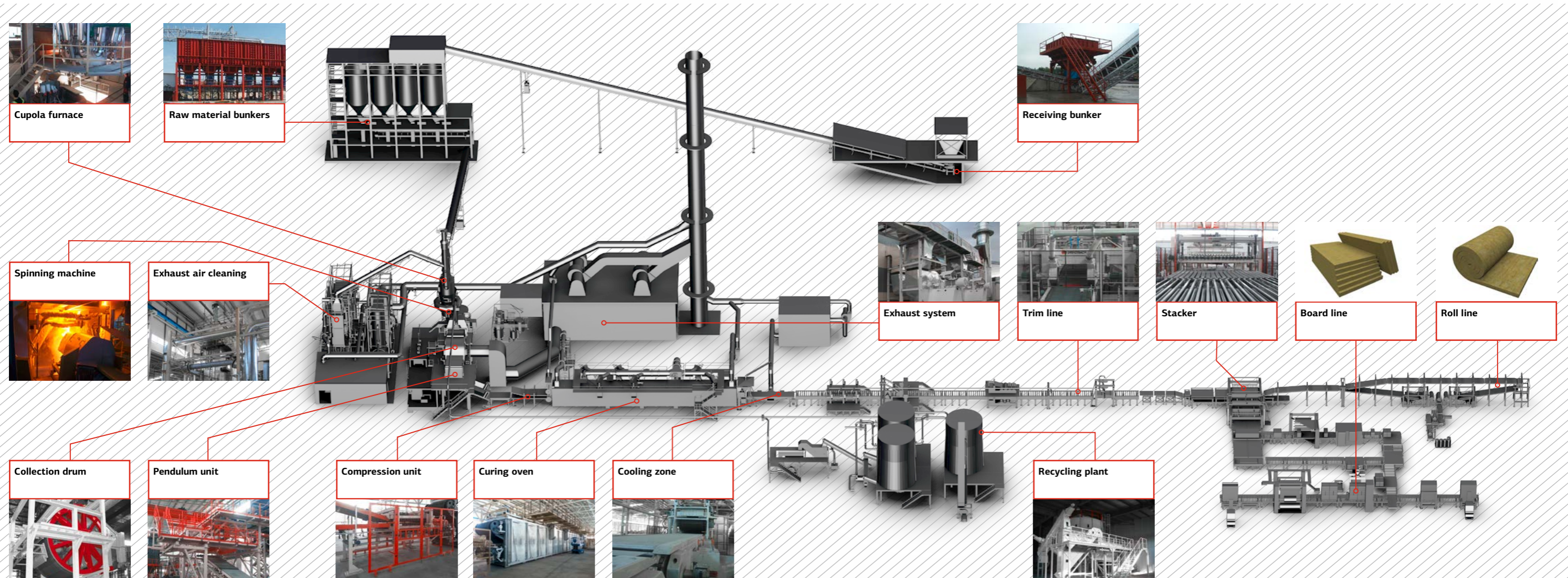
# Production lines for stone wool boards and mats

**Grenzebach offers its customers all possible options for the production of stone wool boards and mats**, from a low cost solution for producers entering the market to highly sophisticated automated plants with very large capacity and high yield.

Whether your need is for a single item of equipment or a full production line, you can be sure of expert advice, excellent technology, reliable equipment and startup support. Our after sales team are at your service, providing technical support, spare parts and advice, 24 hours each day. A hot-line teleservice enables us to solve many problems on-line.

This schematic drawing below provides an example of a typical stone wool production facility. Actual plants may vary, depending on the required capacities, product differences and individual preferences.

All our systems have been proven through many years of experience in the mineral wool industry. Our Technology is constantly updated by the introduction of practical solutions, often developed in partnership with our customers, and reflecting industry standards in motor and control technology.



## General data

Stone wool insulation products **have a low thermal conductivity, prevent excessive heat losses, reduce energy consumption and CO<sub>2</sub> emissions from buildings.**

### Product applications

- Thermal protection
- Fire protection
- Soundproofing

### Product parameters

- Thicknesses 15 – 250 mm
- Widths 600 – 2400 mm
- Densities 30 – 200 kg/m<sup>3</sup>

### Product range

- Stone wool boards and mats
- Without lamination or laminated with glass fleece, aluminium foil or hard paper

### Process parameters

- Capacity 5 t/h final product
- Line widths 1200 mm, 2400 mm
- Line speeds 2 – 30 m/min

### Energy for melting

- Natural gas
- Coke



Spinning machine



Batch feeding system



Conveyor to raw material bunkers



Cupola furnace

## Hot end

The stone wool is produced in the hot end section of the plant. For this section **Grenzebach supplies the entire equipment, from raw material handling up to cooling** of the endless stone wool mat coming from the curing oven.

### Innovative technology for the production of stone wool

- Raw material handling and treatment systems
- Batch feeding systems
- Gas-fired cupola furnaces
- Coke-fired cupola furnaces
- Heat recovery and thermal waste gas incineration systems
- Binder systems
- Spinning machines
- Collection drums
- Pendulum units
- Compression units
- Curing ovens with thermal waste gas incineration systems
- Cooling zones
- Hot end control systems with process visualization



Collection drum



Curing oven



Compression unit



Cooling zone

# Gas-fired cupola furnaces

**Grenzbach can provide gas cupola furnace technology** for stone wool manufacturing processes, individually adapted to the local conditions, eco-friendly and resource-conserving.



Melting material



Gas-fired cupola furnace



Lower part with gas burners



Melt discharge



## Innovative melting technology

- 6 – 8 t/h melting capacity
- Natural gas as energy source
- Combustion air admixed with oxygen
- No iron draining
- Independent from fluctuations in coke prices and quality
- Short power up and power down times (45 minutes until first product)
- Particularly interesting for countries with natural gas resources

# Cold end

In the cold end section the mat is processed and finished to obtain marketable finished products that are packed and palletized.

**Grenzbach supplies the entire equipment for all these tasks**

– this can be fully or semi automatic, as requested by the customer.

## Innovative technology for processing, finishing and packing

- Processing (horizontal band saws, trimming saws, cross cut saws)
- Finishing (laminators, coating systems)
- Stacking (finger stackers, tray stackers, vacuum belt stackers)
- Packing (shrink wrapping systems, film wrapping systems, roll wrapping systems)
- Palletizing (handling equipment, robots)
- Cold End control systems and process visualization



Horizontal band saws



Trimming saws



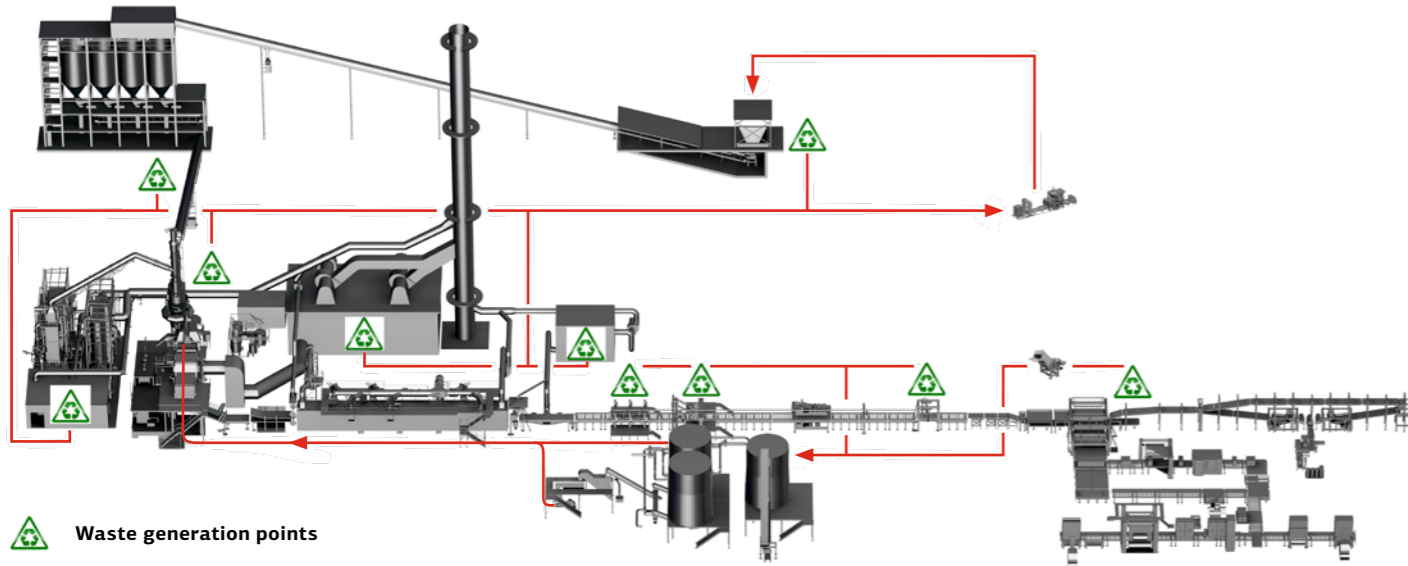
Cross cut saw



Stacker

# Recycling

**Grenzebach offers modern recycling technology** for stone wool production lines to reduce waste, save on raw materials and energy and cut landfill costs.



Waste generation points

Grenzebach waste recycling system

### Innovative technology for waste material reduction

- Recycling plants
- Edge trimmers and edge compactors
- Waste crushers
- Melt granulators
- Briquetting systems
- Process water treatment systems

### Ask Grenzebach for

- Individual recycling concepts
- Upgrades and optimization of existing recycling systems
- Profitability analyses and economic appraisals



Recycling plant

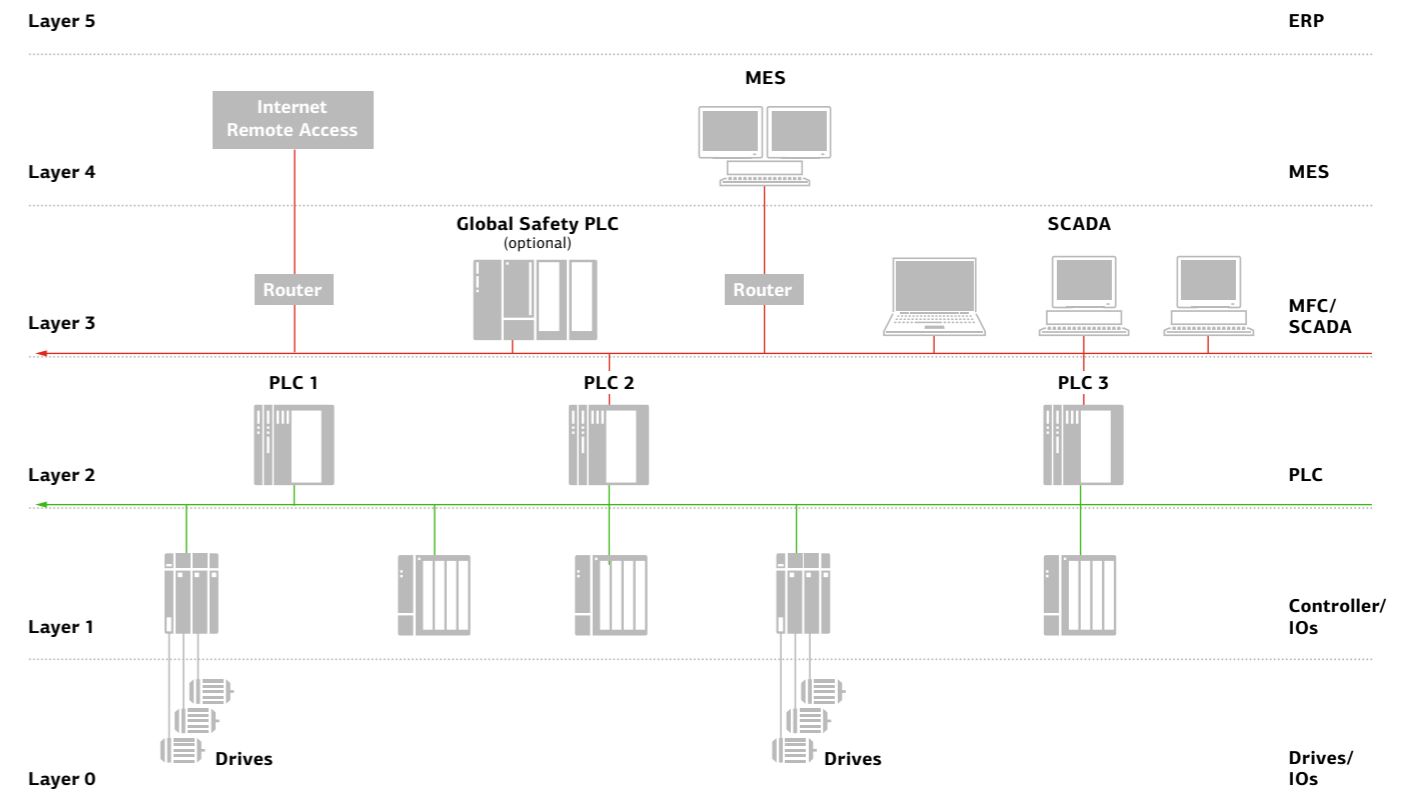


Waste crusher

# Automation

For stone wool production lines, **Grenzebach offers state-of-the-art control technology with an intelligent operation structure** characterized by fast reaction, reliability and user friendly application.

### Grenzebach control architecture



### Innovative control technology for various levels of automation

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| <ul style="list-style-type: none"> <li>- Process control systems</li> <li>- Simulation</li> <li>- Visualization</li> <li>- Operation with high user acceptance</li> <li>- Line control systems</li> <li>- CNC controls with CAD application</li> <li>- Inspection systems</li> </ul> | <ul style="list-style-type: none"> <li>- Administration systems</li> <li>- Order management</li> <li>- Stock management</li> <li>- Quality management to ISO 9002</li> <li>- Optimization</li> <li>- Training</li> <li>- Teleservice/hotline</li> <li>- 24 hour service</li> </ul> |
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**Grenzebach BSH GmbH**

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

**Grenzebach Mashtech LLC**

Moskovskiy,  
Str. Shakespeare bld. 81/2  
108811, Moscow, Russia  
Phone: +7 495 118 64 96  
E-mail: info.gmos@grenzebach.com