EISENMANN

Your Partner for High-Temperature Technology

EISENMANN - Your Partner for Processing Lines

EISENMANN Technology Park Holzgerlingen

Assembly Halls with Development and Test Centre

EISENMANN Education Centre Böblingen

As a leading international supplier of systems for surface finishing technology, environmental engineering, materials flow automation and high-temperature technology, we offer our customers in a whole variety of industries a leading edge based on sophisticated plants, individual solutions and global service.

Our name is synonymous with comprehensive systems competence, top quality and reliability. Our products set standards, as well as revolutionary technological highlights.

EISENMANN employs around 2,500 people worldwide, including more than 1,600 in Germany. Of these, roughly 900 are engaged in engineering.

Our strength lies in developing and combining individual processes to form an overall process from a single source, tailored to encompass all the customer's specific requirements and extensively optimized with regard to production costs, quality and sustainability.

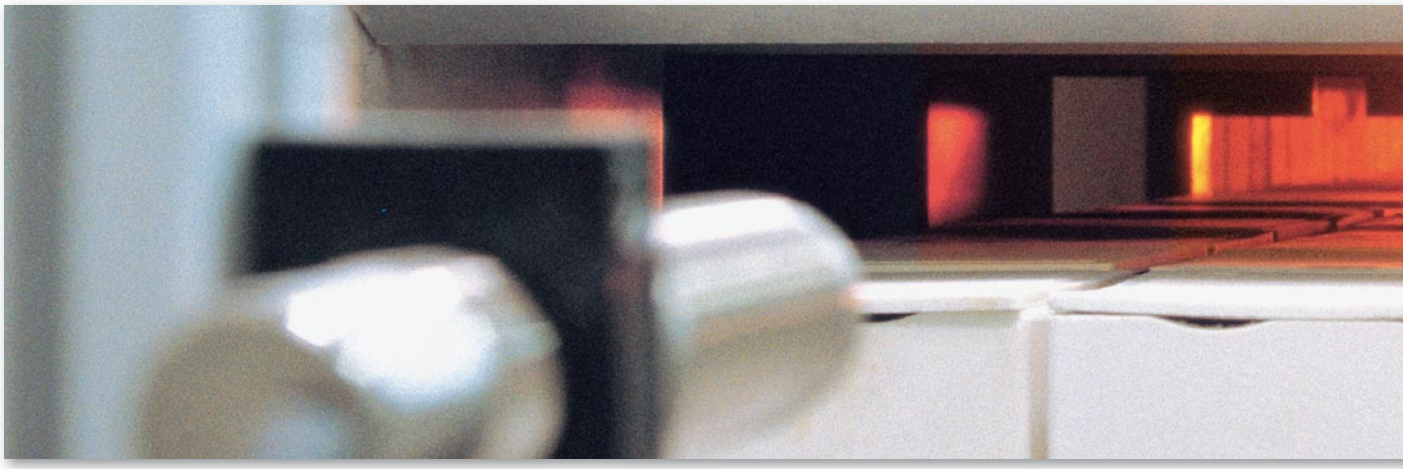
To this end, we make use of the accumulated know-how of our individual divisions and exploit their synergistic effects:

- **Surface Finishing**
- **Process Technology**
- **Environmental Technology**
- **Materials Flow Automation**

Diversity and Competence

- Automotive Systems
- General Finishing
- Environmental Technology
- Biogas Plants
- Conveyor Systems
- Service
- **Process & High Temperature Technology**

Contents



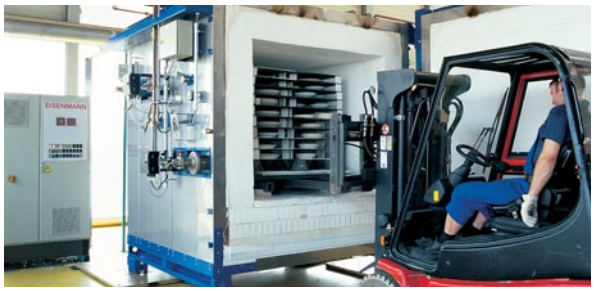
Competence

Our solutions are as individual as your products. EISENMANN has extensive know-how in developing new and innovative processes. Our plants are tailor made to customer's specific standards and requirements, focusing on product quality and reproducibility. At the same time, several different processes may be combined to create an overall solution, thus optimizing production costs and the use of your production resources.

New solutions based on tradition

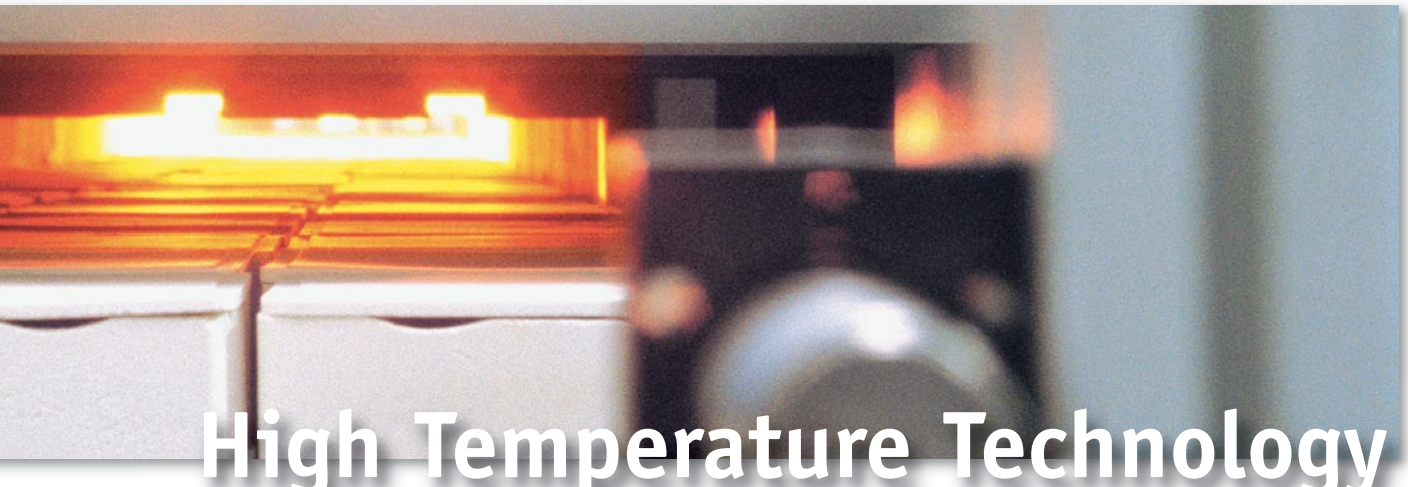
The development of new technologies is our daily business. This is also reflected in the considerable number of patents existing in all divisions of the company – such as Turbo Firing, Quick Firing and E|GATE, to mention just a few. Our know-how is based on experience – our success guaranteed by passing this know-how on to the next generation of engineers and technicians.

Tailor made: automated batch processing



Simple: chamber kiln with manual loading for small series

Complex: fully automated roller-type kiln for high throughput



High Temperature Technology

Small or large – everything is possible

"Size is relative"! From coils weighing a few grams to large stators weighing several tons for power generators: our experience allows us to find a suitable answer to each challenge.

As a plant manufacturing company, we are in a position to plan and build comprehensive complete plants. However, we also design, build and deliver stand alone equipment and systems as required, and offer the entire spectrum of plant engineering activities:

- Planning
- Simulation
- Engineering
- Manufacturing
- Installation
- Commissioning
- Training
- Maintenance
- Operation

For all branches of industry

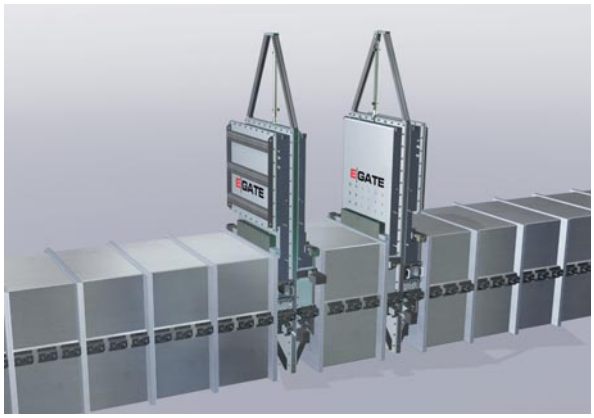
Regardless of the branch of industry concerned, e. g. automotive, medical technology or aerospace, we can provide references in nearly all sectors of the manufacturing industry. Therefore the customer's needs are known and taken into account accordingly. Our strengths are tailor made solutions to the customer's specific requirements by using our modular system, as well as adapting individual components to particular needs.

From development to production

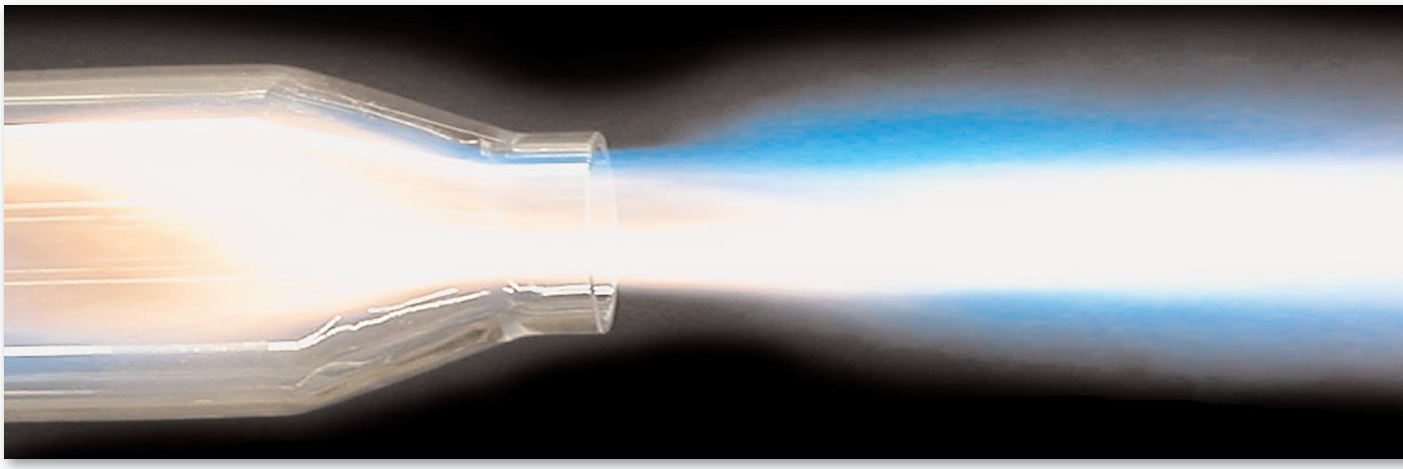
Achieving goals requires the courage to strike out in new directions – including those which were hitherto considered impracticable up to now. We see these challenges as opportunities.

The high-temperature vacuum gate E|GATE is an example of such a new challenge.

Designed as a double door, E|GATE is used in roller-type kilns from EISENMANN. For the first time in high-temperature processes, it permits continuous operation with separation of pressures and atmospheres in the high-temperature area.



E|GATE double door for separating atmospheres



Technologies

Atmosphere

In addition to the plants with controlled and uncontrolled standard atmospheres, the number of kilns with special atmospheres is growing steadily. EISENMANN offers a suitable solution for each application, with gas-tight chamber, roller-type and pusher slab kilns for

- **Flammable atmospheres (e.g. Hydrogen)**
- **Inert atmospheres (e.g. Nitrogen)**

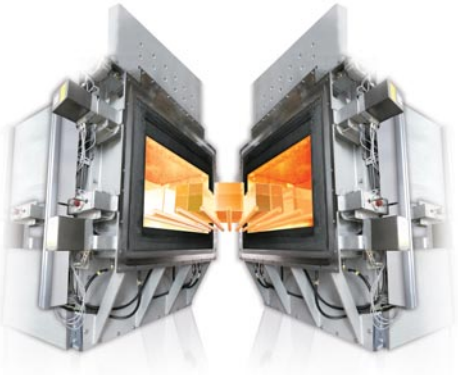
as well as control systems, such as

- **Control of residual oxygen by gas/air ratio**
- **Active control of atmospheres**
- **Passive control of atmospheres**

The process atmospheres can be separated either on the basis of directed flows or by means of gas-tight or vacuum-tight gates.

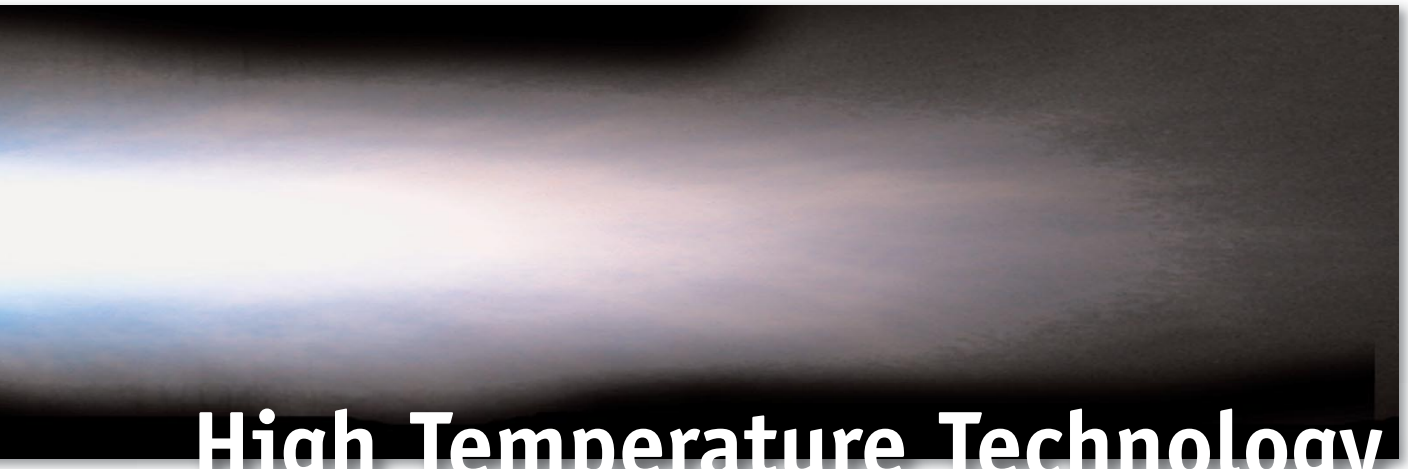
Vacuum

Low pressure and vacuum technology is often used to realize rapid atmosphere changes. This is where the vacuum tight double-door E|GATE completes the range of products for continuous processes in the high-temperature area.



High-temperature vacuum door E|GATE.

Gas-tight roller-type kiln for sintered metals



High Temperature Technology

Heating systems

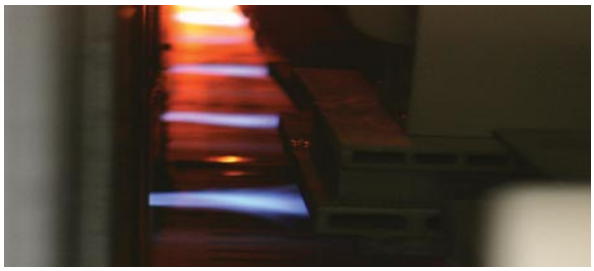
Depending on requirements, heating is supplied directly or indirectly using gas or electricity.

High-speed burners from EISENMANN or multi-zone electric heating elements are used to optimize the heating power and temperature distribution.

Control systems

Reproducible conditions are essential in order to manufacture sophisticated products of constant quality.

In addition to the heating system the control system is crucial to be able to handle this challenge. From our large range of possible solutions, we select the optimum control and measurement concept for your process.

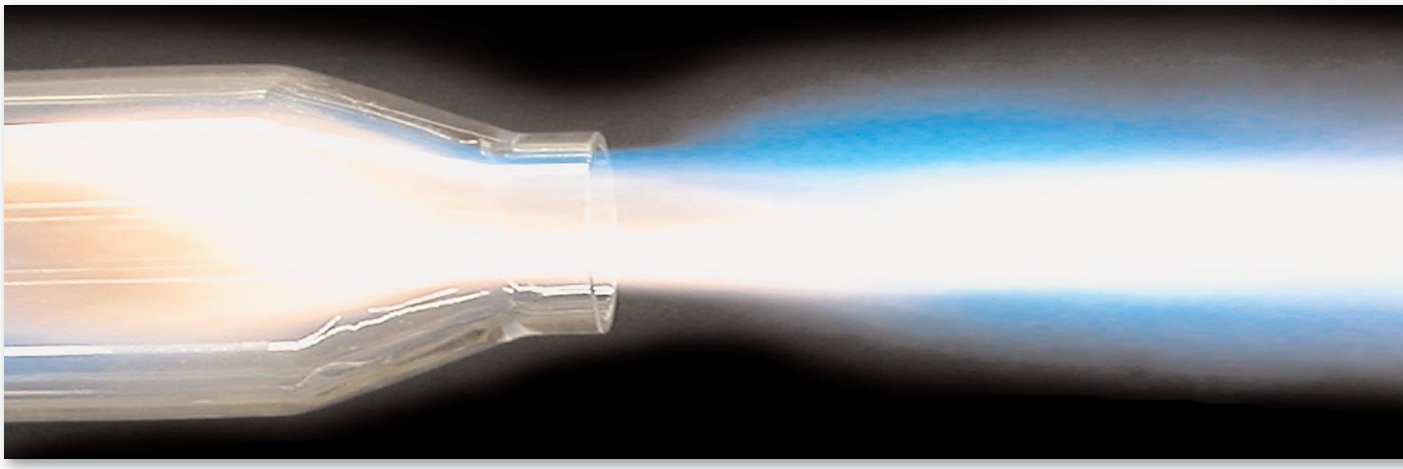


▶ Burner control
From control systems by means of proportionate control to fully automatic control of atmospheres with flow controllers.

▶ Process gas control
From simple flushing of the kiln to all-automatic control with mass flow and pressure controllers.

▶ Heating element control
From thyristor switches to thyristor controllers or transformers.

EISENMANN high-speed burner HGB 100



Technologies

Operating modes

Whether for continuous or intermittent operation – EISENMANN's extensive product range allows the appropriate mode of operation for all required throughputs. Depending on requirements, heating is supplied directly or indirectly, using gas or electricity.

The high-speed burner HGB 100 or multi-zone electric heater elements are used to optimize the heating power and temperature distribution.

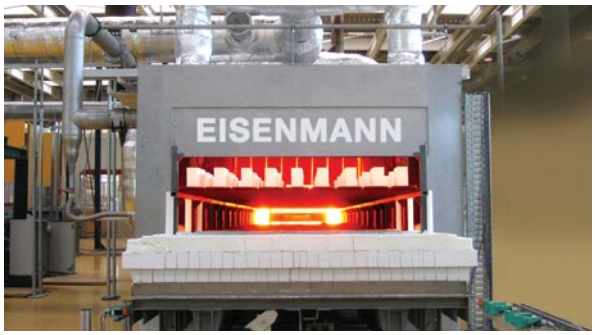
Continuous kilns:

- Tunnel kilns
- Roller-type kilns
- Pusher slab kilns
- Mesh-belt kilns
- Firing rack kilns
- Customized kilns

Discontinuous kilns:

- Shuttle kilns
- Lift-bottom kilns
- Top hat kilns
- Chamber kilns
- Customized kilns

Lift-bottom kiln for automated batch operation



Tunnel kiln for continuous operation

Lift-bottom kiln for porcelain

High Temperature Technology

Handling and material flow

EISENMANN develops and supplies the complete handling technology and materials flow concepts from a single source to match the plant concept.

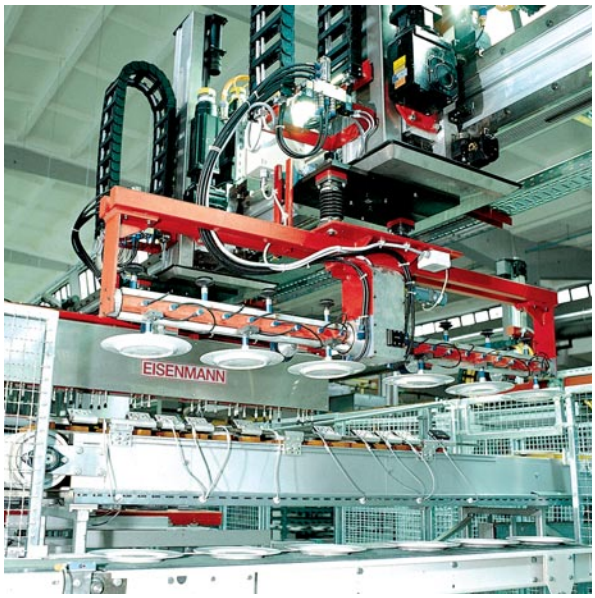
Different loading and unloading systems, such as gantry robots and line robots, link the various conveyor systems:

- Roller conveyors
- Pallet and container conveyors
- Monorail systems
- In-floor conveyors
- Automatic storage-and-retrieval systems
- Automated Guided Vehicles (AGV)
- Control systems and software

In the right place at the right time – we offer intelligent concepts and perfect control technology for your requirements, as well as individual semi-automated or fully automated solutions.

Environmental technology

To assure your plant's sustainable operation, we not only supply the complete range of exhaust air purification systems, but also the components for recovering energy. This cuts costs and protects the environment.



Handling and conveyor systems link the process steps

Thermal incinerator for exhaust air purification

Processes

Sintering, binder burnout, pyrolysis and calcination

Precise compliance with the process parameters is of paramount importance for obtaining a perfect product in such processes as sintering, binder burnout, pyrolysis and calcination. To this end, we meet the highest standards in respect of temperature accuracy and temperature distribution as well as heating and cooling gradients.

Flexible process control allows optimum adaptation to your products, thus minimizing your reject rates and simultaneously boosting your throughput.

Furnace for sinter metals

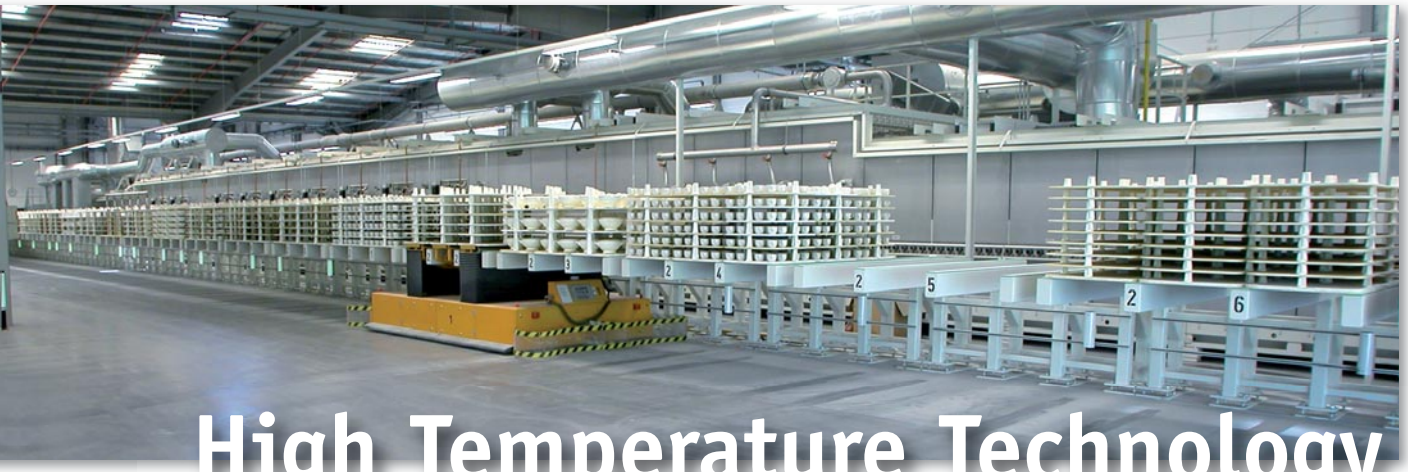
Calcination oven for catalyst material

Drying

Regardless of whether a process drier, pre-drier or drying zone in the main process is called for, we can respond to the individual properties of your products by using a whole variety of drying methods.

- **Convection (circulating air)**
- **Infrared**
- **Near-infrared**
- **Ultraviolet**
- **Radiated heat**

Near-infrared dryer for flat material



High Temperature Technology

Heat treatment

EISENMANN supplies complete heat treatment plants for aluminum alloys and other nonferrous metals, as well as steel and steel alloys.

- Solution annealing
- Quenching
- Artificial ageing
- Soft annealing
- Stress relief annealing
- Normalizing
- Recrystallization and diffusion annealing
- Transformation hardening
- Carburization (carbon cementation)
- Nitriding (nitrogen-hardening)

Roller-type ageing oven for aluminum wheels

Oxidation

Modular systems for the production of carbon fibers comprising the oxidation ovens as well as driers following the cleaning and assembly process steps.

- Oxidation ovens
- Driers

Oxidation oven for PAN fibers for producing carbon fibers

EISENMANN

www.eisenmann.com

EISENMANN Anlagenbau GmbH & Co.KG
Tuebinger Strasse 81
71032 Boeblingen · Germany

Daimlerstrasse 5
71088 Holzgerlingen · Germany

Phone +49 7031 78-0
Fax +49 7031 78-1000
info@eisenmann.com

EISENMANN Service GmbH & Co.KG
Tuebinger Strasse 81
71032 Boeblingen · Germany
Phone +49 7031 78-3000 (6.30 - 18.30 h)
Fax +49 7031 78-3200
info@eisenmann.com

EISENMANN Ingeniería S.A.
Parc de Negocis Mas Blau
Edificio Prima Muntadas
c/Berguedà, 1 · Barcelona
08820 El Prat de Llobregat
Phone +34 93 479-6610
Fax +34 93 479-6620
info.spain@eisenmann.com

EISENMANN France S.a.r.l.
Espace Lumière · 2, Rue Pathé
78406 Chatou Cedex
Phone +33 1 30159800
Fax +33 1 30531009
info.paris@eisenmann.com

EISENMANN Italia S.r.l.
Via Ferrari, 21
21047 Saronno (VA)
Phone +39 02 96718-626
Fax +39 02 96718-629
info.italia@eisenmann.com

EISENMANN U.K. Ltd.
Unit 118 Severn House
Anson Court Business Centre
Staffordshire Technology Park
Beaconside · Stafford
Staffordshire ST18 0GB
Phone +44 1785 283790
Fax +44 1785 283799
info.uk@eisenmann.com

EISENMANN Corporation
150 East Dartmoor Drive
Crystal Lake · Illinois 60014 · USA
Phone +1 815 4554100
Fax +1 815 4551018
info@eisenmann.com

EISENMANN do Brasil
Avenida Duquesa de Goiás, 716
3° andar · Bairro Real Parque
CEP: 05686-002 São Paulo SP
Phone +55 11 21611200
Fax +55 11 37580030
info.brasil@eisenmann.com.br

EISENMANN S.A. DE C.V. Mexico
Blvd. 15 de Mayo 2933
Fracc. Las Hadas
72070 Puebla, Pue.
Phone +52 222 2311712
Fax +52 222 2498835
info.mexico@eisenmann.com

EISENMANN Shanghai Co. Ltd.
Room 301, Gubei Intern. Fortune Center
No. 1452, Hong Qiao Road
Changning District
Shanghai 200336 · P.R. China
Phone +86 21 31352188
Fax +86 21 31352199
info@eisenmann.sh.cn

OOO EISENMANN
Ul. Pyatnitskaya 47-1
119017 Moscow
Russian Federation
Phone +7 495 951-6824
Fax +7 495 951-5211
info.russia@eisenmann.com

EISENMANN India Pvt. Ltd.
EISENMANN Surface Finishing Systems
India Pvt. Ltd.
Technosoft Knowledge Gateway · 1st Floor
Plot No. B-14 · Road No. 1
Wagle Industrial Estate
Thane (W) 400 604 Maharashtra · India
Phone + 91 22 2583 2929
Fax + 91 22 2583 3800
info.india@eisenmann.com

11/2010