

Heat treatment processes  
in the ceramics  
industry





Roller hearth kiln (work photograph Sacmi)



Batch kiln (work photograph Eisenmann)



Roller hearth kiln (work photograph Ceric Wistra)



Kromschroder-System-Technology CD-ROM



Catalogue CD-ROM incl. product selection and docuthek



docuthek CD-ROM



Spare parts list CD-ROM



Technical documentation

## Innovation which pays off

Safety, lower energy consumption and active environmental protection are issues of utmost importance for operators of industrial kilns.

### Safety

Kromschroder gas control and safety systems often do more to make industrial plants safe and more to provide operating personnel with optimum protection than is required by the relevant standards and regulations.

### Systems

High quality in combustion processes is achieved with adapted systems manufactured by Kromschroder. Field bus components with communication capability control these systems. Existing installations can thus be easily modernised and extended at low cost.

### Modular design

The specially coordinated product range offers excellent modular design options. For years now, we have been very successfully taking these important steps into the future of the modular system in kiln engineering.

### Types of gas

All Kromschroder systems are suitable for town gas, natural gas and LPG. In addition, we can supply a large assortment of reliable gas control valves for sewage gas, landfill gas, biologically produced methane, generator gas and coal gas.

### Straightforward start-up procedures

Kromschroder systems are a key cost-cutting factor because they are easy to assemble and install. Start-up procedures are accordingly short and straightforward. We also offer special courses of instructions for various customer and product groups, should you want extra support. Our competent Service Team is also there to help.

### Optimum price/performance ratio

Kromschroder offers technically optimum concepts for your process engineering applications in the ceramics industry with a favourable price/performance ratio.

### High availability thanks to first-class service

The design and rugged construction of the Kromschroder kiln systems add up to a long service life. Preventive maintenance is essential for trouble-free operation, high availability and economy. This is why our Service Team offers you tailor-made maintenance contracts.

### Extensive technical documentation

Multilingual leaflets and operating instructions, planning folders and Kromschroder systems engineering manuals – available in print or on CD-ROM – make it easy for you to operate products from our diversified range – from manual valves, gas filters and gas governors etc. to complete systems. You can download up-to-date Kromschroder information from the Internet at any time.

[www.kromschroeder.com](http://www.kromschroeder.com)  
[www.docuthek.com](http://www.docuthek.com)







Roller hearth kiln (work photograph Dum-Kilnogy S.A.)



Roller hearth kiln (work photograph Inter Kilns Industry)



Intermittent shuttle kiln (work photograph Tagasago)

## Heat treatment processes in the ceramics industry

### Kiln atmosphere and temperature distribution

Using Kromschöder impulse burners with air/gas ratio control, it is possible to achieve an homogeneous temperature distribution throughout the kiln atmosphere. Based on an efficient counter-current principle, our burners ensure optimum mixing of gas and air.

### Lambda control and correction

Kromschöder demonstrates its value as a competent partner in individual solutions – be it for constant lambda correction or as switchable oxidation/reduction cycles in a burner control system.

### Reduction systems

Reduction systems with Kromschöder products allow low-pollutant production with uniform colour range without the additional use of coal and minerals. With our available know-how and an extensive range of products, we are capable of elaborating individual systems.



Controlled gas pressure system



### Hot air compensation

Flue gas temperatures must be kept as low as possible if a gas-fired installation is to work with a high level of efficiency. To do so, the heat in the flue gas can be returned to the process by directing it through heat exchangers in order to raise the temperature of the combustion air. Kromschöder can supply the necessary control valves for gas and air.



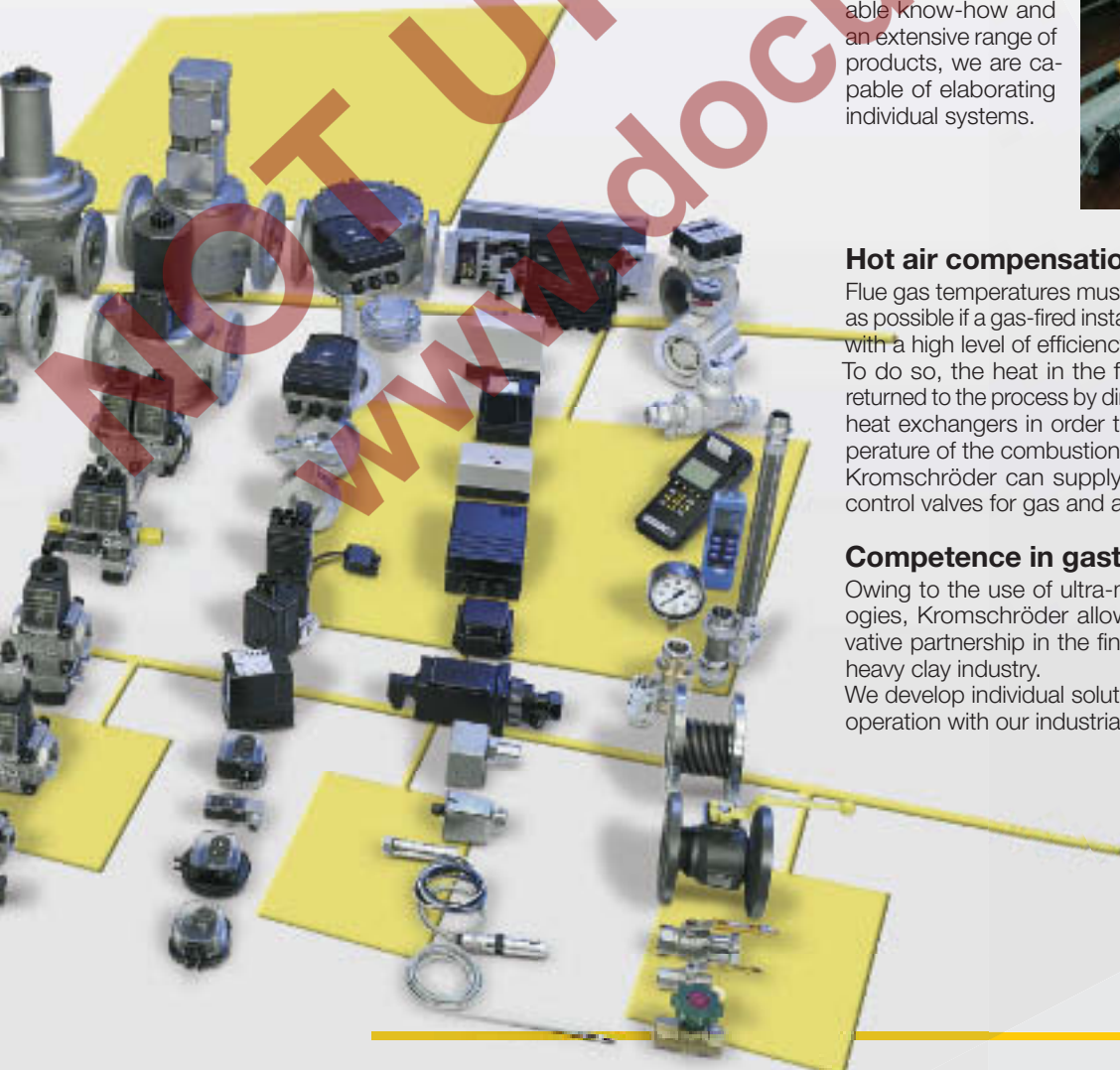
High-velocity ceiling burner

### Competence in gastechology

Owing to the use of ultra-modern technologies, Kromschöder allows you an innovative partnership in the fine ceramics and heavy clay industry. We develop individual solutions in close co-operation with our industrial kiln builders.



Overhead firing with BIC burners





Roller hearth kiln (work photograph Sacmi)



Tunnel kiln (work photograph firm Instalat)



Intermittent shuttle kiln (work photograph Drayton)

### Step-by-step control

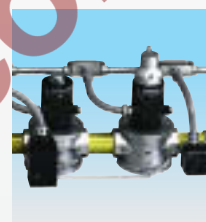
(Impulse control)

The industrial kiln systems built for heavy clay production are mostly equipped with impulse control.

With this type of control, the output impulse from the burner is strong enough to produce a uniform distribution of temperature in the kiln atmosphere and a good level of circulation.

Integrated pneumatics ① offers maximum safety thanks to air deficiency cut-out. A constant lambda value is maintained when subject to changing air pressures.

Step-by-step control without integrated pneumatics ② also offers the option of central lambda adjustment.



Pipework and wiring to American Standard



①



②





Intermittent shuttle kiln (work photograph Keratek)



Roller hearth kiln (work photograph firm Siti)



Intermittent shuttle kiln (work photograph Eisenmann)

### Continuous control

Intermittent shuttle kilns and tunnel kilns equipped with this control system are the low-cost solutions typically used in the production of heavy clay and fine ceramics. Continuous control combined with hot air is used to reach very high temperatures (e.g. engineering ceramics). Continuous control with integrated pneumatics ③ offers the advantage of constant lambda value over a broad control range with simultaneous air deficiency cut-out.

Continuous control of the gas flow rate at constant air flow rate ④ allows capacity adjustment with virtually constant outlet velocity at the burner.

Continuous control with integrated electronics ⑤ allows optional operation with constant lambda value over a broad control range, capacity adjustment with virtually constant outlet velocity at the burner and individual control of required O<sub>2</sub> or CO atmospheres.



③



④



⑤



Intermittent shuttle kiln (work photograph Riedhammer)



Intermittent shuttle kiln (work photograph Keramischer Ofenbau)



Tunnel kiln (work photograph Keller H.C.W.)

## Important products for your process

### Pot burners

Using Kromschroder pot burners provides an homogeneous temperature distribution in reducing and oxidising kiln atmospheres. Existing gas lances can be exchanged easily without additional installation effort. It is possible to adapt the burners to any pot cover on the basis of the well-known Kromschroder high-velocity burners.



### Ring slot burners

Regardless of the control method – be it impulse-controlled or modulating-controlled, the Kromschroder ring slot burner is designed for rapid-burn kilns with closed combustion chambers.

The secondary air allows the flame temperature to be matched to the kiln temperature with high burner impulse. The two-stage combustion allows a broad control range both in oxidising atmospheres and in reducing atmospheres. The secondary air injection achieves short cooling times.



### Excess air burner BIC..L

This burner can be ignited at all output settings over the entire control range. The extremely high air excess reaching up to approx. 1500% ensures a very high pulse magnitude even at a low burner rating. The BIC..L is thus ideal for applications requiring precise temperature control and consistent product quality. The modular design means that it can be easily adapted to the kiln geometry.



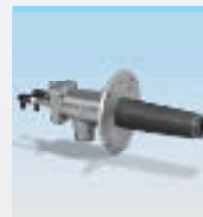
### Burner BIC with integrated reduction lance

The time-tested Kromschroder high-velocity burner can be fitted with an additional gas lance and separate gas connection to order. This lance allows it to be operated with a very high gas excess for reduction processes.



### Burner BICA

This BIC burner version with reduced weight is an ideal complement in the capacity range of tunnel and roller hearth kiln systems.



### Ceramic tube sets TSC

The TSC ceramic tube set range covers all conceivable conditions of use. There are different versions for various flame shapes, capacities, flue-gas outlet velocities or application temperatures. Ceramic tubes have proved their worth in the ceramics industry throughout the world.



### Insulation package

Long-life burner insulation system to protect burners against aggressive kiln atmospheres and thermal load. This sturdy, patented system is directly mounted on new burners or can be retrofitted to existing installations. Suitable for ceiling and side-wall mounting.







Intermittent shuttle kiln (work photograph Eisenmann)



Tunnel kiln (work photograph Lingl)



Intermittent shuttle kiln (work photograph Bricesco)



### Valve series Valvario®

The new valve series Valvario® can be used for safety, control and regulation purposes in air and gas supply systems to gas appliances. It can also be used for main gas control and safety.

Valvario® is designed for a maximum inlet pressure of 500 mbar and allows higher flow rates with the same nominal size. The space-saving, compact design means that it is easy to install. On the standard version, the flow adjustment can be checked using an indicator, whilst a blue LED is used to check the overall function. The device can also be fitted with a position indicator with integral visual indicator.



### Actuators IC 20, IC 40

Kromschöder also makes a significant contribution to the production of high-quality products in the fine-ceramics and earthenware industries by using high-quality kiln systems. This also includes actuators of the IC 20 and IC 40 Series for direct mounting on butterfly valves BVG, BVA and BVH for gas, cold air and hot air up to 450°C.

The basic unit, actuator IC 20, is controlled by a three-point step signal.

Due to its outstanding flexibility, the IC 40 is suitable for various control types ranging from continuous control to staged control. It can be parameterised using a PC with a wide range of data being stored in a history storage.



### Lambda controls with linear flow control LFC

The ever more stringent requirements applicable to the control quality of kiln atmospheres necessitate high-quality but nevertheless low-cost regulating units. Kromschöder linear flow controls of the new generation meet these requirements. They can be used optimally for wide lambda and capacity ranges with continuous control for uninterrupted duty.

### Automatic burner control units IFS

The IFS 200 Series is designed for directly ignited burners in intermittent operation. All the units in the IFS 200 Series have a switch that allows each burner to be switched on and off individually.

IFS 244-I with integral ignition.

IFS 258 is also suitable for UV control and can be equipped with integrated test jacks for flame signal monitoring.

The IFS 100 Series has 2 valve outputs and is suitable for multi-flame control.



### Automatic burner control units IFD

The IFD 400 Series is designed for directly ignited burners in continuous operation. It has a digital display for the program status and flame signal and is suitable for multi-flame control.



### Burner control unit BCU®

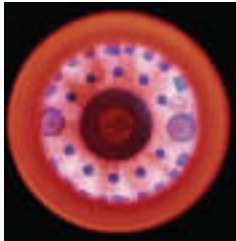
The BCU® Series replaces the local control cabinet. It unites the functionally interrelated components of automatic burner control unit, ignition transformer, operation-control module for Manual/Automatic mode and operating and fault diagnostic system in a compact metal housing. It is suitable for intermittent and continuous operation. Parameterisation and extended diagnostics using PC software BCSOFT.

BCU 370 for modulating-controlled forced draught burners with activation signals for the fan and control valve and also with a tightness control and Profibus-DP as options.

BCU 440 for ionisation-controlled, single-stage burners with optimised connection equipment for zonal wiring.

BCU 460, BCU 465 and BCU 480 for ionisation or UV-controlled burners with optional Profibus-DP bus system.





## Competence in gastechnology

Gas is considered to be one of the most important energy resources in today's—and particularly tomorrow's—world.

Kromschröder is a leading manufacturer of top products and systems for measurement and control of gases, for automation of industrial kilns and for control of heat treatment processes.

Through innovative research and development of trendsetting designs, Kromschröder is a regular source of new impetus for this interesting market.

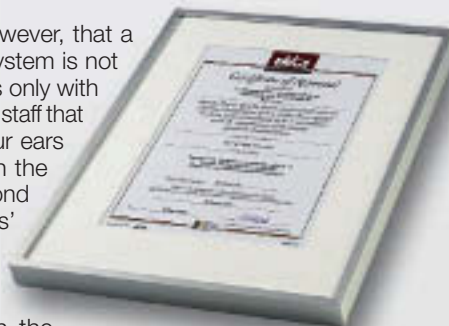
Dedicated quality management and modern, staff-orientated product segments have made Kromschröder into such a competent partner.

### Quality

Kromschröder's quality policy is based on a globally acclaimed system for ensuring products and services of consistently high quality.

Certification in compliance with Standard DIN ISO 9001 confirms the efficiency of our system.

We are well aware, however, that a quality management system is not enough on its own. It is only with the active support of our staff that we are able to keep our ears close to the ground on the market in order to respond quickly to our customers' needs. With a strategy of steady, continuous improvement of all the processes involved in the creation and distribution of our products, we want to actively implement the requirements and expectations raised by the market because customer satisfaction is the standard we strive to achieve.



## Ecology and responsibility

Kromschröder has recognised that the ecological demands of our time must be reflected in a forward-looking management policy. One of the principles of our company philosophy, therefore, is to act with a sense of responsibility to our environment.

The environmental compatibility of a production system is a quality feature of its products. And quality is written with a capital Q at Kromschröder.

We know from experience that environmental protection and business efficiency are not mutually exclusive.

### Inspection and certification

Approval or certification in accordance with ruling national or international standards and specifications is taken for granted with safety equipment and systems.

By participating in relevant international bodies and standards committees, Kromschröder ensures that our customers' interests are represented in international standardisation activities.

*We want to use the most modern technologies and treat our environment with all due care.*

*Our customers are satisfied if we meet their requirements and satisfy their expectations of our products.*

*Kromschröder is committed to producing high quality and to being a supplier of leading-edge technology.*



*Kromschröder understands quality to be the conformity of the properties and features of our products with market standards and expectations.*

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schroder**

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