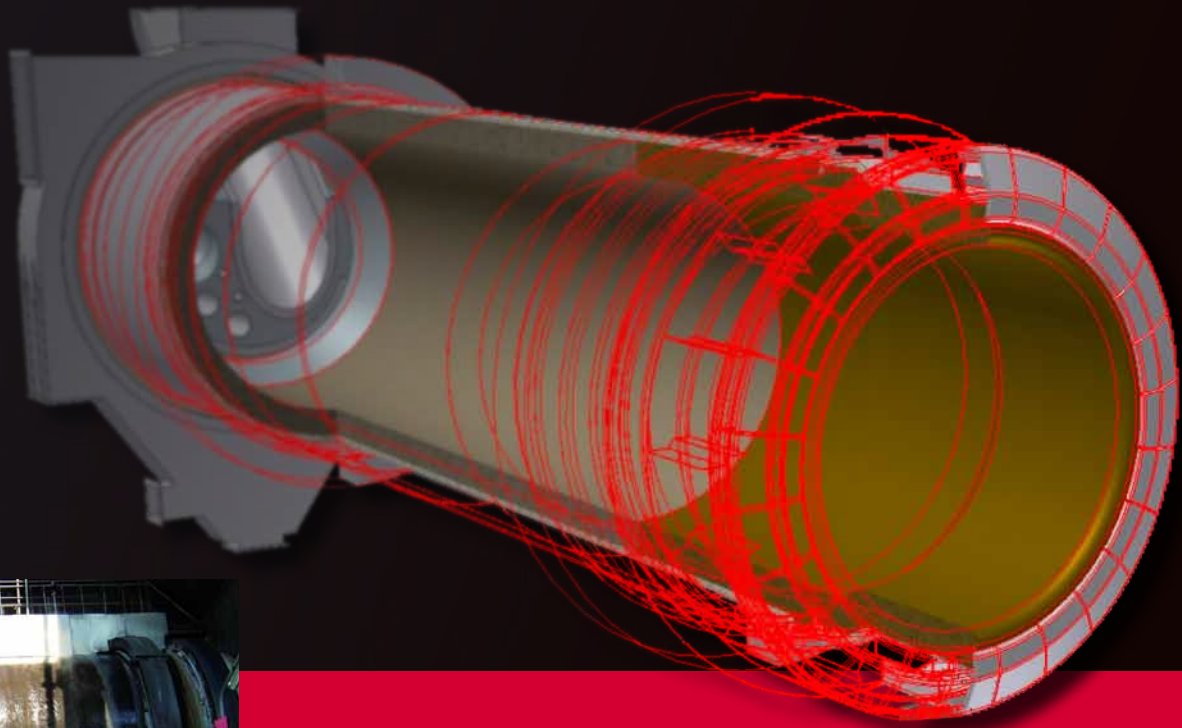




Refractory Systems | **Hazardous Waste Incinerators**



**Left:** Water-cooled rotary kiln of a hazardous waste incinerator.



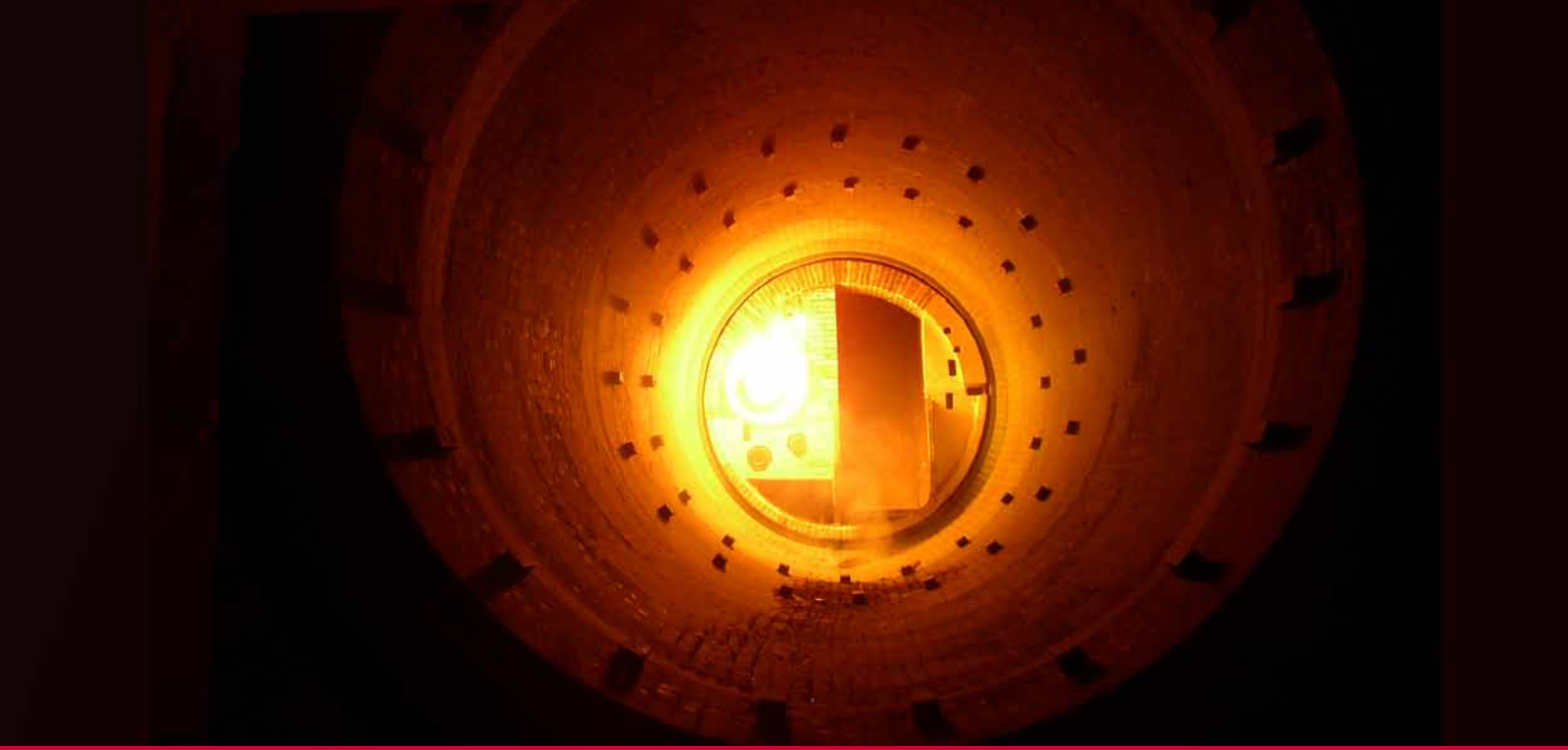
**Left:** Large-area use of carrier bricks in a newly lined rotary furnace (diameter: 4800 mm).



**Left:** Ring-lined, multilevel rotary kiln lining with 10% chromium-corundum brick.



**Left:** View in a round post combustion chamber lined with andalusite bricks.



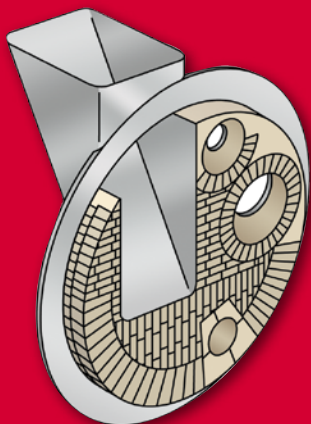
## STEULER-KCH specialises in refractory linings in hazardous waste incinerators

The demand for raising the efficiency of industrial hazardous waste incinerators increasingly necessitates innovative refractory concepts. Operating temperatures of up to 1400 °C under extreme temperature changes, high mechanical stress and severe chemical attack in aggressive atmospheres in the rotary furnace and in the secondary combustion chamber are also raising the requirements of refractory materials.

Chromium-containing materials with low SiO<sub>2</sub> content are corrosion-resistant and infiltration-resistant while ensuring joint elasticity at the same time. Depending on the stress in the relevant equipment area, STEULER-KCH guarantees a wide range of special refractory materials which are also reliably able to meet the requirements of changing factors in hazardous waste incinerators.

STEULER-KCH provides lining concepts for all areas – concepts which are matched to these application areas and ensure the longest possible plant availability.

# Highly abrasion-resistant refractory grades from STEULER-KCH extend incinerator service life



## Front face

The front wall basically serves the function of charging the incinerator. The solid wastes are fed via the chute into the rotary furnace; liquids and slurries are fed via lances and burners.

## Lining options for the front face

The stresses for the front face refractory lining have increased in recent years. Due to higher throughputs, fluctuating temperatures caused by the changing calorific properties of the fuels, and the injection of aggressive media, requirements have continuously increased.

STEULER-KCH offers innovative lining concepts in the form of

- **Brick linings**, i.e. completely lined with shaped and standard bricks
- **Combination linings**, i.e. shaped and fired products (where appropriately applicable), combined with refractory castables
- **Monolithic linings**, i.e. completely lined in the casting or injection process

## Rotary kiln

The rotary kiln is the heart of every incinerator. The refractory lining in this part of the plant is subject to extreme conditions.

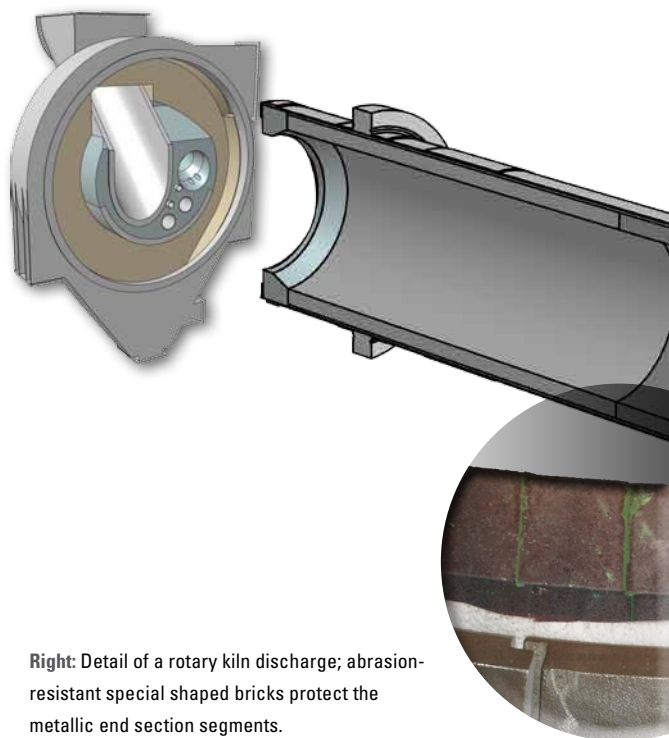
### Inlet and transition zone

In connection with the operation of the rotary kiln, the stresses imparted on the refractory lining are primarily mechanical. STEULER-KCH uses materials with high abrasion resistance and pressure resistance in this zone. Moreover, the moisture penetration in this area also means that the andalusite and corundum materials used here require good temperature change properties at temperatures between 900 and 1150 degrees Celsius.

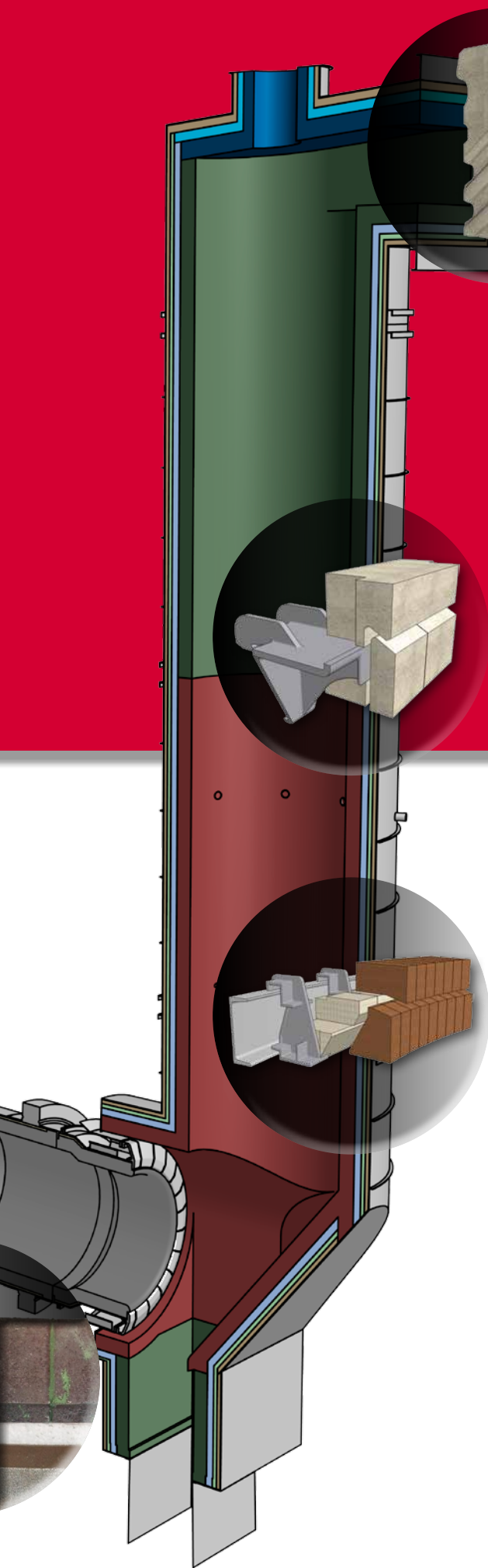
### Main combustion zone and discharge

At combustion chamber temperatures of up to 1400 degrees Celsius, aggressive slag and changing operating conditions exert extreme stresses on refractory materials.

For more than 25 years now, STEULER-KCH has been supplying and installing highly abrasion-resistant materials based on corundum with a chromium-oxide content of up to 15%. Innovative concepts individually tailored to the needs of the operator extend plant availability. Practical testing is carried out in the form of half-shell tests which confirm the extraordinary strength of CZK products from STEULER-KCH. On request we will be glad to provide you with up-to-date references.

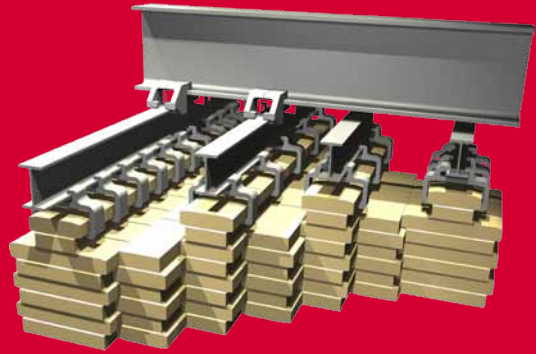


**Right:** Detail of a rotary kiln discharge; abrasion-resistant special shaped bricks protect the metallic end section segments.



## Post combustion chamber ceiling, ceiling boxes and accessory components

STEULER-KCH designs, supplies and installs refractory ceiling systems not only based on dry-pressed shaped brick but also as monolithic linings. The range of heat-resistant cast and steel components and ceramic anchoring bricks offered suggest many possible solutions depending on the specific loading



## Post combustion chamber

In the post combustion chamber, the refractory brick lining is generally subject to very harsh chemical stress from highly alkali conditions. In combination with high combustion chamber temperatures of up to 1350 degrees Celsius, liquid slag severely erodes the brick.

In addition to tried-and-tested standard materials based on andalusite, bauxite and corundum – optionally available in variants which contain chromium-oxide – STEULER-KCH also offers Suprema CAK 710 P, a special highly abrasion-resistant product specifically designed for these unusual loading conditions. Specially manufactured burner bricks, shaped console bricks and sophisticated anchoring systems provide linings with a long service life. Rounding out the product range, a large number of monolithic refractory and insulating materials can be supplied on short notice.



Above: Replacement of shaped console bricks in a round post combustion chamber.

**Below:** Qualified installation personnel ensure professional implementation of the refractory design.



## Material development, production and installation – all from a single source



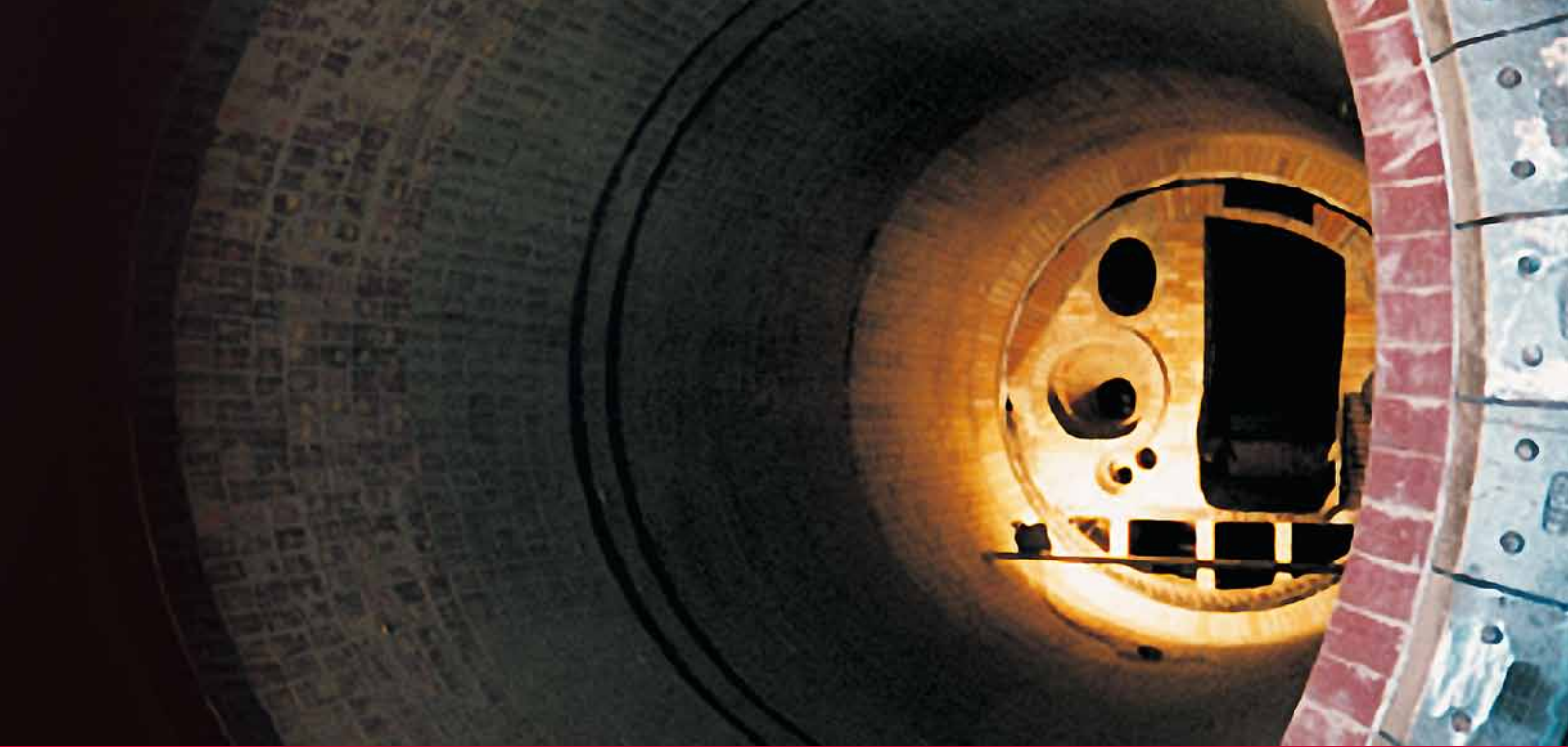
Left: In order to guarantee the reliability of our refractory materials, we carry out abrasion and slagging analyses in advance.



Left: Placement robots ensure safe and effective handling of the pressed bricks.



Left: STEULER-KCH manufactures products using state-of-the-art firing methods, also in the high-temperature range.



### **Product pallet**

Our product portfolio covers shaped and monolithic materials. The range of raw materials extends from dry-pressed fireclay grades for inlet zones and permanent linings to corundum materials with up to 99% aluminium-oxide content.

We satisfy customer needs with a comprehensive selection of andalusite, bauxite, zirconium-mullite and silicon-carbide grades. Depending on the requirement profile – in thermal waste disposal, for example – we use additives such as chromium-oxide and zirconium-silicates. Application engineering characteristics are ensured through the use of state-of-the-art firing technologies at temperatures of up to 1750 °C.

Lightweight refractory and insulating brick, mortars, refractory castables, masses and insulation materials round out our product range.

### **Engineering, installation and supervision**

Our range of services includes engineering, firing services and complete installations. Based on the steel construction drawings and process data provided, STEULER-KCH also develops the complete refractory layout for each aggregate. The scope of work includes not only installation drawings

but also heat transfer calculations and recommended heat-up procedures. Trained supervisors lead the entire process at the construction site and ensure proper installation monitoring. This is how we ensure qualified implementation of complete refractory solutions.

### **Waste gas and waste water incinerators**

Liquid waste and waste gas incinerators with both high firing temperatures and harsh chemical conditions require special refractory materials. Also for these process plants, STEULER-KCH supplies highly wear-resistant materials for front wall brickwork and permanent lining.

Moreover, the scope of goods and services of STEULER-KCH also includes cost-effective solutions for wood, sewage sludge and household waste incinerators.



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Together with its international subsidiaries and representations, STEULER-KCH offers its customers a worldwide network which develops and implements comprehensive system solutions.



#### **SURFACE PROTECTION SYSTEMS**

Lining and flooring systems  
Cements, jointing materials, masonry systems,  
rubber linings



#### **PLASTICS TECHNOLOGY**

Thermoplastic lining systems  
Equipment, piping and tanks made of  
duroplastics and thermoplastics



#### **REFRACTORY SYSTEMS**

High temperature refractory linings



#### **POOL CONSTRUCTION**

STEULER-Q<sup>7</sup> lining systems



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