

# Flue gas cleaning

...for clean air and  
a better environment



Flue gas cleaning and dedusting technology

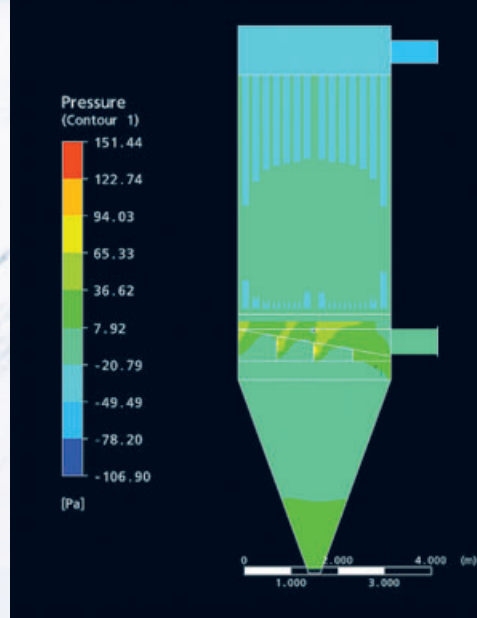


So that the air stays clean!



Hellmich has been developing clever solutions for dedusting and flue gas cleaning, for pipelines and apparatus engineering for over 45 years.

Our expertise in development results in tailor-made, economic equipment for the purification of large surfaces and machines in addition to air purification.



## Flue gas cleaning and dedusting technology

# So that the air stays clean!

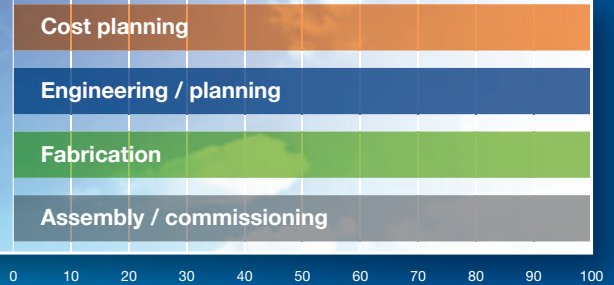


### Hellmich potential

We are your experts for dedusting engineering, flue gas cleaning, pipelines and apparatus engineering. We will advise and support you individually from the tender right up to commissioning. We can react to your requirements quickly and flexibly. Challenge our knowledge and our experience:

- during planning
- during system selection
- in the approvals process
- during equipment operation

#### Hellmich performance barometer



### Enterprise clean air

Our successful, development-friendly family company has been dealing with environmental engineering since its founding in 1963 by Friedrich Hellmich. Our focus in this context is always on technically well thought-out, practical and inexpensive solutions for all sectors of air purification. We place emphasis on high-quality, heavy-duty technology which proves itself in practice day after day.

#### Hellmich products in operation worldwide

The Hellmich range of products is versatile and extensive. Whether central vacuum cleaner, dedusting equipment, silo add-on filters or pneumatic conveying systems, we can develop just the right equipment for all possible applications. Complete flue gas cleaning systems with piping, flues and heat exchangers round off the range of products.

More than 500 flue gas cleaning units and over 1000 dedusting plants being operated worldwide are proof of the high-quality, long service life and economic efficiency of our products.

➡ Experience  
➡ Know-how  
➡ Solutions

**HELLMICH**

So that the air stays clean!



...the best solution  
for fluorine reduction

## FKA Fluorine cascade absorber

We have developed a range of technical solutions for the cleaning of flue gases, such as this special fluorine cascade absorber, which can be operated using a wide range of absorption materials.

### Flue gas cleaning

#### The functional principle

**The fluorine cascade absorber is the standard solution for high fluorine and low chlorine and sulphur concentrations. The sorption material, for example limestone chippings, is located in a silo on top of the absorber.**

The absorption material trickles vertically out of the storage silo past the horizontally aligned cascades in the reaction chamber. In doing so, the pollutants flow through the absorption material and react with the limestone chippings. The saturated limestone chippings are collected in the unit hopper and removed either continuously or intermittently with a screw conveyor. A peeling drum increases the economic efficiency of the plant.

#### Flue gas cleaning

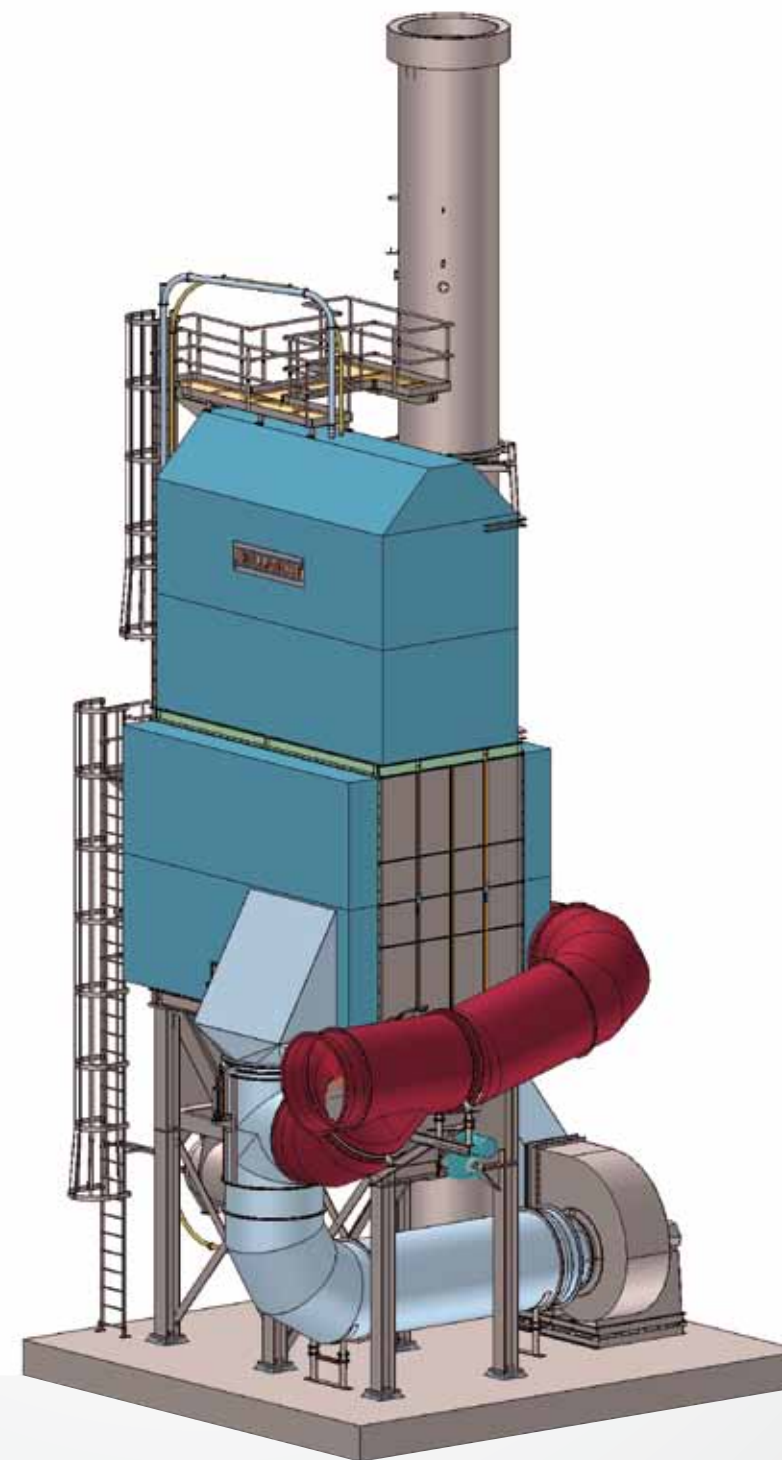
- FKA
- MILL pneumatic conveying
- HKD-R
- SGA

#### Dedusting technology

- EE-D
- HKD
- HS-D
- SAF

#### Pipelines / apparatus engineering / chimneys

- WT heat exchanger
- DGF pneumatic conveying system
- TOW tunnel kiln car cleaning
- Turbo mill
- Pipelines, apparatus engineering, chimneys, steel construction



The reacted surface of the limestone chippings is abraded in the rotating screen drum (peeling drum). The limestone chippings, which can now be reused, are then transported back to the storage silo via a pneumatic transport system. The reaction product which is produced can also be processed by a mill specially constructed for this application and transported on using a pneumatic transport system. Mixing up the reaction product into tiles is possible for the heavy clay industry.

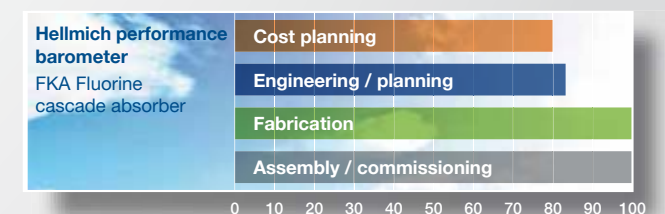
The fluorine cascade absorber can also be operated using other absorption materials.



#### The technology

The absorption material trickles vertically past the horizontally arranged cascades in the reaction chamber, and in doing so the pollutants flow through and react with the sorption material which is then collected in the equipment hopper and removed with a screw conveyor.

#### The performance



#### Applications

High Fluorine concentrations and low dust concentrations

#### The benefits

- Simple and space saving compact construction
- No moving parts in flue gas flow
- Inexpensive absorption material available everywhere
- Up to 40% saturation of reaction medium
- Dry reaction product (i.e. easy handling)
- Lower energy demand
- Low-maintenance



So that the air stays clean!



...robust technology for  
HF, HCl and SO<sub>x</sub> reduction

## SGA packed bed counterflow absorber

We have developed the aggregate bed counterflow absorber to increase the separation performance of our heavy duty aggregate bed facilities. This equipment is also especially suitable for operation at higher temperatures.

### Flue gas cleaning

#### The functional principle

The packed bed counterflow absorber (SGA) is similar in function to the fluorine cascade absorber. However the SGA is different because the reaction chambers (cascade blocks) are arranged in series, and this allows it to reduce SO<sub>x</sub> concentrations from around 2,500 mg/Nm<sup>3</sup> to below 300 mg/Nm<sup>3</sup>.

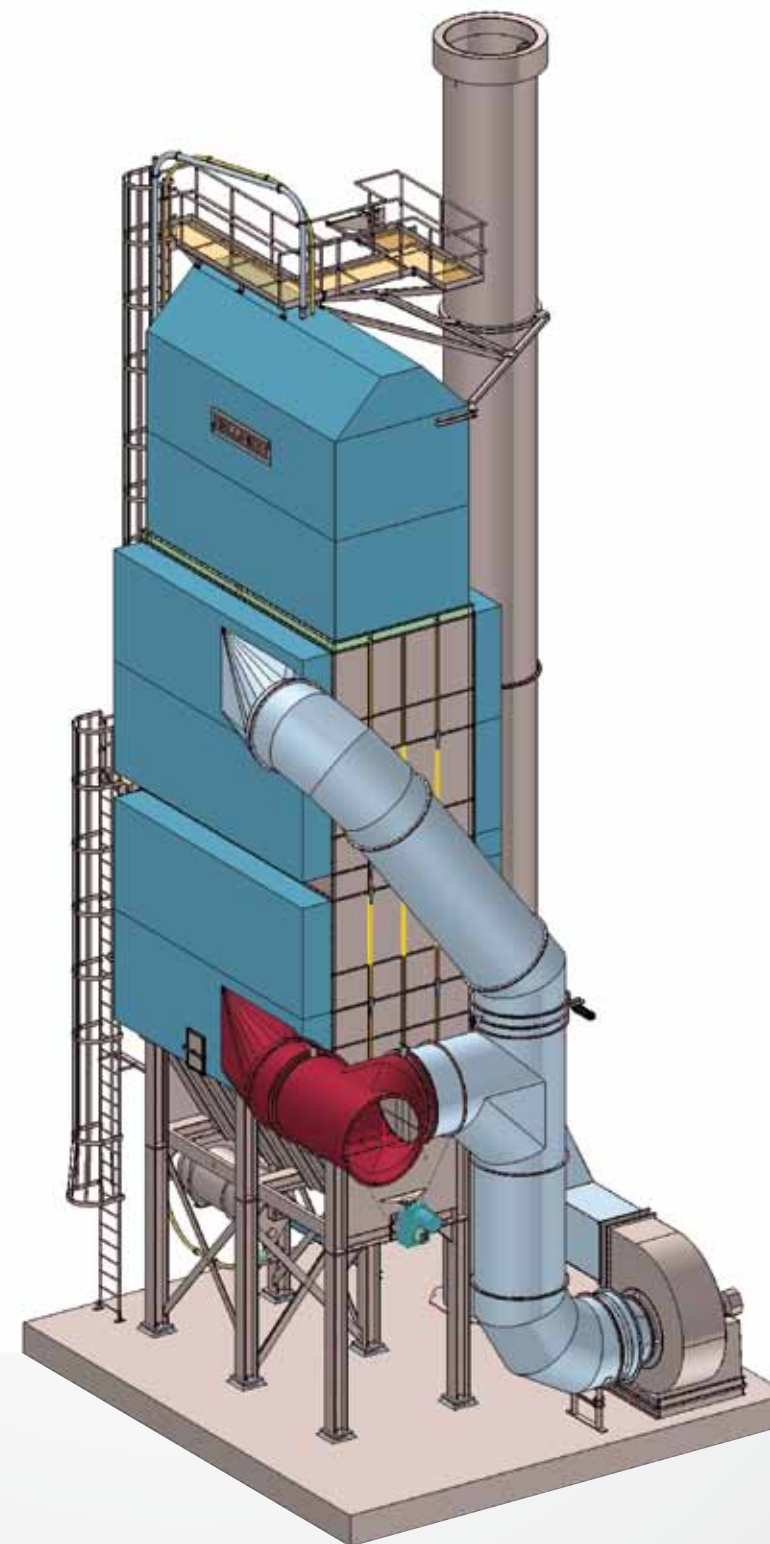
This type of equipment is especially advantageous because there are no moving parts which contact the flue gas flow. Since the absorption areas are connected in series, the flue gases are fed through the absorption material several times, which results in high absorption process efficiency and a simultaneous reduction in contaminants.

The SGA is specially designed for operation at higher temperatures. A man-made calcium carbonate granulate is used as a absorption material.

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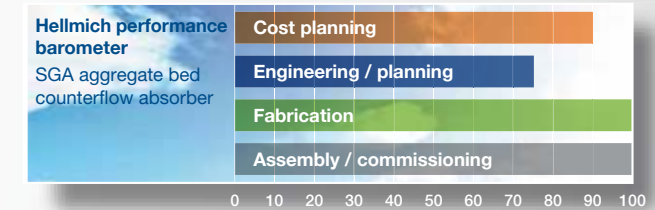
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If sulphur dioxide levels are low, it is also possible to use conventional limestone chippings.

Just like all flue gas cleaning equipment produced by Hellmich, the packed bed counterflow absorber stands out through its extremely low operating costs.

#### The performance



#### The technology

Since the reaction chambers (cascade blocks) are connected in series the flue gases are fed through the absorption material several times, which results in high absorption process efficiency and a simultaneous reduction in contaminants. The SGA stands out through its ability to operate at higher temperatures.



**HELLMICH**

So that the air stays clean!



...the safe solution for  
HF, HCl, SO<sub>x</sub> and dust

## HKD-R hose filter plant

HKD-R technology is used for the separation of high concentrations and observance of low limit levels. The system is also suitable for high dust concentrations.



### Flue gas cleaning

#### The functional principle

The application area for HKD-R technology is high SO<sub>x</sub> concentrations at simultaneous high HCL and/or high dust concentrations. This technology can absorb SO<sub>x</sub>, HCl, HF and dust. The absorption material required is fed into the flue gas flow via a feeding system, e.g. a frequency-regulated dosing screw.

The absorption process commences when the material is fed in. Separation of the reaction product takes place at the filter tubes in the filter plant, whose housing is constructed in heavy-duty sheet steel. Perforated sheets at the head end are used to mount the filter hoses and the supporting cages. Filter media consisting of various materials depending on temperature and flue gas composition are used.

#### Applications

High SO<sub>x</sub> concentrations at simultaneous high HCl and / or high dust concentrations

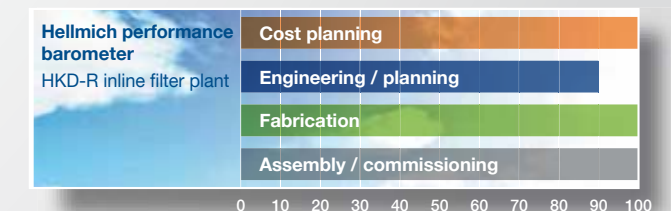
#### The benefits

- High saturation level of sorption material
- Can also be used at high HCl and/or dust concentrations
- Can be coupled to heat recovery system

#### The technology

The necessary absorption material is fed to the flue gas flow using a feeding system. The reaction product is then separated in an hose filter plant and removed.

#### The performance



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In order to achieve optimum utilisation (saturation) of the absorption material, a large proportion of the material is returned to the process after separation (and transport out of the hopper). This results in a saturation level of up to 80% for the absorption material! The selection of absorption material is made depending on the type and concentration of the pollutant.

If the flue gas temperature is above 240 °C, additional ambient air is mixed into it or the temperature is lowered by an upstream heat exchanger.



...the powerful all-rounder  
for SO<sub>x</sub>, HCl, dust and HF

## HKD-R hose filter plant

with conditioning

Process-related flue gases can cause damage and affect the environment. The HKD-R can be fitted / retrofitted with a conditioning system to further increase the separation performance and consumption quantities at the highest concentrations.

### Flue gas cleaning

#### The functional principle

The application area for HKD-R technology is high SO<sub>x</sub> concentrations at simultaneous high HCl and/or high dust concentrations. This technology can absorb SO<sub>x</sub>, HCl, HF and dust. The sorption material required is fed into the flue gas flow via a feeding system, e.g. a frequency-regulated dosing screw.

The absorption process commences when the material is fed in. Separation of the reaction product takes place at the filter hoses in the filter plant, whose housing is constructed in heavy-duty sheet steel. Perforated sheets at the head end are used to mount the filter hoses and the supporting cages. Filter media consisting of various materials depending on temperature and flue gas composition are used.

#### Applications

Highest SO<sub>x</sub> concentrations at simultaneous high HCl and / or high dust concentrations

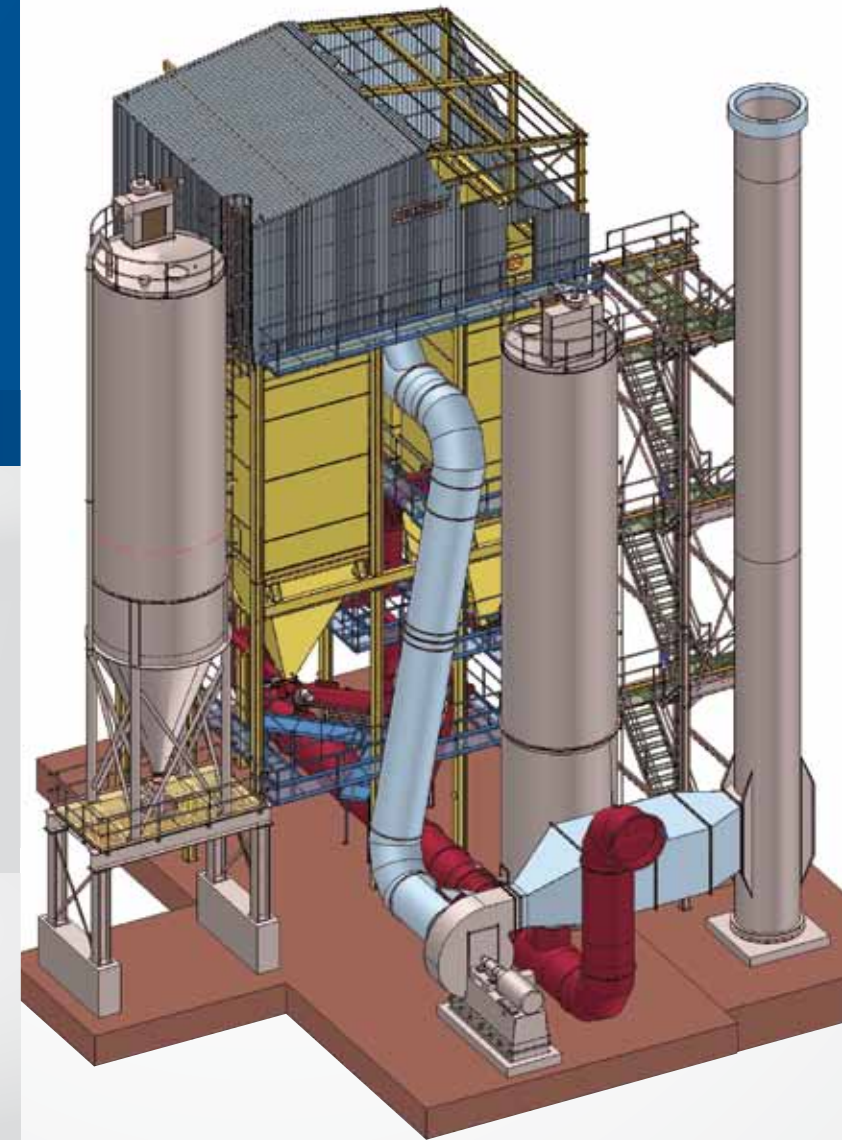
#### The benefits

- Very high saturation level of absorption material
- Can also be used at high HCl, SO<sub>x</sub> and/or dust concentrations
- Can be coupled to heat recovery system

So that the air  
stays clean!



So that the air stays clean!



To achieve optimum utilisation (saturation) of the absorption material, a large proportion of the material is returned to the process after treatment. This results in a saturation level of up to 80% for the sorption material!

The reaction ability of the sorption material can be improved by conditioning the material. A rotating mixing drum, to which fresh or partially saturated sorption material or a mixture of both is added, creates a standing turbulent layer. This turbulent layer has water added to it in stages in small quantities using nozzles. This extremely economical process creates a powdery warm sorption material enriched with water which has an extremely high reaction capability.

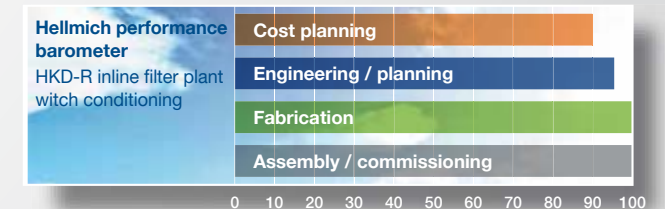
The selection of sorption material is made depending on the type and concentration of the pollutant. If the flue gas temperature is above 240 °C, additional ambient air is mixed into it or the temperature is lowered by a heat exchanger.



#### The technology

The necessary absorption material is fed to the flue gas flow using a feeding system. The reaction product is then separated in an hose filter plant and removed.

#### The performance





...to lower the costs  
for heat energy

## WT heat exchanger / heat recovery

In a manufacturing operation, the energy costs play an increasing role. We at Hellmich have developed a heavy duty, low maintenance system for recovering heat from thermal processes so that you can lower your heat energy costs.

Pipelines / apparatus engineering / chimneys

### The functional principle

**The flue gas air heat exchanger works on the cross and counterflow principle. Flue gases flow through right-angled tubes built into the exchanger block, and in doing so pass their heat energy to the cold air flowing in the opposite direction via the pipe walls.**

The process is controlled using a resistance thermometer so that the heat exchanger operation always takes place above the acid dewpoint. This takes place by mixing part of the extracted hot air with cooling air which effectively prevents any condensate formation. Any soiling occurring on the process gas side is removed by a mechanical system of cleaning chains.



➡ Experience  
➡ Know-how  
➡ Solutions



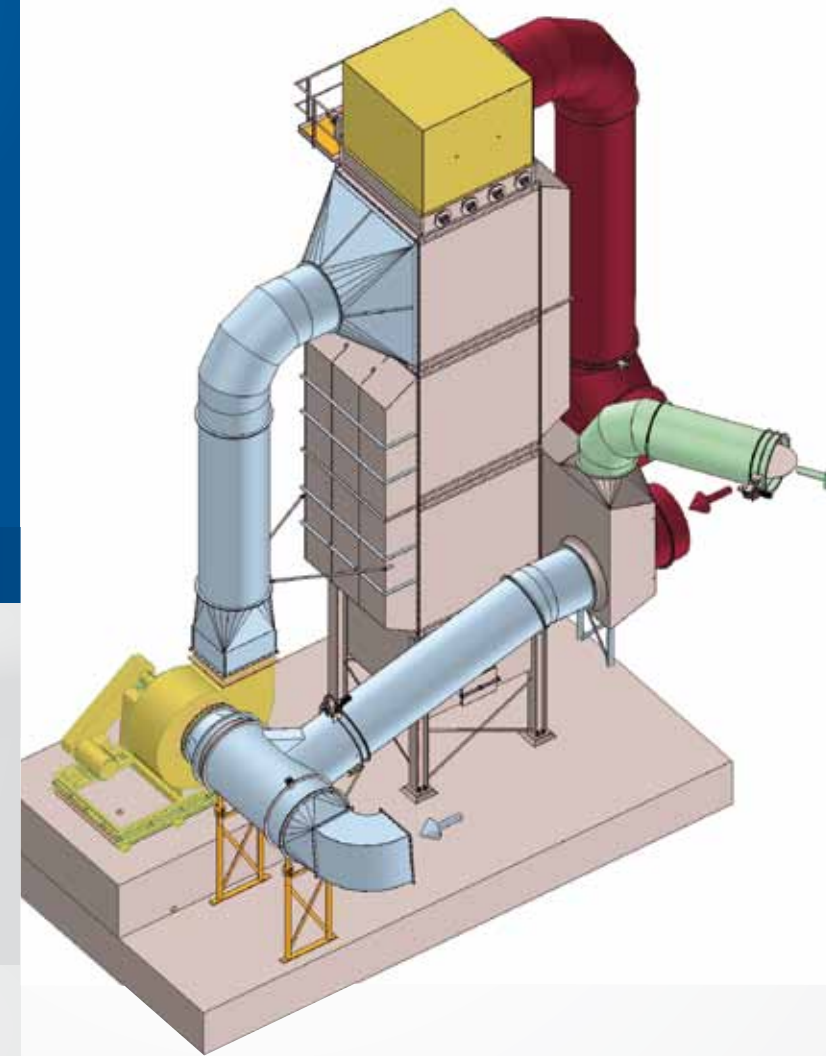
So that the air stays clean!

### Applications

Lowering heat energy costs  
through heat recovery from thermal  
processes

### The benefits

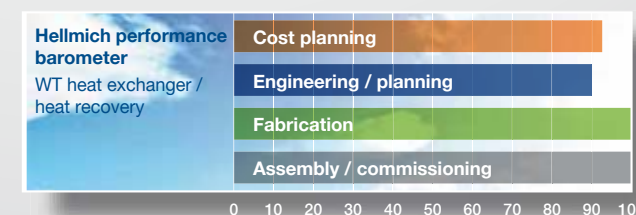
- Heavy-duty construction
- No moving parts in flue gas flow
- No agglomeration on exchanger walls
- Low maintenance costs
- Compact, space saving construction



Agglomerations which often form on piping walls with problematic flue gases do not therefore pose any problems for the exchanger system. The arrangement of the blocks to each other enables a compact, rational and space-saving heat exchanger construction even if the exchanger surfaces are very large.

Our manufacturing programme includes much more than just plate exchangers. Classical tube bundle exchangers are also designed, manufactured and fitted at Hellmich. The heat energy extracted can be used for many production processes or used for building heating.

### The performance



### The technology

Flue gases flow through the exchanger blocks in a vertical direction, the cooling air is horizontal. During the process, the heat energy is transferred to the cooling air via the pipe walls. The heat exchanger construction guarantees safe separation of flue gases from the extracted hot air.





... everything from  
under one roof

## RTO regenerative thermal oxidation / engineering

Flue gas cleaning for anorganic pollutants and the removal of hydrocarbons and NOx - just a few challenges which we can solve completely and reliably.

### Flue gas cleaning

#### The functional principle

**As your expert partner for environmental engineering, we can carry out the engineering of complete, turnkey flue gas cleaning systems.**

This includes facilities for regenerative thermal oxidisation and SNCR/SCR facilities. This enables us not just to solve all the problems which are caused by an organic pollutants, but also to remove all the hydrocarbons and NOx from your facility flue gases safely at the same time as saving energy.

#### Applications

Problem-solving for anorganic pollutants in addition to the removal of hydrocarbons and NOx

#### The benefits

- Established system technology
- Short publication routes
- Considerable experience and expertise
- One contact person

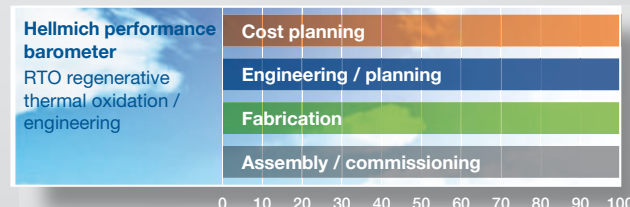
**HELLMICH**

So that the air stays clean!

Thanks to our modern 3-D CAD system, we are capable of implementing the engineering for steel structural components such as stairway towers, penthouses, reactors etc quickly, economically and reliably.

This method enables us to carry out projects in the shortest possible time and therefore to guarantee on-time completion of your pollutant control equipment.

#### The performance







## Flue gas cleaning

- ➔ FKA
- ➔ MILL pneumatic conveying
- ➔ HKD-R
- ➔ SGA

## Dedusting technology

- ➔ EE-D
- ➔ HKD
- ➔ HS-D
- ➔ SAF

## Pipelines / apparatus engineering / chimneys

- ➔ WT heat exchanger
- ➔ DGF pneumatic conveying system
- ➔ TOW tunnel kiln car cleaning
- ➔ Turbo mill
- ➔ Pipelines, apparatus engineering, chimneys, steel construction

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