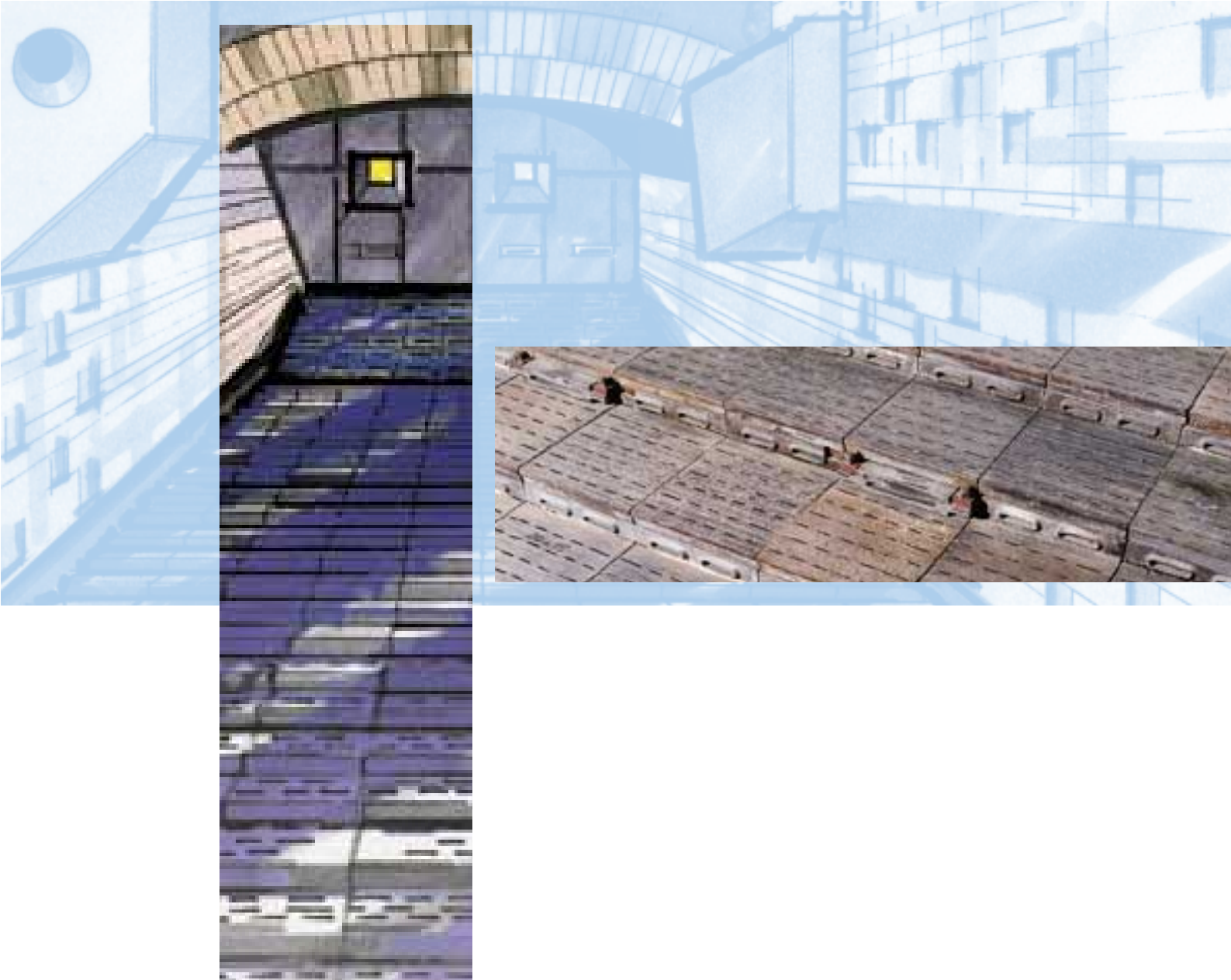


REPOL[®] reciprocating grate cooler.



A company
of ThyssenKrupp

Krupp Polysius



ThyssenKrupp

REPOL® reciprocating grate cooler.

The guarantee for high availability...

Maximum heat recuperation with optimum secondary air quantity, low ultimate clinker temperature with minimum cooling air volume, long service life and availability in spite of increasing grate loading and optimum cooler operation even with frequently changing clinker types are the convincing characteristics of the REPOL® reciprocating grate cooler.

They are also the guarantee for minimal fuel and energy consumption, low capital cost and maintenance expense and flexible adaptation to different production requirements.

Principle of functioning

The clinker cooler has to perform the tasks of cooling the clinker discharged from the kiln from over 1,300°C to around 100 °C, recuperating the maximum possible amount of thermal energy and of carrying the clinker to the crusher and outward conveying equipment. To perform these functions efficiently, the REPOL® reciprocating grate cooler is divided into three zones, which are ideally suited to the different tasks:

The purpose of the **cooler inlet section** is to rapidly and uniformly distribute the clinker discharged from the kiln and aerate it intensively, while avoiding segregation. In the inlet zone, which is subjected to severe thermal and mechanical stresses, a static grate equipped with jet-stream plates is therefore a standard feature of the Polysius reciprocating grate cooler. The 14° inclination and the fixed rows of grate plates are advantageous for good clinker distribution and simultaneously assure optimum clinker aeration.

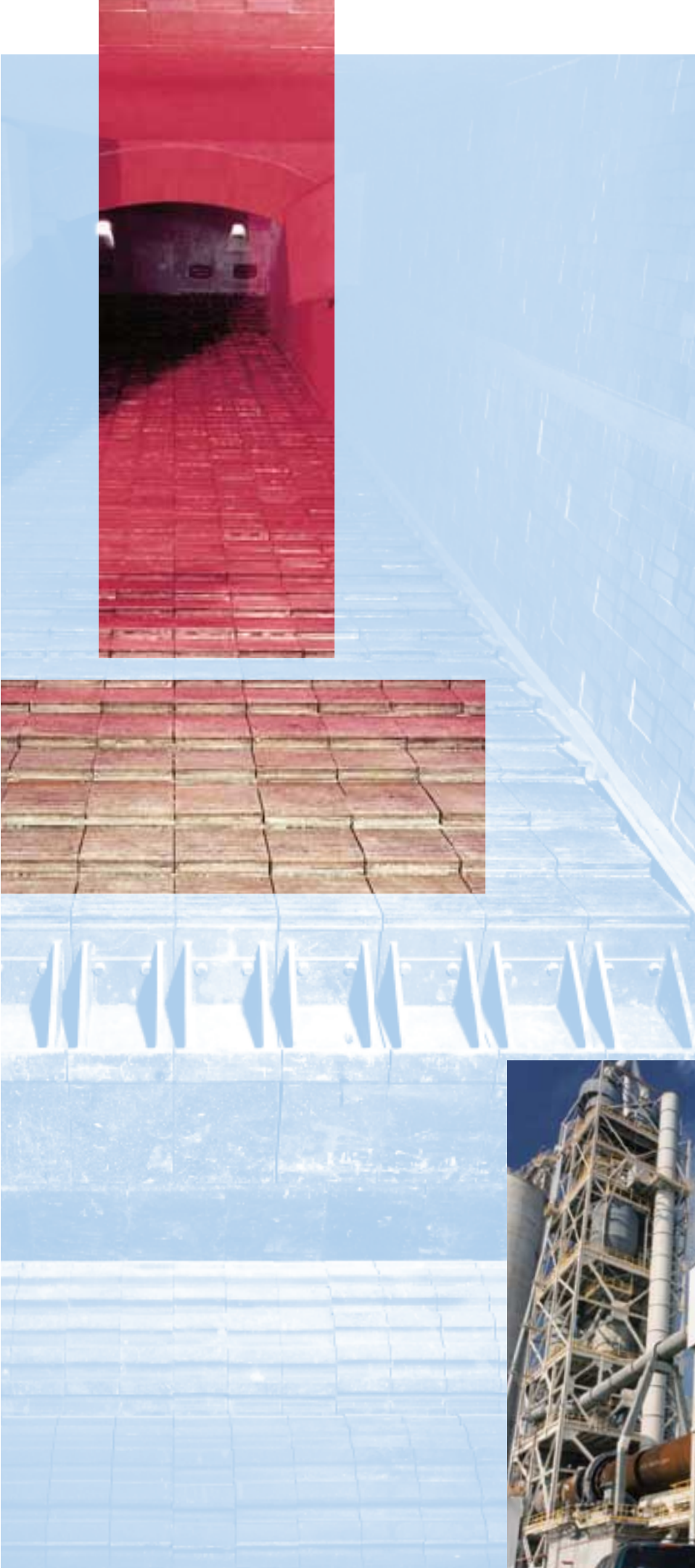
The **recuperation section** fulfils the function of recovering the heat, which is returned to the kiln. As the entire length of the recuperation zone is fitted with small aeration chambers, the cooling air can be optimally suited to the clinker bed and thus extract the maximum possible amount of heat for use in the burning process.

In the **finish cooling section**, also equipped with jet-stream plates, the clinker is cooled to the required ultimate temperature, which is determined by the residence time in the cooler and the total volume of cooling air. To improve the heat transfer and thereby boost the finish-cooling efficiency, it is advantageous to install a force-cooled roll crusher between the grates of the cooler.

Advantages

- Due to its design as a modular system, the REPOL® reciprocating grate cooler is readily adaptable to customers' individual requirements.
- The static grate installed in the cooler inlet section ensures excellent distribution of the clinker and outstanding availability of the most severely stressed part of the cooler.
- The optimised chamber aeration in the recuperation section provides a uniform air penetration of the clinker and enables adaptation to the nature of the clinker bed. This results in superior cooler efficiency and also stabilises the recuperation and cooling process.

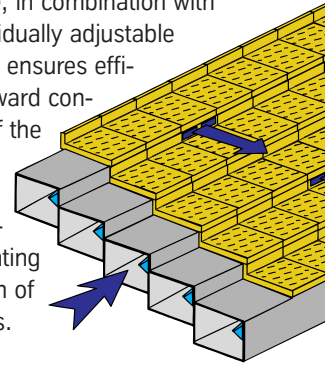




Static grate

The static grate is installed in the inlet zone, which is subjected to severe thermal and mechanical stresses. It ensures both optimum distribution of the clinker over the entire width of the cooler and effective aeration of the clinker bed.

The hot clinker discharged from the kiln rolls down a layer of colder clinker which is moving only slowly down the grate. The inclination of the grate, in combination with the individually adjustable aeration, ensures efficient onward conveying of the clinker while effectively preventing formation of red rivers.



The air-blast nozzles fitted between the steps of the grate are a highly successful solution which enables the specific targeting of snowmen right where they occur.

Kiln plant with REPOL® reciprocating grate cooler in the USA.

...due to innovative detail solutions.

Supporting and drive system

The oscillating frame is supported on dust-protected roller blocks in the side walls of the cooler and driven by the drive cylinder of the fully enclosed hydraulic system, also mounted in a dust-proof casing in the side wall. The centre guidance of the oscillating frame ensures perfectly parallel running.

Roll crusher

The roll crusher installed between the grates of the REPOL® cooler breaks up the clinker into a uniform size at an early stage of the cooling process, so that the finish cooling is greatly improved. Alternatively, the roll crusher can be located at the end of the cooler, where it produces a uniform stream of material for the downstream equipment.

The rolls of this crusher have individual hydraulic drive units. Those in the front section of the crusher serve as screening rolls, while the counter-rotating rolls in the rear section perform the actual crushing. All rolls are cooled by a forced air flow through the shafts and are characterised

by a long service life. A further advantage of the Polysius roll crusher is the fact that complete roll units can be replaced without requiring access to the interior of the cooler.

Hammer crusher

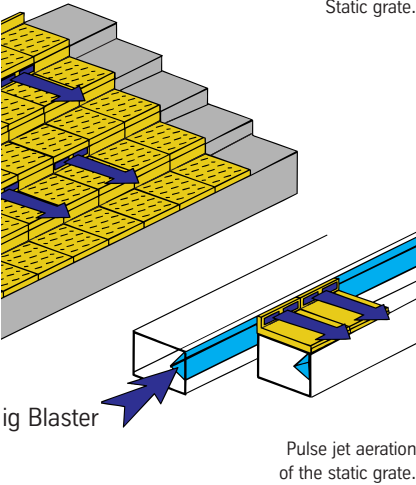
The hammer crusher is only installed at the outlet of the cooler. The hammers mounted between the rotor discs are quick and simple to exchange. The maintenance-friendliness of this unit is augmented by the swing-up, rollout casing.

Individual modernisation solutions

Highly effective components (like the jet-stream plate, the static primary grate and the central grate guide) are so designed that they can be retrofitted in nearly all available makes of reciprocating grate coolers. For cooler and kiln system conversions they therefore offer an ideal basis for boosting efficiency and availability with the minimum of investment. Modernised coolers show clearly improved operating results.



Static grate.



Pulse jet Blaster

Pulse jet aeration of the static grate.

Central grate guide.



Hydraulic drive unit of a clinker grate.



Roll crusher.



Central grate guide

The guide of the grate is in the centre where no heat expansions occur. Thus, the guide system can be adjusted very closely and provides almost 100% straight running of the grate, minimising the gaps between grate and lateral walls. Furthermore, the central guide prevents lateral drifting of the grate with consequential doubling of the gap surface. The resulting great tightness of the grate is another criterion for optimum aeration of the clinker and maximum availability.

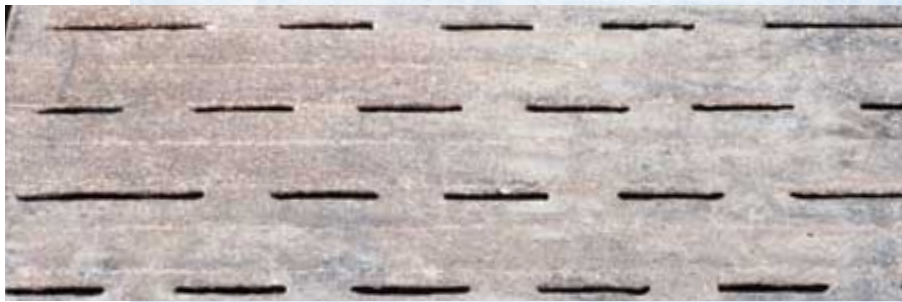


Function illustration of the hammer crusher.

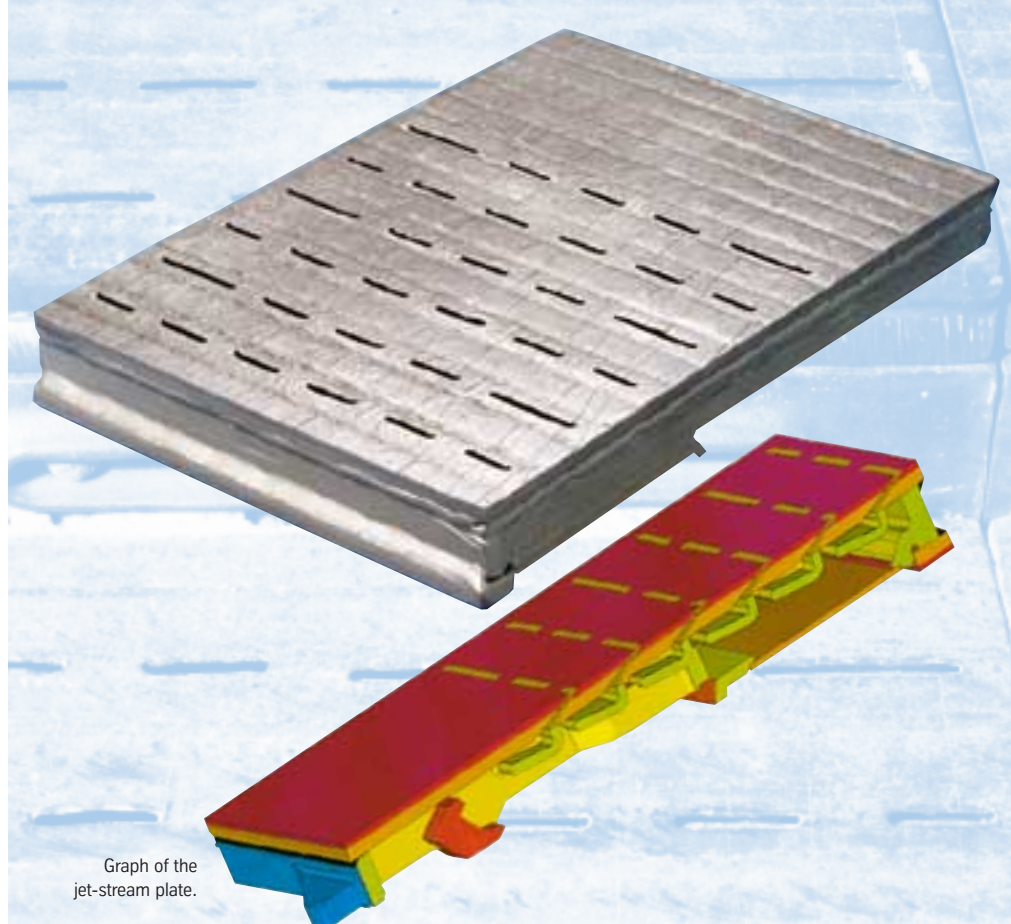
... Jet-Stream plate.

As the centrepiece of the aeration system, the jet-stream plate totally eclipses all process-technological and service life results previously obtained with cooler plates.

For the plate surfaces, thrust faces and side plates, which are subjected to high mechanical and thermal stress, a coating material was selected whose really outstanding wear resistance provides enormously long service lives.



Measurements also prove that, thanks to both material and design, the plates hardly heat up, so that deformations are reliably avoided. In achieving the process-technological optimum, the new aeration slots are a crucial feature. The staggered arrangement of the slots and the tangential outflow of air ensure very uniform and non-turbulent penetration of the clinker bed without blow-throughs, resulting in an excellent heat exchange effect.



Graph of the jet-stream plate.