



CLAUDIUS PETERS
TECHNOLOGIES



Cooling

Technik



The evolution in clinker cooling



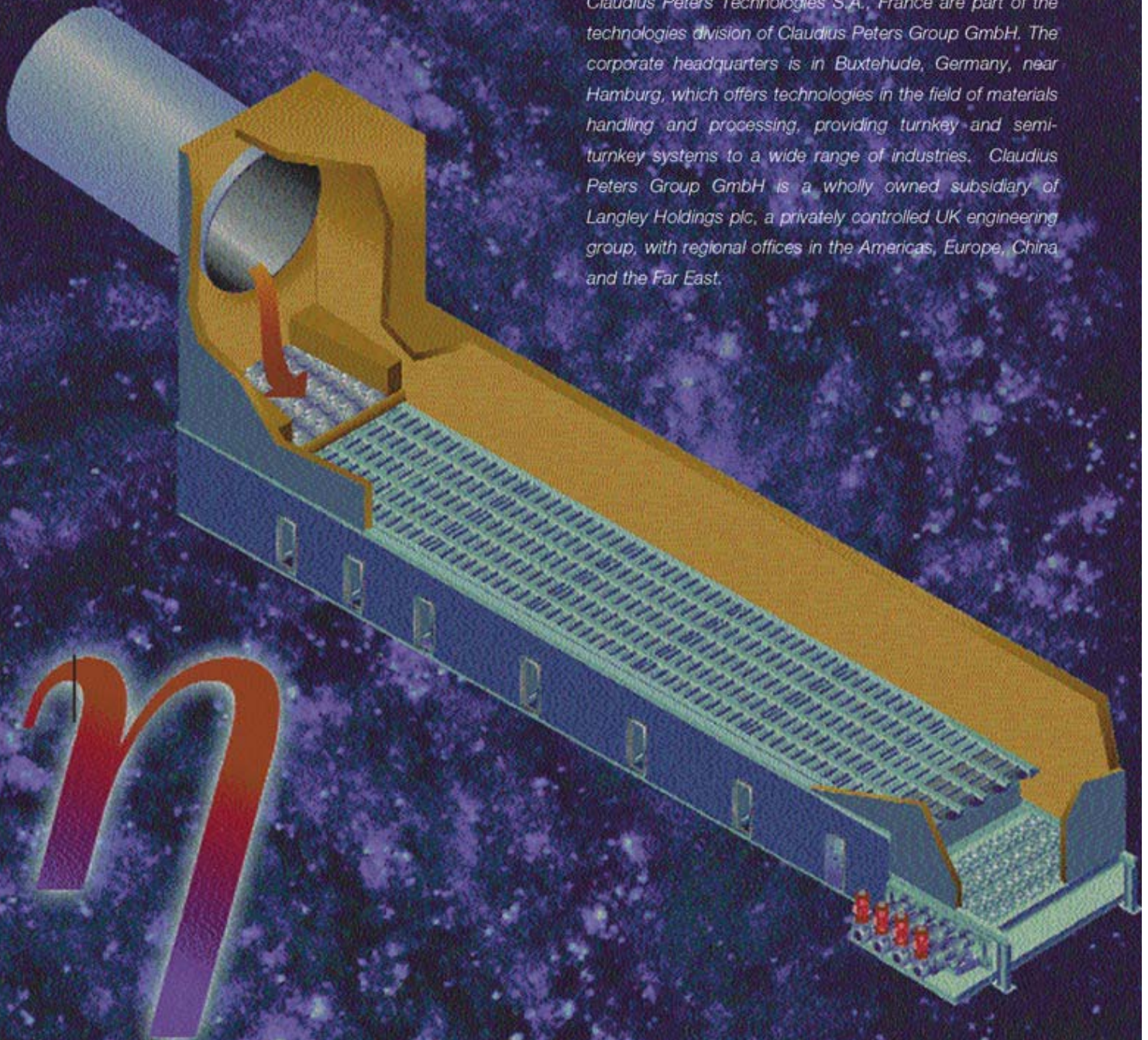
Technology you can trust

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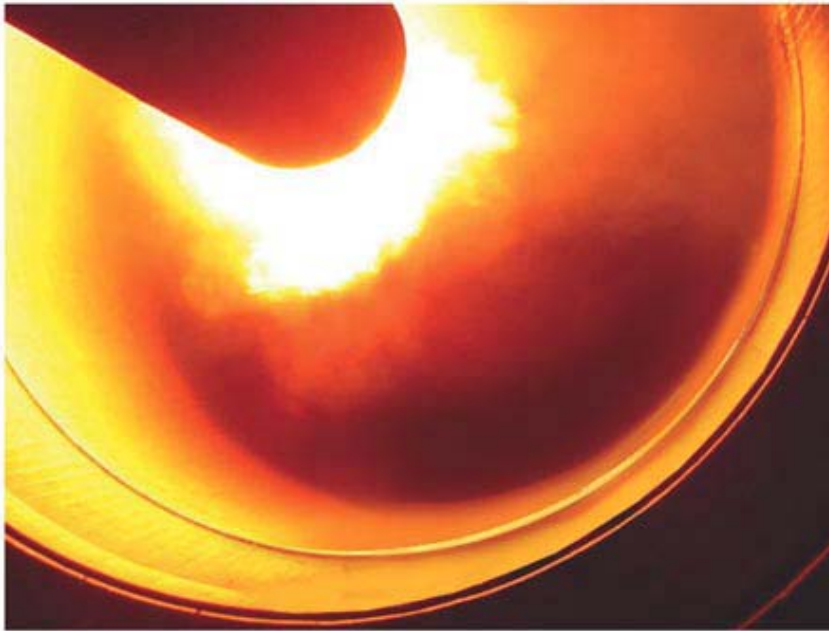
Clinker Cooling has evolved ...

About

Claudius Peters Technologies GmbH, Germany and Claudius Peters Technologies S.A., France are part of the technologies division of Claudius Peters Group GmbH. The corporate headquarters is in Buxtehude, Germany, near Hamburg, which offers technologies in the field of materials handling and processing, providing turnkey and semi-turnkey systems to a wide range of industries. Claudius Peters Group GmbH is a wholly owned subsidiary of Langley Holdings plc, a privately controlled UK engineering group, with regional offices in the Americas, Europe, China and the Far East.



η - the universal symbol for efficiency

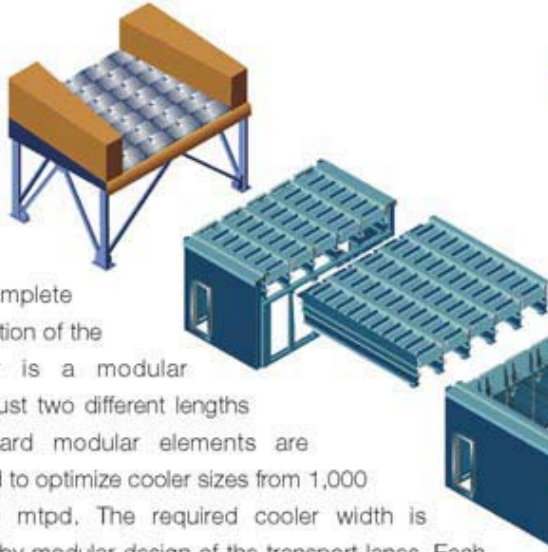


Our reputation speaks for itself

For over half a century Claudius Peters has been renowned as an established cooler specialist in the global cement industry. The company began by marketing the grate cooler in Europe under licence from Fuller. Claudius Peters optimised and rationalised this design, which resulted in the development of the well known Claudius Peters grate cooler, which is presently in operation all over the world. Many of these improvements, such as the hydraulic grate drive (1975) and the roller crusher (1979), are now standard elements in all coolers manufactured today.

Due to ongoing innovations in cooler technology since the 1950s, the production capacity of today's cement plants has increased whilst maintenance and operational costs have reduced. These improvements have largely been driven by design and process technology solutions. Over the past five decades, Claudius Peters has been responsible for many of the innovative new developments that have led to these advances. For example, Claudius Peters introduced the hydraulic drive, the roller crusher, the wear-free CSS (compact swing support) and direct side aeration to create the Compact Swing Cooler as we know it today. Now clinker cooling has again evolved with the new generation Claudius Peters cooler, known as the η -Cooler (η = the ancient Greek symbol of efficiency pronounced "e'ta"). It incorporates a highly efficient transport system. The design of the new cooler significantly reduces the number of parts required and without any conveying elements in the clinker bed, maintenance cost and wear and tear have been dramatically reduced.

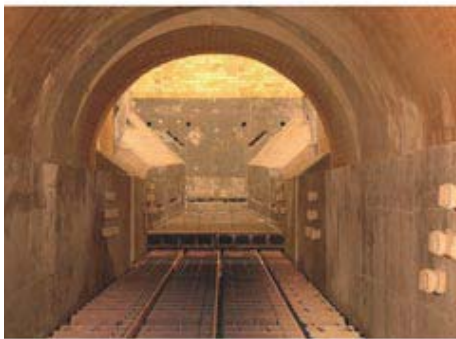
In recent years, Claudius Peters' efforts have been focused on achieving an optimum clinker distribution across the width of the cooler. For extremely high capacity/wide coolers (greater than 10,000 tpd), the cross motion grate was developed in 2000. Another advancement in 2001 was a cooler without fine material falling-through the grate, resulting in a minimum construction height.



The complete lower section of the η -Cooler is a modular design. Just two different lengths of standard modular elements are combined to optimize cooler sizes from 1,000 - 12,000 mtpd. The required cooler width is achieved by modular design of the transport lanes. Each module is delivered completely pre-assembled, further minimising erection times on site. The η -Cooler can be installed in the housings of existing grate coolers with only minor modifications.

Static Inlet

The HE-Module opens up from the kiln drop point to the transport lanes by means of refractory concrete. Here an optimal clinker distribution over the width is achieved. With the HE module, which consists of a static inclined grate, the risk of snowmen forming is virtually eliminated, while also ensuring a protective clinker layer on the module itself. The HE module is aerated via independent zones, each zone has its own flap to adjust the air volume. Due to the flexibility of the air distribution, it is possible to control the kiln discharge conditions even with the changing environment, due to the use of different fuels and raw materials fluctuations.



Transport System

The η -Cooler uses a transport system that is unique to any of the present coolers. The transport is based on the well proven 'walking floor' system that has long been in operation for materials handling.

The η -Cooler consists of parallel transport lanes which are moved together in the direction of the clinker transport (forward stroke) and individually or alternatively in groups retracted (backward stroke).

Depending on the required throughput capacity, a corresponding number of parallel transport lanes are installed, each supported on independent rollers.

Due to Independent Lane Movement (ILM) (parallel, individually driven aerated lanes), the flow behaviour and material speed at the sides can be actively influenced. The slots for the air supply are integrated in the transport lanes by utilizing the Mulden grate plate principle.



... the evolution in Clinker Cooling

Each transport lane is sealed by means of a labyrinth, which eliminates the need for a dust removal system. This together with the fact that the transport lane system is typically offered without any inclination makes the η -Cooler design extremely compact.

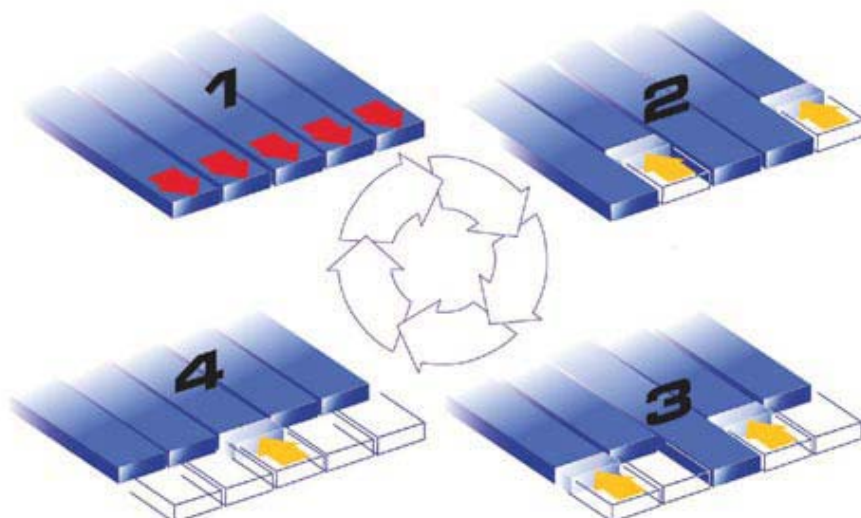
Aeration Concept

Since no installations are required inside the clinker layer the entire cooler bottom is fully aerated leading to uniform cooling and optimum recuperation.

Additionally the η -Cooler still makes use of the chamber aeration principle - a well-proven aeration concept in conventional grate cooler design. However, in contrast to reciprocating grate coolers the η -Cooler allows for a longitudinal division into chambers. This gives the advantage of chamber side aeration (CSA), which improves cooling at the critical side areas of the cooler.

With Chamber Side Aeration (CSA) and Independent Lane Movement (ILM) Claudius Peters can, as no other cooler supplier, actively influence the two most important parameters in Clinker cooling. This gives us the possibility to virtually eliminate such problems as red river.

Example of transport principle for a 5-lane η -Cooler



Cold clinker protects against hot material

Features

- Extremely compact design
- No dust removal system required
- Complete autogenous wear protection
- Long strokes = low grate speed
- Variable stroke length over the cooler width
- No conveying parts within the clinker bed
 - less wear significantly reducing maintenance
 - no obstructions to the clinker flow
 - constant transport efficiency over cooler life
- Controlled air distribution - chamber side aeration

Benefits

- Low construction height
- Modular design - quick to install
- Optimum cooling and heat recovery
- Optimal distribution of clinker across cooler width
- Lower operating costs
- High reliability



Technology you can trust ...

Drive System

The η -Cooler is equipped with an independent hydraulic cylinder drive for each lane. Depending on the number of transport lanes, the structure is modular and utilises standard parts, which minimises maintenance and adjustment. The hydraulic cylinders attributed to each transport lane enable a long lane stroke, which is controlled by an integrated continuous position measuring system.



Drive system Hydraulic units

The Claudius Peters Roller Crusher- The Original!

The roller crusher is an alternative to the conventional hammer crusher that has been the standard tool for eliminating oversized clinker for many years. The roller crusher is a system that has radically reduced the rotational speed of this crusher and implemented many options that were not available with a typical hammer crusher. The roller crusher consists of air-cooled, hydraulically or mechanically driven rollers, whose operating width matches the width of the cooler grate.

The number of rollers depends on the capacity of the cooler. Each roller is equipped with high wear and temperature resistant cast crushing rings. The roller crusher is another modular design for capacities up to 12,000t/d.



A roller crusher for a 4,200-t/d operation

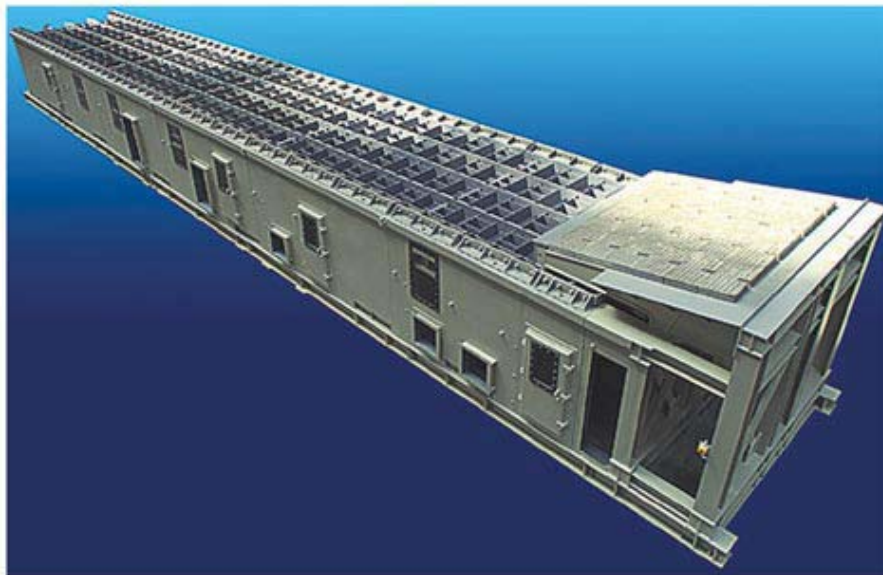
For high temperature crushing such as is seen with mid cooler crushing (stage cooler), the roller crusher is equipped with a cooling air fan. Due to the crushing method, the roller crusher is able to continuously crush large lumps up to 2 metres in diameter. The low rotational speed of the rollers guarantees the highest possible lifetime and low maintenance costs.

Features of Roller Crusher

- Can operate right behind the recuperation zone
- Slow roller speeds, therefore minimal wear
- No refractory damage
- Minimum dust generation
- Long crushing life
- Uniform particle size reduction over long service life
- Crushing of large lumps without kiln stoppage
- Low power consumption
- Fully automated
- Easy maintenance
- High availability



... systems you can rely on



Claudius Peters Full Stroke Hydraulic Cylinder Drive

The EMC₂ (ETA Motion Control Centre) controls and monitors all functions of the lane/cylinder motion. This hydraulic control system continuously measures the position of the cylinders without contacts to ensure the stroke length required for each individual lane.

Claudius Peters Measuring and Control Systems

To ensure reliable and low cost operation, a modern, automated control system is essential. Claudius Peters continues to develop new features for optimum control of the kiln-cooler process.

Claudius Peters Temperature Measuring Device

The gas temperatures within a clinker cooler are an important aspect of the process parameters of the system. Claudius Peters has developed an infrared sensor for quickly and accurately measuring the gas temperature:

- Infrared measuring sensor with 3°C per second reaction time
- Measuring range from 0 - 800°C and 500 - 1500°C
- Easy installation of probe
- Minimal maintenance requirements
- Low investment costs with return of investment (ROI) in months

Conclusion

The η -Cooler continues with the Claudius Peters concept of minimising maintenance and repair costs. The modular design and minimal wear mean major cost savings are achievable when we consider plant shutdown during installation and spare parts requirements. The transport system has no conveying elements within the clinker layer and no clinker can pass through the cooler lanes. With no fines falling through the cooler structure, the under grate hoppers and a dust removal system are eliminated which reduces the overall construction height of the cooler. These design issues ensure a low overall investment cost and minimal operating costs. In conclusion, whether it is a new plant or a conversion, the η -Cooler offers the most efficient operation in terms of installation, heat recovery, transport efficiency, reliability and maintenance costs.



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