



CLAUDIUS PETERS

ETA Cooler

Clinker Cooler
TECHNIK

We know how

Clinker Cooler technik

About

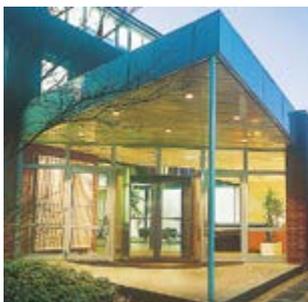
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Since its founding in 1906, Claudius Peters has become one of the world's most respected engineering houses and an innovative world leader. Its German engineering excellence continues to set benchmarks for the design, manufacture and commissioning of materials handling and processing systems for the gypsum, cement, coal, alumina, steel and other bulk-handling industries.

From conception and installation through to commissioning and after-sales support, Claudius Peters provides world-class service to the world's biggest bulk materials producers.

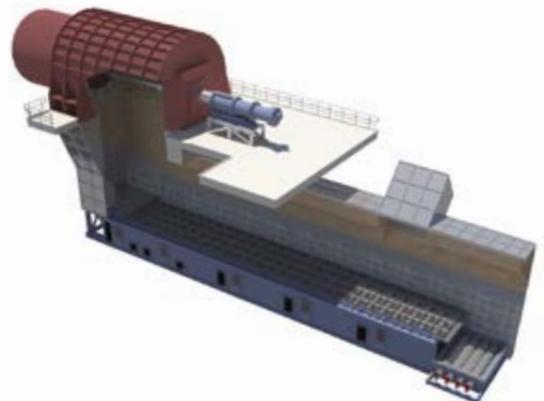
The Claudius Peters Group GmbH is headquartered in Buxtehude near Hamburg, Germany, with regional offices in the Americas, Asia and Europe.



Claudius Peters' headquarters, Buxtehude, Germany.

Clinker Cooling

Claudius Peters' pioneering achievements in clinker cooling technology began in the early 1950s with its 10° sloped single grate cooler. Sixty years later, it continues to build on the experience gained from producing more than 700 clinker coolers, with its highly efficient ETA Cooler. Integrating the well-proven Claudius Peters HE-Module and Hydraulic Drive into its moving floor technology, the ETA Cooler represents the next evolution in clinker cooling.



The Claudius Peters ETA Cooler system.

The ETA Cooler

The benefits of modular design

The ETA Cooler's original modular design, involving self-contained, pre-erected modules shipped separately to the plant site, consists of a standard module with lanes supported by rollers, special drive and end modules plus a static inlet or HE module.

Modular design

The ETA Cooler's design makes it ideal for the replacement of existing coolers, with its pre-fabricated modules saving valuable erection time and enabling clinker production to be resumed within a few weeks.

Features:

- Low local manufacturing portion
- Complete, pre-manufactured modules
- Very short kiln stop times for existing cooler replacement

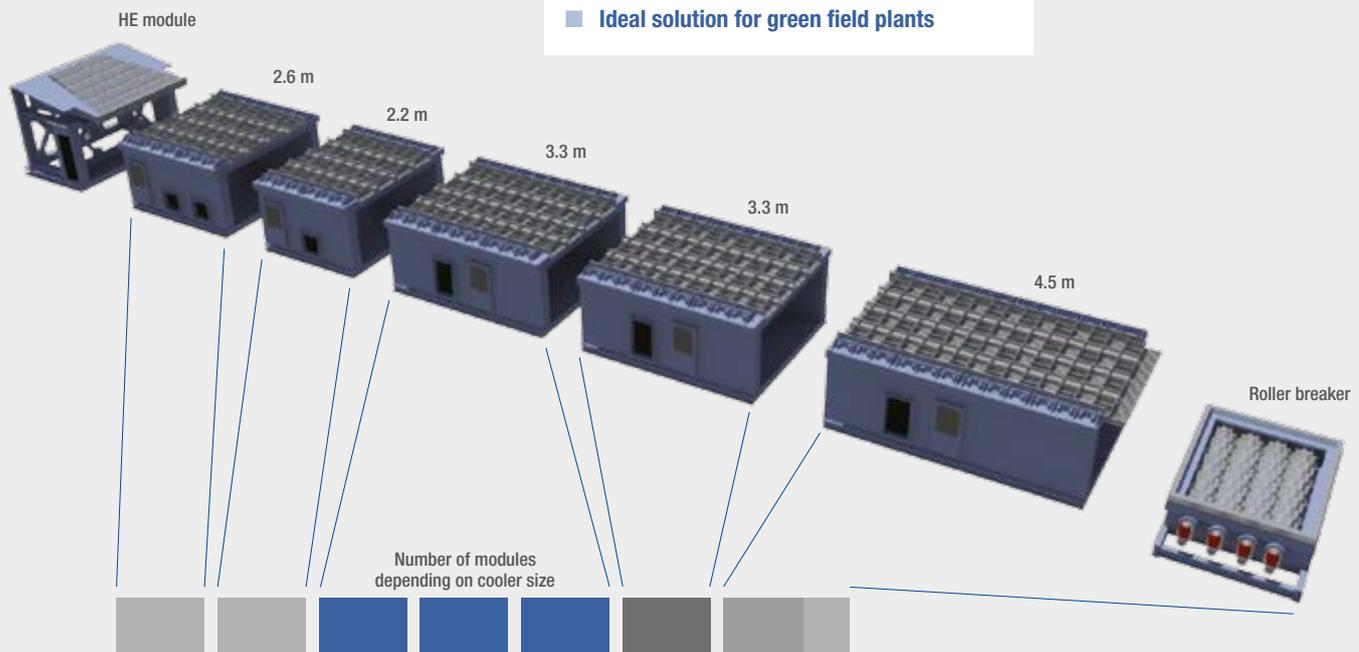
Semi-Modular design

Claudius Peters offers a semi-modular design for green field projects allowing a greater scope of local manufacturing. In this design, core parts such as lanes, sealings, rollers and hydraulic systems are delivered by Claudius Peters as loose parts to site. Although a semi-modular design involves lower capital expenditure, actual work on site is longer when compared with the modular ETA Cooler.

Features:

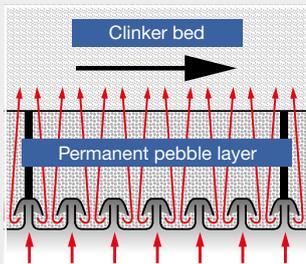
- High local manufacturing portion with steelwork supplied by customer
- Lower capital cost
- Ideal solution for green field plants

World beating capacities of 13,000 tonnes per day and beyond



The Claudius Peters ETA Cooler modular elements.

Highly customizable
3-step transportation system



Lane aeration.



Hydraulic drive system.

HE-Module

The static cooler inlet, HE Module, consists of slot plates placed on an air vessel that enables air to be distributed to small areas with individual air ports, thus ensuring air is guided to the drop zone. To combat 'snowman' formations, air cannon nozzles are installed in the refractory above the module. Operating lifetime of the HE-Module plates is guaranteed at five years.

Aerated Lanes

The aerated lanes, supported on rollers are rectangular frames with aeration inserts filled with sieved pebbles to protect the air inlet from heat and wear. Operating lifetime is guaranteed at five years.

A longitudinal sealing between the lanes helps avoid clinker riddling and an overpressure in the sealing system hinders any entry of clinker. Any fine clinker particles which do enter the sealing system are pneumatically transported to the end of the cooler.

Features:

- No dust removal system required
- Pebbles protect air inlet from wear & heat
- Hard faced lane edges ensure long life cycle
- Five year lifetime guarantee on HE-Module plates, aerated lanes and support rollers

Hydraulic Aggregate

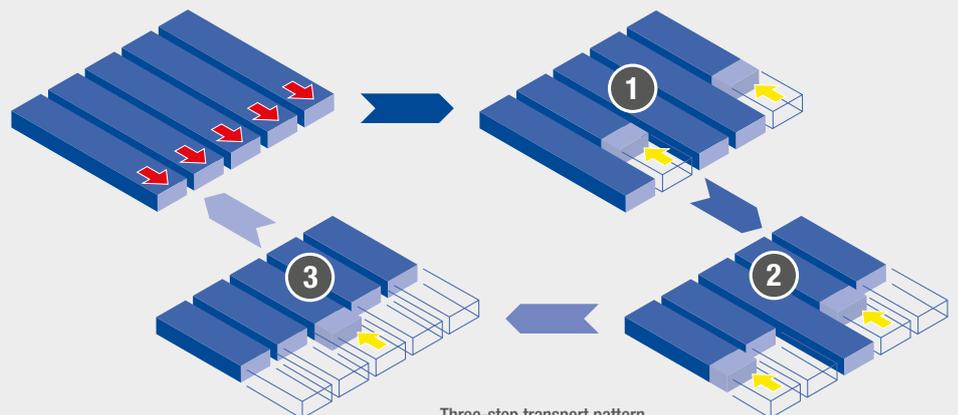
Each aerated lane is moved by one or two hydraulic cylinders. Each cylinder has its own proportional valve and up to three valves connected to one pump. Pumps are located on the hydraulic aggregate, where also the oil is conditioned. The entire system is controlled by an EMC² control panel to enable adjustment of the stroke length and velocity.

The hydraulic cylinders are being flushed with oil taken from the pressure side. This ensures the high pressure seal remains free from contamination and the oil in front of the piston is exchanged.

The hydraulic system also allows for a proven three-step cooler transport pattern (shown below). Setting different stroke lengths for individual lanes allows the operator to adjust the amount of time the clinker remains in the cooler.

Features:

- Continuous position control of cylinders
- Independent stroke length of individual lanes
- Completely modular hydraulic system using standard spare parts
- Flushing of cylinders for longer lifetime



Three-step transport pattern.

Measuring and Control Systems

The recuperation of gas temperature is a vital part of the cooling process. The Claudius Peters gas temperature measuring technology incorporates an infrared sensor for quick and accurate measuring of gas temperature.

Features:

- Quick reaction time of 3°C per second
- Measuring range of up to 1500°C
- Minimal maintenance requirements

Clinker bed height is measured with the level radar system or the weighted chamber pressure of several fans. The pressure system acts as a fall-back.

Features:

- Continuous measurement of bed height
- Optimum automatic control of the transport velocity, resulting in stable recuperation of air temperature and smooth kiln operation
- Installation in kiln hood or cooler roof



Hydraulic aggregate.

Hammer Crusher

The Claudius Peters Hammer Crusher is an impact crusher with a high speed rotor (280rpm & 330rpm – 1320mm DIA). Oversize material that does not pass the 35mm grizzly bars is thrown against the chain curtain until particles pass the grizzly or through the gap between the tip of the hammers and the grizzly bars.

Due to impact, the entire rear of the cooler must be protected with chain curtains and with protection plates fitted to the refractory sidewalls. The high speed of the Hammer Crusher generates considerable dust, which needs to be considered when positioning the cooler's exhaust air duct.

In case a big lump stalls the hammer crusher the turbo coupling protects the equipment, the kiln line however must be stopped if this happens and the lump manually removed.

Features:

- Impact crusher with ca. 300rpm
- Hydraulic turbo coupling safety plug
- Simple and sturdy design



Claudius Peters Hammer Crusher.

Claudius Peters –
more efficient
crushing with
longer machine
life and minimal
maintenance

Maximum control
through chamber
side aeration
and independent
lane movement



Claudius Peters Roller Crusher.

Roller Crusher

The Claudius Peters Roller Crusher is a non-impact crusher, suitable for all capacities, with parallel crushing rollers operating at a constant speed of 4 rpm.

The Roller Crusher produces even grain size over the whole lifetime, compared to a Hammer Crusher where grain size increases over time. If a larger lump cannot be broken at once, the rollers will reverse and after a delay resume crushing, ensuring that larger lumps are slowly eroded. The roller crusher is capable of handling large clinker balls up to 1.5m without stopping the kiln line.

The crusher's slow movement eliminates dynamic forces and ensures that no dust forms at the rear of the cooler. This slow movement also ensures that the operating lifetime of the partially hard-faced crushing rings is guaranteed at three and a half years.

The intermediate roller crusher within a stage cooler is air cooled, meaning that it can handle clinker temperatures of up to 800°C. It is available in 490mm and 610mm crushing ring designs, depending on the width of the cooler.

Features:

- Low rotational speed, minimal wear
- Large lump crushing without kiln stop
- Minimum dust generation
- Uniform particle size reduction

Process Technology

Clinker coolers must take clinker from ca. 1400°C to ca. 100°C, with maximum possible heat going back to the kiln. Because kiln rotation separates fine and coarse grains across the kiln and because each require different air pressures for cooling, traditional grate coolers produce 'red rivers' of hot, fluidised clinker that flow to the back of the cooler.

The ETA Cooler's chamber side aeration (via longitudinal side chambers with a separate cooling fan) combined with independent lane movement, enables operators to actively influence the behaviour of the cooler and thereby eliminate problems such as 'red river'. Its smart design means that it can operate with a clinker bed height of between 800mm and 1,200mm.

Features

- Size of the aeration areas follows the clinker cooling curve
- Chamber side aeration and independent lane movement avoid red river
- High clinker bed possible due to intelligent design



Traditional grate coolers produce 'red rivers'.

Operation Cost

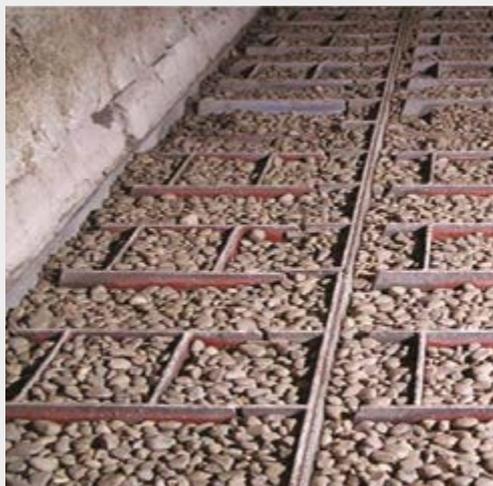
The main test for any cooler is always its operating cost and in this respect the ETA Cooler clearly outperforms the traditional grate cooler.

The lanes are filled with a layer of pebbles; this protects the air inlet from direct clinker contact and gives very fine aeration as well as very favourable heat exchange. The ETA Cooler's high clinker bed and the intelligent aeration scheme deliver optimum recuperation efficiency, resulting in less fuel required to fire the kiln.

The maintenance costs are lower than they would be with a grate cooler, with substantial reduction in wear parts as well. Thus, in terms of overall operation costs, the ETA Cooler has set a new industry benchmark

Features

- **High availability, no kiln stoppages**
- **High cooler efficiency which results in low fuel cost on the kiln**
- **Low maintenance cost due to protected pebble layer**



Aeration lane pebble bed.

References

The ETA Cooler's efficiency and low operating costs have resulted in the sale of more than 70 ETA Coolers to date.

ETA Cooler customers are leaders in the cement industry and include such names as Holcim, Lafarge, Heidelberg Cement, Italcementi, Titan Group and Buzzi Unicem.

Claudius Peters offers flat coolers and stage coolers for operation in wet or dry kilns, for green field plants and as replacements for satellite and other coolers. For green field plants and cooler replacements, the ETA Cooler is the obvious choice.



ETA Cooler installation.

Highly evolved technology, delivering maximum capacity, lower operation costs and highest reliability



CLAUDIUS PETERS

Claudius Peters Projects GmbH

Schanzenstraße 40
DE-21614 Buxtehude, **Germany**
T: +49 4161 706-0
E: projects@claudiuspeters.com

Claudius Peters Technologies SAS

34 Avenue de Suisse
F-68316 Illzach, **France**
T: +33 3 89 31 33 00
E: technologiesSAS@claudiuspeters.com



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Claudius Peters (do Brasil) Ltda.

Rua das Figueiras, 474 - 3 ° andar - Edifício
Eiffel - Bairro Jardim - 09080-300 - Santo
André / SP, **Brazil**
T: +55 (11) 4903 9230
E: brasil@claudiuspeters.com

Claudius Peters (China) Ltd.

Unit 1706-1706,
17/F Laws Commercial Plaza,
788 Cheung Sha Wan Road,
Lai Chi Kok, Kowloon, **Hong Kong**
T: +852 2544 1848
E: hongkong@claudiuspeters.com

Branch Office:

7/F, Office Block, Hong Kong Macau Centre,
No. 2 Chaoyangmen Bei Da Jie,
Beijing 100027, **P. R. China**
T: +86 10 6501 3831
E: beijing@claudiuspeters.com

Claudius Peters (India) Pvt. Ltd.

Unit 408, 4th Floor, Peninsula Plaza,
A/16 Fun Republic Lane, Off Link Road,
Andheri West, Mumbai 400 053, **India**
T: +91 (22) 2674 0045
E: india@claudiuspeters.com

Claudius Peters (Italiana) srl

Via Verdi 2, I-24121 Bergamo, **Italy**
T: +39 0 35 237 196
E: italiana@claudiuspeters.com

Claudius Peters (România) S.R.L.

Str. Oituz Nr. 25C, et 2, 550337 Sibiu,
România
T: +40 (0) 369 407 036
E: romania@claudiuspeters.com

Claudius Peters (Asia Pacific) Pte. Ltd.

25 International Business Park,
#01-65/66 German Centre,
Singapore 609916
T: +65 6562 9100
E: asiapacific@claudiuspeters.com

Claudius Peters (Ibérica) S.A.

Paseo de la Habana, 202 Bis Bj,
E-28036 Madrid, **Spain**
T: +34 91 413 36 16
E: iberica@claudiuspeters.com

Claudius Peters (UK) Ltd.

Unit 10, Thatcham Business Village,
Colthrop Way, Thatcham, Berkshire,
RG19 4LW, **United Kingdom**
T: +44 (0) 1635 872139
E: uk@claudiuspeters.com

Claudius Peters (Americas) Inc.

445 W. President George Bush Highway
Richardson, Texas 75080, **USA**
T: +1 972 386 4451
E: usa@claudiuspeters.com

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