FLSmidth®
Cross-Bar® Cooler
The latest standard in clinker cooling technology
The FLSmidth® Cross-Bar® cooler represents the latest evolution in clinker cooling technology. It is based on proven and refined FLSmidth cooler technology. The result is a cooler representing the highest standard in clinker cooling technology at an attractive investment level.

**Key benefits**

- No Snowman formation with ABC™ inlet
- Consistently high thermal efficiency
- Highly flexible in upgrading existing coolers
- High reliability and availability
- Energy-efficient
- Low civil, construction and operating costs
- Low, easy, predictable maintenance
- Fast and simple installation
- No fall through of clinker to the undergrate compartment
Making the best even better

Similar to our previous coolers, which revolutionised the way clinker coolers are installed, operated and maintained, the FLSmidth Cross-Bar cooler features a stationary grate line with no undergrate spillage or conveying system, separation of the conveying and cooling systems, air distribution plates with mechanical flow regulators, and modular construction. In the FLSmidth Cross-Bar cooler, all bars are movable and reciprocate so as to optimise transport efficiency and enable horizontal installation.

Quick and easy to install, the FLSmidth Cross-Bar cooler ensures maximum availability with minimum maintenance. And with a completely new size and structure of its modules, it makes for an ideal new cooler or upgrade.

Six fundamental design features

Six fundamental design features play a key role in its superior performance:

- Air Blast Controlled inlet
- Self-adjusting mechanical flow regulators
- Stationary, sealed grate line
- Separate clinker conveying and cooling systems
- Horizontal design with optimised transport method
- Modular concept

The FLSmidth® ABC™ fixed inlet as standard prevents the formation of snowmen and gives an optimal start to the cooling process with a more uniform clinker layer.
The six fundamental design features

Air Blast Controlled inlet – No Snowman
MFR cooling process supplemented by an air blast released directly to the grates and the clinker bed. Eliminates snowmen and prevents dead zones where traditional blasters in back and side walls cannot reach. Ensures uniform clinker distribution.

Self-adjusting mechanical flow regulators – Stable operation, fuel savings
Each air distribution plate in the FLSmidth Cross-Bar cooler is equipped with a mechanical flow regulator (MFR) that regulates the airflow via a self-adjusting orifice. This optimal principle of continuous airflow regulation was invented by FLSmidth and helps optimise heat recuperation and distribution of air throughout the entire cooler. In turn, it enables fuel savings and few installed cooling fans.

The MFR maintains a constant airflow through the air distribution plate and clinker bed, irrespective of clinker bed height, particle size distribution or temperature. Should the restriction of airflow through one area of the clinker layer change, the MFR automatically compensates for the variations in restriction and maintains the desired airflow based on simple physics, without operator intervention.

Air through idle hole
Air through holes in tongue
Air through gaps

The proprietary mechanical flow regulator that each air distribution plate is equipped with automatically compensates for variations in restriction and maintains the desired airflow without operator intervention.

High bed resistance
Low bed resistance
Low ΔP MFR
High ΔP MFR

Constant air flow irrespective of overgrate conditions
Stationary, sealed grate line  
– High reliability
The FLSmidth Cross-Bar cooler has no movable grate plates. There is no fall-through of clinker, and no undergrate clinker conveying system or gap management of grates is required. A static layer of clinker protects the air distribution plates against heat and wear, so the plates are no longer a standard wear part.

A well proven and patented sealing design consisting of U- and C-profiles around the drive plates forms a dust trap, preventing clinker from entering the undergrate compartment. No requirement for undergrate spillage system.

Separate clinker conveying and cooling systems  
– Consistently high thermal efficiency
Unlike other cooler designs, the FLSmidth Cross-Bar cooler separates the clinker conveying and air distribution systems. Reciprocating bars fitted above the stationary air distribution system effectively convey, mix and shear the clinker while at the same time preparing the clinker for efficient exposure to the cooling air.

A further benefit to this separation is that gradual wear of the bars has no effect on cooler operation, and thermal efficiency stays high.
Modular concept – Fast, easy, cost-effective installation

The FLSmidth Cross-Bar cooler is designed not only for completely new coolers, but also as an upgrade for most existing coolers. To meet these requirements, the cooler is constructed as a modular system with units of varying size.

The standard units are preassembled in the workshop to ensure high quality and swift, simple installation.

To form a whole cooler, a number of units are put together lengthwise and widthwise, and the movable frames are connected along the length of the cooler.

Horizontal design with optimised transport method – Low civil costs, low wear rates

The cooler’s new drive mechanism is designed to obtain optimal transport efficiency. Each lane of movable frames in the cooler is operated by 1 to 3 hydraulic cylinders depending on the cooler size, and has an independent drive. While all bars move in a shuttle motion, the movement of each lane can also be separately adjusted to accommodate diverse clinker bed conditions.

High clinker transport efficiency allows horizontal construction in order to minimise installation height or maintain overgrate and kiln hood velocities in cooler upgrades – leading to low cost of civil work and reduced dust recirculation.

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**Step 1.**

All lanes move forward

**Step 2.**

Every other lane moves backwards

**Step 3.**

Remaining lanes move backwards

Installation of FLSmidth Cross-Bar cooler inside existing cooler housing

The modular FLSmidth® Cross-Bar® cooler reduces installation time and costs. It is manufactured to a high quality standard and ensures attractive equipment delivery times.
Keeping you productive today and tomorrow

**Low, easy, predictable maintenance**
The FLSmidth Cross-Bar cooler has few wear parts, meaning easy and economical maintenance. The bar and U-profile are held simply in place by wedges and pins and easily accessible from the overgrate area. During operation, a protective layer of clinker is maintained between the air distribution plates and the movable bars, which ensures a long lifetime for the air distribution plates. Experience has shown that the maintenance of coolers is very predictable and simple to perform. This makes for increased flexibility of maintenance planning and prevents critical path situations during a typical kiln overhaul. When maintenance is required, it will normally only take a limited number of shifts to perform.

<table>
<thead>
<tr>
<th>SIMPLE TO OPERATE</th>
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<tbody>
<tr>
<td>- Self-adjusting mechanical flow regulators</td>
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<tr>
<td>- No manual dampers</td>
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<tr>
<td>- No internal piping or air beams</td>
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<tr>
<td>- No sealing air fans</td>
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<td>- Few fans</td>
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<tr>
<th>SIMPLE TO MAINTAIN</th>
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<tbody>
<tr>
<td>- No moving grates</td>
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<td>- No clinker fall-through</td>
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<td>- No side seals</td>
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<td>- No spillage valves</td>
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<td>- No undergrate conveying system</td>
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<td>- Easy replacement of wear parts</td>
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**Attractive investment level**
As part of our efforts to provide you with the best investment possible, we continuously develop our products, optimising them from the standpoint of both technology and economy.

The optimised design and manufacture of the FLSmidth Cross-Bar cooler – with its horizontal construction, high thermal efficiency, low power consumption and low maintenance – enables us to offer this superior cooler with a low total cost of ownership.