WE’RE ON FIRE FOR
THE MOST EFFICIENT LIME KILNS.
EVERY YEAR, MORE THAN 300 MILLION TONS OF LIME AND DOLOMITE ARE BEING CALCINED. MOSTLY IN MAERZ KILNS.

For over 3000 years, burnt lime has been a basic material in the construction business. Today, it is also an important component for the chemical industry, agriculture and especially for the steel industry. Maerz kilns calcine the largest share of the amount needed worldwide – more than kilns from any other manufacturer. There are good reasons for the success that Maerz kilns enjoy: Highest efficiency. Lowest energy consumption. Broad range of kiln types. Individual solutions depending on location, raw material and available fuel. Maerz’ portfolio comprises all modern kiln types.
THE PFR KILN.
FOR SOFT-BURNT LIME, THE HIGH-REACTIVE QUICKLIME.

The PFR kiln from Maerz is ideal for the production of soft-burnt lime. The lime is calcined in a parallel flow. The feedstock and the combustion gases move in the same direction from top to bottom. The energy needed for the calcination is supplied at the beginning of the calcination process. This ensures that the peak temperature in the burning zone is low enough so that the resulting CaO crystallites do not fuse. The specific surface of burnt lime thus remains intact. This burnt lime is highly reactive and ideal, e.g., for the steel industry.

THE HPS KILN.
FOR HARD-BURNT LIME, THE LOW-REACTIVE QUICKLIME.

The HPS kiln from Maerz functions on the principle of counter flow. Combustion gases flow from bottom to top traversing the feedstock; while fuel is only added towards the end of the burning zone. Upon completion of the combustion process higher energy input can be used to raise the peak temperature in the burning zone: Thus, the CaO crystallites fuse and reduce the specific surface of burnt lime. This process produces low reactive lime, which is ideal, e.g., for the production of aerated concrete and sand lime bricks.
A PFR kiln (parallel flow regenerative shaft kiln) consists of two vertical shafts and a connecting crossover channel. Both shafts work with each other. While one calcines the product, the other preheats the stone. In the burning shaft the lime is calcined in parallel flow. The hot combustion gases are then transferred through the crossover channel to the non-burning shaft where they preheat the limestone in counter flow in the upper area of the shaft. The flow direction of the gases is reversed at regular intervals. This allows the regenerative preheating of the stone to take place (the stone in the preheating zone of the kiln acts as heat exchanger) and thus for the maximum use of the heat contained in the kiln gas.

The principle of calcination in parallel flow is ideal for the production of high-reactive quicklime. A PFR kiln from Maerz processes up to 800 tons of burnt lime per day. Gaseous, liquid or pulverised solid fuels as well as different combinations of these may be used. Depending on the required output and grain size of the limestone to be processed, Maerz designs rectangular, circular or Finelime® PFR kilns.
The most cost-efficient and simple design of a PFR kiln: two burning shafts with a rectangular or hexagonal cross section are placed next to each other. Through a direct crossover channel the combustion gases flow from one shaft to the other. The rectangular cross section simplifies the fabrication of the kiln by imposing fewer challenges on the steel construction and the refractory material. This simple and cost-efficient PFR kiln is usually used for outputs of up to 400 tons of burnt lime per day. Since 1966, Maerz has installed more than 200 rectangular PFR kilns worldwide.
For the production of larger capacities of burnt lime per day (300 to 800 tons) Maerz recommends PFR kilns with a circular design. These kilns have a circular shaft cross section and circular ring channels for gas flow. In these channels the combustion gases of the burning shaft are collected before flowing through the crossover channel to the non-burning shaft. In the non-burning shaft the hot gases in turn flow through the circular ring channels along the whole circumference of the shaft. The circular shaft cross section and the gas distribution along the whole circumference of the shafts ensure an even heat distribution in large kilns – indispensable for high lime quality. Since 1966, Maerz has installed more than 300 circular PFR kilns worldwide.
Limestone that is calcined in conventional shaft kilns usually has a grain size of more than 40 millimetres. Smaller-grained stones, not more than 6 to 50 millimetres in size, are often calcined in rotary kilns – which, however, feature very high heat consumption. To solve this problem, Maerz developed a highly specialised PFR kiln: the Finelime® kiln.

How does it work? The special geometry of this kiln and the special charging of the feed material guarantee ideal heat distribution, even when processing small-grained stone.

The principle of the PFR kiln, i.e., the calcination of lime in one shaft and the preheating of the stone with the hot kiln gas in the other shaft, is also used in the Finelime® kiln. Thus its heat consumption is significantly lower compared to rotary kilns. Since 1989, when it was first introduced onto the market, Maerz has installed approximately 60 Finelime® kilns worldwide.
<table>
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<tr>
<th>KILN TYPES</th>
<th>RECTANGULAR PFR KILN</th>
<th>CIRCULAR PFR KILN</th>
<th>FINELIME® KILN</th>
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<tr>
<td>KILN TYPE</td>
<td>E1–E6</td>
<td>R1–R5</td>
<td>F1–F3</td>
</tr>
<tr>
<td>CAPACITY (tons per day)</td>
<td>100–400</td>
<td>300–800</td>
<td>200–400</td>
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<tr>
<td>GRAIN SIZE (mm)</td>
<td>30–120</td>
<td>30–160</td>
<td>15–40</td>
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<tr>
<td>HEAT SUPPLY (kJ/kg) (kcal/kg)</td>
<td>3390–3650 810–870</td>
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<td>3310–3560 790–850</td>
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<tr>
<td>MAIN PRODUCT</td>
<td>High-reactive quicklime</td>
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Low-reactive burnt lime is used for the production of sand lime bricks, aerated concrete bricks and aerated concrete blocks. Previously, no modern shaft kiln was really well adapted to the production of low-reactive burnt lime. This is why Maerz designed, constructed and patented a new single-shaft kiln, the HPS kiln (high-performance shaft kiln). It consistently delivers low-reactive burnt lime with the best quality and the highest energy efficiency.

Maerz HPS kilns feature:

- Use of cooled burner lances, which protrude into the hot bed of material and are adjustable.
- Precisely adjustable operating temperature resulting in individual specific product reactivity.
- Highest specific heat load in correlation to shaft diameter and thus highly compact design.
### HPS KILNS: TECHNICAL DATA.

<table>
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### SPECIAL PRODUCTS FROM MAERZ.

PFR and HPS kilns are not everything. Maerz also offers other kiln types for specific purposes. For instance the annular shaft kiln for all applications requiring a continuous stream of exhaust gases and a high CO\(_2\) content in the exhaust gas. We can also process fine-grained limestone or sand in our suspension calciner POLCAL\(^5\). And last but not least we have developed a technology for preheater rotary kilns, which enables the use of cheap fuels with high sulphur content without raising the sulphur level in burnt lime. Ask us if you are looking for a special solution.
Maerz has already built more than 600 lime kilns worldwide. More than any other manufacturer. We have gained a lot of experience from this, yet we continue to drive our research and development. With each kiln that we build we continue to refine new technologies and to surpass ourselves. Thanks to its sophisticated technology and wide range of different kiln types, Maerz became the leading supplier for the global lime kiln market. Each kiln can be individually adapted to suit all the requirements and conditions imposed by the location, e.g. the altitude above sea level, the quality of the lime-stone or the available fuel.

Maerz knows all about the different types of lime-stone and dolomite. Globally. Before designing a new plant, we carry out tests in our laboratories with the stone to be calcined. Thus we can adapt each plant perfectly to its purpose – and make it the ultimate benchmark for all relevant criteria.

Maerz PFR kilns achieve the highest thermal efficiency of any modern lime kiln: more than 80 per cent. We not only promise you this figure. We achieve it with fuels such as:

- natural gas
- heavy fuel oil
- pulverised coal
- liquefied gas
- off-gas from steel-making process
- wood dust
- waste oil
- as well as with a combination of various fuels.
LOWEST CONSUMPTION OF FUEL AND ELECTRICAL ENERGY.

The typical heat consumption (based on the fuel’s lower calorific value) lies between 3480 and 3850 kJ (830–920 kcal) per kilogram or 2.99 to 3.32 MBtu per short ton of lime, depending on the chemical analysis and the grain size as well as the type of fuel used. The consumption of electrical energy depends on the grain size, the fuel and the kiln’s altitude above sea level. The consumption amounts to 25 to 45 kWh per ton of lime.

EMISSION LEVELS THAT ARE ALSO AN ADVANTAGE FOR THE ENVIRONMENT.

In PFR kilns there is no open flame with a high temperature. This is why hardly any nitrogen oxides are produced. The flames in the kiln are entirely surrounded by material with a lower temperature. The stone directly absorbs the heat for the calcination process. Thus the peak flame temperature is reduced – along with the formation of nitrogen oxides. The interaction of all components and the fine-tuning of the lime plant also play their part in achieving low emission levels.
Maerz supports its customers in different ways – anytime, fast and everywhere. Also after the commissioning of a turnkey plant. These are the services Maerz offers:

- Feasibility studies for your project
- Planning and engineering of lime kilns and entire lime plants
- Turnkey assembly of lime kilns and entire lime plants
- Support with assembly and commissioning from our specialists
- Technical training of your employees for operation and maintenance
- Supply of spare parts
- After sales service including consultation on operation or maintenance issues
- Suggestions on how to modernise existing plants, e.g. by retrofitting to adapt to different fuels or by modernising the control system

Maerz’ customer service operates just as impeccably as its kilns do, globally.

Better safe than sorry.

A reliable control system monitors and controls the operation of the plant. It also operates unmanned. Should a serious incident arise, the kiln will shut down automatically. Constant control also means prevention of breakdowns and thus more efficient operation.

Smooth project handling from A to Z.

Maerz meets all customer requirements and fulfils all expectations – thanks to our experience, know-how and a wide range of different kilns. And also because we are Swiss. We keep our promises. We deliver excellent quicklime quality and efficiency in plant operation, on time and on budget.