Maerz lime kilns are extremely efficient in every climate. For decades.
Is the air a bit thin where you are? No problem: maerz.com
BIG IS NOT ENOUGH

It is true that plant size helps to optimise production costs. This was the spirit behind Liu- zhou Iron & Steel’s project in P.R. China for 6 x 600 tpd kilns, which were successfully commissioned and are now in operation and living up to their promises. These considerations were also the driving force behind Tangshan Gangyuan Metallurgical and Furnace Co. Ltd.’s project, where we will initially install 5 x 800 tpd Maerz PFR kilns on a greenfield basis.

It is important, however, to also invest in new developments and further optimisation of our products: the new design of our C-series of circular PFR kilns combines all the know-how and experience we have gathered in recent years. The up-to-date design not only implements process relevant features such as a conical refractory lining, but also allows an easy upgrade in the future with a firing system for a second fuel without having to modify the existing installation.

We are also proud to introduce our hybrid PFR kiln technology to you, which we presented for the first time at the International Lime Association’s conference in Buenos Aires. This advancement of the PFR principle permits controlling lime reactivity (medium and hard-burnt), still maintaining a thermal efficiency very close to a PFR kiln’s efficiency and thereby not only saving your money but also CO₂ emissions coming from the fuel. It further allows you to produce soft, medium or hard-burnt lime according to market demands with ultimate flexibility.

Finally, there is of course our roundup on new projects which were awarded to us with one very important addition from the cement industry: Anhui Conch Cement, one of the largest cement groups in P.R. China, recently built two of our CemCat High-Dust SCR plants for the denitrification of the rotary kilns’ off-gases. Both plants were recently commissioned and meet the strict requirements for emission limits imposed by the Chinese Environmental Authorities.

All the best and good success for 2020!
Stephan Lechner

THE LARGEST MAERZ IN P.R.

Impressive plant, impressive commissioning and impressive kiln performance of 3,600 tons burnt lime per day at highest efficiency – this is the largest realised Maerz lime kiln plant in the world, (so far)!

As we reported in our December 2017 edition of “Insight Lime”, Sinosteel Co., Ltd. China, entrusted Maerz with the supply of six PFR lime kilns for Liuzhou I&S Co., Ltd. as the end-user. We are very proud to provide our proven technology to Liuzhou I&S Co., Ltd. again to cover the high demand of energy-efficient burnt lime in steel production. Together with the new plant in South West China, Liuzhou Iron & Steel now operates eleven 600 tpd Maerz PFR kilns.

The six new 600 tpd kilns of the circular type R4S process limestone with a grading from 40 to 80 mm and use pulverised hard coal as fuel for firing, which is milled directly at the calcination plant. Within the scope of the contract, Maerz in cooperation with thyssenkrupp Industrial Solutions (China) Co., Ltd., Shanghai, supplied engineering, license, know-how as well as technical assistance services for commissioning of the new lime plant together with on-site training of the end-user’s operating personnel.

So much to the benchmarking data of this milestone project; but what does completion of such a large lime plant in China look like?

3,600 tons of quicklime per day with 6 x 600 tpd R4S Maerz PFR kilns (photo courtesy of Lizhou Iron & Steel Co., Ltd.)
The first kiln was ready to be ignited at the end of January 2019, right before the Chinese New Year celebrations. The remarkable journey culminated in the ignition of kiln no. 1 on 26 January 2019 at 15:58, according to Chinese tradition both a lucky date and a lucky time – a good omen for the continuing successful course of the project. While the locals were celebrating the Chinese New Year, nightly fireworks and an energetic atmosphere accompanied the gentle heating up procedure of kiln no. 1.

The remaining five kilns became operative in June 2019. Three kilns were erected and commissioned, at times simultaneously, which was a huge challenge and required the utmost commitment from all involved parties. With the ignition of the last kiln on site in June 2019 and the achievement of the guaranteed production parameters the project came to a successful and satisfying completion for Maerz and its business contributors.

Another great example where excellent site management meets reliable Swiss technology – that is what Maerz stands for, now and in future.

by Michael Räber
This year’s International Lime Association’s General Assembly and Information Exchange Forum took place 9 - 11 October 2019 in Buenos Aires, Argentina. The annual meeting provides a valuable communication framework for the global lime industry to exchange information, knowledge, and experiences. The event was accompanied by an exhibition of international suppliers, equipment and component manufacturers, in which Maerz Ofenbau AG was strongly represented by Mr. Stephan Lechner, Managing Director, Mr. Xaver Inglis, Deputy Managing Director and Head of Sales Division, Mr. Hannes Piringer, Technical Director and Mr. Borislav Vladic, Senior Key Account Manager.

The meeting also provided the participants with the opportunity to catch up with old friends and to make new interesting contacts, while enjoying an excellent “Bife de Lomo” with a few glasses of “Malbec”. The event was concluded with a trip to Mendoza and San Juan, where the two favourite terms of every lime producer - lime and wine - unite. Further, in Cienaguita we visited the beautiful and spotless lime facility “Padre Bueno” from Cefas of the Calidra group, where two Maerz PFR kilns are located, one since 2009 and one which was recently put into operation.

At this point we would like to sincerely thank the organisers, members of the association and of course our customers and friends, who gave us the opportunity to participate in this important event and hopefully until next year in Paris.

Muchas gracias et à bientôt !

by Borislav Vladic
The hybrid kiln, combining the advantages of both the PFR and the HPS lime kiln, could be of significant interest for various applications.

The upper part, comprising two kiln shafts with their preheating and calcination zones, would work in the same way as the classic PFR kiln.

Due to the limitations imposed by the refractory lining the middle part with the connecting gas channel needs to be operated at a moderate temperature of less than 1,100° C just like a classic PFR lime kiln. For this reason the heat input via the vertical main burner lances would need to be adjusted to achieve a calcination degree of approximately only 90 % at the lower end of the calcination zone.

The part of the kiln underneath the connecting gas channel of the two shafts is longer compared with a normal PFR lime kiln and comprises a sinter zone and a cooling zone.

The sinter zone is fired with radially arranged and horizontally adjustable liquid cooled burners just like in the HPS lime kiln. As these burners are located at the lower end of the sinter zone, where the kiln charge is already completely calcined, very high temperatures can be achieved and the reactivity of the product can thus be reduced to the desired value.

In such an arrangement the rest of the calcination process takes place just above the sinter zone at a safe distance from the connecting gas channel. The energy for this final calcination is provided by the hot gases coming from the sinter zone. Due to the strongly endothermic calcination process these gases are cooled down to a temperature of less than 1,100° C, thus allowing them to safely pass through the connecting channel without damaging the refractory lining.

The flexibility of this new kiln type will add value to any lime plant because it can operate either like a classic PFR lime kiln (without using the burners in the sinter zone), to produce high reactive / soft burnt lime or - as described above - to produce medium to hard burnt lime while still maintaining the excellent thermal efficiency of a PFR lime kiln.

by Hannes Piringer

Combining PFR and HPS-Technology – MAERZ Hybrid Lime Kiln
The C-series is designed to meet the requirements of lime producers worldwide. A design which is sophisticated down to the last detail results in optimised installation and maintenance procedures, low operating costs, a high range of various possible applications and of course familiar Swiss engineering quality. The series portfolio includes kilns with nominal capacities from 350 - 850 tons per day. New software algorithms additionally allow the customer to run the kilns at less than 50 % of the nominal production rates without noteworthy loss in quality.

Limestone fractions of 20 - 40 mm to 60 - 120 mm and higher can be fed into these kilns.

The new stone charging system even allows customers to operate the kilns with mixed stone fractions and to influence the stone distribution inside the shafts by charging selectively to the outer or inner zone of the cross section. All this has been designed to optimise the burning process and to allow customers to maintain a high stone output from the quarry.

As a result of detailed CFD-analysis the cooling system has been renewed in a way that allows critical, coarse crystalline limestone similar to marble with a high amount of fine material in the product to be cooled efficiently with a relatively low amount of cooling air.

A great deal of attention was paid to minimising maintenance as well as to improving accessibility for the remaining maintenance work. Moving parts, such as the flaps, which need regular lubrication can be accessed comfortably and wear parts, such as the lances, can be exchanged more easily due to a new design of the lances and their boxes. Maerz went so far as to design one of the pillars dismountable, thus allowing the discharge tables to be removed or replaced if necessary. According to our customers these and more features become noticeably beneficial in the daily operating of the kiln.
The stone and lime handling systems of the kiln have been equipped with an efficient dedusting system resulting in a dust-free and labour-friendly kiln environment.

Next to the visible improvements, there are also many improvements which are not directly visible. One of them is the conical refractory design of the burning zone. The increasing kiln cross section, from the lance tips to the cooling zone verifiably improves the stone flow inside the shafts and therefore contributes to a more stable burning process.

Nowadays modern kiln operation goes hand in hand with highly sophisticated software and algorithms. Maerz has therefore invested a vast amount of time over the past years to take its software to a higher level. Among others, a very helpful feature to mention is the intelligent quality controller. It helps to support the operators in controlling and stabilising the kiln process. This new feature was successfully tested on the first installed C-type, natural gas fired lime kiln.

With a new data management system Maerz combines trending production, process and quality parameters. Noteworthy is that this data can be accessed from all over the world. Customers are thus able to analyse their production more easily and to better optimise the calcination process. Another nice side effect, which is valuable for the customer is, that should the need arise, Maerz is able to provide process support within a short timeframe.

All in all the new development is a great success, confirmed by reliable operation with a minimum of unplanned downtimes and a consistently high quality of lime. With an average heat input of 3,520 kJ / kg and a stone size of 25 - 90 mm the 550 tpd C3F kiln produced soft burnt lime with an average residual CO₂ content of 1.1 % and available lime content higher than 94 %.

The new C-type is not just a lime kiln. It combines 60 years of experience and passion in the next generation of Maerz parallel flow regenerative lime kilns.

by Hannes Piringer and Benjamin Oberle
Daesung MDI Inc., a company with a rich history, was founded in the 1960s and started off its business operating different limestone and dolomite mines. It continues to grow and to add new products to its portfolio.

The summer of 2014 marks the beginning of a new chapter in the company’s history, when Daesung MDI signed a first contract with Maerz Ofenbau AG for a modern coal-fired rectangular Maerz PFR kiln with a daily capacity of 200 tons of burnt lime. The kiln, processing limestone with a grain size of 45 – 80 mm, was successfully installed and is now operating to the customer’s utmost satisfaction.

In the spring of 2017 the project for the second coal-fired rectangular Maerz PFR kiln with a daily capacity of 300 tons of burnt lime began. This kiln processes limestone with a grain size of 25 – 55 mm.

Daesung MDI once again successfully installed the second kiln, thus achieving a milestone in its history and gaining importance in the lime industry. The plant called “Limechem Center” is up and running, operating with different limestone grain sizes and producing good quality lime.

On 16 October 2019, Daesung MDI held a perfectly organised ceremony to commemorate the completion of the lime plant at its Gangwon-Do Limechem Center. Some 200 guests, from officials to local contractors, Korean lime producers and many others were invited to share this joyous occasion. We at Maerz thank Daesung MDI’s Chairman for the hospitality we were able to enjoy on this memorable day.

by Christian Stampfli

Daesung MDI– Yeongwol-Gun - E5 kilns at 300 tpd each (photo courtesy of Daesung MDI Inc.)
UPGRADING THE CALERAS SAN JUAN LIME PLANT, ARGENTINA

In 2016 and 2018 Caleras San Juan S.A., domiciled in the San Juan Province, Argentina, placed two orders with Maerz Ofenbau AG for the supply of engineering, license, know-how, equipment as well as technical assistance services during erection, commissioning and start-up of two Maerz PFR lime shaft kilns, a stationary crushing plant as well as a roller mill grinding plant for petcoke at the client’s Los Berros lime plant.

The new kilns of the rectangular type E5 will process limestone and dolomite with a grading of 44 - 110 mm and will produce 2 x 300 tons of burnt lime per day. Both natural gas and petrol coke dust will be used as fuel.

Both projects were financed with international credits from Europe accompanied by a Swiss Export Risk Insurance (SERV). A large number of meetings, beginning in 2003, with a continuation in 2011 and then becoming very intense from 2013, led to the desired success. Now the first kiln and the crushing plant have been operating successfully since September 2018 and the second kiln including the grinding plant for petcoke will follow by the middle of next year.

by Borislav Vladic

TANGSHAN GANGYUAN 800 TPD KILNS – LAOTING, P.R. OF CHINA

The foundation stone for the largest Maerz lime plant in history has been laid!

The construction work of the Tangshan Gangyuan Metallurgical and Furnace Co. Ltd. project has successfully started on a greenfield in Hebei province. Local contractors are carrying out the erection of buildings, steel structures and auxiliary installations, while Maerz is delivering key equipment.

The plant will have an impressive production rate of 4,000 tons of burnt lime per day (5 x 800 tpd Maerz R5S lime kilns, lean gas fired). It will set new benchmarks worldwide in terms of capacity, availability & efficiency. Lime production is planned to commence soon.

by Peter Herrsche

EASTERNBULK, INDIA

In July 2019 our customer Easternbulk Lime Products Private Ltd. set up and commissioned its first lime kiln. This project in the south of India in Tuticorin, Tamil Nadu, is a joint venture between Easternbulk Trading and Shipping Private Limited and
our well renowned customer Chememan Public Company Limited in Thailand. This is the first of two E2 150 tpd kilns in India, which are supported from Chememan Thailand. The plant is located in the SIPCOT industrial region of Tuticorin.

This E2 Maerz 2-shaft lime kiln is coal fired and has a capacity of 150 tpd. Maerz supplied engineering and key equipment. With Maerz technical assistance and experienced Chememan personnel, the lime kiln was successfully commissioned and ignited in June 2019 and is now in commercial operation

by Christopher Schneider

MEXICANA DE COBRE, MEXICO

Not far away from the Sonora desert, in the same-named federal state of Mexico, two Maerz kilns erected in 2009 and 2014 are performing to the complete satisfaction of their owner Mexicana de Cobre. This year our customer demonstrated its confidence in Maerz technology by ordering a third Maerz kiln for its lime plant.

Near the town Agua Prieta on a picturesque plateau more than 1,300 m a.s.l., the customer’s engineers are preparing the ground for the new kiln of the circular R4S type, which will process limestone with a grading of 60 - 110 mm and will produce 600 tons of burnt lime per day.

This kiln project marks an important milestone for Mexicana de Cobre enabling it to cope with the increasing demand for lime in its mining business. Our customer is the number one copper producer in Mexico and the fourth largest copper producer worldwide.

Mexicana de Cobre - Impressions from the kick-off meeting and location for the new R4S-kiln (600 tpd)
The order includes the supply of engineering, license, know-how, equipment as well as technical assistance services during erection, commissioning and start-up of the Maerz PFR lime shaft kiln at the customer’s lime plant. Natural gas will be used as fuel. Maerz’s equipment supply comprises the following main items:

- Suspended cylinders
- Process air blowers with electric motors
- Electric, measuring and control system for the lime kiln
- Firing system for natural gas, including the start-up burner equipment
- Hydraulic equipment
- Limestone skip hoist winch, including the pertinent electrical measuring and control equipment
- Air blast units
- Refractory materials

Maerz’s specialised technicians will assist with hot commissioning and acceptance test runs on the lime kiln and the associated equipment.

Abinsk Electric Steel Works Ltd., domiciled in Abinsk, Krasnodar Region, Russia, placed an order for the supply of engineering, license, know-how, equipment and technical assistance services during commissioning and start-up of a Maerz PFR lime shaft kiln as well as the limestone and lime handling systems designed by Parget Makina Ltd., based in Ankara, Turkey.

This new double shaft lime kiln of the rectangular type E2 will calcine limestone with gradings of 20 - 40 mm and 55 - 100 mm respectively and will produce more than 160 tons of lime per day, using natural gas as fuel. Commissioning is scheduled for the middle of 2020.

The supply of this new lime plant is a cooperation between the companies Parget Makina Ltd. from Ankara, Turkey, and Maerz Ofenbau AG.
Major cement manufacturers have taken measures to ensure compliance with the gradually increased limitations for nitrogen oxide and ammonia emissions. Anhui Conch Cement Co., Ltd., a leading company in the industry, has equipped three 5,000 tpd cement production lines with SCR technology from Maerz, thus successfully demonstrating compliance with the most stringent emission standards for cement production in China.

In various Chinese provinces the limit values regarding nitrogen oxide and ammonia emissions are going to be reduced or have already been reduced in the recent past. The target value for the CemCat SCR plants in Jining and Zhongguo is 100 mg / Nm³ NOₓ (hourly average) and 8 mg / Nm³ of ammonia slip (daily average). The current state of technology allows these emission specifications to be achieved reliably with CemCat’s High Dust SCR technology.

<table>
<thead>
<tr>
<th></th>
<th>DESIGN DATA</th>
<th>OPERATING DATA</th>
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</thead>
<tbody>
<tr>
<td>Kiln output</td>
<td>5,100 tpd</td>
<td>~ 6,000 tpd</td>
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<tr>
<td>Gas flow</td>
<td>330,000 Nm³/h</td>
<td>~ 380,000 Nm³/h</td>
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<tr>
<td>Gas temperature</td>
<td>320° C</td>
<td>~ 325° C</td>
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<tr>
<td>NOₓ before SCR</td>
<td>805 mg / Nm³</td>
<td>~ 700 mg / Nm³</td>
</tr>
<tr>
<td>NOₓ after SCR (10 % O₂, dry)</td>
<td>100 mg / Nm³</td>
<td>&lt; 50 mg / Nm³</td>
</tr>
<tr>
<td>NH₃ slip after SCR (10 % O₂, dry)</td>
<td>8 mg / Nm³</td>
<td>&lt; 3 mg / Nm³</td>
</tr>
</tbody>
</table>

Table 1: Process data Jining plant
HIGH DUST / HIGH TEMPERATURE CEMCAT SCR PLANTS IN JINING AND ZHONGGUO

After a construction period of about 5 months, the CemCat SCR plant in Jining was commissioned in August 2019 and the CemCat SCR plant in Zhongguo in October 2019. CemCat designed these High Dust / High Temperature SCR plants for the denitrification of 340,000 Nm$^3$/h flue gas per kiln line (see table 1) thus ensuring permanent compliance with the emission specifications.

Compared with Semi Dust SCR plants, the High Dust SCR plants are very low in pressure drop. The overall pressure drop of a High Dust SCR plant is about 500 Pa, with a temperature drop 10° C lower than that of the Semi Dust plant. The ammonia injection amount can be greatly reduced leading to an ammonia consumption of the cement plant of more than 60 % lower than before the SCR was commissioned. Compared with Semi Dust plants, they have a less variety of equipment and therefore stability is greatly improved. High Dust SCR plants have the lowest operating costs.

After applying CemCat’s High Dust / High Temperature SCR technology, the Jining plant (see table 1) can meet and undercut the minimum nitrogen oxide and ammonia emission standards.

PROVEN TECHNOLOGY SINCE 2006

In more than 10 cement plants in several countries, CemCat has been able to gain years of experience reducing nitrogen oxide to such low values. For more than a decade we have successfully demonstrated that CemCat High Dust / High Temperature SCR plants in cement factories are ideally suited to reliably and continuously reduce nitrogen oxide and ammonia emissions. Since August 2013 all established SCR plants have been operating at an annual availability rate of above 95 %

BUILDING THE NEW HIGH DUST / HIGH -TEMPERATURE SCR PLANTS FOR CONCH IN JINING AND ZHONGGUO

Anhui Conch was responsible for the complete concrete and structural steelwork, including provision of the material. Maerz supplied all core components including the catalyst modules from Europe and Anhui Conch installed them. Anhui Conch was responsible for the construction, Maerz for commissioning. Due to good cooperation, realisation of the project took place within 10 months, which compared to typical European projects denotes a time saving of over 50 %.
The SCR housing, where the catalysts are installed, was preassembled in the workshop and then disassembled for transport. At a preassembly site in the plants at Jining and Zhongguo the reactor walls could then be welded quickly and precisely using an assembling aid. Subsequently, the single layers only needed to be lifted by crane and joined to their final installation position. Preliminary work in the workshop significantly reduced construction time at the plant and improved the quality of workmanship.

The High Dust / High-Temperature SCR plants in Jining and Zhongguo were built on concrete tables. The footprint of the foundation of a single SCR plant is approximately 16 x 17 m.

**DUST CLEANING SYSTEM**

The key component of a well-functioning High Dust SCR installation in a cement plant is the dust cleaning system (see below). The requirements differ significantly from classic soot blowers, which are used in other industries.

The proven CemCat dust cleaning system ensures that the high dust load of approx. 95 g / Nm³ (approx. 30,000 kg / h) in the Jining and Zhongguo plants is blown through the catalyst elements together with the flue gas and does not clog them up. Cement dust contains a lot of clay and is much stickier than dust in other industries. This makes dust cleaning even more difficult.

*by Markus Theus and Daniel Schneider*
Nearly everybody in the industry knows Franz Sidler, one of the record-setters when it comes to years served at Maerz Ofenbau AG. After more than 37 years, he retired in October and can proudly look back on a variety of tasks and challenges he mastered with our company.

He started on 1st of January 1981 as a commissioning engineer coming from a job as plant designer for investments within Brown Boveri, today’s ABB. Being a mechanical engineer by profession, he always loved to combine layout and design work with the practical hands-on application of his abilities. A virtue, which definitely became useful when commissioning Maerz kilns.

He soon discovered his passion for the then new PLC technology for process control and – as a consequence – developed the first PLC software for Maerz kilns. His algorithms, by the way, are still the basis for all generations of software since then.

A couple of years later he moved from field services back home to the Zurich office, where, as a department head, he was responsible for everything in connection with firing systems, hydraulics, electrical hardware and, of course, software. His further career led him to the sales and project management department, where he travelled a lot and took care of our customers all over the world. Sometimes we got the feeling, that he was more often in the air than on the ground when travelling to China (which nearly became his second home), the US or South America. During his extensive journeys he discovered another passion: food and wine. He always brought exotic ingredients and spices back home to his family, where he diligently applied his excellence in engineering to cooking: planning, preparation, precision and passion.

Despite his “jet-set” life-style, Franz took care of his family and luckily for us transferred his passion for his profession to one of his three sons: we are proud and happy that Stefan Sidler now works as a commissioning engineer at Maerz.

As you can see in the photo below, Franz’ passion for food has not changed – the only difference is that he now has much more time to travel the world with his wife and collect even more inspirations for delicious food.

Franz, with your personality, competence and passion you shaped the perception of Maerz Ofenbau in the entire lime industry. We sincerely thank you for that and for your dedication and wish you and your family the very best for the decades to come!

by Stephan Lechner
Happy Holidays
and best wishes for the New Year
from the Maerz Team!

Please contact your Maerz Service Team at service@maerz.com for more information
We are also on social media! Check it out www.linkedin.com/company/maerz