Calcination is one of the key heat treatment processes for a range of industrial minerals, and most crucially for dolomite, limestone, and magnesite. Recent market demand for the calcined grades of these minerals is reflected in the number and range of orders of the world’s leading kiln developers, the Maerz-Polysius-RCE Group.

Polysius Group is a combination of three leaders in the field of calcination and mineral processing technology which have merged together over the last few years (see panel).

In essence, Polysius specialises in the design and engineering of kilns and furnaces for the calcination of limestone and dolomite, magnesite, dolomite, and tabular alumina, calcination of flotation concentrates, and filter cakes as well as the thermal treatment of minerals.

The accompanying table highlights some of the orders received by RCE for new shaft kiln installations over the last two years. The company is largely active in most of the major calcined magnesia projects that are in the process of development.

North Africa & Middle East

The Polysius Group has constructed, is constructing, and is under order to build some 30 Maerz lime shaft kilns and RCE kilns and furnaces in North Africa and the Middle East.

The region is clearly fertile one for calcined minerals production. With continuing investment and growth in mineral consuming markets such as ceramics, glass, and steel, as well as development of large scale mineral production centres, such as in Saudi Arabia, the outlook remains very buoyant.

In the early 1970s appeared to be the starting point for Polysius’ activities in the region. From the beginning in 1974, when Maerz received the first order from Tchacosh Ytong and Sandlimebrick Factory in Iran, the number of kilns and furnaces in the area, including PFR Kilns, single shaft kilns, high temperature kilns, and multiple hearth furnaces, steadily increased with the majority of them being built in Iran.

The latest order for Maerz in Iran was in 2005 for Fouulad Afza Sepahan Co., Esfahan, which ordered two Maerz PFR Kilns with 250 tpd capacity each, to produce burnt dolomite for the Mobarakhe Steel Co.

To date 27 kilns have been ordered, installed or are under construction at 19 different locations in 8 countries in the region. These include: Egypt (2 kilns), Iran (11), Iraq (2), Jordan (3), Libya (2), Saudi Arabia (3), Syria (1 ), and the UAE (3).

Recent orders

The high level of activity in the magnesia industry has clearly kept Polysius busy (see the magnesia article starting p.33 for the latest news).

Most recently RCE has been commissioned to build a new 75 tpd shaft kiln for Bommag Ltd in Turkey. The facility formerly called Calmag, is undergoing a rejuvenation and upgrade with new owners Borrex Holding of Serbia expecting to bring it on stream in spring 2009.

Dr Christoph Beyer, manager of the High Temperature Technology Section, Polysius AG, told IM: “The whole magnesia market is very dynamic at the moment. We have a wide variety of interesting projects with nearly all the bigger players in the market going on.”

At this time, Beyer was only able to disclose two of the company’s recent magnesia projects – Bommag and RHI (ie. the Liaoning RHI Jinding j-v in Dashiqao, China) – since the other projects remain confidential at present.

“The Bomex plant in Turkey will comprise the RCE 2-step burning-technology (calcining/briquetting/deadburning) including an RCE high temperature shaft kiln with an output of 75 tpd DBM.” explained Beyer.

Since February 2008 Polysius has established a High Temperature Technology Section whose function is to support and work hand in hand with RCE concerning turnkey projects and complex installations worldwide.

“There are several technical challenges we are working on right now, we hope to present the results in the coming year.” said Beyer, who heads up the new section at Polysius.

Other recent orders for Maerz include Lingyuan Iron & Steel Group Co. Ltd. of Lingyuan, Liaoning, China, which has placed an order for the installation of a new Maerz PFR Kiln.

The kiln of the type R4P will be of circular design with a shaft cross section of approx. 14.5m² and will produce 550-600 tpd of
Maerz-Polysius-RCE

Maerz Ofenbau AG, Zurich, Switzerland

Maerz Ofenbau AG was founded in 1950 in Zurich, Switzerland, by Austrian magnesite producers to design and sell open hearth furnace technology to the world-wide steel industry.

In 1965 Maerz began the design and construction of a patented "MAERZ® Parallel Flow Regenerative (PFR) Lime Kiln" with high thermal efficiency and superior lime quality. It finally became the generally known "MAERZ® Kiln", continuously improved. The initial design was an oil fired lime kiln of 100 tpd capacity. Soon larger units and firing systems for all types of liquid, gaseous and pulverised solid fuels were introduced.

In the late eighties, Maerz introduced the "MAERZ® Finelime Kiln" to the industry. This vertical shaft kiln type allows the calcination of small size limestone and dolomite which had to be processed in the past in rotary kilns with significantly lower thermal efficiency.

Maerz offers designs for PFR Kilns with nominal capacities between 100 and 800 tpd and with firing systems for all types of liquid, gaseous and pulverised solid fuels.

Maerz’ services also comprise feasibility studies, engineering and design work, supply of key equipment as well as delegation of personnel to supervise erection and commissioning of MAERZ® Kilns.

Polysius AG, Beckum, Germany

Polysius AG is one of the world’s foremost engineering companies supplying services and equipment to the cement and mineral industries. As early as in 1859, Andreas Ernst Gottfried Polysius opened his own workshop in Dessau, thereby laying the foundations for today’s Polysius AG.

At the end of the 19th century Polysius specialised in machines for crushing, grinding and processing raw materials and in the construction of cement plants resulting in the construction of Europe’s first rotary kiln in 1898 and of a complete cement factory in Egypt in 1907.

By acquiring the share capital of Maerz Ofenbau AG in 2006, Polysius offers virtually all types of lime kilns and associated equipment for the lime industry with Maerz acting as the competence centre of all lime related activities within the Group.

RCE Industrieofenbau Engineering GmbH, Radenthein, Austria

RCE was founded in 1976 by Radex Austria AG in Radenthein, Austria, to market internally developed refractory know-how. RCE is a subsidiary company of Maerz Ofenbau AG.

RCE has over 30 years experience in the development of processes and plants for the production of dead burned magnesia, dead burned dolomite, alumina and other refractory products.

Activities are focused on the supply of process know-how, basic engineering and key equipment, especially for multiple hearth furnaces for the calcination of refractory raw materials and high temperature shaft kilns for the production of top grade dead burnt magnesia, dead burnt dolomite, bauxite, alumina and spinels.

RCE has also developed a high efficiency single shaft kiln, based on the design of the high temperature shaft kiln, for the calcination of limestone, dolomite and magnesite.

September 2008