



RAPID MARKET ENTRY

Introduction

More than a year ago, the first modular cement grinding plant worldwide, with a vertical roller mill (VRM), was brought online by Gebr. Pfeiffer. This plant is being followed by nine other ready2grind compact grinding plants; one of them will be commissioned very soon and two others are on their way to their destinations.

Pfeiffer's role in the development of modular grinding plants becomes evident by the customers' interest in this equipment with its core piece, the most modern VRM available. This type MVR mill has been producing cement

to the satisfaction of the customers on all continents. With the integration of a VRM, the ready2grind plant not only offers significant savings in terms of energy when compared with simple grinding systems, but also a high flexibility with regard to cement types and fineness degrees.

The MVR mill can be used for grinding ordinary portland cement (OPC) and any type of mixed cements, as well as slag. In this context, the short dwell time of the material in the mill allows customers to quickly switch between materials. They can change from one cement type to another

Tom Neckel and Jannik Schmalenberger, Gebr. Pfeiffer, discuss the company's compact grinding plants.



Figure 1. R2G 1800 C-4 in Kenya.



Figure 2. R2G 2500 C-4 under construction in Costa Rica.



Figure 3. Material feed unit in Kenya.

within a few minutes in order to adapt to local market demands. OPC with a fineness degree of up to 5000 cm²/g (Blaine) is reliably produced on Pfeiffer MVR mills, with the option of further increasing the Blaine value if needed.

Fast transportation and installation

With the innovative VRM design, the ready2grind system is also available for the grinding of limestone, coal, and gypsum. For the latter, it is available as a combined grinding-calcining system. Transportation and installation can be done rapidly thanks to the design, which uses pre-mounted modules that fit into standard size containers.

This feature is important when it comes to fulfilling the requirements of local markets and simultaneously reducing the risk of extended times for installation caused by unforeseeable incidents on the site. As far as raw material feed and finished product handling are concerned, the entire system can easily be adapted to the individual requirements of the customers and the situation on the site.

Rapid market entry

Rapid market entry is vital to customers that want to establish themselves and sell their product. The invested capital is supposed to produce earnings to ensure a positive return on investment. The ready2grind system possesses the following practical features: all components of the various modules are pre-mounted in 40 ft or 20 ft container frames or containers.

Moreover, they are prepared so that they can be screwed or welded easily on the site. Electric components can be connected with the MCC and PLC also housed in a container. After the customer has laid the foundation, the ready2grind plant will take shape rapidly and will be ready for use after only four weeks (Figure 1).

Kenya and Costa Rica projects: modular design in everyday practice

Plants in Kenya and Costa Rica (Figure 1 and 2) show the advantages of everyday practice offered by the modular design. First of all, the basic modules are set up (Figure 3) with a material feed unit, comprising feed bins and metering devices. These are connected via handling devices (Figure 4) with the core piece of the plant (the MVR mill), followed by additional basic components, such as a plant filter, a hot gas generator, and a fan (Figure 5). These elements are put one on top of the other.

The ancillaries of the mill and the hot gas generator are to be found on the bottom level, on top of which the plant filter is located, with



Figure 4. Handling devices in Kenya.



Figure 5. Mill with ancillaries, filter, and hot gas generator in Kenya.



Figure 6. Product silos as optional modules in Costa Rica.

the fan installed behind the filter tower. The mill and its components (filter, hot gas generator, and fan) are identical in each ready2grind plant of the same size.

Expandable via optional modules

The basic module for material feed and the optional modules for product handling are adapted on the site to suit the individual requirements of the customer. The container housing the electric parts, such as MCC and PLC for plant control, supplements the basic modules. The ready2grind plant can be extended by fitting optional modules anywhere between the dust collecting hopper of the filter and finished product handling (similar to the Costa Rica plant with its product silos in Figure 6).

Other optional modules may be a packing station with a bagging unit and bulk loading on trucks, laboratory equipment, fuel storage, intermediate silos, and transformer station. As well as mechanical equipment, Gebr. Pfeiffer also offers services such as staff training by experienced specialists or service contracts (Table 1). After a one-month installation, subsequent plant commissioning, and briefing of the staff, the plant will be taken over by the customer so that the first bag of cement will be filled after a short and well-calculable period. Once the local market has saturated, the ready2grind plant can easily be relocated thanks to its modular design and short installation and commissioning time.

Ready2grind system: performance data and benefits

The ready2grind plant is currently available in two sizes, though additional sizes can be supplied upon request. The ready2grind plant in Kenya is size R2G 1800 C-4, producing 20 – 30 tph, depending on type of cement and fineness degree. The Costa Rica plant (R2G 2500 C-4), which is under construction, will have a production capacity of up to 72 tph (Table 2). The size R2G 3070 C-4 will be available soon for bigger throughput rates.

Advantages of the ready2grind system include the following:

- Proven concept ensuring highest reliability.
- Cost-efficient transportation of modules in standard container dimensions.
- Rapid delivery, installation, and commissioning.
- Highest availability with moderate investment.
- Immediate market entry, short amortisation, and reduced investment risk.
- Maximum flexibility for rapid response to changing market requirements.

Reducing operating costs over the long term

Different compact units with simple grinding systems are available on the market. At first sight, these seem to be attractive in terms of costs. That may be true in terms of capital investment. But when examining the service period and operating costs of the various grinding systems, the VRM has operating advantages over other grinding systems. Ball mills, for example, need up to 40% more energy during the grinding process compared to Pfeiffer VRMs. Moreover, as the MVR mill unites three processes in one machine (grinding, drying, and classifying), so the number of auxiliary consumers is reduced.

Also as far as maintenance and repair costs are concerned, vertical mills offer considerable

advantages over ball mills. Hence, operating costs are reduced further. The MVR mill also has a short response time when changing from one product to another. During the transition period, the reduced dwell time of the material in the MVR, unlike the ball mill, largely avoids the production of an unsalable intermediate product that would have to be disposed of.

Active redundancy: four grinding rollers ensuring high availability

With the four grinding rollers of the MVR mill, the customers profit from active redundancy, ensuring that the mill remains online when maintenance work is performed on the rollers. Two opposite rollers can be swung out for maintenance work, while production is continued with a minimum throughput rate of 50%, meaning the availability of the mill increases further.

Conclusion

The projects in Kenya and Costa Rica, as well as the ongoing strong demand, prove that the modular ready2grind system offers benefits in terms of market entry, cost saving potential, flexibility, and availability. 🌐

About the authors

Tom Neckel has 30 years experience in the business of machines and plants for international markets. During the first 16 years of his career, he worked in the process technology sector where he acquired fundamental knowledge of material preparation processes, such as grinding, separating, drying, hydrating, and calcining. Neckel worked in the project and sales department for 10 years before being designated Head of Global Marketing of Gebr. Pfeiffer SE in 2014.

Jannik Schmalenberger completed his bachelor's degree in mechanical engineering at the DHBW Mannheim. Since early 2016, he has been working as a Project and Sales Engineer for Gebr. Pfeiffer. Apart from handling inquiries from customers around the world and rating the related mills, Schmalenberger has acquired extensive knowledge of ready2grind modular systems during the last two years.

Table 1. Scope of equipment and service supply.

A. Base plant modules	
A.1	Feed material dosing and feed hoppers.
A.2	Material feeding to mill.
A.3	Mill, classifier, and ancillaries.
A.4	Plant filter, hot gas generator, and fan.
A.5	Electrical controls and drives.
B. Optional equipment modules	
B.1	Product transport and storage silos.
B.2	Packing and truck loading.
B.3	Bulk loading.
B.4	Laboratory.
B.5	Fuel storage.
B.6	Intermediate storage silos.
B.7	Transformer station.
C. Optional service modules	
C.1	Operator training.
C.2	Maintenance training.
C.3	Service contracts.

Table 2. Pfeiffer ready2grind performance table and technical data.

Blue = R2G 1800 C-4/Red = R2G 2500 C-4						
Product	Portland cement CEM 1		Limestone cement CEM II/ B-L		Ground granulated blastfurnace slag (GGBFS)	
Fineness according to Blaine	3300	4000	4000	5000	3800	4500
Grindability (kWh/t)	18	22	15	19	23	27
Production rate (tph)	25 / 60	20 / 50	30 / 72	23 / 57	21 / 47	18 / 44
Maximum feed grain size (mm)	35 / 50					
Tonnes per year (tpy)	up to 220 000 / up to 550 000					
Installed mill motor power (kW)	560 / 1260					
Total installed power (kW)	about 1200 / about 2300					