



MVR 2500 ready2grind unit installed at Caldera works, Costa Rica

Are you ready2grind?

Flexible deployment of grinding plants with rapid installation and commissioning enables cement companies to improve their competitive edge as market requirements change and different products are needed. To meet this call for more flexible options, grinding specialists have introduced compact, mobile grinding units with very short lead times. Gebr Pfeiffer introduces us to its ready2grind units.

■ by **Andreas Schieler**, Gebr Pfeiffer SE, Germany

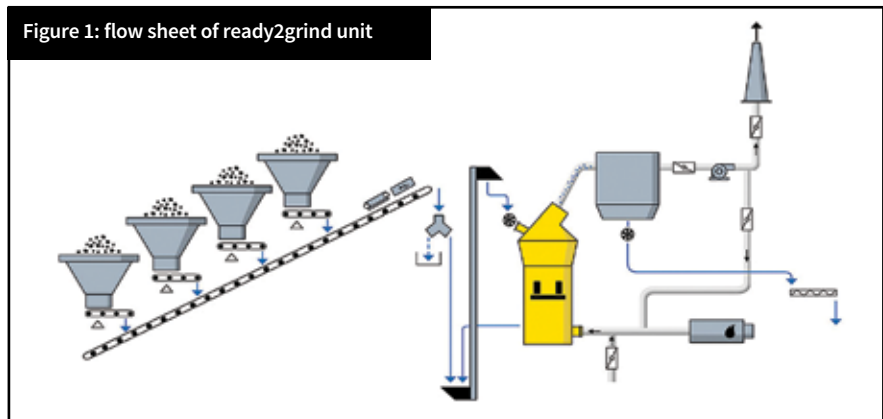
Time is money! For this reason, the time between ordering a new grinding plant and fabrication of the first product is often the decisive factor for many customers. The reasons are manifold and often determined by the local markets. Therefore, many customers look for a grinding plant from one source with a very short delivery time, which is easy to transport and can be erected in the shortest-possible time with simple means.

Serial modularity

The answer to these requirements lies in serial modularity, a concept applied in the modular and standardised design of Gebr Pfeiffer's ready2grind plant (see Figures 1 and 2). The ready2grind series turns a usually highly-customised product into a serial product with several benefits, including cost savings of 25-30 per cent when compared with conventional grinding plants.

Standard containers are manufactured and pre-assembled with grinding plant

Figure 1: flow sheet of ready2grind unit



equipment to form the core module of the grinding plant as early as the manufacturing stage.

The core module contains a Gebr Pfeiffer MVR vertical roller mill with four grinding rollers and a plant filter, which consists of several containers that are assembled to create a compact filter unit. Fan and hot gas generators are also sent to the site in prefabricated containers that can be easily transported. The four

feed bins with metering devices and the conveyor to the mill, as well as the dust collector and an electric container with MCC and PLC, are already included in the core module and pre-assembled in the container frame.

In addition to this core module, there are several expansion modules, which can be added to the core unit as options (see Table 1). With the exception of the silos, these usually consist of an additional container each, which is connected to the grinding plant at the site.

Options are product silos with or without bulk loading facilities, a packing plant or a filling station for big bags. With these options, customer requests can be met in a flexible way. Further optional modules for fuel storage, a transformer station or a (quality assurance) laboratory are also available.

Speedy on-site installation

Once on site, the individual containers are connected to each other within a month (see Figure 3). A separate steel or concrete building for the grinding plant is not needed as the modules are fastened directly onto the strip foundation whereas the building structure is created by the container frames of the modules. Compared to traditional types of erection,

Figure 2: ready2grind plant layout

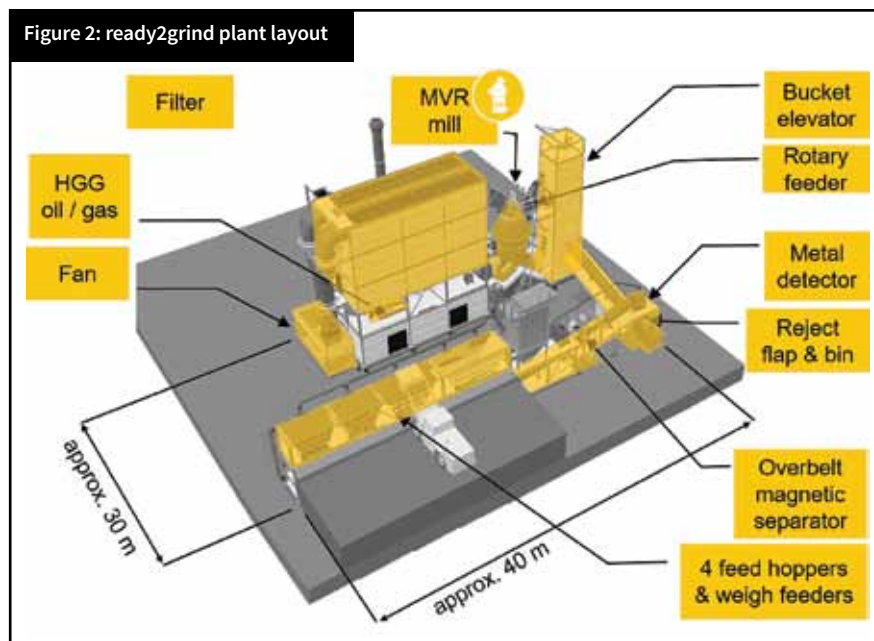


Table 1: ready2grind scope of equipment and service supply

| A. Base plant modules | |
|-------------------------------|---|
| A.1 | Feed material dosing and feed hoppers |
| A.2 | Material feeding to the 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 |



Figure 3: once on site, the individual containers are connected to each other

this saves a time-consuming step during installation and minimises the risk of delays due to bad site conditions, lack of staff or time-consuming reworking. Following commissioning by a staff member of Gebr Pfeiffer, the plant can be controlled on the spot with the easy-to-handle operator station.

Flexible production

The Gebr Pfeiffer MVR mill enables cement producers to grind all types of cement as well as slag, limestone, gypsum, ores and many other materials and special mixtures. Due to their very smooth operation, MVR mills can produce products with a high fineness – eg, CEM I with a specific surface of 5500cm²/g (Blaine), as produced at a Brazilian cement plant.

The ground product is air-swept to the speed-controlled classifier directly after grinding and separated in the downstream filter. This way very little material remains in the plant compared to other grinding systems. Due to the residence time, a fast change of product is easy and provides the operator with enormous flexibility. At the same time, vertical roller mills (VRMs) are characterised by their very low energy consumption and thus by environmentally conscious and cost-saving production. An optional service contract is the basis for optimum maintenance and repair of the plant.

Active redundancy

The four grinding rollers of the MVR mill allow active redundancy, ensuring that the mill remains online when maintenance work is carried out on the rollers. Two opposite rollers can be swung out for maintenance work while production continues at a minimum throughput of 50 per cent. Therefore, the availability of the mill increases further.

Table 2: technical data for ready2grind systems

| Product | Portland cement CEM I | | Limestone cement CEM II/B-L | | Ground granulated blastfurnace slag (GGBS) | |
|---------------------------------|-----------------------------|--------------|--------------------------------|-------|---|-------|
| | 3000 | 4000 | 4000 | 5000 | 3800 | 4500 |
| Grindability (kW/t) | 18 | 22 | 15 | 19 | 23 | 27 |
| Production rate (tph) | 25/60 | 20/50 | 30/72 | 23/57 | 25/60 | 25/60 |
| Max feed grain size (mm) | 35/50 | | | | | |
| Approx production rate (tpa) | up to 220,000/up to 550,000 | | | | | |
| Installed mill motor power (kW) | 560/1260 | | | | | |
| Total installed power (kW) | about 1200/about 2300 | | | | | |
| Note: | R2G 1800 C-4 | R2G 2500 C-4 | | | | |

Figure 4: R2G 2500 in operation in Caldera, Costa Rica



Additional benefits

In addition to their speedy installation and commissioning, flexible means of production and increased availability through active redundancy, Gebr Pfeiffer's ready2grind systems provide several extra benefits, including:

- modules in standard container sizes for cost-efficient transportation and rapid delivery
- highest operational availability with moderate investment
- immediate market entry
- short amortisation with typical payback times of 2-3 years for normal applications
- reduced investment risk as onsite installation risk is reduced
- maximum flexibility to react to changing market requirements at short notice
- highest reliability, proven concept.

System design

The ready2grind design is currently available in three sizes:

1. R2G 2500 – best-selling option with a throughput rate of 50-72tph of cement, depending on composition and fineness required

2. R2G 1800 – throughput rate of 20-30tph
3. R2G 3070 – throughput rate above 75tph.

Table 2 shows the performance of R2G 2500 and 1800 systems.

For the grinding-calcining of natural gypsum and plaster of Paris, specific variants of the ready2grind+calcining design are available.

Case study R2G 2500: Caldera, Costa Rica

In Caldera, Costa Rica, Gebr Pfeiffer commissioned a ready2grind 2500 unit two months ago.

The unit was delivered with a pre-hopper battery including a metering device and conveyor to the mill, a Gebr Pfeiffer MCR 2500 C-4 vertical roller mill with four grinding rollers including classifier

and ancillaries, plus the process filter, the hot gas generator and the fan. Most components were manufactured by Gebr Pfeiffer although the proportioning belt scales, plant fans and some parts of the filter were outsourced. The plant's throughput of 400,000tpa of cement is stored in three product silos prior to bagging in the packing plant or loading onto bulk trucks. The supply scope also included complete erection and commissioning supervision with staff training by Gebr Pfeiffer. Usually, the time between contract signing and FOB delivery of the plant at the site takes 5-7 months. Following the start of erection, it takes around a further 12 weeks to begin production.

Case study R2G 1800: Kenya

The first R2G 1800 plant is located in Kenya, where it produces around 30tph of cement for the local market. The complete R2G unit, including all equipment from the feed hopper to the packing plant was delivered in only six months.

The plant in Kenya presented two challenges: as it was the company's first ready2grind unit, Pfeiffer engineers had to develop standard procedures for the entire engineering, manufacture, installation and commissioning within a limited timeframe. And unlike the Caldera unit, the ready2grind plant in Kenya had to be integrated into an existing works. Gebr Pfeiffer addressed both challenges successfully.

Further interest

Following these initial successes, a further four plants are currently being manufactured and are scheduled for delivery later this year. Three plants have already been delivered and are expected to start installation soon. ■

Figure 5: the first R2G 1800 plant, installed in Kenya in only six months

