Ready-to-go baghouses

The fast pace of today's cement markets requires cement companies to deploy production assets such as grinding facilities at short notice to gain the edge on their competitors. The support of equipment manufacturers to deliver modular 'ready-to-install' production systems is key in the success of cement producers when entering new markets.

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Rapid deployment of production assets is essential in successfully entering new markets. One way of optimising the response to new opportunities in today's fast-changing cement markets are the recently-developed small grinding stations. Compact and efficient they can be put into operation in just a few weeks.

From modular grinding to modular baghouses

To support such operational flexibility, Redecam Group SpA has designed a modular baghouse that is easy and fast to install. It has the same features and high performance of the conventional units that have established this Italian company's legacy of high performance for the last 35 years.

The complete unit of the modular baghouse is pre-assembled in the factory, thus reducing installation time on site by 80 per cent and eliminating any quality issues that can sometimes arise with field assembly. The design allows each fully pre-assembled module to fit into a standard 40ft shipping container. All modules have bolted flanges that enable fast and accurate assembly into the full unit at site. The clean air plenum modules are also prepared with a high level of pre-assembly with compressed air tank receivers and solenoid valves already installed. The supporting structure for the unit is incorporated within the hopper modules in the workshop to lower shipping costs. The structure requires only minimal bolting work to attach to the completed assembly.

Despite the smart design, which minimises steelwork, the baghouse built with the modular concept handles high gas flows while achieving high performance. The design accommodates bags up to 8m in length. Emission levels are guaranteed to be lower than 5mg/Nm^3. To illustrate the unit's high performance, it is possible to treat gas flow rates up to 235,000m^3/h, using only 7m bags, with the baghouse pre-assembled and shipped using only 15 standard 40ft containers.

Following the building of modular grinding units, Redecam has developed a modular baghouse that is easy to deploy

Costa Rican case study

As an example of this innovative, high-performance system, Redecam recently supplied a modular baghouse to a Costa Rican cement plant, owned by Cementos Fortaleza and Plycem. The company's client, Gebr Pfeiffer Inc, installed its ready-to-grind system with a VRM 2500 C-4 vertical mill and the Redecam Modular Baghouse with a technical and performance specification as shown in Table 1.

This modular baghouse was designed with the 'double approach' system recently developed by Redecam. This system allows the gas to be distributed through both the bottom and the side of the bags. This ensures 100 per cent of the bags' filtration surface is used in the filtration process, avoiding the underused surfaces common in standard designs. Therefore, the ΔP across the filter is reduced and the number of cleaning cycles is minimised. As a result, the lifespan of the bags increases drastically. For example, the average lifetime of these bags is around 100,000 cleaning cycles. A typical baghouse works at a rate of five cycles/h and as a result bag life is around 2.5 years. Assuming the new concept baghouse achieves the same performance at a rate of two cycles/h, the bag lifetime is more than doubled.

Moreover, this also results in a large reduction in consumption of compressed air, which saves both money and compressed air capacity. The degree of savings in terms of compressed air depends on power costs per kiloWatt, which varies from plant to plant. However, tests run by Redecam show positive results with power cost savings of up to 30 per cent when compared to a traditional baghouse. Therefore, the total savings in operating costs is substantial.

Table 1: modular baghouse performance		
Parameters	**Operation**	**Design**
Gas flow at filter inlet (Nm^3/h)	136,000	147,000
Inlet temperature (˚C)	112	120
Static pressure at filter inlet (mmwg)	-660	-680
Volume at filter inlet (Am^3/h)	210,000	235,000
Number of compartments	4	
Total number of bags	1200	
Bag diameter x nominal length (mm)	127 x 7000	
Cloth area (m^2)	3350	
Fabric type	Polyester/ acrylic 550 CS17	
Air-to-cloth ratio (m/m^2min)	1.03	1.13
Inlet dust content (g/Nm^3)	450	500
Outlet dust recovered at screws (kg/h)	61,200	73,600
Pressure drop flange-to-flange (daPa)	120	135
Overall baghouse length (mm)	12,100	
Overall baghouse width (mm)	6600	
Overall baghouse height (mm)	11,500	
Number of containers	15	
Size of each module (L x W) – 40in OT (mm)	12,180 x 2240/2390	

The baghouse provides an easy-to-install solution to control dust from modular grinding units

Project timeline

In the design phase, the efficient concept of the modular baghouse allows Redecam to finish detailed drawings within just a few weeks of the project start. While the design is somewhat standardised, Redecam engineers are able to quickly tailor the baghouse to meet the specific process requirements of the site. In this way, the baghouse is optimally sized while achieving the extremely low emissions standards typically required.

Once the detailed design is finished, Redecam's worldwide procurement expertise is used to quickly obtain the best-quality materials at the optimum price. Since the design already takes into account the maximum sizes allowed in shipping containers, the baghouse supplier has the flexibility to take advantage of material pricing opportunities all over the world.

The company's design also allows fast and efficient field erection. All pre-assembled pieces are equipped with a special sealing gasket that allows the bolted flanges to be mated together quickly and accurately. The gasket means site welds are not necessary, saving considerable time and expense for field erection.

Total assembly time in almost all cases is only two weeks – significantly shorter when compared with the up to six-week assembly and start-up time of a conventional baghouse. Commissioning also takes only two days. Therefore, the following construction schedule is typical:

- unloading modules from containers – one day
- lifting of modules into place and bolting – five days
- installation of bags and cages – three days
- connection of compressed air pipes – two days
- electrical connections – three days
- cold test, commissioning and start-up – two days.

Flexible baghouse deployment

To meet the needs of a rapidly-changing market, cement producers require easy-to-install baghouse solutions to enable an effective deployment of production assets. The Redecam modular baghouse is a perfect fit for the new modular grinding stations. This combination gives cement producers a flexible, fast and economical tool to manage their grinding needs across their fleet of production facilities. ■