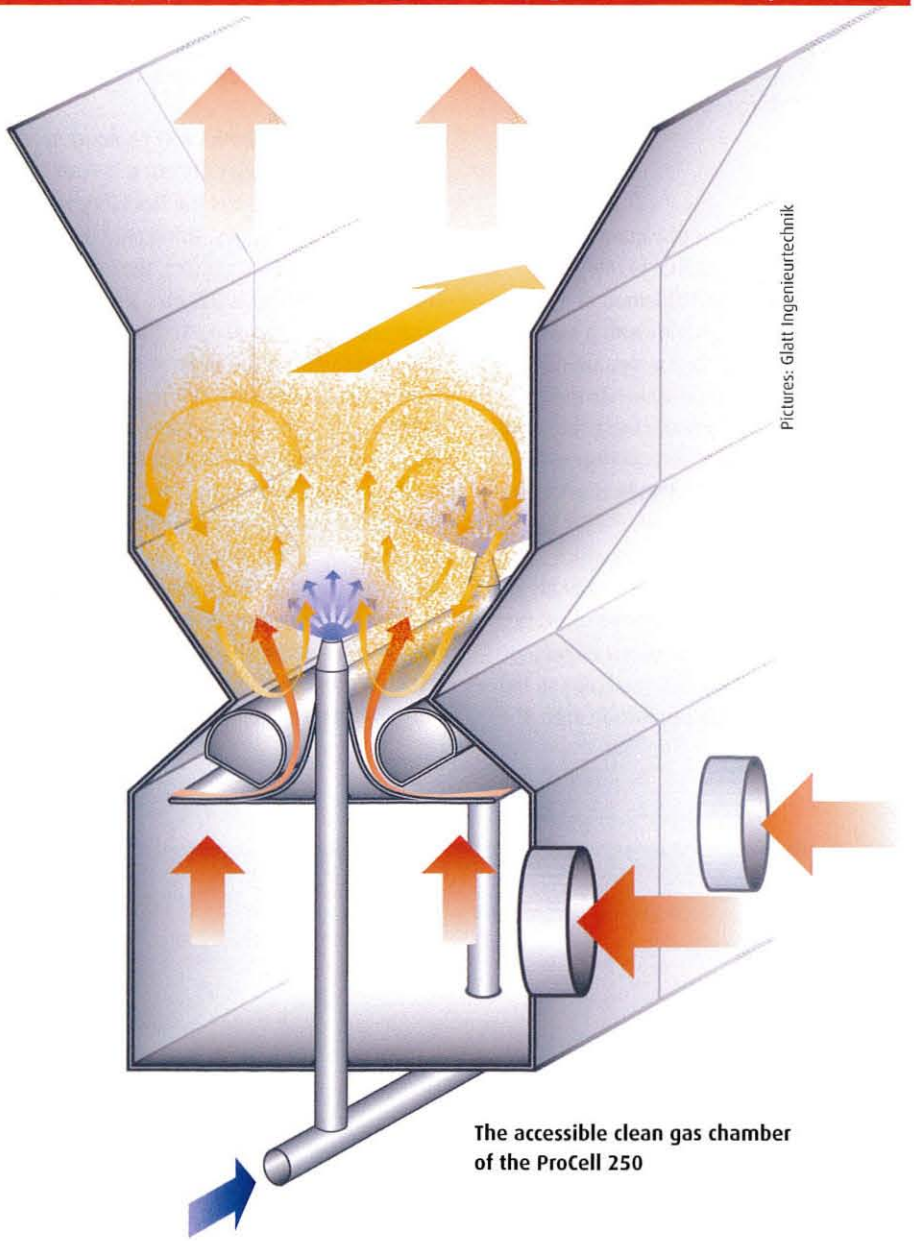
# Full Flexibility with Spouted Bed

## Glatt's ProCell continuous spouted-bed equipment makes high-quality granulates and pellets

At the end of 2009, one of the world's largest spouted-bed granulation systems started up at Dresden-based contract manufacturer IPC. The company's new ProCell 250 from Glatt Ingenieurtechnik provides unprecedented flexibility for agglomeration and spray granulation processes.



Pictures: Glatt Ingenieurtechnik

**The accessible clean gas chamber of the ProCell 250**

Glatt Ingenieurtechnik is one of the leading suppliers of systems for continuous manufacturing of granulates and pellets using fluid-bed and spouted-bed technologies. Depending on customers' requirements, Glatt supplies either just the main granulation equipment or complete plants, including buildings. For this project Glatt delivered not just the know-how and equipment, but also the entire building complex stretching over four floors.

The ProCell 250 spouted-bed system itself (see Box) stretches over three levels. On level 1 are the inlet air chambers and process chamber. Level 2 houses the expansion chamber and filter housing, while level 3 gives access to the clean gas chamber.

Solid raw materials, such as powders for agglomeration, are brought directly from the warehouse to level 1 of the plant. There, a combined discharge station for big bags and paper sacks discharges the product into dedicated containers on level 0. The containers are then carried up to level 3 by elevator, and discharged via a docking station into a gravimetric feeder.

Liquids are brought from the warehouse to level 0 and transferred to a spray tank that can also be heated. From this tank, liquids are sprayed directly into the ProCell 250 to form granulates.

The resulting granules leave the process chamber on level 1 and fall under gravity to level 0. There they are cooled if necessary in a helical vibration conveyor. The granules are then pneumatically conveyed to a screen on level 2; oversize particles are milled and pneumatically conveyed back to the ProCell 250 process chamber, together with the undersize material. Granules of the correct size, meanwhile, fall into a product silo on level 1 and thence to a big bag filling station on level 0.

For a contract manufacturing plant flexibility and ease of cleaning are of great importance. Manufacturing and technical areas are strictly separated to protect the technical area against contamination with product. Only the manufacturing area needs to be cleaned.

All the equipment is selected for easy cleaning, for example star feeders with quick-change stars, and easily removable pneumatic conveyor pipes. The liquid pumps and the manifold for the spray nozzles are installed on trolleys that can be moved to the washing room. The ProCell 250 is equipped with a washing in place (WIP) system. The spray nozzles can remain in the plant during washing. The internal bag filter is washed by cleaning nozzles, and further cleaning nozzles are also installed in the clean gas chamber.

Contact Glatt Ingenieurtechnik: Phone +49 (0) 36 43 / 47 - 0

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AT A GLANCE

## Advantages of the Spouted Bed

In contrast to fluid-bed technology, in a spouted bed the process gas enters the process chamber through two slots rather than across the whole cross-section of the chamber. As a result, a powerful jet of gas emerges in the center of the process chamber. In principle, any process that is possible in a fluidized bed can also be carried out in a spouted bed. However, the ProCell spouted-bed technology offers additional advantages. The high gas velocity in the jet allows the unit to handle heavy particles, yet an increase in cross-section towards the top of the process chamber ensures that even very fine particles remain within the unit. The special geometry of the process chamber also concentrates the product around the spray nozzles, allowing uniform coating using only 50 percent of the liquid quantity required in fluid-bed systems. For continuous processes, this also means a 50 percent reduction in residence time. Glatt owns the patent for the integration of spray nozzles in spouted-bed systems, as used in ProCell units.

The ProCell 250 can also be equipped with a bottom screen and operated as a fluid-bed system, demonstrating its tremendous process flexibility. The spray system is designed to handle molten materials, with an integral heating system, as well as aqueous solutions and suspensions. The unit can also be used for agglomeration and coating, thanks to simultaneous solids metering and liquid spraying. Process gas temperatures from 15 °C to 200 °C, at a wide range of flowrates, further widen the plant's areas of application.

For handling products carrying a risk of dust explosions, the ProCell 250 is equipped with an explosion suppression system.

### An Evolving Partnership

IPC—International Process Center—offers certified contract manufacturing of finished products for the food, animal feed and fine chemicals industries. Advanced fluid-bed processes with a focus on granulation and coating are the main techniques used at the Dresden site.

The production system based around the ProCell 250 is now the sixth plant on the site. The company's relationship with the Glatt group dates back to 2005, when IPC first extended its original batch-type fluid-bed system. On this occasion Glatt Ingenieurtechnik was responsible for planning and installing the process equipment and building, while Glatt Process Technologie from Binzen/Germany, the parent company of the Glatt Group, delivered a fluid-bed GPCG 300 Glatt Particle Coater Granulator.

The GPCG 300 was subsequently equipped with a larger filter, allowing it to be operated at higher gas velocities while also extending the service time between cleaning operations. As a result, this plant has the highest capacity of the five batch-type fluid-bed systems at the Dresden site. Three different process inserts allow different processes: fluid-bed agglomeration with top spray nozzles, coating with the 32" Wurster, and coating with the 46" Wurster.

In 2007, a ProCell 70 process insert was added to the GPCG 300 and the system extended by adding a screening-milling cycle. This allowed IPC for the first time to offer the direct manufacturing of granules from liquid using only spray granulation. The ProCell systems have brought IPC the latest process technology in the form of Glatt's innovative spouted-bed equipment. **KEM**

**ProCell 250 inlet air chambers and process chamber**