

## **PRODUCT TECHNOLOGY HIGHLIGHT: New Generation of Inverting Filter Centrifuges**

Inverting filter centrifuges are virtually continuous, fully automated filtering centrifuges with horizontally mounted bowls. The main characteristic is the discharge process, which is guaranteed to leave no residual heel. The filter cloth is pulled from the bowl while rotating and is thus inverted inside out. The isolated solids are discharged completely from the bowl and channeled directly to the downstream aggregates or containers. Due to its operating principle, no residue remains inside the bowl, product yield is maximized, and the quality of the discharge solids remains constant even over longer product runs. Therefore, the centrifuge can be operated hermetically sealed for the entire length of a product run.

### **Then and Now**

The inverting filter centrifuge was developed during the early '70s. Its second generation, launched in the early '90s, was characterized by modern drive and automation technology as well as improved GMP design. The introduction of the PAC system for pressure-added centrifugation and centrifuge drying increased the centrifuge's range of application and established it in the special and fine chemicals industries. More than half of all inverting filter centrifuges delivered today are equipped with the PAC system. A third generation centrifuge, introduced in June, presents a new design with increased performance, ease of operation, and safety for operators and product.

### **The Third Generation**

The equivalent filtering surface area  $\propto$  the product of maximum centrifugal acceleration and filtering surface area is a characteristic measure for the throughput of a filtering centrifuge. The new generation of inverting filter centrifuges features double the equivalent filtering surface area. As a result, this shortens the necessary spin times for most separation tasks.

They also feature optimized dynamics: the drives are designed to accelerate and brake the drum in the shortest possible time, thus minimizing dead time, e.g. for emptying the centrifuge. The kinetic energy of the bowl is fed back into the grid during braking.

Of course, the third generation of the inverting filter centrifuge also offers pressurized centrifugation and the option of centrifuge drying. The PAC feed pipe has been simplified and provided with new modules for CIP cleaning, process observation, and sampling of solids from the bowl. It has been designed to avoid condensation when feeding cold liquids and overflow of the bowl. Other improvements include the reduction of parts from 113 to 30 and an innovative, economic, and easily replaced bowl seal.

### **More Advantages**



The new inverting filter centrifuge (the F-Series) requires 30 percent less space than its predecessor due to its shortened, almost square footprint. This allows it to be integrated easily into existing installations. In new plants, the compact design enables the user to economize on building and cleanroom expenses.

A flexible membrane for cleanroom design is already integrated into the machine housing, eliminating the time-consuming installation and adaptation of the cleanroom membrane onsite. A further advantage of this feature is that the machine housing is isolated from possible out-of-balance vibration and media. All flexible hosing and piping, as well as the inertisation unit and the CIP station, are already mounted under the machine cover at the manufacturer's site, thus shortening setup and avoiding installation errors. The controls of the new inverting filter centrifuge are located in an explosion-proof control cabinet integrated into the machine frame. The error-prone wiring between centrifuge and control cabinet is therefore reduced to connecting a single bus cable.

Pre-installed piping and cabling of the new inverting filter centrifuge are mostly hidden under the machine covers, giving the machine a clean and tidy appearance. Also, the machine housing has swiveling double doors on both sides, granting easy access, and sight glasses in the filtrates housing allow viewing of the process area.

### **Attention to Detail**

The inverting filter centrifuge's inherently closed mode of operation keeps operators and product protected, and a new non-contact seal between the filtrate and solids area prevents leakage. The radii of all housing parts in contact with product were considerably increased. This ensures removal of any remaining product with the easily inspected and threadlessly mounted rotation spray nozzles.

A lot of attention was paid to the core of the inverting filter centrifuge &#151; the filter cloth, its support, and mounting. The new filter cloths with drainage layer can be placed directly into the bowl, and the potentially hard-to-clean support screen for the filter cloth has been eliminated.

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