

# Field Report



## A Feature Comparison of the Filtertech Model Supramatic (ACF), Ultramatic (ASF) and Simplimatic (ASP) Automatic Centrifuges With Various Competitive Models

When considering a centrifuge for the clarification of your process stream, Filtertech offers this comparative analysis which outlines the major differences between our complete line of fully automatic centrifuges and other units available on the market today.

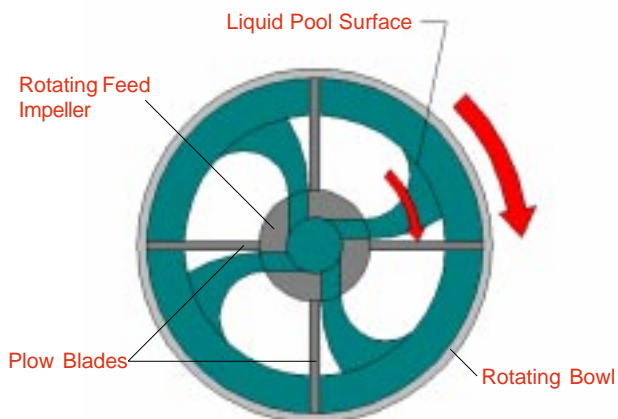
### SEPARATION EFFICIENCY

When evaluating centrifuge design its important to understand the principle of operation and what needs to be accomplished. A centrifuge is a device which magnifies the forces of gravity in a gravity separation (settling) process. So it is important to note that what improves gravity separation also improves centrifugal separation. The primary objective is to minimize turbulence in a settling tank to allow even the finest particulates to settle. The same is true with the centrifuge therefore, by reducing turbulence in the centrifuge bowl, the separation efficiency increases. The other principles which improve separation efficiency is the gravitation (G) force which is seen by the liquid and the amount of time the liquid is allowed to settle which in the case of a centrifuge is the residence time in the bowl. Below are some of the unique and patented features which take advantage of these principles and increase separation efficiency.

**Rotating Feed Impeller** - The top feed design for the **Supramatic** and **Ultramatic** models allow the rotating feed impeller to synchronize the incoming liquids rotational speed to match that of the centrifuge bowl. From the frame of reference of the liquid in the centrifuge bowl, by matching the rotational speed, the liquid entering the pool drops straight into the bowl thus minimizing turbulence and increases separation efficiency (see figure 1.) Other competitive units do not offer this feature and the result is that the liquid enters the pool with increased turbulence which reduces separation efficiency.

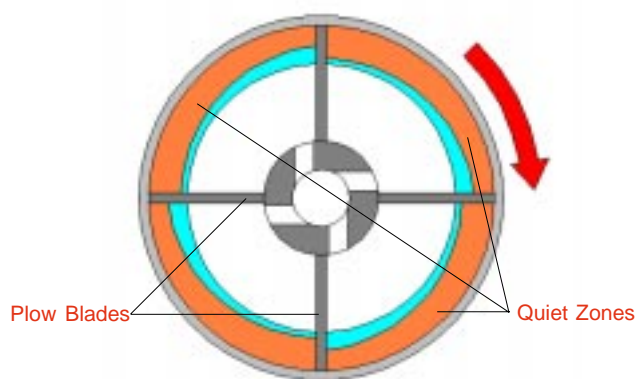
**Increased Quiet Zones** - To improve separation efficiency, the

Figure 1



**Supramatic** model centrifuge utilizes a unique **four blade** plow design which establishes four smaller quiet zones as compared to two blade design of some competitive models. By creating smaller quiet zones you shorten the distance traveled by particles between impeller blades to achieve a uniform distribution and reduce axial liquid slippage thus minimizing turbulence (see Fig 2).

Figure 2



**Patented Centri-Lock Plow Clutch** - To further minimize turbulence in the rotating bowl, **all models** have a patented clutch mechanism which automatically locks the plow blades at the same rotational speed as the bowl. Since the plow blades are typically submerged in the liquid pool, any movement of the blades in relation to the bowl would cause turbulence to be created. Competitive units do not lock their scraping mechanism to the rotational speed of the bowl but instead rely on the drag caused by the liquid in the bowl to rotate the scraping mechanism which is the equivalent of dragging a large paddle through a settling tank and stirring up the settled solids. This effect greatly reduces the separation efficiency of such units.

**Bowl Diameter, Rotational Speed and Retention** - To achieve the maximum gravitational forces to act on the process liquid, the rotational speed and bowl diameter need to be as large as possible since centrifugal force ( $G_{force}$ ) is calculated as follows.

$$G_{force} = D \times RPM^2$$

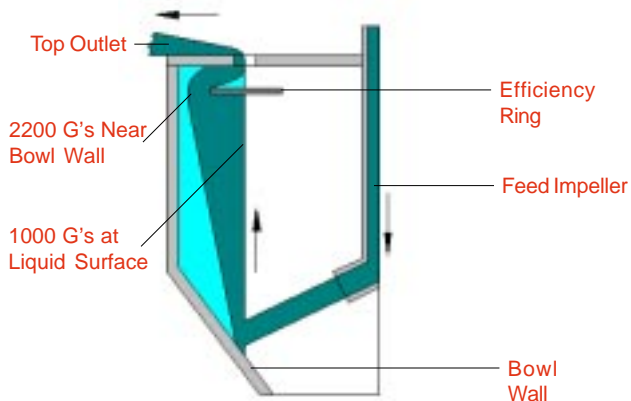
Where: D = Bowl Diameter  
RPM = Rotational Speed

In addition to the G-forces generated by the centrifuge, the residence time also plays an important role in achieving maximum separation efficiency. By maximizing the bowl volume you increase the bowl volume and thereby the retention time in the bowl, which is the amount of time the solution is exposed to the high G-forces.

**All Filtertech model** centrifuges combine both the highest G-force generation along with the longest retention time to give the most efficient centrifuge on the market today. Competitive units have lower G-force generation and retention time in comparison

**Efficiency Ring** - To remove even the smallest particulates, **All Filtertech automatic centrifuge models** utilize an efficiency ring which forces the liquid to travel past the outer most diameter of the rotation bowl where the gravitational (G) forces are the greatest and the maximum separation efficiency occurs. This acts as a polish in which the finest particulates are removed just prior to exiting the bowl (see figure 3). Competitive models do not incorporate this feature and therefore do not realize the benefit of a final polish.

**Figure 3**



## SUPERIOR DESIGN AND CONSTRUCTION

In addition to separation efficiency the overall design and construction of the centrifuge is important as well. Important construction features included ruggedness of design, ease of cleaning, frequency of maintenance and overall automation of the unit.

**Plow Blade Construction** - The **Supramatic** model incorporates a rugged 4-blade plow construction to provide removal of the densest solids cake. To assure easy release of the sludge from the plow blades, a Teflon® coating is applied. This reduces significantly the hang up of sludge on the plow blades which can cause out-of-balance operation and subsequent ramp down for recleaning. Competitive centrifuges do not incorporate an **active** 4 plow blade design as well as the Teflon® coating on the blades which results in more frequent cleaning cycles due to poor cleaning of the bowl.

**Nu-Tride® Plow Blades** - To maximize wear and corrosion resistance, all models incorporate a Nu-Tride® surface treatment on the plow blades.

**Patented "LSD Smart Machine Technology"** - This patented technology for models **Supramatic and Ultramatic** signals the machine when it's holding capacity has been reached and cleaning is required. This insures that cleaning will take place only when required and not when the bowl is half empty or over full. Competitive models only clean on a time cycle which may result in premature cleaning cycles or delayed cleaning which can result in the bypass of dirty liquid through the centrifuge.

**Gear Driven Plow Cleaning System** - This system provides for all models the highest amount of torque (up to 12,000 inch-pounds of torque) during the cleaning cycle to prevent damage of the plow blade assembly and is able to remove the most tightly packed sludges from the bowl and eliminating the need for additional cleaning cycles. This system design utilizes both a drive motor for bowl rotation and a second motor for driving the plow blade when clean-

ing the bowl. By using a two motor design we have been able to select the drive with the best torque and operating characteristics. Some competitive units utilize a single drive design with a commonly available variable frequency drive. While the concept of a single drive sounds good on paper, in actual operation the single drive does not have the necessary torque and operation ranges that can be achieved with the two motor design.

**Quickly Removable Rotating Assembly** - For ease of maintenance, **all Filtertech models** incorporate a rotating assembly which is quickly removable for inspection or maintenance. The labyrinth seal design and positive pressure design prevents liquid and mist from entering the bearing housing thus providing for longer life and less maintenance.

**Patented Tangent Plow Blade Assembly** - Featured in the **Ultramatic** model design, the patented Tangent Plow Blade Assembly improves separation efficiency and reduces cleaning time.

**Computer Balanced Rotating Bowl Assemblies** - **All Filtertech models** include a computer balanced rotating bowl and plow blade assembly to within a 1/10 of a gram. This reduces the load on the bearing thus providing for longer bearing life while competitive models do not computer balance their rotating bowls. In addition the centrifuge also incorporates a longer spindle length as compared to other competitive units. This too reduces wear on the bearings.

**Rugged Heavy-Duty Construction** - **All Filtertech centrifuges** incorporate a Heavy-Duty monocoque frame design for long life and superior operating stability at even the highest RPM speeds. In addition they are available as an option in stainless steel construction

**Quick Connect Control Panel Wiring** - The Filtertech centrifuges incorporate a quick connect design in which you simply bring power into the control panel and plug the wiring harness from the centrifuge into the control panel and you are ready for operation.

**PLC Driven Control Panel With Touchscreen Interface** - For control and operation of the centrifuge, the **Supramatic and Ultramatic** models incorporate a PLC driven control panel and a touchscreen interface. In addition, copyright protected software which includes password protection, onscreen diagnostics

**Hanging Design on Simplamatic Model (Patent Pending)** - This model incorporates a unique hanging design in which the centrifuge is mounted to support frame above the bowl. This design provides additional stability and less vibration due to a lower center of gravity as well as ease of maintenance with the bearing housing easily accessible.

**Summary** - Filtertech offers 4 series of centrifuges, 3 automatic and 1 manual with **7 different models** to meet your specific requirements relative to flowrate and solids removal. In addition, specially designed reservoir tanks with any model centrifuge provide a unique system approach. For more information, request product bulletins FT220B Supramatic, FT229A Ultramatic and FT224 Manual/Simplamatic.

## **FILTERTECH**

Main Office/Factory  
Fairgrounds Drive, Manlius, NY 13104  
TEL: 315-682-8815; FAX: 315-682-8825  
Web Site: [www.filtertech.com](http://www.filtertech.com)  
e-mail: [info@filtertech.com](mailto:info@filtertech.com)

West Region Office  
6202 South Maple Ave. Suite 127, Tempe, AZ 85283  
TEL: 480-775-1111; FAX 480-775-0604