

## WARRANTY

Steadfast Equipment warrants this product to be free from defects in material and workmanship for a period of thirty (30) days from the date of purchase from Steadfast Equipment or its authorized distributors. This warranty assumes that the product has been properly installed and operated under normal conditions of use. This warranty does not cover damages due to acts of God, misuse, abuse, negligence or modification of the product or damage due to improper operation or attempted repair by other than Steadfast Equipment or one of its representatives. In order to make a claim under this warranty the buyer must notify Steadfast Equipment during this period. Buyer is responsible for freight charges both to and from Steadfast Equipment in all cases. Contact Steadfast Equipment for instructions before returning any merchandise.

STEADFAST EQUIPMENT WILL NOT BE RESPONSIBLE OR LIABLE FOR INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, however arising, including, but not limited to, those for use of any products, loss of time, inconvenience, lost profit, labor charges, of other incidental or consequential damages with respect to persons, business, or property resulting from the use of this product, breach of warranty, negligence or otherwise.

THE CUSTOMER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF STEADFAST EQUIPMENT PRODUCTS FOR THE CUSTOMER'S USE, OR FOR INCORPORATING THEM INTO OBJECTS, PROCESSES, OR APPLICATIONS WHICH THE CUSTOMER DESIGNS, ASSEMBLES, CONSTRUCTS, MANUFACTURES, OR PERFORMS.

## TECHNICAL ASSISTANCE

If you have any questions about the operation, use, or performance of this product contact Steadfast Equipment or its authorized representative.

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**Steadfast Equipment**

*"Creativity is our Cornerstone"*

## Disposable Rotary Drum Filter Operations and Maintenance Manual



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Protected under US patent 6,336,561

## SAFETY PRECAUTIONS

### **DANGER**

Do not operate motor in an atmosphere containing explosive or flammable gases or liquids. Do not pressurize filter.

### **WARNING**

To avoid risk of electrocution do not expose motor to conditions where it could come in contact with water or other liquids

### **CAUTION**

Surfaces of motor may become very hot during operation. Do not touch these surfaces until motor has been turned off and allowed to cool

### **WARNING : PRODUCT USE LIMITATION**

This product has been designed for and is limited to LABORATORY USE ONLY. The user is responsible for determining the chemical compatibility of our devices in their applications.

### **WARNING : PRODUCT USE LIMITATION**

The user is responsible for determining the applicability of this product for their use. The customer's use of this equipment is outside the control of Steadfast Equipment, and thus Steadfast Equipment is not responsible or liable for any damages that occur as a result of the use of this product. Because of this filter's disposable nature, and the wide variety of potentially hazardous materials that it may be exposed to, Steadfast Equipment cannot accept returns of used or opened units. Steadfast Equipment's warranty on defective equipment is outlined in the Operations and Maintenance Manual

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## SPECIFICATIONS

### FILTER ASSEMBLY:

#### Materials of Construction:

Filter Housing and Rotating Inner Drum: Polycarbonate or Polypropylene

Filtration Media: Ultra High Molecular Weight Polyethylene, Porous plastic

Vacuum Seal: Carboxylated Nitrile

O-rings: Buna-N

The user is responsible for determining the chemical compatibility of our devices in their applications.

### DRIVE MOTOR ASSEMBLY, 4002:

#### Materials of Construction:

Support Stand: Aluminum / Polycarbonate/ABS

Quick Release Pins: Stainless steel

#### Power:

110 V, 60 Hz, 1 phase

Note: In locations outside the US, power requirements may not be those noted above. In these cases, users should consult the motor and controller specifications included with the product.

Motor and controller specifications are found in their manuals accompanying this product.

**PROBLEM**

Processing / Filtrate Flow rate Drops off, increasing vacuum, and decreasing overflow does not help

**CAUSE AND SOLUTION**

Clean solids off Rotating Inner Drum. This is done by shutting off vacuum to the device while allowing the rotation and feed flow to continue. You must monitor the overflow rate and level in the bottom of the housing when this is done to keep from exceeding the Level Control Overflow capacity. After 4 to 10 rotations in this way the cake should have washed off the Rotating Inner Drum, and vacuum can be reestablished. This solves low flow conditions that occur due to blinding of the filter media.

Processing / Filtrate Flow rate Drops off, above three solutions did not work

Filter media may be plugged. The filter media supplied with the device may not be suitable for your application. Contact Steadfast Equipment for further details.

White Marks on filter housing

These marks sometimes occur as a result of the fabrication, they have no adverse effects to the device's operation.

Air / Vacuum Leaks at sides of Drum

Bypassing around the end of the filter media can occur in some applications. This may produce a vacuum leak sound and cloudy filtrate. The area where this is occurring can be seen as a "hole" in the cake built up on the drum. To solve, this "hole" must be filled with solids. To do so, stop the drum rotation momentarily by switching the drive motor to the "off" position for 5 to 10 seconds while the "hole" is submerged. Repeat until "hole" is plugged. Remember not to leave the drive motor in the "off" position too long so that the cake on the submerged section of the drum gets so thick that it prevents it from turning when it is switched back "on."

For further information contact Steadfast Equipment:  
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206-409-7594 (USA)

**PARTS LIST**

**FILTER ASSEMBLY:**

RDF Assembly – 1ea, Device Volume - 0.22 L

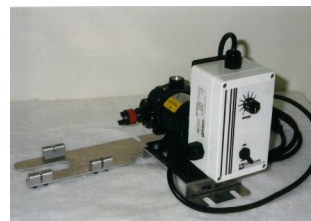


1008 Drive Shaft/Coupler – 1ea

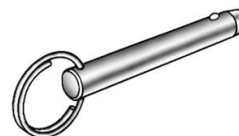


**DRIVE MOTOR ASSEMBLY, 4002:**

- 1012 Drive Motor & Controller - 1 ea
- 1014 Support Stand – 1ea
- 1013 Spider Coupling – 1ea
- 1018 1/8" Hex Key – 1 ea



1015 Quick Release Pins – 2 ea



## INSTALLATION AND SETUP

By opening and operating this device the users signifies their agreement with the terms in the Warranty for this product

### CAUTION

If this filter is intended to be used in a "clean" manner, the user must take the appropriate precautions to insure the installation and connections to the device are made in a way to accommodate the application at hand

### CAUTION

Read all instructions before proceeding

### WARNING : PRODUCT USE LIMITATION

The Disposable Rotary Drum Filter is a single use device, and is designed to operate in most cases for a total of 8 hours. Because of the wide range of applications that this product may be used in, this device may fail to operate satisfactorily before this 8-hour timeframe has expired. It is the user's, not Steadfast Equipment's, responsibility to determine the suitability of this device for your specific application

1. Place Drive Motor Assembly on a secure surface with filter end hanging over the edge as shown in Figure 1.
2. Insure that spider coupling on drive shaft of motor is oriented as far right as possible, as shown in Figure 2. If this is not the case loosen the set screw on the spider coupling and move it as far as possible to the right.



Figure 1

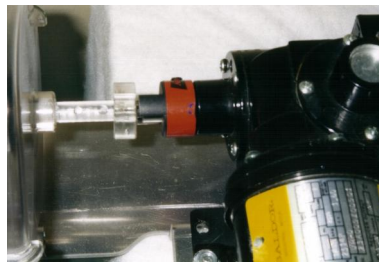


Figure 2

## TROUBLESHOOTING

All cake filtration applications in which the Disposable Rotary Drum Filter can be used will have their own unique operational parameters. With that in mind, the following list is given only as guidelines on how to solve some of the operational problems that may be experienced.

### PROBLEM

Solids accumulation in bottom of filter housing

### CAUSE AND SOLUTION

Increase inlet feed rate. A diverter is located inside the Feed Inlet that produces agitation in the bottom of this device to insure that the slurry solids stay in suspension. Increasing the feed inlet flow rate increases the velocity at this point increasing the agitation and minimizing solids accumulation. Note that this increase in feed rate will produce an associated increase in overflow rate.

Low liquid level in filter housing

Increase feed rate. Some amount of overflow must always be present in the Level Control Overflow to insure proper operation of the device.

No accumulation of solids on the Rotating Inner Drum, or poor cake formation on Rotating Inner Drum

Insure that vacuum is being pulled on the device via the Filtrate Discharge, and that this vacuum is at least 5 in.Hg and a flow rate of at least 4 ACFM. This amount of vacuum may not be sufficient for all applications. Requirements may range between 4 to 8 ACFM for some applications depending on the properties of the slurry being filtered. Higher vacuum will increase your ability to form an acceptable cake on the Rotating Inner Drum.

Jerky Rotating Inner Drum operation

In some applications jerky operation of the Rotating Inner Drum can occur at higher vacuums. This is due to compression of the vacuum seal on the device. This is common. The device should be operated at a vacuum level of between 5 in.Hg and 17 in.Hg. Lowering the operating vacuum can alleviate this.

Processing / Filtrate Flow rate Drops off

Increase vacuum to the device.

Processing / Filtrate Flow rate Drops off, increasing vacuum cannot be done or does not help

Lower overflow rate. Less agitation in the lower housing of the device will allow more solids to accumulate on the drum and increase the filtration rate. When decreasing the overflow rate by decreasing the slurry flow, make sure that this flow is not so low that solids accumulate significantly in the lower housing.

4. Start rotation of Rotating Inner Drum by switching controller to the ON position and turning the speed controller dial to about the 2 position. Manually measure the resulting rotation rate of the Rotating Inner Drum, and adjust the speed controller dial until this rate is between 2 revolutions/min. and 4 revolutions/min.
5. Initiate vacuum on the device via the Filtrate Outlet. This vacuum level should be between 5 in.Hg and 17 in.Hg throughout the subsequent operation of this device. Note: Normally 4 ACFM air flow rate is required for this device. These requirements may range between 4 ACFM to 8 ACFM for some applications depending on the properties of the slurry being filtered.
6. When vacuum is started the slurry level in the bottom of the filter housing may decrease and the overflow flow slow down or stop. If this occurs the feed rate to the device must be increased. In order to insure that the device has the proper liquid level, some amount of flow must always be present in the Level Control Overflow.
7. Solids should now start accumulating on the outer surface of the Rotating Inner Drum. Full coverage of the drum is attained when enough solids have accumulated that they start to come in contact with the Scraper Blade and start falling out of the device via the Cake Discharge chute. Filtrate rates during this initial filter covering may be very high and the level in the Filtrate Receiver must be monitored closely.
8. Soon after steady removal of solids via the Cake Discharge chute is established, the filter's operation should stabilize. This can take from 1 minute to 10 minutes to occur.
9. The thinner the layer of cake removed during rotation, the dryer this cake will be. If a thick cake is being removed, increase the rotation rate of the Rotating Inner Drum by increasing the setting on the speed controller dial.
10. Your Disposable Rotary Drum Filter is now in steady state operation, and should operate in this manner for up to 8 hours. Continue to monitor this operation and observe any changes that occur. Solutions to common problems that may be experienced during this steady state operation, and their solutions can be found in the TROUBLESHOOTING section of this manual.
11. When the slurry feed vessel/container is empty and filtration is complete continue to operate the filter until as much liquid as possible is removed from the lower housing of the filter. Then stop the vacuum, drum rotation, and feed pump.
12. Disconnect Filter Assembly from the motor by loosening set screw on spider coupling and sliding it to the far right in the reverse manner that you did to couple the motor to the filter originally.
13. Disconnect tubing connections from the filter and any connections made to the Cake Discharge chute.
14. Remove Quick Release Pins that are holding the filter to the Drive Motor Assembly.
15. Dispose of filter properly. Dispose of waste filters only in accordance with local regulations and taking properly into account the nature of any residues inside the casing.

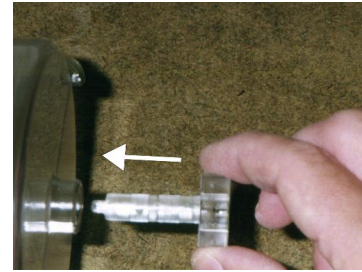


Figure 3



Figure 4

3. Insert Drive Shaft/Coupler into RDF Assembly, and turn it until it engages, Figure 3.
4. Insert front end (cake discharge chute end) of the Filter Assembly into the two supports on the Support Stand, Figure 4.
5. Tilt Filter Assembly backwards into the single support on the back of the Support Stand, Figure 5. Make sure the holes in the Filter Assembly line up with the holes in the supports. If they do not, repeat steps 4 and 5 until this alignment occurs.
6. Insert one Quick Release Pin in the rear support making sure that it is inserted all the way. Repeat for one of the two supports on the front of the Filter Assembly (Figure 6). Note: One of the supports in the front of the filter assembly does not require a Quick Release Pin inserted through it, this is normal.
7. Connect the spider coupling to Drive Shaft/Coupler by sliding the spider coupling to the left to engage it to the Drive Shaft/Coupler. The filter drum may have to be manually rotated so that the spider coupling and Drive Shaft/Coupler can mate properly. Once this is done secure spider coupling by tightening setscrew as shown in Figure 7 using the Hex Key supplied.
8. The Disposable Rotary Drum Filter is now ready to be attached to your process and operated.

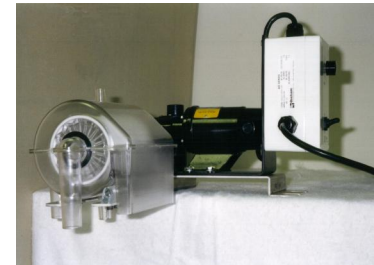


Figure 5

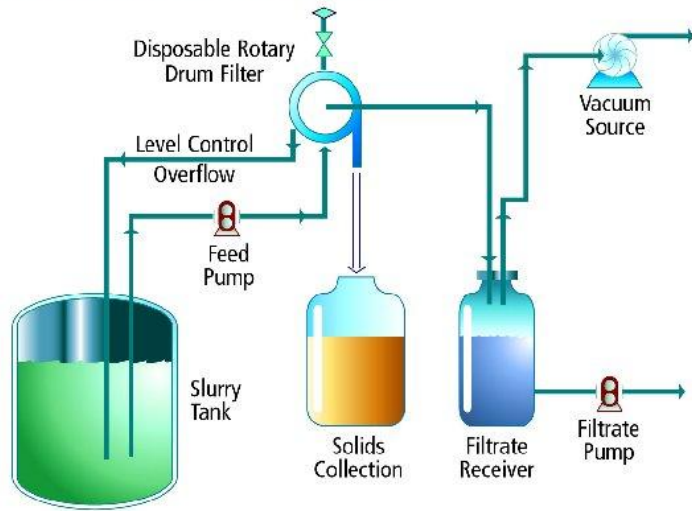


Figure 6



Figure 7

## Operational Flowsheet



The above flow sheet shows how your Disposable Rotary Drum Filter fits into a typical cake filtration application. Only the Disposable Rotary Drum Filter Assembly and Drive Motor Assembly are supplied by Steadfast Equipment, the other tanks, containers, pumps, piping, and tubing are to be supplied by the user. If assistance is needed in acquiring these other components contact Steadfast Equipment.

NOTE: The Slurry or Feed Tank must be located physically lower than the filter assembly if the above configuration is used.

### CAUTION

If this filter is intended to be used in a "clean" manner, the user must take the appropriate precautions to insure the installation and connections to the device are made in a way to accommodate the application at hand

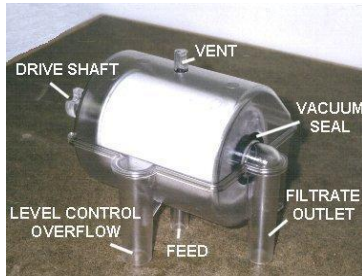


Figure 8

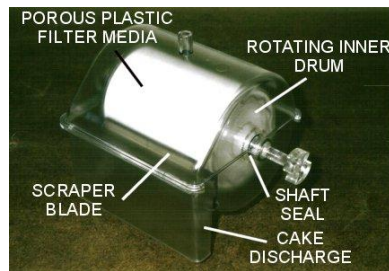


Figure 9

1. Figures 8 and 9 show the connection points to the Disposable Rotary Drum Filter.
2. Do not expose the Filtrate Outlet to vacuum until instructed to in the OPERATION section of this documentation.

3. Make tubing connections to the Filter Assembly after it has been installed and coupled to the Drive Motor Assembly using the following sizes:
  - Feed to slurry supply using standard 5/8" ID tubing (or flexible 1/2" ID tubing).
  - Level Control Overflow back to the Feed or Slurry Tank, 1" ID tubing.
  - Filtrate Outlet to the vacuum source via filtrate receiver, 1" tubing (this tubing must be able to withstand full vacuum).
4. If "treated" air or gas is required inside this device, an air filter or other connection can be made to the Vent connection.

### WARNING

The Filter Assembly is NOT designed to be operated under pressure. If a gas connection is made to the Vent port, the user must insure that the Filter Assembly housing is not exposed to pressure. Pressurizing of the Filter Assembly housing could lead to its failure and injury to operating personnel

5. Connect Cake Discharge chute to Solids Connection container or locate this chute over such a container. Your system is now ready to begin the cake filtration operation.

## OPERATION

After the installation of your Disposable Rotary Drum Filter is completed and the process connections made as outlined above, you are ready to start your filtering operation.

### DANGER

Do not operate motor in an atmosphere containing explosive or flammable gases or liquids

### WARNING

To avoid risk of electrocution do not expose motor to conditions were it could come in contact with water or other liquids

### CAUTION

Do not exceed the overflow capacity of the Level Control Overflow. Typically the maximum overflow rate is about 3 liters/min. Exceeding the capacity of the Level Control Overflow could result in liquid flowing over the Scraper Blade and flowing out the Cake Discharge chute.

### CAUTION

Observe all connections to Filter Assembly during startup and subsequent operation to detect leaks. Fix leaks immediately when found

1. Insure that Drive Motor Controller is in the OFF position and the speed dial is turned counter-clockwise as far as it can go. With this done, plug Drive Motor Assembly into the appropriate power source.
2. Insure that the Filtrate Outlet is not yet exposed to vacuum.
3. Initiate slurry feed to device and allow it to establish an overflow back to the feed/slurry tank. In most cases this initial flow rate should be about 1.5 liter/min. to 3 liter/min.