

**The Komline-Sanderson
Rotary Drum Vacuum Filter
for process filtration, wastewater
clarification and sludge dewatering.**



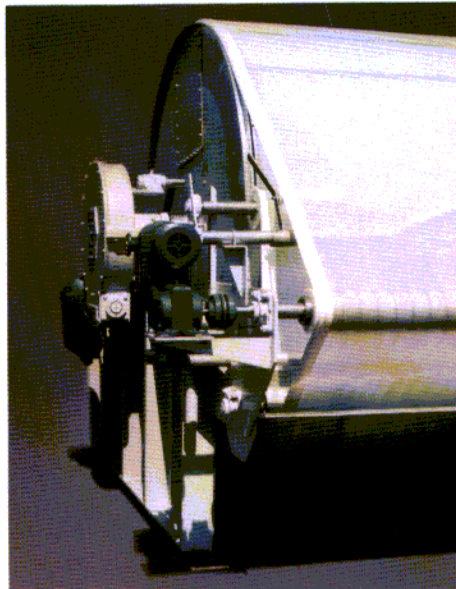
Komline-Sanderson

The Komline-Sanderson Rotary Drum Vacuum Filter.

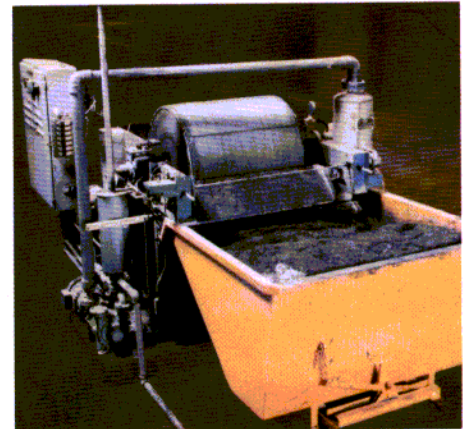
RDVF.

Komline-Sanderson Rotary Drum Vacuum Filters are used extensively in the processing of chemicals, pharmaceuticals, cosmetics, foods, minerals and in wastewater treatment and sludge dewatering for industry and municipalities. *RDVFs* are extremely versatile and provide reliable, continuous liquid/solid separation with minimum operator attention and low maintenance.

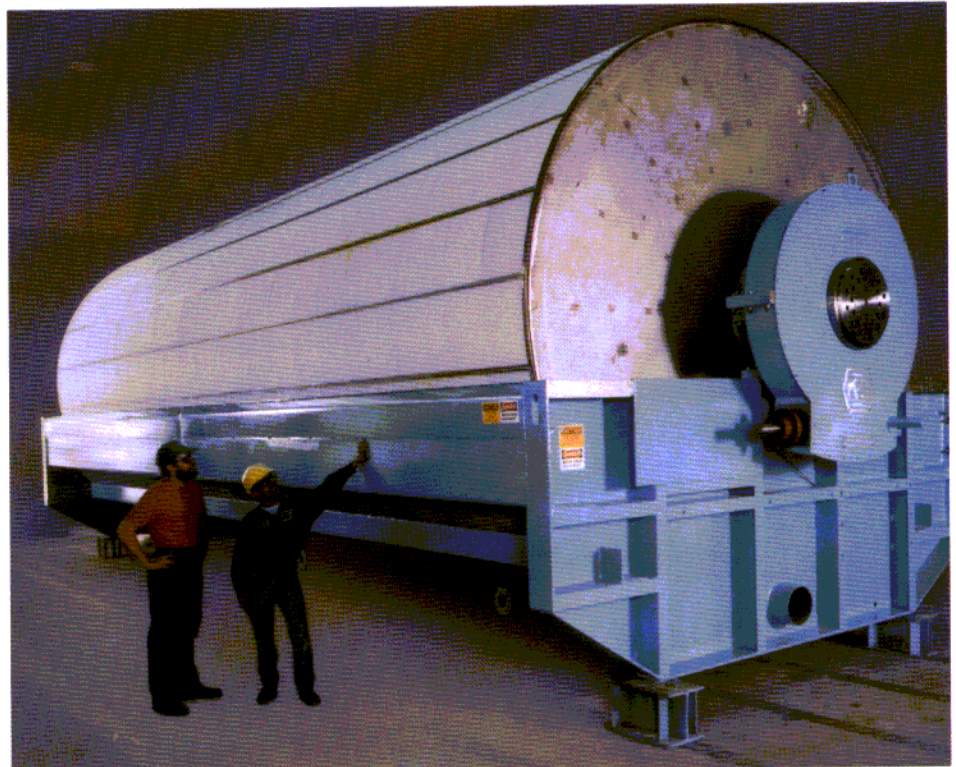
Each *KS-RDVF* filter is specifically designed to handle slurries that produce variations in cake thickness, moisture content and stickiness. The *RDVF* readily adapts to changes in feed rate and solids concentration and, at the same time, provides superior performance and high production rates.



Flexibelt® Discharge



Packaged Unit



1526 Sq. Ft. RDVF

When to use a *RDVF*.

- For *general filtration* where high rates, low cake moisture and clear filtrate are required.
- For *clarification*, where filtrates free from suspended solids are desired, with low filter aid usage.
- For *cake washing*, to yield high-purity filter cake using minimum wash liquor.
- For *extraction* with high product recovery using minimum wash liquor.
- For *wastewater clarification* to reduce or eliminate costly surcharges or the impact on downstream processes.
- For *sludge dewatering*, to reduce sludge volume by 95% or more, lowering handling and disposal costs.

Factors that affect *RDVF* rates.

- Particle size, shape and concentration.
- Vacuum levels and the cycle time in the cake formation, washing and drying zones.
- The temperature and viscosity of the suspension.

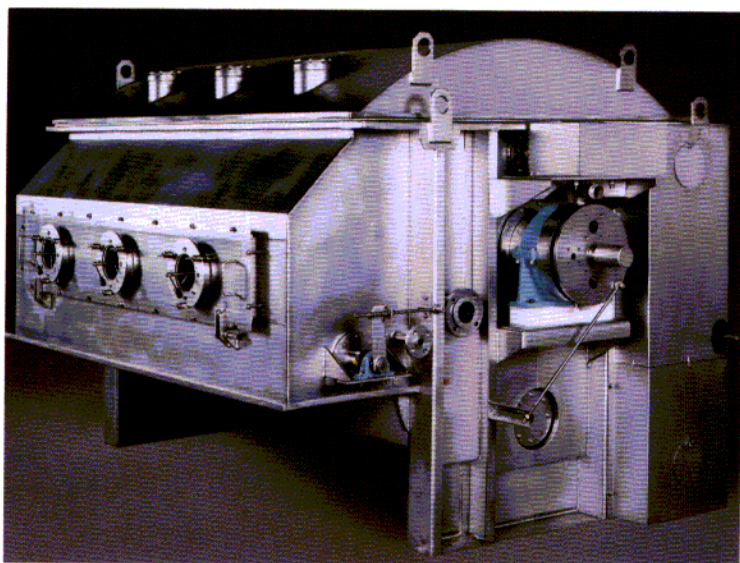
Auxiliary Equipment.

Komline-Sanderson also offers auxiliary *RDVF* equipment for a total filtration system: vacuum pumps, vacuum receivers, filtrate pumps, precoat tanks, instrumentation and control panels, conveyors and feed pumps. Either as separate items or skid mounted systems.

Options.

Materials of construction from plastics to titanium and optional base metal and weld surface finishes are provided as required by the process.

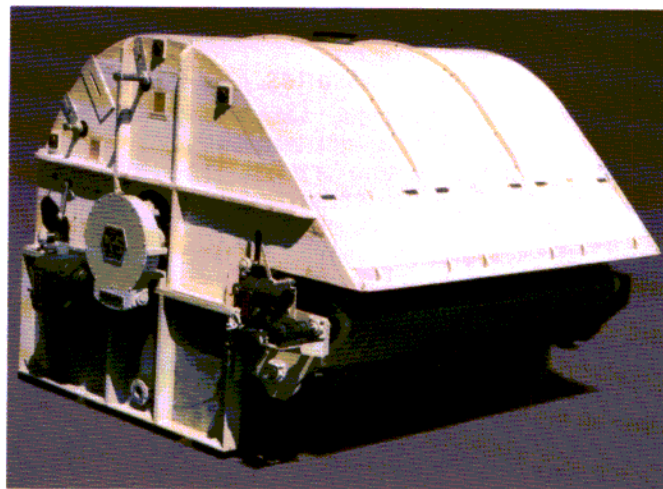
Optional equipment, designed to enhance the *RDVF* and complete the system, includes cake washing manifolds, cake compression and washing assemblies, repulpers, shredders, vapor retention hoods and vapor tight construction.



Vapor Tight Design



Vacuum & Filtrate Auxiliaries

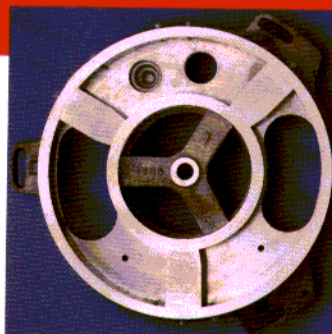


Vapor Retaining Hood

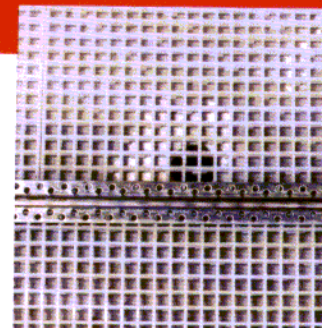
How it works.



Filter Valve ■



Filter Valve Interior & Bridge Blocks



Division Strips & Grids ■

The process cycle of the *RDVF* is continuous. Each revolution consists of cake formation, cake washing (if required), drying and cake discharge.

As the drum rotates — partially submerged in the slurry — vacuum draws the liquid through the filter medium (cloth) on the drum surface which retains the solids. The vacuum pulls air (or gas) through the cake and continues to remove liquid as the drum rotates. If required, the cake can be washed prior to final drying...and discharge.

The filtrate and air flow through the internal filtrate pipes, through the rotary valve and into a vacuum receiver where the liquid is separated from the gas stream.

Vacuum is normally developed by a liquid ring vacuum pump. The filtrate is usually removed from the receiver by a pump or barometric leg.

Multiple receivers connected to the filter valve allow for the separation of mother liquor from the wash liquor, and vacuum levels can be varied at the cake forming and washing/drying zones.

Options & Systems Accessories.

Vacuum and Filtrate Equipment. Vacuum pumps, filtrate pumps, vacuum receivers, instrumentation and controls are available from Komline-Sanderson. The proper selection and application of these components ensures successful operation of the total filter system.

To minimize installation costs and time, K-S offers "packaged" systems pre-piped and pre-wired.

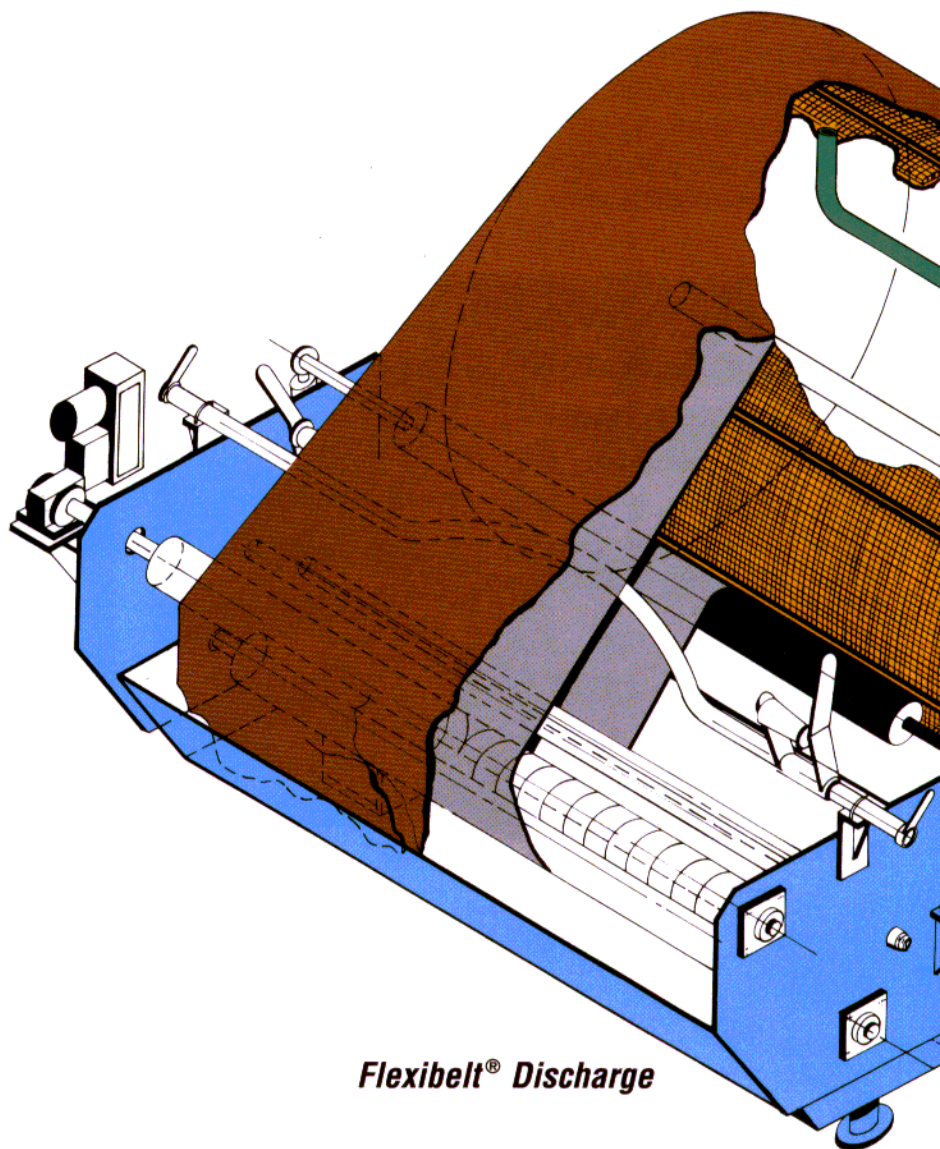
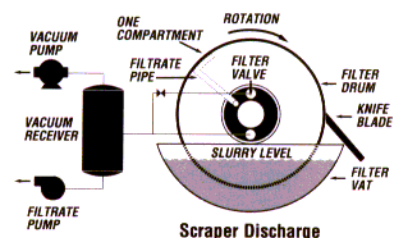
Cake conveyors and Repulpers. K-S can provide cake conveyors of belt or screw design. A cake shredder can be provided to break up fibrous cake. If the filter cake needs to be converted back into a slurry, then a horizontal shaft repulper can be installed.

Cake Washing. Cake washing, to obtain a desired purity or for the extraction of product, is easily accomplished on a *RDVF*.

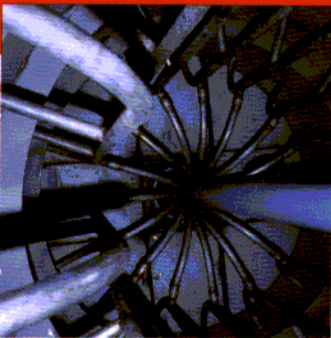
Depending upon the amount of wash liquor required, wash pipes utilizing spray nozzles or drip pipes can be installed. In applications where cake cracking occurs and

good washing must be obtained, K-S offers a combination compression and wash assembly. A traveling wash blanket and a series of compression rolls help seal the cracks and distribute the wash liquor. Cake compression also aids in the reduction of cake moisture.

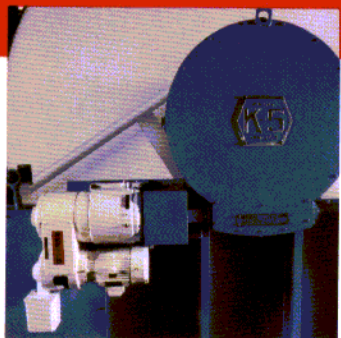
Vapor Containment. For applications where vapor containment is required, K-S offers vapor retention and vapor-tight hood designs.



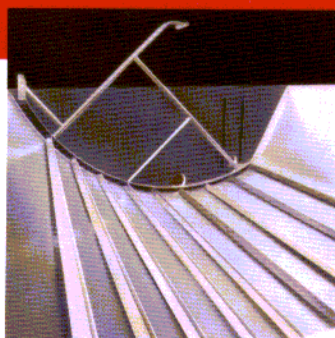
Flexibelt® Discharge



Filtrate Piping & Drum Detail



Drum Drive



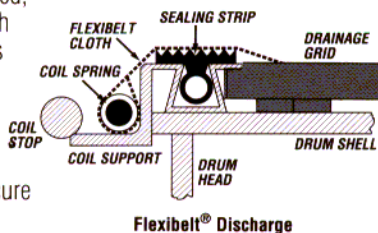
Filter Vat & Agitator

Filter Valve. The automatic filter valve uses adjustable bridge blocks to separate the filter into cake formation, washing, drying and discharge zones. The valve body is stationary and the pipe plate rotates with the drum. A replaceable plastic wear plate is used between the valve body and the pipe plate with center and peripheral springs providing a tight seal.

Each port in the pipe plate corresponds to a section of the drum. Low pressure-drop design for piping and valve maximizes the hydraulic capacity of the filter.

Division Strips and Grids. The drum surface is divided into sections using perforated wing division strips. The perforated design maximizes the available filtration area. A vacuum pressure of 20" Hg and higher can be maintained, allowing for high production rates and minimum cake moisture.

The division strips are also used to secure



Flexibelt® Discharge

the filter medium with caulking ropes or to hold elastomer seal strips used on our *Flexibelt*® filter.

The surface of the drum is covered with snap-in polypropylene drainage grids that support the filter medium. Small feet on the grids allow for unrestricted flow of filtrate to the filtrate pipes. Special drainage grids for high-temperature service are available as an option.

Filtrate Piping. Internal filtrate pipes transfer the filtrate from each section of the drum to a single port at the filter valve. Filtrate pipe sizes and arrangements are designed to minimize resistance to flow and maximize hydraulic throughput.

Drum Detail. Interior reinforcing rings ensure drum concentricity and drum end plates are also reinforced.

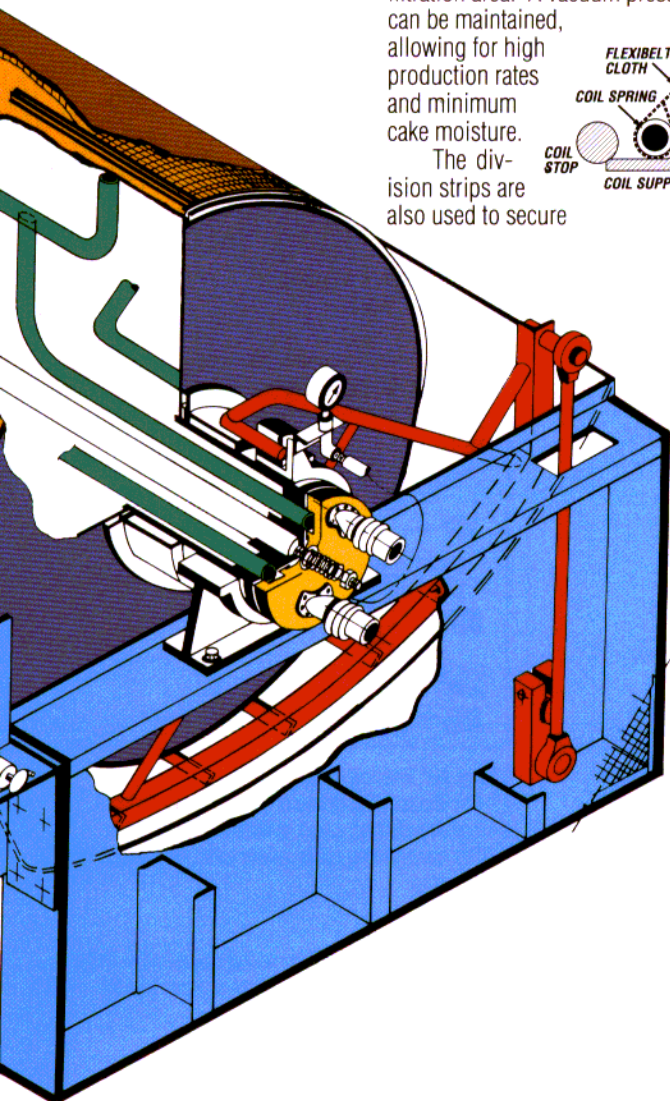
The drum is supported by trunnions that rest in bearings mounted on the vat sill. The drum trunnions ride in split trunnion bearings with replaceable phenolic bearing liners.

An access manway is provided for inspections and a vent connection keeps the drum interior at atmospheric pressure at all times.

Drum Drive. All filters are driven by a heavy-duty worm drive for smooth performance. The K-S drive design eliminates the maintenance and jerky operation usually associated with a chain drive. All K-S drives are variable-speed.

Filter Vat & Agitator. A reinforced filter vat contains the slurry and supports the drum. Standard filters are designed for 37 1/2% drum submergence. Where long cake formation times are required, K-S offers a 60% high-submergence design. Slurry level is controlled with an adjustable overflow weir or an electronic level sensor. Drains and cleanout ports are standard.

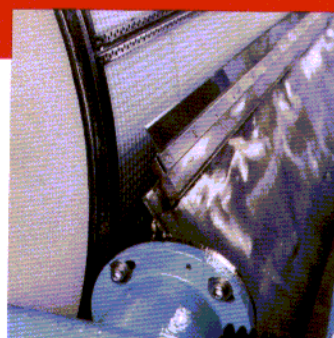
The agitator is ruggedly built and its curvature engineered for minimum drum and vat clearance to prevent settling of heavy solids. The agitator oscillates at approximately 15 strokes per minute to maintain a uniform suspension. It is driven on both sides by a crank to distribute the loads evenly. The support bearing is located on top of the trunnion away from the slurry. The agitator can be swung out of the vat without removing the filter drum or disconnecting the pivot bearing.



Discharge designs for the K-S RDVF.



Flexibelt® Discharge

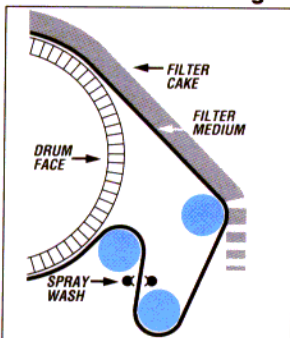


Precoat Discharge



Scraper Discharge

Flexibelt® Discharge.



- Where filter medium washing is required to prevent blinding.
- For the discharge of thin cakes.
- For dry cake discharge or sluice (wet) cake discharge.

How it works.

The *Flexibelt®* (Patent #3,017,997) rotary drum vacuum filter consists of an endless cloth filter belt that moves around the drum, over the discharge roll, after which the cloth is washed and returns to the drum.

As the belt leaves the drum, it carries the cake to the discharge roll where it is "flexed" by a raised helix and falls away. The discharge roll is driven independently, and because the roll's surface speed is different from the cloth's speed, it produces a rippling effect resulting in positive cake discharge. A variable speed drive provides optimum flexibility. The K-S *Flexibelt®* can discharge thinner cakes than competitive designs that use a smooth roll.

After discharge, the cloth is washed continuously on both sides. The wash water on the backside of the cloth is carried away by a patented self-bailing wash roll (Patent #3,399,779). This elimination of the "water bag" between the wash roll and the cloth improves cloth tracking.

Adjustable jacks on the return roll provide belt tension, while the end idlers on the equalizing bar, discharge roll and take-up rolls guide the belt edge envelope. Spray nozzles remove slurry from the belt edges to prevent material build up on the idlers.

K-S also offers an optional wet cake discharge design.

Flexibelt® Features & Benefits.

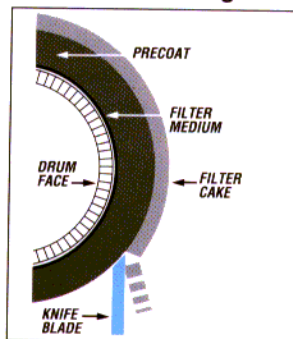
- Variable speed discharge roll with raised helix for positive cake removal.
- Two-sided cloth and end-seal washing to prevent blinding and ensure long belt life.

- Filter belt construction using resilient coilsprings enclosed in heavy-duty edge envelopes and drum end elastomer sealing strip to minimize edge leakage.
- Quality filter fabrics and heavy-duty reinforcement for maximum belt life.
- Wide variety of filter media and closures: pressure lock, stainless steel clipper or plastic zipper.
- Self-bailing wash roll, equalizing bar with curved center and adjustable end-idlers for easy adjustment of belt-tracking.

Typical Flexibelt® Discharge Applications.

- Corn Gluten
- Starch
- Pharmaceuticals
- Municipal Sewage Treatment Sludge
- Pigments
- Talc
- Hydroxide Sludges
- Water Softening Sludges
- Steel Mill Waste
- Organic/Inorganic Chemical Products
- Industrial Wastes
- Edible Oil Dewaxing

Precoat Discharge.



- For slimy, sticky, oily and blinding solids.
- For clear filtrates.
- For filtering dilute slurries with varying feed concentrations.
- For the discharge of very thin filter cakes.

How it works.

The Precoat filter is used when direct filtration against a cloth medium is not possible because the cake cannot be removed from the cloth or when blinding is indicated.

A uniform vacuum is applied to the drum surface

and the filter is coated initially with a layer of diatomaceous earth, perlite, cellulose, carbon or a combination thereof. A woven filter medium retains the precoat solids up to 4" thick. (Special designs allow for a 6" thick precoat.) The thicker the precoat layer the longer the operating period before reapplication is necessary.

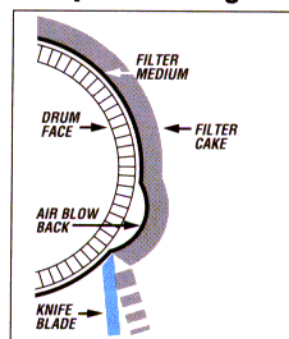
As the feed slurry is filtered, the solids are retained on the surface of the precoat layer. On each revolution, an advancing stellite knife shaves off the deposited solids and a .001" - .006" thick layer of precoat per drum revolution. Removing a thin layer of precoat with each revolution renews the filtration surface and optimizes filtration rates.

The advance rate of the knife can be infinitely adjusted for maximum filtration rates and minimum precoat usage.

Typical Precoat Discharge Applications.

- Corn Syrup
- Fruit Juices & Wines
- Pharmaceuticals
- Food Processing Waste
- Hydroxide Sludges
- Slop Oil
- Flexographic Ink Wastes
- Industrial Waste

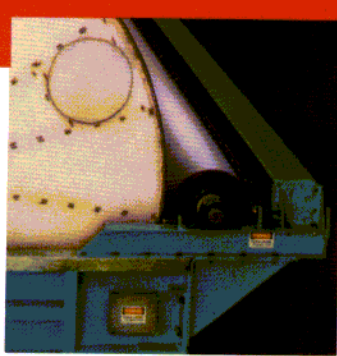
Scraper Discharge.



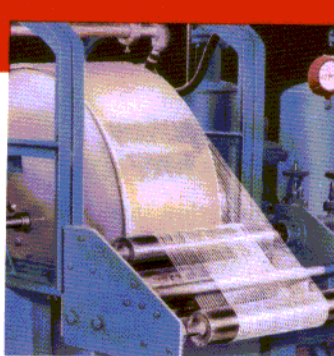
- For fast filtering materials.
- For discharging granular or crystalline material.
- For discharging cakes in excess of 1/4" thick.
- For nonblinding cakes where cloth washing is not required.

How it works.

Typically used where filter medium blinding is *not* a problem, a plastic or hard rubber scraper blade is used to remove the cake.



Roll Discharge



String Discharge



Coilfilter® Discharge

To discharge the filter cake, vacuum is released just ahead of the scraper, and an air blow-back is applied to blow the filter medium.

In most cases, the scraper does not come in contact with the drum preventing unnecessary wear of the cloth. For certain applications the drum is wire-wound over the filter medium and the scraper presses against the wire.

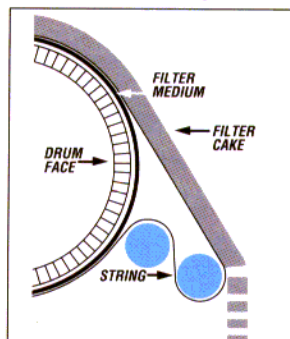
Typical Roll Discharge Applications.

- Kaolin Clay
- Titanium Dioxide
- Pigments
- Ceramic Materials
- Magnesium Hydroxide

Typical Scraper Discharge Applications.

- Flue Gas Desulfurization Sludge
- Scrubber Sludges
- Inorganic Chemicals and Minerals
- Pigment Processing
- Plastic Resins (Polymers)
- Calcium Compounds
- Titanium Dioxide

String Discharge.



- For discharging cohesive cakes.
- For discharging gelatinous cakes.

How it works.

Closely spaced parallel strings are tied completely around the filter drum and pass over the discharge and return rolls. The strings leave the drum surface and lift the filter cake from the filter medium. As the strings pass around the discharge roll, the cake separates from the strings. An alignment comb maintains the proper spacing of the strings and assists in discharging any residual cake.

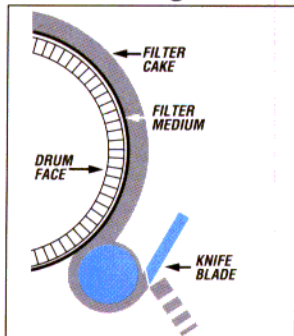
The string discharge filter optimizes the effect of the drying zone. Elimination of the air-blow-back requirement prevents the rewetting of the cake with the residual filtrate that might be clinging to the internal piping.

Since no mechanical wear and tear occurs to the filter medium, long life is assured. Good filtrate clarity is possible as well, since the medium is fixed to the drum surface.

Typical String Discharge Applications.

- Starch
- Fruit Juice
- Fermentation Broths
- Mineral Processing

Roll Discharge.



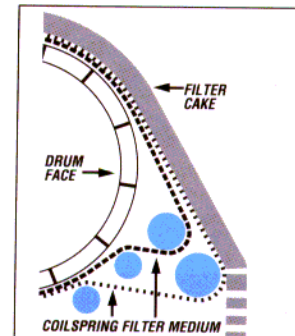
- For discharging very thin, sticky (tacky) cakes.
- For discharging dilatent and thixotropic materials.
- For applications with very small particle sizes.

How it works.

The roll discharge filter is usually fitted with a very tight filter medium to retain very small particles. Since the roll does not touch the medium itself, there is no mechanical wear and tear to the medium, and high retention qualities are maintained.

As the cake enters the discharge area, the vacuum is released (vented) from the drum section just ahead of the discharge roll. The discharge roll — already covered with the product — is in contact with the thin cake on the drum surface. The cake on the drum sticks to the cake on the roll and is transferred. A scraper knife or wire cuts part of the cake from the discharge roll, leaving a heel of filter cake on the roll.

Coilfilter®



- For fibrous sludges and slurries.

How it works.

More than just another discharge design, the K-S Coilfilter® is a unique rotary vacuum filter employing two layers of non-blinding, continuous stainless steel coil springs as the filter medium.

The coil springs retain the filter cake, pass around the drum over the discharge roll and aligning rolls. As with a string discharge, the dry cake is lifted from the drum surface by the coil springs. As the springs flex over the discharge roll, the cake falls away. The coil springs are washed before returning to the drum.

The drum deck is formed by a series of compartments which have an integrated trough that channels the filtrate to the internal piping. Each compartment is kept separate by a seal strip that also serves to hold the springs in their proper alignment. Ask for Komline-Sanderson's Bulletin #122 for more details on this special filter.

Typical Coilfilter® Applications.

- Municipal Sewage Sludge
- Pulp & Papermill Sludge
- Fibrous Slurries

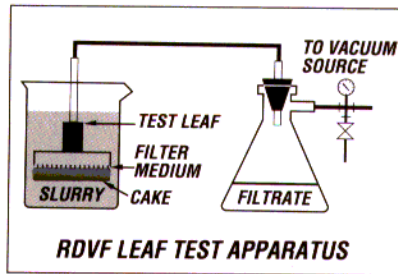
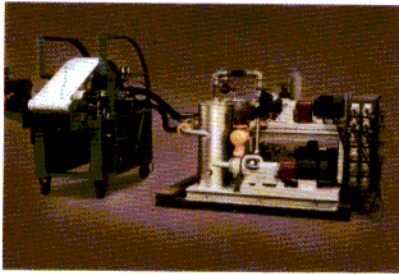
RDVF materials of construction for non-corrosive as well as extremely corrosive applications.

- Carbon Steel - epoxy painted
 Stainless Steel
 Special Alloys
 Rubber Covered Carbon Steel
 Fiberglass Reinforced Plastic

Filtering Area of K-S Drum Filters in Square Feet*

		Face																											
		1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	24'	36'						
Diameter	3'	9.4	18.8	28.2	37.7	47.1	56.5																						
	4.5'			42.4	56.5	70.6	84.8	98.9	113	127																			
	6'				75.5	94.2	113	132	151	170	188	207	226																
	8'						150	176	201	226	251	277	302	327	352	377	402												
	10'									283	314	345	377	409	440	471	502	534	565	596	628								
	12'										377	415	452	490	528	565	603	641	679	716	754	904							
	13.5'																												1526

*Additional sizes between 754 sq. ft. and 1,526 sq. ft. are available



Filter Fabrics.

The K-S Filter Fabrics Division can fabricate standard or custom filtration media products from either synthetic or natural materials. Our broad knowledge of filtration and our practical experience enables K-S technicians to select the proper filter medium for any application and to apply the best fabrication techniques. For complete details on K-S filter fabrics, ask for Bulletin 145.



Laboratory & Pilot Testing.

To assist you in selecting the most economical size and type of filter, Komline-Sanderson maintains a laboratory and pilot demonstration equipment. To evaluate the performance of a rotary drum vacuum filter, K-S offers bench scale testing using a 0.1 sq. ft. filter leaf. The leaf uses the same drainage grid as a full size RDVF and permits the evaluation of a variety of discharge designs and filter media. With its high degree of precision and well established scale-up factors, the leaf test procedure is commonly used to size large filters.

If pilot tests are required, K-S has a 3' diameter x 1' face (9.4 sq. ft.) filter constructed of 316 s.s. for rent.

The K-S Commitment.

The superior performance of the Komline-Sanderson Rotary Drum Vacuum Filter begins with the K-S commitment to quality and more than 50 years of experience designing and building liquid/solid separation equipment.

Every K-S RDVF unit is manufactured to the highest standards and serviced by K-S factory trained technicians. A complete inventory of spare parts is maintained in our Peapack, New Jersey and Brampton, Ontario, Canada manufacturing facilities. Our laboratory testing services and pilot demonstration equipment are available, as required.



To Contact Komline-Sanderson:

Call: 1-800-CALL 4 K-S
(225-5457)

Fax: 1-800-FAXS 4 K-S
(329-7457)

e-mail: info@komline.com

www: http://www.komline.com



Komline-Sanderson

12 Holland Avenue, Peapack, NJ 07977-0257
908-234-1000 Fax 908-234-9487

Brampton, Ontario, L6W 1W1, Canada
905-453-5330 Fax 905-453-2214