

WHERE TO START—IF YOU HAVE A PROBLEM WITH AN EXISTING PRESSURE LEAF FILTER IN YOUR PLANT - - -

Pressure Leaf Filter Problems and Their Causes

This trouble-cause chart is not intended as a cure-all, but rather as an aid in narrowing the search for causes of difficulties. LEEM/LSS would be pleased to be of assistance. Just give us a call.

Trouble	Probable Causes
Poor Clarity, Filter aid bleeds through	<input type="checkbox"/> Insufficient venting <input type="checkbox"/> Worn gaskets <input type="checkbox"/> Damaged cloth <input type="checkbox"/> Filter medium too coarse <input type="checkbox"/> Entrained gases <input type="checkbox"/> Inadequate cake thickness <input type="checkbox"/> Fluctuating pressure <input type="checkbox"/> Inadequate flow rate
Solids come through as soon as the filtration cycle is started.	<input type="checkbox"/> Filter aid too coarse (if precoat is used) <input type="checkbox"/> Poor or incomplete precoat on leaves <input type="checkbox"/> Filter medium too coarse (if precoat not used) <input type="checkbox"/> Entrained air or fluctuating pressure <input type="checkbox"/> The leaves (cloth, rivets, or outlet) or manifold may leak <input type="checkbox"/> Liquid used for precoat too greatly different from liquid filtered <input type="checkbox"/> Switch over disturbed precoat because of changes in flow rate, temperature or viscosity.
Recycle time during precoating is too long	<input type="checkbox"/> Leaks in the leaves or manifold <input type="checkbox"/> Insufficient precoat material
Filtrate becomes cloudy well past beginning of cycle	<input type="checkbox"/> Filter cloth is too coarse for stable bridging at higher pressure <input type="checkbox"/> Fluctuating pressures <input type="checkbox"/> Filter medium or leaves mechanically weak—begin to shift or yield at high pressures <input type="checkbox"/> Leaks due to damaged screens or worn gaskets
Plugged cloth	<input type="checkbox"/> Leaves not thoroughly cleaned between cycles <input type="checkbox"/> Imperfect precoating or inadequate precoat thickness <input type="checkbox"/> Filter cloth too fine, too coarse, or poor choice of weave <input type="checkbox"/> Use of dirty liquor for precoating
Sagging filter cloth or wrinkles	<input type="checkbox"/> Original cloth of poor quality <input type="checkbox"/> Very high temperatures <input type="checkbox"/> Cloth not properly fastened to leaves <input type="checkbox"/> Excessive backwash or backblow
Leaves bent out of shape	<input type="checkbox"/> Most probably misoperation of the filter resulting in overfilling of the cake space <input type="checkbox"/> Use of rubber mallets to remove cake <input type="checkbox"/> Plugged cloths causing uneven cakes that bridge in places between leaves <input type="checkbox"/> Uneven cakes caused by settling and segregation of solids
Leaves plugged internally	<input type="checkbox"/> Filter cloth too coarse, letting coarse solids inside the leaf <input type="checkbox"/> Flow velocity inside leaf too low, permitting solids to settle out <input type="checkbox"/> Chamber cluttered with horizontal surfaces on which solids can settle <input type="checkbox"/> Inadequate drainage and wasting of filter

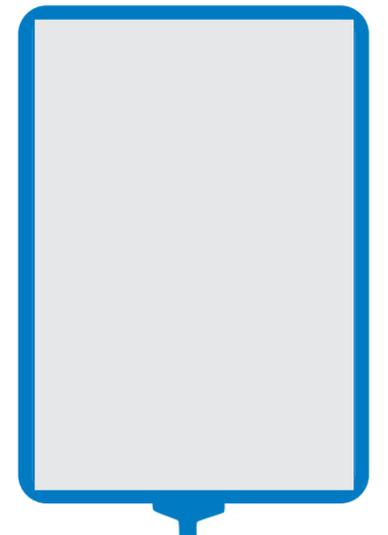
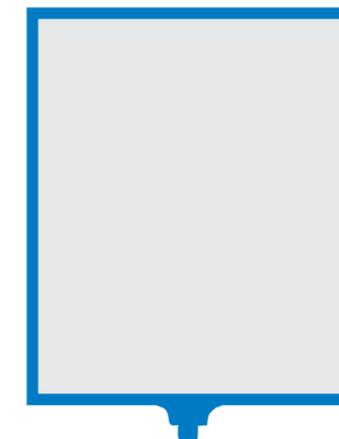
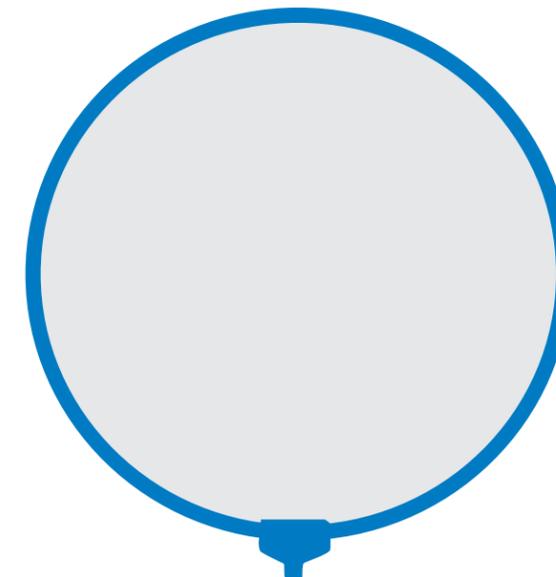
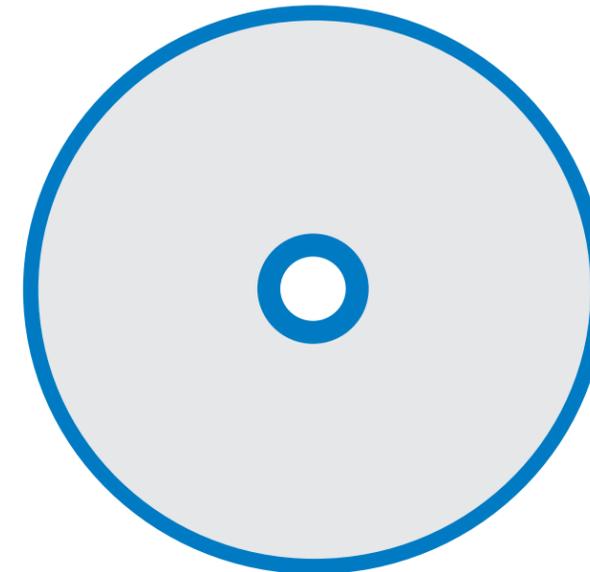
LEEM / LSS Filtration

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Filter Leaves

for ALL KINDS of Pressure Leaf Filters

New Rebuilt Recovered



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Wedge-Flow® Wire Filter Leaves



- STRONGER
- LONGER LASTING
- EASY TO RESCREEN
- BETTER THROUGHPUT

If you want to increase flow through your Pressure Filter Leaves, you should examine your process to determine where the restrictions are. The logical areas of restriction to flow are the filter cloth (wire cloth or fabric bag), the nozzle (outlet) and the chamber (internal structure).

As the pressure leaf filtration process starts a new or clean leaf offers little resistance to flow. During precoat, the precoat itself (diatomaceous earth or perlite) becomes the major resistance to flow. As the filtration cycle proceeds the filter cake becomes the major resistance to flow.

As long as the filter leaves remain clean and rigid, the above mentioned conditions will exist. However, as cycle after cycle is run on a filter, other restrictions begin to develop. This is because solid contaminants being removed and/or filter aid (D.E. or perlite) begin to accumulate in and on the leaf. If the solids accumulating restrict the filter cloth or the nozzle, this condition can be easily observed and corrective cleaning can take place. If however, the accumulation is in the chamber of the leaf, corrective cleaning is more difficult because the chamber is not easy to get at for cleaning. As one can imagine, as the chamber becomes more and more clogged, flow is reduced and filter cycles become shorter.

Chamber clogging is more likely and more severe if the internal structure of a leaf contains complex materials (such as various sizes of wire cloth and perforated metal) that provide places for contaminants and filter aid to accumulate. Also, twisting of the leaf will cause plugging and "blinding off" of areas of the leaf. We have observed this internal chamber clogging of many leaves (our own and those of other manufacturers) that we sent to us for rebuilding.

We then set out to develop a better chamber that would minimize accumulation of solids inside of the leaf. Our answer to the problem is the Wedge-Flow® chamber. Some examples of which follow.

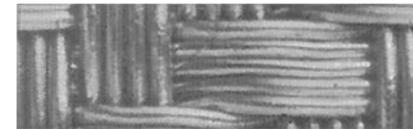
We and our customers have been very pleased with the Wedge-Flow® chamber results. Customers have reported as much as 50% increase in flow in some of our leaves rebuilt with a Wedge-Flow® core. In addition the leaves are considerably more rigid. To date, we have designed Wedge-Flow® chamber filter leaves for over 50 companies, covering a period of several years, with excellent results.

FILTER MEDIUM

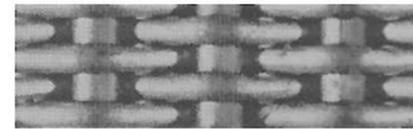
The major consideration of the filter medium is retention of precoat filter aid which must bridge the medium's opening and form a cake to retain influent solids. The filter medium must be uniformly woven to precoat evenly with minimum recirculation. The filter medium must also sluice and backwash cleanly, drop the cake freely and resist plugging and damage. Some filter media are shown below. Many others are available.



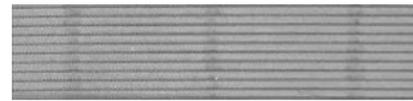
Neva-Clog® is a unique metallic filter medium consisting of two perforated sheets with offset holes. The smooth surface resists abrasion and promotes easy cake drop. Neva-Clog does not easily blind, clog or corrode. It is usually made of 316L.



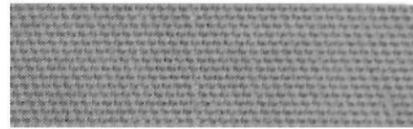
AU "Multibraid" is composed of bundles of wire in both directions. It is less vulnerable to entrapment of particles and blinding than is normal wire cloth. AU builds a cake promptly (minimum recycling) with all diatomaceous earth filter aids. It is strong and durable. Supplied as woven or calendered.



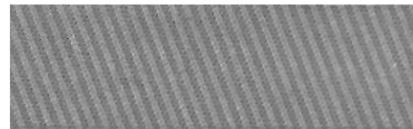
24X110 is a standard (plain dutch) wire cloth for filter media use. It resists heavy sluicing pressure. It can be calendered to improve retention characteristics and to resist rough treatment and scraping.



Wedge-Flow® is a filter medium consisting of closely spaced (controlled opening) wedge shaped wire resistance welded to support wires. It is rugged, easy to clean by sluicing and can be backwashed.



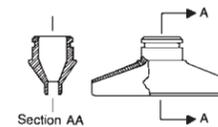
Plastic filter cloth is available in a variety of weaves using polyester or polypropylene monofilament for weaving. It can be supplied as a bag to cover the bare leaf or as a cut piece to be put onto the leaf by caulking or by other means.



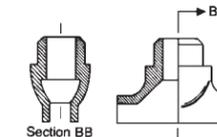
24X128 is a woven stainless steel of about sixty micron nominal retention. It is double-warp twilled dutch weave used in fine filtration applications.

OUTLETS

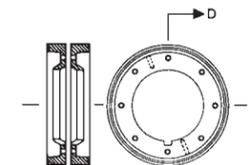
A strong outlet with a tight fit is required to support the leaf and to provide a non-leaking attachment to the manifold. The outlet must be able to handle the desired filtrate flow with a minimum resistance to flow. Many metal outlets are machined castings which LEEM/LSS carries in inventory.



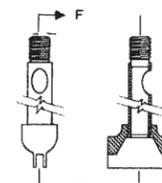
"O" Ring Gasket



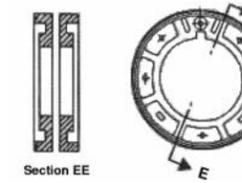
Flat Gasket



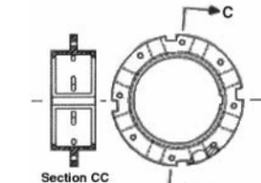
Center Drain — 2 Piece Hub (Metal)



Outlet with Threaded Pipe Nipple



Center Drain — 2 Piece Hub Noryl reinforced Plastic



Center Drain — 1 Piece Hub (Metal)

Importance of Properly Designed Filter Leaves

Leaves make the filter. It is at the leaves that liquor is mechanically separated into residue and treated product. Profitable operation of a filter depends on leaves that constantly function properly.

Constructing New Leaves

Metal leaves are fabricated in all sizes, shapes and alloys to original specifications or improved field tested designs. We also fabricate plastic leaves.

Rebuilding Leaves

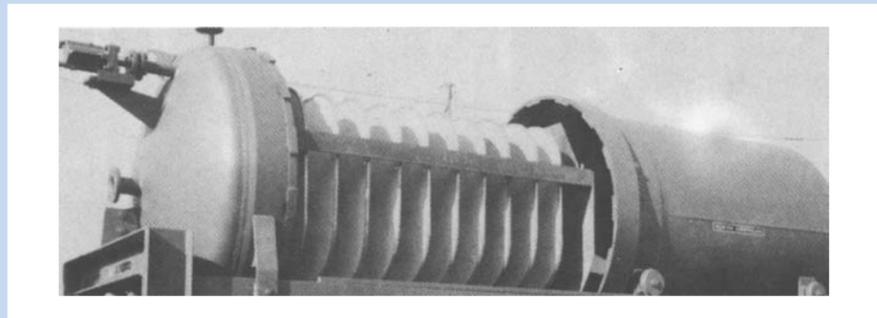
Frequently your present leaves can be restored "as new" with replacement of worn internals, prior to recovering with suitable filter medium. Rebuilding often saves money over new leaves.

Design

Leaves are designed to provide maximum strength and flow at minimum pressure drop within the filter chamber. They are furnished with permanent or field replaceable closures and with a filtrate outlet to match the manifold. Smooth edge binders provide strength, filtrate collection space and protection for fabrics against excessive wear. Leaves can be supplied bare or covered.

Four key elements must function properly in a well designed leaf.

- Filter Medium
- Chamber
- Binder & Closure
- Outlet Fitting

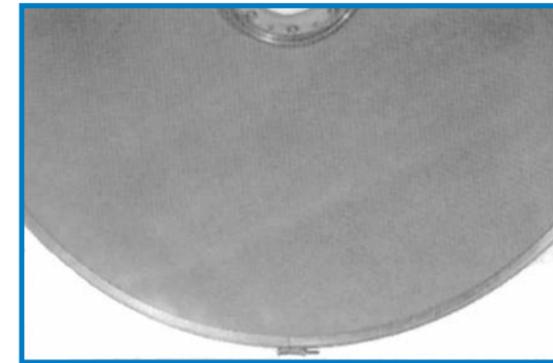


Open Pressure Leaf Filter Showing Leaves

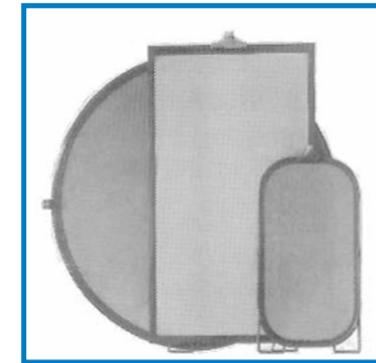
WE OFFER REPLACEMENT FILTER LEAVES FOR THE FOLLOWING FILTERS:

BIRD MACHINE
 BOWSER (PROCESS FILTERS)
 BUFFALO FILTERS
 DeLAVAL
 DeSOLA-SUCHAR
 DUPPS
 EIMCO
 ENZINGER (DURIRON)
 FUNDA
 GOSLIN BIRMINGHAM
 HERCULES®
 IDREX
 INDUSTRIAL
 KEENE
 KELLEY
 NIAGARA® (AMETEK)
 NORTH-AMERICAN
 PASSAVANT
 PRONTO
 SCHENK
 SEITZ
 SHRIVER
 SPARKLER
 SWEETLAND (DORR-OLIVER)
 U.S. FILTER
 AND OTHERS

Stationary and Rotating Filter Leaves



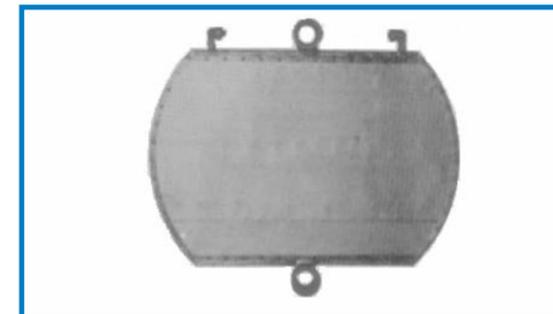
Rotating pressure filter leaf with removable eye-bolt closure for field recovery.



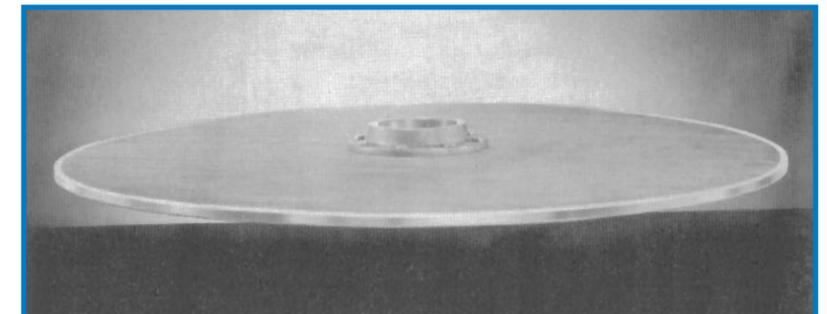
Stationary pressure filter leaves—round, square corner and radius corner.



Rotary pressure leaf covered with Neva-Clog®, bolted construction.



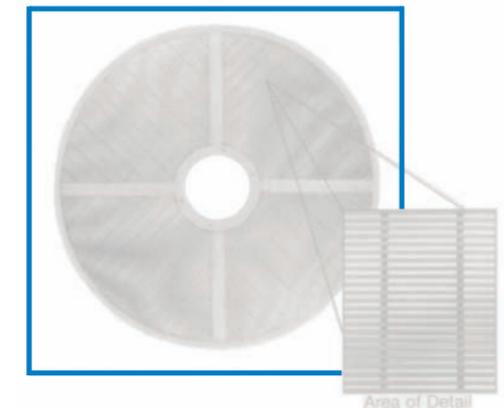
Arc-sided bolted style leaf for horizontal cylindrical pressure shell, showing roller hangers and double eye outlet (forming filtrate manifolds).



One sided leaf from vertical filter with horizontal leaves, center discharge.

This is our latest use of a Wedge-Flow® core to improve a center discharge pressure leaf design and allow it to withstand pressure differentials of 80 psi. By using a quad-cut Wedge-Flow® chamber with a bar frame we replaced a complex European radial rib/perforated plate chamber to give our customer the following advantages:

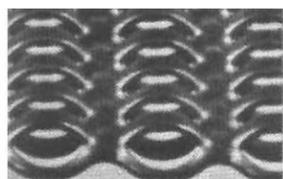
1. Better internal drainage
2. Lighter weight
3. A leaf that is more easily rescreened
4. A spot welded screen to frame closure that should outlast the present riveted design.
5. Longer filter runs due to a higher allowable differential pressure.



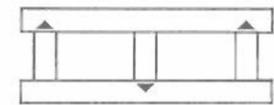
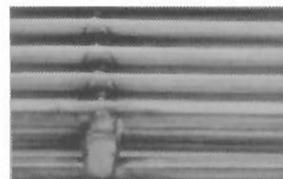
If you are disappointed with the flow you are getting through your filters and your filter output, then we would like to discuss your pressure leaf filtration with you. Please give us a call.

CHAMBER (DRAINAGE) MATERIALS

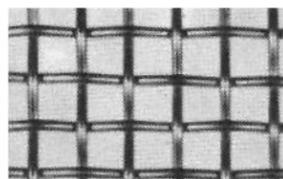
The chamber material supports the filter media or spacing (intermediate) screen, allows good filtrate flow and imparts strength and rigidity to the leaf.



Por-O-Septa® is a type of perforated, lightweight, deep chamber, sheet metal medium. If properly used, it provides excellent strength, rigidity and drainage. It is available in various thicknesses and opening sizes. In larger round leaves it can be quadrant cut to give greater rigidity.



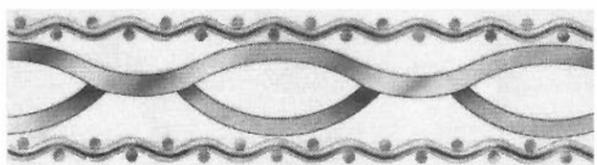
Wedge-Flow® is a lightweight, resistance welded metal panel which provides excellent strength rigidity and drainage. The outside (face) wires may be round or triangular (wedge) shaped, depending on the application. If properly used the smooth surface of the Wedge-Flow panel will allow elimination of a spacing screen.



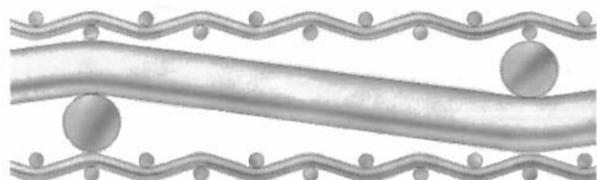
One mesh (wires spaced one inch apart in both directions) is still widely used for chamber material. It is relatively inexpensive, but usually requires the use of a spacing screen to avoid excessive wear on the filter media.

SPACING (INTERMEDIATE) SCREENS

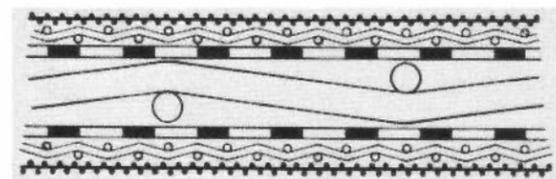
Spacing screens are used when the irregular surface of the chamber material is likely to damage the filter medium as pressure is applied and released. Calendering (flattening by rolling) is sometimes performed on spacing screens to provide a smoother wearing surface.



The sketch at left shows an enlarged view of Por-O-Septa with a 20 mesh spacing screen.



Spacing screens are also often used with one mesh (1X1 mesh) chambers. The sketch at left shows an enlarged view of a one mesh with an 8 mesh (8 wires per inch) spacing screen.



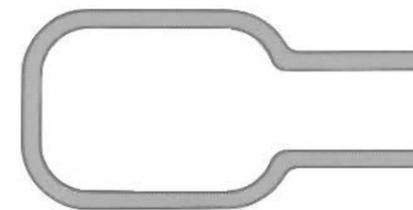
Perforated metal spacing screens are sometimes used in leaves with 5 or even 7 layers. The sketch at left shows a 7 layer leaf. The perforated metal provides a very smooth surface and excellent rigidity in high pressure drop filtration.

BINDERS AND CLOSURES

The *binder* surrounds the leaf and provides the means for preventing leakage around the edge of the leaf. In addition, the binder helps maintain the shape of the leaf, retain the filter medium and provide flow to the outlet in bottom outlet leaves. Popular binders are as follows:



Back-To-Back "U"



#966 Heavy Tubular Frame



"U" Channel



#23 Keyhole



Tee Bar

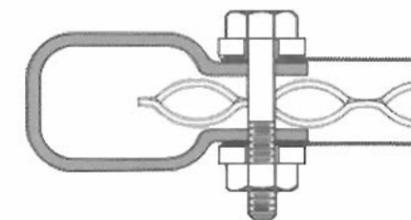


Bar Frame

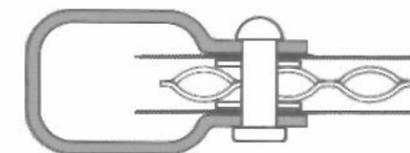
Closure provides the means for holding the components of the leaf tightly together so that the leaf is leakproof. Closure may be by various methods including bolting, riveting, welding, crimping and clamping. The different methods vary in cost, effectiveness and ease of leaf repair. They should be discussed with your LEEM/LSS representative.

The tolerance between the binder and the filter media with closure in place on LEEM/LSS leaves is determined by the needs of the application.

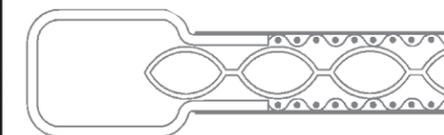
Popular leaf construction, showing *binder and closure*, are as follows:



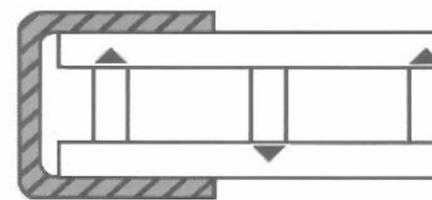
Chamber: Por-O-Septa
Binder: #966 Heavy Tubular Frame
Closure: Bolted



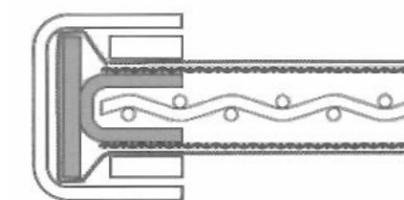
Chamber: Por-O-Septa
Binder: #966 Heavy Tubular Frame
Closure: Riveted



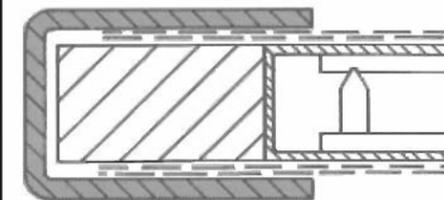
Chamber: Por-O-Septa
Binder: "H" Rim (NA-H)
Closure: "U" Rim—Clamped



Chamber: Wedge-Flow®
Binder: "U" Channel
Closure: Welded



Chamber: Coarse Wire Mesh
with Spacing Screen
Binder: Tee Bar
Closure: Crimped



Chamber: Wedge-Flow®
Binder: Bar Frame
Closure: Welded