

Leopold[®] FilterWorx[™]

Systems for Wastewater Tertiary Filtration

PROVEN SYSTEMS ENABLING MUNICIPALITIES TO ACHIEVE CLEAN, SAFE WATER



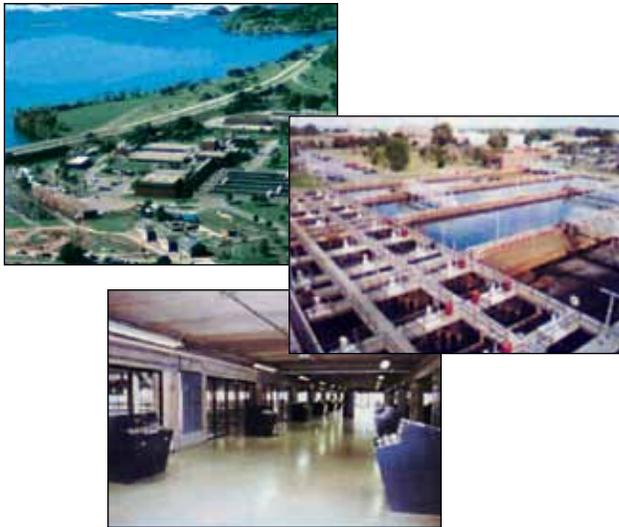
**Declining Rate Filtration
Installation Profile:**

Sugar Creek Wastewater Treatment Plant
Charlotte, N.C.

Scope:	<ul style="list-style-type: none"> • 10 Filters • 33' x 11' • 3,630 sf 		
Media:	<ul style="list-style-type: none"> • Leopold® Anthracite, 1.0 mm E.S., 1.3 U.C., 48" Deep 		
Media Support:	<ul style="list-style-type: none"> • Gravel 		
Underdrain:	<ul style="list-style-type: none"> • Leopold® Air/Water Underdrain 		
Flow Rate:	<ul style="list-style-type: none"> • 15 mgd, 2.87 gpm/sf 		
System Performance:	Influent	Effluent	Removal
TSS	8 ppm	2 ppm	75%
BOD	7 ppm	3 ppm	57%

**Physical Chemical Filtration
Installation Profile:**

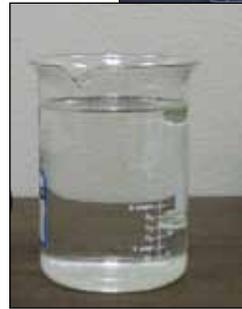
Niagara Falls Wastewater Treatment Plant
Niagara Falls, N.Y.



Scope:	<ul style="list-style-type: none"> • 28 Filters • 17' x 42' • 19,992 sf 		
Media:	<ul style="list-style-type: none"> • GAC, 8' 		
Media Support:	<ul style="list-style-type: none"> • Gravel, 12" 		
Underdrain:	<ul style="list-style-type: none"> • Leopold® Air/Water Underdrain 		
Flow Rate:	<ul style="list-style-type: none"> • 37 mgd Average, 75 mgd Peak 		
System Performance:	Influent	Effluent	Removal
TSS	20 ppm	5-6 ppm	70%-75%

Water Recovery Filtration Installation Profile:

Chandler Airport Water Reclamation Facility
Chandler, Ariz.



Scope:	Current	2003 Expansion	
	<ul style="list-style-type: none"> • 4 Filters • 15' x 26' • 1,560 sf 	<ul style="list-style-type: none"> • 8 Filters • 15' x 26' • 3,120 sf 	
Media:	<ul style="list-style-type: none"> • 1.45-1.55 mm E.S. <1.4 U.C. Anthracite, 5" Deep 		
Media Support:	<ul style="list-style-type: none"> • Leopold® IMS® Cap 		
Underdrain:	<ul style="list-style-type: none"> • Leopold® Air/Water Underdrain 		
Flow Rate:	Current	2003 Expansion	
	<ul style="list-style-type: none"> • 6.5 mgd 	<ul style="list-style-type: none"> • 10 mgd, 2.23 gpm/sf 	
System Performance:	Influent	Effluent	Removal
TSS	2.6 ppm	1.4 ppm	46%

Filter Systems Designed and Engineered to Achieve Your Process Performance Requirements

Leopold filter systems are a powerful and reliable solution for municipal wastewater treatment. Each Leopold tertiary filter is designed and engineered with unsurpassed systems knowledge and applications experience to achieve specific performance requirements of individual wastewater treatment plants.



Designed-In Process Performance

A Leopold filter is planned based on your particular upstream conditions. Each aspect of the Leopold wastewater filter — filter media, filter controls, design parameters — is tuned to achieve maximum filtration efficiency at the longest possible filtration cycles. But more importantly, Leopold filters are designed and engineered to meet your permit requirements.

Assured Performance Based on Leopold Experience and Testing

Loading rates, media configuration, and backwash process design are often largely determined by the designer's experience with similar applications. No one has more experience with rapid gravity granular bed filters than Leopold.

Our systems knowledge is based on more than 70 years of experience treating wastewater around the world. More than 200 Leopold tertiary filter systems are installed throughout the U.S. and abroad.

Leopold also tests its filters at our site or yours. We can set up and run a pilot test at your site on your particular application to demonstrate filter performance. We can also set up a test lateral run in our Product Development Center and demonstrate, full-scale, the head loss and flow distribution during backwash with your flume configuration.

Media Designed for Optimum Solids Retention and Consistent Filtrate Quality

The filter media in a Leopold filter — media quality, bed composition, bed depth, and grain size distribution — is designed according to filter configuration, influent quality, pretreatment process, and desired filtrate quality. Our objective is to achieve optimum suspended solids removal due, in part, to more efficient solids storage in the box, with minimal changes in filtrate quality during periods of high solids loads.

Filter Control Designed for Successful Operation and Optimum Performance

By continuously monitoring filtrate quality and the condition of the filter media, Leopold filter controls can automatically initiate and control the backwash sequence. The filter is cleaned only when it needs to be cleaned, only as frequently or infrequently as changing conditions require, and only as long as necessary to clean the media. Filter run times and filtrate quality are optimized at the lowest possible cost. And by keeping the filter media well-conditioned, the life of the filter can be lengthened.

By automatically sequencing backwash properly, Leopold filter controls help avoid surges and potentially disastrous upsets which can adversely affect filtrate quality, damage a filter system, and cost money.

Backwash Designed to Restore Original Headloss and Solids Storage Conditions

Leopold filters employ an upflow water wash with full bed cleaning. To ensure thorough cleaning of the filter media, Leopold filters also employ air scour. Air scour provides very effective cleaning action as the result of higher shear forces in the media bed and abrasion between grains.

Single-Source Responsibility for a Process Guarantee

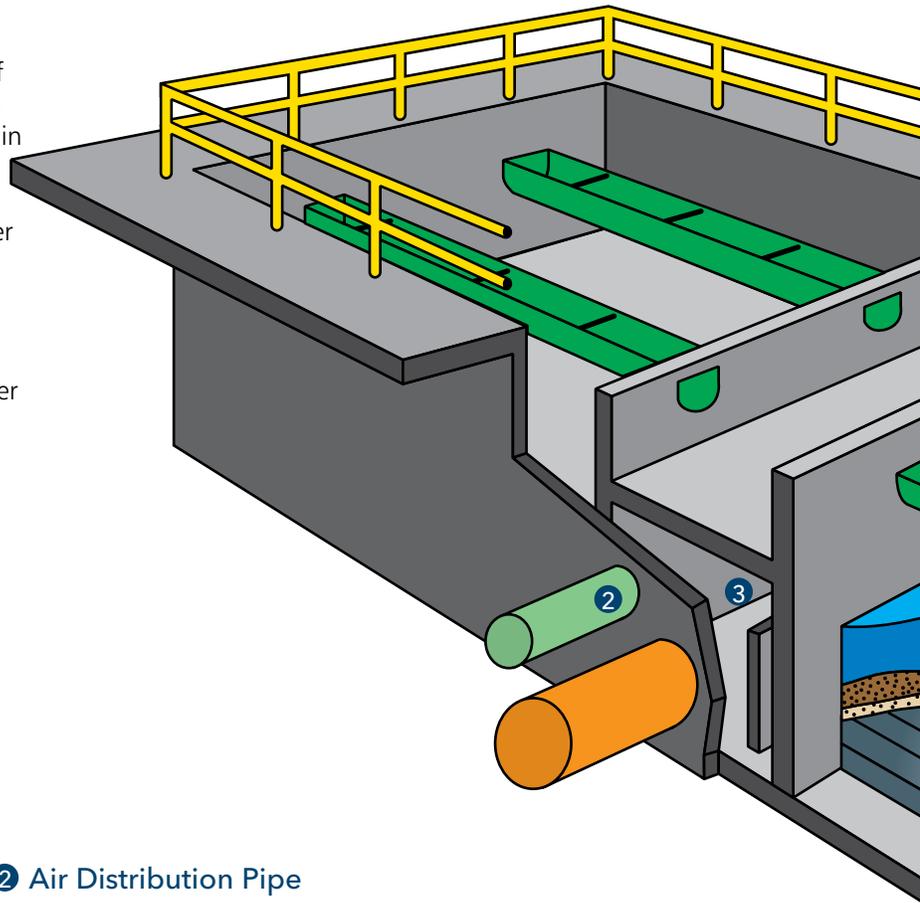
Because Leopold puts it all together, we take the initiative for the successful integration of the filter in your plant. You need only look to Leopold for successful filter operation and performance that meets your requirements.

Our Gold Tag™ service means we'll be there for you long after the filter is put in service. Leopold stands behind its systems and works in partnership with its customers to ensure that your Leopold filter performs as well tomorrow and the day after tomorrow as it did the day it was commissioned.

Everything About a Leopold Filter Is Designed to Deliver the Filtrate Quality You Require

1 Underdrain

The underdrain evacuates filtered water from the filter during the filter run and introduces water and air during backwashing and air scour. Leopold® Universal® Type S™ and Type SL® underdrain provide superior distribution of water and air for effective media backwashing in every Leopold filter design. Type S underdrain is ideal for designs requiring longer laterals. Type SL underdrain features a lower profile, making it ideal for shallow filters where greater filter media depth is desired. Both feature the dual lateral design pioneered by Leopold, ensuring uniform distribution of water and air at each dispersion orifice opening even in extra-long lengths. Both feature a unique water recovery channel for superior air scouring and water backwash performance. Both are constructed of high-density polyethylene (HDPE) construction for strength and corrosion resistance.

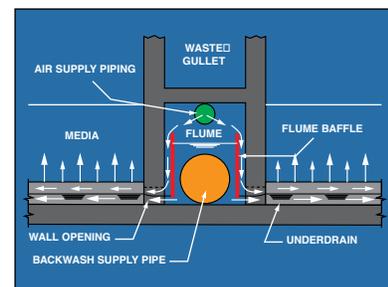


2 Air Distribution Pipe

Delivers air to the underdrain for air scour during the backwash sequence. Leopold air distribution pipe is engineered to meet specific backwash requirements and custom-fabricated to fit specific filter designs.

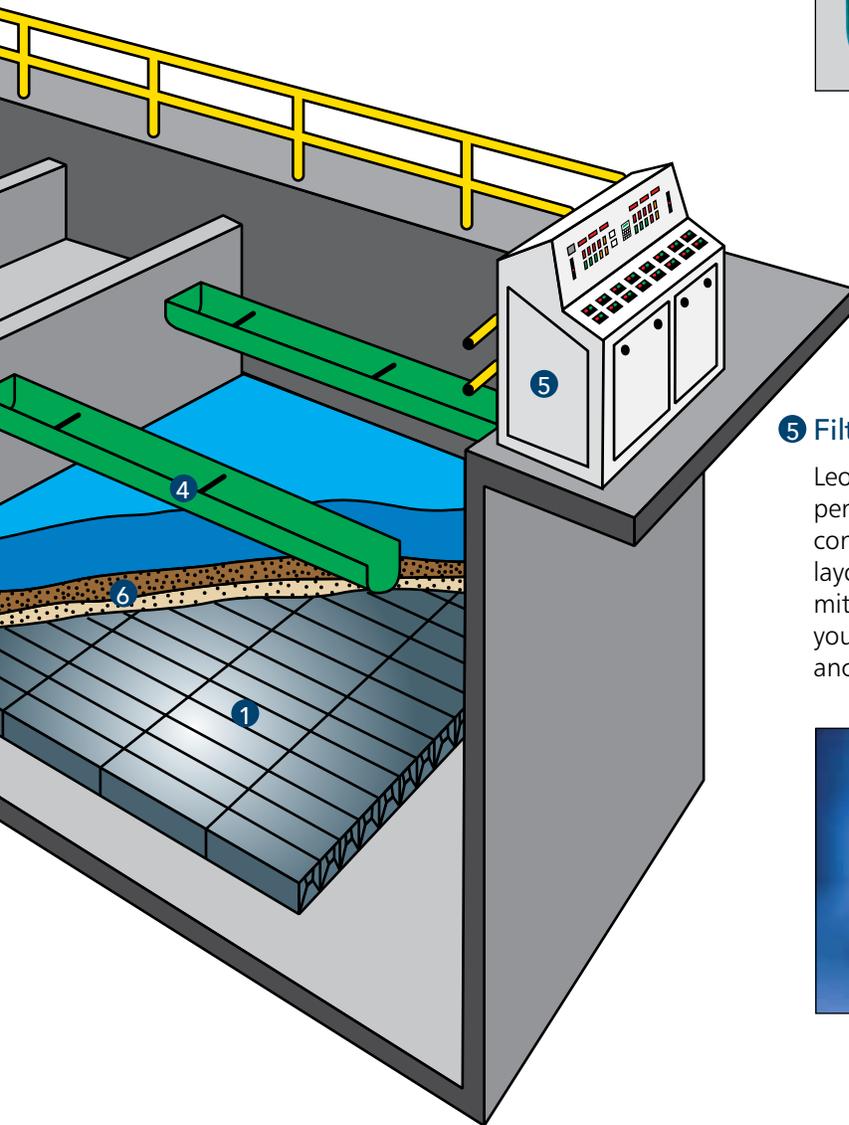
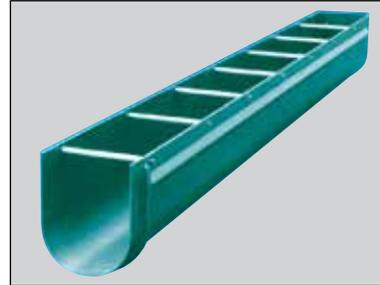
3 Flume

For new construction, a Leopold filter can be arranged with a Leopold flat-bottom flume, as shown here, front flume, center flume, or H flume to achieve the best and most cost-effective layout. A Leopold flat-bottom flume allows substantial cost savings in excavation and support structures. When rehabilitating a filter, Leopold computer-optimizes the flume arrangement to make any necessary changes and correct existing deficiencies.



4 Backwash Water Troughs

Made of durable fiberglass-reinforced plastic (FRP), Leopold sizes its wash troughs for the carrying requirement of the filter design.



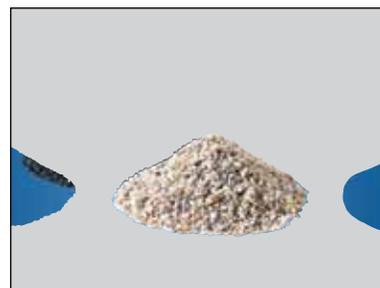
5 Filter Controls

Leopold filter controls provide complete independent distributed, filter-side monitoring and control. Controls engineered according to your layout, upstream conditions, and effluent permit requirements not only help you to operate your filter cost-efficiently, but also in compliance with stringent regulations.



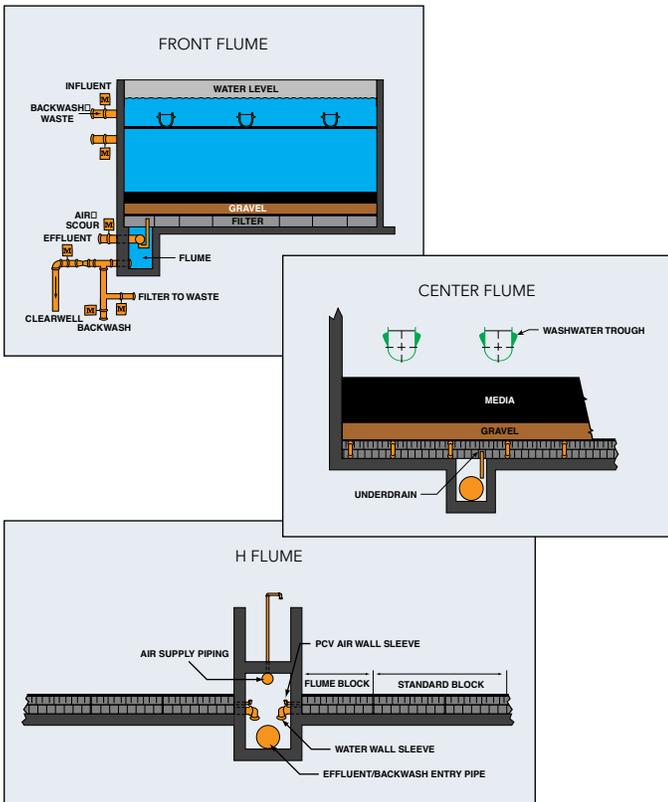
6 Filter Media

Leopold designs the media profile — monomedia deep bed, dual media, tri-media, effective size, and uniformity coefficient — based on suspended solids concentration, particle sizes, and composition of the influent stream. The objective is to optimize suspended solids removal due, in part, to more efficient solids loading, as well as produce smaller changes in filtrate quality during periods of high solids loading.



Designing a New Filter with the Best and Most Cost-Effective Layout

A Leopold filter can be arranged with a front flume, center flume, or H flume to achieve the best and most cost-effective layout for your plant. A Leopold flat-bottom flume is available that allows substantial cost savings in excavation and support structures. The magnitude of these savings can be greatly amplified where poor subsurface conditions, such as rock or groundwater, exist.



Bringing Existing Filters into Compliance with Current Regulations

Leopold-rehabilitated filters adapt your existing structure to current technology . . . and to meet current regulations. Leopold custom-engineers the filter to add air scour for improved backwash performance, with air headers and backwash troughs placed for optimum arrangement. The filter bed is optimized through media selection and bed composition, and the use of our lower profile Type SL underdrain for deeper media beds in shallow filter boxes.



Learn More About Leopold Filter Systems for Wastewater Treatment

Additional literature is available describing the technology components of Leopold filters. Plus, we can show you how our systems can deliver guaranteed performance and process results.

To learn more, visit www.fbleopold.com or call (724) 452-6300.



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