The leader in the process filtration industry for over 40 years, LAKOS continues to maintain an unrivaled reputation in the marketplace for solving problems and delivering dynamic, long-lasting solutions

LAKOS®

Separators and Filtration Solutions

Our Commitment to Innovation

Claude Laval Corporation, headquartered in the United States, is recognized worldwide for engineering, manufacturing and marketing the original centrifugal action, solids-from-liquids separator. Our LAKOS line of products are created using patented cyclonic separation technology, bringing the best performance and value to our customers. Building on a heritage of innovation for more than four decades, we continue to provide the best in filtration technology in today's diverse, growing and often demanding industrial sector. We continue to maintain our goal to expand our proprietary product offering by making improvements to our original design while also providing an increasing number of complimentary accessories, all resulting in streamlined, packaged solutions.

From the beginning the LAKOS patented design has been considered "clean technology". Water and energy conservation as well as waste minimization are at the core of our family of filtration products that are manufactured and sold through resellers and partners in over 75 countries. Ensuring the most efficient use of critical and limited resources, LAKOS technology remains a key element of any water and energy resource management strategy.

***LAKOS** offers Innovative - Adaptable - Intelligent Filtration Solutions for Process Industries*

Effective and Comprehensive Solutions

- Remove troublesome solids from liquids
- Extend the effective life of process equipment by reducing abrasive wear and fouling
- Control or eliminate waste liquid/solids
- Reduce downtime and maintenance
- Keep fluid systems operating at optimum efficiency
- Engineered compatibility
- Reliable start-up and operation
- Dependability you can trust
- Small footprint

- **Energy Savings**
  LAKOS Separators use less energy than traditional filtration. They keep downstream surfaces clean and reduce heat exchanger fouling, resulting in reduced energy costs. Other types of filters (like bag and other "barrier filters") have a very high per-square-inch-density when loaded with solids. As a result, any pumps used in these systems must be sized for the greater density of the barrier. When the barrier is clean the pump is actually oversized and uses excessive energy. By utilizing LAKOS products with a steady pressure drop, you don't need to oversize a pump for the filtration solution.
- **Water Savings**
  LAKOS solutions offer options for zero water loss. LAKOS products can also reduce water loss due to their ability to purge while operating, and can also optimize water savings when combined with a water treatment program, unlike other types of filters.
- **Waste Reduction**
  When collecting solids using traditional media filtration you can create more waste materials than you remove. Making the problem even worse, by blending solids with the media, the waste becomes more expensive to dispose of safely and is often classified as hazardous waste. LAKOS products can transfer dewatered solids into an application suitable collection receptacle, resulting in greatly reduced waste solids leaving the plant and creating the potential to either (a) sell the material to a recycler or (b) reuse it in the plant. This may eliminate solids removal fees and reduce government regulations and employee health issues as well.

LAKOS Successfully Applied in all Industries:

Automotive, see literature LS-588
Pre-wash and pre-paint stations, deluge processes, coolant filtration.

Food Processing, see literature LS-630
Bulk pre-washing, process liquid recycling, fry oil reclamation.

Primary Metals, see literature LS-740
Quench systems, spray nozzles and descaling operations, hot strip mills, rolling mills, scrap recovery.

Process Cooling, see literature LS-725
Heat exchanger protection, compressor jackets, pump seals, open and closed loop recirculation, heat pumps.

Municipal Services, see literature LS-849
Source water sand and grit removal, wastewater pre-treatment, water conditioning systems.

Vehicle Wash Systems, see literature LS-588
Cars, buses, trucks, trains. Pit/sump scavenging, wash water re-use without detergent/chemical stripping.

Ethanol, see literature LS-761
Spray nozzle protection, basin scavenging, bacteria control through reduced solids accumulation, heat exchangers, reduced blowdown and chemical usage, energy savings.

Oil and Gas, see literature LS-646
Pump protection, primary and secondary produced water, brine filtration, frac water, disposal wells, secondary recovery, offshore platforms.

Chemical Processing
Liquid recycling, pre-filtration, waste minimization.

Power Plants
Hydro, Thermal and Gas applications. Protecting pump seals, oil coolers, condensers, heat exchangers and cooling towers.

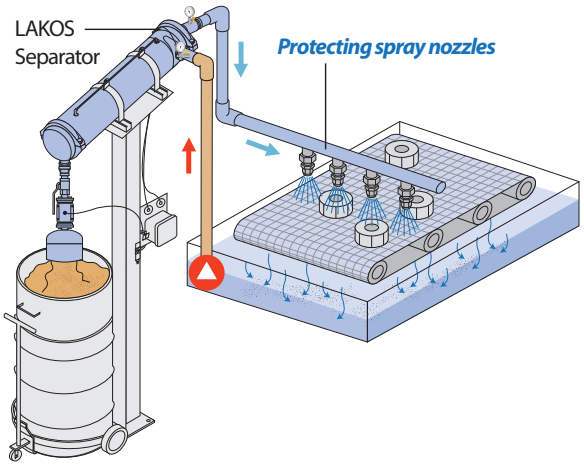
Mining Operations
Recycling, solids recovery, leach processes.

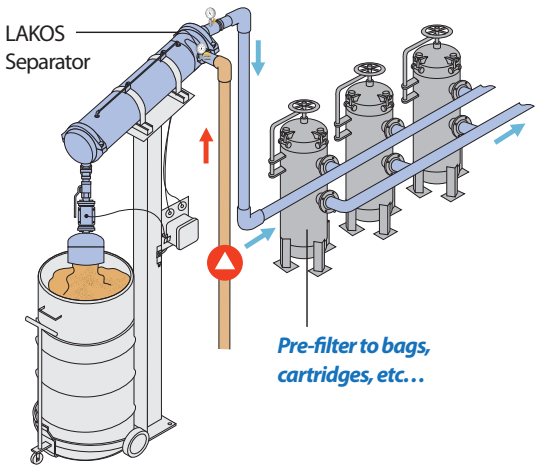
Pulp and Paper Mills
Plant intake water, black liquor, process recycling.

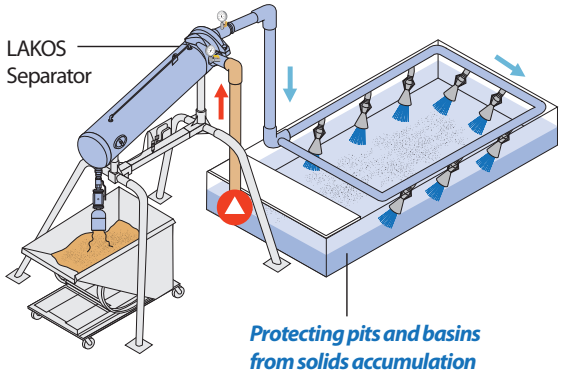
Fuel Distribution Systems
Jet fuel, kerosene, gasoline, pipeline, pre-filtration.

Also - industrial laundries, glass and plastics, fire protection systems, wet scrubbers, pump intake screening, water well pump protection and more.

All literature available at www.lakos.com.







Protect Your Fluid System Applications with the Performance of LAKOS

The potential for LAKOS Separators exists in virtually all fluid flow processes. The most common applications are shown here. Put our experience to work solving your toughest problems. Compare your operating costs to the payback value LAKOS offers in these areas. Call us for immediate and specific application assistance.

Most Common Applications

- **Spray nozzle and small orifice protection (see top illustration)**
  Avoid fouling, clogging and/or abrasive wear. Eliminate excessive downtime, maintenance and/or parts replacements.
- **Pre-filtration extends the life of finer filtration and water treatment systems (see illustration at left)**
  Reduce fine-micron cartridge or bag filter consumption with the pre-removal of larger solids (see performance on next page). Extend the operating cycles of filter elements and water treatment processes. Reduce maintenance, downtime and filter media replacement costs.
- **Heat Exchanger Protection**
  Control solids fouling. Remove precipitated grit and scale. Maintain optimum system efficiencies and avoid excessive energy loss.
- **Waste Minimization/Reduction**
  Extend the life of process liquids by removing troublesome solids. Concentrate separated solids for easy disposal or recovery/re-use. Reduce your government-regulated waste for significant process-related savings.
- **Pump Protection**
  Increases the life expectancy and efficiency of turbine and submersible pumps by a minimum of 4 times with a LAKOS Down Hole Separator. The DHS separates troublesome sand from the water before it enters the pump, and before it can grind away at a pump's internal components.
- **Prevent excessive solids accumulation in pits, sumps and tanks (see illustration at left)**
  Cooling tower basins. Quench pits. Parts washing tanks. Eliminate solids build-up and the inevitable shutdowns, shoveling and maintenance routines. Avoid solids-induced bacteria growth and premature liquid disposal.

All LAKOS Centrifugal Separators Feature:

- Continuous, uninterrupted filtration removal (no standby equipment required)
- Single pass predictability of 98% of 74 microns, given solids with specific gravity of 2.6 and water at 1.0.
- Appreciable aggregate removal of particles (up to 75%) as fine as 5 microns.
- No screens or filter elements to plug/fill
- Zero to minimal liquid loss

Resulting in

Increases Productivity/ Process Efficiency
Lowers Energy Costs
Reduce Maintenance Costs/ Extends Equipment Life
Conveniently Handles Waste
Lowers Health Risks
Reduces Fluid and/or Pressure Loss

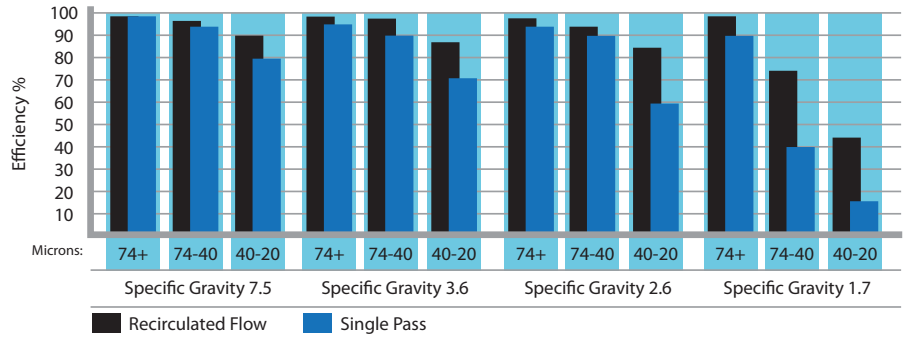
Additional Features of LAKOS Products

Particle size vs. particle weight
Centrifugal separation employs the principles of velocity and gravity to achieve performance. Essentially, heavier particles (indicated by higher specific gravity ratings, see chart at right) can be removed more easily and at smaller particle sizes (see graph below).

Improved performance when recirculating liquids
The continuous recirculation of a given liquid through a LAKOS Separator will remove a greater percentage of even finer solids. Field and laboratory proven, this attribute can also be achieved with a two stage "Bi-Sep Configuration" (see page 9) and is especially valuable when liquids and chemicals are expensive or when solids-contaminated liquid disposal is costly or regulated.

Fibrous solids and larger particles
Anticipating the need to remove large and fibrous solids as well as (or even instead of) very fine solids clearly reinforces the versatility and value of LAKOS Separators. Limited only by the clearance of the separator's internal Swirlex Tangential Slots or Annular Transfer Ring (see pages 6 & 7), LAKOS Separators can remove solids from 1/4 inch (6 mm) up to 2 inches (51 mm). Consult your LAKOS representative for specific details.

Solids Removal Chart



Typically Separable Materials	Specific Gravity
Aluminum	2.7
Ashes (Coal)	2.0
Brass	9.0
Bronze; Copper	8.9
Carbon; Concrete; Lava	1.8-2.5
Coal (Anthracite)	1.3-1.9
Earth (Silt; Soil)	1.2-2.0
Glass (Crystal)	3.0
Granite; Gravel	2.5-3.0
Graphite	2.3
Iron	7.8
Lead	11.3
Limestone	2.8
Manganese	7.4
Nickel	8.9
Sand; Silica; Shale	2.6-2.8
Steel	7.8
Tin Ore	6.4-7.0

Industrial Filtration

J-SERIES®

Heavy Duty Separators

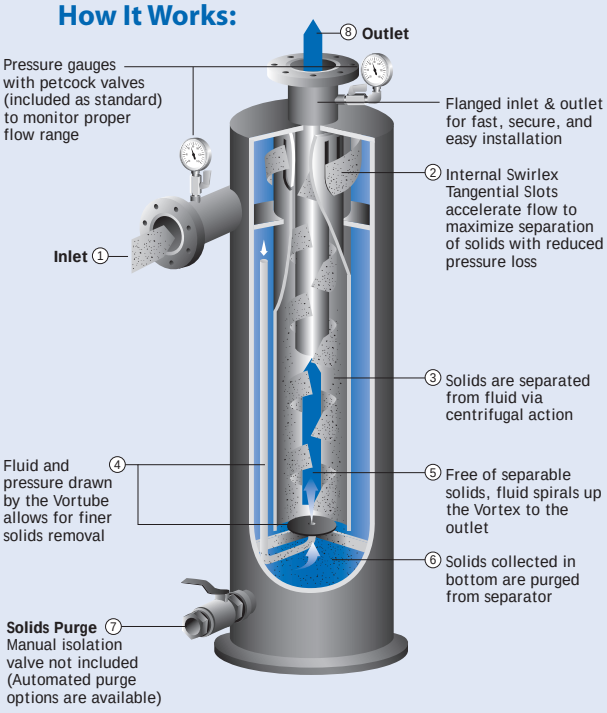
Flow Range: 4 - 12,750 U.S. gpm
(1 - 2,895 m³/hr)
Maximum Pressure: 150 psi (10.3 bar) – *Consult factory for higher pressures*

Commonly Used For:

- Spray nozzle protection
- Pre-filtration
- Source water filtration
- Heat exchanger protection

See literature LS-632 and LS-631 for details

How It Works:



See pages 10 & 11 for purging options

Down Hole Separator

DHS

Water Well Sand Damage Control

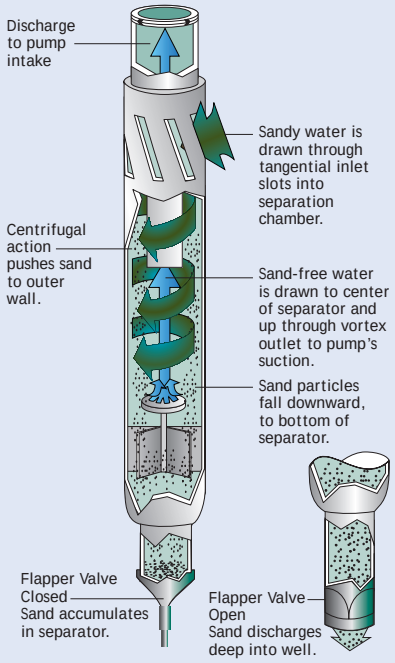
Flow Range: 100 - 3,180 U.S. gpm
(23 - 723 m³/hr)

Commonly Used For:

- Prevent sand damage to larger submersible and turbine pumps
- Prevent sand from entering process water supply

See literature LS-739 for details

How It Works:



All Purpose Separator Carbon Steel/Stainless

ILB/ILS

Carbon Steel Stainless Steel

Low Flow Solution

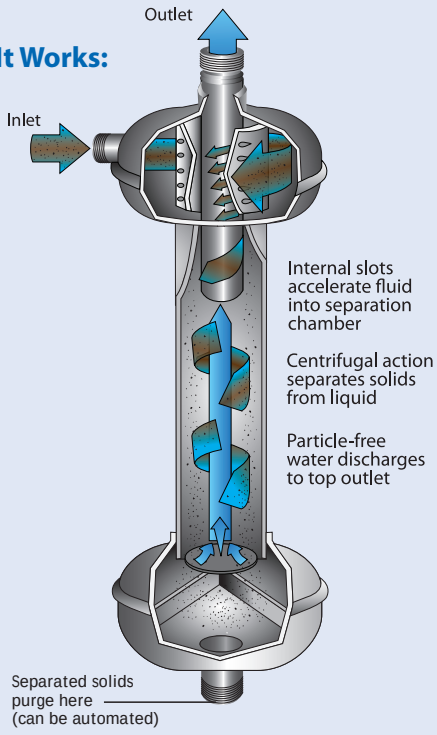
Flow Range: 3 - 290 U.S. gpm (.7 - 66 m³/hr)
Maximum Pressure: 150 psi (10.3 bar)

Commonly Used For:

- Low flow, low solids, load applications
- Testing

See literature LS-289 for details

How It Works:

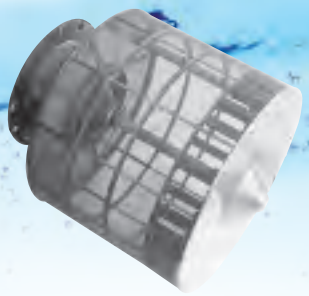


See pages 10 & 11 for purging options

Self-Cleaning Screen

ISF

Open Source Water Solution



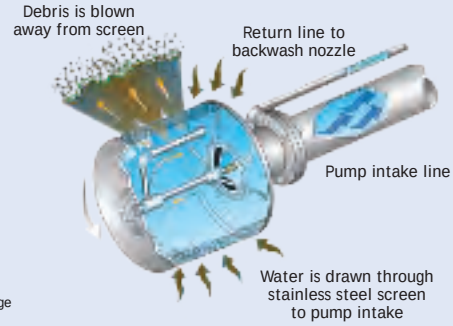
Flow Range: up to 2,700 U.S. gpm (up to 615 m³/hr)

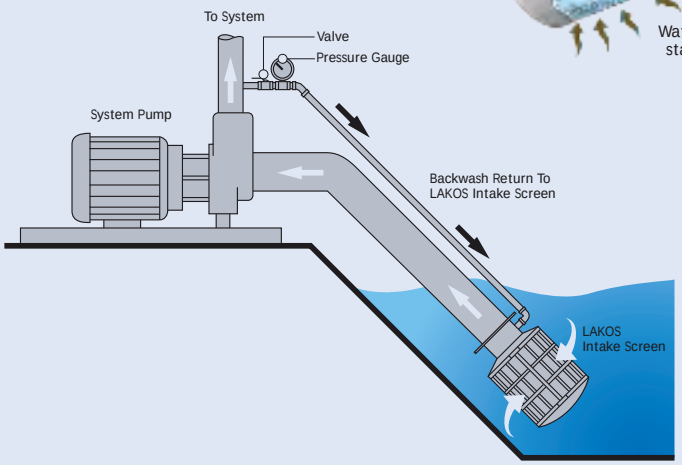
Commonly Used For:

- Source water from rivers, canals, lakes, etc.
- Protect pumps and other water system components from leaves, algae, moss, sticks, and other troublesome debris

See literature PC-125 for details

How It Works:





Skid Mounted J-Series with Strainer, Pump and Solids Handling Options

JCX System

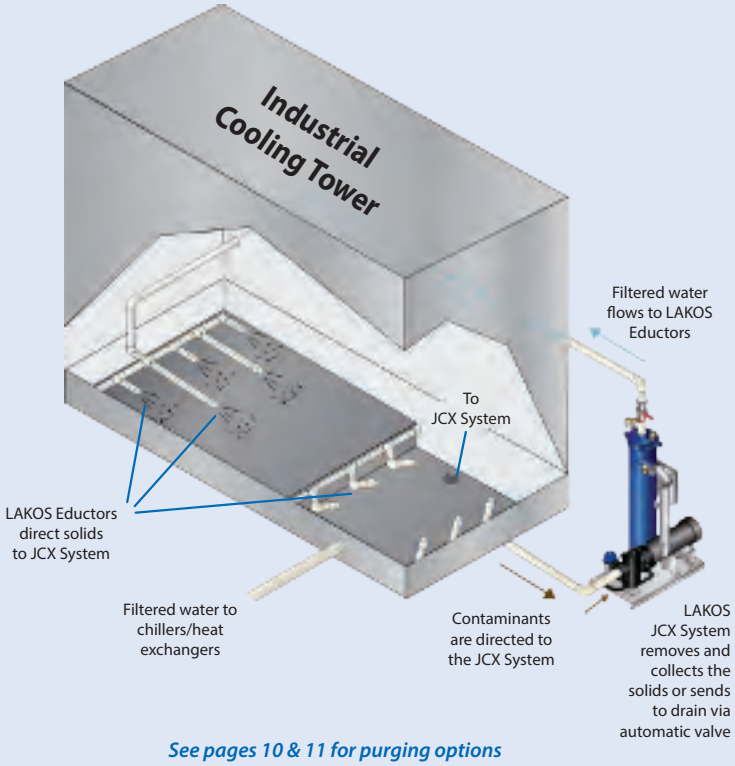
Process Cooling Tower Basin Cleaning

Flow Range: 100 - 1,200 U.S. gpm (23 - 273 m³/hr)
Maximum Pressure: 150 psi (10.3 bar) – *Consult factory for higher pressures*

Commonly Used For:

- Process cooling towers basin cleaning
- Reducing blow-down, bio fouling and chemical use

See literature LS-730 for details



See pages 10 & 11 for purging options

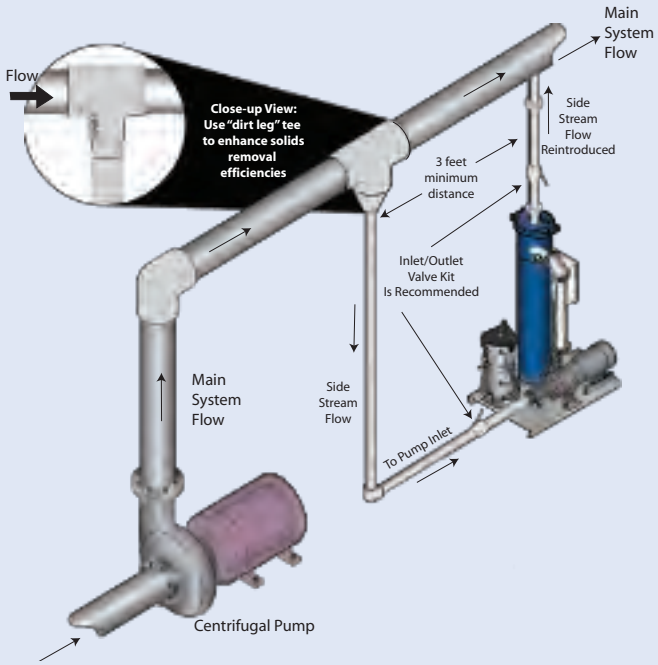
JBX System

Side Stream Packaged Solution

Flow Range: 100 - 1,200 U.S. gpm (23 - 273 m³/hr)
Maximum Pressure: 150 psi (10.3 bar) – *Consult factory for higher pressures*

Commonly Used For:

- Side stream cooling tower filtration
- Higher percentage of side stream flow



Elevated Separator for Enhanced Solids Handling Gravity Flow

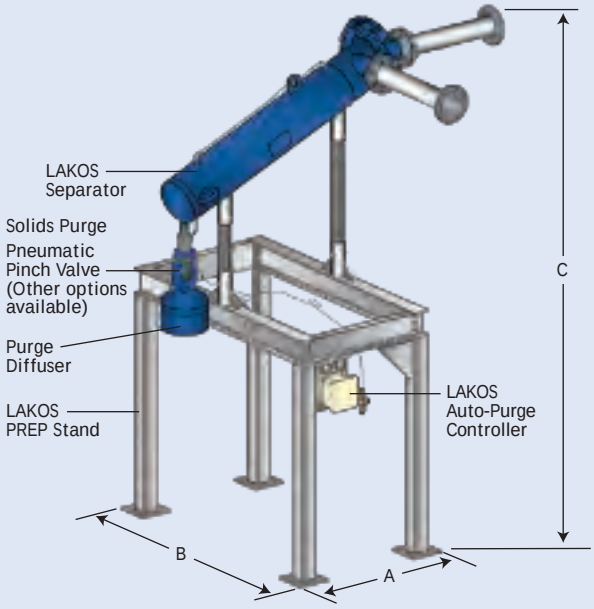
PRX System

Flow Range: 4 - 12,750 U.S. gpm (1 - 2,895 m^3/hr)
Maximum Pressure: 150 psi (10.3 bar) – *Consult factory for higher pressures*

Commonly Used For:

- Minimizing waste in pit sumps
- Turnkey solids recovery and removal

See literature LS-635 for details



See pages 10 & 11 for purging options

Separators Installed in Series

Bi-Sep and Tri-Sep Configurations

Enhanced Performance Solution

Tri-Sep Configuration shown

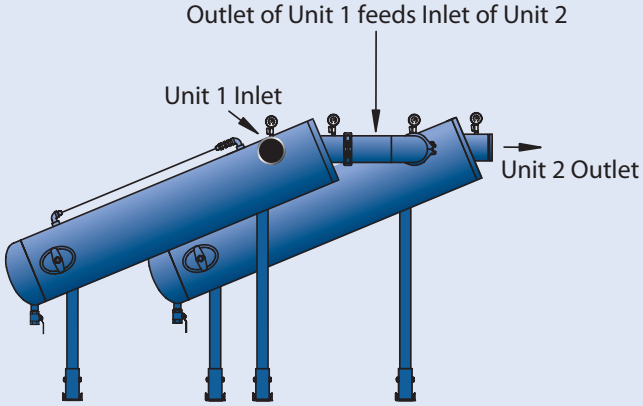
Flow Range: depends on model
Maximum Pressure: *Consult factory*

Commonly Used For:

- Increased efficiency through multiple passes
- Higher solids load handling
- Increased efficiency with finer solids

Boost Filtration Performance with Separators Installed in a Series

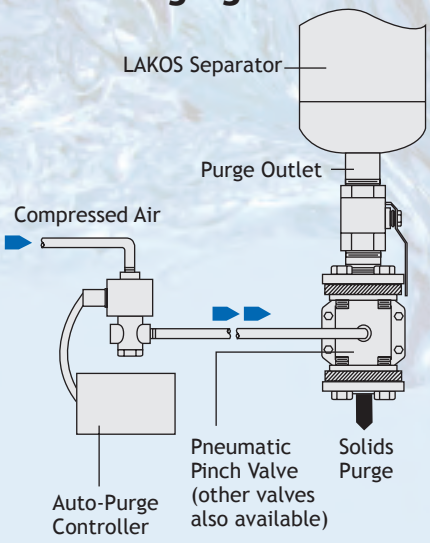
If your application includes a higher solids concentration or you wish to remove finer particulates than a single separator will allow, then combining two or more separators and piping them in series is a great option. Any LAKOS J-Series Centrifugal Separator can be configured in this way (see page 5 for recirculated flow chart).



Separation is a solution only when the solids have been removed:

- from the liquid
- from the separator
- and from the facility

Automatic Purging



AutoPurge Ball Valve

AutoPurge Pneumatic Pinch Valve or Electric Pinch Valve

AutoPurge Fail Safe Pneumatic Ball Valve

Solids Purge Transfer Systems

AutoPurge-Ball Valves – Requires only electricity to actuate the valve according to programmed purge frequency and duration. Refer to form LS-238 for details.

AutoPurge-Pneumatic Pinch Valves – Preferred technique for durability and abrasive solids. Requires electricity for the programmable controller and compressed air to operate the valve. Refer to form LS-237 for details.

AutoPurge-Fail Safe Pneumatic Ball Valves – Provides the added safety of closing the valve during a power failure. Compressed air and electricity are required. Refer to form LS-356 for details.

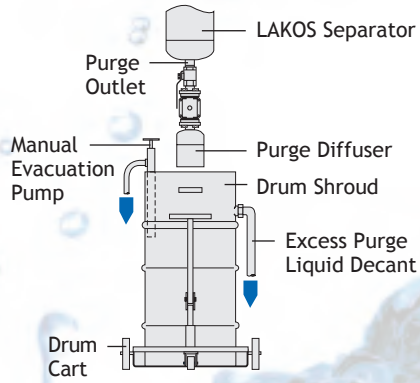
Purge Diffusers – When purging into an open vessel, this device prevents excessive splashing. Easily attaches to any LAKOS AutoPurge valve. Refer to form LS-563 for details.

Purge Liquid Concentrators – Significantly reduces liquid loss during purging by as much as 50 times less, providing a very concentrated solids discharge. Fully automated. Refer to form LS-542 for details.

Purge Diffuser

Purge Liquid Concentrator

Solids Handling Options



Systems also available with a tilt-style hopper.

Purge Bag Vessel (PBV)

Drum Shroud Decant System (SDS)

Purged Solids Handling Systems

Purge Bag (PBV) Vessel – A closed system with a bag filter to capture and concentrate purged solids. Includes indicator package to identify when bag requires change-out. *Solids Capacity: 360 cubic inches (6 liters)* Refer to form LS-687 for details.

Drum Shroud Decant (SDS) System – Turns a standard 55-gallon drum into a solids concentrating device, capable of 80-90% solids by volume. Unique shroud connects to the drum in order to decant excess purged liquid back to system use. *Solids Capacity: 12,700 cubic inches or 7 cubic feet (200 liters)* Refer to form LS-552 for details.

Solids Collection Hopper (SCH) Systems – Features an easy tilt design for solids discharge and decant connections to return excess purged liquid back to system use. Concentrates solids 80-90%. *Solids Capacity: 1 cubic yard or 27 cubic feet or 46,656 cubic inches (765 liters)* Refer to form LS-556 for details.

Custom Solids Handling Systems – LAKOS has designed systems involving extra-large containers, screw augers, rail cars, oversize dump trucks and more. Consult factory for special requirements.

Bag Filter Housing (BFH) – A solids collection and fluid recovery system. The BFH captures and concentrates solids in a closed vessel. It can also be used as a prefilter. Refer to form LS-460 for details.

Solids Collection Hopper (SCH) Systems

Custom Solids Handling Systems

Bag Filter Housing (BFH)

Application Selection Guide

FILTRATION SOLUTIONS

Problem Source	Problem	Recommended Filtration	Benefits	Flow Range	LAKOS Solution
Open Source Water	• Impeller damage and wear • Lost suction • Messy and time consuming maintenance • Blocked water flow	Self-Cleaning Pump Intake Screen	• Reliable self cleaning internal backwash system, keeps water intake area free of debris • Improved pump performance • Energy savings	50-2,400 U.S. gpm (11.3-545 m^3/hr)	**Self Cleaning Pump Intake Screen** **Model: ISF**
Source Water From Well	• Abrasive wear to pump's impellers and bearings • Expensive repairs and replacements • High energy usage • Sand in source water	Pump protection separator installed on suction of submersible pump	• Eliminates excessive wear to pump's impellers and bearings • Helps maintain pump's efficiency and saves money by reducing energy costs • Extends pump life by 5 times or more	100-3,180 U.S. gpm (23-722 m^3/hr)	**Pump Protection Sand Separator** for large submersible and turbine pumps **Model: DHS**
Process Water	• Plugged or worn spray nozzles • Uneven water distribution • Excessive pumping • Costly premature replacement costs • High energy/operating costs • Unscheduled shutdowns for maintenance • Solids causing process waste	Centrifugal sand separator	• Centrifugally removes sand and other sediment up to 98% of 200 mesh • No moving parts to wear out; no screens or filter elements to clean or replace • Reduced operating costs • Increased productivity	4-12,750 U.S. gpm (1-2,895 m^3/hr)	**High Performance Liquid Solids Separation Systems** **Models:** • **JPX, JPL and Bi-Sep/Tri-Sep Configurations** (high flow in carbon and stainless steel)
Process Water	*Same as above but also:* • Limited space • Turnkey solution desired	Complete Filtration Solution	*Same as above but also:* • Convenient total solution in a single system	4-12,750 U.S. gpm (1-2,895 m^3/hr)	**Packaged Systems** **Models:** • **JCX** • **JBX** • **PRX**
Process Water Where Fine Filtration Is Needed	• Fine particles	Barrier filtration typically used in tandem with LAKOS Separator, which acts as a pre-filter to finer filtration	• Easy to install	Up to 450 U.S. gpm (102 m^3/hr)	**Cartridge and Bag Filters**

LAKOS®
Separators and Filtration Solutions

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LAKOS Separators and Filtration Solutions are manufactured and sold under one or more of the following U.S. Patents: 5,320,747; 5,338,341; 5,368,735; 5,425,876; 5,571,416; 5,578,203; 5,622,545; 5,653,874; 5,894,995; 6,090,276; 6,143,175; 6,167,960; 6,202,543; 7,000,782; 7,032,760 and corresponding foreign patents, other U.S. and foreign patents pending.