High performance liquid-solids separation systems

Exclusive internal acceleration creates maximum performance to achieve maximum protection of fluid handling systems from unwanted solids (see illustration inside for details). Its advanced & patented design, building upon the performance LAKOS is known for, now also removes 50% more of the finer solids (< 40 microns), resulting in higher aggregate solids removal. Independently tested. Proven superior for today’s demanding filtration requirements. For settleable solids only.

Trouble-free operation & advanced purging/solids-handling concepts keep fluids clean and concentrate separated solids

No screens or filter elements to clean or replace; no messy servicing routines

No backwashing; zero fluid loss options

Low & steady pressure loss

Choice of profiles to accommodate space/piping limitations

Swirllex™ internal accelerating slots for optimum solids-removal performance; patented

Vortube™ for enhanced solids separation/collection; patented

Grooved inlet/outlet connections for easy installation

In-line inlet/outlet configuration for simplified piping (low-profile models only)

Unishell construction for easy installation

Optional material construction & ASME code

Flow range:
285 - 12,750 U.S. gpm
(65 - 2895 m³/hr) per unit

Maximum standard pressure rating:
150 psi (10.3 bar)

Maximum fluid operating temperature:
180°F (82°C)

See also eHTX Separators for Higher Energy Efficiency. See Literature LS-924 for details.

LAKOS is a proud member of ASHRAE and BOMA
Solids Removal Chart

<table>
<thead>
<tr>
<th>Microns @ Specific Gravity 2.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
</tr>
<tr>
<td>Single Pass</td>
</tr>
</tbody>
</table>

For improved energy efficiency and lower pressure loss, refer to eHTX Separators. See literature LS-924.

How It Works

Outlet

Grooved-end connections at inlet & outlet for fast, secure, easy installation

Internal Swirllex tangential slots accelerate flow to maximize separation of solids

Particles are separated from fluid via centrifugal action

Free of separable particles, fluid spirals up the vortex to the outlet

Vortex flow draws fluid and pressure from the solids collection chamber via the Vortube

Fluid and pressure drawn by Vortube to more positively allow even finer solids to be drawn into solids collection chamber (Separated, instead of entering vortex flow to outlet)

Solids Purge

HTH Installation

with Optional SRV Package

Inlet

Lakos HTH Separator

Lakos SRV: Solids Recovery Vessel

Liquid return to pump suction

System Flow

Pumped Solids

System Flow

Pump
### Specifications

<table>
<thead>
<tr>
<th>Model*</th>
<th>Flow Range</th>
<th>Inlet/Outlet</th>
<th>Purge Size</th>
<th>Collection Chamber Capacity</th>
<th>Weight</th>
<th>Weight with Water</th>
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<tbody>
<tr>
<td></td>
<td>U.S. gpm</td>
<td>m³/hr</td>
<td>Male N.P.T.</td>
<td>gal liter</td>
<td>lbs</td>
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</table>

*Models ending with 'L' are low profile, 'V' for vertical profile

**Inlet/Outlet may also be specified with ANSI flanges or DIN flanges

- **Maximum pressure rating:** 150 psi (10.3 bar); consult factory for higher pressure requirements
- **Pressure loss range:** 3 - 12 psi (.2 - .8 bar)
- **Maximum particle size:** .375 inch (9 mm)
- **Material (standard carbon steel):** Domes - A 285C/516 GR70, .25 inch (6 mm) minimum thickness
- Other parts - A - 36, A - 538 or other quality grade, .25 inch (6 mm) minimum thickness
- **Paint coating:** Acrylic urethane, spray-on black

### Flow vs. Pressure Loss

- **Flow Range (m³/hr):** 50, 75, 100, 150, 350, 500, 1,000, 2,000
- **Pressure Loss (psi):** 0.2, 0.4, 0.6, 0.8, 1.0
- **Flow Rate (U.S. gpm):** 200, 300, 400, 1,000, 2,000, 5,000, 10,000
Inlet/Outlet Pressure Gauge Taps

1/4-inch NPT female; required at both inlet and outlet for proper flow verification; optional kit available, including inlet/outlet pressure gauges with petcock valves and a manual isolation valve for the purge connection

Inspection/Drain Plug

1/2-inch NPT female; provides access to upper chamber for inspection of slot area; also allows for draining the upper chamber if necessary

Lifting Ring

For installation purposes

Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>D (mm)</th>
<th>E (mm)</th>
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Dimensions for reference only. Consult factory when pre-plumbing.
Inlet/Outlet Pressure Gauge Taps
1/4-inch NPT female; required at both inlet and outlet for proper flow verification; optional kit available, including inlet/outlet pressure gauges with petcock valves and a manual isolation valve for the purge connection

Inspection/Drain Plug
1/2-inch NPT female; provides access to upper chamber for inspection of slot area; also allows for draining the upper chamber if necessary

Lifting Rings
For installation purposes

Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>mm</th>
<th>B</th>
<th>mm</th>
<th>C</th>
<th>mm</th>
<th>D</th>
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<td>42</td>
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</table>

Dimensions for reference only. Consult factory when pre-plumbing.
1. LAKOS HTH Separators must be purged regularly to remove the separated solids from the temporary collection chamber.

2. All purge hardware should be installed prior to any elbows or turns in the purge piping. Avoid “uphill” purging, which can clog purge piping and hinder effective solids evacuation.

3. For best results, purging is recommended while the LAKOS Separator is in operation, utilizing system pressure to enhance solids evacuation.

4. LAKOS provides a full selection of rugged, durable automatic purging and solids-handling systems to optimize the performance of your separation system. CAUTION: Economy-type valves typically fail prematurely in the harsh/abrasive environment of solids purging.

5. Be sure to include an isolation valve prior to the automatic valve (available from LAKOS at an additional cost) in order to facilitate servicing of the automatic valve without system shutdown.

LAKOS HTH 3500 used to keep wind-blown sand from damaging heat exchangers and other equipment in manufaacturing plant in New Mexico.

Series of LAKOS HTH 1950 separators used to keep sand our of customer cooling tower installation in Mexico.

LAKOS HTH 0500 used to keep water tower condenser free of solids in chilled water system.
Separator Type & Performance
The removal of specific unwanted solids from a pumped/pressurized fluid flow system shall be accomplished with a centrifugal-action vortex separator. Solids removal efficiency is principally predicated on the difference in specific gravity between the liquid and the solids. Fluid viscosity must be 100 SSU or less.

In a single pass through the separator, given solids with a specific gravity of 2.6 and water at 1.0, performance is predictably 98% of 74 microns and larger. Additionally, particles finer in size, heavier by specific gravity and some lighter by specific gravity will also be removed, resulting in an appreciable aggregate removal of particles (up to 75%) as fine as 5 microns.

In a recirculating system, 98% performance is predictable to as fine as 40 microns (given solids with a specific gravity of 2.6), with correspondingly higher aggregate performance percentages (up to 90%) of finer solids.

Performance Requirement
Separator performance must be published independent test results from a recognized and identified test agency. Standard test protocol of upstream injection, downstream capture and separator purge recovery is allowed with 50-200 mesh particles to enable effective, repeatable results. Single-pass test performance must not be less than 95% removal. Model tested must be of the same flow-design series as specified unit.

Separator Design & Function
A tangential inlet and mutually tangential internal accelerating slots shall be employed to promote the proper velocity necessary for the removal of the separable solids. The internal accelerating slots shall be spiral-cut for optimum flow transfer, laminar action and particle influence into the separation barrel. The separator’s internal vortex shall allow this process to occur without wear to the accelerating slots.

Separated particle matter shall spiral downward along the perimeter of the inner separation barrel, in a manner which does not promote wear of the separation barrel, and into the solids collection chamber, located below the vortex deflector plate.

To insure maximum particle removal characteristics, the separator shall incorporate a vortex-induced pressure relief line (Vortube), drawing specific pressure and fluid from the separator’s solids collection chamber via the outlet flow’s vortex/venturi effect, thereby efficiently encouraging solids into the collection chamber without requiring a continuous underflow or excessive system fluid loss.

System fluid shall exit the separator by following the center vortex in the separation barrel and spiral upward to the separator outlet.

Purging & Solids Handling
Evacuation of separated solids shall be accomplished automatically, employing a dedicated solid-state controller in a NEMA 4 housing. Available for worldwide single-phase voltages of 24VAC to 250VAC. Programming options to include a purge frequency range of every 60 seconds to every 23 hours, 59 minutes. Purge duration options range from 10 seconds to 59 minutes, 59 seconds. Non-volatile memory. Meets CSA requirements. This controller shall automatically operate one of the following techniques:

Motorized Ball Valve - An electrically-actuated valve shall be programmed at appropriate intervals and duration in order to efficiently and regularly purge solids from the separator’s collection chamber. Valve body shall be bronze (optional stainless steel also available). Valve ball shall be stainless steel with teflon seat. Valve size: _______

Pneumatic Ball Valve - A fail-safe valve shall be programmed at appropriate intervals and duration in order to efficiently and regularly purge solids from the separator’s collection chamber. A spring-control shall provide that this valve closes in the event that compressed air or electricity is interrupted. Valve body shall be bronze (optional stainless steel also available). Valve ball shall be stainless steel with teflon seat. Valve size: _______

Solids Recovery Vessel - Separated solids shall be continuously purged under controlled flow into a vessel equipped with one (or three, depending on the model specified) 25-micron filterfelt solids collection bag. Solids collection capacity: 360 cubic inches (6 liters). If larger vessel is specified: 1080 cubic inches (18 liters). Excess liquid shall pass through the bag and return to system flow via piping connected to the system pump’s suction line. The system shall include an air/pressure relief line for the vessel. If optional Indicator Package has been specified: System also includes manual isolation valves for use when servicing the collection bag; sightglasses for verification of flow through the vessel; annunciator for indicating when the collector bag needs cleaning/replacement; flow control orifice to minimize fluid volume/velocity through the vessel and collector bag; clamps, tubing and specialty piping for completing the system assembly.

Systemization (A specified option only)
The separator and its accessories shall be packaged as a complete system, with all components from a single source. In addition to the equipment already specified, the system shall also include pressure gauges with petcock valves for both the inlet and outlet of the separator and an isolation valve at the purge outlet for servicing of the automatic valve as necessary without interrupting system flow.

Separator Details
A. Inlet & outlet shall be grooved connections, size: _______
B. Purge outlet shall be threaded size: _______
C. The separator shall operate within a flow range of: _______
D. Pressure loss shall be between 3-12 psi (.2 - .8 bar), remaining constant, varying only when the flow rate changes.

Separator Construction
The separator shall be of unisheen construction with A-36, A-538 or equivalent quality carbon steel, minimum thickness of 25 inches (6.35 mm). Maximum operating pressure shall be 150 psi (10.3 bar), unless specified otherwise.

Paint coating shall be acrylic urethane, spray-on, gloss black.

As a specified option only: The separator shall be constructed in accordance with the standards of the American Society of Mechanical Engineers (ASME), Section VIII, Division 1 for pressure vessels. Certification shall be confirmed with the registered “U-stamp” on the body of the separator.

Separator Source & Identification
The separator shall be manufactured by LAKOS Filtration Systems, a division of Claude Laval Corporation in Fresno, California USA.

Specific model designation is: _______
Limited Warranty

All products manufactured and marketed by this corporation are warranted to be free of defects in material or workmanship for a period of at least one year from date of delivery. Extended warranty coverage applies as follows:

All LAKOS Separators: Five year warranty

All other components: 12 months from date of installation; if installed 6 months or more after ship date, warranty shall be a maximum of 18 months from ship date.

If a fault develops, notify us, giving a complete description of the alleged malfunction. Include the model number(s), date of delivery and operating conditions of subject product(s). We will subsequently review this information and, at our option, supply you with either servicing data or shipping instruction and returned materials authorization. Upon prepaid receipt of subject product(s) at the instructed destination, we will either repair or replace such product(s), at our option, and if determined to be a warranted defect, we will perform such necessary product repairs or replace such product(s) at our expense.

This limited warranty does not cover any products, damages or injuries resulting from misuse, neglect, normal expected wear, chemically-caused corrosion, improper installation or operation contrary to factory recommendation. Nor does it cover equipment that has been modified, tampered with or altered without authorization.

No other extended liabilities are stated or implied and this warranty in no event covers incidental or consequential damages, injuries or costs resulting from any such defective product(s).

## Solids Collection - Zero Liquid Loss and Capture Separated Solids

- Capture separated solids easily and return liquid back to system
- Remove collected solids without interrupting system flow
- Single (1) bag Solids Recovery Vessel (SRV) available in two sizes: 16-inch (SRV-816) and 33-inch (SRV-833)
- Three (3) bag Closed Recovery Vessel (CRS) for 10” separators and larger
- Filter bags available from 10 micron to 50 microns
- Optional indicator package provides convenient way to determine bag change-outs on SRV-816, SRV-833 and CRS-836B
- Optional dry contact available for remote monitoring. Can be tied to BMS (Building Management System)
- Lower waste water treatment costs

For more information, see LAKOS Literature LS-576 and LS-622

## Purge Options - Automated Solids Purge

- Purge separated solids from LAKOS Separators at pre-determined intervals. LAKOS Controllers provide options to control and adjust purge intervals and duration
- LAKOS Purge valves are capable of handling all types of fine, fibrous, and mildly abrasive solids
- EFS: Electric Battery Backup Fail-safe valve automatically closes the valve in the event of a power failure
- LAKOS Controllers feature solid state reliability, thus removing the need for routine maintenance
- All LAKOS Valves are CE compliant

For more information, see LAKOS Literature LS-238 and LS-913

## Tower Basin Sweeping with HydroBoosters

- Patented LAKOS HydroBoosters create sweeping action on the cooling tower basin floor to reduce under-deposit corrosion, cooling tower nozzle clogging and extend cooling tower life
- HB and eHB HydroBoosters Vortexing action moves cooling tower solids towards the filtration system by using directed turbulence, thereby preventing solids accumulation on the basin floor, and removing the food source for biological activity
- Minimize manual basin cleaning, cooling tower maintenance, risk of injury associated with basin floor cleaning, and system downtime
- HB and eHB HydroBoosters are designed for durability and to resist cooling tower water chemicals