# High performance liquid-solids separation systems

Flow range:

285 - 12,750 U.S. gpm (65 - 2895 m<sup>3</sup>/hr) per unit

Maximum standard

pressure rating: 150 psi (10.3 bar)

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 settlable 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

Swirlex 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



How-it-Works Illustration

Model Specifications

Installation & Operating Instructions

Maintenance & Purging

Engineering Specifications





# How It Works



Lakos products are manufactured and sold under one or more of the following U.S. Patents: 3,289,608; 3,512,651; 3,568,837; 3,701,425; 3,947,364; 3,963,073; 4,027,481; 4,120,795; 4,123,800; 4,140,638; 4,147,630; 4,148,735; 4,305,825; 4,555,333; 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; Des. 327,693; and corresponding foreign patents; other U.S. and foreign patents pending.



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# Specifications

Model*	Flow Range		Inlet/Outlet Grooved	Purge Size	Collection Chamber Capacity		Weight		Weight with Water	
	U.S. gpm	m³/hr	Coupling**	Male N.P.T.	gal	liter	lbs	kg	lbs	kg
HTH-0285-L HTH-0285-V	285-525	65-120	4"	1-1/2"	2.1	7.9	398	181	520	236
					3.8	14.4	357	162	463	211
HTH-0450-L HTH-0450-V	450-825	100-190	6"	1-1/2"	2.8	10.6	606	275	1006	457
					5.6	21.2	568	258	936	426
HTH-0500-L HTH-0500-V	500-1100	115-250	6"	1-1/2"	2.8	10.6	613	279	1003	456
					5.6	21.2	575	261	1011	460
HTH-0810-L HTH-0810-V	810-1670	185-380	8"	1-1/2"	6.2	23.5	838	381	1584	720
					9.1	34.4	819	372	1506	685
HTH-1275-L HTH-1275-V	1275-3100	290-705	10"	2"	11.5	43.5	1293	588	2730	1241
					21.8	82.5	1360	618	2710	1232
HTH-1950-L HTH-1950-V	1950-4350	440-990	12"	2"	15.0	56.8	1618	736	3552	1615
					30.0	113.6	1703	774	3529	1604
HTH-3500-L HTH-3500-V	3500-6800	795-1545	16"	2"	50.6	191.5	4631	2105	10556	4798
					81.3	307.8	4759	2163	10301	4682
HTH-6700-L HTH-6700-V	6700-12750	1522-2895	20"	2"	81.0	306.6	7333	3333	17254	7843
					162.0	613.2	7788	3540	17185	7811

\*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 - 53B or other quality grade, .25 inch (6 mm) minimum thickness

Paint coating: Acrylic urethane, spray-on black



Flow vs. Pressure Loss

A HTH-0285
B HTH-0450
C HTH-0500
D HTH-0810
E HTH-1275
F HTH-1950
G HTH-3500
H HTH-6700

# **HTH Low Profile**



### 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

Consult factory when pre-plumbing.



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## Installation Instructions

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## Maintenance/Purging

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 solidshandling 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 Separators are shipped on skids or in wooden crates. Support legs (low profile units only) are detached for shipping. A large ring, located on the unit's side or upper chamber, is provided for hoisting as necessary.

A suitable foundation is necessary to accommodate the LAKOS Separator's weight including liquid (see data, page 3). Anchor bolts are recommended in the base of the legs (low profile) or skirt (vertical profile).

Prior to installation, inspect the inlet/outlet/purge connections for foreign objects incurred during shipping/storage.

Inlet/outlet pipe connections to the LAKOS Separator should be a straight run of at least five pipe diameters to minimize turbulence and enhance performance.

Proper purge hardware and/or solids-handling equipment is required to flush separated solids from the separator (see details, page 2).

All LAKOS Separators operate within a prescribed flow range (see data, page 3). Pipe size is not a factor in model selection. Use appropriate hardware to match the inlet/outlet size. Grooved couplings are not included with the separator. Optional flanged connections are available upon request.

Inlet pressure to the LAKOS Separator must be at least equal to or greater than the anticipated pressure loss through the separator (see pressure loss chart, page 3) plus 15 psi (1 bar) plus whatever downstream pressure is required.

Pressure gauges are required at both the inlet and outlet of the separator in order to monitor pressure loss and proper system flow (see "Flow vs. Pressure Loss" chart, page 3). Gauge kit available from LAKOS at additional cost. If separator operates with an open discharge, a valve should be installed to create a back pressure of at least 5 psi (.3 bar).

Winterizing is important if the LAKOS Separator is to remain idle in freezing temperatures. Drain liquid as necessary to avoid expansion of water to ice and related damages.

## 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 supported by 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 fiberfelt 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 componentry 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 unishell construction with A-36, A-53B 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 then 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, chemicallycaused 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).

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