

LAKOS Separators: Ethanol's Choice for Filtration

LAKOS has been leading the process filtration industry for over 40 years and solving filtration needs in ethanol plants for more than a decade



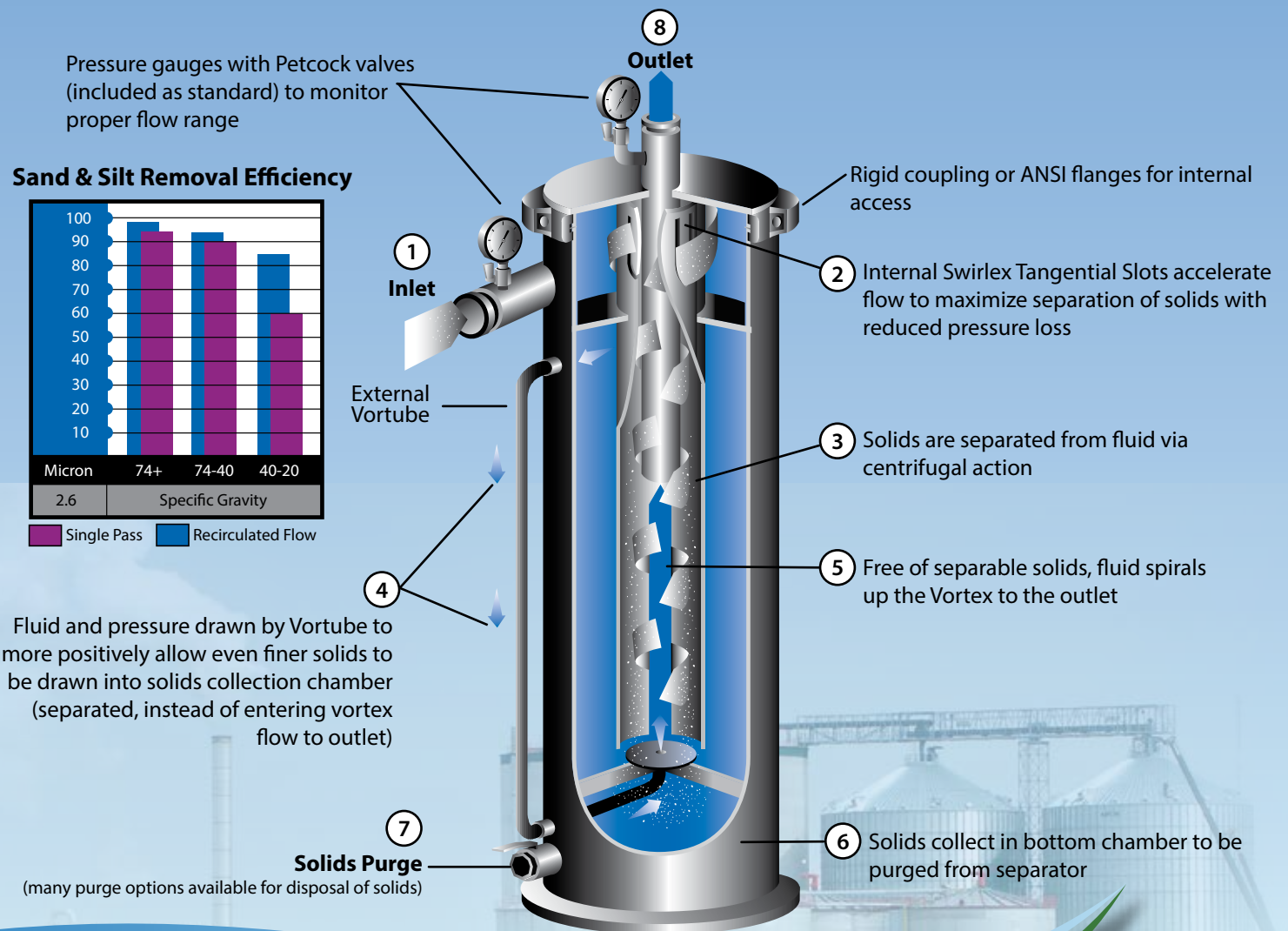
LAKOS Solutions for Ethanol Plants

LAKOS is dedicated to facilitating ethanol plants in being energy efficient and supporting their efforts to maintain operation at optimum energy balance levels. Maintaining this level of efficiency requires clean water and conservation of key components, using non-barrier, non-strainer, centrifugal filtration.

Water plays a vital role in the production of ethanol, whether it be well water, surface water or municipal/city water. The processing of plant materials into ethanol involves heating and cleaning processes. Heat demands continuous cooling techniques and the removal of unwanted solids. Each of these require filtration to optimize the operating performance of an ethanol plant. LAKOS Filtration can increase a plant's efficiency, which will in return increase overall productivity as well as profits, by:

- 1) Maximizing output through efficient plant operations
- 2) Using best-in-class practices to improve efficiency
- 3) Optimizing production margins by reducing overall energy consumed

How It Works: LAKOS Centrifugal-Action Separation



Most Common Filtration Solutions

PROBLEM AREAS IN ETHANOL PLANTS:

KEY LAKOS BENEFITS



Clean In Place (CIP)

- 1) Clogged nozzles
- 2) Loss of pressure
- 3) Downtime for nozzle replacement and/or cleaning

- Removes sand, silt, and fibrous materials buildup
- Continuous operation, no downtime
- Low equipment maintenance
- Protects productivity



Cooling Towers

- 1) Solids that build up from process water and airborne sources
- 2) Under-deposit corrosion
- 3) Maintaining entire system efficiency
- 4) Equipment downtime

- Keeps basins swept, with no manual basin cleaning
- Extends equipment life, resulting in no under-deposit corrosion
- Saves money with less downtime and less maintenance
- Increases entire system productivity and assisting with overall system energy savings



Cooling Loop

- 1) Clogging of high-heat, low-flow areas
- 2) Accumulation of suspended solids
- 3) Maintaining entire system efficiency

- Side stream filtration is easy to retrofit and effectively controls solids deposition and fouling in cooling tower systems
- Lowers energy costs due to improved heat transfer capacity
- Reduces maintenance and cleaning processes



Heat Exchanger

- 1) Fouling of small orifices of heat exchanger
- 2) Managing/reducing energy costs
- 3) Requires frequent cleaning

- Enhances thermal performance
- Makes system more efficient by preventing fouling/dirt build up
- Cleaner system means better heat transfer rates for longer periods of time ensuring maximum energy efficiency



Plant Source Water

- 1) Sand damage to well pumps impellers and bearings
- 2) Solids from source water getting into the process
- 3) Downtime/maintenance for replacing equipment

- Extends the life of the pump by removing solids
- Increases pump efficiency
- Eliminates the need for a clean water source
- Trouble free operation
- No backwashing required
- Keeps solids out of the process



LAKOS is being used by some of the nation's top ethanol producers:

- 1) Green Plains Energy
 - 2) Golden Grain Energy
 - 3) Cardinal Ethanol
 - 4) Platt Valley Ethanol
 - 5) Pacific Ethanol
- and many more . . .

JPX Separators are a Common Choice for Ethanol Filtration

The JPX is a High Performance Liquid-Solids Separation System, with internal acceleration (see page 2 diagram) that provides optimum performance to protect fluid handling systems from unwanted solids. Its advanced and patented design builds upon the performance for which LAKOS is known. Independently tested and proven superior for today's demanding filtration requirements. For settleable solids only, the JPX operates trouble free and has highly developed purging/solids-handling capabilities to remove solids from a fluid and then efficiently dispose of them.

For more information on LAKOS JPX Separators, please refer to literature LS-632.



JPX-1160-V/Stainless Steel with AutoPurge in Ethanol Plant

LAKOS also offers packaged solutions for cooling tower basin cleaning or side stream filtration for greater efficiencies. Plant efficiency equals increased productivity, and energy savings. Using non-barrier, non-strainer centrifugal filtration, LAKOS Separators can help maximize production at a minimal cost, providing a consistent level of filtration with little or no maintenance. This saves time, energy and money for ethanol plants.



JCX Filtration Systems

JCX Systems are a common filtration solution for industrial cooling towers. For more information on our packaged systems, please refer to literature LS-730 or visit our website at www.LAKOS.com



Other LAKOS Filtration Solutions Commonly Used In Ethanol Plants

LAKOS Separators and Filtration Solutions are manufactured and sold under one or more of the following U.S. Patents:

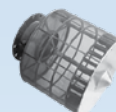
5,320,747; 5,338,341; 5,368,735;
5,425,876; 5,571,416; 5,578,203;
5,622,545; 5,653,874; 5,894,995;
6,090,276; 6,143,175; 6,167,960;
6,202,543; 7,000,782; 7,032,760 and
corresponding foreign patents, other U.S.
and foreign patents pending.



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PPS Submersible Pump Protection Separator



ISF- Self Cleaning Pump Intake Screen



BFH- Bag Filter Housing



STS- Sand Media Tank System