

For The Oil & Gas Industry



LAKOS
Oil & Gas Desanding Systems[®]

Performance. Productivity. Profitability.

Throughout the processing of oil, there are requirements for the protection of fluid-handling equipment from the abrasive effects of sand and grit. Pumps, valves, tanks, piping...from exploration to refining, unwanted solids must be removed to maintain effective operating systems.

Effectively applied, the benefits are increased production capacity and reduced downtime/maintenance expenses. Without additional major capital investment. Without increased labor burden. With minimal impact to existing piping designs and process flows.

Merging the demands of profitability with the pressures of global competition, you cannot overlook LAKOS technology for its significant potential to reduce costs and increase production.

Give LAKOS Oil & Gas your serious consideration.

LAKOS Oil & Gas. You need to remove sand & grit from produced water. You know the drawbacks of traditional filtration techniques. You have the opportunity to make a much better choice.

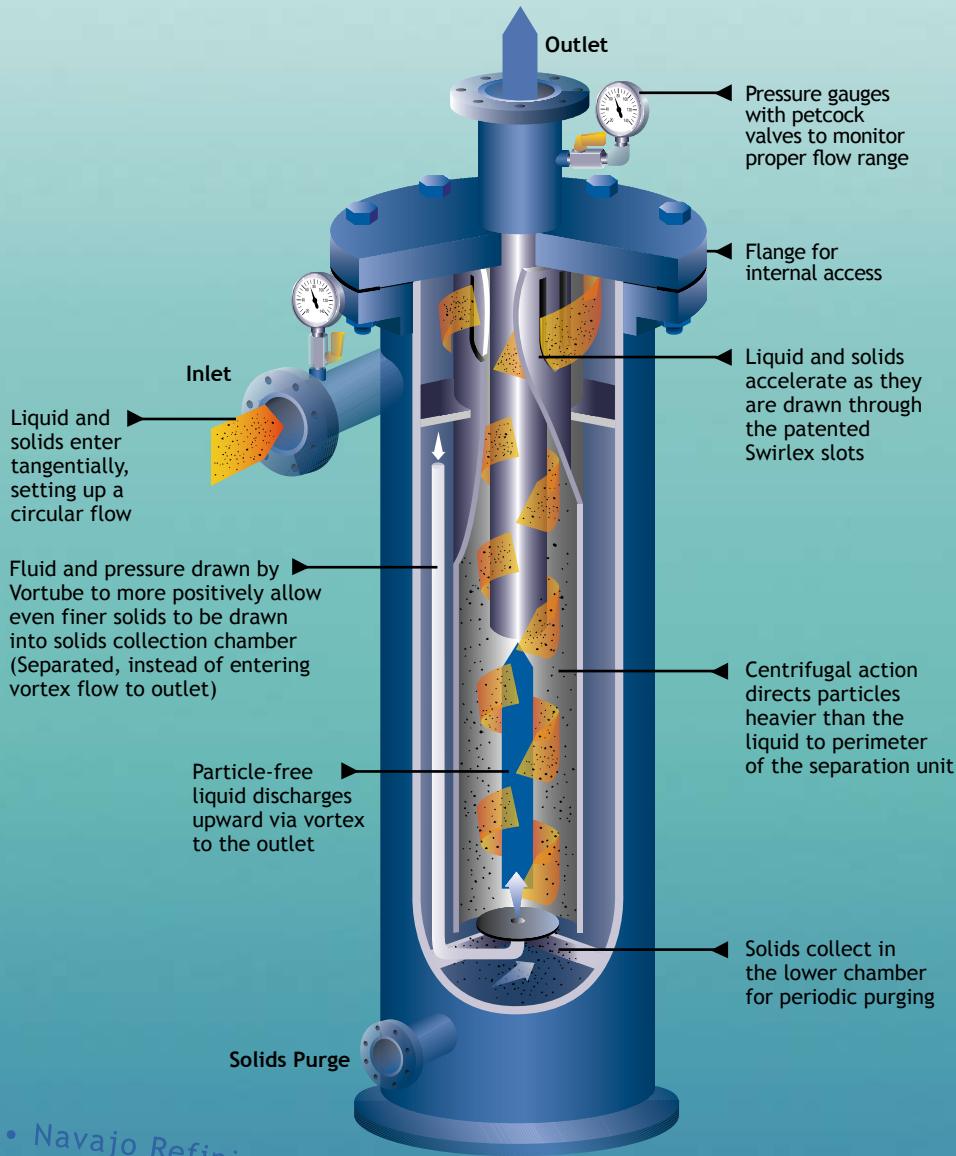
LAKOS Oil & Gas employs centrifugal action to remove troublesome solids from liquids. Specialized accessories concentrate the solids for easy handling and zero liquid loss. Compact designs save space and fit into the toughest piping schemes. Complete systems. Engineered compatibility. Simplified, one-source purchasing.

Easy installation. Reliable start-up and operation. Dependability you can trust. With proven applications in the oil & gas industry for over 20 years, LAKOS Oil & Gas expands on that success with a dedicated line of precision desanders to meet a wide range of flow rates, solids loads and application conditions (see page 5 for more details). Tap into this experience. Challenge this capability. Benefit from this technology.

Shell • Total/Fina/ELF • Chevron • British Petroleum • Occidental • Exxon
Phillips Petroleum • Petrobras • PEMEX • PetroCanada • PanCanadian •

Custom
through

Centrifugal-Action Desanding



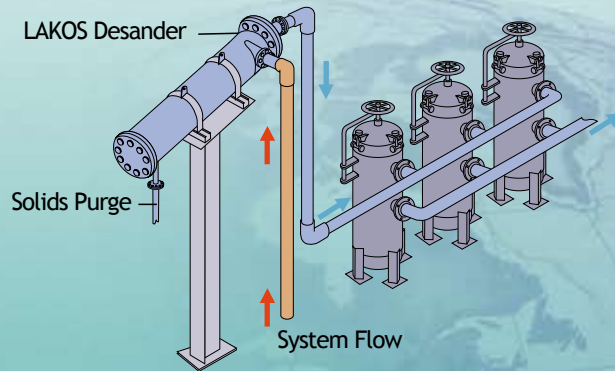
- ▶ No moving parts to wear out
- ▶ No screens, cartridges or filter elements to clean or replace
- ▶ No backwashing
- ▶ No routine maintenance or downtime requirements
- ▶ No standby equipment needs
- ▶ Low & steady pressure loss
- ▶ Easily automated
- ▶ Compact, space-saving profiles
- ▶ Little or no liquid loss
- ▶ Effective solids concentration for easy disposal/recovery

Mobil • Navajo Refining • BHP Petroleum • USX/Marathon • Statoil • UNOCAL
 ESSO • Can-Oxy • Amoco • Sonatrach • ARCO • Texaco • Conoco • Husky

ners
 out the world...

Typical Applications

Pre-Filter To Bags, Cartridges, etc...



Primary Filtration

Wherever critical filtration requirements exist, pre-filter with LAKOS Desanders to extend operating cycles and reduce filter replacements/maintenance/downtime.

Secondary Recovery

Protects high pressure pumps and finer filters used in waterflood injection techniques.

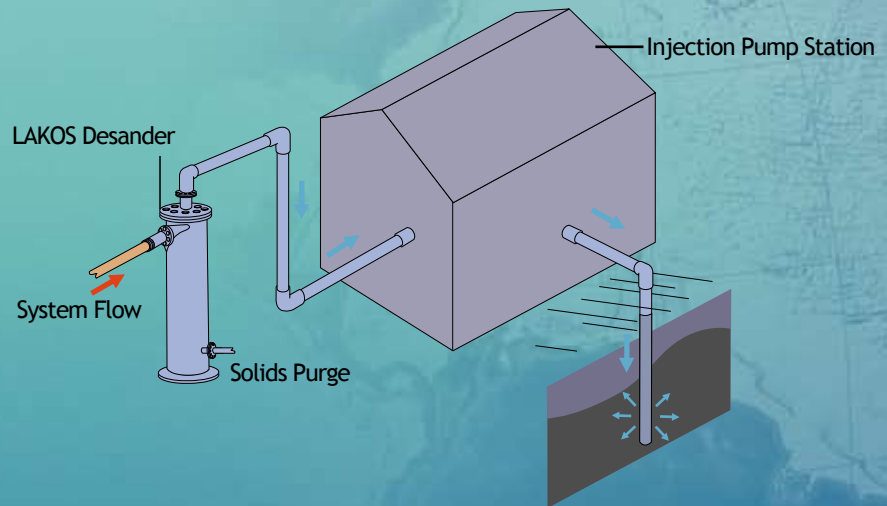
Produced Water

Removes sand prior to re-injection or disposal. Protect oil-water hydrocyclones. Prevent sand accumulation in free-water-knock-out (FWKO) tanks and heater-treaters. Handles heavy solids loads and slugging easily.

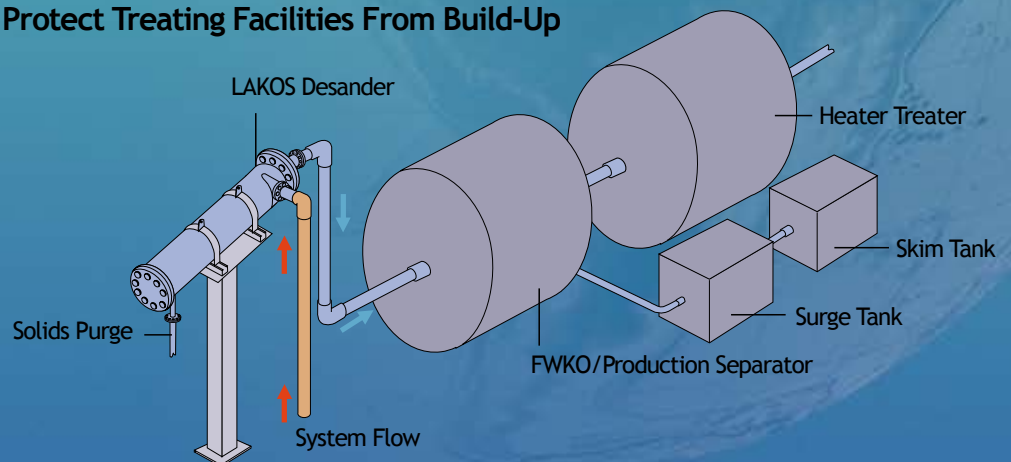
Downhole Pump Protection

Extend the life of production well PCP & ESP pumps. See page 6 for more details.

Waterflood Injection Protection



Protect Treating Facilities From Build-Up





▶ **As primary filtration,** a LAKOS Desander keeps sand & silt from river water out of a plant's piping system, reducing overall system maintenance and fouling.



▶ **A waterflood injection site** depends on a LAKOS Desander to extend the life of its oil/water hydrocyclone by removing abrasive particles. This LAKOS 740 psi (51 bar) system replaced a bag filter with greater efficiency, lower pressure loss and reduced maintenance requirements.



▶ **Savings of over \$100,000** annually have been attributed to this LAKOS produced water application, reducing pump wear, damage to an oil/water hydrocyclone (see inset photo) and overall downtime & maintenance.



▶ **Sandy river water** is pre-filtered with a LAKOS Desander to protect ultrafiltration equipment from excessive maintenance routines prior to high pressure injection wells.

Distribution
Retailing
Storage
Completion
Exploration
On-Gate
Production
Disposal
Pipeline
Refining
Transportation
Secondary Recovery
Drilling
Treating
Exploration
Production Gathering

LAKOS Oil & Gas Desander Series

The actual flow rate of your system is key to proper model selection. Internal accessibility enables the removal of unusually large or difficult solids and provides for internal coatings to protect against corrosive/aggressive liquids/solids. Satisfying all the material and manufacturing requirements of the American Society of Mechanical Engineers, LAKOS offers standard A.S.M.E. Code construction.



Lakos Separators 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.

▶ **Flow Range:**

138 - 438,000 bbl/d
(24 - 70,000 m³/d).

▶ **Pressure Ratings:**

Standards up to 2500 psi (170 bar).

▶ **Pressure Loss Range:**

3-12 psi (0.2 - 1.0 bar).

▶ **Inlet/Outlet Connections:**

ANSI Flanged, also available with DIN, JIS or other flanges & connections.

▶ **Material Specifications:**

Standard carbon steel with corrosion allowance; also available in stainless steel. Consult factory for special requirements.

▶ **Process Treatments:**

Post-weld heat-treated, fusion-bonded epoxy (3M Scotchkote), sand-blasted (unpainted).

▶ **Other Options:**

Low or vertical profiles, exterior modifications, packaged/multi-stage/skid systems and more.

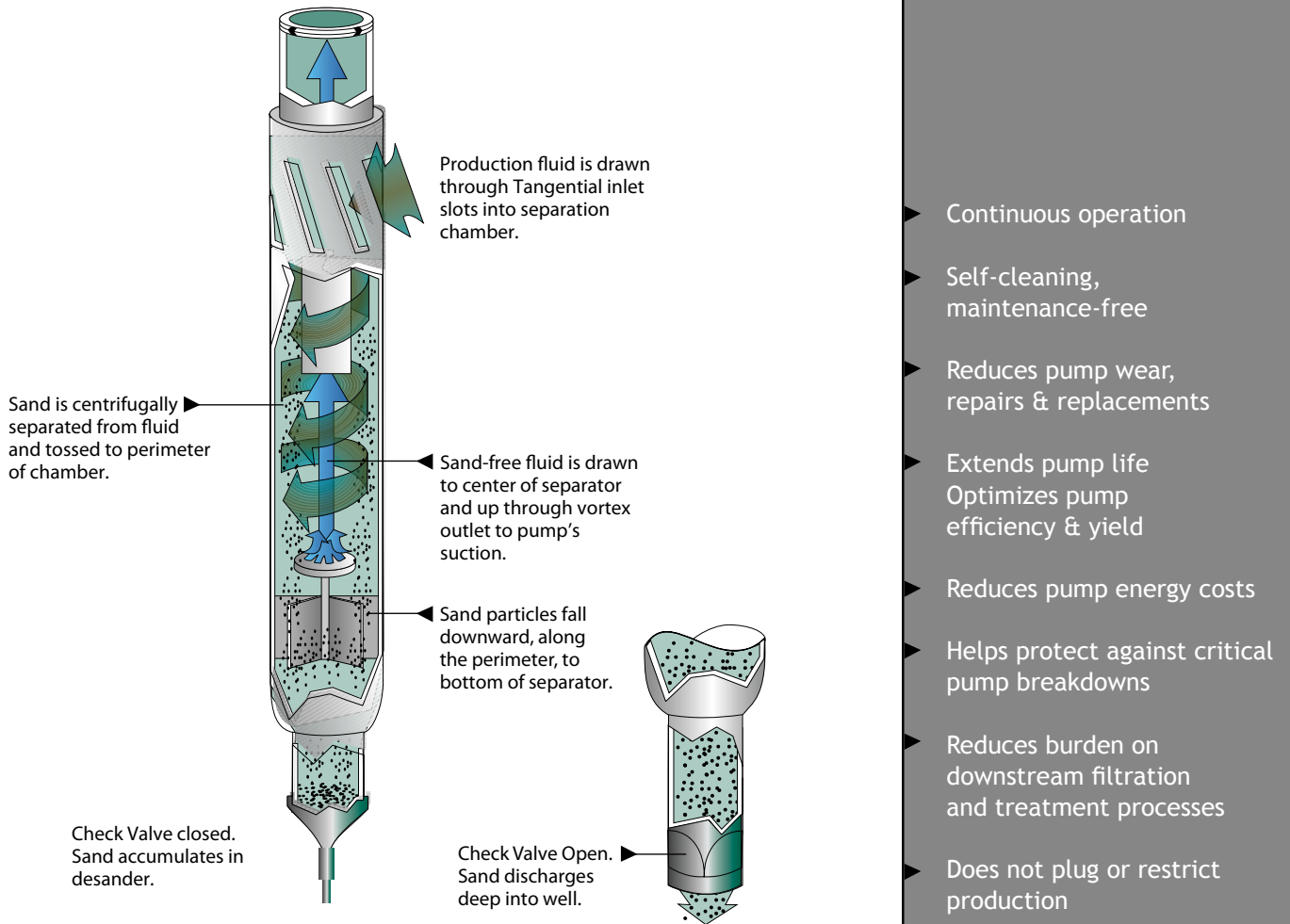
▶ **Automatic Purging:**

Options include pneumatic and electric-actuated valves with remote timer controls.

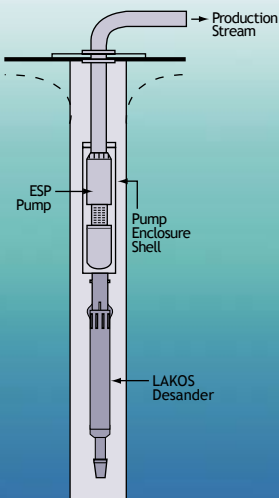
▶ **Solids-Handling Options:**

LAKOS Systems available for concentrating separated solids into your choice of collection vessels.

LAKOS Oil & Gas Pump Protection Desander Series



- ▶ Continuous operation
- ▶ Self-cleaning, maintenance-free
- ▶ Reduces pump wear, repairs & replacements
- ▶ Extends pump life
Optimizes pump efficiency & yield
- ▶ Reduces pump energy costs
- ▶ Helps protect against critical pump breakdowns
- ▶ Reduces burden on downstream filtration and treatment processes
- ▶ Does not plug or restrict production



Production Well Application

- ▶ Installs directly onto the suction of a PCP or ESP pump in submerged produced water applications to remove troublesome sand & grit before it can damage the pump's impellers & bowls. Range of models to handle flow rates of 175 - 12,000 bbl/d (24 - 1776 m³/d).
- ▶ Separated sand is discharged deep into the well. Risk of accumulation in the well is offset by the dynamics of the well and inflow/outflow characteristics. Detailed report available.



A Tradition. A Heritage.

Since the mid-1940's, Claude Laval Jr.'s inventions have been solving problems. A miniature camera that takes picture deep into water wells. A well casing repair device that restores the effective use of a water well. And, the first desander, which protected submersible and turbine irrigation pumps. Today, the LAKOS Desander is a proven solution for process industries, public water systems, heat transfer systems and more. Complete and engineered solutions for the removal and concentration of troublesome solids. Total liquid recycling. More and more problems solved.



The LAVAL history features more than 150 U.S. and foreign patents. Its focus is clearly filtration. Its complete line of products includes desanders, sand filters, self-cleaning screen filters and pump intake screens for a broad range of industries. Experience, quality, performance and integrity. Satisfying real problems with value-oriented solutions. It is our heritage. It is exclusively what we do best. From the 100,000 + square foot manufacturing, sales, marketing and engineering headquarters in California and strategic secondary manufacturing and warehousing, Claude Laval Corporation directs its operations with a worldwide network of technically-trained distributors. We welcome your technical/application inquiries. We encourage you to tour our facilities. We are your reliable source for experienced application expertise.

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