High Efficiency Tower Clean Systems

**Eliminate Basin Cleaning and Reduce Energy Consumption**

**eTCX Features and Benefits:**

- 99% filtration efficiency of solids down to 25 micron (2.6 Specific Gravity) and larger greatly reduces suspended solids in recirculated cooling tower water; significantly improving equipment life and removing food source for biological activity

- Minimize tower nozzle clogging, protect basin floor from under-deposit corrosion, eliminate risk of injury associated with manual basin cleaning, and greatly reduce heat transfer loss in downstream equipment

- eTCX System can be utilized for basin sweeping, side stream cleaning, and closed loop cleaning applications

- NEMA Premium 1750RPM TEFC motor provides superior efficiency, greater returns on investment, and meets most urban noise abatement levels

- Pumps feature precisely trimmed and dynamically balanced impellers that help extend pump seal and bearing life

- Electric fail-safe valve (EFS) eliminates manual purging and automatically closes valve in event of power failure

- eHB HydroBooster water nozzles operate as low as 10psi. 50% less psi than our standard HydroBoosters; reducing need for larger pumps

- Solids Recovery Vessel (SRV) offers zero water loss and helps meet waste/chemical disposal requirements. eTCX System features SRV-833 - a larger SRV allowing for fewer bag changes

- LAKOS SmartStart™ control panel features motor overload protection, under power (dry run) conditions. Control panel also logs last 15 faults and is user retrievable. Optional BACnet and Modbus compatibility modules are available from the factory.

**FLOW RATES:**

- **Basin Sweeping:** 50 – 810 US gpm (11 – 184 m³/hr)
- **Side Stream:** 65 – 810 US gpm (15 – 184 m³/hr)

- **Maximum Pressure Rating:** 150 psi (10.3 bar)
- **Maximum Fluid Operating Temperature:** 100°F (37.8°C)

Contact factory for high temperature models

*LAKOS High Efficiency eTCX Tower Clean Systems help keep the cooling tower basin free of suspended solids that cause scale, corrosion, fouling and biological activity.*

*Controlling these factors leads to lower maintenance, improved chemical effectiveness, longer cooling tower and downstream equipment life, and a significant decrease in long-term water and energy costs.*

**FILTRATION APPLICATIONS:**

- Basin Sweeping
- Side Stream
- Closed Loop

<table>
<thead>
<tr>
<th>WATER USAGE</th>
<th>SOLIDS METER</th>
<th>MAINTENANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero Water Loss Options Available</td>
<td>Micron Removal μm (microns)</td>
<td>High</td>
</tr>
<tr>
<td>5μm</td>
<td>25μm</td>
<td>Med</td>
</tr>
<tr>
<td>44μm</td>
<td>74+μm</td>
<td>Low</td>
</tr>
<tr>
<td>Zero Maintenance Options Available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LAKOS FILTERATION SOLUTIONS
High Efficiency Basin Sweeping

Traditional side stream filtration systems take a percentage of the flow (generally 10-25% or less) from the main line using a by-pass directly to the filtration system. The filtered water is then returned to the main line. Basin sweeping is simply relocating the traditional side stream filtration system from the main line directly to the cooling tower basin, thus increasing the percentage of side stream filtration to 20% or more.

Additional advantage is gained by recirculating the filtered water through a network of pipes and nozzles that sweep and direct other settled and suspended solids from the basin towards the filtration system – and away from the condenser water pump.

Basin sweeping capacity is determined by the volume of water in the basin rather than assigning a percentage of the full flow, as is commonly done with traditional side stream applications.

**ADVANTAGES OF eTCX SYSTEM**

- **AVERAGE SYSTEM PUMP POWER REDUCTION**
  - eTCX Systems: 28.5%
  - TC Systems: 28.5% Less Energy Required

- **AVERAGE SYSTEM NOISE REDUCTION** (dB comparison)
  - eTCX Systems: 79.8%
  - TC Systems: 79.8% Less Noise

- **AVERAGE SYSTEM PUMP POWER REDUCTION (per US gpm)**
  - eTCX Systems: 34.4%
  - TC Systems: 34.4% Pump Power Reduction (P/gpm)

- **AVERAGE SYSTEM kW REDUCTION**
  - eTCX Systems: 29.7%
  - TC Systems: 29.7% Decrease in system kW consumption

*Ask us about our ROI Calculator*

**Solids Removal Chart: Recirculated flow at 20% Side Stream**

<table>
<thead>
<tr>
<th>Microns (µm) at 2.6 Specific Gravity</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>32+ µm</td>
<td>99.5%</td>
</tr>
<tr>
<td>23-32 µm</td>
<td>99%</td>
</tr>
<tr>
<td>16-22 µm</td>
<td>89%</td>
</tr>
<tr>
<td>11-15 µm</td>
<td>82%</td>
</tr>
<tr>
<td>1-10 µm</td>
<td>70%</td>
</tr>
</tbody>
</table>

The above efficiency results were based upon 20% side stream within 16 hours. Field results may vary depending on side stream percentage and basin size. Performance results verified by independent testing.
Installation Best Practices

- Start with a clean basin.
- Required submergence of 2" above centerline inlet of HydroBoosters.
- Position the HydroBoosters to direct solids toward the filtration system’s pump intake and away from any other system pump suction areas.
- Use a closed-loop header in order to equalize the pressure to each HydroBooster.
- Eliminate weirs, baffles or other devices which may promote settling or dead spots within the sump.
- Where possible, take advantage of any existing slopes to direct solids toward the low end of a sump.
- When possible, position the system’s pump intake where solids are most likely to enter the sump.

- eHB HydroBoosters operate at 10psi.
- 50% less than our standard HydroBoosters

6x induced flow rate activity

1 US gpm enters HydroBooster

Directed turbulence maximizes cleaning efficiency in the tower basin/remote sump. LAKOS eHB HydroBoosters provide that turbulence with patented vortexing action. Consult LAKOS for technical assistance in basin sweeping layout and piping options.

Basin Cleaning in a Factory Packaged Tower

TC Systems in Aulani Disney Hawaii Resort, Hawaii USA

Basin Sweeping in a Field Erected Tower

HydroBooster Layout at Roseburg Forest Products, California USA
LAKOS recommends one eTCX basin sweeping system per cell for maximum energy savings and reduced life-cycle costs.

When short term budget needs demand, eTCX systems also provide the benefit of filtering two cooling tower cells alternately – without operator input.

**Alternating Kit Features and Benefits:**
- Provides primary and stand-by tower filtration
- Use one filtration system to clean two cooling tower cells alternately. Economical basin sweeping solution for applications with light solids loading
- Utilized when filtration requirements have larger horsepower (HP) needs and the environment is such that it will allow for smaller HP systems to alternate between cells
- Automated valve switching operation eliminates manual switching in dual cell tower configurations

**Solids Recovery Vessel (SRV)**

**Features and Benefits:**
- New Solids Recovery Vessel (SRV-833) features double capacity to allow for fewer bag change outs
- Capture separated solids easily and return clean liquid back to eTCX pump suction; eliminating liquid loss
- Continuous operation; remove collected solids without interrupting system flow for service
- Lower waste treatment costs, meet waste disposal requirements and greatly reduce chemical loss
- Indicator package (SRI-816) provides convenient way to determine bag change-outs
- Optional dry contact available for remote monitoring with BMS (Building Management System) connection or audio/visual alarms for bag changes
- For more information see LAKOS literature LS-622
The LAKOS SmartStart™ control panel protects the pump and motor by monitoring power and current to identify locked rotor, cycle faults, current phase imbalance, and under power (dry run) conditions. The control panel also logs last 15 faults and is user retrievable. Optional BACnet and Modbus compatibility modules are available from the factory.

**Pump and Motor Protection**
- Low flow shutdown
- Electronic overload protection, including locked rotor, cycle fault, phase imbalance, and maximum time to start
- Ground fault protection

**Fault Reporting**
- Fault logging retains critical data
- Last 15 fault types are recorded

**Purge and SRV**
- SmartStart™ panel features built-in default support for solids purge. This allows operator to switch between solids collection and/or solids purge without the need for a new control box.

**Optional BACnet or ModBus**
- Native RS-485 76800 BPS for high performance
- Additional programmable digital input. Additional analog input, selectable between 0-10V, 4-20mA, or 10k thermistor
- Includes power metering display with programmable parameters

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**Electric Fail-Safe Valve (EFS)**

**Features and Benefits:**
- Battery backup electric fail-safe option automatically closes valve in event of power failure
- Eliminates manual purging
- EFS actuator features an electronic circuit that automatically adjusts the motor speed (depending on torque variations) to keep cycle time constant – maintaining consistent purge durations
- EFS actuator housing is made of a V0 self-extinguish class techno-polymer material for fire safety
- Can be combined with an SRV to offer temporary hands-off operation
- For more information see LAKOS literature LS-913
High Efficiency Side Stream and Closed Loop Cleaning

**Side Stream**

**BENEFITS:**
- Economical filtration solution
- Large or variable flow application where full flow is not an option and basins are not accessible
- Reduce suspended solids in main line flow
- Easy to retrofit
- Zero liquid loss options with LAKOS Solids Recovery Vessel
- Zero filtration maintenance when using LAKOS automated purge valves

**Closed Loop**

**BENEFITS:**
- Side stream filtration to remove solids generated in closed loops
- Zero liquid (water or coolant) loss with Solids Recovery Vessel
- Direct replacement for side stream bags or spiral wound cartridges

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**Inlet/Outlet Premium Butterfly Valve Kits**

<table>
<thead>
<tr>
<th>Model</th>
<th>Inlet Valve Sizes</th>
<th>Outlet Valve Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>eTCV models</td>
<td>2.5” to 8” Flanged Butterfly Valves</td>
<td>1.25” to 4” Butterfly Valves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.25” and 1.5” models are NPT ball valves</td>
</tr>
</tbody>
</table>

**HydroBoosters™**

<table>
<thead>
<tr>
<th>Model</th>
<th>Connection Size</th>
<th>Extension Pipe Size (minimum)</th>
<th>Input Flow</th>
<th>Input PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHB</td>
<td>½” (12.7mm) male NPT</td>
<td>¾” (19.05mm)</td>
<td>10 US gpm (2m³/hr)</td>
<td>10 psi</td>
</tr>
</tbody>
</table>

**NOTE:** These flow rates are based on an input pressure of 10psi (68 bar). Minimum water level above centerline of HydroBooster should be 2 inches (50.8 mm).
Basin Sweeping Model Selection

After determining the basin size using the formula to the right, refer to the flow rate column below.

Select a model that has an equal or larger flow rate. Flow rates larger than those below are available.

Please consult LAKOS.

Basin Sweeping Configuration

Flow Rate = Basin square footage

<table>
<thead>
<tr>
<th>Models</th>
<th>eHTX Separators</th>
<th>Flow Rates¹</th>
<th>Diffuser/Strainer inlet²</th>
<th>Separator outlet</th>
<th>System Weight³</th>
<th>Pump HP/kW²</th>
<th>Full Load Amperage³</th>
</tr>
</thead>
<tbody>
<tr>
<td>eTCX-0050-SRV</td>
<td>eHTX-0025</td>
<td>50</td>
<td>11</td>
<td>2-1/2”</td>
<td>1-1/4”</td>
<td>558</td>
<td>264</td>
</tr>
<tr>
<td>eTCX-0080-SRV</td>
<td>eHTX-0040</td>
<td>80</td>
<td>18</td>
<td>2-1/2”</td>
<td>1-1/2”</td>
<td>568</td>
<td>257</td>
</tr>
<tr>
<td>eTCX-0110-SRV</td>
<td>eHTX-0060</td>
<td>110</td>
<td>25</td>
<td>3”</td>
<td>2”</td>
<td>683</td>
<td>309</td>
</tr>
<tr>
<td>eTCX-0160-SRV</td>
<td>eHTX-0080</td>
<td>160</td>
<td>36</td>
<td>4”</td>
<td>2-1/2”</td>
<td>832</td>
<td>377</td>
</tr>
<tr>
<td>eTCX-0210-SRV</td>
<td>eHTX-0090</td>
<td>210</td>
<td>48</td>
<td>4”</td>
<td>3”</td>
<td>875</td>
<td>396</td>
</tr>
<tr>
<td>eTCX-0310-SRV</td>
<td>eHTX-0140</td>
<td>310</td>
<td>70</td>
<td>6”</td>
<td>4”</td>
<td>1109</td>
<td>502</td>
</tr>
<tr>
<td>eTCX-0410-SRV</td>
<td>eHTX-0185</td>
<td>410</td>
<td>93</td>
<td>6”</td>
<td>4”</td>
<td>1233</td>
<td>555</td>
</tr>
<tr>
<td>eTCX-0610-SRV</td>
<td>eHTX-0260</td>
<td>610</td>
<td>138</td>
<td>6”</td>
<td>4”</td>
<td>1859</td>
<td>845</td>
</tr>
<tr>
<td>eTCX-0910-SRV⁴</td>
<td>eHTX-0320</td>
<td>810</td>
<td>184</td>
<td>8”</td>
<td>6”</td>
<td>2493</td>
<td>1133</td>
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Side Stream and Closed Loop Configuration

Flow Rate is critical to system performance. Select model based on Side Stream Flow Rates. LAKOS recommends 20% Side Stream

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<td>15</td>
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<td>267</td>
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<td>eTCX-0080-SRV</td>
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<td>6”</td>
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<td>1233</td>
<td>555</td>
</tr>
<tr>
<td>eTCX-0410-SRV</td>
<td>eHTX-0185</td>
<td>610</td>
<td>138</td>
<td>6”</td>
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<td>1859</td>
<td>845</td>
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<td>eTCX-0610-SRV</td>
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<td>810</td>
<td>184</td>
<td>8”</td>
<td>6”</td>
<td>2493</td>
<td>1133</td>
</tr>
<tr>
<td>eTCX-0910-SRV⁴</td>
<td>eHTX-0320</td>
<td>520</td>
<td>118</td>
<td>10”</td>
<td>6”</td>
<td>3045</td>
<td>1359</td>
</tr>
</tbody>
</table>

NOTES: All eTCX models are available in PLUS system configurations for filtration down to 35 microns.

¹ Higher flow rates available. Contact LAKOS.
² Models 0050 and 0080 use 3500 RPM.
³ Contact LAKOS for motor specific FLA.
⁴ Minimum suction pipe size is equivalent to system’s diffuser inlet. Pump NPSHR and piping to-and-from LAKOS Systems should be reviewed and sized accordingly. Consult LAKOS for design assistance if length of suction line is more than 25’ or has several elbows or elevation changes.
⁵ eTCX-0810 and eTBX-0810 units are 22 1/2 deg. low profile

Dimenson

<table>
<thead>
<tr>
<th>Models</th>
<th>Dim A</th>
<th>Dim B</th>
<th>Dim C</th>
</tr>
</thead>
<tbody>
<tr>
<td>inches</td>
<td>mm</td>
<td>inches</td>
<td>mm</td>
</tr>
<tr>
<td>eTCX-0050-SRV</td>
<td>24</td>
<td>610</td>
<td>39-3/4</td>
</tr>
<tr>
<td>eTCX-0080-SRV</td>
<td>29-1/2</td>
<td>749</td>
<td>45</td>
</tr>
<tr>
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<td>749</td>
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<td>749</td>
<td>45</td>
</tr>
<tr>
<td>eTCX-0310-SRV</td>
<td>31-1/2</td>
<td>800</td>
<td>45</td>
</tr>
<tr>
<td>eTCX-0410-SRV</td>
<td>31-1/2</td>
<td>800</td>
<td>45</td>
</tr>
<tr>
<td>eTCX/eTBX-0610-SRV</td>
<td>36</td>
<td>914</td>
<td>49-3/4</td>
</tr>
<tr>
<td>eTCX/eTBX-0810-SRV</td>
<td>46-1/2</td>
<td>1181</td>
<td>123-3/4</td>
</tr>
</tbody>
</table>

Dimensions are for spatial considerations only. Do not pre-plumb based on above dimensions. Contact factory for detailed dimensions.

More detailed CAD drawings and CSI specifications are available at LAKOS.com.
Independent Testing

LAKOS Separators have been independently tested and certified by an independent testing agency, the International Center for Water Technology (ICWT), confirming our separators' filtration performance and capability to remove troublesome particle matter from pumped water.

For over 30 years the internationally recognized ICWT/CIT Testing Laboratories have been providing independent, third party testing to a wide range of irrigation and other industries around the world.

ICWT has experience with hydraulics, pumps, filters, and valves. Fluid component testing provides manufacturers, distributors and end-users with accurate performance data for applicability assessment and enable product development. ICWT was recently certified by IAPMO R&T - North America's premier third party certification body for plumbing and mechanical products. More information about the testing agency and testing process can be found at www.californiawater.org.

Limited Warranty

This product series is warranted to be free of defects in material or workmanship, given the following terms:

LAKOS Separator: 5 years

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 designation, 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, 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).

Claude Laval Corporation, headquartered in Fresno California since 1972, is recognized worldwide for engineering, manufacturing and marketing the original centrifugal action solids from liquids separator and being the world-wide leader in cyclonic separation technology.

LAKOS Separators are manufactured in the USA. eTCX system components are warranted for one (1) year from date of delivery. If installed 6 months or more after ship date, warranty shall be a maximum of 18 months from ship date. eHTX separators are warranted for five (5) years from date of delivery. For detailed warranty information visit http://www.lakos.com.

LAKOS is a proud and contributing member of ASHRAE for over 30 years.