High Efficiency Tower Clean Systems

Automatically Keep Cooling Tower Basins Clean

**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

- Control panel supports both Solids Recovery Vessel (SRV) and Automated Purge (EFS/ABV) allowing users the option to convert their system from an SRV to ABV/EFS - Eliminating the need to change the control panel.

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

- 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

**FLOW RATES:**

- **Basin Sweeping:** 50 – 910 US gpm (11 – 206 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

**FILTRATION APPLICATIONS:**

- Basin Sweeping
- Side Stream
- Closed Loop

_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.

**WATER USAGE**

- **Zero Water Loss Options Available**

**SOLIDS METER**

- **Micron Removal µm (microns)**
  - 5µm
  - 25µm
  - 44µm
  - 74+µm

**MAINTENANCE**

- **High**
- **Med**
- **Low**

Zero Maintenance Options Available

[Image of filtration system]
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**

<table>
<thead>
<tr>
<th>AVERAGE SYSTEM PUMP POWER REDUCTION</th>
<th>AVERAGE SYSTEM PUMP POWER REDUCTION (per US gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>eTCX Systems 28.5%</td>
<td>eTCX Systems 34.4%</td>
</tr>
<tr>
<td>TC Systems</td>
<td>TC Systems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AVERAGE SYSTEM NOISE REDUCTION (dB comparison)</th>
<th>AVERAGE SYSTEM kW REDUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>eTCX Systems 79.8%</td>
<td>eTCX Systems 29.7%</td>
</tr>
<tr>
<td>TC Systems</td>
<td>TC Systems</td>
</tr>
</tbody>
</table>

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

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.
eHB HydroBoosters™

**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.

**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*  
*Basin Sweeping in a Field Erected Tower*
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

1. All wiring, conduit, and fittings from the control panel to the actuator/valve assemblies to be sized and provided by others. 2. Multi-Tower Basin Cleaning control panel is powered separately from the LAKOS Filtration system.
Features and Benefits:

- 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
- 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

Solids Recovery Vessel (SRV)

- Helps capture separated solids from LAKOS Separators – and return clean liquid back to the system through pump suction for zero liquid loss

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

<table>
<thead>
<tr>
<th>Models</th>
<th>Valve Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFS-07</td>
<td>3/4&quot; 19.05</td>
</tr>
<tr>
<td>EFS-15</td>
<td>1-1/2&quot; 38.1</td>
</tr>
</tbody>
</table>

Purge controller is required and included as part of valve kit.
**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).

**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

**Side Stream**

- 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

**Closed Loop**

- 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

**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
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 Rates</th>
<th>Diffuser/Strainer inlet</th>
<th>Separator outlet</th>
<th>System Weight</th>
<th>Pump HP/kW</th>
<th>Full Load Amperage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>US gpm</td>
<td>m^3/hr</td>
<td></td>
<td>lbs</td>
<td>kW</td>
<td></td>
</tr>
<tr>
<td>eTCX-0050-SRV</td>
<td>eHTX-0025</td>
<td>50</td>
<td>11</td>
<td>2-1/2&quot;&quot;</td>
<td>1-1/4&quot;&quot;</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&quot;&quot;</td>
<td>1-1/2&quot;&quot;</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&quot;</td>
<td>2&quot;</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&quot;</td>
<td>2-1/2&quot;&quot;</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&quot;</td>
<td>3&quot;</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&quot;</td>
<td>4&quot;</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&quot;</td>
<td>4&quot;</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&quot;</td>
<td>4&quot;</td>
<td>1859</td>
<td>845</td>
</tr>
<tr>
<td>eTCX-0910-SRV</td>
<td>eHTX-0320</td>
<td>910</td>
<td>206</td>
<td>8&quot;</td>
<td>6&quot;</td>
<td>2493</td>
<td>1133</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Models</th>
<th>eHTX Separators</th>
<th>Flow Rates</th>
<th>Diffuser/Strainer inlet</th>
<th>Separator outlet</th>
<th>System Weight</th>
<th>Pump HP/kW</th>
<th>Full Load Amperage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>US gpm</td>
<td>m^3/hr</td>
<td></td>
<td>lbs</td>
<td>kW</td>
<td></td>
</tr>
<tr>
<td>eTCX-0050-SRV</td>
<td>eHTX-0025</td>
<td>65</td>
<td>15</td>
<td>2-1/2&quot;&quot;</td>
<td>1-1/4&quot;&quot;</td>
<td>558</td>
<td>267</td>
</tr>
<tr>
<td>eTCX-0080-SRV</td>
<td>eHTX-0040</td>
<td>95</td>
<td>22</td>
<td>2-1/2&quot;&quot;</td>
<td>1-1/2&quot;&quot;</td>
<td>568</td>
<td>257</td>
</tr>
<tr>
<td>eTCX-0110-SRV</td>
<td>eHTX-0060</td>
<td>140</td>
<td>32</td>
<td>3&quot;</td>
<td>2&quot;</td>
<td>683</td>
<td>309</td>
</tr>
<tr>
<td>eTCX-0160-SRV</td>
<td>eHTX-0080</td>
<td>210</td>
<td>48</td>
<td>4&quot;</td>
<td>2-1/2&quot;&quot;</td>
<td>832</td>
<td>377</td>
</tr>
<tr>
<td>eTCX-0210-SRV</td>
<td>eHTX-0090</td>
<td>310</td>
<td>70</td>
<td>6&quot;</td>
<td>4&quot;</td>
<td>1109</td>
<td>502</td>
</tr>
<tr>
<td>eTCX-0310-SRV</td>
<td>eHTX-0140</td>
<td>410</td>
<td>93</td>
<td>6&quot;</td>
<td>4&quot;</td>
<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&quot;</td>
<td>4&quot;</td>
<td>1859</td>
<td>845</td>
</tr>
<tr>
<td>eTCX-0610-SRV</td>
<td>eHTX-0260</td>
<td>910</td>
<td>206</td>
<td>8&quot;</td>
<td>6&quot;</td>
<td>2493</td>
<td>1133</td>
</tr>
</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th>Models</th>
<th>Dim A</th>
<th>Dim B</th>
<th>Dim C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>inches</td>
<td>mm</td>
<td>inches</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>
<td>eTCX-0110-SRV</td>
<td>29-1/2</td>
<td>749</td>
<td>45</td>
</tr>
<tr>
<td>eTCX-0160-SRV</td>
<td>29-1/2</td>
<td>749</td>
<td>45</td>
</tr>
<tr>
<td>eTCX-0210-SRV</td>
<td>29-1/2</td>
<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-0610-SRV</td>
<td>36</td>
<td>914</td>
<td>49-3/4</td>
</tr>
<tr>
<td>eTCX-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.
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).