

Specification Sheet for

eTCX TowerClean/SideStreamClean High Efficiency Systems

SECTION _____ Liquid-Solids Separation System

Part I – General

1.01 Purpose

- A. The system will remove unwanted solids from a cooling tower sump/remote basin, or side-stream recirculated cooling water system using a centrifugal-action vortex separator. The liquid-solids separation system will help prevent particle fouling of the cooling system's components reduce maintenance and servicing routines, maintain optimum energy efficiency of the heat exchange process, limit blow down & chemical use practices and control harmful bacteria growth in the basin/sump or cooling water system. Fluid viscosity must be 100 SSU or less.
- B. **If Specified For Cooling Tower Basin/Remote Sump Use** -- A completely assembled package shall be supplied for the isolated recirculation and particle separation/filtration of the fluid in the cooling tower basin/remote sump in order to prevent troublesome accumulation of solids in the tower basin/sump. Flow through the separator package shall be continuous, without interruption for the periodic evacuation of separated solids. Placement of the separator package's inlet and outlet within the basin/sump shall be strategically determined and supplemented where necessary with specific flow enhancement/agitation devices known as eHydroBoosters.
- C. **If Specified For Side Stream Use** -- Control of solids in the recirculated cooling water system shall be accomplished via a side-stream flow of not less than 10-20% of the full-stream system flow through a completely assembled separation/filtration package. The package's pump shall provide sufficient pressure for the re-introduction of side-stream fluid back into system flow.

1.02 System Performance

- A. In a single pass through the eHTX separator system, given solids with a specific gravity of 2.6 and water at 1.0, performance is predictably 98% of 44 microns and larger. Additionally, particles finer in size, heavier by specific gravity and some lighter by specific gravity will also be removed.
- B. In a recirculating system, given solids with a given solids with a specific gravity of 2.6 and water at 1.0, 99% performance is predictable to as fine as 25 microns, with correspondingly higher aggregate performance percentages (up to 80%) of solids as fine as 2 microns.
- C. Separator performance must be supported by published independent test results from a recognized and identified agency. Standard test

protocol of upstream injection, downstream capture and separator purge recovery is allowed with the 50-200 mesh particles to enable effective, repeatable results. Single pass test performance must be not less than 95% removal. Model tested must be of the same design series as specified unit.

Part II - Products

2.01 Manufacturer

- A. The separator system shall be manufactured by LAKOS Filtration Systems, a division of Claude Laval Corporation in Fresno, California USA. Specific model designation is: _____

2.02 eHTX Series Liquid-Solids Separator

- A. 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 optimal 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.
- B. 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 stool.
- C. To insure maximum particle removal characteristics, eHTX Series Separator shall incorporate a enhanced 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.
- D. System fluid shall exit the separator by following the center vortex in the separation barrel and spiral upward to the separator outlet.
- E. The separator shall feature the following access capabilities for either inspection or the removal of unusual solids/debris:
1. A hand-hole port at the collection chamber (eHTX models 3-1/2" and 4" only).
 2. An upper chamber full sized grooved coupling or flanged top to allow complete access to the inlet chamber, acceleration slots, and internal separation barrel.
- F. The separator shall be of unishell construction with SA-36, SA-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.
- G. Paint coating shall be oil-based enamel, spray-on, gloss black.
- H. Pressure gauges shall be included for the inlet/outlet of the separator.

- I. ***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.
- J. Inlet & outlet shall be grooved or flanged, size: _____
- K. Purge outlet shall be threaded, size: _____
- L. The separator shall operate within a flow range of: _____
- M. Pressure loss shall be between 2-15 psi (0.14-1.0 bar), remaining constant, varying only when the flow rate changes.

2.03 Purging & Solids Handling

- A. Separated solids are continuously purged under controlled flow into a 304 stainless steel Solids Recovery Vessel (SRV-833) equipped with one 33” 10-micron polyester solids collection bag. Solids collection capacity: 732 cubic inches (12 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. System will also include an indicator package (SRI) that includes: manual isolation valves for use when servicing the collection bag; annunciator for indicating when the collector bag needs cleaning/replacement; flow control orifice to minimize fluid volume/velocity through the vessel and collector bag.
- B. As an alternative evacuation of separated solids may be accomplished automatically, employing an electric actuated fail safe ball valve (EFS) with integrally-equipped programming for controlling the frequency and duration of solids purging; brass ball valve assembly; battery backup style fail safe control.

2.04 Suction Diffuser

- A. Provided with system to protect system pump from damage or fouling by larger solids or debris.
- B. Cast-iron housing; manual-cleaning; 1/8-inch (3.2 mm) or larger minimum mesh rating; stainless steel screen.

2.05 Pump

- A. End-suction, single stage; Premium Efficiency TEFC motor; cast iron housing; bronze or cast iron impeller; mechanical shaft seal (Viton-Silicon Carbide); flooded suction required.

2.06 Piping

- A. Schedule 40 galvanized carbon steel; reinforced rubber hose to solids recovery vessel; Piping on larger systems to be fabricated carbon steel pipe, painted or coated; Larger systems will require field assembly of piping between separator skid and pump skid.

2.07 Electrical Control

- A. IEC starter with overload module; HOA selector switch; NEMA-4X UL Listed enclosure; re-set/disconnect/trip switch; 120 volt, single phase control voltage; includes provision for using EFS purge valve assembly and timer; built-in amp meter; automatic low flow shutdown; BACnet and Modbus optional; 15 fault log memory.

2.08 Valves

- A. Ball valves on purge line for isolation of solids-handling/purging equipment. Optional inlet/outlet butterfly valve kit is available.

2.09 Optional Alternating Valve Kit

- A. Alternating valve kit option shall provide the ability to switch the separator system flow from one cooling tower basin to another based on a time setting. The 3 way valves shall be pre-wired from the factory and incorporate a time delay relay to initiate valve actuation between the cooling tower cells. The valves shall be a 3 way butterfly or ball type and incorporate factory installed linkage to open and close each 3 way valve assembly. The actuator shall be electrically actuated with 120v provided by the main control panel on the separator system. Each valve assembly will be installed on the outlet of the separator and the inlet strainer prior to the system pump. Assemblies will be preassembled and shipped loose because of weight and will require field installation.

2.10 Skid Plate

- A. Stainless steel, 3/16-inch (5 mm) minimum thickness on system up to eTCX-0410

2.11 eHydroboosters

- A. Placement of the separator package's inlet and outlet within the basin shall be strategically determined and supplemented where necessary with specific agitation devices known as ehydroboosters. Each ehydrobooster shall be capable of increasing its input flow 10 psi or more, to six times greater output flow without excessive wear to the ehydrobooster, thereby providing the proper directed turbulence to prevent troublesome solids accumulation and induce separable solids to the separator pump suction.

Part III - EXECUTION

3.01 Installation

- A. Coordinate with the installing contractor to ensure equipment is installed in conformance with manufacturer's recommendations and those found in the specification.
- B. If deficiencies are noted by the field service representative, the contractor shall make the necessary corrections and the manufacturer's field service personnel will visit the installation site and oversee any corrections and or modifications required. A written report shall be filed with the Engineer at each visit.

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).