



Bulletin 251C - Metric

LSWE/LRWB

CLOSED CIRCUIT COOLERS

Featuring the Exclusive Thermal-Pak® Coil



LSWE

LRWB



Low Sound, Forced Draft
Closed Circuit Coolers

CERTIFIED ISO 9001 & ISO 14001

† Mark owned by the Cooling Technology Institute



Since its founding in 1976, EVAPCO, Incorporated has become an industry leader in the engineering and manufacturing of quality heat transfer products around the world. EVAPCO's mission is to provide first class service and quality products for the following markets:

- Industrial Refrigeration
- Commercial HVAC
- Industrial Process
- Power

EVAPCO's powerful combination of financial strength and technical expertise has established the company as a recognized manufacturer of market-leading products on a worldwide basis. EVAPCO is also recognized for the superior technology of their environmentally friendly product innovations in sound reduction and water management.

EVAPCO is an employee owned company with a strong emphasis on research & development and modern manufacturing plants. EVAPCO has earned a reputation for technological innovation and superior product quality by featuring products that are designed to offer these operating advantages:

- Higher System Efficiency
- Environmentally Friendly
- Lower Annual Operating Costs
- Reliable, Simple Operation and Maintenance


With an ongoing commitment to Research & Development programs, EVAPCO provides the most advanced products in the industry – **Technology for the Future, Available Today!**



EVAPCO products are manufactured on five continents around the world and distributed through hundreds of factory - authorized sales representatives.

LSWE/LRWB

Design and Construction Features

The LSWE and LRWB units are a result of EVAPCO's extensive experience in forced draft centrifugal fan designs. Both models are designed for easy maintenance and long, trouble free operation. These units are also designed with IBC Compliant construction and  Certified Performance. All features shown are available on all models.

Exclusive Thermal-Pak® Coil

- Providing Maximum Efficiency Per Plan Area



Easy Field Assembly

- Ensures easy assembly and fewer fasteners
- Incorporates self-guiding channels to guide the coil casing section into position improving the quality of the field seam

Totally Enclosed Pump Motors

- Helps assure long, trouble-free operation



Clean Pan Design

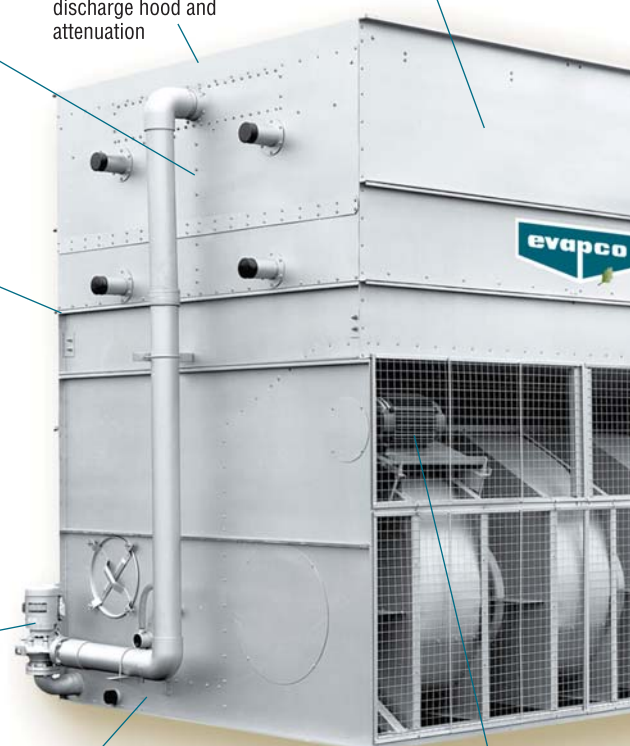
- Sloped design allows water to drain completely from cold water basin
- Easier Removal of dirt and debris

Drift Eliminators Located in Casing

- Drift eliminators integrate with coil casing section for easy mounting of ductwork, discharge hood and attenuation

G-235 Heavy Mill-Dip Galvanized Steel Construction

(Stainless steel available as an affordable option)



Totally Enclosed Fan Motors

- Assures long life
- All normal maintenance can be performed quickly from outside the unit
- If required, motor may be easily removed
- Motors are now located outboard on multi-motor units for even easier drive system access
- Premium efficient inverter-ready motors are standard
- 5 Year motor and drive warranty is standard

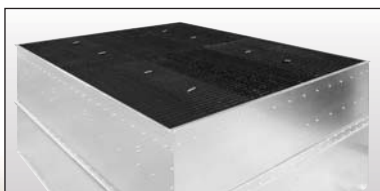
IBC Certification

- Every unit has independent certification and compliance with IBC



Efficient Drift Eliminators

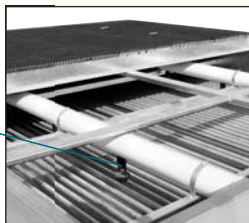
- Advanced design limits maximum drift rate to 0.001% of circulated spray water rate
- Corrosion resistant PVC for long life



U.S. Patent # 6,315,804

Zero Maintenance PVC Spray Distribution Header with ZMII® Nozzles

- Nozzles are threaded into header at proper orientation
- Fixed position nozzles require zero maintenance
- Large orifice nozzles prevent clogging
- Threaded end caps for ease of cleaning



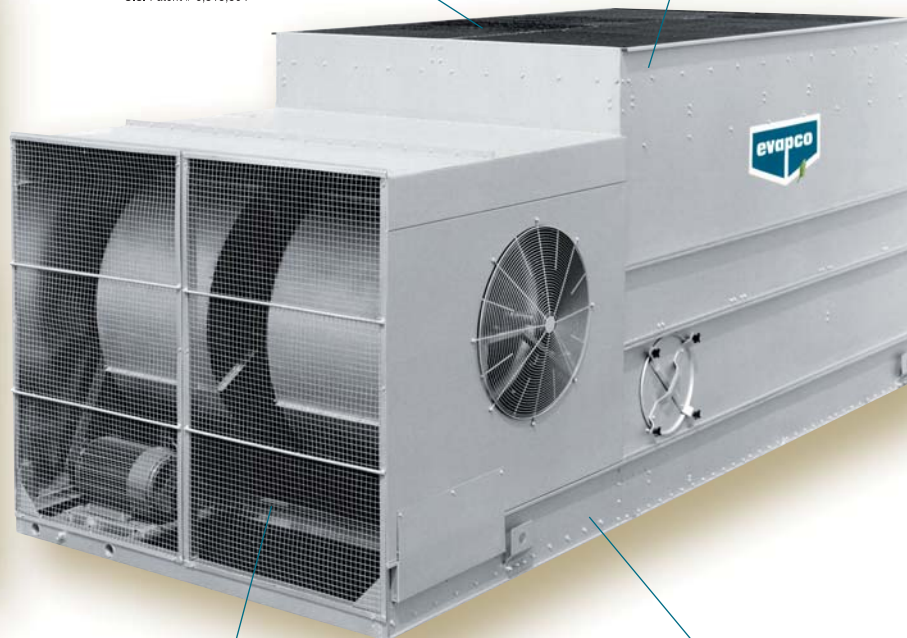
CTI Certified



Optional

304L SST COIL

- Featuring Thermal-Pak® Construction
- 304L SST Construction for Superior Corrosion Resistance



Standard Stainless Steel Cold Water Basin

- Eliminates the need for unreliable epoxy coatings

Easy to Service Motor & Drive System

- Belt tensioning and bearing lubrication can be performed from outside the unit
- Locking mechanism can also be used as a wrench to adjust the belts (LRWB only)
- Motor is fully accessible by removing one inlet screen
- Split fan housings allow removal of all mechanical equipment through the end of the unit (LRWB only)

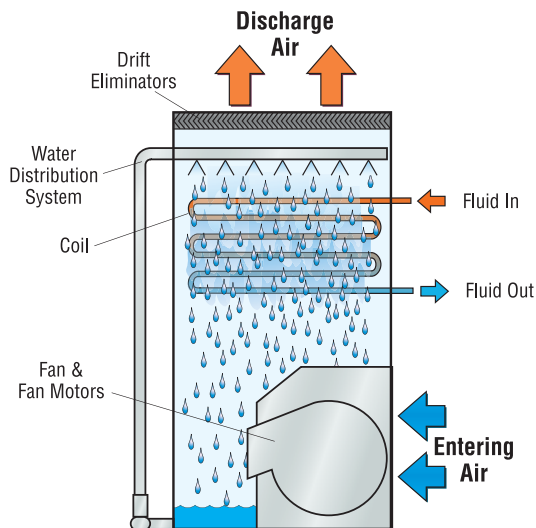


Optional Factory Mounted Solid Chemical/Water Treatment System

All units are available with Evapco's optional **Smart Shield**® solid chemical water treatment system. Evapco's **Smart Shield**® System is an environmentally sensitive alternative for treating water in evaporative cooled equipment. The **Smart Shield**® includes all the components required for an effective water treatment system, factory mounted and wired.

Principle of Operation

The process fluid is circulated through the coil of the closed circuit cooler. Heat from the process fluid is dissipated through the coil tubes to the water cascading downward over the tubes. Simultaneously air is blown through the unit by the fans and travels upward over the coil opposite the water flow. A small portion of the water is evaporated which removes the heat. The warm moist air is forced to the top of the closed circuit cooler by the fan and is discharged to the atmosphere. The remaining water falls to the sump at the bottom of the cooler where it is recirculated by the pump up through the water distribution system and back down over the coils.



Example of an LSWE

EVAPCOAT Corrosion Protection System:

G-235 Hot-Dip Galvanized Steel Construction

The standard material of construction for evaporative cooling equipment for many years has been hot-dip galvanized steel. The purpose of galvanizing is to protect the base metal from corrosion, and the thickness of the galvanized layer directly affects the equipment life.

EVAPCO has been instrumental in the development of corrosion protection technology and was the first manufacturer to use G-235 galvanized steel construction. The G-235 designation equates to a minimum of 2.35 ounces of zinc per square foot (approximately 725 gram of zinc per square meter) of surface area.

The EVAPCOAT Corrosion Protection System is the heaviest galvanized coating available for extended corrosion protection eliminating the need for costly, unreliable epoxy paint finishes.

Cooling Coil

EVAPCO Closed Circuit Coolers utilize EVAPCO's proprietary Thermal-Pak® coil design which assures greater operating efficiency. The elliptical tube design allows for closer tube spacing, resulting in greater surface area per plan area than round-tube coil designs. In addition, the Thermal-Pak® design has lower resistance to airflow and also permits greater water loading, making the Thermal-Pak® coil the most effective design available.

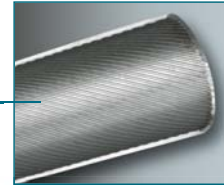
The Thermal-Pak® coil design also features EVAPCO's CrossCool™ Internal Tube Enhancement Technology. This increases fluid turbulence through the coil, further increasing the evaporative capacity.



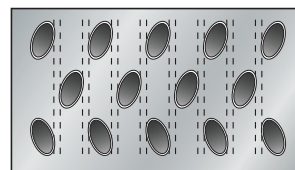
Featuring



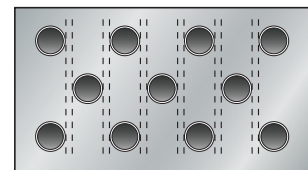
THERMAL-PAK® ELLIPTICAL TUBE



CROSSCOOL™
INTERNAL TUBE ENHANCEMENT



Thermal-Pak® Coil by EVAPCO



Round Tube Coil by Others

The coils are manufactured from high quality steel tubing following the most stringent quality control procedures. Each circuit is inspected to ensure the material quality and then tested before being assembled into a coil. Finally, the assembled coil is pneumatically tested at 2.69 MPa under water to ensure it is leak free.

To protect the coil against corrosion, it is placed in a heavy steel frame and then the entire assembly is dipped in molten zinc (hot-dip galvanized) at a temperature of approximately 427°C.

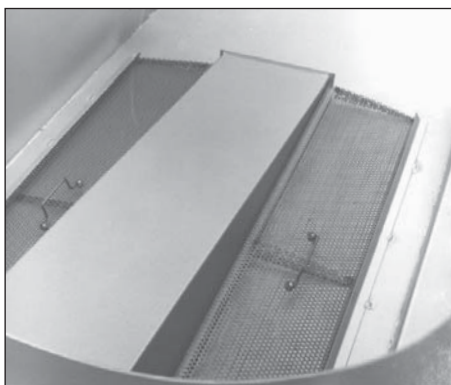
Note: Closed circuit coolers should only be used on sealed, pressurized systems. Continual aeration of the water in an open system can cause corrosion inside the tubes of the cooler leading to premature failure.

DESIGN FEATURES

LSWE/LRWB

Stainless Steel Strainers

One other component of evaporative cooling equipment which is subject to excessive wear is the suction strainer. **EVAPCO provides a Type 304 stainless steel strainer on all units as standard** (except remote sump applications). Strainers are positioned around a large anti-vortex hood in easily handled sections.



Strainer Assembly

Maintenance Free ZMII® Spray Nozzle Water Distribution System

EVAPCO'S Zero Maintenance ZMII® Spray Nozzle remains clog-free while providing even and constant water distribution for reliable, scale-free evaporative cooling under all operating conditions.

The heavy duty ABS ZMII® Spray nozzles have a 32mm diameter opening and a 32mm splash plate clearance. Furthermore, the fixed position ZMII® nozzles are mounted in corrosion-free PVC water distribution pipes that have threaded end caps. Together, these elements combine to provide unequalled coil coverage and scale prevention, and make the industry's best performing non-corrosive, maintenance-free water distribution system.



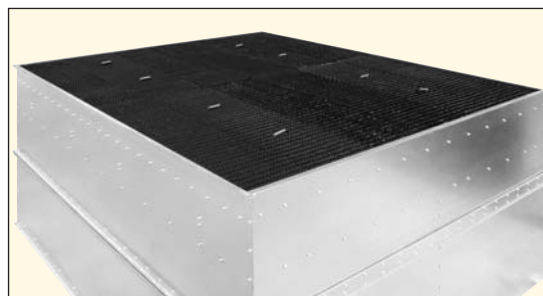
ZMII® Nozzle

Efficient Drift Eliminators

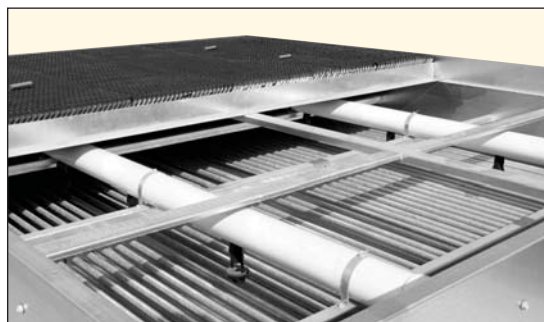
The LSWE & LRWB are provided with an efficient drift eliminator system that effectively reduces entrained water droplets from the air discharge to less than 0.001% of the spray water flow rate.

The eliminators are constructed of non-corrosive PVC with a multi-pass design for maximum drift reduction. They are assembled in modular sections for easy removal and access to the water distribution system.

In addition to reducing drift, the eliminators also function as effective debris screens which protect the spray system from sunlight and debris.



LSWE and LRWB Drift Eliminator



Drift Eliminators Removed for Coil Inspection

Stainless Steel Material Options

The LRWB is standard with a stainless steel cold water basin. Optional upgrades to stainless steel water touch basins, stainless steel water touch units and all stainless steel construction are also available on the LRWB.

The LSWE is available with optional stainless steel cold water basins, water touch basins, water touch units and all stainless steel construction.

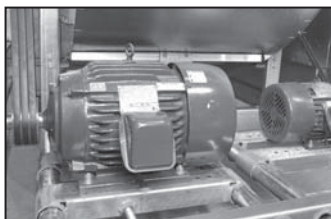
For more information on these stainless steel options, see your local EVAPCO sales representative.

Fan Motor Mount

TEFC fan motors are mounted in a convenient open area for ease of belt tensioning, motor lubrication and electrical connection. The motor base is designed for easy adjustment and to be locked into position to maintain proper belt tension.



Example LSWE Fan Motor Mount



*LRWB Fan Motor Mount
(shown with optional pony motor)*

Fan Access-Split Housing

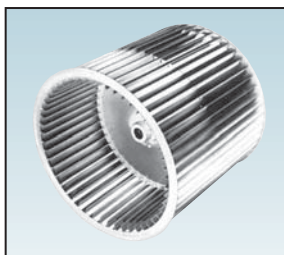


Another unique feature of the LRWB Closed Circuit Cooler is the split fan housing. The split fan housing on the LRWB allows quick removal of the fans from the front end of the unit. This feature allows fan removal when units are placed side by side where space is minimal.

Mechanical Drive System Access

The LSWE and LRWB mechanical drive systems are easy to maintain. Bearing lubrication and belt adjustment can be performed from outside the unit. There is no need to remove fan screens to maintain important drive components. In addition, the locking mechanism used to maintain belt tension can also work as a wrench to adjust the belt.

Centrifugal Fan Assembly



Fans on LSWE and LRWB Closed Circuit Coolers are of the forward curved centrifugal design with hot-dip galvanized steel construction. All fans are statically and dynamically balanced and are mounted in a hot-dip galvanized steel housing.

Basin Access

The LSWE drain pan is designed to improve maintenance access and make it easier for operating technicians to clean. The bottom of the pan is sloped to the unit drain to ensure that the basin will completely drain and allow sediment and debris that may collect in the basin to be easily flushed from the unit. The design helps to prevent buildup of sedimentary deposits, biological films and standing water.

Large circular access doors are provided to allow entry into the basin. All float valve and strainer assemblies are located near the door for easy adjustment and cleaning. The sump is designed to catch the dirt accumulated. This can be flushed out simply with a hose. The stainless steel strainers may be easily removed for periodic cleaning.



Capacity Control

All LSWE and LRWB models come standard with premium efficient, inverter capable fan motors that can be used with variable frequency drive (VFD) systems for precise capacity control. VFD systems can control the speed of a fan motor by modulating the voltage and frequency of the motor input electrical signal. When connected to a building automation system a VFD can receive signals varying fan speeds to meet demand loads. This popular method of capacity control can yield significant energy savings.

Evapco offers two-speed fan motors as an option for alternative capacity control. In periods of lightened loads or reduced wet bulb temperatures the fans can operate at low speed providing about 60% of full speed capacity yet consuming only about 15% of full speed power. In addition to the energy savings the sound levels of the unit can be greatly reduced by operating at low speed. These motors do not require the use of VFD systems however they can only operate at two speeds: full or low.

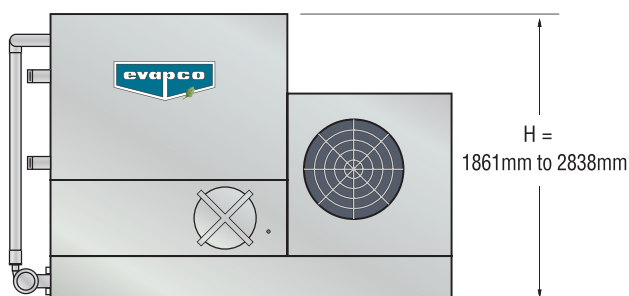
DESIGN FEATURES

LSWE/LRWB

LRWB Reduced Height and Maintenance Accessibility

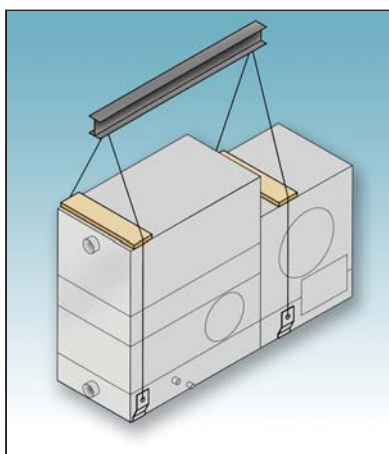
The LRWB has been designed to satisfy installation requirements where height limits must be observed. The lower profile design of the LRWB does not, however, sacrifice maintenance accessibility for reduced height. Its unique casing design allows the water distribution system, cold water basin, fan section and other unit components to be easily maintained.

Small, light-weight sections of the drift eliminators can be easily removed to access the water distribution system. A large circular access door is located on the side of the cold water basin to allow adjustment of the float assembly, removal of the stainless steel strainers and cleaning of the basin. The fan motor and drive system are located at one end of the unit and are completely accessible by removing the inlet screens. Routine bearing lubrication and belt tensioning can be performed from the exterior of the unit without removing the inlet screens.



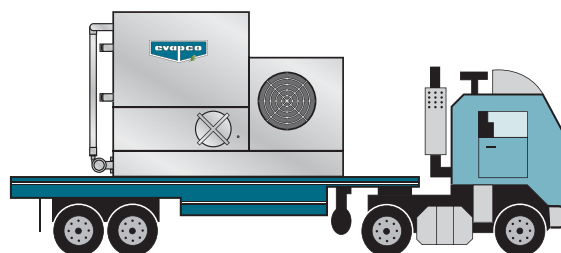
Low Installed Costs

The compact, unitary design of the LRWB closed circuit cooler allows it to be shipped completely assembled. This results in lower transportation costs and no assembly requirements at the job site. Note: Options such as sound attenuation and discharge hoods will require additional lifts and some minor assembly.



Transport of a Pre-Assembled Unit

Since the LRWB ships fully assembled, it is ideal for truck-mounted applications, for remote sites or temporary installations.



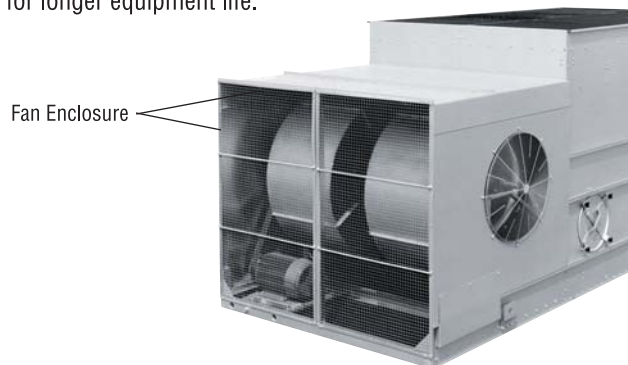
Stainless Steel Cold Water Basin—Standard

The LRWB is standard with a stainless steel cold water basin. Optional upgrades to stainless steel water touch basins, stainless steel water touch units and all stainless steel construction are also available on the LRWB.



Integral Fan Enclosure for Lower Sound

The LRWB comes standard with an integral fan enclosure that reduces sound levels by 2 dB. This 3-sided enclosure also protects the fan and drive system for longer equipment life.



Application Versatility

Centrifugal units are recommended for a wide range of installations. They are quiet, can easily be hidden, and the increase in fan HP over propeller fan units is generally not significant in the small size range. They are also excellent for installations where sound is sensitive, such as residential neighborhoods, and when the unit must handle external static pressure.



LSWE Unit



LRWB Unit

Very Quiet Operation

Centrifugal fan units operate at low sound levels which make this design preferred for installations with external static pressure where noise is a concern. Additionally, since the sound from the fans is directional, single sided air entry models can be turned away from critical areas avoiding a sound problem. When even quieter operation is necessary, centrifugal fan models can be equipped with optional sound attenuation packages. See the Sound Reducing Options section of this catalog or consult the factory for details.

In addition, the LRWB features a specially engineered fan enclosure and drive system that is designed to offer very quiet operation without the high cost of external attenuation packages. The LRWB fan system was developed through hundreds of hours of laboratory tests resulting in the lowest standardized sound levels available in the industry. In fact, the sound level of the LRWB on average is 2 dBA quieter than competitors' similar models.

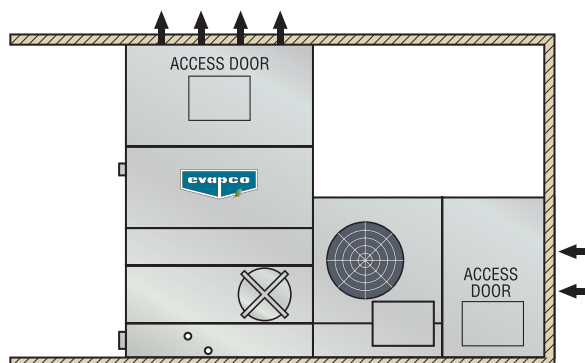
Indoor Installation

All LSWE and LRWB Closed Circuit Coolers can be installed indoors where they normally require ductwork to and from the unit. The design of the ductwork should be symmetrical to provide even air distribution across both intake and discharge openings. Guidelines for Ducted Applications:

- 1) The static pressure loss imposed by the ductwork must not exceed 125Pa. The fan motor size must be increased for ESP up to 125Pa.

- 2) For ducted installations, the solid bottom panel option must be ordered. On the LRWB blank off plates will also be provided in lieu of the side air inlet screens with this option.
- 3) NOTE: Access Doors must be located in the ductwork for service to the fan drive components and water distribution system.

Drawings are available showing recommended ductwork connections. See EVAPCO's Layout Guidelines for additional information.



PRODUCT APPLICATIONS

LSWE/LRWB

Design

EVAPCO Closed Circuit Coolers are of heavy-duty construction and designed for long trouble-free operation. Proper equipment selection, installation and maintenance is, however, necessary to ensure full unit performance. Some of the major considerations in the application of a cooler are presented below. For additional information, contact the factory.

Air Circulation

It is important that proper air circulation be provided. The best location is on an unobstructed roof top or on ground level away from walls and other barriers. Those closed circuit coolers located in wells, enclosures or adjacent to high walls must be properly located to avoid the problems associated with recirculation.

Recirculation raises the wet bulb temperature of the entering air causing the water temperature to rise above the design. For these cases, the discharge of the unit should be located at a height even with the adjacent wall, thereby reducing the chance of recirculation. For additional information, see the EVAPCO Equipment Layout Manual.

Good engineering practice dictates that the closed circuit cooler discharge air not be directed or located close to or in the vicinity of building air intakes.

Piping

Cooler piping should be designed and installed in accordance with generally accepted engineering practices. The piping layout should be symmetrical on multiple unit systems, and sized for a reasonably low water velocity and pressure drop.

The standard closed circuit cooler is recommended only on a closed, pressurized system. The piping system should include an expansion tank to allow for fluid expansion and purging air from the system.

Note: Closed Circuit Coolers should never be used on an open type system. An open type system with a cooler may result in premature coil failure.

The piping system should be designed to permit complete drainage of the heat exchanger coil. This will require a vacuum breaker or air vent to be installed at the high point and a drain valve installed at the low point of the piping system. Both must be adequately sized.

All piping should be securely anchored by properly designed hangers and supports. No external loads should be placed upon the cooler connections, nor should any of the pipe supports be anchored to the cooler framework.

Recirculating Water Quality

Proper water treatment is an essential part of the maintenance required for evaporative cooling equipment. A well designed and consistently implemented water treatment program will help to ensure efficient system operation while maximizing the equipment's service life. A qualified water treatment company should design a site specific water treatment protocol based on equipment (including all metallurgies in the cooling system), location, makeup water quality, and usage.

Bleed off

Evaporative cooling equipment requires a bleed or blowdown line, located on the discharge side of the recirculating pump, to remove concentrated (cycled up) water from the system. Evapco recommends an automated conductivity controller to maximize the water efficiency of your system. Based on recommendations from your water treatment company, the conductivity controller should open and close a motorized ball or solenoid valve to maintain the conductivity of the recirculating water. If a manual valve is used to control the rate of bleed it should be set to maintain the conductivity of the recirculating water during periods of peak load at the maximum level recommended by your water treatment company.

Water Treatment

The water treatment program prescribed for the given conditions must be compatible with the unit's materials of construction, including any galvanized components. The initial commissioning and passivation period is a critical time for maximizing the service life of galvanized equipment. EVAPCO recommends that the site specific water treatment protocol includes a passivation procedure which details water chemistry, any necessary chemical addition, and visual inspections during the first six (6) to twelve (12) weeks of operation. During this passivation period, recirculating water pH should be maintained above 7.0 and below 8.0 at all times. Batch feeding of chemicals is not recommended.

Control of Biological Contaminants

Evaporative cooling equipment should be inspected regularly to ensure good microbiological control. Inspections should include both monitoring of microbial populations via culturing techniques and visual inspections for evidence of biofouling.

Poor microbiological control can result in loss of heat transfer efficiency, increase corrosion potential, and increase the risk of pathogens such as those that cause Legionnaires' disease. Your site specific water treatment protocol should include procedures for routine operation, startup after a shut-down period, and system lay-up, if applicable. If excessive microbiological contamination is detected, a more aggressive mechanical cleaning and/or water treatment program should be undertaken.



LSWE/LRWB

OPTIONAL EQUIPMENT

Extended Surface Coil

Closed Circuit Coolers can be provided with spiral fins on the heat exchanger coil to increase the dry performance of the unit. Dry performance is accomplished by rejecting heat to the atmosphere without the use of the spray pump and the evaporation process. Dry operation can be practical in cold climates and/or when reduced winter loads exist. The quantity of finned rows can be varied to optimize dry performance. See your local sales representative for more information.



Electric Water Level Control

EVAPCO LSWE & LRWB closed circuit coolers are available with an optional electric water level control system in place of the standard mechanical makeup valve and float assembly. This package provides accurate control of the pan water level and does not require field adjustment, even under widely variable operating conditions.

The control was designed by EVAPCO and consists of multiple heavy duty stainless steel electrodes. These electrodes are mounted external to the unit in a vertical standpipe. For winter operation, the standpipe must be wrapped with electric heating cable and insulated to protect it from freezing. The weather protected slow closing solenoid valve for the makeup water connection is factory supplied and is ready for piping to a water supply with a pressure between 140 kPa (minimum) and 340 kPa (maximum).



Self Supporting Service Platform

Some LSWE Closed Circuit Coolers are available with self-supporting service platforms that include access ladders which are designed for easy field installation. This option offers significant savings in comparison to field constructed, externally supported catwalks. The EVAPCO service platform option may be installed on either side, or the end opposite the connections.

Screened Bottom Panels

Protective inlet screens are provided on the sides and/or end of the unit's air intake. Screens are not provided below the fan section since most units are mounted on the roof or at ground level. It is recommended that bottom screens be added to the unit when it will be elevated. These screens can be provided by the factory at an additional cost or added by the installing contractor.

Solid Bottom Panels for Ducted Installations

When centrifugal fan units are installed indoors and intake air is ducted to the unit, a solid bottom panel is required to completely enclose the fan section and prevent the unit from drawing air from the room into the fan intakes. When this option is ordered, air inlet screens are omitted.

Two Speed Motors

Two speed fan motors can provide an excellent means of capacity control. In periods of lightened loads or reduced wet bulb temperatures, the fans can operate at low speed, which will provide about 60% of full speed capacity, yet consume only about 15% of the power compared with high speed. In addition to the energy savings, the sound levels of the units will be greatly reduced at low speed.

Water Level Indicator

Units may be supplied with a water level indicator to provide a visual indication of basin water level without opening access doors or air inlet louvers. The level indicator can be furnished with an optional low and high level alarm switches or a transmitter for continuous level monitoring.

FREEZE PROTECTION AND HEAT LOSS

LSWE/LRWB

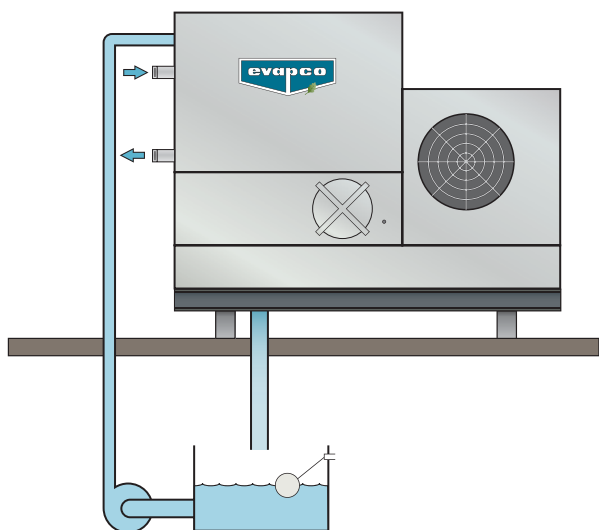
Freeze Protection

If the units are installed in a cold climate and operated year-round, freeze protection must be provided for the heat exchanger coil in the unit as well as for the recirculating water system.

Recirculating Water System Freeze Protection Options

Remote Sump Configuration

The surest way to protect the recirculating water system from freezing is with a remote sump. The remote sump should be located inside the building and below the unit. When a remote sump arrangement is selected, the spray pump is provided by others and installed at the remote sump. All water in the closed circuit cooler basin should drain to the remote sump when the spray pump cycles off.



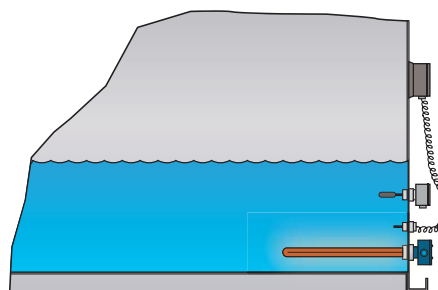
Hot Water Coils

Pan coils are available as an alternate to using electric basin heaters or a remote sump. Constructed of galvanized pipe and installed in the closed circuit cooler basin, they are supplied without controls and are ready for piping to an external hot water source. Pan water heater controls should be interlocked with the water circulating pump to prevent their operation when the pump is energized.

Basin Heater Package

If a remote sump configuration is not practical, electric basin heater packages are available to keep the pan water from freezing when the unit cycles off. Water lines to and from the unit, spray pump and related piping should be heat traced and insulated up to the overflow level to protect from freezing.

The unit should not be operated dry (fans on, pump off) unless the basin is completely drained and the unit has been designed for dry operation. Consult the factory when dry operation is a requirement.



LSWE Basin Heater Sizing*

Model No.	kW (-18°C)	kW (-28°C)	kW (-40°C)
4-2F6 to 4-5I6	(1) 2	(1) 3	(1) 4
4-3G9 to 4-5J9	(1) 3	(1) 4	(1) 5
4-3H12 to 4-5K12	(1) 3	(1) 5	(1) 7
4-3I18 to 4-5M18	(1) 5	(1) 7	(1) 9
5-3I12 to 5-7M12	(1) 4	(1) 6	(1) 8
5-3J18 to 5-7N18	(2) 3	(2) 4	(1) 12
8P-3K12 to 8P-7O12	(1) 5	(1) 8	(1) 10
8P-3M18 to 8P-7P18	(2) 4	(2) 6	(2) 7
8P-3K24 to 8P-7O24	(2) 5	(2) 7	(2) 10
8P-3M36 to 8P-7P36	(2) 7	(2) 12	(2) 15
10-3M12 to 10-7P12	(1) 7	(1) 10	(1) 15
10-3K18 to 10-7N18	(2) 5	(2) 7	(2) 10
10-3M24 to 10-7P24	(2) 7	(2) 10	(2) 15
10-3K36 to 10-7N36	(2) 10	(4) 7	(4) 9

LRWB Basin Heater Sizing*

Model No.	kW (-18°C)	kW (-28°C)	kW (-40°C)
3-2D6 to 3-5I6	(1) 2	(1) 3	(1) 4
5-2F6 to 5-5I6	(1) 3	(1) 5	(1) 6
5-3H9 to 5-7K9	(1) 4	(1) 6	(1) 8
5-3J12 to 5-7N12	(1) 6	(1) 8	(1) 12
8-3J9 to 8-5M9	(1) 7	(1) 9	(1) 12
8-4K12 to 8-7O12	(1) 9	(1) 12	(1) 16

* Electric heater selection based on ambient air temperature shown.

Heat Exchanger Coil Freeze Protection Options

The simplest and most foolproof method of protecting the heat exchanger coil from freeze-up is to use a glycol solution. If this is not possible, an auxiliary heat load must be maintained on the coil at all times so that the water temperature does not drop below 10°C when the cooler is shut down and, a minimum recommended flow rate per unit as shown in the table below must be maintained. Refer to Heat Loss Data Table on page 13 for heat loss data.

LSWE Minimum Flows for Freeze Protection

Model No.	Minimum Flow for Freeze (l/s)	
	Standard Unit	Series Flow Unit (-Z)
4-2F6 to 4-5I6	4.2	2.1
4-3G9 to 4-5J9	4.2	2.1
4-3H12 to 4-5K12	4.2	2.1
4-3I18 to 4-5M18	4.2	2.1
5-3I12 to 5-7M12	5.9	3.0
5-3J18 to 5-7N18	5.9	3.0
8P-3K12 to 8P-7O12	9.3	4.7
8P-3M18 to 8P-7P18	9.3	4.7
8P-3K24 to 8P-7O24	18.7	9.3
8P-3M36 to 8P-7P36	18.7	9.3
10-3M12 to 10-7P12	11.9	5.9
10-3K18 to 10-7N18	11.9	5.9
10-3M24 to 10-7P24	23.7	11.9
10-3K36 to 10-7N36	23.7	11.9

LRWB Minimum Flows for Freeze Protection

Model No.	Minimum Flow for Freeze (l/s)	
	Standard Unit	Series Flow Unit (-Z)
3-2D6 to 3-5I6	3.8	1.9
5-2F6 to 5-5I6	5.9	3.0
5-3H9 to 5-7K9	5.9	3.0
5-3J12 to 5-7N12	5.9	3.0
8-3J9 to 8-5M9	9.3	4.7
8-4K12 to 8-7O12	9.3	4.7

If an anti-freeze solution is not used, the coil must be drained immediately whenever the pump is shut down or flow stops. Care must be taken to ensure that the piping is sized to allow the water to flow quickly from the coil. This method of freeze control should only be used in an emergency situation. Coils should not be drained for an extended period of time. **Leaving the coil drained and open to the atmosphere can cause corrosion inside the tubes which may lead to premature coil failure.**

The amount of glycol required for a system will depend upon the total volume of water in the closed loop and the winter ambient conditions for the installation. The Engineering Data Tables presented on pages 19-36 provide the water volume contained inside the cooler coils to assist in this calculation.

Discharge Hoods with Positive Closure Dampers

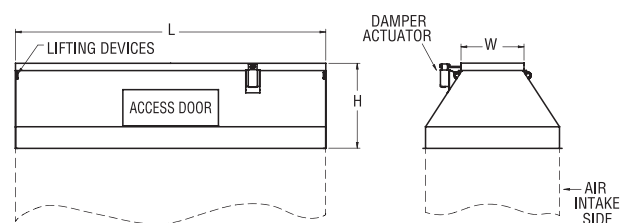
When a closed circuit cooler is used in a water-to-air heat pump system or in certain process cooling applications, a method of reducing the heat loss during idle periods of wintertime operation may be required. For these cases, an optional discharge hood with positive closure dampers and damper actuator is available.

The discharge hood with dampers is designed to minimize the heat loss from convective airflow through an idle cooler. Further reductions in heat loss may be obtained with the addition of insulation to the hood and casing, minimizing conductive heat losses. Insulation may be factory-installed on the hood and casing or field-installed by an insulation contractor.

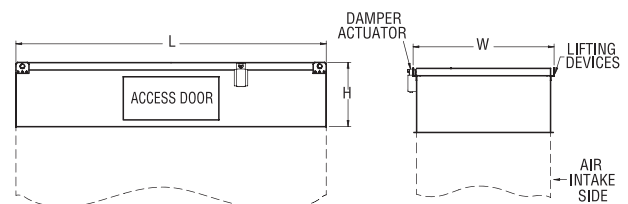
The discharge hood and dampers are constructed of hot-dip galvanized steel. Hoods are equipped with access panels to facilitate maintenance on the eliminators and water distribution system. The dampers, damper actuator and linkage are all factory-assembled. Actuator controls and wiring are field-supplied by others. Damper actuators require 120 volt power supply.

The system control sequence should provide for dampers to be fully open before the fans are running and closed when the fans are off; the damper actuator must be interlocked with the temperature control system for this purpose. When a centrifugal fan model uses a tapered discharge hood, the next larger size fan motor must be used to overcome the additional static pressure.

Heat loss data is provided for standard units without hoods, with hoods and with hoods and insulation. Table ratings are based on 10°C water in the coil, -23°C ambient and 70 km/hour winds (fan and pump off).



Tapered Discharge Hood (See page 13 for dimensions)



Straight-Sided Discharge Hood (See page 13 for dimensions)

HEAT LOSS

LSWE/LRWB

LSWE Heat Loss Data

LSWE Model	Standard Unit (kW)	Unit with Hood (kW)	With Hood & Insulation (kW)
4-2x6	10.8	8.5	5.6
4-3x6	14.7	9.7	6.2
4-4x6	17.9	10.5	6.7
4-5x6	19.9	11.4	7.3
4-3x9	22.3	12.9	8.2
4-4x9	27.0	14.1	9.1
4-5x9	30.5	15.2	9.7
4-3x12	30.2	15.8	10.3
4-4x12	36.3	17.6	11.1
4-5x12	41.0	19.0	12.3
4-3x18	45.4	22.3	14.4
4-4x18	55.1	24.6	15.8
4-5x18	61.8	26.7	17.0
5-3x12	43.1	20.5	13.2
5-4x12	52.2	22.6	14.4
5-5x12	58.6	24.3	15.5
5-6x12	62.4	26.4	16.7
5-7x12	67.7	28.7	18.2
5-3x18	65.3	28.1	18.2
5-4x18	78.8	30.8	19.6
5-5x18	88.8	33.4	21.4
5-6x18	94.3	36.0	23.1
5-7x18	102.3	39.3	25.2
8-3x12	66.5	28.7	18.5
8-4x12	80.9	30.8	19.6
8-5x12	90.5	32.8	21.1
8-6x12	96.4	34.9	22.3
8-3x18	91.1	38.7	24.9
8-4x18	110.2	41.3	26.4
8-5x18	137.1	44.0	28.1
8-6x18	146.2	46.6	29.9
8-7x18	158.5	50.7	32.5

LSWE Model	Standard Unit (kW)	Unit with Hood (kW)	With Hood & Insulation (kW)
8-3x24	133.0	57.4	36.9
8-4x24	161.7	61.5	39.3
8-5x24	181.1	65.6	42.2
8-6x24	192.8	69.7	44.5
8-7x24	208.9	75.6	48.3
8-3x36	201.6	77.4	49.8
8-4x36	244.4	82.6	52.7
8-5x36	274.2	87.9	56.3
8-6x36	292.4	93.2	59.8
8-7x36	317.0	101.1	64.8
10-3x12	86.1	31.9	20.2
10-4x12	104.3	34.3	22.0
10-5x12	117.2	36.6	23.4
10-6x12	124.8	39.3	25.2
10-7x12	135.4	42.8	27.5
10-3x18	130.4	41.9	26.7
10-4x18	157.9	44.8	28.7
10-5x18	177.3	48.1	30.8
10-6x18	188.7	51.3	32.8
10-7x18	204.5	55.7	35.7
10-3x24	172.3	63.6	40.7
10-4x24	208.6	68.6	44.0
10-5x24	234.1	73.5	46.9
10-6x24	249.3	78.2	50.1
10-7x24	270.1	85.0	54.5
10-3x36	254.9	83.5	53.3
10-4x36	315.9	90.0	57.4
10-5x36	354.5	96.1	61.5
10-6x36	377.7	102.3	65.3
10-7x36	409.3	111.0	70.9

LRWB Heat Loss Data

LRWB Model	Standard Unit (kW)	Unit with Hood (kW)	With Hood & Insulation (kW)
3-2x6	9.7	8.5	6.4
3-3x6	13.5	10.5	6.7
3-4x6	15.8	11.4	7.3
3-5x6	18.2	12.3	7.9
5-2x6	15.2	12.9	8.5
5-3x6	21.1	13.2	8.8
5-4x6	25.5	14.4	9.1
5-5x6	28.7	15.5	10.0
5-3x9	32.2	17.3	11.1
5-4x9	39.0	18.8	12.0
5-5x9	43.7	20.2	12.9
5-6x9	46.6	21.4	13.8
5-7x9	47.5	25.2	16.1
5-3x12	43.1	21.7	13.8
5-4x12	52.2	23.4	14.9
5-5x12	58.6	24.9	16.1
5-6x12	62.4	26.7	17.3
5-7x12	63.6	31.4	19.9
8-3x9	49.8	22.6	14.4
8-4x9	60.1	24.3	15.5
8-5x9	67.7	26.1	16.7
8-6x9	72.1	27.5	17.9
8-7x9	73.3	32.2	20.8
8-3x12	66.8	27.5	17.6
8-4x12	80.9	29.6	18.8
8-5x12	90.8	31.4	20.2
8-6x12	96.7	33.4	21.4
8-7x12	98.4	39.0	24.9

DISCHARGE HOOD DIMENSIONS

LSWE Tapered Discharge Hood Dimensions

Model No.	H (mm)	L (mm)	W (mm)	Weight (kg)	Number of Hoods
4-2F6 to 4-5I6	838	1826	537	95	1
4-3G9 to 4-5J9	838	2724	537	125	1
4-3H12 to 4-5K12	838	3645	537	160	1
4-3I18 to 4-5M18	838	5486	537	220	1
5-3I12 to 5-7M12	1003	3645	740	205	1
5-3J18 to 5-7N18	1003	5486	740	280	1
8P-3K12 to 8P-7O12	1083	3651	1159	280	1
8P-3M18 to 8P-7P18	1083	5486	1159	380	1
8P-3K24 to 8P-7O24	1083	3651	1159	560	2
8P-3M36 to 8P-7P36	1083	5486	1159	755	2
10-3M12 to 10-7P12	1280	3648	1476	350	1
10-3K18 to 10-7N18	1280	5486	1476	480	1
10-3M24 to 10-7P24	1280	3648	1476	705	2
10-3K36 to 10-7N36	1280	5486	1476	955	2

LRWB Tapered Discharge Hood Dimensions

Model No.	H (mm)	L (mm)	W (mm)	Weight (kg)	Number of Hoods
3-2D6 to 3-5I6	622	1826	483	105	1
5-2F6 to 5-5I6	997	1826	737	175	1
5-3H9 to 5-7K9	997	2724	737	235	1
5-3J12 to 5-7N12	997	3648	737	310	1
8-3J9 to 8-5M9	1080	2724	1080	355	1
8-4K12 to 8-7O12	1080	3648	1080	440	1

LSWE Straight-Sided Discharge Hood Dimensions

Model No.	H (mm)	L (mm)	W (mm)	Weight (kg)	Number of Hoods
4-2F6 to 4-5I6	762	1826	1156	80	1
4-3G9 to 4-5J9	762	2724	1156	115	1
4-3H12 to 4-5K12	762	3645	1156	135	1
4-3I18 to 4-5M18	762	5486	1156	180	1
5-3I12 to 5-7M12	762	3645	1575	150	1
5-3J18 to 5-7N18	762	5486	1575	225	1
8P-3K12 to 8P-7O12	762	3651	2426	205	1
8P-3M18 to 8P-7P18	762	5486	2426	280	1
8P-3K24 to 8P-7O24	762	3651	2426	410	2
8P-3M36 to 8P-7P36	762	5486	2426	560	2
10-3M12 to 10-7P12	762	3648	3026	285	1
10-3K18 to 10-7N18	762	5493	3026	390	1
10-3M24 to 10-7P24	762	3648	3026	565	2
10-3K36 to 10-7N36	762	5493	3026	775	2

LRWB Straight-Sided Discharge Hood Dimensions

Model No.	H (mm)	L (mm)	W (mm)	Weight (kg)	Number of Hoods
3-2D6 to 3-5I6	749	1826	1029	170	1
5-2F6 to 5-5I6	749	1826	1540	215	1
5-3H9 to 5-7K9	749	2724	1540	310	1
5-3J12 to 5-7N12	749	3648	1540	390	1
8-3J9 to 8-5M9	749	2724	2388	445	1
8-4K12 to 8-7O12	749	3648	2388	565	1



LSWE/LRWB

OPTIONAL EQUIPMENT

SMART SHIELD® Soild Chemical Water Treatment System



The LSWE/LRWB is available with EVAPCO's **Factory Mounted** water treatment systems. EVAPCO offers a soild chemical solution for water treatment to maintain your heat transfer efficiency and extend the life of the equipment. Each system has been specifically designed for your cooler.

EVAPCO's Water Systems offer LSWE/LRWB owners a single-souce of responsibility for equipment, water treatment, and service. Smart Shield® is manufactured and warranted by EVAPCO.

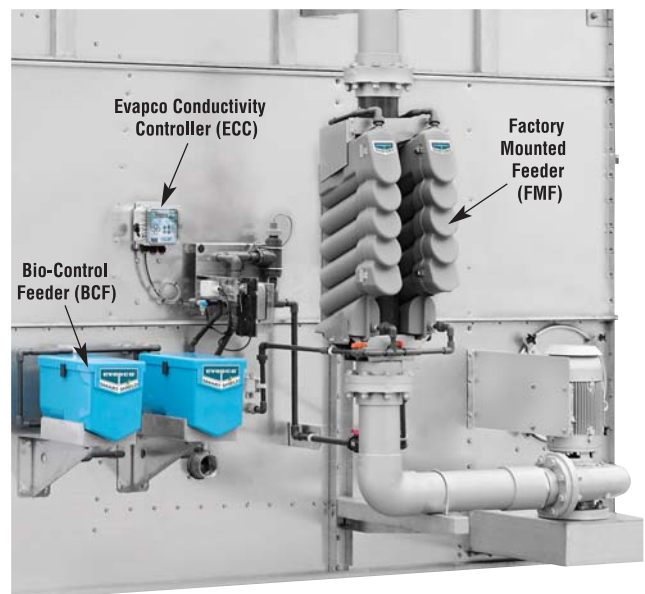
Benefits of adding an EVAPCO water treatment system include:

- **SAVES MONEY** by simplifying commission:
 - Single power connection is the only field installation requirement
- **Factory Mounting** your water treatment system ensures that it is installed to factory specifications.
- **Patented self-draining piping** eliminates the need for line insulation and heat tracing above the overflow level..
- **A Factory Authorized Service Partner** provides the first year of water system service and monitoring, to ensure proper operation and ongoing success.
- **Conductivity control package** maximizes water efficiency and features:
 - Low maintenance non-fouling torodial probe
 - USB port for downloadable 60 day audit trail of system operation
 - Motorized blowdown valve that provides the most reliable bleed control with power open / spring return operation.

EVAPCO's **Smart Shield®** system utilizes proven soild chemistry delivered via our revolutionary feed system. Patented controlled relese scale and corrosion inhibitor is fed whenever your spray water pump is energized, keeping your system protected anytime the spray water pump is

operating. **Smart Shield®** is a complete water treatment package that:

- Utilizes 'Bag in Bag' no touch chemical replenishments, making reloads easier and safer.
- Creates reduced packaging, shipping and handling providing a reduced carbon footprint compared to liquid chemicals.
- Eliminates the hazards associated with liquid chemicals, potential for liquid spills and the need for expensive feed pumps making it the easiest and safest chemical water treatment system available today.



SOUND REDUCING OPTIONS

LSWE/LRWB

Sound Attenuation Packages

The centrifugal fan design of the LSWE and LRWB models operate at lower sound levels which make these units preferable for installations where noise is a concern. For noise-sensitive applications, the LSWE and LRWB centrifugal fan models may be supplied with various stages of intake and/or discharge attenuation packages which greatly reduce sound levels.

Consult the factory for certified sound data for each sound attenuation option.

Fan Side Inlet Attenuation (LRWB Only)

Reduces sound radiated from the fan side air intakes and has an open side to allow for air entry. This attenuation package ships loose to be mounted in the field on each side of the closed circuit cooler over the fan intakes.

Fan End Inlet Attenuation

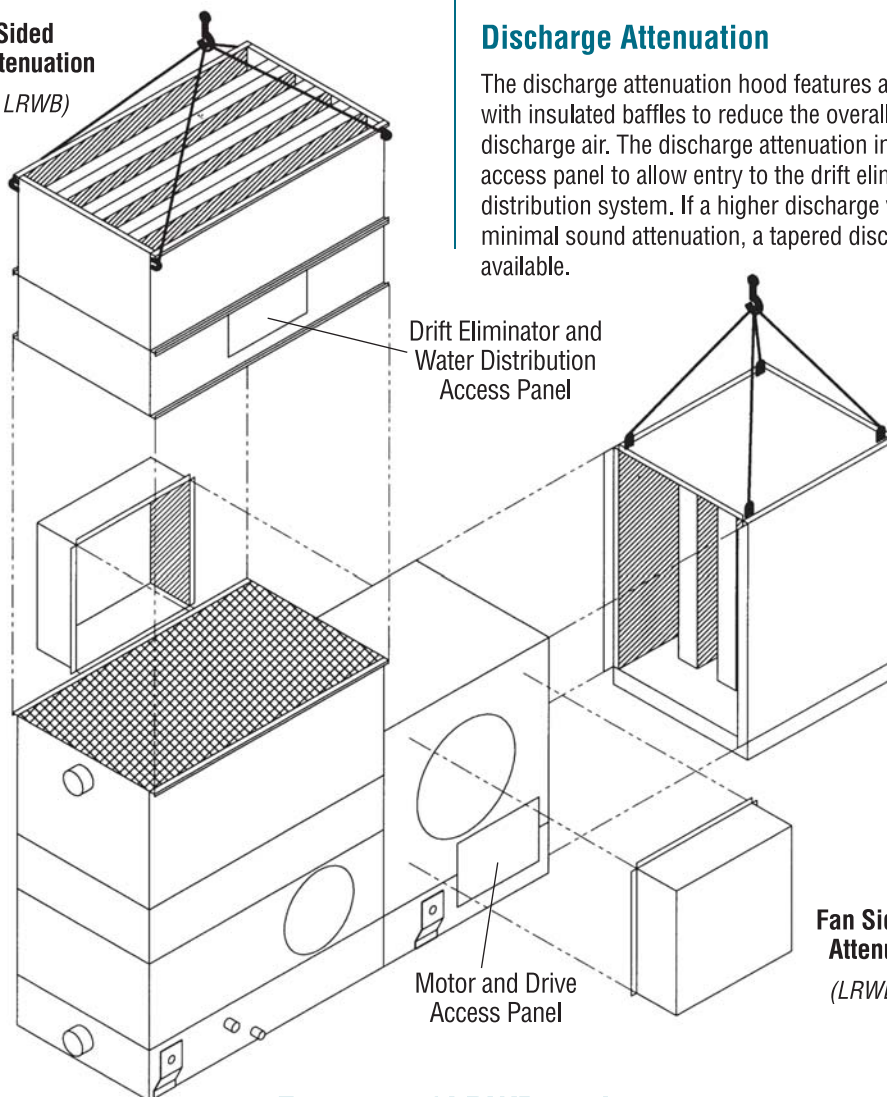
Reduces sound radiated through the end air intakes. It consists of baffled panels that change the path of the air entry and capture the radiated noise thus reducing the overall sound levels generated. In addition, the external belt adjustment mechanism is extended through the inlet attenuator to allow for easy adjustment without having to enter the unit. Solid bottom panels are included with this option to force the inlet air through the attenuator.

Discharge Attenuation

The discharge attenuation hood features a straight-sided design with insulated baffles to reduce the overall sound levels of the discharge air. The discharge attenuation incorporates a large access panel to allow entry to the drift eliminators and water distribution system. If a higher discharge velocity is required with minimal sound attenuation, a tapered discharge hood is available.

Straight Sided Discharge Attenuation

(LSWE and LRWB)



Example of LRWB model

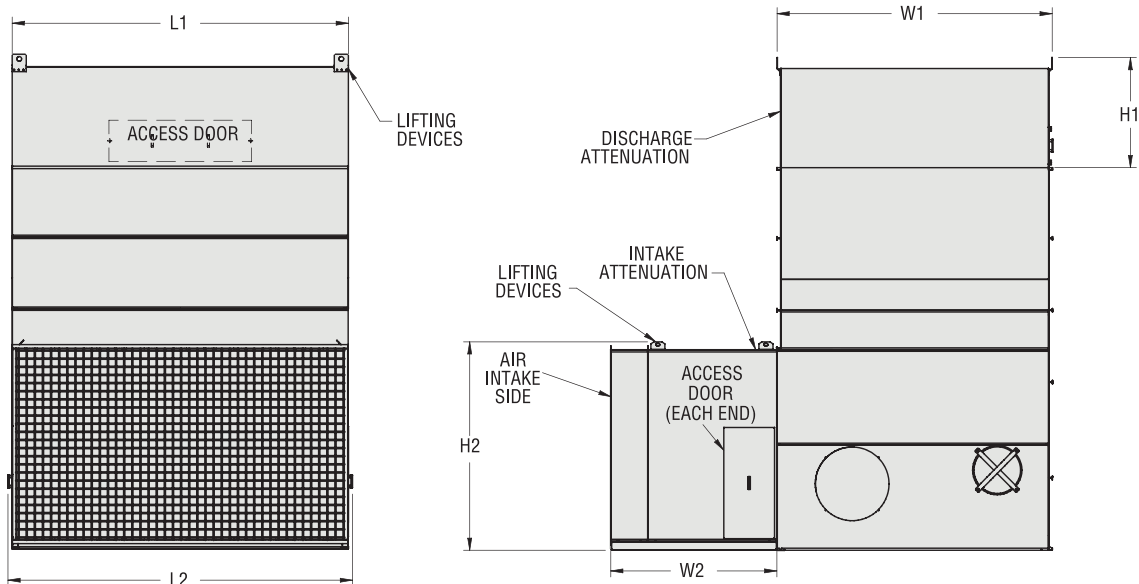
LSWE Discharge Attenuation Dimensions*

Model No.	H1 (mm)	L1 (mm)	W1 (mm)	Weight per Attenuator (kg)	Number of Attenuators
4-2F6 to 4-5I6	1194	1823	1156	255	1
4-3G9 to 4-5J9	1194	2724	1156	340	1
4-3H12 to 4-5K12	1194	3645	1156	455	1
4-3I18 to 4-5M18	1194	5486	1156	620	1
5-3I12 to 5-7M12	1194	3645	1572	550	1
5-3J18 to 5-7N18	1194	5486	1572	755	1
8P-3K12 to 8P-7O12	1813	3651	2343	1040	1
8P-3M18 to 8P-7P18	1813	5486	2343	1415	1
8P-3K24 to 8P-7O24	1813	3651	2343	1040	2
8P-3M36 to 8P-7P36	1813	5486	2343	1415	2
10-3M12 to 10-7P12	1813	3645	3023	1230	1
10-3K18 to 10-7N18	1813	5486	3023	1670	1
10-3M24 to 10-7P24	1813	3645	3023	1230	2
10-3K36 to 10-7N36	1813	5486	3023	1670	2

LSWE Intake Attenuation Dimensions*

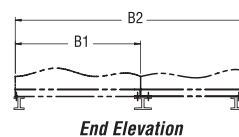
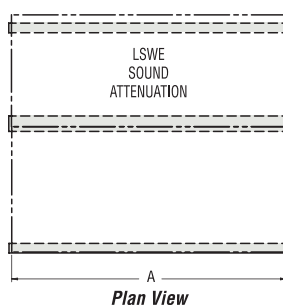
Model No.	H2 (mm)	L2 (mm)	W2 (mm)	Weight per Attenuator (kg)	Number of Attenuators
4-2F6 to 4-5I6	1010	1895	1816	390	1
4-3G9 to 4-5J9	1010	2819	1816	545	1
4-3H12 to 4-5K12	1010	3740	1816	695	1
4-3I18 to 4-5M18	1010	5582	1816	1015	1
5-3I12 to 5-7M12	1175	3740	1816	750	1
5-3J18 to 5-7N18	1175	5582	1816	1090	1
8P-3K12 to 8P-7O12	2070	3743	1816	1015	1
8P-3M18 to 8P-7P18	2070	5582	1816	1455	1
8P-3K24 to 8P-7O24	2070	3693	1816	1015	2
8P-3M36 to 8P-7P36	2070	5534	1816	1455	2
10-3M12 to 10-7P12	2261	3747	1816	1055	1
10-3K18 to 10-7N18	2261	5588	1816	1540	1
10-3M24 to 10-7P24	2261	3696	1816	1055	2
10-3K36 to 10-7N36	2261	5540	1816	1540	2

* Attenuation dimensions may vary slightly from catalog. See Factory certified prints for exact dimensions.



LSWE Attenuation

Note: Intake sound attenuation must be fully supported. If the recommended steel support is being used a third "I" beam is required for the intake attenuation. Refer to page 37.



DISCHARGE & INTAKE ATTENUATION DIMENSIONS

LSWE/LRWB

LRWB Discharge Attenuation Dimensions*

Model No.	H1 (mm)	L1 (mm)	W1 (mm)	Weight per Attenuator (kg)	Number of Attenuators
3-2D6 to 3-5I6	1102	1822	1029	305	1
5-2F6 to 5-5I6	1102	1822	1540	385	1
5-3H9 to 5-7K9	1102	2724	1540	530	1
5-3J12 to 5-7N12	1102	3648	1540	905	1
8-3J9 to 8-5M9	1102	2724	2388	710	1
8-4K12 to 8-7O12	1102	3648	2388	920	1

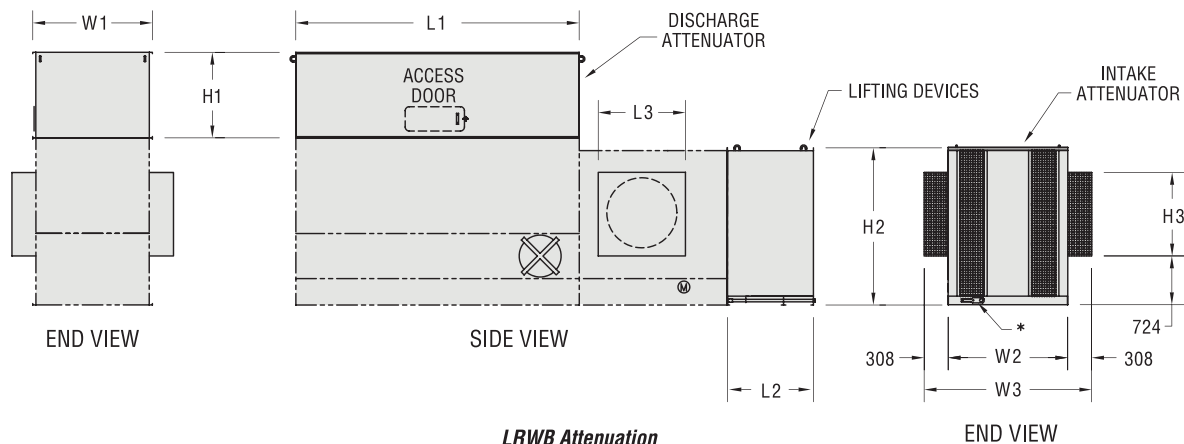
LRWB Fan End Attenuation Dimensions*

Model No.	H2 (mm)	L2 (mm)	W2 (mm)	Weight per Attenuator (kg)	Number of Attenuators
3-2D6 to 3-5I6	1622	1029	1108	365	1
5-2F6 to 5-5I6	2022	1540	1105	580	1
5-3H9 to 5-7K9	2022	1540	1105	580	1
5-3J12 to 5-7N12	2022	1540	1105	580	1
8-3J9 to 8-5M9	2022	2394	1108	695	1
8-4K12 to 8-7O12	2022	2394	1108	695	1

LRWB Fan Side Attenuation Dimensions*

Model No.	H3 (mm)	L3 (mm)	W3 (mm)	Weight per Attenuator (kg)	Number of Attenuators
3-2D6 to 3-5I6	854	1645	883	27	2
5-2F6 to 5-5I6	937	2156	1372	27	2
5-3H9 to 5-7K9	937	2156	1372	27	2
5-3J12 to 5-7N12	937	2156	1372	27	2
8-3J9 to 8-5M9	1076	3010	1121	27	2
8-4K12 to 8-7O12	1076	3010	1121	27	2

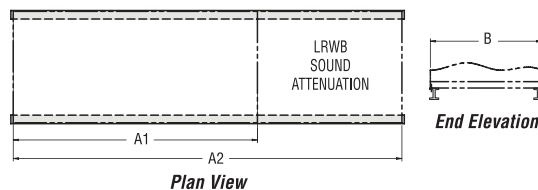
* Attenuation dimensions may vary slightly from catalog. See Factory certified prints for exact dimensions.



LRWB Attenuation

END VIEW

Note: Intake sound attenuation must be fully supported. If the recommended steel support is being used a third "I" beam is required for the intake attenuation. Refer to page 37.
*External belt adjustment mechanism.



Plan View

End Elevation



LSWE/LRWB

Notes:

STEEL SUPPORT

LSWE/LRWB

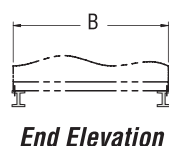
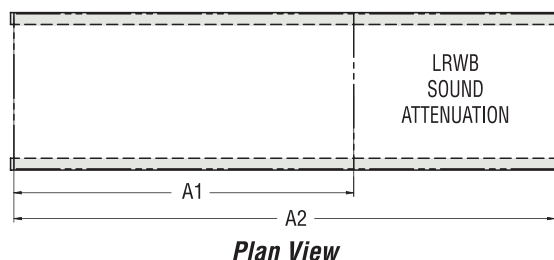
Steel Support

The recommended support for EVAPCO Closed Circuit Coolers is structural "I" beams located under the outer flanges and running the entire length of the unit. Mounting holes 19mm in diameter are located in the bottom channels of the pan section to provide for bolting to the structural steel. (Refer to certified drawings from the factory for bolt hole locations.)

Beams should be level to within 1/360 of unit length, not to exceed 13mm before setting the unit in place. Do not level the unit by shimming between it and the "I" beams as this will not provide proper longitudinal support.

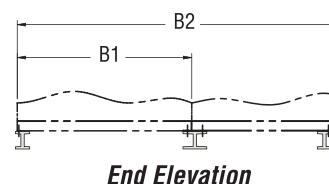
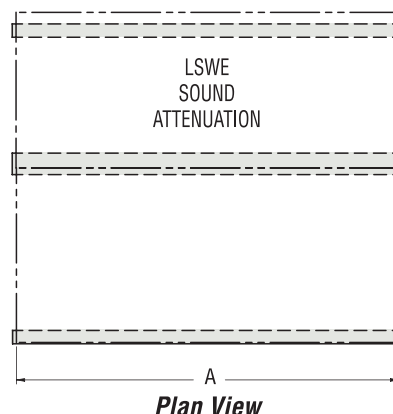
LRWB Dimensions

Model No.	A1 (mm) (Unit Only)	A2 (mm) (Unit with Intake Atten.)	B (mm)
3-2D6 to 3-5I6	3096	4207	1029
5-2F6 to 5-5I6	3731	4842	1540
5-3H9 to 5-7K9	4629	5740	1540
5-3J12 to 5-7N12	5553	6664	1540
8-3J9 to 8-5M9	4629	5740	2388
8-4K12 to 8-7O12	5553	6664	2388



LSWE Dimensions

Model No.	B1 (mm) (Unit Only)	B2 (mm) (Unit with Intake Atten.)	A (mm)
4-2F6 to 4-5I6	1235	219	1826
4-3G9 to 4-5J9	1235	219	2724
4-3H12 to 4-5K12	1235	219	3645
4-3I18 to 4-5M18	1235	219	5486
5-3I12 to 5-7M12	1661	3467	3645
5-3J18 to 5-7N18	1661	3467	5490
8P-3K12 to 8P-7O12	2388	4191	3651
8P-3M18 to 8P-7P18	2388	4191	5486
8P-3K24 TO 8P-7O24	2388	4191	7341
8P-3M36 TO 8P-7P36	2388	4191	11030
10-3M12 TO 10-7P12	2991	4794	3648
10-3K18 TO 10-7N18	2991	4794	5493
10-3M24 TO 10-7P24	2991	4794	7334
10-3K36 TO 10-7N36	2991	4794	11020



Part 1 – General

- 1.1 RELATED DOCUMENTS
 - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
- 1.2 SUMMARY:
 - A. This Section includes factory assembled and tested, closed-circuit forced-draft cooling tower (also known as a closed circuit cooler).
- 1.3 SUBMITTALS
 - A. General: Submit the following:
 1. Certified drawings of the closed circuit cooler, sound data, recommended steel support indicating weight loadings, wiring diagrams, installation instructions, operation and maintenance instructions, and thermal performance guarantee by the manufacturer.
- 1.4 QUALITY ASSURANCE
 - A. Verification of Performance:
 1. Test and certify closed circuit cooler thermal performance according to CTI Standard 201.
 2. Test and certify closed circuit cooler sound performance according to CTI ATC-128.
- 1.5 WARRANTY
 - A. Motor/Drive System: Five (5) year comprehensive warranty against materials and workmanship including motor, fan, bearings, mechanical support, sheaves, bushings and belt.
 - B. Unit: One (1) year from start-up, not to exceed eighteen (18) months from shipment on the unit.

Part 2 – Products

- 2.1 MANUFACTURERS
 - A. Manufactures: Subject to compliance with requirements, provide closed circuit cooler manufactured by one of the following:
 1. EVAPCO, Inc.
 2. Approved Substitute
- 2.2 MATERIALS
 - A. Galvanized Sheet Steel casing and fan housing having G-235 designation.
 - B. Optional Type 304 and/or 316 Stainless Steel as specified.
- 2.3 FORCED-DRAFT, CLOSED CIRCUIT COOLER
 - A. Description: Factory assembled and tested, forced draft closed circuit cooler complete with heat transfer coil, fan(s), fan screens, accessories, and rigging supports.
 - B. Closed Circuit Cooler Characteristics and Capacities: Refer to the Closed Circuit Cooler schedule.
 - C. Fan(s):
 1. Type and Material: forward curved, centrifugal of hot-dipped galvanized construction. The fans shall be factory installed, and statically and dynamically balanced for vibration free operation.
 2. Fan Housing: The complete drive system, including the electric motor, belts, bearings, fan, and drives shall be completely enclosed in a protective housing which covers the drive system and provides sound reduction.
 3. Maximum sound pressure level of ____dB(A) measured at 1.5m from the fan inlet during full speed operation in accordance with CTI Standard ATC-128.
 - D. Water Distribution System: Non-corrosive materials.
 1. Evenly distribute water over heat transfer coil with pressurized spray tree.
 - a. Pipes: Schedule 40 PVC, Non-corrosive Materials
 - b. Nozzles: Non-clogging, ABS Plastic, threaded into branch piping.
 2. Maximum pressure at inlet shall be ____ Pa.
 - E. IBC Compliance: The unit structure shall be designed, analyzed, and constructed in accordance with the latest edition of the International Building Code (IBC) Regulations for seismic loads up to ____ g and wind loads up to ____ KPa.

- F. Collection Basin Material: Type 304 Stainless Steel (standard LRWB, optional LSWE) or Heavy Gauge G-235 Galvanized Steel (standard LSWE, optional LRWB) for long life and durability:
 1. Removable Type 304 Stainless Steel strainer with openings smaller than nozzle orifices.
 2. Joints: Bolted and sealed watertight.
 3. Overflow, Makeup and Drain connections: G-235 Galvanized Steel (MPT and FPT).
 - G. Casing: Heavy Gauge G-235 Galvanized Steel or Type 304 Stainless Steel (Optional):
 1. Casing panels shall totally encase all sides of the heat transfer surface to protect it from direct exposure to environmental elements. All galvanized steel panel edges shall be coated with a 95% pure zinc compound during fabrication.
 2. Fasteners: Corrosion resistance equal to or better than materials being fastened.
 3. Joints: Sealed watertight.
 4. Welded Connections: Continuous and watertight
 - H. Heat Transfer Coil: Heavy Gauge G-235 Galvanized Steel encased in a steel framework with the entire assembly hot-dip galvanized after construction or Type 304 Stainless Steel (Optional). The coil assembly shall be completely enclosed and protected from sunlight exposure, environmental elements and debris. The tubes shall be sloped for free drainage of the coil and designed for low pressure drop. The coil shall be pneumatically tested at 2.69MPa under water. The coil connections shall be Beveled for Weld or Flanged (Optional) or Grooved (Optional).
 - I. Drift Eliminators: PVC, for long life and durability resistant to rot, decay and biological attack; formed, bonded together for strength and durability in block format for easy removal and replacement; self extinguishing with flame spread rating of 5 per ASTM E84-81a; 0.001% drift rate.
 - J. Water Level Control: Brass mechanical makeup water valve and plastic float with an adjustable linkage.
 - K. Water Recirculation Pump: Close-coupled, centrifugal type with mechanical seal. The pump motor shall be ____ kW totally enclosed for outdoor service on ____ volts, ____ hertz, and ____ phase.
- 2.4 MOTORS AND DRIVES
 - A. General requirements for motors are specified in Division 23 Section "Motors".
 - B. Enclosure Type: TEFC
 - C. Fan Motor Speed: VFD Duty (Option: 2-speed)
 - D. Drive: Power Band Belt designed for 150% of the motor nameplate kW.
 1. Belt: V-belt type neoprene.
 2. Sheaves: Steel, taper lock design.
 3. Bearings: Heavy duty, self-aligning bearings with extended grease lines and fittings.
 4. Fan Shaft: Solid steel shaft (LRWB). Hollow shaft with forged bearing journals (LSWE).
 5. Vibration Cutout Switch (Optional): Mechanical switch to de-energize fan motors if excessive vibration.
 - 2.5 MAINTENANCE ACCESS
 - A. Access Door: A circular access door shall be located above the basin to allow for easy access to the pan interior.
 - B. Ladders (Optional): Aluminum, vertical complying with 29 CFR 1910.27.
 - 2.6 SOUND ATTENUATION (OPTIONAL)
 - A. Inlet Attenuation: Materials to be same as fan section. Baffled panels shall change the path of air entry and capture radiated noise. External belt adjustment and lubrication points shall be provided.
 - B. Discharge Attenuation: Straight-sided discharge hood with insulated baffles to reduce the overall sound level of the discharge air. A large access panel to allow access to the water distribution system and drift eliminators shall be provided.



LSWE/LRWB

Notes:



EVAPCO PRODUCTS ARE MANUFACTURED WORLDWIDE.



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