LSTB COOLING TOWERS

Low Sound
Forced Draft, Counterflow Cooling Towers
Thermal Performance from 685 to 5930 kW Nominal Capacity

Technology for the Future... Available Today!

Certified EN ISO 9001
Since its founding in 1976, EVAPCO, Inc. has become a world-wide leader in supplying quality cooling equipment for thousands of customers in both the commercial and industrial markets.

EVAPCO’s success has been the result of a continual commitment to product improvement, quality workmanship and a dedication to providing unparalleled service.

Our emphasis on research and development has led to many product innovations – a hallmark of EVAPCO through the years.

The ongoing R & D Program enables EVAPCO to provide the most advanced products in the industry – technology for the future, available today.

With 17 facilities in eight countries and over 170 sales offices in 42 countries world-wide, EVAPCO is ready to assist in all your equipment needs.

The new & improved EVAPCO Model LSTB forced draft centrifugal cooling towers now feature IBC Compliance in addition to CTI Certification. These features reinforce EVAPCO’s position as the leading manufacturer of forced draft evaporative cooling equipment.

**Z-725 Heavy Mill Galvanized Steel Construction**

(Stainless steel available as an affordable option)

- Increases field rigging joint integrity
- Greater structural integrity

**Stainless Steel Strainer**

- Resists corrosion better than other materials

† **CTI Certified**

Refer to page 15 for details

† Mark owned by the Cooling Technology Institute
**Totally Enclosed Fan Motors & Superior Drive System**

- Assures long life
- Located in dry, incoming air-stream, allowing normal maintenance to be done from the outside of the unit
- If required, motor can be easily removed
- One piece fan shaft
- Belt tensioning and bearing lubrication can be performed from outside the unit
- Motor is fully accessible by removing one inlet screen

**Water Saver Drift Eliminators**

- New patented design reduces drift rate to < 0.001%
- Saves water and reduces water treatment cost
- Greater structural integrity vs. old style blade-type
- Recessed into casing for greater protection
- Drift rate certifications Eurovent OM-14-2009

**Exclusive EVAPAK® fill**

- Provides the most efficient thermal performance per plan area
- Suitable for use as a working platform

**PVC Spray Distribution Header**

- Nozzles are threaded into the header to ensure proper orientation.
- Fixed position nozzles require little maintenance.
- Large orifice nozzle with integral sludge ring to prevent clogging.
- Treaded end-caps on distribution piping for ease of cleaning.
Application Versatility
Centrifugal fan units are recommended for a wide range of installations. They are excellent for larger installations where very quiet operation is a must, such as residential neighborhoods. In addition, centrifugal fan units can operate against the static pressure loss of ductwork and are ideal for indoor installations.

Very Quiet Operation
Centrifugal fan units provide an inherently low noise characteristic which makes this design preferred for most installations that require low sound levels. The sound they produce is predominantly in the high frequencies which is easily attenuated by building walls, windows, and natural barriers. 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. Consult the factory for details.

Indoor Installation
Centrifugal cooling towers can be installed indoors when it is desirable to hide the unit or when it is the only space available. In addition to being quiet, they can handle the external static pressure of ductwork by using the next larger size fan motor. Drawings are available showing how to make ductwork connections.

Blow-Thru Construction
All moving parts of Forced Draft Towers-fans, motors, bearing, drives, and belts, are in the dry entering airstream. This design feature reduces corrosion and maintenance problems in these vital areas.

Low Installed Costs
The LSTB forced draft cooling tower is designed using a modular concept to minimize rigging, piping and support costs. All major components are factory assembled into complete sections. Fans, shafts, bearings and drives are installed and aligned at the factory as an integral part of the pan section to eliminate the necessity of field rigging these key parts.
**Fan Motors**

All LSTB models utilize heavy duty totally enclosed fan motors (T.E.F.C.) designed specifically for cooling tower applications. In addition, EVAPCO offers many optional motors to meet your specific needs.

**Fan Motor Location**

EVAPCO mounts the fan motor in a convenient open area to make it easy to adjust belt tension, access the motor, electrically connect it, or change the motor if necessary. The fan motor and drive are under a protective cover for safety purposes and to protect them from the elements.

**Centrifugal Fan Assembly**

Fans on the LSTB models are of the forward curved centrifugal type with hot-dip galvanized steel construction. All fans are statically and dynamically balanced and mounted in a hot-dip galvanized steel housing designed and manufactured by EVAPCO.

**Forged Bearing Journal**

The fan shafts used on all LSTB models are standard with forged bearing journals, eliminating the two-piece fan shaft with welded end journals, which is susceptible to rusting and eventual failure. The solid forged design of the LSTB fan shaft provides durable long-lasting operation, free from premature mechanical failure.
Two Speed Motors
For those installations requiring close control, two speed 1500/750 RPM motors are an excellent method of capacity control. This arrangement gives capacity steps of 10% (fans off), 60% (fans halfspeed) and 100%.
A temperature controller can be supplied to set control steps at 3°, so fairly close temperature control can be maintained without excessive cycling of the fan motor.
Two-speed motors also save operating costs. At half-speed, the motor draws less than 15% of full load power. Since maximum wet bulb and maximum load very seldom coincide, the cooling tower will actually operate at half-speed as much as 80% of the time. Thus, power costs will be reduced by approximately 85% during the major portion of the operating season.
A third advantage of two-speed motors is that noise levels are reduced by 6 to 8 dB when operating at half-speed. Since both the load and the wet bulb are normally lower at night, the tower will operate at low speed and the noise level will be substantially reduced during this noise sensitive period.
Caution – The water circulation pump must be interlocked with the fan motor starter(s) to insure water flow over the tower fill during fan operation.

Inverter Duty Motors
EVAPCO recommends the use of Inverter Duty Motors when Variable Frequency Drives are utilized for capacity control. Inverter Duty Motors are available as an option.

Accessibility
The pan/fan section of a centrifugal fan unit is designed for easy accessibility and maintenance. Fan and drive components are positioned to allow easy adjustment and cleaning. All grease fittings are in convenient locations for periodic lubrication. Large circular access doors are provided on each section to allow entry into the pan. All float valve and strainer assemblies are located near the door for easy adjustment and cleaning. The pan sump is designed to catch the dirt accumulated and can be flushed out with a hose.

Efficient Drift Eliminators*
An extremely efficient drift eliminator system is standard on the LSTB Cooling Tower. The system removes entrained water droplets from the air stream to limit the drift rate to less than 0.001% of the recirculating water rate. With a low drift rate, the LSTB Cooling Tower saves valuable water and water treatment chemicals. The LSTB can be located in areas where minimum water carry-over is critical, such as parking lots.
The drift eliminators are constructed of an inert polyvinyl chloride (PVC) plastic material which effectively eliminates corrosion of these vital components. They are assembled in sections to facilitate easy removal for inspection of the water distribution system. EVAPCO can provide the Eurovent drift rate certificate in accordance with OM-14-2009.

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.
**DESIGN FEATURES**

**EVAPCOAT:**

**Z-725 Hot-Dip Galvanized Steel Construction**
The Z-725 Mill Hot-Dip Galvanized Steel Construction is the heaviest level of galvanizing available for manufacturing evaporative cooling towers and has more zinc protection than competitive designs using Z-275 and Z-600 steel.

![Zinc Coating Diagram]

EVAPCO has been a leader in the industry in developing heavier galvanizing, and was the first to standardize on Z-725 mill hot-dip galvanized steel. Z-725 designation means there is a minimum of 725 g of zinc per m² of surface area present on the steel.

During fabrication, all panel edges are coated with a 95% pure zinc-rich compound for extended corrosion resistance.

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

**Stainless Steel Material Options**
The EVAPCOAT Corrosion Protection System is satisfactory for most applications. If additional corrosion protection is required the following stainless steel options are available (AISI 304 and 316). Please contact your local EVAPCO representative for pricing.

- **Stainless Steel Cold Water Basins:**
  - Models LSTB 8112 to 8536
  - Models LSTB 10112 to 10636
- **Stainless Steel Water Touch Basin:**
  - All LSTB Models
- **Stainless Steel Water Touch Units:**
  - All LSTB Models
- **All Stainless Steel Units:**
  - All LSTB Models

Consult the factory for construction details.

**EVAPAK® Cooling Tower Fill**
The patented* EVAPAK® fill design used in the forced draft cooling tower line is the culmination of thousands of hours of research and testing conducted by EVAPCO’s research engineers. This program has produced a cooling tower fill with superior heat transfer, reduced channeling in flow passages, improved drip enhancement for lower air side pressure drop and exceptional structural strength.

The fill is specially designed to induce highly turbulent mixing of the air and water for heat transfer. This is made possible by forming the raw fill into corrugated panels on which there are small ridges. These ridges serve many purposes, one of which is to create agitation in both the water and the air in the tower. This increase in turbulence prevents channeling of the water and promotes better mixing of air and water, therefore improving heat transfer. In addition, special drainage tips allow high water loadings without excessive pressure drop.

The fill is constructed of inert polyvinyl chloride (PVC). It will not rot or decay and is formulated to withstand water temperatures of 55°C. Because of the unique way in which the cross-fluted sheets are bonded together, the structural integrity of the fill is greatly enhanced, making the fill usable as a working platform.

A high temperature fill is available for water temperatures exceeding 55°C. Consult your EVAPCO representative for further details.

*U.S. Patent No. 5,124,087
Pan Freeze Protection
Remote Sump

Whenever a cooling tower is idle during sub-freezing weather, the water in the sump must be protected from freezing and damaging the pan. The simplest and most reliable method of accomplishing this is with a remote sump tank located in a heated space in the building under the tower. With this system, the water in the tower drains to the indoor tank whenever the pump is shut-off. When a tower is ordered for remote sump operation, the standard float valve and strainer are omitted, and the unit is provided with an oversized water outlet connection. When a remote sump is not possible, a supplementary means of heating the pan water must be provided.

Electric Heaters

Electric immersion heaters are available factory installed in the basin of the tower. They are sized to maintain a +5°C pan water temperature at -18°C ambient with the fans off. They are furnished with a combination thermostat/low water protection device to cycle the heater on when required and to prevent the heater elements from energizing unless they are completely submerged. All components are enclosed in rugged, weather proof enclosures for outdoor use. Heater control packages are available as an option.

Electric Water Level Control

EVAPCO LSTB Cooling Towers 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 stand pipe. For winter operation, the stand pipe 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 350 kPa (maximum).

Vibration Isolators

The fans on EVAPCO cooling towers are balanced and run virtually vibration free. In addition, the rotating mass is very small in relation to the total mass of the cooling tower, further reducing the possibility of objectionable vibration being transmitted to the building structure. As a result, vibration isolation is generally not required.

In those cases where it is determined that vibration isolation is necessary, spring type vibration isolator rails can be furnished. The rails are constructed of heavy gauge Z-725 hot-dip galvanized steel for superior corrosion resistance. Rails are designed to be mounted between the cooling tower and the supporting steel framework. They have 90% efficient and have approximately 25 mm static deflection. Rails are designed for wind loading up to 80 km/h. It is important to note that vibration isolation must be installed continuously along the full length of the cooling tower on both sides of the unit. Point isolators may be used between the supporting steel and the building framework, but not between the unit and the supporting steel.

IBC Certification cannot be given when vibration isolators are installed.

Other Options Available:
Capacity Dampers and Controls
Pony Motors
Tapered Discharge Hoods
Solid Bottom Panels
Fill Access Door

Contact your EVAPCO representative for further details.
EVAPCO LSTB Cooling Towers have heavy-duty construction and are designed for long, trouble-free operation. However, proper equipment selection, installation and maintenance are necessary to insure good unit performance. Some of the major considerations in the application of a cooling tower are presented below. For additional information, contact the factory.

Air Circulation
In reviewing the system design and unit location, it is important that enough fresh air is provided to enable proper unit performance. The best location is on an unobstructed roof top or on ground level away from walls and other barriers. Care must be taken when locating towers in wells or enclosures or next to high walls. The potential for recirculation of the hot, moist discharge air back into the fan intake exists. Recirculation raises the wet bulb temperature of the entering air causing the leaving water temperature to rise above design. For these cases, a discharge hood or ductwork should be provided to raise the overall unit height even with the adjacent wall, thereby reducing the chance of recirculation. For additional information see the EVAPCO Equipment Layout Manual. Engineering assistance is also available from the factory to identify potential recirculation problems and recommend solutions.

Piping
Cooling tower piping should be designed and installed in accordance with generally accepted engineering practices. All piping should be anchored by properly designed hangers and supports with allowance made for possible expansion and contraction. No external loads should be placed upon cooling tower connections, nor should any of the pipe supports be anchored to the unit framework.

Maintaining the Recirculated Water System
The cooling in a tower is accomplished by the evaporation of a portion of the recirculated spray water. As this water evaporates, it leaves behind all of its mineral content and impurities. Therefore, it is important to bleed-off an amount of water equal to that which is evaporated to prevent the buildup of impurities. If this is not done, the mineral content and/or the corrosive nature of the water will continue to increase. This will ultimately result in heavy scaling or a corrosive condition.

Bleed-off
A bleed line should be installed in the piping, external to the unit. The bleed line must be properly sized for the application and provided with a metering connection and globe valve. The recommended bleed off for a cooling tower is equivalent to the evaporation rate of 1.58 l/h per kW of cooling. If the make-up water supplying the unit is relatively free of impurities, it may be possible to cut back the bleed, but the unit must be checked frequently to make sure scale is not forming. Make-up water pressure must be maintained between 140 and 350 kPa for proper operation of the float valve.

Water Treatment
In some cases the make-up water will be so high in mineral content that a normal bleed-off will not prevent scaling. In this case, water treatment will be required. If chemical water treatment is utilized, contact reputable water treatment company familiar with the local water conditions. Any chemical water treatment used must be compatible with the stainless or galvanized construction of the unit. The pH of the water should be maintained between 7.0 and 8.8. In order to prevent “white rust”, the galvanized steel in the unit may require routine passivation of the steel when operating in higher pH levels. Batch chemical feeding is not recommended because it does not afford the proper degree of control.

If acid cleaning is required, extreme caution must be exercised and only inhibited acids compatible with galvanized steel construction should be used.

Control of Biological Contamination
Water quality should be checked regularly for biological contamination. If biological contamination is detected, a more aggressive water treatment and mechanical cleaning program should be undertaken. The water treatment program should be performed by a qualified water treatment company and in accordance with relevant local legislation. It is important that all internal surfaces be kept clean of accumulated dirt and sludge. In addition, the drift eliminators should be maintained in good operating condition.

Note: The location of the cooling tower must be considered during the equipment layout stages of a project. It is important to prevent the discharge air (potential of biological contamination) from being introduced into the fresh air intakes of the building.
Structural Steel Support
The recommended method of support for the LSTB cooling tower is two structural “I” beams located under the outer flanges and running the entire length of the unit. Mounting holes 19 mm in diameter, are located at 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. See the drawing and chart below for unit dimensions.

**Note:**
1) Beams should be level before setting the unit in place.
2) Do not level the unit by shimming between it and the “I” beams as this will not provide proper longitudinal support.
3) Beams should be sized in accordance with accepted structural practices. Support beams and anchor bolts are to be furnished by others.

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<th>LSTB DIMENSIONS</th>
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* Consult factory for units with intake attenuators
The LSTB Cooling Tower is now available with sound attenuators to reduce the overall sound generated from the side or top of the Cooling Tower. Each option provides various levels of sound reduction and can be used in combination to provide the lowest sound level.
Sound Attenuation

The centrifugal fan design of the LSTB models operate at lower sound levels which make the units preferable for installations where noise is a concern. For extremely noise sensitive installations, the LSTB models may be supplied with inlet and/or discharge attenuation packages which greatly reduce the sound levels. Evapco offers inlet and/or discharge attenuation packages with CTI Certified performance.

Discharge attenuation quiets sound radiating from the top of the unit and features a design with insulated walls acoustically lined with high density fiberglass.

Inlet attenuation reduces sound radiated through the tower air intakes and consists of acoustically lined baffles to capture radiated noise.

### LSTB Discharge Attenuation Dimensions*

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<th>Unit Footprint</th>
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<th>W1 (mm)</th>
<th>Weight per attenuator (kg)</th>
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### LSTB Intake Attenuation Dimensions*

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

† Mark owned by the Cooling Technology Institute
The International Building Code (IBC) is a comprehensive set of regulations addressing the structural design and installation requirements for building systems—including HVAC and industrial refrigeration equipment.

With the advent of the IBC, EVAPCO is proud to introduce the LSTB Cooling Towers with IBC 2006 compliance standard.

Wind, Rain, Earthquake and Hurricane

EVAPCO Cooling Towers... designed to withstand seismic or wind load forces.
What is IBC?

International Building Code

The International Building Code (IBC) is a comprehensive set of regulations addressing both the structural design and the installation requirements for building systems – including HVAC and industrial refrigeration equipment. Compared to previous building codes that considered only the building structure and component anchorage, the requirements contained within the IBC address anchorage, structural integrity, and the operational capability of a component following either a seismic or wind load event. Simply stated, the IBC code provisions require that evaporative cooling equipment, and all other components permanently installed on a structure, must be designed to meet the same seismic or wind load forces as the building to which they are attached.

How Does IBC 2006 Apply to Cooling Towers?

Based on site design factors, calculations are made to determine the equivalent seismic “g force” and wind load (kilo-Newton per square meter, kN/m²) on the unit. The cooling tower must be designed to withstand the greater of either the seismic or wind load.

The New LSTB is offered with a choice of TWO structural design packages:

- **Standard Structural Design** – For projects with ≤1.0 g seismic or 2.87 kN/m² wind loads
- **Upgraded Structural Design** – Required for projects with >1.0 g seismic or 6.94 kN/m² wind loads

All locations with design criteria resulting in a seismic design force of up to 1.0g or a wind load of 2.87 kN/m² or below will be provided with the standard LSTB structural design. An upgraded structural design is available for installations with design criteria resulting in “g forces” greater than 1.0g. The highest “g force” location in North America is 5.12g. The highest wind load shown on the maps is 273 km/h, which is approximately equal to 6,94 kN/m² velocity pressure. Therefore, the upgraded structural design package option for the New LSTB is designed for 5.12 g and 6,94 kN/m² making it applicable to ALL building locations in North America.

Design Implementation

EVAPCO applies the seismic design and wind load information provided for the project to determine the equipment design necessary to meet IBC requirements. This process ensures that the mechanical equipment and its components are compliant per the provisions of the IBC as given in the plans and specifications for the project.

Independent Certification

Although the IBC references and is based on the structural building code ASCE 7, many chapters and paragraphs of ASCE 7 are superceded by the IBC, independent certification and methods of analysis are such paragraphs. Per the most recent edition of the code, the EVAPCO compliance process included an exhaustive analysis by an independent approval agency. As required by the International Building Code, EVAPCO supplies a certificate of compliance as part of its submittal documents. The certificate of compliance demonstrates that the equipment has been independently tested and analyzed in accordance with the IBC seismic and wind load requirements. EVAPO has worked closely with the independent approval agency, The VMG Group, to complete the independent equipment testing and analysis.

If the seismic “g force” or wind load kN/m² requirements for the project site are known, EVAPO’S online equipment selection software, iES, will allow you to choose the required structural design package – either standard construction or upgraded construction.

For further questions regarding IBC compliance, please contact your local EVAPO Representative.

Certificate of Compliance

LSTB, LPT Cooling Towers
PMWQ, LSW(A/B), LSRW(B) Closed Circuit Coolers
PMC-E, LSCB and LRC Evaporative Condensers

Are certified to meet or exceed the Seismic and Wind Load Provisions set forth in the applicable building codes for this project. These products have been manufactured following all applicable quality assurance programs.

Applicable Building Codes:
- IBC 2006
- ASCE-7
- NFPA 5000

Referenced Report:
- VMA-43387

Approval Agency:
- The VMG Group
- EVAPO, Specialists in Heat Transfer Products and Services.
CTI Certification Purpose (STD-201)

This standard sets forth a program whereby the Cooling Technology Institute will certify that all models of a line of evaporative heat rejection equipment offered for sale by a specific manufacturer will perform thermally in accordance with the manufacturer’s published ratings...

Technology for the Future, Available Today!

† Mark owned by the Cooling Technology Institute
What is CTI?

Cooling Technology Institute

The Cooling Technology Institute is an organization headquartered in the United States with over 400 member companies from around the globe. CTI membership is composed of manufacturers, suppliers, owner operators, and test agencies from over 40 countries. In 2008 CTI certified more than 5000 Evaporative Heat Transfer Systems (EHTS) from 49 product lines of 24 participants.

CTI’s Mission and Objectives

This can be best explained by the CTI’s published Mission statement and Objectives revised in December 2003 and published on their website www.cti.org.

CTI Mission Statement

To advocate and promote the use of environmentally responsible Evaporative Heat Transfer Systems (EHTS) for the benefit of the public by encouraging:
- Education
- Research
- Standards Development and Verification
- Government Relations
- Technical Information Exchange

CTI Objectives

- Maintain and expand a broad base membership of individuals and organizations interested in Evaporative Heat Transfer Systems (EHTS).
- Identify and address emerging and evolving issues concerning EHTS.
- Encourage and support educational programs in various formats to enhance the capabilities and competence of the industry to realize the maximum benefit of EHTS.
- Encourage and support cooperative research to improve EHTS technology and efficiency for the long-term benefit of the environment.
- Assure acceptable minimum quality levels and performance of EHTS and their components by establishing standard specifications, guidelines, and certification programs.
- Establish standard testing and performance analysis systems and procedures for EHTS.
- Communicate with and influence governmental entities regarding the environmentally responsible technologies, benefits, and issues associated with EHTS.
- Encourage and support forums and methods for exchanging technical information on EHTS.

Benefits to the End User

CTI defines an independent testing certification program that is specifiable, enforceable and available to all equipment manufacturer’s. End users that purchase CTI certified products are assured that those products will perform thermally as specified. Additionally CTI certification is the first step for the Green Building Concept in Europe:
- LEED - Leadership in Energy and Environmental Design
- Best Available Practice
- Green Building Rating System

Thermal Performance Guarantee

In addition to the CTI Certification, Evapco unequivocally guarantees the Thermal Performance of ALL Evapco Equipment. Every unit order is confirmed with a submittal package that includes an Evapco Thermal Performance Guarantee Certificate.
CTI Certification Program

CTI Certification Process

- Submit Application for Certification
- CTI completes a technical review of the product line submitted
- CTI performs an initial qualification test in a laboratory on a specified model number
- CTI issues an Approval Letter with Validation Number if test is passed. Letter is also distributed to all members of CTI to inform everyone that a successful certification has been completed. The Certification Validation Number assigned should be fixed to each tower sold and displayed in all catalogs and other literature
- Product Line must undergo an Annual Reverification Test - Different model number is selected every year
- More details can be found on the CTI website www.cti.org

CTI Certification Test Parameters

- Entering Wet Bulb temperature - 12.8°C to 32.2°C
- Cooling Range - Minimum of 2.2°C
- Cooling Approach - Minimum of 2.8°C
- Process Fluid Temperature - Maximum of 51.7°C
- Barometric Pressure - 91.4 to 105 kPa
- More details can be found on the CTI website www.cti.org

CTI Certification Limitations

- Specific manufacturer’s product line name and model numbers
- Applicable only to product lines and model numbers submitted
- Multiple cell model numbers are allowed if the airflow is not affected or the configuration impact is included in the unit rating
- Optional accessories are allowed if the airflow is not affected or the accessory impact is accounted for in the rating
- More details can be found on the CTI website www.cti.org

Evapco Europe CTI Certified LSTB Product Line

LSTB Line of CTI Certified Cooling Towers

- CTI Certification Validation Number 05-13-03
- Includes Intake attenuators and related motor changes
- Includes Discharge attenuators and related motor changes
- Includes Full sound attenuators and related motor changes
- Includes Tapered discharge hoods
- iES Technical data sheet will state “CTI Certified Selection” if the selection falls within the CTI Certification Test Parameters
- Unit will receive a CTI Certified Shield located near the nameplate

Note

All CTI Certified Product Lines of all manufacturers with CTI certified products can be found on the website: http://www.cti.org/certification.shtml

† Mark owned by the Cooling Technology Institute
Thermal Performance

Engineering Data & Dimensions
Models LSTB 5112 to 5718

Thermal performance certified by the Cooling Technology Institute (CTI) in accordance with CTI Standard STD-201

To Make a Selection:
Locate the column with the desired operating temperature conditions. Read down the column until you find the l/s equal to or greater than the flow required. Read horizontally to the left to find the model number of the unit that will perform the duty.

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>MOTOR kW</th>
<th>TEMP °C</th>
<th>EWT</th>
<th>LWT</th>
<th>WB</th>
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<td>74.1</td>
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Note: For alternate selections and conditions other than those stated, consult your iES selection program or local EVAPCO representative.

† Mark Owned by the Cooling Technology Institute.
### Small Centrifugal Fan Models

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Weight (kg)</th>
<th>No. Fans</th>
<th>Fan Motor kW*</th>
<th>Air Flow m³/s</th>
<th>Dimensions (mm)</th>
<th>Connections (mm)</th>
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**LSTB 5112 to 5718**

**NOTES:**
1. An adequately sized bleed line must be installed in the cooling tower system to prevent build-up of impurities in the recirculated water.
2. Connections 150 mm or smaller are MPT. Connections larger than 150 mm are Beveled For Welding (BFW).
3. Do not use catalog drawings for certified prints. Dimensions are subject to change.
* For external static pressure up to 120 Pa, use next size fan motor.
Models LSTB 8P112 to 8P536

Thermal performance certified by the Cooling Technology Institute (CTI) in accordance with CTI Standard STD-201†

To Make a Selection:
Locate the column with the desired operating temperature conditions. Read down the column until you find the l/s equal to or greater than the flow required. Read horizontally to the left to find the model number of the unit that will perform the duty.

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>MOTOR kW</th>
<th>TEMP °C</th>
<th>EWT 35</th>
<th>40</th>
<th>35</th>
<th>42</th>
<th>37</th>
<th>40</th>
<th>37</th>
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<td>37.6</td>
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<td>47.4</td>
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<td>81.4</td>
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<td>282.3</td>
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Note: For alternate selections and conditions other than those stated, consult your iES selection program or local EVAPCO representative.

† Mark Owned by the Cooling Technology Institute.
NOTES:
1. An adequately sized bleed line must be installed in the cooling tower system to prevent build-up of impurities in the recirculated water.
2. Connections 150 mm or smaller are MPT. Connections larger than 150 mm are Beveled For Welding. (BFW)
3. Do not use catalog drawings for certified prints. Dimensions are subject to change.

* For external static pressure up to 120 Pa, use next size fan motor.

Large Centrifugal Fan Models

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Weight (kg)</th>
<th>No. Fans</th>
<th>Fan Motor kW*</th>
<th>Air Flow m³/s</th>
<th>Water In</th>
<th>Water Out</th>
<th>Make Up</th>
<th>Drain</th>
<th>Connections (mm)</th>
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LSTB 8P8112 to 8P536
### Models LSTB 10112 to 10636

To Make a Selection:
Locate the column with the desired operating temperature conditions. Read down the column until you find the l/s equal to or greater than the flow required. Read horizontally to the left to find the model number of the unit that will perform the duty.

#### Cooling Capacity in l/s

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>MOTOR kW</th>
<th>TEMP °C</th>
<th>EWT</th>
<th>LWT</th>
<th>WB</th>
</tr>
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<td>LSTB 10412</td>
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<td>32</td>
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#### Thermal Performance

Thermal performance certified by the Cooling Technology Institute (CTI) in accordance with CTI Standard STD-201

† Mark Owned by the Cooling Technology Institute.

Note: For alternate selections and conditions other than those stated, consult your iES selection program or local EVAPCO representative.

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 Thermal Solutions, Better Choices!
### Large Centrifugal Fan Models

**LSTB 10112 to 10636**

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**NOTES:**
1. An adequately sized bleed line must be installed in the cooling tower system to prevent build-up of impurities in the recirculated water.
2. Connections 150 mm or smaller are MPT. Connections larger than 150 mm are Beveled For Welding. (BFW)
3. Do not use catalog drawings for certified prints. Dimensions are subject to change.
4. For external static pressure up to 120 Pa, use next size fan motor.
1.0 FORCED DRAFT LSTB COOLING TOWER

1.1 General

Furnish and install factory assembled cooling tower of blow through, counterflow design with a horizontal single air side entry and a vertical air discharge. The unit shall be completely factory assembled and conform to the specifications and schedules.

The total fan power should not exceed _____ kW and the total overall unit dimensions should not exceed the following:

- Length: mm
- Width: mm
- Height: mm

The unit will be delivered in two parts: the bottom section (pan-fan) and the top section (heat transfer). The unit (top and bottom section) shall be joined together with elastic sealer and bolted together with corrosion resistance fasteners.

Approved manufacturer: Evapco – model LSTB ________

1.2 Thermal Performance – Performance Warranty

The tower shall be capable of performing the thermal duties as shown in the schedule and on drawings, and its design thermal rating shall be certified by the Cooling Technology Institute (C.T.I.). Only models with performance certified by CTI will be approved.

Manufacturers performance guarantee without CTI certification for the proposed model or an independent field performance test shall not be accepted.

1.3 Applicable Standards

- ATC 128 Test Code for Measurement of Sound from Water Cooling Towers
- CTI STD 201 Standard for Thermal Performance Certification of Evaporative Heat Rejection Equipment

1.4 Submittals

- a) The manufacturer shall submit a five year history of the proposed type of cooling tower with a minimum of 10 installations for similar sized equipment.
- b) Shop drawings: submit shop drawings indicating dimensions, weight loadings and required clearances.
- c) Product data: submit manufacturers technical product data, original selection printouts and clearance requirements.
- d) Performance data: submit curves showing certified and guaranteed cooling tower performance with variation in outdoor air wet bulb temperature at design air flow and design flow rate. In addition submit performance curves for 90% and 110% of design water flow rate, indicating the cooling tower temperatures versus the ambient air wet bulb temperatures.
- e) Complete noise data sheet for the selected cooling tower.
- f) Maintenance data for the cooling tower and accessories.
- g) The cooling tower manufacturer shall provide factory test run certificates of the fans and fan motor.

1.5 Product Delivery – Storage and Handling

- a) The contractor shall make the provisions for proper storage at site before installation and handle the product per the instructions of the manufacturer.
- b) Once installed provide the necessary measures that the units remain clean and protected from any dust and mechanical damage.

1.6 Quality Assurance

- a) The manufacturer shall have a quality assurance system in place which is certified by an accredited registrar and complying with the requirements of ISO 9001:2000. This is to guarantee a consistent level of product and service quality.
- b) Manufacturers without ISO 9001 certification are not acceptable.

1.7 Warranty

- a) The products will be warranted for a period of a minimum one year from start up date or eighteen months from the date of shipment, whichever comes first.

2.0 PRODUCT

2.1 Construction – Corrosion Resistance

- a) The structure and all steel elements of the pan and casing shall be constructed of Z 725 hot dip galvanized steel for long life and durability. Alternatives with lower zinc layer thickness and external paint or coating are not accepted as equal.
- b) The strainer shall be made of stainless steel type 304.
- c) During fabrication all panel edges shall be coated with a 95% pure zinc compound.

OPTIONAL EXECUTION – BASIN IN SST 304

2.1. Construction – Corrosion Resistance

- a) The structure and all steel elements of the pan up to the water level shall be made of SST 304.
- b) Alternatives with hot dip galvanized steel and epoxy coatings in lieu of the SST 304 are not considered equal and accepted.
- c) All other steel components and the casing shall be constructed of Z 725 hot dip galvanized steel for long life and durability. Alternatives with lower zinc layer thickness and external paint or coating are not accepted as equal.
- d) The strainer shall be made of stainless steel type 304.
- e) During fabrication all galvanized steel panel edges shall be coated with a 95% pure zinc compound.

OPTIONAL EXECUTION – Complete Unit SST 304 (except moving parts)

2.1. Construction – Corrosion Resistance

- a) The structure and all steel elements shall be made of SST 304.
- b) Alternatives with hot dip galvanized steel and epoxy coatings to replace the SST 304 are not considered equal and accepted.

2.2 Pan / Fan section

- a) The heat transfer section shall be removable from the pan to provide easy handling and rigging.
- b) The pan – fan section shall include fans and drives mounted and aligned in the factory. These items shall be located in the dry air stream.
- c) Standard pan accessories shall included circular access doors, strainer(s) of anti vortex design, brass make up valve with unsinkable plastic float arranged for easy adjustment.

2.3 Mechanical Equipment

2.3.1 Fan(s)

- a) Fans shall be dynamically balanced forwardly curved centrifugal type fans.
- b) Fan housings shall have curved inlet rings for efficient air entry and rectangular discharge cowls which extend into the basin to increase fan efficiency and to prevent water from splashing into the fans.
- c) Curved inlet rings shall be made of the same material as the cooling tower.
- d) All fans will undergo a dry running test in the factory after being installed in the cooling tower basin.
- e) The fans will be mounted on either a solid or a hollow shaft with forged bearing journals.
- d) Easy to remove fan screens shall be provided to avoid direct contact with the moving parts.
2.3.2 Bearings and Drive  
  a) The fan shaft (s) shall be supported by heavy duty, self-aligning pillow block bearings with cast iron housings and lubrication fittings for maintenance.  
  b) The fans drives shall be V belt type with taper lock sheaves designed for 150 % of the motor nameplate horsepower.

2.3.3 Motor  
  a) The fan motor shall be Totally Enclosed, Fan Cooled (TEFC), squirrel cage, ball bearing type motor.  
  b) The motor shall be minimum IP 55 degree of protection, Class F insulation, Service Factor 1 and selected for the appropriate cooling tower duty and the correct ambient temperature but minimum 40°C.  
  c) Motor bearings shall be greased for life or external grease lines shall be provided.  
  d) The motor shall be mounted on an adjustable heavy duty steel motor base.  
  e) The motor selection shall be selected for the appropriate external static pressure.  
  f) The motor power supply shall be _____ volts, ____ hertz and _____ phase.

2.4. Casing Section  
2.4.1 Heat Transfer  
  a) The cooling tower fill shall be PVC (Polyvinyl Chloride) of cross fluted design for optimum heat transfer and efficiency.  
  b) The cross fluted sheets shall be bonded together for maximum strength and durability. Fill packs which are not bonded are not allowed.  
  c) The PVC fill shall be self extinguishing for fire resistance with a flame spread rating of 5 per ASTM E 84 – 81a.  
  d) The fill shall be resistant to rot, decay or biological attack.  
  e) The fill shall be able to withstand a water temperature of 55°C. The fill sheets will be bonded together in such a way that the structural integrity of the fill makes the fill usable as a working platform.  
  f) The cooling tower manufacturer shall be responsible for the manufacturing and performance testing of the fill. This is to assure single source responsibility.

2.4.2 Water Distribution  
  a) The spray header and branches shall be constructed of Schedule 40, Polyvinyl Chloride (PVC) pipe for corrosion resistance and shall have a steel connection to attach the external piping.  
  b) The internal tower water distribution piping shall be easily removable for cleaning purposes.  
  c) The branches have end caps to assist with debris removal.  
  d) The water shall be distributed over the fill by precision molded ABS spray nozzles with large minimum 1 inch orifice openings and integral sludge ring to eliminate clogging.  
  e) The nozzles shall be threaded into the water distribution piping to assure positive positioning. The nozzles are located on the side of the header to allow the larger debris to flow easily through the water distribution system.  
  f) Each cell shall have only one hot water return inlet, otherwise the cooling tower manufacturer shall provide the necessary extra provisions (piping, balancing valves, ... ) to achieve the same at no extra cost.

2.4.3 Drift Eliminators  
  a) The drift eliminators shall be constructed entirely inert polyvinyl (PVC) that has been specially treated to resist ultra violet light.  
  b) Assembled in easily handled sections, the eliminator blades shall be spaced on 1 inch centers and shall incorporate three changes in air direction to assure efficient removal of entrained moisture from the discharge air stream.  
  c) The maximum drift rate shall not exceed 0,001 % of the recirculated water rate.  
  d) The drift eliminators shall be EuroventOM-14-2009 certified.

3.0 ACCESSORIES (optional)  
3.1 Electric Heaters  
  a) The cooling tower cold water basin shall be provided with an electric heater package to prevent freezing of the water in the cold water basin.  
  b) The electric heater package includes: electric heater elements and a combination of thermostat and low water level cutoff.  
  c) The heaters shall be selected to maintain 4°C basin water temperature at ____°C ambient.  
  d) The heater(s) shall be _____V / ____ phase / ____ Hz electric power supply.

3.2 Three Probe Electric Water Level Control Package  
  a) The cooling tower manufacturer shall provide an electric water level control package instead of the mechanical float valve arrangement.  
  b) The package consist of the following elements:  
     - Multiple heavy duty stainless steel SST 316 static probes mounted in a stilling tube outside the unit. Electrodes or sensors mounted inside the unit are not accepted as there operation will disturbed by the moving water in the basin.  
     - A ABS , IP 56 case contains all the contacts for the different level probes and will provide a output signal of a relay for automatic filling and one relay for alarm level.  
     - The power supply to the control package is 24 Vac / 230 Vac - ____ Hz .  
     - A weather protected solenoid valve for the water make up ready for Piping to a water supply with pressure between 140 kPa and 340 kPa.

3.3 Intake Sound Attenuation  
  a) The unit will be equipped with intake sound attenuation consisting of a hot dip galvanized steel housing of the same quality of the unit and completed with acoustical baffles made of fiberglass material which is suitable for use in cooling towers.  
  b) The intake sound attenuator is provided with large access doors which allow access to maintain the fans and bearings.  
  c) The intake sound attenuator is completed with a solid bottom panel between the cooling tower basin.  
  d) The cooling tower motor size must be adjusted for the additional static pressure drop caused by the sound attenuator.

3.4 Discharge Sound Attenuation  
  a) The unit will be equipped with discharge sound attenuation consisting of a hot dip galvanized steel housing of the same quality of the unit and completed with acoustical baffles made of fiberglass material which is suitable for use in cooling towers.  
  b) The discharge sound attenuator is provided with large access doors which allow access to maintain the water distribution system without removing the baffles.  
  c) The cooling tower motor size must be adjusted for the additional static pressure drop caused by the sound attenuator.

3.5 Vibration Switch  
  a) A vibration limit switch shall be installed on the mechanical equipment support and wired into the control panel. The purpose of this switch will be interrupt power to the motor in the event of excessive vibration.  
  b) The switch shall be adjustable for sensitivity, and shall require manual reset.