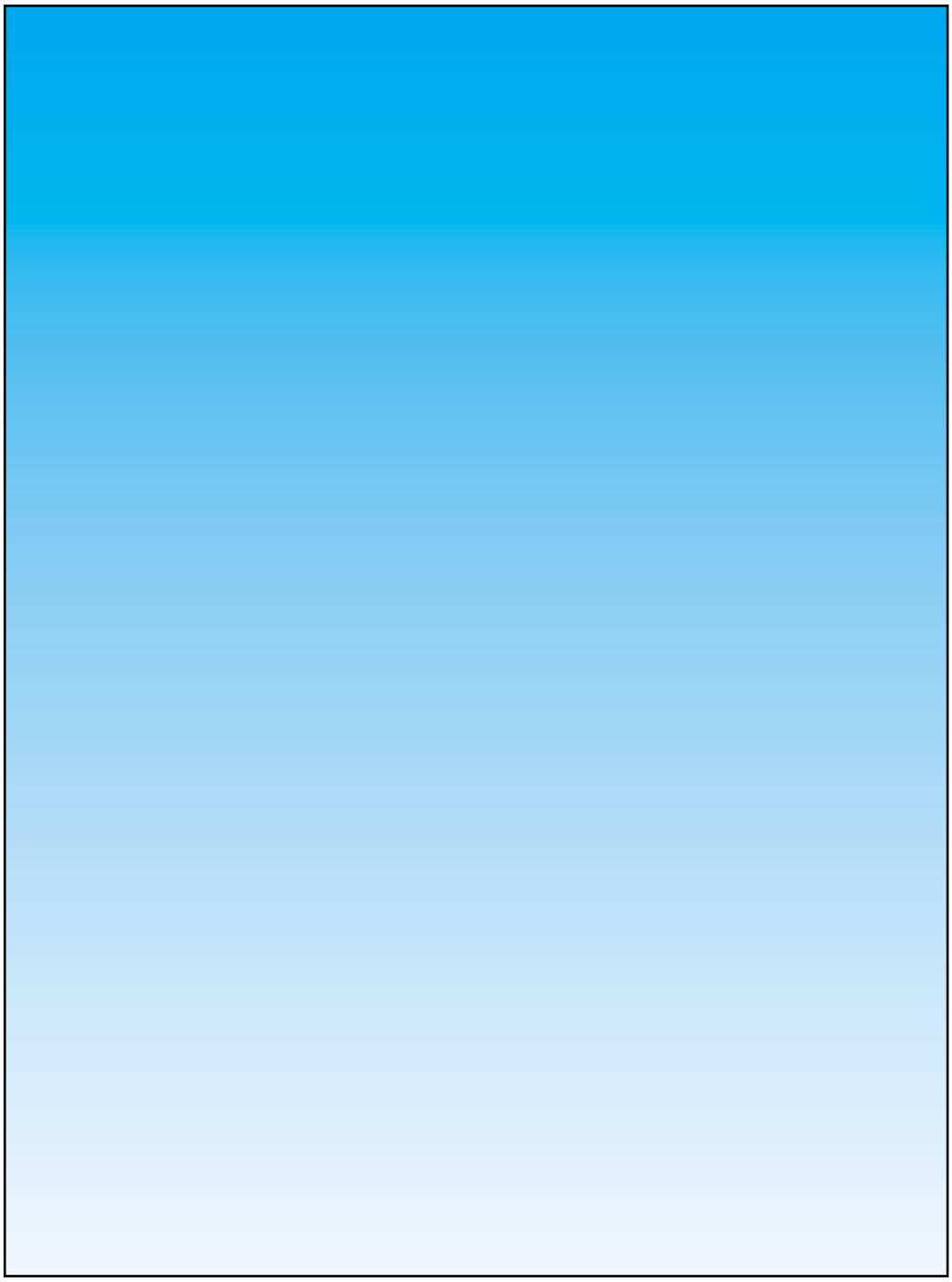
LSTA
Cooling Towers

Advanced Features In
Forced Draft, Counterflow Towers

Member MCAA
Mechanical Contractors Association of America

Member Cooling Tower Institute



EVAPCO LSTA Cooling Towers

The EVAPCO model LSTA forced draft, counterflow cooling tower features a highly efficient design that generally requires less plan area than similar cooling towers. The patented* EVAPAK® fill used in the LSTA tower is an advanced design with a crossfluted pattern that provides more surface area per cubic foot of fill. In addition, the fill has a high velocity air entry tip that maximizes water to air contact within the tower providing greater heat transfer efficiency.

EVAPCO LSTA cooling towers offer the inherent advantages of a forced draft design. All moving parts are located in the dry entering air stream-minimizing maintenance and extending the life of the tower.

The total emphasis in the design of EVAPCO Cooling Towers has been for the end user, tough rugged construction for long life and minimum maintenance.

FEATURES:

Superior EVAPCOAT Corrosion Protection System

- G-235 Hot Dip Galvanized Steel
- PVC EVAPAKT Fill
- PVC Spray Distribution System
- PVC Drift Eliminators
- Stainless Steel Strainers

Preferred Replacement Unit

- Unit footprint fits most existing steel
- Reduced Plan Area
- Lower Operating Weight

Superior Drive System

- One piece fan shaft
- Forged bearing journals
- External motor mounts for easy access

Industrial Grade Motors

- Totally enclosed motors standard
- Motors are easy to access and protected from the elements

Small Centrifugal Fan Models-LSTA
From 156 to 312 Nominal tons

*U.S. Patent No. 5,124,087

Designed for Very Quiet Operation, Indoor Locations and Replacement Projects

Large Centrifugal Fan Models-LSTA
From 228 to 1300 Nominal tons

LSTA
Design Features

Application Versatility

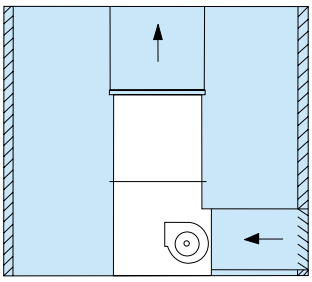
Centrifugal fan units are recommended for a wide range of installations. They are excellent for larger installations where very quiet operation is a must, such as residential neighborhoods. In addition, centrifugal fan units can operate against the static pressure loss of ductwork and are ideal for indoor 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

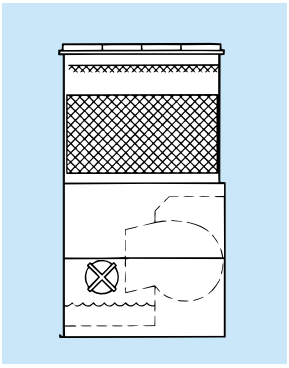
Centrifugal cooling towers can be installed indoors when it is desirable to hide the unit or when it is the only space available. In addition to being quiet, they can handle the external static pressure of ductwork by using the next larger size fan motor. Drawings are available showing how to make ductwork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



DUCTWORK

Blow-Thru Construction

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



Low Installed Costs

The LSTA 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.

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Fan Motors

All LSTA 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, including:

- Premium Efficiency Motors
- Multi-Speed Motors
- Inverter-Duty Motors for VFD Applications

Fan Motor Location

EVAPCO mounts the fan motor in a convenient open area to make it easy to adjust belt tension, lubricate 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.

LARGE SERIES MOTOR MOUNT

SMALL SERIES MOTOR MOUNT

Centrifugal Fan Assembly

Fans on the LSTA 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.

CENTRIFUGAL WHEEL

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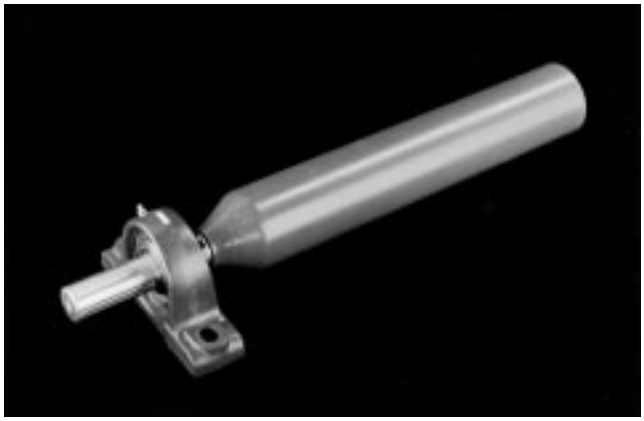
Forged Bearing Journal

The fan shafts used on all LSTA models are standard with forged bearing journals. The competition's design utilizes a two-piece fan shaft with welded end journals, that is susceptible to rusting and eventual failure. The solid forged design of the LSTA fan shaft provides durable long-lasting operation, free from pre-mature mechanical failure.



LSTA
Design Features

Two Speed Motors

For those installations requiring close control, two speed 1800/900 RPM motors are an excellent method of capacity control. This arrangement gives capacity steps of 10% (fans off), 60% (fans half-speed) and 100%. A temperature controller can be supplied to set control steps at 5°, 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.

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 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.

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PAN SECTION ACCESSIBILITY

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.

PVC Eliminators

The final element in the upper part of the cooling tower are moisture eliminators which strip the entrained water droplets from the leaving air stream. EVAPCO's patented* eliminator insures that drift loss will be minimized. The eliminators are approximately 5" deep, spaced on 1" centers. They incorporate a hooked leaving edge designed to direct the discharge air stream away from the fans to help eliminate recirculation of hot, saturated air back into the fan inlets.

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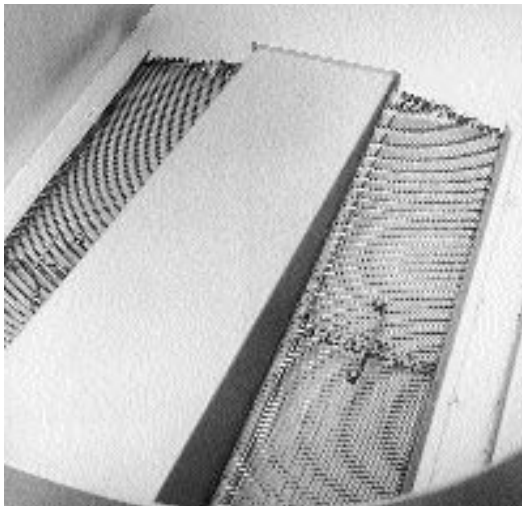
ELIMINATOR

The air discharge side of the cooling tower is the most corrosive and most difficult area to clean and refinish. To provide the greatest protection in this area, the drift eliminators are made of inert polyvinyl chloride (PVC). The PVC material will effectively eliminate corrosion of these vital components and is specially treated to resist ultraviolet light.

The eliminators are assembled in easily handled sections to facilitate removal. This will expose the entire upper portion of the unit and water distribution system for periodic inspection.

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 (except remote sump applications) as standard.** Strainers are positioned around a large anti-vortex hood in easily handled sections.



STRAINER

*U.S. Patent No. 4,500,330

EVAPCOAT:
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 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.

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. Please contact your local EVAPCO representative for pricing.

- Stainless Steel Cold Water Basins:

  Models LSTA 8P-121 to LSTA 8P-365
  Models LSTA 10-121 to LSTA 10-366

- Stainless Steel Water Touch Basin:

  All LSTA Models

- Stainless Steel Water Touch Units:

  All LSTA Models

- All Stainless Steel Units:

  All LSTA Models

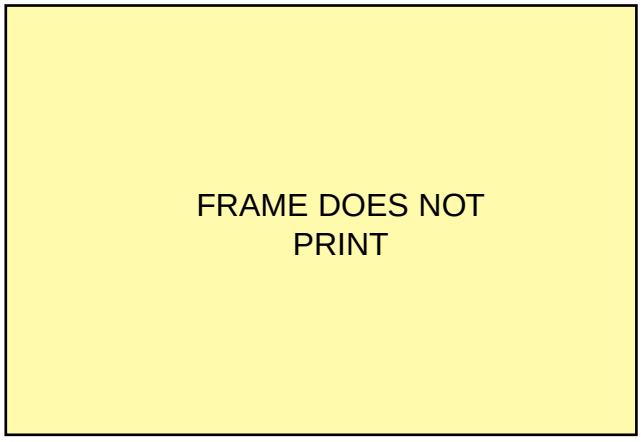
Consult the factory for construction details.

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 **130°F**. The fill also has excellent fire resistant qualities providing a flame spread rating of 5 per ASTM-E84-81a. (The flame spread rating scale ranges from 0 for non-combustible to 100 for highly combustible). Because of the unique way in which the crossfluted 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 130°F. Consult your EVAPCO representative for further details.



EVAPAK FILL
*U.S. Patent No. 5,124,087

LSTA Applications

Design

EVAPCO LSTA 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.

Capacity Control

The design wet bulb for which the cooling tower is sized occurs only a small percentage of the time. Unless colder water temperatures are beneficial to the process being cooled, some form of capacity control will be needed. A common control practice is to cycle the fans off when leaving water is below the minimum allowable temperature. However this does not provide close control of the leaving water temperature.

Another method is to use two-speed fan motors which add a second step of control. Two speed fan motors are an excellent method of capacity control for the LSTA. This arrangement gives capacity steps of 10% (fans off), 60% (fans half-speed) and 100%. A temperature controller can be supplied to set control at 5° increments, 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 approximately 15% of full load power. Since maximum wet bulb and maximum load very seldom coincide on air conditioning systems, the cooling tower will actually operate at half speed 80% of the time. Thus, power costs will be reduced by approximately 85% during the major portion of the operating season.

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.

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 3 gpm per 100 tons 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 20 and 50 psig 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 and a reputable water treatment company familiar with the local water conditions should be consulted.

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 6.5 and 8.0. 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. 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.

LSTA Optional Equipment

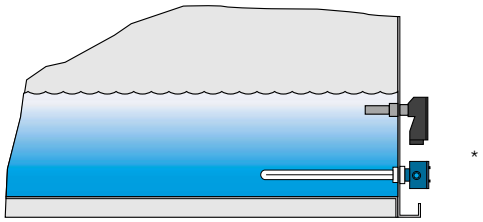
Pan Freeze Protection

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 out 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 +40˚F pan water temperature at 0˚F 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. Contact your EVAPCO representative for further details.



BASIN HEATER
*See Factory certified prints for detailed drawings

Unit No.	KW*	Unit No.	KW*
LSTA 5-121 to 125	4	LSTA 8P-361 to 365	(2) 7
5-181 to 187	(2) 3	10-121 to 126	7
8P-121 to 125	5	10-181 to 187	(2) 5
8P-181 to 186	(2) 4	10-241 to 245	(2) 7
8P-241 to 245	(2) 5	10-361 to 366	(2) 10

* Electric heater selection based on 0˚F ambient temperature.
For alternate low ambient heater selections, consult the factory.

Steam or Hot Water Coils

Pan coils are available as an alternate to the electric heaters described above. Constructed of galvanized pipe installed in the cooling tower basin, they are supplied less controls and are ready for piping to an external steam or hot water source. Pan water heater controls should be interlocked with the water circulating pump to prevent their operation when the pump is energized.

Electric Water Level Control

EVAPCO LSTA 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 20 psig (minimum)and 50 psig. (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 G-235 hot-dip galvanized steel for superior corrosion resistance. Rails are designed to be mounted between the cooling tower and the supporting steel framework. They are 90% efficient and have approximately 1" static deflection. Rails are designed for wind loading up to 50 mph.

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.

Screened Bottom Panels

Protective inlet screens are provided on the front of the fan section on the LSTA. Screens are not provided on the bottom of the fan section since most units are mounted on the roof or at ground level.

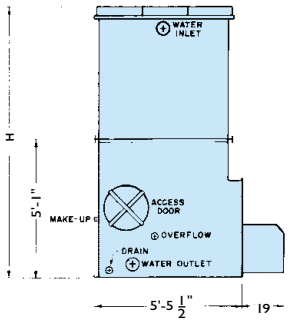
If units are installed in an elevated position, bottom screens are recommended for safety protection.

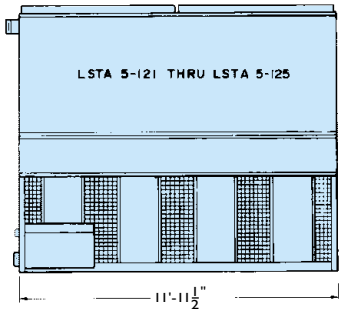
Other Options Available:

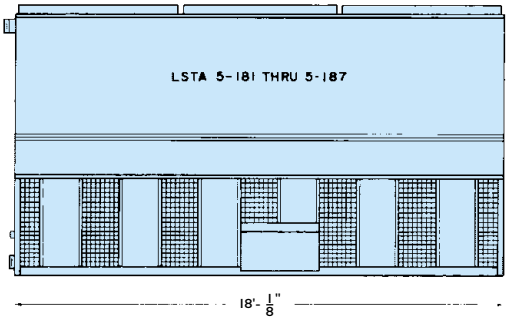
Capacity Dampers and Controls
Pony Motors
Ladders
Inverter Duty and 2 Speed Motors
Steam Injectors
Stainless Steel Fan Shafts
Tapered Discharge Hoods
Solid Bottom Panels

Engineering Dimensions & Data

SMALL CENTRIFUGAL FAN MODELS
LSTA 5-121 to 5-187







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 6″ or smaller are MPT. Connections larger than 6″ 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 ½″, use next size fan motor.

UNIT NO.	WEIGHTS			Fan Motor HP*	CFM	DIMENSIONS		CONNECTIONS				
	Shipping	Operating	Heaviest Section			Height	Length	Water In	Water Out	Make Up	Drain	Over-Flow
LSTA 5-121	3,560	5,790	2,220	20	38,700	10' 5½"	11' 11½"	6"	6"	1"	2"	3"
5-122	3,770	6,010	2,220	20	37,600	11' 5½"	11' 11½"	6"	6"	1"	2"	3"
5-123	3,890	6,120	2,330	25	40,400	11' 5½"	11' 11½"	6"	6"	1"	2"	3"
5-124	4,100	6,340	2,330	25	39,500	12' 5½"	11' 11½"	6"	6"	1"	2"	3"
5-125	4,150	6,390	2,380	30	41,800	12' 5½"	11' 11½"	6"	6"	1"	2"	3"
LSTA 5-181	5,690	8,610	3,570	25	55,100	10' 5½"	18' ⅛"	6"	6"	2"	2"	3"
5-182	5,750	8,660	3,620	30	58,400	10' 5½"	18' ⅛"	6"	6"	2"	2"	3"
5-183	5,820	8,730	3,690	40	64,000	10' 5½"	18' ⅛"	6"	6"	2"	2"	3"
5-184	6,060	8,980	3,620	30	56,800	11' 5½"	18' ⅛"	6"	6"	2"	2"	3"
5-185	6,130	9,040	3,690	40	62,200	11' 5½"	18' ⅛"	6"	6"	2"	2"	3"
5-186	6,450	9,360	3,690	40	60,800	12' 5½"	18' ⅛"	6"	6"	2"	2"	3"
5-187	6,500	9,420	3,740	50	63,200	12' 5½"	18' ⅛"	6"	6"	2"	2"	3"

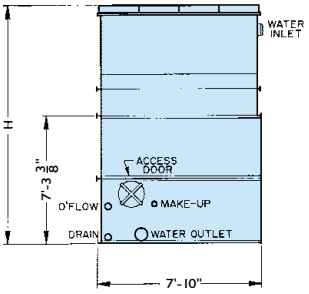
Thermal Performance

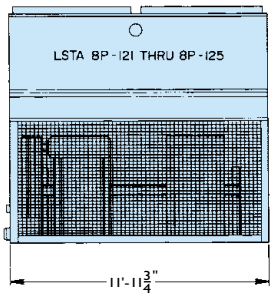
Models LSTA 5-121 to 5-187

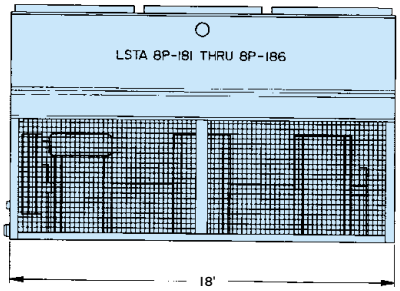
			Cooling Capacity in GPM									
		Temp °F										
MODEL	Motor	EWT	90	95	90	95	90	95	90	95	95	100
LSTA	HP	LWT	80	80	80	80	80	80	80	80	85	85
		WB	66	66	68	68	70	70	72	72	75	75
5-121	20		643	490	579	452	516	403	446	355	579	456
5-122	20		694	542	633	503	568	450	496	399	633	507
5-123	25		734	578	671	538	604	480	531	428	671	542
5-124	25		777	610	710	567	638	509	560	457	710	572
5-125	30		813	641	744	597	670	538	589	482	744	602
5-181	25		909	693	815	638	726	570	628	497	815	643
5-182	30		973	739	882	682	778	610	672	538	882	688
5-183	40		1036	801	942	738	841	654	727	583	942	745
5-184	30		1056	819	961	758	859	677	747	606	961	764
5-185	40		1133	888	1034	822	929	734	811	653	1034	829
5-186	40		1185	937	1084	873	978	785	862	706	1084	880
5-187	50		1241	976	1135	909	1020	821	897	739	1135	916
			Cooling Capacity in GPM									
		Temp °F										
MODEL	Motor	EWT	95	100	95	97	100	102	95	97	100	102
LSTA	HP	LWT	85	85	85	87	85	87	85	87	85	87
		WB	76	76	78	78	78	78	80	80	80	80
5-121	20		544	430	467	572	369	448	379	490	312	393
5-122	20		596	479	518	625	414	499	424	542	355	440
5-123	25		632	512	554	663	443	534	454	578	380	470
5-124	25		668	541	584	701	472	563	482	610	407	498
5-125	30		701	570	614	735	498	592	510	641	427	526
5-181	25		762	606	659	803	523	632	539	693	432	558
5-182	30		821	649	704	869	560	676	575	739	466	596
5-183	40		884	698	764	929	605	731	618	801	509	639
5-184	30		902	721	782	949	626	752	641	819	536	662
5-185	40		973	783	848	1021	675	815	691	888	580	716
5-186	40		1023	833	899	1071	729	866	745	937	628	769
5-187	50		1068	869	935	1121	763	902	780	976	658	804

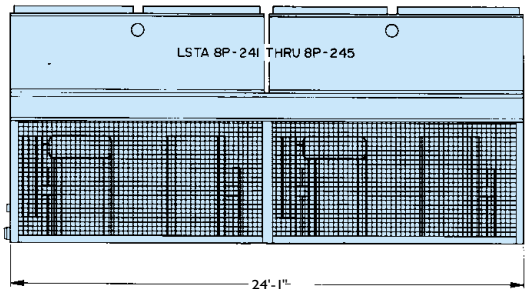
Engineering Dimensions & Data

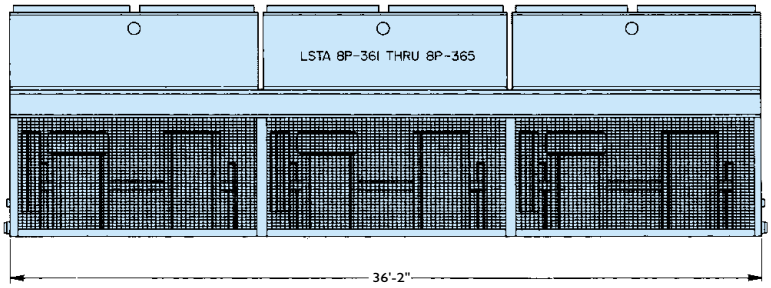
LARGE CENTRIFUGAL FAN MODELS
LSTA 8P-121 to 8P-365











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 6″ or smaller are MPT. Connections larger than 6″ 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 ½″, use next size fan motor.

UNIT NO.	WEIGHTS			Fan Motor HP*	CFM	DIMENSIONS		CONNECTIONS				
	Shipping	Operating	Heaviest Section			Height	Length	Water In	Water Out	Make Up	Drain	Over-Flow
LSTA 8P-121	5,620	9,790	3,590	30	58,400	12' 5½"	11' 11¾"	8"	8"	2"	2"	3"
8P-122	5,710	9,880	3,690	40	63,800	12' 5½"	11' 11¾"	8"	8"	2"	2"	3"
8P-123	6,060	10,240	3,690	40	62,100	13' 5½"	11' 11¾"	8"	8"	2"	2"	3"
8P-124	6,410	10,580	3,690	40	60,100	14' 5½"	11' 11¾"	8"	8"	2"	2"	3"
8P-125	6,480	10,650	3,750	50	64,300	14' 5½"	11' 11¾"	8"	8"	2"	2"	3"
LSTA 8P-181	8,190	14,240	5,050	40	84,800	12' 5½"	18'	8"	8"	2"	2"	3"
8P-182	8,250	14,300	5,110	50	90,800	12' 5½"	18'	8"	8"	2"	2"	3"
8P-183	8,700	14,750	5,050	40	82,600	13' 5"	18'	8"	8"	2"	2"	3"
8P-184	8,760	14,810	5,110	50	88,500	13' 5"	18'	8"	8"	2"	2"	3"
8P-185	8,780	14,830	5,130	60	93,500	13' 5"	18'	8"	8"	2"	2"	3"
8P-186	9,290	15,340	5,130	60	90,600	14' 5"	18'	8"	8"	2"	2"	3"
LSTA 8P-241	11,540	20,000	6,800	(2)25	107,500	13' 5½"	24' 1"	(2)8"	10"	2"	2"	3"
8P-242	11,150	19,600	7,100	(2)40	127,500	12' 5½"	24' 1"	(2)8"	10"	2"	2"	3"
8P-243	11,850	20,300	7,100	(2)40	124,200	13' 5½"	24' 1"	(2)8"	10"	2"	2"	3"
8P-244	12,550	21,000	7,100	(2)40	120,100	14' 5"	24' 1"	(2)8"	10"	2"	2"	3"
8P-245	12,670	21,130	7,230	(2)50	128,600	14' 5"	24' 1"	(2)8"	10"	2"	2"	3"
LSTA 8P-361	16,830	29,030	10,250	(3)30	175,200	12' 5"	36' 2"	(3)8"	(2)8"	(2)2"	(2)2"	(2)3"
8P-362	17,120	29,320	10,540	(3)40	191,300	12' 5"	36' 2"	(3)8"	(2)8"	(2)2"	(2)2"	(2)3"
8P-363	18,170	30,380	10,540	(3)40	186,300	13' 5"	36' 2"	(3)8"	(2)8"	(2)2"	(2)2"	(2)3"
8P-364	19,220	31,420	10,540	(3)40	180,200	14' 5"	36' 2"	(3)8"	(2)8"	(2)2"	(2)2"	(2)3"
8P-365	19,410	31,610	10,770	(3)50	193,000	14' 5"	36' 2"	(3)8"	(2)8"	(2)2"	(2)2"	(2)3"

Thermal Performance

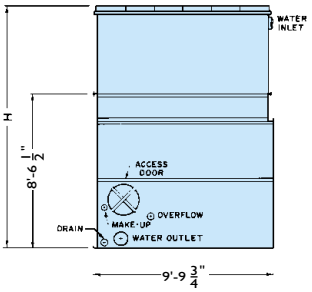
Models LSTA 8P-121 to 8P-365

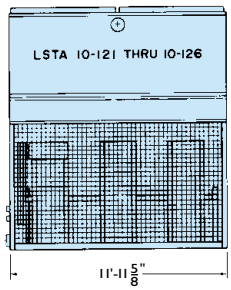
			Cooling Capacity in GPM									
		Temp °F										
MODEL	Motor	EWT	90	95	90	95	90	95	90	95	95	100
LSTA	HP	LWT	80	80	80	80	80	80	80	80	85	85
		WB	66	66	68	68	70	70	72	72	75	75
8P-121	30		942	721	851	660	759	581	649	516	851	666
8P-122	40		1026	791	930	727	828	644	716	567	930	733
8P-123	40		1110	872	1015	808	912	725	797	647	1015	815
8P-124	40		1170	922	1070	859	963	773	848	693	1070	865
8P-125	50		1226	970	1122	903	1013	813	891	731	1122	910
8P-181	40		1355	1034	1229	950	1089	838	935	732	1229	958
8P-182	50		1467	1120	1327	1035	1176	914	1020	802	1327	1044
8P-183	40		1491	1158	1354	1075	1212	961	1060	855	1354	1084
8P-184	50		1596	1246	1455	1157	1304	1037	1142	924	1455	1167
8P-185	60		1675	1307	1526	1216	1366	1092	1201	973	1526	1226
8P-186	60		1746	1375	1596	1281	1436	1154	1264	1041	1596	1291
8P-241	(2) 25		1936	1507	1763	1398	1578	1251	1379	1114	1763	1410
8P-242	(2) 40		2054	1573	1861	1452	1652	1280	1427	1133	1861	1466
8P-243	(2) 40		2217	1739	2021	1618	1818	1450	1596	1291	2021	1630
8P-244	(2) 40		2337	1842	2136	1719	1924	1549	1697	1387	2136	1732
8P-245	(2) 50		2464	1941	2256	1803	2030	1616	1779	1449	2256	1818
8P-361	(3) 30		2841	2150	2555	1978	2262	1749	1948	1537	2555	1997
8P-362	(3) 40		3088	2372	2806	2181	2496	1931	2149	1700	2806	2201
8P-363	(3) 40		3355	2609	3056	2424	2731	2167	2391	1945	3056	2444
8P-364	(3) 40		3508	2766	3209	2577	2889	2324	2545	2087	3209	2597
8P-365	(3) 50		3704	2907	3384	2709	3039	2449	2675	2201	3384	2730
			Cooling Capacity in GPM									
		Temp °F										
MODEL	Motor	EWT	95	100	95	97	100	102	95	97	100	102
LSTA	HP	LWT	85	85	85	87	85	87	85	87	85	87
		WB	76	76	78	78	78	78	80	80	80	80
8P-121	30		800	623	683	840	534	653	548	721	440	567
8P-122	40		869	689	752	916	590	720	605	791	492	628
8P-123	40		955	771	833	1002	670	802	686	872	570	709
8P-124	40		1008	820	884	1057	717	852	733	922	618	757
8P-125	50		1058	862	929	1109	755	896	772	970	653	796
8P-181	40		1151	899	982	1214	763	941	784	1034	*	816
8P-182	50		1239	981	1069	1308	834	1026	857	1120	694	890
8P-183	40		1271	1023	1108	1337	886	1066	907	1158	755	939
8P-184	50		1367	1103	1192	1436	957	1148	980	1246	818	1014
8P-185	60		1433	1161	1252	1507	1007	1207	1032	1307	857	1068
8P-186	60		1503	1223	1318	1576	1073	1271	1096	1375	929	1131
8P-241	(2) 25		1656	1332	1441	1741	1154	1387	1181	1507	985	1223
8P-242	(2) 40		1739	1367	1504	1835	1180	1437	1210	1573	998	1251
8P-243	(2) 40		1902	1543	1666	1996	1336	1605	1368	1739	1140	1417
8P-244	(2) 40		2012	1642	1768	2110	1434	1705	1467	1842	1237	1516
8P-245	(2) 50		2126	1719	1858	2229	1497	1789	1530	1941	1295	1581
8P-361	(3) 30		2384	1873	2049	2519	1601	1960	1643	2150	1326	1706
8P-362	(3) 40		2628	2068	2255	2769	1769	2162	1816	2372	1473	1885
8P-363	(3) 40		2867	2308	2499	3016	2010	2404	2055	2609	1718	2121
8P-364	(3) 40		3024	2463	2651	3171	2155	2558	2203	2766	1856	2276
8P-365	(3) 50		3183	2591	2786	3342	2274	2688	2325	2907	1963	2399

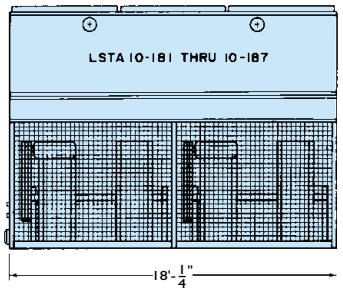
* Thermal Capacity Below Minimum Allowable Flow.

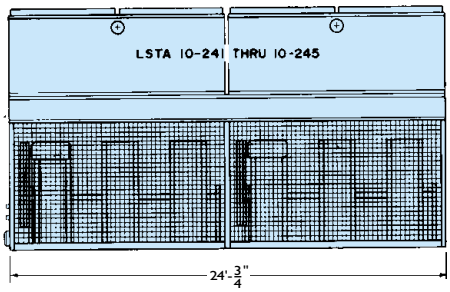
Engineering Dimensions & Data

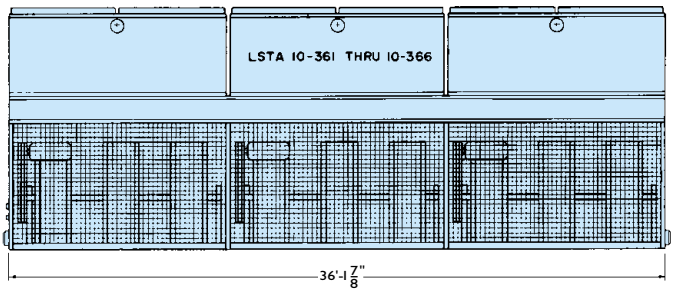
LARGE CENTRIFUGAL FAN MODELS
LSTA 10-121 to 10-366











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 6″ or smaller are MPT. Connections larger than 6″ 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 ½″, use next size fan motor.

UNIT NO.	WEIGHTS			Fan Motor HP*	CFM	DIMENSIONS		CONNECTIONS				
	Shipping	Operating	Heaviest Section			Height	Length	Water In	Water Out	Make Up	Drain	Over-Flow
LSTA 10-121	7,890	13,260	4,940	30	69,000	14' 11"	11' 11⅝"	8"	8"	2"	3"	4"
10-122	8,010	13,380	5,060	40	75,600	14' 11"	11' 11⅝"	8"	8"	2"	3"	4"
10-123	8,410	13,780	5,060	40	73,800	15' 11"	11' 11⅝"	8"	8"	2"	3"	4"
10-124	8,070	13,440	5,120	50	81,000	14' 11"	11' 11⅝"	8"	8"	2"	3"	4"
10-125	8,480	13,850	5,120	50	79,200	15' 11"	11' 11⅝"	8"	8"	2"	3"	4"
10-126	8,600	13,970	5,240	60	83,900	15' 11"	11' 11⅝"	8"	8"	2"	3"	4"
LSTA 10-181	11,450	19,220	7,490	(2)25	110,600	13' 11"	18' ¼"	(2)8"	10"	2"	3"	4"
10-182	11,590	19,360	7,630	(2)30	117,100	13' 11"	18' ¼"	(2)8"	10"	2"	3"	4"
10-183	12,060	19,830	7,490	(2)25	107,500	14' 11"	18' ¼"	(2)8"	10"	2"	3"	4"
10-184	12,200	19,970	7,630	(2)30	113,900	14' 11"	18' ¼"	(2)8"	10"	2"	3"	4"
10-185	12,810	20,580	7,630	(2)30	111,300	15' 11"	18' ¼"	(2)8"	10"	2"	3"	4"
10-186	12,400	20,170	7,830	(2)40	124,700	14' 11"	18' ¼"	(2)8"	10"	2"	3"	4"
10-187	13,010	20,780	7,830	(2)40	121,900	15' 11"	18' ¼"	(2)8"	10"	2"	3"	4"
LSTA 10-241	14,760	25,490	9,680	(2)40	155,400	13' 11"	24' ¾"	(2)8"	10"	2"	3"	4"
10-242	15,580	26,300	9,680	(2)40	151,200	14' 11"	24' ¾"	(2)8"	10"	2"	3"	4"
10-243	15,700	26,430	9,810	(2)50	162,000	14' 11"	24' ¾"	(2)8"	10"	2"	3"	4"
10-244	16,520	27,240	9,810	(2)50	158,400	15' 11"	24' ¾"	(2)8"	10"	2"	3"	4"
10-245	16,660	27,380	9,950	(2)60	163,600	15' 11"	24' ¾"	(2)8"	10"	2"	3"	4"
LSTA 10-361	22,070	37,910	14,440	(3)40	233,100	13' 11"	36' 1⅞"	(3)8"	(2)10"	3"	3"	4"
10-362	23,290	39,130	14,440	(3)40	226,800	14' 11"	36' 1⅞"	(3)8"	(2)10"	3"	3"	4"
10-363	23,480	39,320	14,630	(3)50	243,000	14' 11"	36' 1⅞"	(3)8"	(2)10"	3"	3"	4"
10-364	24,700	40,540	14,630	(3)50	237,700	15' 11"	36' 1⅞"	(3)8"	(2)10"	3"	3"	4"
10-365	24,970	40,810	14,900	(3)60	251,800	15' 11"	36' 1⅞"	(3)8"	(2)10"	3"	3"	4"
10-366	25,240	41,080	15,170	(3)75	269,000	16' 4"	36' 1⅞"	(3)8"	(2)10"	3"	3"	4"

Thermal Performance

Models LSTA 10-121 to 10-366

			Cooling Capacity in GPM									
		Temp °F										
MODEL	Motor	EWT	90	95	90	95	90	95	90	95	95	100
LSTA	HP	LWT	80	80	80	80	80	80	80	80	85	85
		WB	66	66	68	68	70	70	72	72	75	75
10-121	30		1281	989	1158	913	1035	817	899	728	1158	922
10-122	40		1404	1087	1274	1009	1138	903	995	804	1274	1017
10-123	40		1476	1158	1349	1077	1212	970	1063	871	1349	1085
10-124	50		1519	1175	1372	1089	1232	976	1073	884	1372	1098
10-125	50		1591	1250	1453	1165	1306	1051	1150	942	1453	1174
10-126	60		1650	1289	1504	1199	1349	1082	1184	972	1504	1209
10-181	(2) 25		1815	1387	1644	1276	1459	1130	1257	997	1644	1287
10-182	(2) 30		1939	1483	1752	1368	1558	1212	1348	1070	1752	1381
10-183	(2) 25		2034	1567	1843	1452	1643	1297	1431	1157	1843	1464
10-184	(2) 30		2124	1646	1930	1530	1724	1373	1510	1223	1930	1542
10-185	(2) 30		2229	1744	2033	1621	1825	1459	1600	1306	2033	1634
10-186	(2) 40		2298	1781	2083	1657	1863	1479	1633	1318	2083	1670
10-187	(2) 40		2392	1876	2183	1746	1962	1572	1724	1412	2183	1760
10-241	(2) 40		2565	1962	2335	1814	2062	1611	1785	1418	2335	1831
10-242	(2) 40		2794	2169	2558	2016	2270	1799	1989	1599	2558	2033
10-243	(2) 50		3012	2346	2740	2180	2454	1952	2151	1739	2740	2198
10-244	(2) 50		3173	2498	2897	2330	2609	2100	2301	1883	5897	2348
10-245	(2) 60		3273	2577	2993	2400	2693	2166	2370	1947	2993	2418
10-361	(3) 40		3822	2941	3459	2724	3083	2410	2685	2131	3459	2749
10-362	(3) 40		4199	3258	3797	3024	3409	2695	2982	2394	3797	3050
10-363	(3) 50		4537	3512	4118	3275	3674	2935	3233	2604	4118	3301
10-364	(3) 50		4779	3744	4362	3494	3909	3144	3450	2812	4362	3521
10-365	(3) 60		4933	3857	4505	3601	4032	3245	3555	2909	4505	3628
10-366	(3) 75		5167	4063	4721	3781	4246	3398	3731	3056	4721	3812

			Cooling Capacity in GPM									
		Temp °F										
MODEL	Motor	EWT	95	100	95	97	100	102	95	97	100	102
LSTA	HP	LWT	85	85	85	87	85	87	85	87	85	87
		WB	76	76	78	78	78	78	80	80	80	80
10-121	30		1086	866	946	1143	756	904	775	989	633	802
10-122	40		1195	961	1040	1257	833	1000	853	1087	708	883
10-123	40		1269	1028	1108	1332	900	1068	920	1158	773	950
10-124	50		1293	1035	1123	1354	984	1079	919	1175	*	954
10-125	50		1368	1113	1198	1435	974	1156	997	1250	836	1029
10-126	60		1414	1146	1234	1485	1004	1190	1026	1289	865	1059
10-181	(2) 25		1537	1209	1319	1622	1035	1264	1062	1387	874	1102
10-182	(2) 30		1639	1298	1414	1729	1111	1356	1140	1483	940	1182
10-183	(2) 25		1726	1380	1498	1818	1198	1439	1226	1567	1019	1268
10-184	(2) 30		1809	1459	1576	1905	1267	1517	1298	1646	1077	1343
10-185	(2) 30		1912	1546	1669	2008	1351	1608	1383	1744	1155	1429
10-186	(2) 40		1954	1575	1708	2056	1364	1643	1397	1781	1165	1446
10-187	(2) 40		2054	1668	1798	2156	1459	1733	1491	1876	1253	1540
10-241	(2) 40		2175	1710	1875	2303	1474	1797	1516	1962	*	1576
10-242	(2) 40		2385	1919	2079	2522	1657	2000	1698	2169	1408	1758
10-243	(2) 50		2573	2077	2247	2705	1800	2163	1844	2346	1538	1908
10-244	(2) 50		2729	2227	2397	2862	1945	2313	1988	2498	1680	2055
10-245	(2) 60		2820	2294	2469	2957	2011	2381	2056	2577	1734	2122
10-361	(3) 40		3239	2586	2813	3413	2212	2701	2268	2941	1863	2352
10-362	(3) 40		3574	2877	3118	3750	2479	2999	2539	3258	2111	2631
10-363	(3) 50		3858	3125	3371	4062	2699	3250	2765	3512	2293	2866
10-364	(3) 50		4097	3338	3595	4307	2909	3468	2977	3744	2502	3077
10-365	(3) 60		4233	3441	3703	4449	3007	3573	3075	3857	2589	3176
10-366	(3) 75		4445	3605	3894	4663	3154	3751	3224	4063	2731	3327

* Thermal Capacity Below Minimum Allowable Flow.

LSTA Cooling Tower Specifications

Furnish and install as shown on the plans an EVAPCO Model _____ blow-through cooling tower. Each unit shall have the capacity to cool _____ GPM of water from _____ ˚F to _____ ˚F with a _____ ˚F entering wet bulb temperature. The tower shall operate against _____ w.g. external static pressure. Unit height shall not exceed _____.

Pan and Casing

The pan and casing shall be constructed of G-235 hot-dip galvanized steel for long life and durability. The heat transfer section shall be removable from the pan to provide easy handling and rigging.

The pan/fan section shall include fans and drives mounted and aligned at the factory. These items shall be located in the dry entering air stream to provide maximum service life and easy maintenance. Standard pan accessories shall include circular access doors, stainless steel strainers, and brass make-up valve with unsinkable, foam filled plastic float.

Centrifugal Fans/Drives

Fans shall be forwardly curved centrifugal type of hot-dip galvanized construction. The fans shall be factory installed into the fan/pan section, and statically and dynamically balanced for vibration free operation. Fans shall be mounted on either a solid steel shaft or a hollow steel shaft with forged bearing journals. The fan shaft shall be supported by heavy-duty, self-aligning bearings with cast iron housings and lubrication fittings for maintenance.

The fan drives shall be V-belt type with taper lock sheaves designed for 150% of the motor nameplate horsepower.

Fan Motor

_____ horsepower **T.E.F.C.** ball bearing fan motor(s) with 1.15 service factor shall be furnished suitable for outdoor service on _____ volts, _____ hertz, and _____ phase. Motor(s) shall be mounted on an adjustable base.

Fill

The cooling tower fill shall be PVC (Polyvinyl Chloride) of cross-fluted design for optimum heat transfer and efficiency. The cross-fluted sheets shall be bonded together for strength and durability. The PVC fill shall be self-extinguishing for fire resistance with a flame spread rating of 5 per ASTM E84-81a. It shall also be resistant to rot, decay or biological attack.

Water Distribution System

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. The water shall be distributed over the fill by precision molded ABS spray nozzles with large ⅜ by 1 inch orifice openings and integral sludge ring to eliminate clogging. The internal tower water distribution piping shall be removable for cleaning purposes.

Eliminators

The eliminators shall be constructed entirely of inert polyvinyl chloride (PVC) that has been specially treated to resist ultra violet light. 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 removal of entrained moisture from the discharge air stream. They shall have a hooked leaving edge to direct the discharge air away from the fans to minimize recirculation.

Finish

All pan and casing materials shall be constructed of G-235 heavy gauge mill hot-dip galvanized steel for maximized protection against corrosion. During fabrication, all panel edges shall be coated with a 95% pure zinc-compound.

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