

LSCE

EVAPORATIVE CONDENSERS



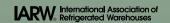
Low Sound

Thermal Performance from 155 to 6931 kW Nominal Capacity

RESEARCH POWERED SOLUTIONS!

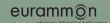
CERTIFIED EN ISO 9001

















ince 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.

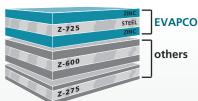
The ongoing R & D Program enables EVAPCO to provide the most advanced products in the industry – technology for the future, available today.

With 19 facilities in nine countries and over 175 sales offices in 51 countries world-wide, EVAPCO is ready to assist in all your equipment needs.

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

Z-725 Heavy Mill Galvanized Steel Construction

(Stainless steel available as an affordable option)



NEW!Easy Field Assembly

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



Stainless Steel Strainer

 Resists corrosion better than other materials

NEW!Clean Pan Design

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



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DESIGN AND CONSTRUCTION FEATURES



IBC Compliant Design Refer to page

13 for details





Fully Integrated 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
- Eliminators now integrated within casing section for easy mounting of ductwork, discharge hood and attenuation
- Drift rate certifications Eurovent OM-14-2009



- Nozzles are threaded into the header.
- 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.

Thermal Pak II Heat Transfer Technology

- More surface area per plan area than competitive designs.
- Improved heat transfer efficiency due to tube geometry and orientation of tubes.
- Lower refrigerant charge.
- Optional Stainless Steel Coil technology.

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





DESIGN FEATURES



Capacity Control

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

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

Basin Access

The basin/fan section of a centrifugal fan unit is designed for accessibility and ease of maintenance.

Large circular access doors are provided to allow entry into the basin. All float valve and strainer assemblies are located near the door for easy adjustment and cleaning. The sump is designed to catch the dirt



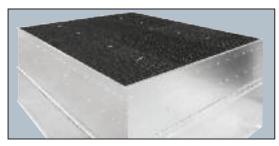
accumulated. This can be flushed out simply with a hose. The stainless steel strainers may be easily removed for periodic cleaning.

Efficient Drift Eliminators

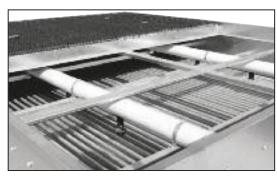
An extremely efficient drift eliminator system is standard on the LSCE Condenser. The system removes entrained water droplets from the air stream to limit the drift rate to less than 0.001% of the recirculating water rate. With a low drift rate, the LSCE Condenser saves valuable water and water treatment chemicals. The LSCE can be located in areas where minimum water carryover 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.

In addition to reducing drift, the eliminators protect the spray system from debris and prevent sunlight from entering the condenser.



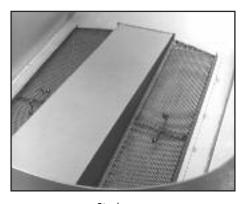
LSCE Drift Eliminators



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



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



OPTIONAL EQUIPMENT



Pan Freeze Protection

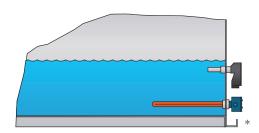
Remote Sump

Whenever a condenser 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 condenser. With this system, the water in the condenser drains to the indoor tank whenever the pump is shut-off. When a condenser 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 +4°C to +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.

Contact your EVAPCO representative for further details.



Basin Heater
*See factory certified prints for detailed drawings.

Unit No.	KW*	Unit	No.	KW*
LSCE 36 to 80	1 x 2 kW	LSCE	281 to 386	1 x 5 kW
LSCE 90 to 120	1 x 3 kW	LSCE	410 to 560	2 x 4 kW
LSCE 135 to 170	1 x 3 kW	LSCE	591 to 770	2 x 5 kW
		LSCE	820 to 1120	2 x 7 kW
LSCE 185 to 250	1 x 4 kW			
LSCE 280 to 385	2 x 3 kW	LSCE	400 to 515	1 x 7 kW
		LSCE	550 to 805	2 x 5 kW
		LSCE	800 to 1030	2 x 7 kW
		LSCE	1100 to 1610	2 x 10 kW
I		1		

^{*} Electric heater selection based on -18°C ambient temperature. For alternate low ambient heater selections, consult the factory.

Electric Water Level Control

EVAPCO LSCE Condensers 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 700 kPa (maximum).

Vibration Isolators

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

Other Options Available:

Pump Heater Pony Motors Tapered Discharge Hoods Solid Bottom Panels Dual Pump Assembly





DISCHARGE & INTAKE ATTENUATION DIMENSIONS

Sound Attenuation

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

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 condenser air intakes and consists of acoustically lined baffles to capture radiated noise.

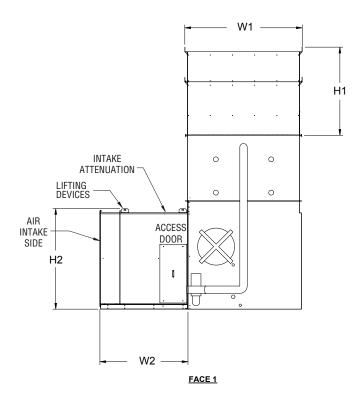
LSCE Discharge Attenuation Dimensions*

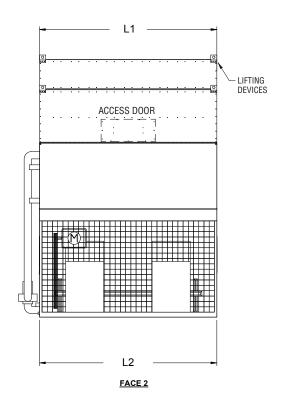
LSCE type	H1 (mm)	L1 (mm)	W1 (mm)	Weight per attenuator (kg)	Number of attenuators
4x6	1190	1830	1160	195	1
4x9	1190	2730	1160	259	1
4x12	1190	3640	1160	340	1
4x18	1190	5490	1160	467	1
5x12	1190	3640	1570	404	1
5x18	1190	5490	1570	553	1
8x12	1810	3640	2420	544	1
8x18	1810	5490	2420	735	1
8x24	1810	3640	2420	544	2
8x36	1810	5490	2420	735	2
3mx12	1810	3640	3020	644	1
3mx18	1810	5490	3020	871	1
3mx24	1810	3640	3020	644	2
3mx36	1810	5490	3020	871	2

LSCE Intake Attenuation Dimensions*

LSCE type	H2 (mm)	L2 (mm)	W2 (mm)	Weight per attenuator (kg)	Number of attenuators
4x6	1010	1830	1810	435	1
4x9	1010	2720	1810	594	1
4x12	1010	3640	1810	753	1
4x18	1010	5490	1810	1107	1
5x12	1170	3640	1810	789	1
5x18	1170	5490	1810	1148	1
8x12	2070	3640	1810	1139	1
8x18	2070	5490	1810	1669	1
8x24	2070	3640	1810	1139	2
8x36	2070	5490	1810	1669	2
3mx12	2260	3640	1810	1066	1
3mx18	2260	5490	1810	1769	1
3mx24	2260	3640	1810	1066	2
3mx36	2260	5490	1810	1769	2

^{*}Attenuation dimensions may vary slightly from catalog. See factory certfied prints for exact dimensions.





LSCE Attenuation





Selection Procedure

The following selection procedure is applicable to both reciprocating and screw compressors. (Refer to factory for selection on centrifugal compressors.) The total heat of rejection for the system is determined by adding the evaporator load, expressed in kW, and the absorbed kW of the compressor motor. This procedure applies to both open type and hermetic compressors.

Once the heat of rejection has been determined, multiply it by the factor for the specified operating conditions (condensing temperature and wet bulb temperature) obtained from either Table 1 or Table 2. The resultant figure is then used to select a unit from Table 3.

EXAMPLE

Given: 1000 kW Evaporator Load, Ammonia

Refrigerant at 36°C Condensing

Temperature, 24°C Wet Bulb Temperature

with a 300 kW Compressor.

Selection: Evaporator Load = 1000 kW

Compressor Load = 300 kWTotal = 1300 kWHeat of Rejection

From Table 2, the Capacity Factor for 36°C Condensing Temperature and 24°C Wet Bulb temperature = 1,20

1300 1,20 1560
(Total Heat x (Capacity = (Corrected Heat of Rejection) Factor) Rejection Load)

Therefore, from Table 3, select LSCE-370.

Note:

For screw compressor selections employing water cooled oil cooling, select a condenser for the total kW as in the example. The condenser can then function in one of two ways:

- (1) Recirculating water from the water sump can be used directly in the oil cooler. A separate pump should be employed and the return water should be directed into the water sump at the opposite end from the pump suction.
- (2) The condenser coil can be circuited so that water or a glycol-water mixture for the oil cooler can be cooled in a separate section of the coil. Specify load and water flow required.

For refrigerant injection cooled screw compressors select the condenser in the same manner as shown in the example.

If the oil cooler is supplied by water from a separate source, then the oil cooling load should be deducted from the heat of rejection before making the selection.

Table 1 - HCFC-22 and HFC-134a Heat Rejection Factors

Conde Pres.	(kPa)	Cond. Temp.	ı	Wet Bulb Temperature, (°C)																
22	134a	°C	10	12	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1090	669	30	1,07	1,15	1,25	1,38	1,47	1,57	1,69	1,83	2,00	2,23	2,50	2,86	3,36	_	-			
1154	718	32	0,94	1,01	1,09	1,19	1,26	1,32	1,40	1,49	1,60	1,74	1,90	2,11	2,36	_	-	_	-	-
1220	759	34	0,85	0,90	0,97	1,04	1,09	1,14	1,20	1,26	1,34	1,43	1,54	1,66	1,81	2,02	2,31	_	-	-
1253	785	35	0,80	0,85	0,91	0,97	1,02	1,06	1,11	1,15	1,21	1,29	1,37	1,46	1,56	1,71	1,89	2,13	2,41	2,77
1287	814	36	0,77	0,81	0,86	0,92	0,96	1,00	1,04	1,07	1,13	1,19	1,26	1,34	1,43	1,56	1,71	1,90	2,14	2,43
1359	856	38	0,70	0,74	0,78	0,82	0,85	0,86	0,90	0,93	0,96	1,01	1,06	1,11	1,18	1,26	1,35	1,47	1,62	1,78
1431	915	40	0,65	0,67	0,70	0,73	0,76	0,78	0,80	0,83	0,86	0,89	0,93	0,97	1,02	1,08	1,14	1,22	1,32	1,44
1508	978	42	0,59	0,62	0,64	0,67	0,68	0,70	0,72	0,74	0,77	0,80	0,83	0,86	0,89	0,94	0,98	1,04	1,11	1,19
1587	1026	44	0,54	0,56	0,59	0,61	0,62	0,63	0,65	0,66	0,68	0,70	0,73	0,75	0,78	0,82	0,85	0,89	0,92	0,97

Table 2 - Ammonia (R-717) Heat Rejection Factors

Condensing Pres.	Cond. Temp.	ı	Wet Bulb Temperature, (°C)																
(kPa)	°C	10	12	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1063	30	0,95	1,03	1,12	1,23	1,31	1,40	1,51	1,63	1,79	1,99	2,24	2,56	3,00	_	_	_	_	_
1133	32	0,84	0,90	0,97	1,06	1,12	1,18	1,25	1,32	1,43	1,55	1,70	1,88	2,11	-	-	-	_	-
1206	34	0,76	0,81	0,86	0,93	0,98	1,02	1,07	1,12	1,19	1,28	1,36	1,48	1,61	1,80	2,06	-	_	-
1245	35	0,71	0,76	0,81	0,87	0,91	0,95	0,99	1,03	1,08	1,15	1,23	1,30	1,39	1,53	1,69	1,90	2,15	2,47
1284	36	0,69	0,73	0,77	0,82	0,86	0,89	0,92	0,96	1,01	1,07	1,13	1,20	1,28	1,39	1,53	1,70	1,91	2,17
1365	38	0,63	0,66	0,69	0,73	0,76	0,78	0,81	0,83	0,86	0,90	0,94	0,99	1,05	1,12	1,21	1,31	1,44	1,59
1451	40	0,58	0,60	0,62	0,65	0,67	0,70	0,72	0,74	0,76	0,80	0,83	0,87	0,91	0,96	1,02	1,09	1,18	1,29
1539	42	0,53	0,55	0,57	0,60	0,61	0,63	0,64	0,66	0,68	0,71	0,74	0,76	0,80	0,84	0,88	0,93	0,99	1,06
1630	44	0,49	0,50	0,52	0,54	0,56	0,56	0,58	0,59	0,61	0,63	0,65	0,67	0,70	0,73	0,76	0,79	0,83	0,86





Table 3 - Unit Heat Rejection

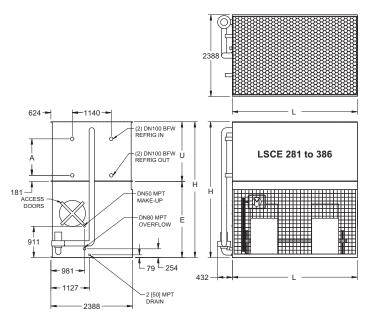
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41 177 355 1528 721 3102 48 207 360 1550 755 3250 54 232 370 1593 770 3315 65 280 385 1657 800 3444 70 301 386 1662 805 3466 75 323 400 1722 820 3532 80 344 410 1766 860 3702 90 387 430 1851 861 3704 100 431 431 1855 900 3875 110 474 450 1937 920 3961 120 517 460 1980 950 4090 135 581 475 2045 960 4133 150 646 480 2066 980 4219 155 667 490 2109 1000 4305	36	155	345	1485	720	3100
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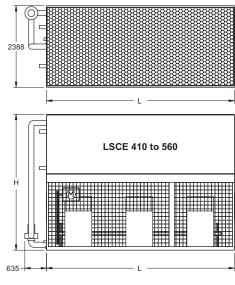
Note: For applications requiring layout or fan kW combinations not shown above, please consult the factory or your EVAPCO representative.





Models LSCE 281 to 560





Model	Far	ıs		Weights (kg)		Refrigerant Operating	Coil	Spray	Pump	Remote Pump				Dime	ensions (ı	nm)	
No.	kW	m³/s	Shipping	Operating	Heaviest Section*	Charge (kg)	Volume (I)	kW	l/s	Liters Req'd**	Conn. Size (mm)	Operating Weight	Height H	Length L	Lower E	Upper U	Coil A
LSCE 281	15	22,5	5045	6800	3490	117	7416	4	36	1365	250	5955	3585	3651	2219	1365	686
LSCE 295	18,5	24,2	5060	6815	3500	117	7416	4	36	1365	250	5970	3585	3651	2219	1365	686
LSCE 310	22	25,8	5080	6835	3525	117	7416	4	36	1365	250	5990	3585	3651	2219	1365	686
LSCE 330	18,5	23,7	5695	7505	4140	144	9176	4	36	1365	250	6715	3775	3651	2219	1556	876
LSCE 345	22	25,2	5720	7530	4165	144	9176	4	36	1365	250	6735	3775	3651	2219	1556	876
LSCE 360	22	24,7	6380	8240	4825	172	10936	4	36	1365	250	7500	3966	3651	2219	1746	1067
LSCE 386	30	27,2	6455	8315	4900	172	10936	4	36	1365	250	7575	3966	3651	2219	1746	1067
LSCE 410	18,5	31,7	7295	9955	5115	173	11011	5,5	53	2005	300	8725	3585	5486	2219	1365	686
LSCE 431	22	33,7	7315	9980	5140	173	11011	5,5	53	2005	300	8745	3585	5486	2219	1365	686
LSCE 460	30	37	7390	10050	5210	173	11011	5,5	53	2005	300	8820	3585	5486	2219	1365	686
LSCE 475	22	33	8265	11010	6085	215	13669	5,5	53	2005	300	9850	3775	5486	2219	1556	876
LSCE 490	37	39,9	7395	10055	5215	173	11011	5,5	53	2005	300	8820	3585	5486	2219	1365	686
LSCE 510	30	36,3	8335	11080	6160	215	13669	5,5	53	2005	300	9925	3775	5486	2219	1556	876
LSCE 530	30	35,6	9345	12165	7165	257	16327	5,5	53	2005	300	11080	3966	5486	2219	1746	1067
LSCE 540	37	39,2	8340	11085	6165	215	13669	5,5	53	2005	300	9930	3775	5486	2219	1556	876
LSCE 560	37	38,3	9350	12170	7170	257	16327	5,5	53	2005	300	11085	3966	5486	2219	1746	1067

^{*} Heaviest section is the coil section

Refrigerant charge is shown for R-717. Multiply by 1,93 for R-22 and 1,98 for R-134a.

Dimensions are subject to change. Do not use for pre-fabrication.

^{**} Liters shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation.

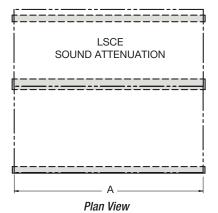
(300 mm would normally be sufficient.)

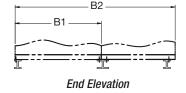




Structural Steel Support

The recommended method of support for the LSCE condenser 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.





	LSCE DIMENSIONS										
	Unit No		A (length)	B1(unit only)	B2*						
LSCE	36 to	80	1826	1238	3050						
	90 to	120	2724	1238	3050						
	135 to	170	3648	1238	3050						
	185 to	250	3648	1652	3470						
	280 to	385	5493	1652	3470						
	281 to	386	3648	2388	4200						
	410 to	560	5493	2388	4200						
	591 to	770	7341	2388	4200						
	820 to	1120	11024	2388	4200						
	400 to	515	3648	2991	4800						
	550 to	805	5493	2991	4800						
	800 to	1030	7341	2991	4800						
	1100 to	1610	11024	2991	4800						

^{*} Units with intake attenuators

Note:

- 1) Beams should be level to within 1/360 of unit length, not to exceed 13 mm 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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- Compact design eliminates moving parts and ensures low energy consumption



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