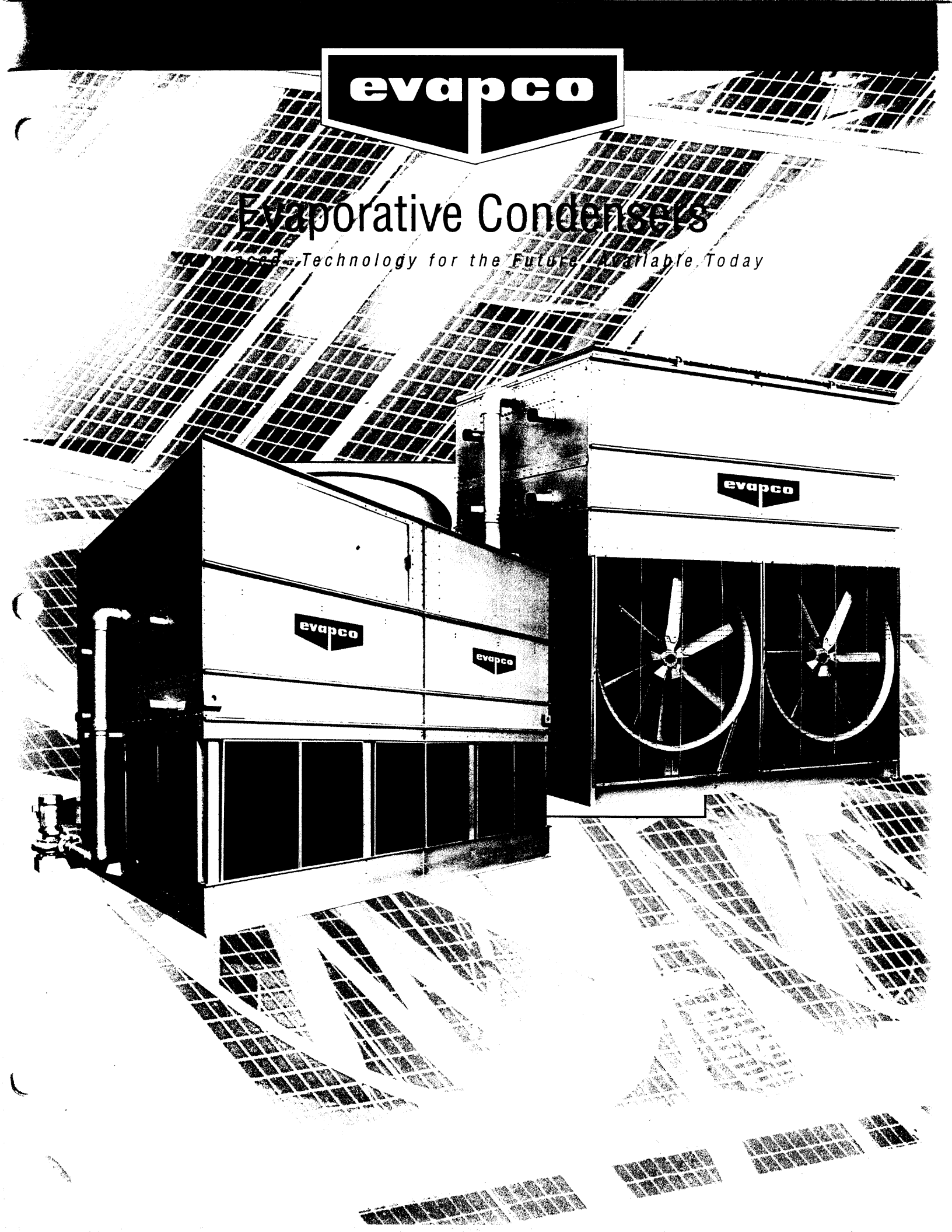
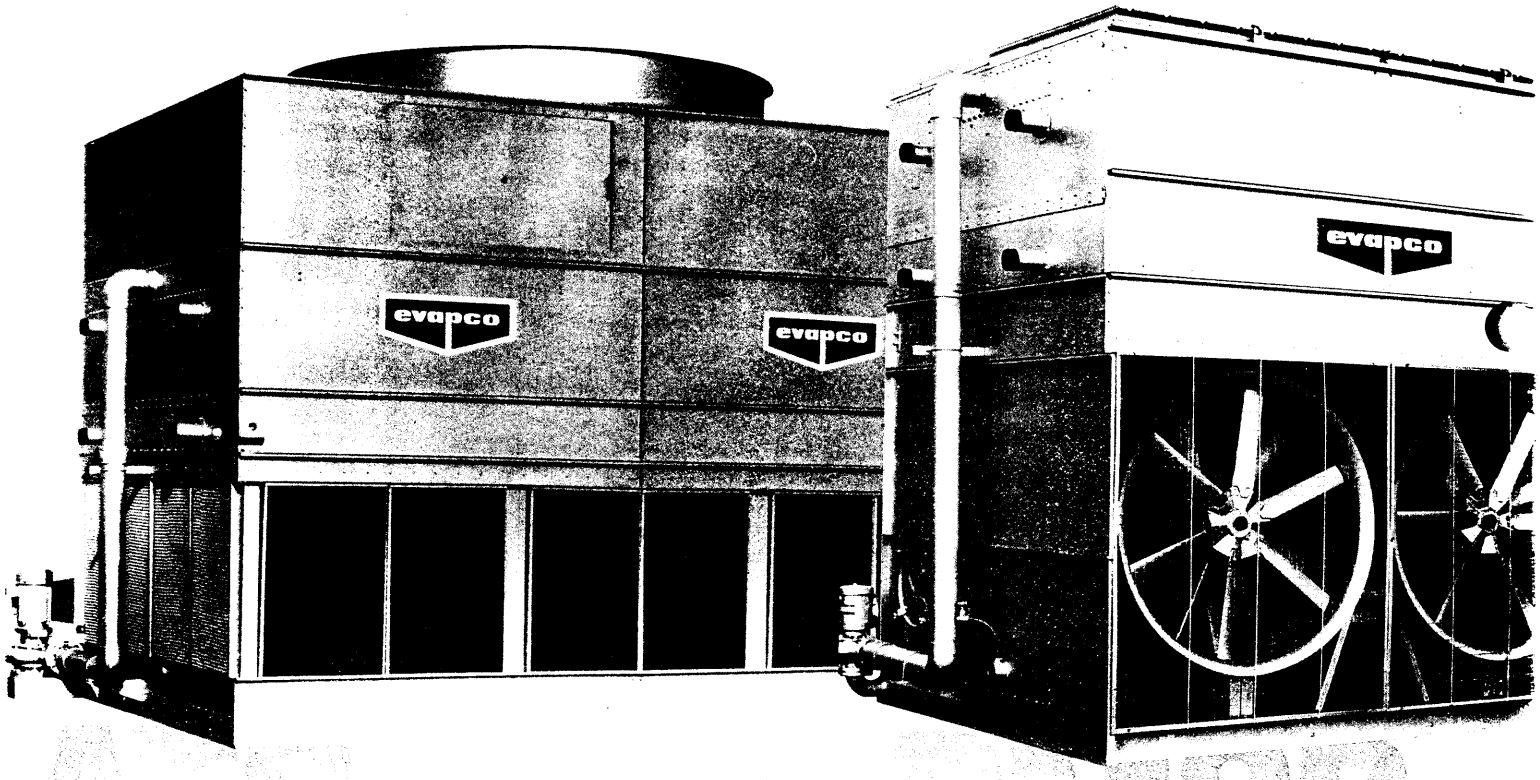

evapco
Evaporative Condensers
Technology for the Future, Available Today
evapco
evapco
evapco

EVAPCO offers a variety of evaporative condenser designs

Each unit is a reflection of Evapco's commitment to excellence in engineering and manufacturing. An emphasis on research and development has resulted in many condenser innovations.

All Evapco condensers have the following features as standard:

- Patented* Thermal-Pak® Coil resulting in the maximum thermal performance available per plan area.
- Heavy Gauge Hot Dip Galvanized Steel construction assuring long operating life.
- Totally Enclosed Fan and Pump Motors with minimum 1.15 service factor.



ATC Series

The ATC line of evaporative condensers represents Evapco's commitment to product development. The line is comprised of 72 models ranging in size from 50 to 3225 nominal tons.
The induced draft counterflow condensers are designed especially for easy maintenance and long, trouble-free operation.

Design advantages include:

- Less Maintenance
- Lower Fan Horsepower
- Lower Sound Levels
- Greater Accessibility
- Less Chance of Recirculation
- Superior Warranty
- No Casing Leaks

PMCB Series

PMCB Models are forced draft, with axial flow fans and are available in capacities from 124 to 1,255 ammonia tons. The effective axial flow fans can reduce power requirements by up to 50% over centrifugal fan models of similar capacity.

* U.S. Patent No. 4,755,331

Numerous sizes to accommodate almost any application.

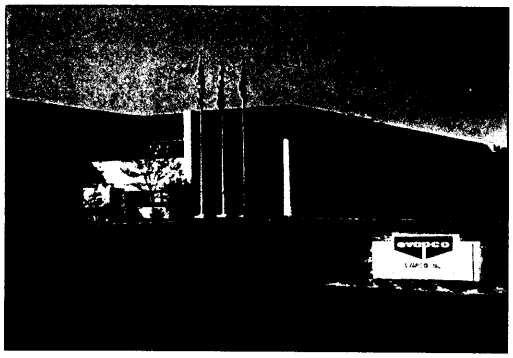
- Stainless Steel Suction Strainers easily removed for periodic cleaning.
- Proven Performance, Industrial Design and Quality Construction for years of Dependable Service.
- Evapco's Commitment to 100% Customer Satisfaction.

LSCB Series

LSCB centrifugal fan forced draft condensers are recommended for a wide range of applications. LSCB models are very quiet and ideal for applications where noise is a concern. In addition, sound attenuation packages are available to further reduce the sound levels.
The centrifugal fans can also operate against the static pressure loss of ductwork and are the only evaporative condensers suitable for indoor installations, or those with inlet or outlet ductwork. These condensers are available in capacities of 26 through 1,142 ammonia tons.

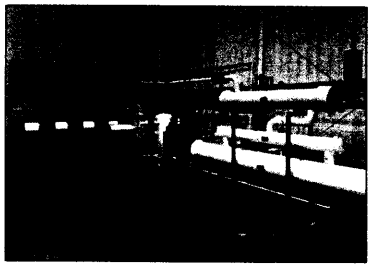
UBC Series

UBC models are available in the sizes from 180 to 3225 nominal tons. They have the same design advantages of the ATC Series, and have been independently certified to withstand seismic forces of 1.0 g horizontal, 0.5 g vertical, and 0.3 g horizontal/orthogonal. In addition, the design is certified for wind loading of 125 pounds per square foot. UBC models should be considered for every "critical use" application where there is the potential for a seismic or high windload event.



Since its founding in 1976, EVAPCO, Inc. has become a world-wide leader in supplying quality equipment to the Industrial Refrigeration industry.

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



An emphasis on research and development has lead 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 13 facilities in 8 countries and over 160 sales offices in 42 countries world-wide, EVAPCO is ready to assist in all your refrigeration needs.

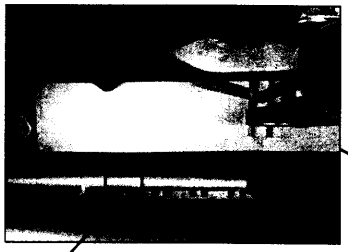
Patented Thermal-Pak® Coil Design

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

U.S. Patent No. 4,755,331

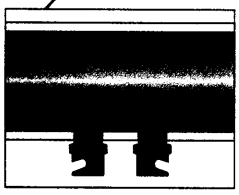
Thermal-Pak® Coil by EVAPCO

Round Tube Coil by Others



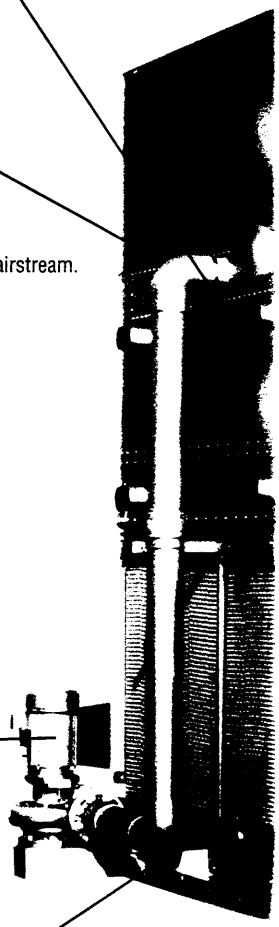
Efficient Drift Eliminators

- Advanced design removes mist from leaving airstream.
- Corrosion resistant PVC for long life.



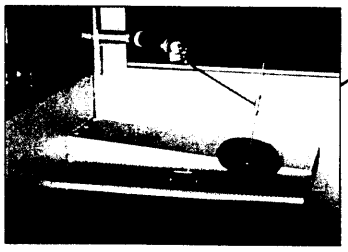
PVC Spray Distribution Header with ABS Nozzles

- Nozzles are threaded to assure proper orientation.
- "Anti-Sludge Ring" reduces maintenance.
- Large orifice nozzles prevent clogging.



Totally Enclosed Pump Motors

- Help assure long, trouble-free operation.



Stainless Steel Strainers

- Resists corrosion better than other materials.

ATC & UBC Design and Construction Features

The ATC and UBC line of evaporative condensers reflects EVAPCO's commitment to product development. Their advanced design provides owners with many operational and performance advantages.

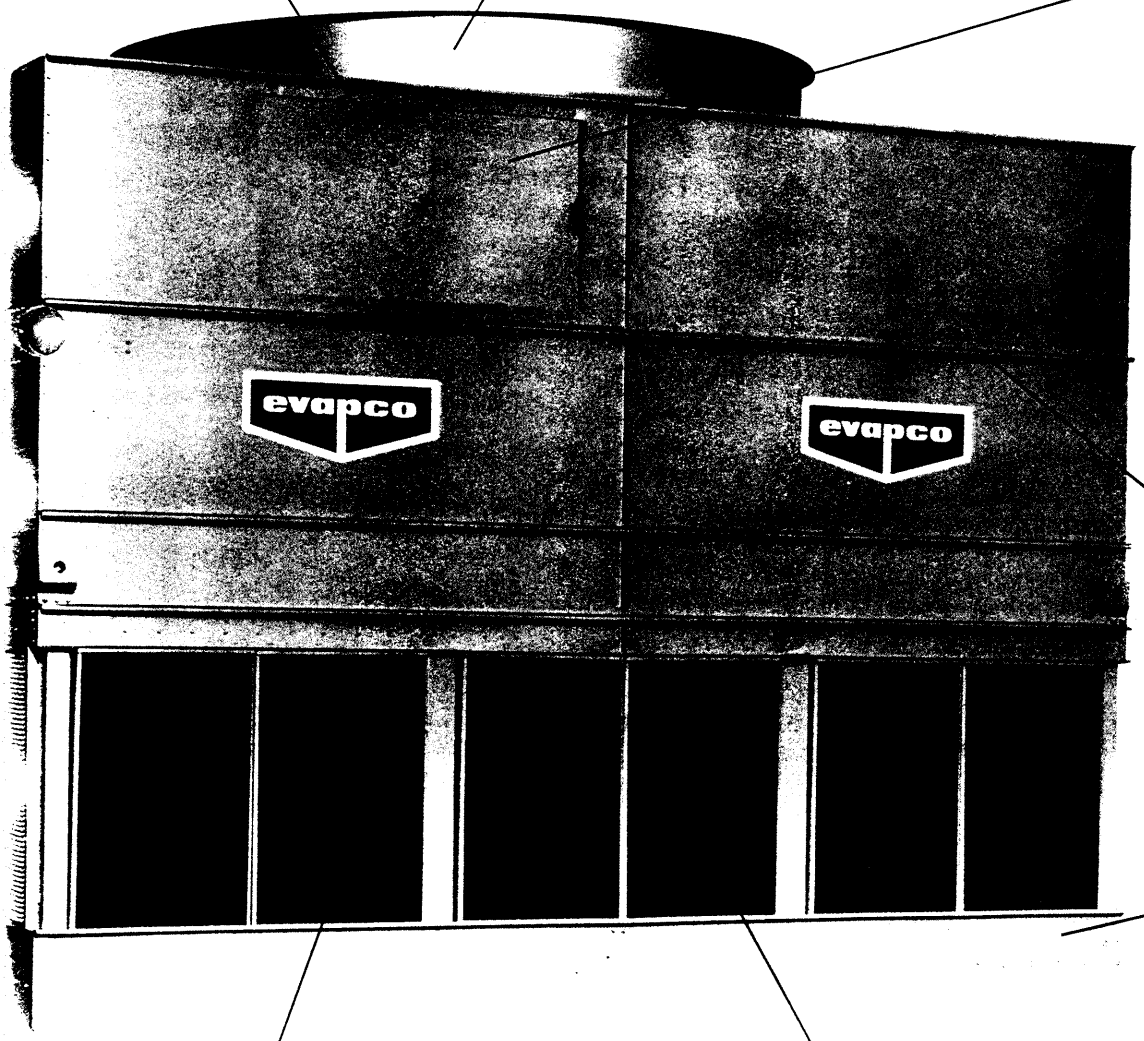
These induced draft, counterflow condensers are designed for easy maintenance and long, trouble-free operation.

Totally Enclosed Fan Motors

- Assures long life.
- Covered by 5 Year Warranty.

Unique Fan Drive System

- Power-Band Belts for Better Lateral Rigidity.
- Advanced Design Aluminum Fan Blades.
- Non-corroding Cast Aluminum Sheaves.
- Heavy-Duty Fan Shaft Bearings with L-10 life of 75,000 - 135,000 hrs.
- All Other Components Corrosion Resistant Materials.
- All Components Covered by 5 Year Warranty.



Easy to Service Motor Mount Design

- All normal maintenance can be performed quickly from outside the unit.
- No tools required for belt adjustment.
- Extended lube lines for easy bearing lubrication.
- If required, motor may be easily removed.

Double-Brake Flange Joints

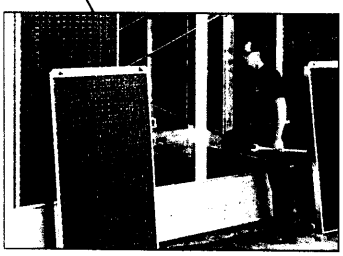
- Stronger than single-brake designs by others.
- Minimizes water leaks at field joints.
- Greater structural integrity.

G-235 Heavy Mill-Dip Galvanized Steel Construction

(Stainless steel available as affordable option)

Large Area Inlet Louvers

- Easily removable for access.
- Designed to keep sunlight out–preventing biological growth.
- Keeps dirt and debris out of unit.



Most Accessible Basin

- Access from all four sides.
- Large open area simplifies maintenance.
- Basin may be inspected with pumps running.

Induced Draft Fan Drive Systems

Direct Drive Units - 4' Wide Models

ATC-50 to ATC-165

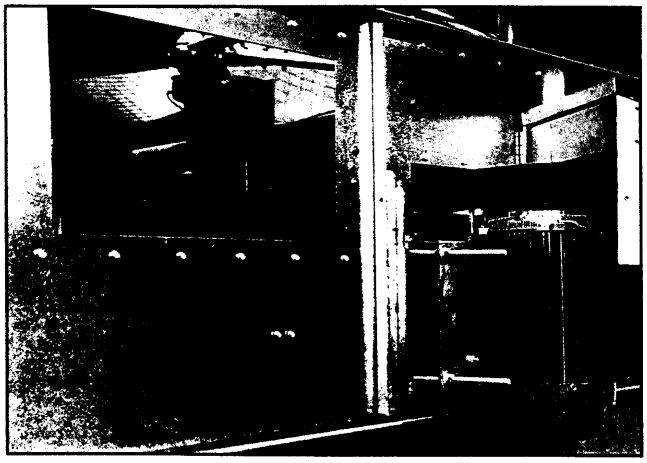
The smaller size units are equipped with a direct drive fan system. The aluminum alloy fan is mounted on a totally enclosed motor for the ultimate in simplicity with the fewest moving parts.

Direct Drive Fan System

Belt Drive Units - 8' Wide Models

ATC-180 to ATC-535
UBC-180 to UBC-535

The fan motor and drive assembly on these units is designed to allow easy servicing of the motor and adjustment of the belt tension from the exterior of the unit. A T.E.F.C. fan motor is mounted on the outside of models 180 through 535. A protective cover swings away to allow servicing and belt adjustment.

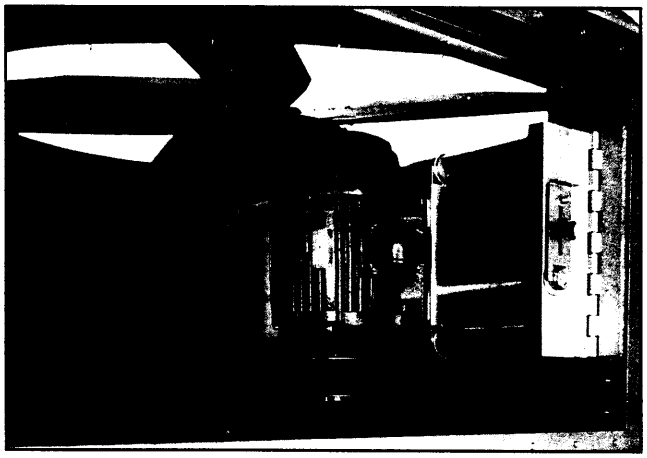


External Motor Mount

Belt Drive Units - 12' & 24' Wide Models

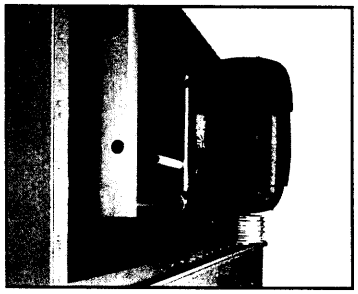
ATC-420 to ATC-3225
UBC-420 to UBC-3225

The fan motor and drive assembly on models ATC and UBC-420 to 3225 is also designed to allow easy servicing of the motor and adjustment of the belt tension from the exterior of the unit. The T.E.A.O. fan motor is located inside the fan casing on a rugged heavy duty motor base. The innovative motor base also features a unique locking mechanism for a positive adjustment.



Motor Base Assembly

The motor base is designed to swing out through a very large, 14 square foot access opening. This allows for easy servicing of the motor.



Motor Access

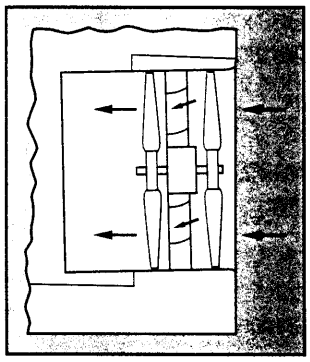
Power- Band Drive Belt: The Power-Band is a solid-back, multigroove belt system that has high lateral rigidity. The proven drive system is used in ATC and UBC models 180 through 3225. The belt is constructed of neoprene with polyester cords. The drive belt is designed for 150 percent of the motor nameplate horsepower for long life and durability.
Fan Shaft Bearings: The fan shaft bearings in ATC and UBC units are specially selected for long, trouble-free life. They are rated for an L-10 life of 75,000 to 135,000 hours and are the heaviest pillow block bearing available.
Aluminum Alloy Sheaves: Fan sheaves are constructed of corrosion free aluminum for long life. The aluminum also helps belts last longer.
Five Year Drive Warranty: All drive components on ATC and UBC units are covered by Evapco's exclusive 5 year drive warranty - including fan motors!!

Forced Draft Fan Drive Systems

PMCB Condensers

Vane Axial Fan Assembly

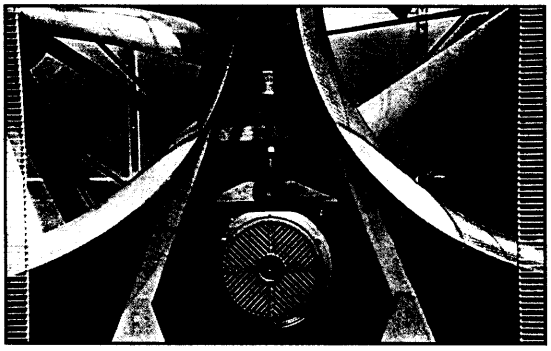
The PMCB models utilize two stage, vane axial fans for highly efficient operation. The fans are installed in a closely fitted cowl with a venturi inlet and advanced design guide vanes between stages, which help direct the flow and increase efficiency. Fans are constructed of heavy-duty cast aluminum and are virtually corrosion-free.



Two Stage Fan

PMCB Fan Motor Mount

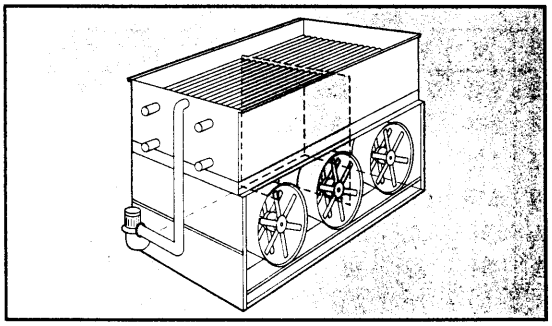
Evapco's tandem TEFC motor mount assembly allows for two fans to be operated with one motor for simplicity. Routine maintenance is easily performed. If redundancy is a concern, individual fan motor drives are available as an option on PMCB models.



Tandem Fan Drive Motor Mount

Internal Baffles

As a standard feature, all Evapco condensers with multiple motors are provided with an internal baffle system which extends from the pan bottom vertically through the coil bundle. This allows the user to cycle fan motors independently to match system load without the harmful effects of air by-pass.

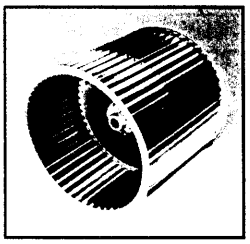


Internal Baffles

LSCB Condensers

Centrifugal Fan Assembly

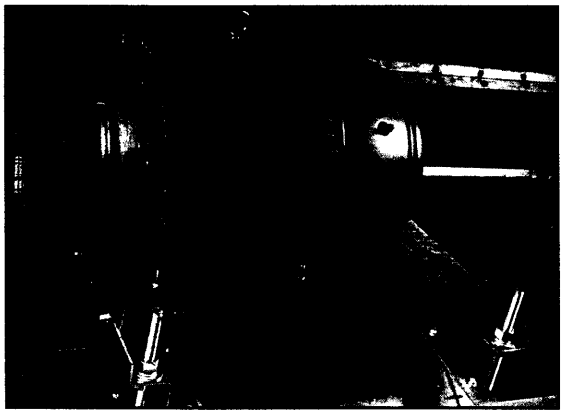
Fans on LSCB condensers are of the forward curved centrifugal design with hot-dip galvanized steel construction. All fans are statically and dynamically balanced and are mounted in a hot-dip galvanized steel housing.



Centrifugal Fan

LSCB Fan Motor Mount

TEFC fan motors are mounted in a convenient open area for ease of belt tensioning, motor lubrication, and electrical connection. The fan motor and drive are under a protective cover for safety and to protect them from the elements.



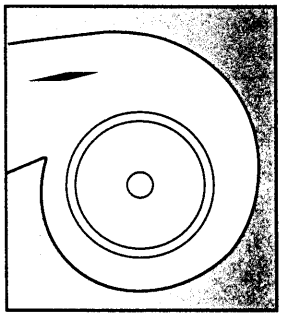
Centrifugal Fan Motor Mount

Capacity Control Dampers & Pony Motors

In addition to two speed fan motors, variable frequency drives, (VFD's), or cycling fan motors on multiple motor units, LSCB condensers have two other types of capacity control options available to them; Pony motors, and capacity control fan dampers.

Pony motors utilize a smaller fan motor in conjunction with the primary motor for use in times of reduced loading. This pony motor is typically 1/4 the hp of the primary motor, and can significantly reduce energy requirements.

Capacity control fan dampers are located directly in the fan housings. They control head pressure by modulating the air flow through the unit to match the capacity of the condenser to the system load.



Fan Dampers

Selection Procedure

Two methods of selection are presented, the first is based on the total heat of rejection as described immediately below. The second and more simple method is based on evaporator tons. The evaporator ton method is only applicable to systems with open type reciprocating compressors.

The heat of rejection method is applicable to all but centrifugal compressor applications and is normally used for selecting evaporative condensers for use with hermetic compressors and screw compressors. It can also be used for standard open type reciprocating compressors as an alternate to the evaporator ton method.

The evaporator ton method is based on the estimated heat of compression. **The heat of rejection method of selection is more accurate and should be used whenever possible.**

Refer to the factory for selections on systems with centrifugal compressors.

Heat of Rejection Method

In the heat of rejection method, a factor for the specified operating conditions (condensing temperature and wet bulb) is obtained from Table 1 or 2 and multiplied times the heat of rejection. The resultant figure is used to select a unit from Table 3. Unit capacities are given in Table 3 in thousands of BTU/Hr or MBH.

If the heat of rejection is not known, it can be determined by one of the following formulaes:

Open Compressors:

Heat of Rejection = Evaporator Load (BTU/Hr) + Compressor BHP x 2545

Hermetic Compressors:

Heat of Rejection = Evaporator Load (BTU/Hr) + K.W. Compressor Input x 3415

EXAMPLE

Given: 450 ton load, ammonia refrigerant 96.3° condensing temperature, 78° W.B. temperature and 500 compressor BHP.

Selection: Heat of Rejection

450 tons x 12000 = 5,400,000 BTU/Hr

500 BHP x 2545 = 1,272,500 BTU/Hr

Total 6,672,500 BTU/Hr

From Table 1 the capacity factor for 96.3° condensing and 78° W.B. = 1.37 6,672,500 x 1.37 = 9,141,325 BTU/Hr or 9142 MBH. Therefore, select a model ATC or UBC-630, PMCB-630 or LSCB-625.

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

Condensing Pres. psig		Cond. Temp. °F	Wet Bulb Temperature, (°F)																	
HCFC-22	HFC 134a		50	55	60	62	64	66	68	70	72	74	75	76	77	78	80	82	84	86
156	95	85	1.10	1.22	1.39	1.50	1.61	1.75	1.93	2.13	2.42	2.78	3.02	3.29	3.64	4.00	-	-	-	-
168	104	90	.93	1.02	1.14	1.21	1.28	1.36	1.45	1.57	1.71	1.89	2.00	2.12	2.25	2.38	2.85	3.50	-	-
182	114	95	.80	.87	.95	1.00	1.05	1.10	1.15	1.22	1.31	1.40	1.45	1.50	1.56	1.64	1.82	2.07	2.37	2.77
196	124	100	.71	.76	.82	.85	.88	.91	.94	.98	1.03	1.09	1.12	1.15	1.20	1.24	1.34	1.46	1.63	1.82
211	135	105	.63	.66	.70	.72	.75	.77	.80	.83	.87	.91	.93	.95	.97	1.00	1.06	1.13	1.23	1.35
226	146	110	.56	.59	.62	.64	.65	.67	.69	.71	.74	.77	.78	.80	.82	.84	.88	.93	.98	1.04

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

Condensing Pres. psig	Cond. Temp. °F	Wet Bulb Temperature, (°F)																	
		50	55	60	62	64	66	68	70	72	74	75	76	77	78	80	82	84	86
152	85	.98	1.09	1.24	1.34	1.44	1.56	1.72	1.90	2.16	2.48	2.70	2.94	3.25	3.57	-	-	-	-
166	90	.83	.91	1.02	1.08	1.14	1.21	1.29	1.40	1.53	1.69	1.79	1.89	2.01	2.12	2.54	3.12	-	-
181	95	.71	.78	.85	.89	.94	.98	1.03	1.09	1.17	1.25	1.29	1.34	1.39	1.47	1.63	1.85	2.12	2.47
185	96.3	.69	.75	.82	.86	.90	.94	.98	1.03	1.10	1.18	1.22	1.26	1.31	1.37	1.51	1.71	1.94	2.25
197	100	.63	.68	.73	.76	.79	.81	.84	.87	.92	.97	1.00	1.03	1.07	1.11	1.20	1.30	1.46	1.63
214	105	.56	.59	.62	.64	.67	.69	.71	.74	.78	.81	.83	.85	.87	.89	.95	1.01	1.10	1.21
232	110	.50	.53	.55	.57	.58	.60	.62	.63	.66	.69	.70	.71	.73	.75	.79	.83	.87	.93

Table 3 - Unit Heat Rejection

ATC & UBC Models			
Model	MBH Base	Model	MBH Base
50	735	830	12,201
65	956	860	12,642
80	1,176	890	13,083
90	1,323	920	13,524
105	1,544	1010	14,847
120	1,764	1075	15,803
135	1,985	1090	16,023
150	2,205	1110	16,317
165	2,426	1240	18,228
180	2,646	1265	18,596
200	2,940	1310	19,257
210	3,087	1335	19,625
230	3,381	1370	20,139
260	3,822	1395	20,507
285	4,190	1435	21,095
320	4,704	1460	21,462
345	5,072	1500	22,050
370	5,439	1530	22,491
415	6,101	1575	23,153
420	6,174	1605	23,594
440	6,468	1625	23,888
460	6,762	1655	24,329
485	7,130	1690	24,843
490	7,203	1720	25,284
505	7,424	1735	25,505
520	7,644	1800	26,460
535	7,865	1915	28,151
540	7,938	1980	29,106
560	8,232	2100	30,870
580	8,526	2370	34,839
630	9,261	2500	36,750
670	9,849	2615	38,441
700	10,290	2740	40,278
730	10,731	2860	42,042
765	11,246	3010	44,247
800	11,760	3225	47,408

PMCB Models			
Model	MBH Base	Model	MBH Base
175	2,573	725	10,658
190	2,793	755	11,099
210	3,087	770	11,319
220	3,234	775	11,393
235	3,455	805	11,834
240	3,528	815	11,981
250	3,675	850	12,495
275	4,043	855	12,569
290	4,263	885	13,010
295	4,337	910	13,377
325	4,778	935	13,745
330	4,851	950	13,965
335	4,925	960	14,112
350	5,145	985	14,480
360	5,292	1000	14,700
375	5,513	1015	14,921
385	5,660	1018	14,965
390	5,733	1030	15,141
415	6,101	1060	15,582
425	6,248	1075	15,803
435	6,395	1080	15,876
450	6,615	1105	16,244
455	6,689	1110	16,317
475	6,983	1120	16,464
480	7,056	1165	17,126
495	7,277	1175	17,273
510	7,497	1260	18,522
535	7,865	1320	19,404
540	7,938	1380	20,286
560	8,232	1410	20,727
580	8,526	1485	21,830
585	8,600	1510	22,197
600	8,820	1540	22,638
630	9,261	1550	22,785
645	9,482	1630	23,961
660	9,702	1710	25,137
690	10,143	1770	26,019
705	10,364		

LSCB Models			
Model	MBH Base	Model	MBH Base
36	529	400	5,880
41	603	430	6,321
48	706	450	6,615
54	794	480	7,056
65	956	500	7,350
70	1,029	515	7,571
75	1,103	550	8,085
80	1,176	590	8,673
90	1,323	625	9,188
100	1,470	650	9,555
110	1,617	690	10,143
120	1,764	720	10,584
135	1,985	755	11,099
150	2,205	800	11,760
155	2,279	805	11,834
170	2,499	860	12,642
185	2,720	900	13,230
200	2,940	960	14,112
210	3,087	1000	14,700
225	3,308	1030	15,141
240	3,528	1100	16,170
250	3,675	1180	17,346
280	4,118	1250	18,375
300	4,410	1310	19,257
315	4,631	1380	20,286
335	4,925	1440	21,168
355	5,219	1510	22,197
370	5,439	1610	23,667
385	5,660		

Note: Table 3 presents only the current standard model line selections. Other models exist for special horsepower or layout applications.

Evaporator Ton Method

In the evaporator ton method, factors for the specified operating conditions (suction temperature, condensing temperature and wet bulb) are obtained from either Table 5 or 6 and multiplied times the heat load in tons. The resultant figure is used to select a unit from Table 4. The condenser model in Table 4 is equal to the unit capacity in evaporator tons for HCFC-22 or HFC-134a conditions of 105°F condensing, 40°F suction and 78° wet bulb.

For other conditions, or for ammonia, R-717 refrigerant, obtain the capacity factors from either Table 5 or 6 and multiply times the evaporator load in tons to determine the correct tons required.

EXAMPLE

Given: 300 ton evaporator load, R-717, condensing at 95° F, with +10° F suction and 76° F wet bulb temperatures.

Selection: The capacity factor from Table 6 for the given condensing and wet bulb conditions is 1.38, and the capacity factor for the suction temperature of +10° F is 1.03, so the corrected capacity required may be determined as:

300 X 1.38 X 1.03 = 426 corrected tons. therefore select a model ATC or UBC-440, PMCB-435 or LSCB-430 depending on unit type desired, and any layout or horsepower considerations.

Table 4 - Unit Sizes

ATC & UBC Models				PMCB Models				LSCB Models		
50	415	830	1575	175	425	725	1075	36	225	650
65	420	860	1605	190	435	755	1080	41	240	690
80	440	890	1625	210	450	770	1105	48	250	720
90	460	920	1655	220	455	775	1110	54	280	755
105	485	1010	1690	235	475	805	1120	65	300	800
120	490	1075	1720	240	480	815	1165	70	315	805
135	505	1090	1735	250	495	850	1175	75	335	860
150	520	1110	1800	275	510	855	1260	80	355	900
165	535	1240	1915	290	535	885	1320	90	370	960
180	540	1265	1980	295	540	910	1380	100	385	1000
200	560	1310	2100	325	560	935	1410	110	400	1030
210	580	1335	2370	330	580	950	1485	120	430	1100
230	630	1370	2500	335	585	960	1510	135	450	1180
260	670	1395	2615	350	600	985	1540	150	480	1250
285	700	1435	2740	360	630	1000	1550	155	500	1310
320	730	1460	2860	375	645	1015	1630	170	515	1380
345	765	1500	3010	385	660	1018	1710	185	550	1440
370	800	1530	3225	390	690	1030	1770	200	590	1510
				415	705	1060		210	625	1610

Table 5 - HCFC-22 and HFC-134a Capacity Factors

Condensing Pres. psig		Cond. Temp. °F	Wet Bulb Temperature, (°F)																
HCFC-22	HFC 134a		50	55	60	62	64	66	68	70	72	74	75	76	77	78	80	82	84	86
156	95	85	1.05	1.16	1.32	1.43	1.53	1.66	1.83	2.02	2.30	2.64	2.87	3.13	3.46	3.80	-	-	-	-
168	104	90	.90	.98	1.10	1.17	1.24	1.31	1.40	1.52	1.65	1.82	1.93	2.05	2.17	2.30	2.75	3.38	-	-
182	114	95	.78	.85	.93	.98	1.02	1.07	1.12	1.19	1.28	1.37	1.42	1.46	1.52	1.60	1.78	2.02	2.31	2.70
196	124	100	.70	.75	.81	.84	.87	.90	.93	.97	1.02	1.08	1.11	1.14	1.19	1.23	1.33	1.44	1.61	1.80
211	135	105	.63	.66	.70	.72	.75	.77	.80	.83	.87	.91	.93	.95	.97	1.00	1.06	1.13	1.23	1.35
226	146	110	.57	.60	.63	.65	.66	.68	.70	.72	.75	.78	.79	.81	.83	.85	.89	.94	.99	1.05

Suction Temp. °F		-20°	-10°	-0°	+10°	+20°	+30°	+40°	+50°
Suction Press. (psig)	HCFC-22	10.1	16.5	24.0	32.8	43.0	54.9	68.5	84.0
	HFC-134a	-1.8	1.9	6.5	11.9	18.4	26.1	35.0	45.4
Capacity Factor		1.22	1.17	1.13	1.09	1.06	1.03	1.00	0.97

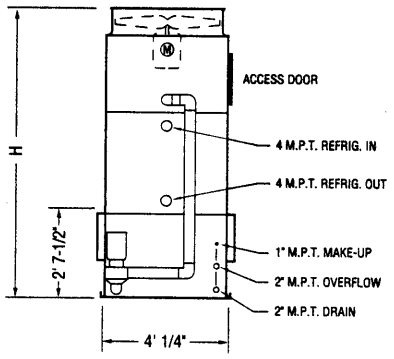
Table 6 - Ammonia (R-717) Capacity Factors

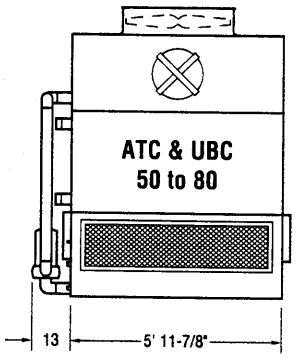
Condensing Pres. psig	Cond. Temp. °F	Wet Bulb Temperature, (°F)																	
		50	55	60	62	64	66	68	70	72	74	75	76	77	78	80	82	84	86
152	85	.99	1.09	1.25	1.34	1.44	1.57	1.73	1.91	2.17	2.49	2.71	2.95	3.26	3.59	-	-	-	-
166	90	.84	.93	1.03	1.10	1.16	1.23	1.32	1.42	1.55	1.71	1.81	1.92	2.04	2.16	2.59	3.17	-	-
181	95	.74	.80	.87	.92	.97	1.01	1.06	1.12	1.21	1.29	1.33	1.38	1.44	1.51	1.68	1.91	2.18	2.55
185	96.3	.72	.78	.85	.89	.93	.97	1.01	1.07	1.14	1.22	1.26	1.30	1.35	1.41	1.56	1.76	2.01	2.33
197	100	.66	.71	.76	.79	.82	.85	.87	.91	.96	1.01	1.04	1.07	1.12	1.15	1.25	1.36	1.52	1.69
214	105	.59	.62	.66	.68	.71	.73	.75	.78	.82	.86	.88	.90	.91	.94	1.00	1.07	1.16	1.27
232	110	.53	.56	.59	.61	.62	.64	.66	.68	.71	.73	.74	.76	.78	.80	.84	.89	.93	.99

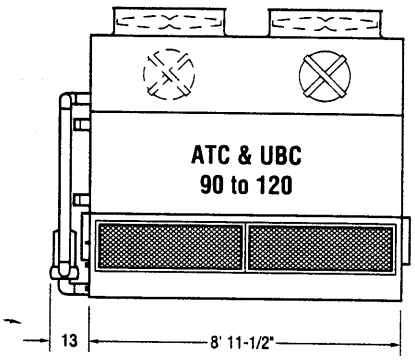
Suction Temp. °F	-30°	-20°	-10°	0°	+10°	+20°	+30°	+40°
Suction Press. (psig)	-1.6	3.6	9.0	15.7	23.8	33.5	45.0	58.6
Capacity Factor	1.18	1.14	1.10	1.07	1.03	1.00	0.97	0.95

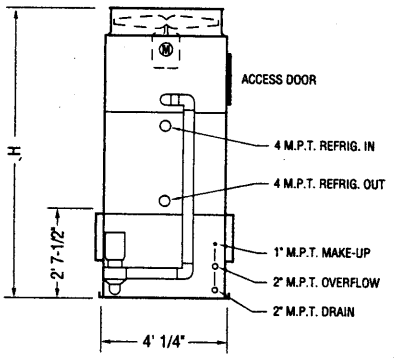
Note: Table 4 presents only the current standard model line selections. Other models exist for special horsepower or layout applications. Please consult the factory or your Evapco representative for these special situations.

Engineering Dimensions & Data *Models ATC & UBC 50 to 165*









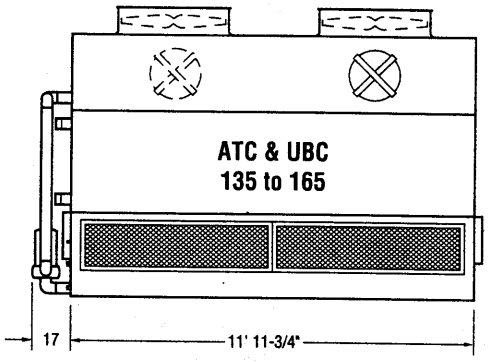


Table 7 Engineering Data

ATC & UBC Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Height
		HP	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd**	Conn. Size	
50	35	3	11,800	2,600	3,870	2,150	64	3/4	135	120	6"	8' 5-1/4"
65	46	5	12,600	3,030	4,340	2,570	85	3/4	135	120	6"	9' 3/4"
80	57	5	12,000	3,470	4,830	3,020	106	3/4	135	120	6"	9' 8-1/4"
90	64	(2)3	21,200	3,720	5,550	3,110	96	1	200	180	6"	8' 5-1/4"
105	74	(2)3	19,800	4,330	6,230	3,730	128	1	200	180	6"	9' 3/4"
120	85	(2)3	19,100	4,990	6,950	4,380	159	1	200	180	6"	9' 8-1/4"
135	96	(2)3	25,300	5,590	8,160	4,820	170	1-1/2	270	230	8"	9' 3/4"
150	106	(2)3	23,800	6,420	9,070	5,650	212	1-1/2	270	230	8"	9' 8-1/4"
165	117	(2)5	25,900	6,450	9,100	5,680	212	1-1/2	270	230	8"	9' 8-1/4"

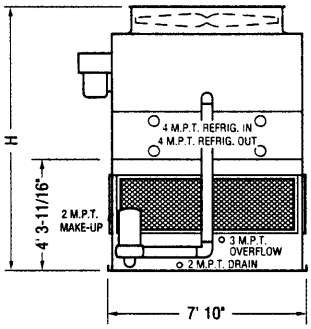
* Tons at standard conditions: HCFC-22 and HFC-134a. 105°F condensing, 40°F suction and 78°F W.B.; ammonia 96.3°F condensing, 20°F suction and 78°F W.B.

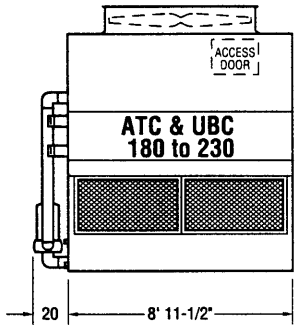
** Gallons shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation. (12" would normally be sufficient.)

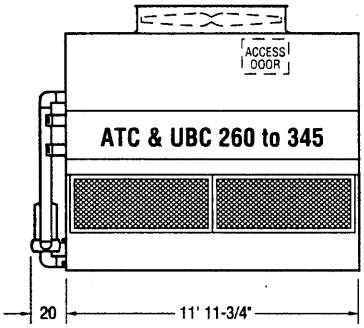
† Heaviest section is the coil section.

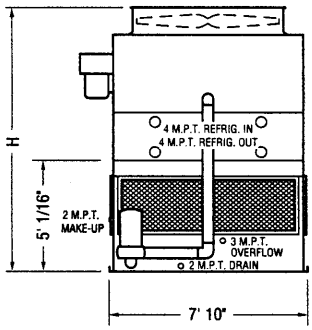
Refrigerant charge is shown for R-717. Multiply by 1.93 for R-22 and 1.98 for R-134a.

Models ATC & UBC 180 to 535









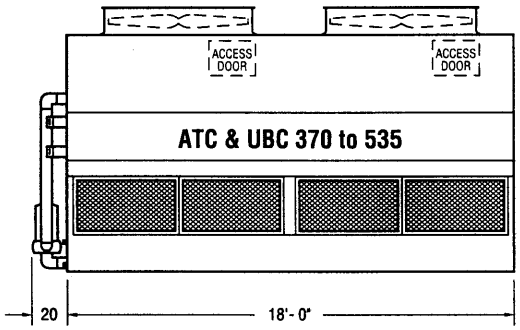


Table 8 Engineering Data

ATC & UBC Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Height
		HP††	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd**	Conn. Size	
180	128	10	40,500	7,250	10,280	6,030	191	2	405	250	8"	11' 1-3/4"
200	142	7-1/2	36,500	8,440	11,590	7,220	255	2	405	250	8"	11' 9-1/4"
210	149	10	38,500	8,470	11,620	7,250	255	2	405	250	8"	11' 9-1/4"
230	163	10	37,100	9,770	13,050	8,550	320	2	405	250	8"	12' 4-3/4"
260	184	10	46,500	11,280	15,550	9,320	340	3	545	340	10"	11' 9-1/4"
285	202	15	52,500	11,330	15,600	9,370	340	3	545	340	10"	11' 9-1/4"
320	227	15	51,000	12,950	17,390	10,990	425	3	545	340	10"	12' 4-3/4"
345	245	20	52,900	14,620	19,050	12,660	510	3	545	340	10"	13' 1/4"
370	262	(2)10	81,800	13,580	19,730	11,280	382	5	800	490	12"	11' 10-1/8"
415	294	(2) 7-1/2	73,600	15,990	22,390	13,690	510	5	800	490	12"	12' 5-5/8"
440	312	(2)10	78,000	16,050	22,450	13,750	510	5	800	490	12"	12' 5-5/8"
485	344	(2)10	74,900	18,480	25,140	16,180	640	5	800	490	12"	13' 1-1/8"
535	379	(2)15	80,900	20,890	27,810	18,590	766	5	800	490	12"	13' 8-5/8"

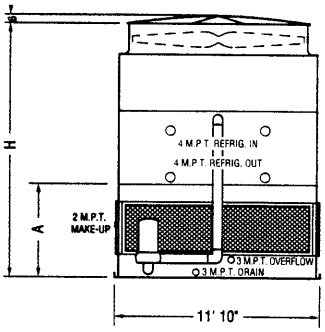
* Tons at standard conditions: HCFC-22 and HFC-134a. 105°F condensing, 40°F suction and 78°F W.B.; ammonia 96.3°F condensing, 20°F suction and 78°F W.B.

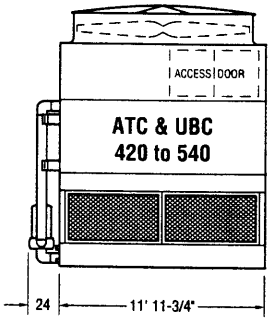
†† On Models ATC and UBC-180 to 535 the motors are shipped loose for field mounting.

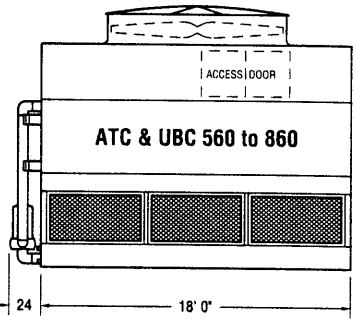
** Gallons shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation. (12" would normally be sufficient.)

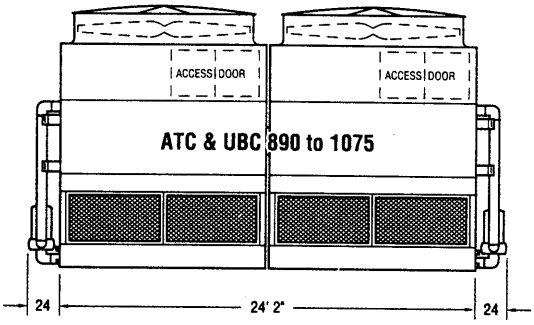
† Heaviest section is the coil section.
Refrigerant charge is shown for R-717. Multiply by 1.93 for R-22 and 1.98 for R-134a.

Engineering Dimensions & Data *Models ATC & UBC 420 to 1720*









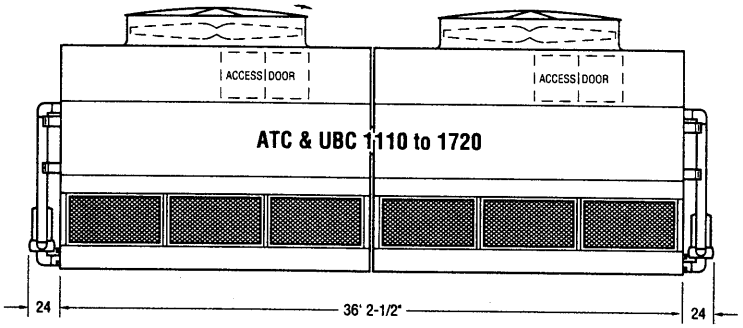


Table 9 Engineering Data

ATC & UBC Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Dimensions	
		HP	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd**	Conn. Size	A	Height
420	298	15	75,400	16,830	23,090	14,650	530	5	800	500	12"	5' 1/8"	13' 11-1/8"
460	326	25	84,200	16,950	23,210	14,770	530	5	800	500	12"	5' 1/8"	13' 11-1/8"
490	348	20	79,700	19,280	25,800	17,100	670	5	800	500	12"	5' 1/8"	14' 7-5/8"
505	358	25	82,000	19,360	25,880	17,180	670	5	800	500	12"	5' 1/8"	14' 7-5/8"
520	369	25	80,000	21,810	28,590	19,630	800	5	800	500	12"	5' 1/8"	15' 4-1/8"
540	383	30	82,700	21,930	28,710	19,750	800	5	800	500	12"	5' 1/8"	15' 4-1/8
560	397	25	122,000	20,880	29,800	17,410	600	7-1/2	1,200	720	12"	6' 1/8"	14' 2-5/8"
580	411	30	128,900	21,000	29,920	17,530	600	7-1/2	1,200	720	12"	6' 1/8"	14' 2-5/8"
630	447	20	115,600	24,620	33,940	21,150	800	7-1/2	1,200	720	12"	6' 1/8"	14' 11-1/8"
670	475	25	120,900	24,700	34,020	21,230	800	7-1/2	1,200	720	12"	6' 1/8"	14' 11-1/8"
700	496	30	124,600	24,820	34,140	21,350	800	7-1/2	1,200	720	12"	6' 1/8"	14' 11-1/8"
730	518	25	115,000	28,350	38,140	24,940	1,000	7-1/2	1,200	720	12"	6' 1/8"	15' 7-5/8"
765	543	30	120,900	28,470	38,260	25,060	1,000	7-1/2	1,200	720	12"	6' 1/8"	15' 7-5/8"
800	567	40	129,000	28,750	38,540	25,340	1,000	7-1/2	1,200	720	12"	6' 1/8"	15' 7-5/8"
830	589	40	125,100	32,460	42,720	29,050	1,200	7-1/2	1,200	720	12"	6' 1/8"	16' 4-1/8"
860	610	50	131,400	32,760	43,020	29,350	1,200	7 1/2	1,200	720	12"	6' 1/8"	16' 4-1/8"
890	631	(2)20	165,200	33,660	46,180	14,690	1,060	(2)5	1,600	1,000	(2)12"	6' 1/8"	14' 11-1/8"
920	652	(2)15	146,200	38,400	51,440	17,060	1,340	(2)5	1,600	1,000	(2)12"	6' 1/8"	15' 7-5/8"
1010	716	(2)25	165,000	38,640	51,680	17,180	1,340	(2)5	1,600	1,000	(2)12"	6' 1/8"	15' 7-5/8"
1075	762	(2)30	165,400	43,780	57,340	19,750	1,600	(2)5	1,600	1,000	(2)12"	6' 1/8"	16' 4-1/8"
1110	787	(2)25	244,000	41,860	59,700	17,410	1,200	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	15' 2-5/8"
1265	897	(2)20	234,800	49,340	67,980	21,150	1,600	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	15' 11-1/8"
1335	947	(2)25	241,300	49,500	68,140	21,230	1,600	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	15' 11 1/8"
1395	989	(2)30	249,300	49,740	68,380	21,350	1,600	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	15' 11 1/8"
1460	1035	(2)25	230,500	56,800	76,380	24,940	2,000	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	16' 7-5/8"
1530	1085	(2)30	241,800	57,040	76,620	25,060	2,000	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	16' 7-5/8"
1605	1138	(2)40	257,000	57,600	77,180	25,340	2,000	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	16' 7-5/8"
1655	1174	(2)40	250,100	65,020	85,540	29,050	2,400	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	17' 4-1/8"
1720	1220	(2)50	262,700	65,620	86,140	29,350	2,400	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	17' 4-1/8"

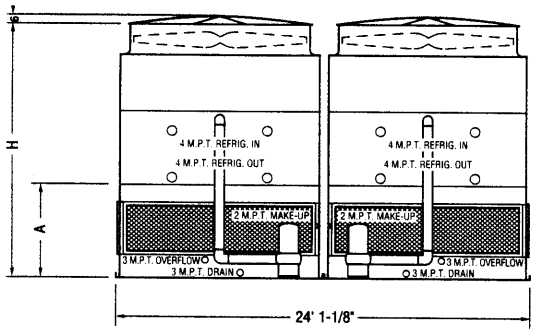
* Tons at standard conditions: HCFC-22 and HFC-134a. 105°F condensing, 40°F suction and 78°F W.B.; ammonia 96.3°F condensing, 20°F suction and 78°F W.B.

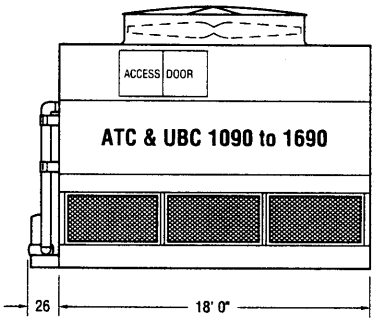
** Gallons shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation. (12" would normally be sufficient.)

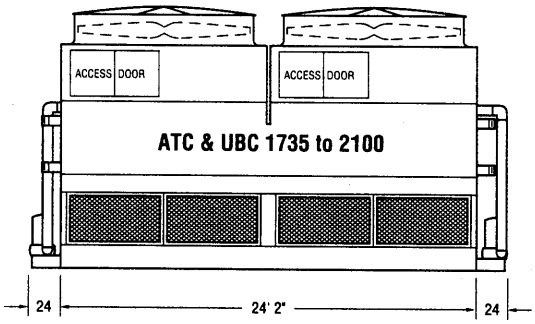
† Heaviest section is the coil section.

Refrigerant charge is shown for R-717. Multiply by 1.93 for R-22 and 1.98 for R-134a.

Models ATC & UBC 1090 to 3225







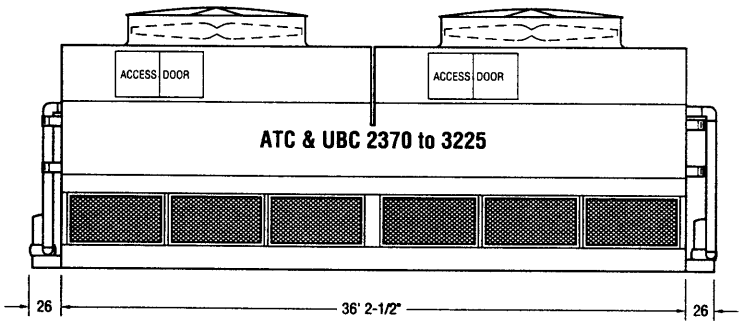


Table 10 Engineering Data

ATC & UBC Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Dimensions	
		HP	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd**	Conn. Size	A	Height
1090	773	(2)25	243,000	41,820	59,660	17,410	1,200	(2) 7-1/2	2,400	1,440	(2)12"	7'1/8"	15'2-5/8"
1240	879	(2)20	231,900	49,300	67,940	21,150	1,600	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	15' 11-1/8"
1310	929	(2)25	239,000	49,460	68,100	21,230	1,600	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	15'11-1/8"
1370	972	(2)30	248,300	49,700	68,340	21,350	1,600	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	15' 11-1/8"
1435	1018	(2)25	230,000	56,760	76,340	24,940	2,000	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	16' 7-5/8"
1500	1064	(2)30	239,600	57,000	76,580	25,060	2,000	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	16' 7-5/8"
1575	1117	(2)40	256,700	57,560	77,140	25,340	2,000	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	16' 7-5/8"
1625	1152	(2)40	249,500	64,980	85,500	29,050	2,400	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	17' 4-1/8"
1690	1199	(2)50	260,000	65,580	86,100	29,350	2,400	(2) 7-1/2	2,400	1,440	(2)12"	7' 1/8"	17' 4-1/8"
1735	1230	(4)20	322,300	67,420	92,460	14,690	2,120	(4)5	3,200	2,000	(4)12"	8' 2-1/8"	17' 1-1/8"
1800	1277	(4)15	290,800	76,900	102,980	17,060	2,680	(4)5	3,200	2,000	(4)12"	8' 2-1/8"	17' 9-5/8"
1915	1358	(4)20	312,700	77,060	103,140	17,100	2,680	(4)5	3,200	2,000	(4)12"	8' 2-1/8"	17' 9-5/8"
1980	1404	(4)25	328,900	77,380	103,460	17,180	2,680	(4)5	3,200	2,000	(4)12"	8' 2-1/8"	17' 9-5/8"
2100	1489	(4)30	329,000	87,660	114,780	19,750	3,200	(4)5	3,200	2,000	(4)12"	8' 2-1/8"	18' 6-1/8"
2370	1681	(4)20	445,600	98,520	135,800	21,150	3,200	(4) 7-1/2	4,800	2,880	(4)12"	8' 2-1/8"	17' 1-1/8"
2500	1773	(4)25	457,500	98,840	136,120	21,230	3,200	(4) 7-1/2	4,800	2,880	(4)12"	8' 2-1/8"	17' 1-1/8"
2615	1855	(4)30	473,000	99,320	136,600	21,350	3,200	(4) 7-1/2	4,800	2,880	(4)12"	8' 2-1/8"	17' 1-1/8"
2740	1943	(4)25	435,700	113,440	152,600	24,940	4,000	(4) 7-1/2	4,800	2,880	(4)12"	8' 2-1/8"	17' 9-5/8"
2860	2028	(4)30	454,900	113,920	153,080	25,060	4,000	(4) 7-1/2	4,800	2,880	(4)12"	8' 2-1/8"	17' 9-5/8"
3010	2135	(4)40	484,600	115,040	154,200	25,340	4,000	(4) 7-1/2	4,800	2,880	(4)12"	8' 2-1/8"	17' 9-5/8"
3225	2287	(4)50	490,600	131,080	172,120	29,350	4,800	(4) 7-1/2	4,800	2,880	(4)12"	8' 2-1/2"	18' 6-1/8"

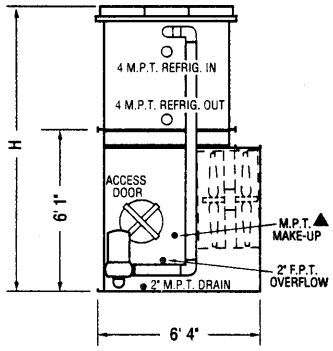
* Tons at standard conditions: HCFC-22 and HFC-134a. 105°F condensing, 40°F suction and 78°F W.B.; ammonia 96.3°F condensing, 20°F suction and 78°F W.B.

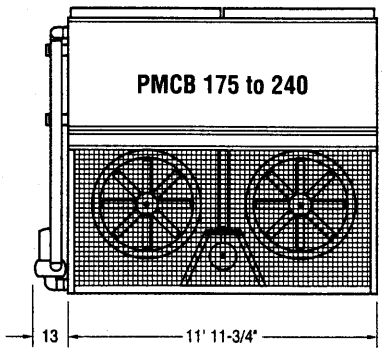
** Gallons shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation. (12" would normally be sufficient.)

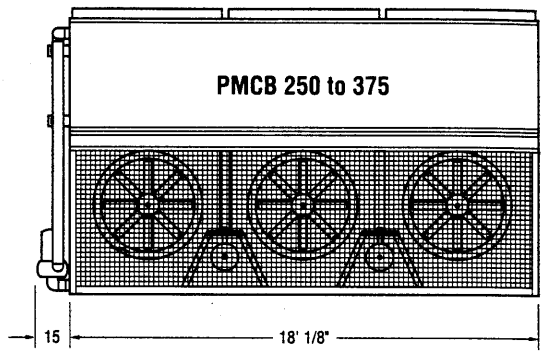
† Heaviest section is the coil section.

Refrigerant charge is shown for R-717. Multiply by 1.93 for R-22 and 1.98 for R-134a.

Engineering Dimensions & Data *Axial Fan Models PMCB 175 to 375*







▲ NOTE:
Make-Up 1" M.P.T. on PMCB 175 to 240
Make-Up 1-1/2 M.P.T. on PMCB 250 to 375

Table 11 Engineering Data

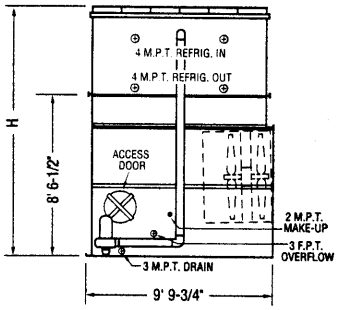
PMCB Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Height
		HP	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd**	Conn. Size	
175	124	7-1/2	31,300	7,850	10,120	5,470	220	2	345	240	8"	10'9-1/4"
190	135	10	34,000	7,980	10,250	5,470	220	2	345	240	8"	10' 9-1/4"
210	149	10	33,500	9,090	11,420	6,580	275	2	345	240	8"	11' 5-3/4"
220	156	10	33,000	10,110	12,490	7,700	330	2	345	240	8"	12' 2-1/4"
235	167	15	36,600	9,220	11,550	6,580	275	2	345	240	8"	11' 5-3/4"
240	170	15	35,500	10,240	12,620	7,700	330	2	345	240	8"	12' 2-1/4"
250	177	10 & 5	54,000	10,480	13,330	6,690	245	3	515	350	10"	10' 3/4"
275	195	7-1/2 & 5	48,500	12,030	14,970	8,330	330	3	515	350	10"	10' 9-1/4"
295	209	10 & 5	51,900	12,120	15,060	8,330	330	3	515	350	10"	10' 9-1/4"
325	230	10 & 5	50,900	13,830	16,860	9,990	410	3	515	350	10"	11' 5-3/4"
335	238	10 & 5	50,300	15,390	18,520	11,660	495	3	515	350	10"	12' 2-1/4"
360	255	15 & 7-1/2	57,000	14,040	17,070	9,990	410	3	515	350	10"	11' 5-3/4"
375	266	15 & 7-1/2	56,300	15,600	18,730	11,660	495	3	515	350	10"	12' 2-1/4"

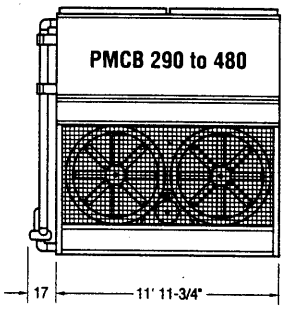
* Tons at standard conditions: HCFC-22 and HFC-134a. 105°F condensing, 40°F suction and 78°F W.B.; ammonia 96.3°F condensing, 20°F suction and 78°F W.B.

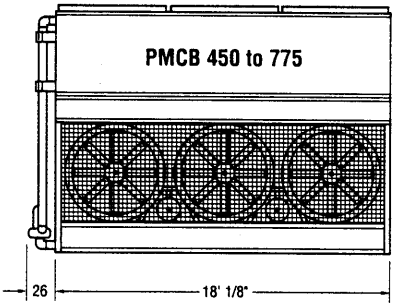
** Gallons shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation. (12" would normally be sufficient.)

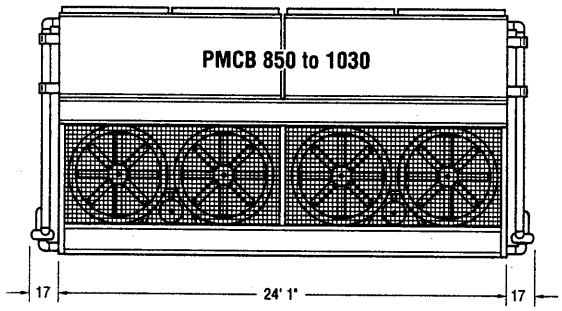
† Heaviest section is the coil section.
Refrigerant charge is shown for R-717. Multiply by 1.93 for R-22 and 1.98 for R-134a.

Axial Fan Models PMCB 290 to 1550









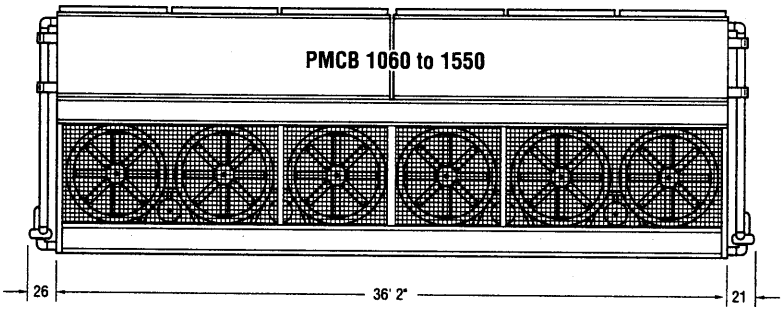


Table 12 Engineering Data

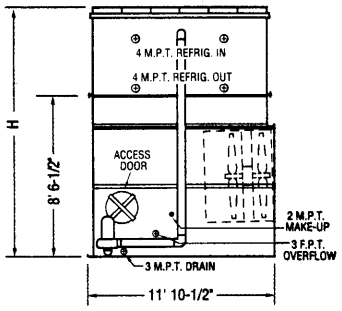
PMCB Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Height
		HP	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd**	Conn. Size	
290	206	10	62,300	12,870	18,530	8,530	330	5	685	420	10"	12' 6-1/4"
330	234	7-1/2	56,500	14,890	20,740	10,740	440	5	685	420	10"	13' 2-3/4"
350	248	10	61,600	14,980	20,830	10,740	440	5	685	420	10"	13' 2-3/4"
385	273	10	60,400	17,090	23,170	12,940	550	5	685	420	10"	13' 11-1/4"
390	277	15	67,800	15,130	20,980	10,740	440	5	685	420	10"	13' 2-3/4"
415	294	20	74,000	15,250	21,100	10,740	440	5	685	420	10"	13' 2-3/4"
425	301	15	66,100	17,240	23,320	12,940	550	5	685	420	10"	13' 11-1/4
455	323	20	72,500	17,360	23,440	12,940	550	5	685	420	10"	13' 11-1/4"
480	340	25	76,500	17,500	23,580	12,940	550	5	685	420	10"	13' 11-1/4"
450	319	10 & 5	96,500	19,030	27,180	12,380	490	7-1/2	1,030	620	12"	12' 6 1/4"
585	415	10 & 5	92,500	25,570	34,420	18,680	820	7-1/2	1,030	620	12"	13' 11-1/4"
630	447	20 & 10	112,700	22,710	31,210	15,500	660	7-1/2	1,030	620	12"	13' 2-3/4"
645	457	15 & 7-1/2	102,000	25,760	34,610	18,680	820	7-1/2	1,030	620	12"	13' 11-1/4"
690	489	20 & 10	109,300	25,910	34,760	18,680	820	7-1/2	1,030	620	12"	13' 11-1/4"
725	514	25 & 15	114,800	26,450	35,300	18,680	820	7-1/2	1,030	620	12"	13' 11-1/4"
755	535	25 & 15	114,000	29,390	38,590	21,870	990	7-1/2	1,030	620	12"	14' 7-3/4"
775	550	30 & 15	117,000	29,930	39,130	21,870	990	7-1/2	1,030	620	12"	14' 7-3/4"
850	603	(2)15	132,200	34,020	46,270	12,940	1,100	(2)5	1,370	850	12"	13' 11-1/4"
910	645	(2)20	145,000	34,260	46,510	12,940	1,100	(2)5	1,370	850	12"	13' 11-1/4"
950	674	(2)20	142,400	38,480	51,100	15,150	1,320	(2)5	1,370	850	12"	14' 7-3/4"
960	681	(2)25	153,000	34,540	46,790	12,940	1,100	(2)5	1,370	850	12"	13' 11-1/4"
1000	709	(2)25	150,000	38,760	51,380	15,150	1,320	(2)5	1,370	850	12"	14' 7-3/4"
1030	730	(2)30	154,200	39,080	51,700	15,150	1,320	(2)5	1,370	850	12"	14' 7-3/4"
1060	752	(2)10 & (2)5	185,700	44,260	61,380	15,500	1,320	(2)7-1/2	2,060	1,620	14"	13' 2-3/4"
1175	833	(2)15 & (2) 7-1/2	209,000	44,640	61,760	15,500	1,320	(2) 7-1/2	2,060	1,620	14"	13' 2-3/4"
1260	894	(2)20 & (2)10	225,400	44,960	62,080	15,500	1,320	(2)7-1/2	2,060	1,620	14"	13' 2-3/4"
1380	979	(2)20 & (2)10	218,600	51,360	69,180	18,680	1,640	(2)7-1/2	2,060	1,620	14"	13' 11-1/4"
1510	1071	(2)25 & (2)15	228,000	58,320	76,820	21,870	1,980	(2)7-1/2	2,060	1,620	14"	14' 7-3/4"
1550	1100	(2)30 & (2)15	234,000	59,400	77,900	21,870	1,980	(2)7-1/2	2,060	1,620	14"	14' 7-3/4"

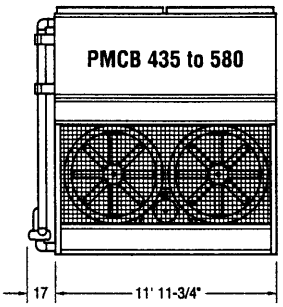
* Tons at standard conditions: HCFC-22 and HFC-134a. 105°F condensing, 40°F suction and 78°F W.B.; ammonia 96.3°F condensing, 20°F suction and 78°F W.B.

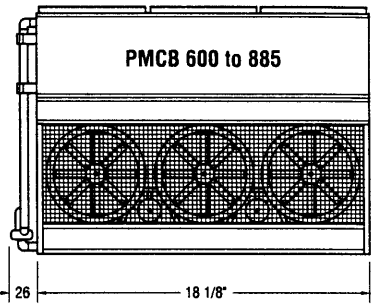
** Gallons shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation. (12" would normally be sufficient.)

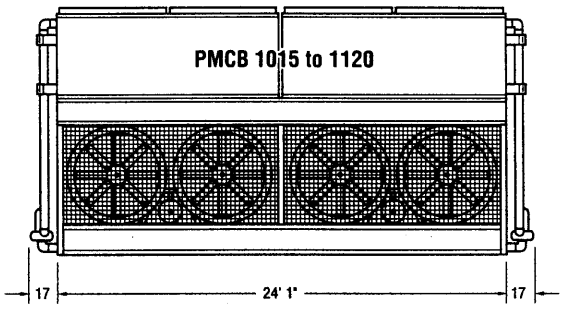
† Heaviest section is the coil section.
Refrigerant charge is shown for R-717. Multiply by 1.93 for R-22 and 1.98 for R-134a.

Engineering Dimensions & Data *Axial Fan Models PMCB 435 to 1770*









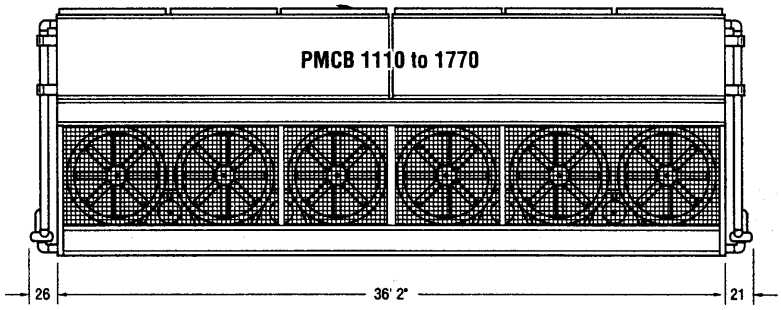


Table 13 Engineering Data

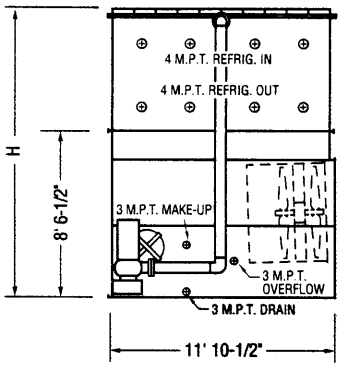
PMCB Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Height
		HP	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd**	Conn. Size	
435	309	15	74,100	18,000	24,410	13,150	530	5	800	500	10"	14' 2-3/4"
475	337	15	73,900	20,650	27,320	15,790	660	5	800	500	10"	14' 11-1/4"
495	351	25	87,200	18,260	24,670	13,150	530	5	800	500	10"	14' 2-3/4"
510	362	30	89,900	18,420	24,830	13,150	530	5	800	500	10"	14' 2-3/4"
535	379	25	85,000	20,910	27,580	15,790	660	5	800	500	10"	14' 11-1/4"
540	383	20	79,400	23,330	30,240	18,440	790	5	800	500	10"	15' 7-3/4"
560	397	25	84,000	23,470	30,380	18,440	790	5	800	500	10"	15' 7-3/4"
580	411	30	86,900	23,630	30,540	18,440	790	5	800	500	10"	15' 7-3/4"
600	426	20 & 10	129,000	22,700	31,520	15,180	600	7-1/2	1,200	730	12"	13' 6-1/4"
660	468	15 & 7-1/2	118,000	26,550	35,870	18,920	800	7-1/2	1,200	730	12"	14' 2-3/4"
705	500	20 & 10	125,500	26,710	36,030	18,920	800	7-1/2	1,200	730	12"	14' 2-3/4"
770	546	20 & 10	121,900	30,710	40,510	22,740	1,000	7-1/2	1,200	730	12"	14' 11-1/4"
805	571	20 & 10	120,800	34,350	44,650	26,560	1,200	7-1/2	1,200	730	12"	15' 7-3/4"
815	578	25 & 15	128,800	31,250	41,050	22,740	1,000	7-1/2	1,200	730	12"	14' 11-1/4"
855	606	30 & 15	135,000	31,410	41,210	22,740	1,000	7-1/2	1,200	730	12"	14' 11-1/4"
885	628	30 & 15	132,800	35,430	45,730	26,560	1,200	7-1/2	1,200	730	12"	15' 7-3/4"
1015	720	(2)20	160,000	40,990	54,600	15,790	1,320	(2)5	1,600	1,000	14"	14' 11-1/4"
1080	766	(2)20	158,800	46,110	60,210	18,440	1,580	(2)5	1,600	1,000	14"	14' 7-3/4"
1120	794	(2)25	168,000	46,390	60,490	18,440	1,580	(2)5	1,600	1,000	14"	15' 7-3/4"
1110	787	(2)15 & (2) 7-1/2	238,000	44,550	62,460	15,180	1,200	(2)7-1/2	2,400	1,460	16"	13' 6-1/4"
1320	936	(2)15 & (2)7-1/2	236,000	52,550	71,460	18,920	1,600	(2)7-1/2	2,400	1,460	16"	14' 2-3/4"
1410	1000	(2)20 & (2)10	251,000	52,870	71,780	18,920	1,600	(2)7-1/2	2,400	1,460	16"	14' 2-3/4"
1485	1053	(2)25 & (2)15	264,000	53,950	72,860	18,920	1,600	(2)7-1/2	2,400	1,460	16"	14' 2-3/4"
1540	1092	(2)30 & (2)15	274,000	54,270	73,180	18,920	1,600	(2)7-1/2	2,400	1,460	16"	14' 2-3/4"
1630	1156	(2)25 & (2)15	257,600	61,950	81,820	22,740	2,000	(2)7-1/2	2,400	1,460	16"	14' 11-1/4"
1710	1213	(2)30 & (2)15	270,000	62,270	82,140	22,740	2,000	(2)7-1/2	2,400	1,460	16"	14' 11-1/4"
1770	1255	(2)30 & (2)15	265,600	70,310	91,180	26,560	2,400	(2)7-1/2	2,400	1,460	16"	15' 7-3/4"

* Tons at standard conditions: HCFC-22 and HFC-134a. 105°F condensing, 40°F suction and 78°F W.B.; ammonia 96.3°F condensing, 20°F suction and 78°F W.B.

** Gallons 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. (12" would normally be sufficient.)

† 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.

Axial Fan Models PMCB 935 to 1165



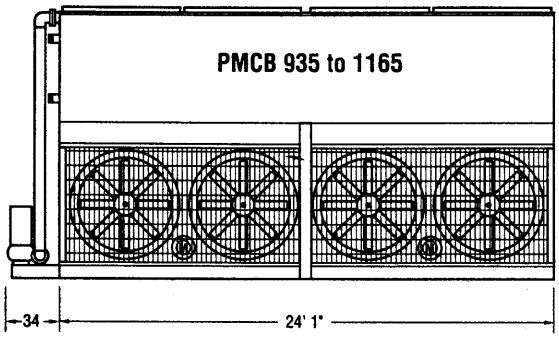


Table 14 Engineering Data

PMCB Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Height
		HP	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd**	Conn. Size	
935	663	(2)20	162,800	34,660	48,970	25,250	1,060	10	1,600	1,000	14"	14' 9-3/4"
985	699	(2)25	174,400	34,940	49,250	25,250	1,060	10	1,600	1,000	14"	14' 9-3/4"
1010	722	(2)20	160,800	39,260	53,930	29,850	1,320	10	1,600	1,000	14"	15' 7-3/4"
1075	762	(2)25	170,000	39,540	54,210	29,850	1,320	10	1,600	1,000	14"	15' 7-3/4"
1105	784	(2)30	176,600	39,860	54,530	29,850	1,320	10	1,600	1,000	14"	15' 7-3/4"
1165	826	(2)30	173,800	44,460	59,490	34,450	1,580	10	1,600	1,000	14"	16' 5-3/4"

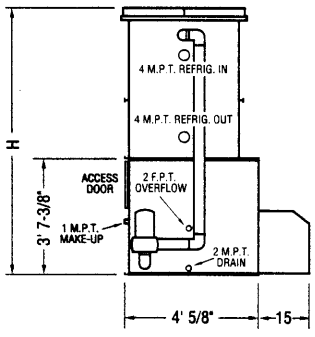
These units are available for ammonia applications only.

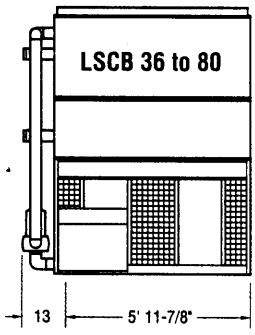
* Tons at standard conditions: ammonia 96.3° condensing, 20° suction and 78° W.B.

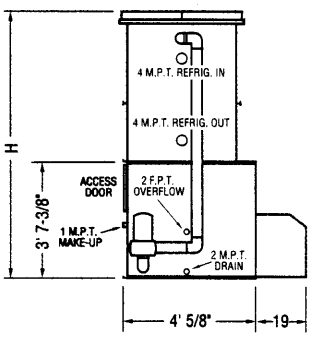
** Gallons shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation. (12" would normally be sufficient.)

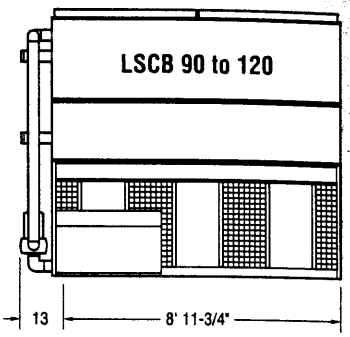
† Heaviest section is the coil section.
Refrigerant charge is shown for R-717. Multiply by 1.93 for R-22 and 1.98 for R-134a.

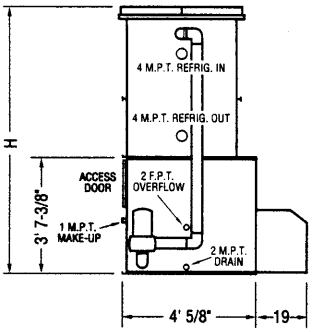
Engineering Dimensions & Data *Centrifugal Fan Models LSCB 36 to 170*











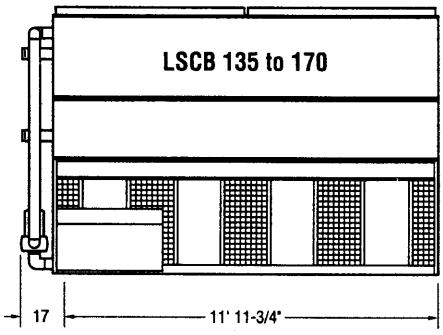


Table 15 Engineering Data

LSCB Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Height
		HP**	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd***	Conn. Size	
36	26	3	10,200	2,220	3,170	2,220	38	3/4	120	80	4"	6' 8-1/2"
41	29	5	12,000	2,280	3,230	2,280	38	3/4	120	80	4"	6' 8-1/2"
48	34	3	10,000	2,710	3,550	1,680	58	3/4	120	80	4"	7' 4"
54	38	5	11,800	2,790	3,630	1,680	58	3/4	120	80	4"	7' 4"
65	46	5	11,600	3,100	3,960	2,040	77	3/4	120	80	4"	7' 11-1/2"
70	50	7-1/2	13,000	3,190	4,050	2,040	77	3/4	120	80	4"	7' 11-1/2"
75	53	5	11,400	3,420	4,300	2,430	96	3/4	120	80	4"	8' 7"
80	57	7-1/2	12,800	3,570	4,450	2,430	96	3/4	120	80	4"	8' 7"
90	64	5	15,300	4,380	5,700	3,000	115	1	180	120	6"	7' 11-1/2"
100	71	7-1/2	17,400	4,520	5,840	3,000	115	1	180	120	6"	7' 11-1/2"
110	78	10	19,200	4,650	5,970	3,000	115	1	180	120	6"	7' 11-1/2"
120	85	10	18,800	5,050	6,390	3,590	144	1	180	120	6"	8' 7"
135	96	10	23,800	5,720	7,580	3,960	154	1-1/2	245	170	6"	7' 11-1/2"
150	106	15	26,600	5,840	7,700	3,960	154	1-1/2	245	170	6"	7' 11-1/2"
155	110	10	23,300	6,500	8,410	4,750	192	1-1/2	245	170	6"	8' 7"
170	121	15	26,100	6,650	8,560	4,750	192	1-1/2	245	170	6"	8' 7"

* Tons at standard conditions: HCFC-22 and HFC-134a. 105°F condensing, 40°F suction and 78°F W.B.; ammonia 96.3°F condensing, 20°F suction and 78°F W.B.

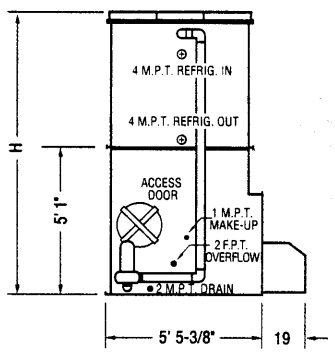
** For dry operation or for external static pressure up to 1/2" use next larger size fan motor.

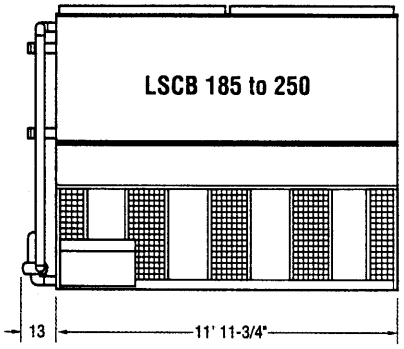
*** Gallons shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation. (12" would normally be sufficient.)

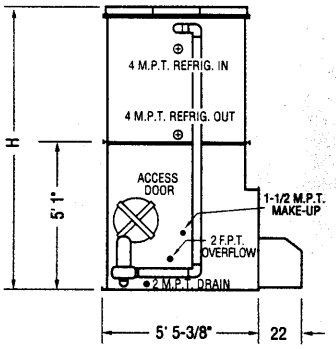
† Heaviest section is the coil section.

Refrigerant charge is shown for R-717. Multiply by 1.93 for R-22 and 1.98 for R-134a.

Centrifugal Fan Models LSCB 185 to 385







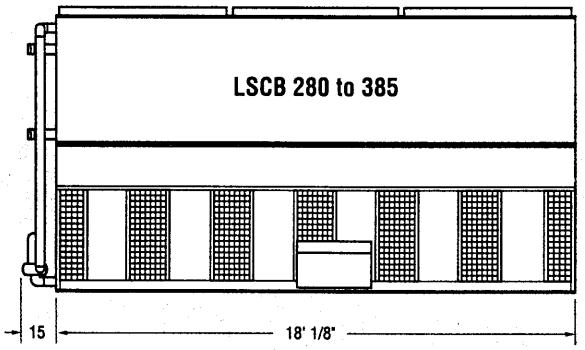


Table 16 Engineering Data

LSCB Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Height
		HP**	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd***	Conn. Size	
185	131	10	32,900	7,910	10,240	5,470	220	2	345	230	8"	9' 9-1/4"
200	142	15	35,700	8,060	10,390	5,470	220	2	345	230	8"	9' 9-1/4"
210	149	20	37,600	8,190	10,520	5,470	220	2	345	230	8"	9' 9-1/4"
225	160	15	34,700	9,070	11,470	6,580	275	2	345	230	8"	10' 5-3/4"
240	170	20	37,200	9,200	11,600	6,580	275	2	345	230	8"	10' 5-3/4"
250	177	20	36,800	10,210	12,670	7,700	330	2	345	230	8"	11' 2-1/4"
280	199	15	47,300	12,070	15,130	8,330	330	3	515	340	8"	9' 9-1/4"
300	213	20	52,000	12,200	15,260	8,330	330	3	515	340	8"	9' 9-1/4"
315	223	25	55,500	12,400	15,460	8,330	330	3	515	340	8"	9' 9-1/4"
335	238	20	50,400	13,770	16,900	9,990	410	3	515	340	8"	10' 5-3/4"
355	252	25	54,300	13,970	17,100	9,990	410	3	515	340	8"	10' 5-3/4"
370	262	30	57,700	14,120	17,250	9,990	410	3	515	340	8"	10' 5-3/4"
385	273	30	56,500	15,590	18,810	11,660	495	3	515	340	8"	11' 2-1/4"

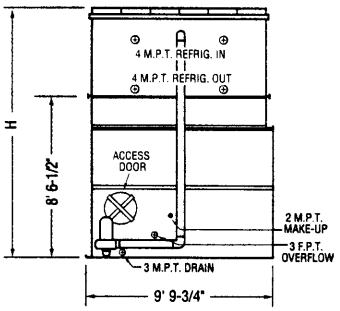
* Tons at standard conditions: HCFC-22 and HFC-134a. 105°F condensing, 40°F suction and 78°F W.B.; ammonia 96.3°F condensing, 20°F suction and 78°F W.B.

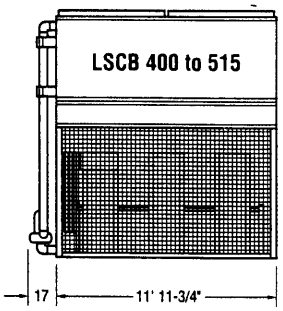
** For dry operation or for external static pressure up to 1/2" use next larger size fan motor.

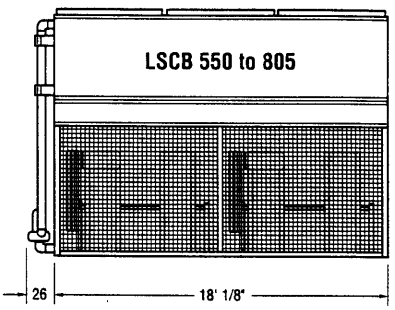
*** Gallons shown is water in suspension in unit and piping. Allow for additional water in bottom of remote sump to cover pump suction and strainer during operation. (12" would normally be sufficient.)

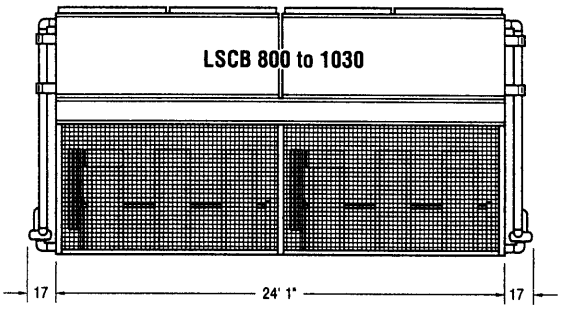
† Heaviest section is the coil section.
Refrigerant charge is shown for R-717. Multiply by 1.93 for R-22 and 1.98 for R-134a.

Engineering Dimensions & Data *Centrifugal Fan Models LSCB 400 to 1610*









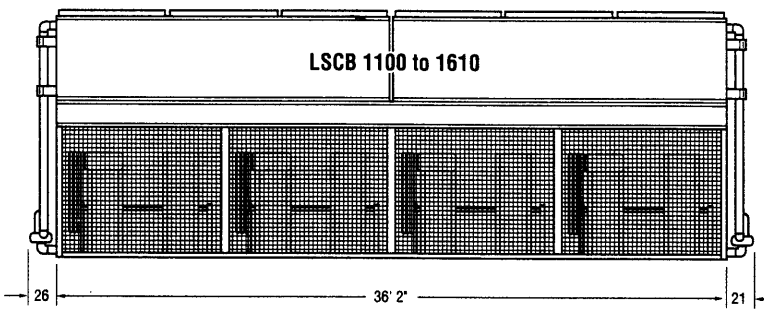


Table 17 Engineering Data

LSCB Model No.*	R-717 Tons*	Fans		Weights			R-717 Operating Charge	Spray Pump		Remote Pump		Height
		HP**	CFM	Shipping	Operating	Heaviest Section†		HP	GPM	Gallons Req'd***	Conn. Size	
400	284	30	70,900	15,870	21,970	10,740	440	5	685	410	10"	13' 2-3/4"
430	305	25	66,600	18,020	24,360	12,940	550	5	685	410	10"	13' 11-1/4"
450	319	30	69,500	18,170	24,510	12,940	550	5	685	410	10"	13' 11-1/4"
480	340	40	75,600	18,410	24,750	12,940	550	5	685	410	10"	13' 11-1/4"
500	355	40	74,200	20,420	26,990	15,150	660	5	685	410	10"	14' 7-3/4"
515	365	50	77,200	20,480	27,050	15,150	660	5	685	410	10"	14' 7-3/4"
550	390	(2)15	97,400	22,990	31,860	15,500	660	7-1/2	1,030	600	12"	13' 2-3/4"
590	418	(2)20	105,000	23,370	32,240	15,500	660	7-1/2	1,030	600	12"	13' 2-3/4"
625	443	(2)25	111,200	23,610	32,480	15,500	660	7-1/2	1,030	600	12"	13' 2-3/4"
650	461	(2)20	102,900	26,670	35,900	18,680	820	7-1/2	1,030	600	12"	13' 11-1/4"
690	489	(2)25	109,000	26,910	36,140	18,680	820	7-1/2	1,030	600	12"	13' 11-1/4"
720	511	(2)30	114,000	27,140	36,370	18,680	820	7-1/2	1,030	600	12"	13' 11-1/4"
755	535	(2)30	113,000	30,350	39,930	21,870	990	7-1/2	1,030	600	12"	14' 7-3/4"
805	571	(2)40	121,500	31,180	40,760	22,490	990	7-1/2	1,030	600	12"	14' 7-3/4"
800	567	(2)30	141,800	31,400	43,600	10,740	880	(2)5	1,370	820	12"	13' 2-3/4"
860	610	(2)25	133,200	35,710	48,370	12,940	1,100	(2)5	1,370	820	12"	13' 11-1/4"
900	638	(2)30	139,000	35,910	48,570	12,940	1,100	(2)5	1,370	820	12"	13' 11-1/4"
960	681	(2)40	151,200	36,390	49,070	12,940	1,100	(2)5	1,370	820	12"	13' 11-1/4"
1000	709	(2)40	148,400	39,770	52,670	15,150	1,320	(2)5	1,370	820	12"	14' 7-3/4"
1030	730	(2)50	154,400	39,980	52,890	15,150	1,320	(2)5	1,370	820	12"	14' 7-3/4"
1100	780	(4)15	194,800	45,620	63,650	15,500	1,320	(2) 7-1/2	2,060	1,500	14"	13' 2-3/4"
1180	837	(4)20	210,000	46,140	64,170	15,500	1,320	(2) 7-1/2	2,060	1,500	14"	13' 2-3/4"
1250	887	(4)25	222,400	46,620	64,650	15,500	1,320	(2) 7-1/2	2,060	1,500	14"	13' 2-3/4"
1310	929	(4)30	230,400	47,260	65,290	15,500	1,320	(2) 7-1/2	2,060	1,500	14"	13' 2-3/4"
1380	979	(4)25	218,000	53,230	71,960	18,680	1,640	(2) 7-1/2	2,060	1,500	14"	13' 11-1/4"
1440	1021	(4)30	228,000	53,490	72,230	18,680	1,640	(2) 7-1/2	2,060	1,500	14"	13' 11-1/4"
1510	1071	(4)30	226,000	60,100	79,380	21,870	1,980	(2) 7-1/2	2,060	1,500	14"	14' 7-3/4"
1610	1142	(4)40	243,000	61,750	81,030	22,490	1,980	(2) 7-1/2	2,060	1,500	14"	14' 7-3/4"

* Tons at standard conditions: ammonia 96.3° condensing, 20° suction and 78° W.B.
** For dry operation or for external static pressure up to 1/2" use next larger size fan motor.
*** Gallons 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. (12" would normally be sufficient.)
† 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.

Optional Equipment for Evaporative Condensers

All Models

Two Speed Motors

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

Remote Sump Configuration

For units operating in areas where temperatures may be very low, or where low temperatures may occur during periods when the unit is not operating, a sump located inside the building is the preferred means of ensuring that the basin water will not freeze. For these applications, the condenser will be supplied without the spray pump, suction strainers and all associated piping, but with an oversize bottom outlet.

Basin Heater Package

If a remote sump configuration is not practical, electric basin heater packages are available to help prevent freeze-up of the basin water. The packages include electric heater elements, and a combination thermostat/low water cutoff.

Multiple Circuit Coils

Condensers may be supplied with multiple circuit coils to match various system requirements such as split systems, or if a glycol or water circuit is desired for compressor head cooling.

Electric Water Level Control

Evaporative condensers may be ordered with an electric water level control in lieu of the standard mechanical float and make-up assembly. This package provides accurate control of water levels and does not require field adjustment.

Water Level Indicator

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

Self Supporting Catwalk and Handrailing

Evapco condensers are available with self-supporting catwalk, which may be easily installed in the field. This option offers significant savings compared to field constructed catwalks, which must be supported by a structure external to the unit. The catwalk may be installed on either side, or the end opposite the connections. Perimeter handrail is available for PMCB and LSCB models, but is not required for ATC models. Ladders may be provided with the catwalk option.

ATC & UBC Models

Access Ladders

Access ladders are available for ATC and UBC units which will provide access for motor, drive, and water distribution system inspection and maintenance.

Jib Boom

In the event that a fan motor should need to be replaced, a jib boom is available from which a chain fall can be mounted to easily lower the motor to the ground.

Stainless Steel Basin

ATC and UBC condensers are available with an inexpensive all stainless steel basin section. This provides superior corrosion resistance over other materials of construction.

PMCB Models

Wide Blade Fans

Wide blade fans are available for PMCB forced draft units. The cast aluminum fans operate at lower tip speeds to significantly reduce sound levels.

LSCB Models

Capacity Control Dampers

Capacity control dampers are an excellent way to match condenser capacity to system requirements. This option consists of dampers mounted in the air stream which modulate the air flow through the unit. They may also be supplied with an electric control package.

Sound Attenuation Package

For extremely noise-sensitive applications, LSCB units may be supplied with intake and/or discharge attenuation packages which greatly reduce sound levels. Oversize fan motors are required for this option in order to overcome the additional static pressure.

Solid Bottom Panels

When centrifugal fan, LSCB units are installed indoors and intake air is ducted to them, solid bottom panels are required to completely enclose the fan section. With this option, fan screens are omitted, and bearing lubrication lines are extended to facilitate maintenance.

Application

Design
Evapco units are heavy-duty construction and designed for long trouble-free operation. Proper equipment selection, installation and maintenance is, however, necessary to ensure good unit performance. Some of the major considerations in the application of a condenser are presented below. For additional information, contact the factory.

Structural Steel Support
The recommended method or support for Evapco condensers is two structural "I" beams located under the outer flanges and running the entire length of the unit. Mounting holes 3/4" in diameter, are located in the bottom channels of the pan section to provide for bolting to the structural steel; refer to certified drawings from the factory for bolt hole locations.
Beams should be level to within1/8" in 6' before setting the unit in place. Do not level the unit by shimming between it and the "I" beams as this will not provide proper longitudinal support.

Air Circulation
In reviewing the system design and unit location, it is important that proper air circulation be provided. The best location is on an unobstructed roof top or on ground level away from walls and other barriers. Care must be taken when locating condensers in wells or enclosures or next to high walls. The potential for recirculation of hot, moist discharge air back into the fan intake exists. Recirculation raises the wet bulb temperature of the entering air causing the condensing pressure to rise above the 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. Good engineering practice dictates that the evaporative condenser's discharge air not be directed or located close to or in the vicinity of building air intakes. Engineering assistance is available from the factory to identify potential recirculation problems and recommend solutions.
For additional information regarding layout of evaporative condensers, see Evapco Bulletin entitled *"Equipment Layout"*.

Piping
Condenser piping should be designed and installed in accordance with generally accepted engineering practice. 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 condenser connections, nor should any of the pipe supports be anchored to the unit framework. For additional information concerning refrigerant pipe sizing and layout, see Evapco Bulletin entitled "Piping Evaporative Condensers".

Indoor Installations
Centrifugal fan models can be installed indoors where it is desirable to hide the unit or where it is the only location available. Discharge ductwork is required for these installations. Normally it is best to use the room as a plenum for inlet air, but inlet ductwork can be used if required.
The design of ductwork should be symmetrical to provide even air distribution across both intake and discharge openings. The static pressure loss imposed by the ductwork must not exceed 1/2". Care must be taken to provide large access doors in the ductwork for accessibility to the unit fan section, eliminators and water distribution system for normal maintenance.
The centrifugal fan condenser can handle the external static of ductwork by using the next larger size fan motor. Units installed with inlet ductwork should also be ordered with the solid bottom panel option. Drawings are available from the factory showing size and location of duct connections.

Maintaining the Recirculated Water System
The heat rejection in a condenser 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 build-up of these impurities. If this is not done, the mineral or the acidic nature of the water will continue to increase. This will ultimately result in heavy scaling or a corrosive condition.

Bleed-off
Each unit supplied with a pump mounted on the side is furnished with a clear bleed line for visual inspection and a valve which, when fully open, will bleed-off the proper amount of water. 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 should be maintained between 20 and 50 psig.

Water Treatment
In some cases the make-up 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 galvanized construction of the unit. If acid is used for treatment, it should be accurately metered and the concentration properly controlled. The pH of the water should be maintained between 6.5 and 8.0. **Units constructed of galvanized steel operating with circulating water having a pH of 8.3 or higher will require periodic passivation of the galvanized steel to prevent the formation of "white rust".** 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 recommended for use with galvanized construction should be used. **For more information see Evapco Bulletin entitled "Maintenance Instructions".**

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 in conjunction with 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.

ATC & UBC Evaporative Condenser Specifications

Furnish and install, as shown on the plans, an Evapco model _____ induced draft, counterflow evaporative condenser with a condensing capacity of _____ MBH total heat of rejection when operating with _____ refrigerant at _____ °F condensing temperature with a _____ °F design wet bulb temperature.

Basin and Casing
The basin and casing shall be constructed of G-235 hot-dip galvanized steel for long life and durability.
Standard basin accessories shall include overflow, drain, type 304 stainless steel strainers, and brass make-up valve with plastic float.

Direct Drive Models ATC and UBC-50 to 165

Fan Motor
_____ horsepower totally enclosed fan cooled fan motor(s), with 1.25 service factor shall be furnished suitable for outdoor service on _____ volts, _____ hertz, and _____ phase.

Drive
The fan shall be mounted on the motor in a direct drive configuration.

Belt Drive Models ATC and UBC-180 to 535

Fan Motor
_____ horsepower totally enclosed fan cooled motors 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 which is accessible from the outside of the unit for service. A swing away protective cover shall shield the motor and sheave from the weather.

Drive
The fan drive shall be multigroove, solid back V-belt type with taper lock sheaves designed for 150% of the motor nameplate horsepower. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative condenser service. Fan sheave shall be aluminum alloy construction. The fans and the fan sheaves shall be mounted on the shaft with a specially coated bushing to provide maximum corrosion protection. Belt adjustment shall be accomplished from the exterior of the unit. Bearing lube lines shall be extended to the exterior of the unit for easy maintenance.

Belt Drive Models ATC and UBC-420 to 3225

Fan Motor
_____ horsepower totally enclosed air over ball bearing fan motor(s), with 1.15 service factor shall be furnished suitable for service on _____ volts, _____ hertz, and _____ phase. Motor(s) shall be mounted on an adjustable base which allows the motor to swing to the outside of the unit for servicing.

Drive
The fan drive shall be a multigroove, solid back V-belt type with taper lock sheaves designed for 150% of the motor nameplate horsepower. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative condenser service. Fan and motor sheaves shall be aluminum alloy construction. The fans and fan sheaves shall be mounted on the shaft with a specially coated bushing to provide maximum corrosion protection. Belt adjustment shall be accomplished from the exterior of the unit. Bearing lube lines shall be extended to the exterior of the unit for easy maintenance.

Axial Propeller Fans
Fans shall be heavy duty axial propeller type statically balanced. The fans shall be constructed of aluminum alloy blades, installed in a closely fitted cowl with venturi air inlet. Fan screens shall be galvanized steel mesh and frame, bolted to the fan cowl.

Fan Shaft Bearings
Fan shaft bearings shall be heavy duty self-aligning ball type with grease fittings extended to the outside of the unit. Materials shall be stainless steel balls with chrome steel races and zinc plated housing for corrosion resistance. Bearings shall be designed for a minimum L-10 life of 75,000 hours.

Water Recirculation Pump
The pump(s) shall be a close-coupled, centrifugal type with mechanical seal, installed vertically at the factory to allow free drainage on shut down.
_____ horsepower totally enclosed motor(s) shall be furnished suitable for outdoor service on _____ volts, _____ hertz, and _____ phase.

Heat Transfer Coil
Condensing coil(s) shall be all prime surface steel, encased in a steel framework and hot-dip galvanized after fabrication as a complete assembly. The tubes shall be arranged in a self-spacing, staggered pattern in the direction of airflow for maximum heat transfer efficiency and minimum pressure drop, without the use of additional spacers between the coil tubes. The coil(s) shall be designed with sloping tubes for free drainage of liquid refrigerant and shall be pneumatically tested at 400 psig, under water.

Water Distribution System
The system shall provide a water flow rate of not less than 6 GPM over each square foot of unit face area to ensure proper flooding of the coil. The spray header shall be constructed of schedule 40 polyvinyl chloride pipe for corrosion resistance. All spray branches shall be removable for cleaning. The water shall be distributed over the entire coil surface by precision molded ABS spray nozzles (1-1/4" x 5/16" orifice) with internal sludge ring to eliminate clogging. Nozzles shall be threaded into spray header to provide easy removal for maintenance.

Eliminators
The eliminators shall be constructed entirely of inert polyvinyl chloride (PVC) in easily handled sections. The eliminator design shall incorporate three changes in air direction to assure complete removal of all entrained moisture from the discharge air stream. Maximum drift rate shall be less than 0.001% of the circulating water rate.

Louvers
The louvers shall be constructed from polyvinyl chloride (PVC). The louvers shall be mounted in easily removable frames for access to the pan for maintenance. The louvers shall have a minimum of two changes in air direction to prevent splashout and block direct sunlight.

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

UBC Seismic/Windload Specification
The equipment shall be designed and manufactured to withstand 1.0g horizontal acceleration concurrent with 0.3g horizontal orthogonal and 0.5g vertical acting through the center of gravity (wind pressure of 125 pounds per square foot applied at the center of pressure). This design shall have been analyzed and certified by a licensed structural engineer, independent of the manufacturer. The analysis shall include the principal members and joints of the unit as well as the mounting configuration and hardware. The use of external reinforced anchorage, supports and bracing to meet the design acceleration levels (wind pressure) shall not be accepted. The unit will not be expected to maintain operation during the seismic (high windload) event.

PMCB Evaporative Condenser Specifications

Furnish and install, as shown on the plans, an Evapco model _____ evaporative condenser. Each unit shall have condensing capacity of _____ BTUH heat rejection, operating with _____ refrigerant at _____ °F condensing temperature and _____ °F design wet bulb temperature.

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, motors 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 maintenaince. Standard pan accessories shall include circular access doors, stainless steel strainers, wastewater bleed line with adjustable valve and brass makeup valve, with an unsinkable foam filled plastic float.

Power-Mizer Fan Drives

Fans shall be vane-axial type constructed of cast aluminum alloy blades. They shall be arranged in a two-stage system installed in a closely fitted cowl with venturi air inlet and air stabilizing vanes. Fan shaft bearings shall be a heavy-duty self aligning ball type with grease fittings extended to the outside of the unit.

The fan drive shall be solid backed Power-Band constructed of neoprene with polyester cords designed for 150% of motor nameplate horsepower. Drives are to be mounted and aligned at the factory.

Fan Motor

_____ horsepower totally enclosed fan cooled 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.

Heat Transfer Coil

The coil(s) shall be all prime surface steel, encased in steel framework with the entire assembly hot-dip galvanized after fabrication. Coil(s) shall be designed with sloping tubes for free drainage of liquid refrigerant and tested to 400 psig air pressure under water.

Water Distribution System

The system shall provide a water flow rate of not less than 6 GPM over each square foot of the unit face area to ensure proper flooding of the coil. The spray header shall be constructed of schedule 40, PVC pipe for corrosion resistance. All spray branches shall be removable and include a threaded end plug for cleaning. The water shall be distributed over the entire coil surface by precision molded ABS spray nozzles (1" x 1/2" orifice) with internal anti-sludge rings to eliminate clogging. Nozzles shall be threaded into a spray header to provide easy removal for maintenance.

Water Recirculation Pump

The pump(s) shall be a close-coupled, bronze fitted, centrifugal type with mechanical seal, installed vertically at the factory to allow free drainage on shut down. _____ horsepower totally enclosed, motor shall be furnished suitable for outdoor service on _____ volts, _____ hertz, and _____ phase.

Eliminators

The eliminators shall be constructed entirely of PVC that has been specially treated to resist ulta-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 maximum protection against corrosion. During fabrication, all panel edges shall be coated with 95% pure zinc-rich compound.

LSCB Evaporative Condenser Specifications

Furnish and install, as shown on the plans, an Evapco model _____ evaporative condenser. Each unit shall have condensing capacity of _____ BTUH heat rejection, operating with _____ refrigerant at _____ °F condensing temperature and _____ °F design wet bulb temperature.

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, motors 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 maintenaince. Standard pan accessories shall include circular access doors, stainless steel strainers, wastewater bleed line with adjustable valve and brass makeup valve, with an unsinkable foam filled plastic float.

Centrifugal Fan Drives

Fans shall be forwardly curved centrifugal type of hot-dip galvanized construction. The fans shall be factory installed into the pan-fan 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 drive shall be V-belt type with taper lock sheaves designed for 150% of motor nameplate horsepower. Drives are to be mounted and aligned at the factory.

Fan Motor

_____ horsepower totally enclosed fan cooled 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.

Heat Transfer Coil

The coil(s) shall be all prime surface steel, encased in steel framework with the entire assembly hot-dip galvanized after fabrication. Coil(s) shall be designed with sloping tubes for free drainage of liquid refrigerant and tested to 400 psig air pressure under water.

Water Distribution System

The system shall provide a water flow rate of not less than 6 GPM over each square foot of the unit face area to ensure proper flooding of the coil. The spray header shall be constructed of schedule 40, PVC pipe for corrosion resistance. All spray branches shall be removable and include a threaded end plug for cleaning. The water shall be distributed over the entire coil surface by precision molded ABS spray nozzles (1" x 1/2" orifice) with internal anti-sludge rings to eliminate clogging. Nozzles shall be threaded into a spray header to provide easy removal for maintenance.

Water Recirculation Pump

The pump(s) shall be a close-coupled, bronze fitted, centrifugal type with mechanical seal, installed vertically at the factory to allow free drainage on shut down. _____ horsepower totally enclosed, motor shall be furnished suitable for outdoor service on _____ volts, _____ hertz, and _____ phase.

Eliminators

The eliminators shall be constructed entirely of PVC that has been specially treated to resist ulta-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 maximum protection against corrosion. During fabrication, all panel edges shall be coated with 95% pure zinc-rich compound.

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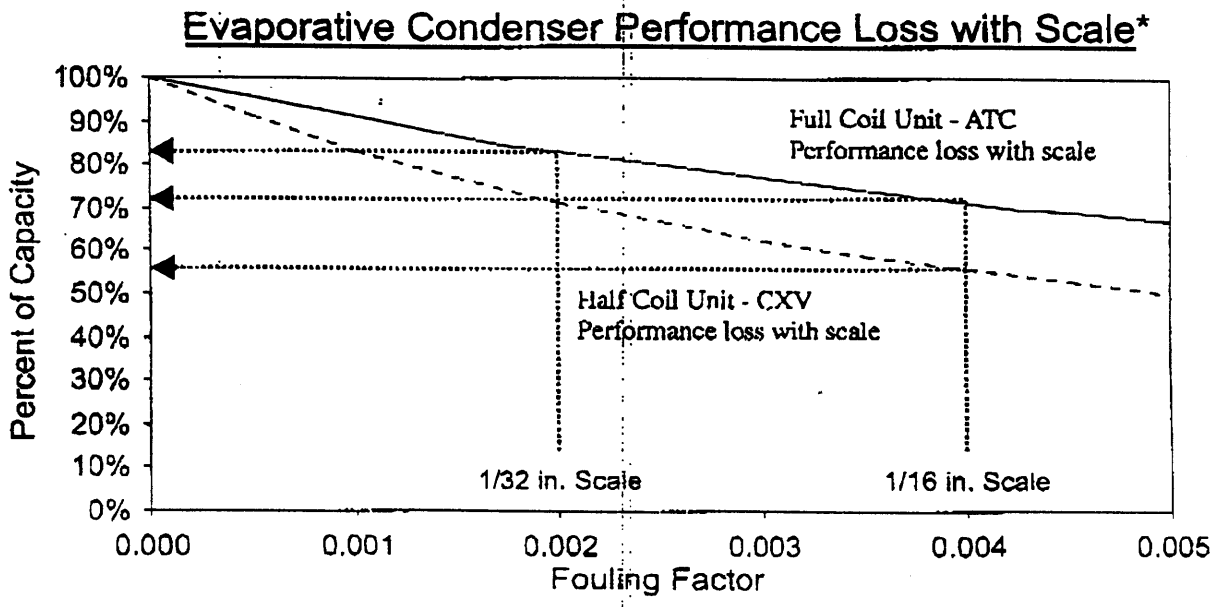
PERFORMANCE VS. SCALE

Excessive scale buildup negatively impacts the thermal performance of evaporative condensers. More significant to the end-user, is the fact that operating costs significantly increase when scale buildup inhibits heat transfer forcing the equipment to work harder to maintain the design condensing temperature. Knowing this, water treatment programs are designed to control the buildup of scale on evaporative equipment. In real world applications, we must accept that scale can only be controlled and not completely eliminated.

With respect to *evaporative* cooling, a CXV unit will typically cool the same load as a similarly sized ATC, but with about half the coil surface. With an equivalent heat load, the CXV unit will reject the same amount of heat through half the amount of coil...i.e. a higher concentration of heat rejection. In theoretical terms, this can be expressed in terms of the Heat Transfer Co-efficient "K" (BTU/hr-sqft-F). Restated, the same load through half the surface area means the CXV will have a "K" value approximately two times higher than the Evapco unit.

Scale build up has a greater impact on heat transfer processes with high "K" values than heat transfer processes with lower "K" values.

As a result, a typical scale buildup of 1/32" will reduce the **CXV capacity by 30%**. In other words, the CXV is twice as vulnerable to scale as compared to an equivalent Evapco coil! *The following graph shows that the performance of a CXV is greatly affected by even the smallest amount of scale.*



***Refer to page 8 for basis of calculations**

CXV UNITS OPERATE IN THE "SCALE DANGER ZONE"

PERFORMANCE VS. SCALE (REFERENCE PAGE)

$Q = K \times A \times LMTD$

Where Q = Rate of heat transfer
K = Overall heat transfer coefficient (BTU/hr.sqft.F)
A = Coil surface area (sqft)
LMTD = Log mean temperature difference (F)

K, the overall heat transfer coefficient can be further broken down as follows:

$$K = \frac{1}{(1/K_{CL}) + F}$$

Where K_{CL} = Heat transfer coefficient before fouling
F = Fouling adjustment factor

COMPARISON OF THE EFFECT OF FOULING:

ATC CONDENSER

Assume K = 100

If there is no fouling then F = 0
and $K = K_{CL} = 100$

If there is 1/32" of scale with F = 0.002
Then $K = K_{(WITH\ FOULING)}$

Using $K_{(WITH\ FOULING)} = \frac{1}{(1/K_{CL}) + F}$

Using $K_{(WITH\ FOULING)} = \frac{1}{(1/100) + 0.002}$

Then $K_{(WITH\ FOULING)} = 83.3$

Capacity $_{(with\ scale)} = \frac{K_{(WITH\ FOULING)}}{K_{(NO\ FOULING)}}$

Capacity (%) $_{(with\ scale)} = \frac{83.3}{100} \times 100 = 83.3\%$

= 16.7 % reduction in the heat transfer coefficient due to 1/32" of scale.

CXV CONDENSER

Assume K = 200

If there is no fouling then F = 0
and $K = K_{CL} = 200$

If there is 1/32" of scale with F = 0.002
Then $K = K_{(WITH\ FOULING)}$

Using $K_{(WITH\ FOULING)} = \frac{1}{(1/K_{CL}) + F}$

Using $K_{(WITH\ FOULING)} = \frac{1}{(1/200) + 0.002}$

Then $K_{(WITH\ FOULING)} = 142.86$

Capacity $_{(with\ scale)} = \frac{K_{(WITH\ FOULING)}}{K_{(NO\ FOULING)}}$

Capacity (%) $_{(with\ scale)} = \frac{142.86}{200} \times 100 = 71.4\%$

= 28.6 % reduction in the heat transfer coefficient due to 1/32" of scale.