

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 kW
Total = 1300 kW
Heat of Rejection

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

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

Therefore, from Table 3 select LSCB-370, or LRC-379, or PMCB 375, or PMCB 385 depending upon layout, fan kW, and any other design considerations.

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 R-22 and R-134a Heat Rejection Factors

Condensing Pressure, (KPa)		Cond. Temp. °C	WET BULB TEMPERATURE, °C.																	
			10	12	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
22	134-a																			
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	0,88	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 Pressure, (KPa)	Cond. Temp. °C	WET BULB TEMPERATURE, °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	1,38	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 Capacity

LSCB - Centrifugal Fan Models									
Model No.	kW Base	Model No.	kW Base	Model No.	kW Base	Model No.	kW Base	Model No.	kW Base
LSCB-36	155	LSCB-210	904	LSCB-400	1722	LSCB-620	2669	LSCB-950	4090
41	177	225	969	410	1766	625	2691	960	4133
48	207	240	1033	430	1851	650	2798	980	4219
54	232	250	1076	431	1855	660	2841	1000	4305
65	280	280	1205	450	1937	690	2970	1020	4391
70	301	281	1206	460	1980	691	2972	1030	4434
75	323	295	1270	475	2045	720	3100	1060	4563
80	344	300	1292	480	2066	721	3102	1080	4649
90	387	310	1335	490	2109	755	3250	1100	4736
100	431	315	1356	500	2153	770	3315	1120	4822
110	474	330	1421	510	2196	800	3444	1180	5080
120	517	335	1442	515	2217	805	3466	1250	5381
135	581	345	1485	530	2282	820	3532	1310	5640
150	646	355	1528	540	2325	860	3702	1380	5941
155	667	360	1550	550	2368	861	3704	1440	6199
170	732	370	1593	560	2411	900	3875	1510	6501
185	796	385	1657	590	2540	920	3961	1610	6931
200	861	386	1662	591	2544				

LRC - Centrifugal Fan Models									
Model No.	kW Base	Model No.	kW Base	Model No.	kW Base	Model No.	kW Base	Model No.	kW Base
LRC - 25	108	LRC - 65	280	LRC - 128	551	LRC - 225	969	LRC - 249	1072
27	116	72	310	131	564	233	1003	287	1236
29	125	76	327	140	603	246	1059	300	1292
35	151	84	362	155	667	188	809	321	1382
38	164	91	392	174	749	211	908	336	1446
42	181	101	435	183	788	227	977	361	1554
48	207	114	491	190	818	240	1033	379	1632
51	220	108	465	201	865	255	1098		
58	250	116	500	213	917	269	1158		

Power-Mizer Models									
Model No.	kW Base	Model No.	kW Base	Model No.	kW Base	Model No.	kW Base	Model No.	kW Base
PMCB-190	818	PMCB-360	1550	PMCB-580	2497	PMCB-885	3810	PMCB-1380	5941
210	904	375	1614	600	2583	960	4133	1410	6070
220	947	390	1679	630	2712	1000	4305	1485	6393
235	1012	415	1787	660	2841	1015	4370	1540	6630
240	1033	435	1873	690	2970	1030	4434	1630	7017
250	1076	455	1959	725	3121	1080	4649	1710	7362
275	1184	480	2066	755	3250	1120	4822	1770	7620
295	1270	510	2196	775	3336	1175	5058		
325	1399	535	2303	815	3509	1260	5424		
350	1507	560	2411	855	3681	1320	5683		

Alternate Power-Mizer Models*									
Model No.	kW Base	Model No.	kW Base	Model No.	kW Base	Model No.	kW Base	Model No.	kW Base
PMCB-175	753	PMCB-425	1830	PMCB-585	2518	PMCB-805	3466	PMCB-1060	4563
290	1248	450	1937	645	2777	850	3659	1110	4779
330	1421	475	2045	705	3035	910	3918	1510	6501
335	1442	495	2131	770	3315	950	4090	1550	6673
385	1657	540	2325						

Unit Selections

Selections for all evaporative condensers can be made by using EVAPCO's IES computer selection software. IES provides quick and accurate selections at the click of a button. In addition to selections, the program displays unit drawings, dimensional and shipping information. Please contact your local sales representative or visit the EVAPCO Europe web.

NOTE: For applications requiring layout or fan kW combinations not shown above, please consult the factory or your EVAPCO representative.

* Alternate Power-Mizer models represent selections for alternate plan area or low fan kW applications. Standard models should be used for the lowest first-cost selection.

Engineering Dimensions & Data

Low Silhouette Evaporative Condenser Centrifugal Fan Models LRC 188 to 379

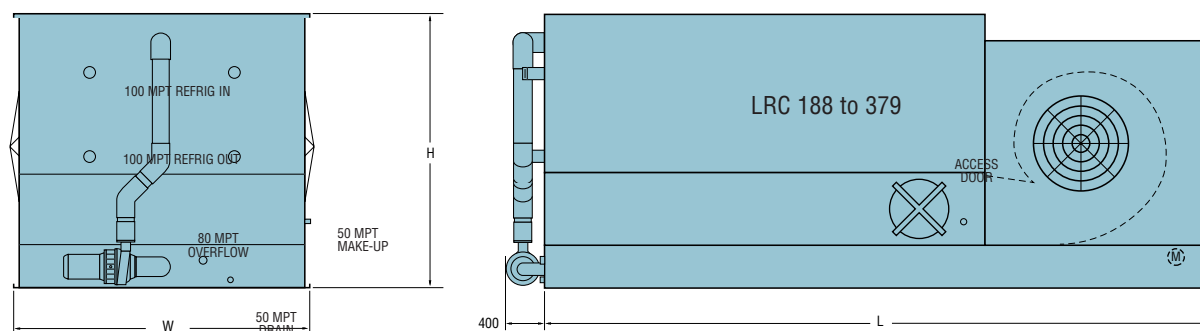


TABLE 5 Engineering Data

UNIT NO.	FANS			WEIGHTS (kg)		R-717 Operating Charge (kg)	SPRAY PUMP		REMOTE SUMP		DIMENSIONS (mm)		
	N°	kW*	m³/s	Shipping	Operating		kW	l/s	Liters Req'd***	Conn. Size	HEIGHT H	LENGTH L	WIDHT W
LRC-188	2	15	19,7	3680	5780	94	1,5	25,6	946	200	2121	4629	2388
211	2	11	17,6	4225	6370	119	1,5	25,6	946	200	2311	4629	2388
227	2	15	19,3	4230	6380	119	1,5	25,6	946	200	2311	4629	2388
240	2	18,5	20,8	4235	6380	119	1,5	25,6	946	200	2311	4629	2388
255	2	15	19,0	4920	7165	178	1,5	25,6	946	200	2502	4629	2388
269	2	18,5	20,4	4925	7170	178	1,5	25,6	946	200	2502	4629	2388
LRC-249	2	22	26,3	4410	7265	128	2,2	34,4	1363	250	2121	5553	2388
287	2	18,5	24,3	5110	8035	166	2,2	34,4	1363	250	2311	5553	2388
300	2	22	25,9	5125	8040	166	2,2	34,4	1363	250	2311	5553	2388
321	2	18,5	23,8	5865	8845	204	2,2	34,4	1363	250	2502	5553	2388
336	2	22	25,3	5875	8855	204	2,2	34,4	1363	250	2502	5553	2388
361	2	30	27,9	6010	8985	204	2,2	34,4	1363	250	2502	5553	2388
379	2	30	27,3	6715	9750	242	2,2	34,4	1363	250	2692	5553	2388

* For dry operation or for external static pressure up to 125 Pa use next larger size fan motor.

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

*** 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.)

Applications

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 to 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 140 and 340 kPa.

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 these cases 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.

Note: The location of the evaporative condenser must be considered during the equipment layout stages of a project. It is important to prevent the discharge air (potential of biological contamination) from being introduced into the fresh air intakes of the building.

Recirculating Water System - Freeze Protection

Water lines to and from the unit, spray pump and related piping should be heat traced and insulated up to the overflow level in order to protect from freezing.

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

REMOTE SUMP

Whenever a condenser is idled during subfreezing 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. The recirculating water pump is mounted at the remote sump and whenever it is shut-off, all of the water drains into the indoor tank. 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 bottom water outlet connection. Where 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 condenser. They are sized to maintain a +4 or +5°C pan water temperature with -18°C ambient air temperature with the fans and pumps off. They are furnished with a thermostat and low water protection device to cycle the heater on when required and to prevent the heater elements from energizing unless they are completely submerged. Components are enclosed in rugged, weatherproof enclosures for outdoor use. The heater power contactors and electric wiring are not included as standard.

Electric Pan Heaters

Model No.	kW*
LSCB 36 to 80	2
LSCB 90 to 170	3
LSCB 185 to 250	4
LSCB 280 to 385	(2) 3
LSCB 281 to 386	5
LSCB 410 to 560	(2) 4
LSCB 591 to 770	(2) 5
LSCB 820 to 1120	(2) 8
LSCB 400 to 515	8
LSCB 550 to 805	(2) 5
LSCB 800 to 1030	(2) 8
LSCB 1100 to 1610	(2) 10
LRC 25 to 72	2
LRC 76 to 114	3
LRC 108 to 183	4
LRC 190 to 246	6
LRC 188 to 269	7
LRC 249 to 379	9
PMCB 175 to 240	5
PMCB 250 to 375	(2) 4
PMCB 290 to 480	8
PMCB 450 to 775	(2) 6
PMCB 850 to 1030	(2) 8
PMCB 1060 to 1550	(4) 6
PMCB 435 to 580	(2) 6
PMCB 600 to 885	(2) 8
PMCB 1015 to 1120	(2) 12
PMCB 1110 to 1770	(2) 16

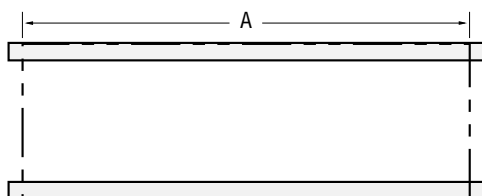
* Electric heater selection based on -18°C ambient temperature. For alternate low ambient heater selections, consult the factory.

Steel Support

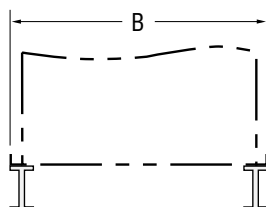
The recommended support for EVAPCO condensers is structural “I” beams located under the outer flanges and running the entire length of the unit. Mounting holes, 19mm in diameter are located in the bottom channels of the pan section to provide for bolting to the structural steel. (Refer to certified drawings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

Beams should be level to within 3mm per 2m 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.

Plan Views



End Elevations



LRC DIMENSIONS

				LRC DIMENSIONS	
Models				A	B
LRC	25	to	72	3083	1029
LRC	76	to	114	3731	1540
	108	to	183	4636	1540
	190	to	246	5553	1540
LRC	188	to	269	4629	2388
	249	to	379	5553	2388

LSCB DIMENSIONS

				LSCB DIMENSIONS	
Models				A	B
LSCB	36	to	80	1826	1235
	90	to	120	2724	1235
	135	to	170	3651	1235
LSCB	185	to	250	3645	1664
	280	to	385	5490	1664
LSCB	281	to	386	3651	2388
	410	to	560	5486	2388
	581	to	770	7341	2388
	820	to	1120	11011	2388
LSCB	400	to	515	3648	2991
	550	to	805	5493	2991
	800	to	1030	7334	2991
	1100	to	1610	11024	2991

PMCB DIMENSIONS

				PMCB DIMENSIONS	
Models				A	B
PMCB	175	to	240	3648	1927
	250	to	375	5493	1927
PMCB	290	to	480	3648	2991
	450	to	775	5490	2991
	850	to	1030	7334	2991
	1060	to	1550	11024	2991
PMCB	435	to	580	3651	3620
	600	to	885	5490	3620
	1015	to	1120	7341	3620
	1110	to	1120	11024	3620