

LENNOX**HORIZONTAL AIR CONDITIONERS
CHA5 SERIES****CHA**

Page 7

November 15, 1961

Supersedes 8-15-1961

AXIAL FLOW FAN

16 gauge, phosphate treated steel with baked-on thermo-setting acrylic enamel. Designed and fabricated by Lennox specifically for this unit. Moves large air volumes quietly with low power consumption. Belt driven.

COMPRESSOR

Suction cooled, resiliently mounted. Carries five year warranty. Accessible gauge ports. Overload protected.

DUAL PRESSURE SWITCH

Protects system against abnormal operating conditions. High pressure requires manual reset. Low pressure is automatic reset. Factory mounted.

CONDENSER COIL

Coil circuiting provides sub-cooling resulting in a high Btuh per watt rating. Nearly two square feet of net coil face area per ton of capacity. Aluminum fins flat bonded to seamless copper tubes. Lennox designed and constructed. Pressure tested at 455 psi.

CONTROL PANEL

Easily accessible. Controls are factory mounted and wired.

WEATHERPROOF CABINET

20 gauge, hot dipped, zinc coated steel. Baked-on thermo-setting acrylic enamel. Large service panels.

ACOUSTICAL INSULATION

1½ lb. density fiberglass. Insulates cabinet and hushes air noise.

CENTRIFUGAL BLOWER

Quiet belt drive. Can use high speed drives and large motor. Permanently lubricated ball bearings. Resilient mountings. Low power consumption. Factory mounted drives.

EVAPORATOR COIL

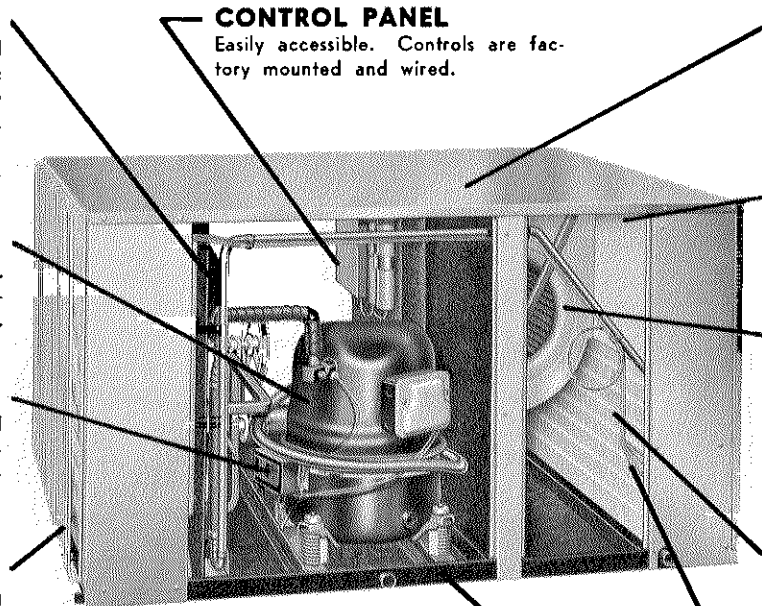
4 rows seamless copper tubes with flat bonded aluminum fins. Lennox designed and fabricated. Pressure tested at 455 psi.

CORROSION PROOF BASE

Covered with corrosion resistant material on both sides.

CAPILLARY TUBES

Accurately meter refrigerant flow.

**MAJOR FEATURES**

Lennox CHA5 air conditioners offer flexibility of installation, high efficiency and a quietness of operation unmatched by any other self contained air conditioners.

Condenser air is pulled through the coil and discharged out the weatherproof grilles at the sides.

Evaporator air is pulled through the evaporator coil, turned 180° and discharged out the same side of the unit it entered. See sketch page 8.

The interior of the unit is completely lined with acoustical fiberglass which hushes objectionable air and compressor noise. The condenser fan and evaporator blower have adjustable, quiet operating belt drives.

All serviceable components are designed for simple service and located for easy service access.

The high efficiency is attributed to the extra large condenser (see specifications) with its generous sub-cooling feature coupled with the Lennox designed power prop which has been proven one of the most efficient air movers in the industry.

The unit can be installed outdoors on a rooftop, a slab at grade level, or partially extending through an outside wall.

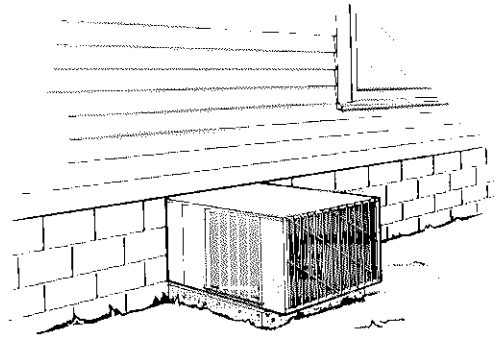
Unit is shipped fully charged and completely erected in one package. All controls are factory mounted and wired. In addition, each unit has been test operated at the factory. CHA units been extensively tested in the Lennox calorimeter room and are accurately rated according to ARI standard 210-58 and are U.L. listed and CSA certified.

SPECIFICATIONS

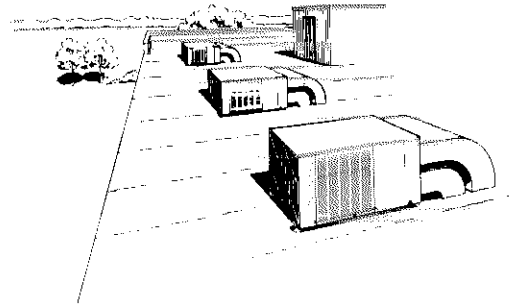
Model No.		CHA5-401 & 403	CHA5-501 & 503
Total cooling cap. Btuh @ ARI standard conditions		47,000	60,000
Compressor watts @ ARI standard conditions		5220	7050
Dehumidifying capacity, % of total cooling capacity		33	31
Refrigerant type		R-22	R-22
Refrigerant operating charge, lbs.		7 lbs. 8 oz.	8 lbs. 13 oz.
Condenser Coil	Net face area sq. ft.	7.06	8.75
	Tube diameter, inches	1/2	1/2
	Number of rows of tubes	3	3
	Fins per inch	10	10
Condenser Fan	Diam. in. and No. of blades	24-5	28-6
	Cfm, (free air)	3540	4400
	Rpm, (free air)	745	720
	Motor horsepower	1/2	1/2
	Watts (free air)	600	600
	Motor pulley (bore x diam.), inches	5/8 x 3 1/4	5/8 x 3 1/4
	Pulley (bore x diam.) inches	3/4 x 6	3/4 x 7
Evaporator Coil	Net face area, sq. ft.	3.21	4.38
	Tube diameter, inches	1/2	1/2
	Number rows of tubes	4	4
Evaporator Blower	Fins per inch	10	10
	Wheel—nominal diam. x width, inches	12 x 12	12 x 12
	Motor horsepower	1/3	1/2
	Motor pulley (bore x diam.), inches	1/2 x 4 1/8	5/8 x 4 1/8
	Pulley (bore x diam.) inches	1 x 7	1 x 7
	Belt length, inches	43 (A Sect.)	47 (A Sect.)
	*Cfm	1600	2000
	Watts (free air)	280	370
Rpm, range	690-935	690-935	
Condensate drain size, FPT, inches		3/4	3/4
Number of packages in shipment		1	1
Approximate shipping weight, lbs.		800	1000

*This is nominal 400 cfm per ton. Larger air volume will increase capacity see blower performance charts.

TYPICAL APPLICATIONS



Unit on Slab at Grade Level



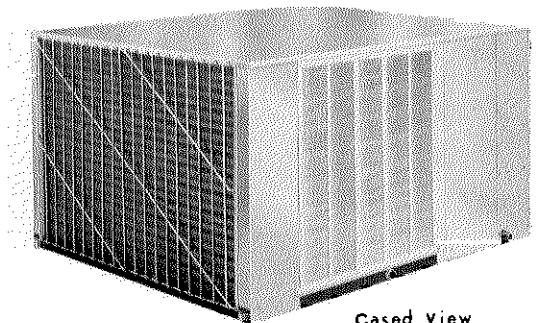
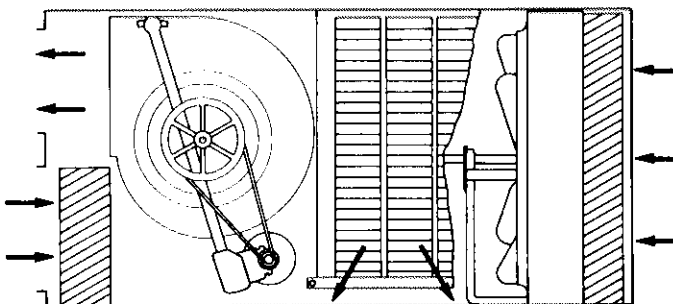
Roof Top Installation

CLEARANCES

In applications where the top of the unit cannot be removed for servicing component parts the following minimum installation clearances must be observed.

Control Panel Side of Unit..... 24"
 Other Side of Unit..... 30"

DETAIL SHOWING AIR PATTERN



Cased View

COOLING PERFORMANCE

CHA5-400 COOLING PERFORMANCE

1600 Cfm Evaporator Coil Air Volume @ 80° DB and 67° WB

Outdoor Temperature (Degree F.)	Total Capacity (Btuh)	*Total Input (Watts)	Total Btuh Per Watt
85	49,200	5690	8.65
95	47,000	6100	7.70
105	43,900	6520	6.73
115	40,000	6940	5.76

*Includes compressor, condenser blower motor and evaporator blower motor.

CHA5-500 COOLING PERFORMANCE

2000 Cfm Evaporator Coil Air Volume @ 80° DB and 67° WB

Outdoor Temperature (Degree F.)	Total Capacity (Btuh)	*Total Input (Watts)	Total Btuh Per Watt
85	63,600	7420	8.57
95	60,000	8020	7.48
105	55,000	8480	6.49
115	49,500	8900	5.56

*Includes compressor, condenser blower motor and evaporator blower motor.

BLOWER PERFORMANCE

CHA5-401 & 403 EVAPORATOR COIL BLOWER PERFORMANCE CHART

Cfm	STATIC PRESSURE EXTERNAL TO UNIT—INCHES WATER GAUGE																					
	0		.10		.20		.30		.40		.50		.60		.70		.80		.90		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1400	485	.135	550	.175	620	.225	680	.265	730	.31	780	.35										
1500	510	.170	580	.200	645	.255	700	.295	750	.345	800	.395	855	.455								
1600	550	.200	615	.25	675	.29	725	.345	775	.39	825	.45	870	.50	915	.565						
1700	585	.235	645	.29	700	.335	750	.39	800	.44	845	.50	895	.56	935	.62	980	.675				
1800	620	.30	680	.34	730	.39	780	.44	825	.51	875	.56	915	.62	960	.69	1000	.75	1030	.80		

NOTE: All cfm data is measured external to the unit using standard return air opening. Data is obtained from approved N.A.F.M. wind tunnel tests.

BLOWER PERFORMANCE

CHA5-501 & 503 EVAPORATOR COIL BLOWER PERFORMANCE CHART

Cfm	STATIC PRESSURE EXTERNAL TO UNIT—INCHES WATER GAUGE																					
	0		.10		.20		.30		.40		.50		.60		.70		.80		.90		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1800	540	.22	590	.25	640	.31	695	.35	740	.42	790	.465	830	.53	880	.58	920	.65	965	.72	1010	.81
1900	570	.255	615	.305	670	.35	715	.40	765	.46	810	.525	850	.575	890	.625	930	.71	975	.77	1020	.86
2000	595	.29	640	.34	695	.39	740	.45	780	.50	830	.57	870	.63	910	.685	950	.76	990	.83	1030	.92
2100	630	.34	670	.38	715	.44	760	.49	805	.565	850	.62	890	.68	930	.75	970	.825	1010	.90		
2200	660	.39	700	.435	745	.50	790	.56	830	.64	870	.69	910	.74	950	.825	985	.88				

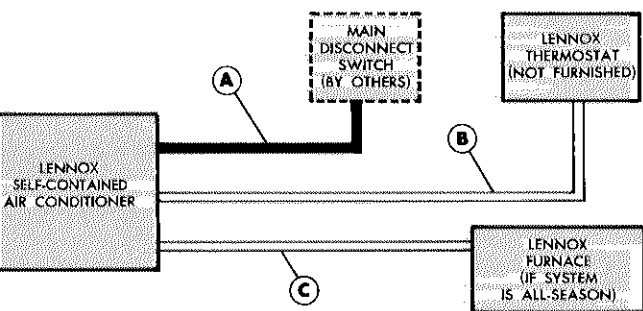
NOTE: All cfm data is measured external to the unit using standard return air opening. Data is obtained from approved N.A.F.M. wind tunnel tests.

ELECTRICAL DATA

Model No.		CHA5-401	CHA5-403	CHA5-501	CHA5-503
Line voltage data		230 volt 60 cy., 1 phase	208/240 volt 60 cy., 3 phase	230 volt 60 cy., 1 phase	208/240 volt 60 cy., 3 phase
Compressor	Nameplate amps	28.8	21.2	35.2	25.8
	Running amps	25.9	17.0	32.0	22.3
	Power factor	.89	.82	.95	.82
	Locked rotor amps	110.0	78.0	127.0	109.0
Condenser Coil Fan	Nameplate amps	3.9	3.9	3.9	3.9
	Locked rotor amps	19.9	19.9	19.9	19.9
Evaporator Coil Blower	Nameplate amps	2.6	2.6	3.9	3.9
	Locked rotor amps	16.2	16.2	19.9	19.9
Max. unit amps		35.3	27.6	42.9	33.5
AWG Wire Size for Various Lengths of run	10'	6	8	6	8
	50'	6	8	6	8
	100'	6	8	6	8
	200'	4	6	4	6
Disconnect size, amps		60	60	60	60
Fuse/Tron size, amps		55	40	55	40

NOTE: 440 and 550 volt units are available on special order.

*FIELD WIRING



A—Two Wire Power—Single Phase
Three Wire Power—Three Phase

See electrical data table for size of wire.

B—†Three Wire Low Voltage—18 ga. min.—for cooling only installations

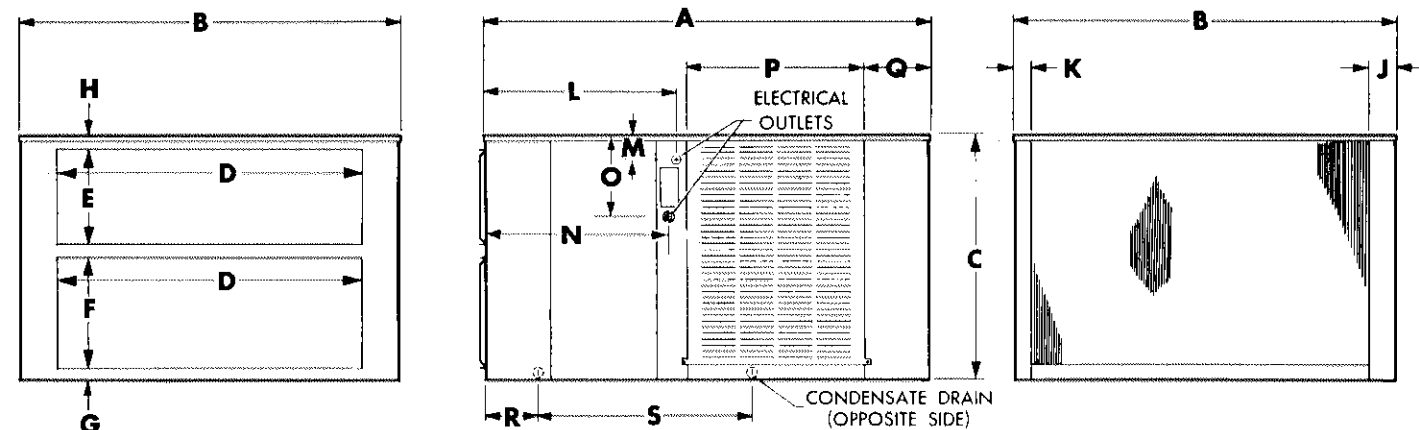
‡Four Wire Low Voltage—18 ga. min.—for all-season installations

C—†Two Wire Low Voltage—18 ga. min.—for all-season installations

*All wiring must conform to NEC.

†May be class II wiring if local codes permit.

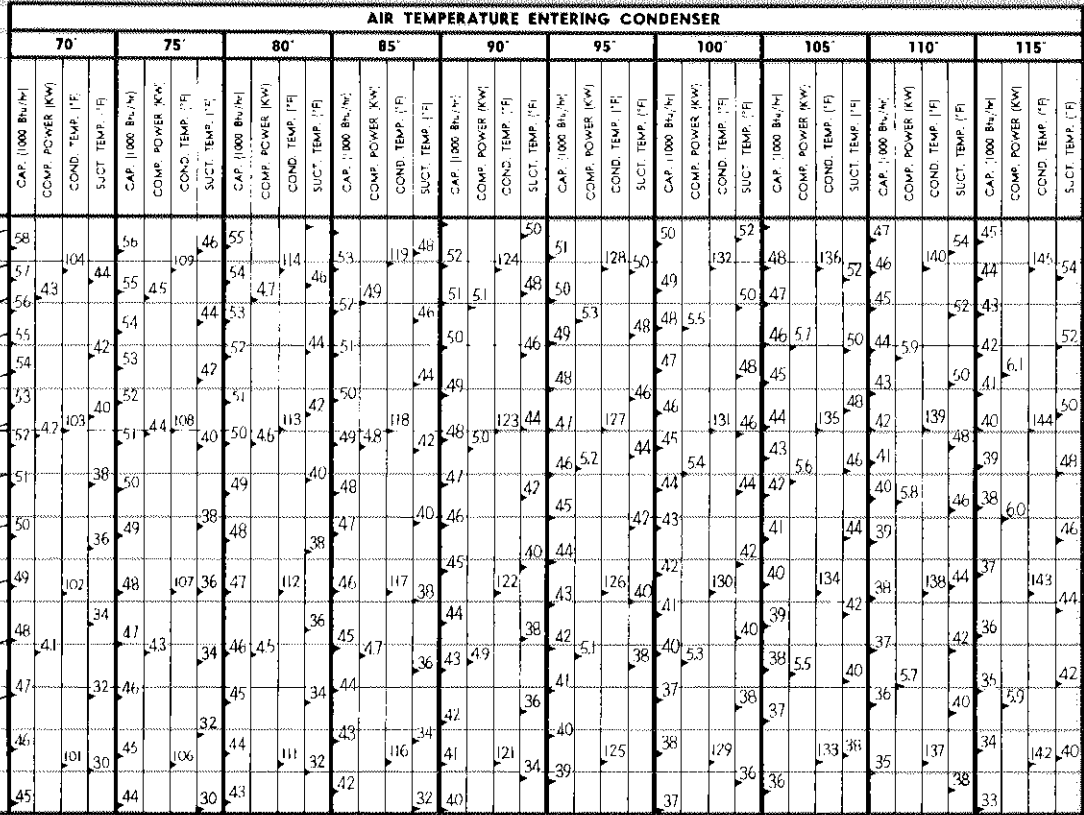
DIMENSIONS (in inches)



Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S
CHA5-400	55	42 $\frac{1}{4}$	28	33 $\frac{3}{4}$	9 $\frac{3}{4}$	11 $\frac{3}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	3 $\frac{1}{8}$	2 $\frac{1}{8}$	23 $\frac{3}{8}$	3 $\frac{1}{8}$	22 $\frac{1}{4}$	10	21 $\frac{7}{8}$	8	6 $\frac{7}{16}$	24 $\frac{1}{4}$
CHA5-500	55	47 $\frac{1}{4}$	30 $\frac{1}{2}$	37 $\frac{3}{4}$	11 $\frac{3}{4}$	13 $\frac{3}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	3 $\frac{1}{8}$	2 $\frac{1}{8}$	23 $\frac{3}{8}$	3 $\frac{1}{8}$	22 $\frac{1}{4}$	10	21 $\frac{7}{8}$	8	6 $\frac{7}{16}$	24 $\frac{1}{4}$

PERFORMANCE DATA

**PERFORMANCE DATA
CHA5-400**



REF. DATA: CHA5-400: 3640 CFM COND. AIR 67°F/61

EVAPORATOR AIR - CFM

**HOW TO USE PERFORMANCE
CHART, CHA5-400**

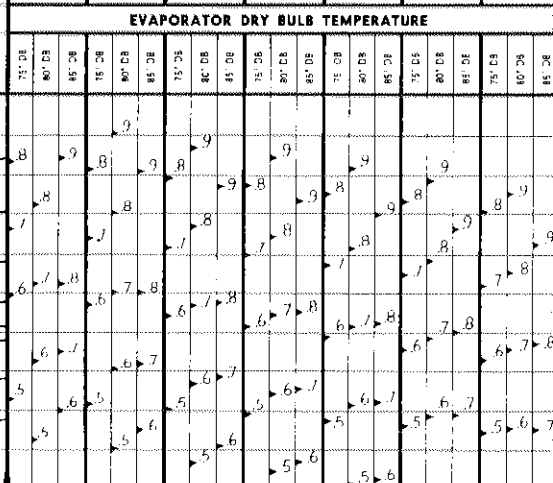
Given—Evaporator Cfm 1600; entering condenser temperature 95°F; entering evaporator wet bulb temperature 67°F.

Find from graph—Capacity 47,000 Btu/h; compressor power 5.23 kw; condensing temperature 127°F; suction temperature 45°F.

NOTE: Condenser and evaporator blower motor watts 880.

**CHA5-400
DEHUMIDIFYING
CAPACITY**

AIR TEMPERATURE ENTERING CONDENSER						
85	90	95	100	105	110	115
S/T RATIO	S/T RATIO	S/T RATIO	S/T RATIO	S/T RATIO	S/T RATIO	S/T RATIO



**EXAMPLE OF HOW TO FIND
DEHUMIDIFYING CAPACITY CHA5-400**

Given—Evaporator coil Cfm 1600; condensing unit entering air temperature 95°F; evaporator unit entering air wet bulb temperature 67°F; evaporator unit air dry bulb temperature 80°F.

Find from graph S/T ratio: .67. Thus, dehumidifying capacity (or latent heat removal) is 33%. S/T ratio is the ratio of sensible heat removal capacity to total capacity.

INDOOR COIL - CFM

PERFORMANCE DATA

PERFORMANCE DATA CHAS-500

		AIR TEMPERATURE ENTERING CONDENSER																												
		70°	75°	80°	85°	90°	95°	100°	105°	110°	115°																			
80°	79°	CAP. (1000 Btu/hr)	COMP. POWER (KW)	COND. TEMP. (°F)	SUCT. TEMP. (°F)	CAP. (1000 Btu/hr)	COMP. POWER (KW)	COND. TEMP. (°F)	SUCT. TEMP. (°F)	CAP. (1000 Btu/hr)	COMP. POWER (KW)	COND. TEMP. (°F)	SUCT. TEMP. (°F)	CAP. (1000 Btu/hr)	COMP. POWER (KW)	COND. TEMP. (°F)	SUCT. TEMP. (°F)	CAP. (1000 Btu/hr)	COMP. POWER (KW)	COND. TEMP. (°F)	SUCT. TEMP. (°F)	CAP. (1000 Btu/hr)	COMP. POWER (KW)	COND. TEMP. (°F)	SUCT. TEMP. (°F)	CAP. (1000 Btu/hr)	COMP. POWER (KW)	COND. TEMP. (°F)	SUCT. TEMP. (°F)	
		78°	77°	6.2	46	117	48	6.8	117	50	72	70	127	52	68	76	54	66	135	54	64	80	141	56	60	82	143	58	58	83
76°	75°	6.0	44	116	46	6.6	116	48	70	68	127	50	66	74	52	64	131	52	62	78	140	54	58	81	142	56	56	82	148	58
74°	73°	5.8	42	115	44	6.4	115	46	68	66	127	48	64	72	50	62	127	50	60	76	139	52	56	79	142	54	54	81	145	56
72°	71°	5.6	40	114	42	6.2	114	44	66	64	127	46	62	70	48	60	127	48	58	74	139	50	54	77	142	52	52	81	145	54
70°	69°	5.4	38	113	40	6.0	113	42	64	62	127	44	60	68	46	58	127	46	56	72	134	48	52	75	141	50	50	80	144	52
68°	67°	5.2	36	112	38	5.8	112	40	62	60	127	42	58	66	44	56	127	44	54	70	134	46	50	73	141	48	48	79	144	50
66°	65°	5.1	34	111	36	5.6	111	38	60	58	127	40	56	64	42	54	127	42	52	68	133	44	48	71	141	46	46	77	144	48
64°	63°	5.0	32	110	34	5.4	110	36	58	56	127	38	54	62	40	52	127	40	50	66	133	42	46	69	140	44	44	76	143	46
62°	61°	4.9	30	109	32	5.2	109	34	56	54	127	36	52	60	38	50	127	38	48	64	133	40	44	67	140	42	42	74	143	44
60°	59°	4.8	28	108	30	5.1	108	32	54	52	127	34	50	58	36	48	127	36	46	62	132	38	42	65	139	40	40	72	141	42
	58°	4.8	26	107	28	5.1	107	30	52	50	127	32	48	56	34	46	127	34	44	60	132	36	40	63	139	38	38	70	140	40

1500 2000 2500
EVAPORATOR AIR - CFM

CHAS-500, 3400 LPM COND. AIR 6/8/61

HOW TO USE PERFORMANCE CHART, CHAS-500

Given—Evaporator Cfm 2000; entering condenser temperature 95°F.; entering evaporator wet bulb temperature 67°F.

Find from graph—Capacity 60,000 Btu/h; compressor power 7.05 kw; condensing temperature 129°F.; suction temperature 44°F.

NOTE: Condenser and evaporator blower motor watts 970.

CHAS-500 DEHUMIDIFYING CAPACITY

		AIR TEMPERATURE ENTERING CONDENSER						
		85°	90°	95°	100°	105°	110°	115°
75° DB	80° DB	S/T RATIO	S/T RATIO	S/T RATIO	S/T RATIO	S/T RATIO	S/T RATIO	S/T RATIO
		75° DB	80° DB	.8	.9	.9	.9	.9
64°	65°	.7	.8	.8	.8	.8	.8	.8
66°	67°	.6	.7	.7	.7	.7	.7	.7
68°	69°	.5	.6	.6	.6	.6	.6	.6
70°		.5	.5	.5	.5	.5	.5	.5

1500 2000 2500
INDOOR COIL - CFM

CHAS-500 DEHUMIDIFYING CAP. 6/8/61

EXAMPLE OF HOW TO FIND DEHUMIDIFYING CAPACITY CHAS-500

Given—Evaporator coil Cfm 2000; entering condensing unit air temperature 95°F.; entering evaporator air wet bulb temperature 67°F.; evaporator unit air dry bulb temperature 80°F.

Find from graph—S/T ratio: .69. Thus, dehumidifying capacity (or latent heat removal) is 31%. S/T ratio is the ratio of sensible heat removal capacity to total capacity.

LENNOX Industries Inc.

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