

Commercial/Industrial Arctic Circle High-Capacity Evaporative Cooling

Selection, dependability and performance.

Arctic Circle's commercial/industrial, high-capacity coolers are designed for extended use in office buildings, restaurants, churches, schools, factories, agri-businesses and other applications where commercial grade coolers are needed.

Features

- ▶ Ideally suited for spot-cooling in factories, laundries and restaurants.
- ▶ Efficient way to cool greenhouses, produce bins, livestock and poultry areas.
- ▶ Cuts down high utility and maintenance costs associated with air conditioning systems.
- ▶ Capacities up to 21000 CFM (Industry Standard Ratings).
- ▶ Side or down discharge models.
- ▶ POLYBOND[®], an appliance type finish, is applied to all parts exposed to water. POLYBOND[®] resists corrosion and is easy to clean.
- ▶ Heavy-gauge, galvanized steel.
- ▶ Water float valve *included*.
- ▶ Bleed off kit *included*.
- ▶ AdobeAir motors and pumps are U.L. recognized.
- ▶ Solid shaft for rugged durability.
- ▶ Embossed pad frames for added strength.
- ▶ Precision balanced blower wheel.
- ▶ City of Los Angeles (C.O.L.A.) Approved.
- ▶ AMCA licensed ratings.



**ES830
ED830**



**ES143
ED143**



**ES213
ED213**



AdobeAir, Inc. certifies that the evaporative air cooling products shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings Program.

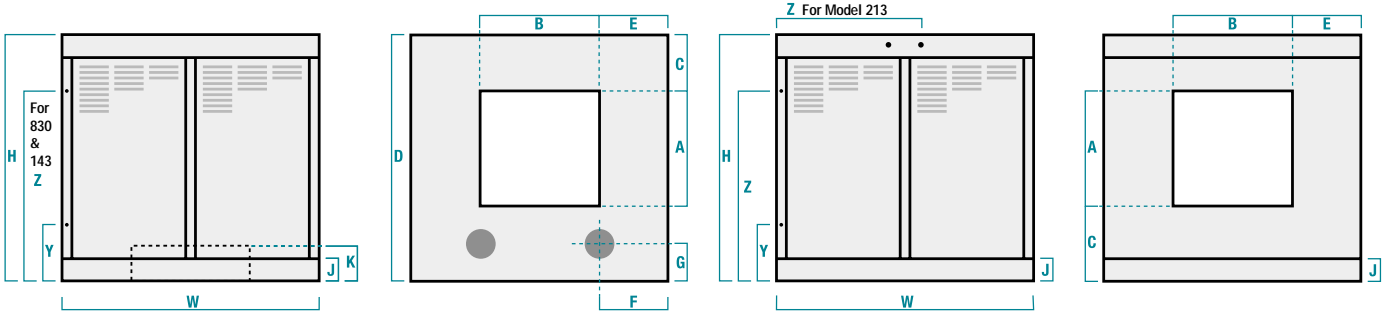
Dimensions

Side View

Bottom View

Side View

Front View



Model Number	Cabinet			Duct Location				Drain Location		Bottom Pan		Water Service K.O. ² Y	Electric Service Loc. ³ Z	Pads No / Ht / Wd	Blower Wheel Dia / Wd / Shft.	Effective Pad Area Sq. In.	Shipping	Weights ¹ Operating
	H	W	D	Opening A	B	Location C	E	F	G	Depth J	Riser K							
ES830*	53½	41¼	41¼	21¾	21¾	15⅞	9¾	20⅝	7½	3⅜	–	7	42½	12/24/17	21/20/1	4186	270	557-604
ED830*	53½	41¼	41¼	21¾	21¾	4½	9¾	20⅝	7½	3⅜	6½	7	42½	16/24/17	21/20/1	5581	285	566-625
ES143	53¾	50	50	26⅞	26⅞	16½	11½	10	6½	3½	–	7	46¾	12/22/24	24/24/1⅜	5559	400	776-808
ED143	53¾	50	50	26⅞	26⅞	5¾	11½	10	6½	3½	7¾	7	46¾	12/22/24	24/24/1⅜	7412	420	774-825
ES213	61¼	62	62	31¾	31¾	22	15	7¾	4⅝	3½	–	5½	33	12/28/28	28/28/1⅜	8387	600	1163-1213
ED213	61¼	62	62	31¾	31¾	8⅞	15	7¾	4⅝	3½	9¼	5½	33	16/28/28	28/28/1⅜	11183	620	1164-1240

*These models have a single drain.

- 1: In pounds. Side/Down discharge weights shown. Shipping weight is cabinet and carton. Operating weight variance determined by motor. Accessories and motor boxed separately.
- 2: Water knock-out is clearance for running 1/4" tubing.
- 3: Units have 7/8" knock-out for running electrical service.
- 4: Drain is 3/4" male hose thread.

Sizing Instructions

For Commercial/Industrial Environments

The four steps (using ASHRAE 5% design standards for climatic conditions) to determine the correct CFM requirements are

1. Determine the temperature of cooler discharge (Cd)

$Cd = WB + .2 (DB - WB)$, where WB = ambient wet bulb temperature in °F and DB = ambient dry bulb temperature in °F

2. Determine the design sensible heat load (SHL) in (BTU/h) (Note A)

3. Compute needed CFM from the formula

$$CFM = SHL \div 1.08\Delta t$$

Where CFM = Cubic feet per minute of cooler discharge,

SHL = British Thermal Units per hour, sensible load.

and Δt = Difference between temperature of air leaving the conditioned environment and entering the conditioned environment (cooler discharge) or temperature rise (See Note B)

4. From the Air Delivery sections in the charts select the equipment that will deliver the required CFM at the expected system static pressure.

Note A: Sensible load only of conditioned environment

Note B: Δt is a designer-specified number. Average room temperature will be approximately midpoint between two values expressed.

Alternative Sizing Method

If heat load is undetermined this method may be used, it assumes commercial/light industrial environment with normal heat loads. Unusual heat loads may increase these requirements, and should be calculated by the other method.

1. Determine Cd as in (1) of other method

2. Determine the volume of the area to be cooled

In work spaces with high ceilings consider only the worker environment – normally up to 8 or 10 feet above the floor. If large volumes of space are occupied by machinery or stored goods these volumes need not be included.

3. Determine required CFM

Multiply the volume in cubic feet (from step 2) by the appropriate factor depending on Cd:

	Factor
if Cd°F less than 69.7°	.2
69.7°-72°	.25
72°-73.6°	.32
73.6°-75°	.4
75°-76.3°	.5
76.3°-77.5°	.7
Over 77.5°	1.0+

4. From the air delivery sections of the charts, select the equipment that will deliver the required CFM at the expected system static pressure.

Motor Sheave Selection

1. Determine the external static pressure of the air delivery system.

2. Determine the motor (H.P., Voltage and Phase) required to deliver the design airflow.

3. Determine the shaft size for the motor selected.

Refer to the Electrical Specifications chart on page 7.

4. Determine the RPM that will deliver the required airflow (CFM) at the static pressure of the system.

Refer to the Certified Air Delivery CFM chart for the chosen cooler, find the selected motor HP.

5. Determine the sheave, and the number of turns open, that is closest to the desired RPM.

Refer to the Sheave Selection charts on page 6. Find the selected motor HP, shaft size, and desired RPM (See Steps 2-4 above). You might need to look at more than one sheave before finding the correct RPM.

6. Specify the sheave and sheave setting (turns open) for the installer.

Ordering

When ordering your cooler, you should know this information.

- ▶ System design static pressure.
- ▶ Desired air volume at system design.
- ▶ Electrical power supply available.
- ▶ Stability of structure to support operating weight of unit.

Complete systems consist of the following components, and are sold separately for application versatility.

- ▶ Cabinet
- ▶ Motor
- ▶ Motor sheave
- ▶ Pulley-belt kit
- ▶ Pump

NOTE: Motor starters, internal wiring and over-current protection are not supplied.

KoolKalk...

Computer Aided Sizing

The sizing method described in this brochure can be used for general sizing of direct evaporative coolers.

For more accurate sizing we recommend the use of KoolKalk... an IBM compatible computer program designed specifically for AdobeAir Evaporative Coolers. Contact your local AdobeAir representative for more information.

Certified Air Delivery CFM at Various External Static Pressures

Inches Water Gauge. AMCA Licensed Ratings.

Model	BHP	Pulley & Belt Kit	Belt Information		0		.1		.2		.3	
			Qty	A77	CFM	RPM	CFM	RPM	CFM	RPM	CFM	RPM
ED830	3/4	PB141	1	A77	5420	335	5290	342	5120	351	4850	366
	1	PB141	1	A77	5960	369	5850	375	5740	381	5490	394
	1 1/2	PB141	1	A77	6830	422	6720	428	6630	433	6490	440
	2	PB141	1	A77	7510	465	7420	470	7330	474	7240	479
	3	PB141	1	A77	8600	532	8520	536	8440	540	8360	545
ES830	3/4	PB141	1	A77	5450	327	5270	340	4990	354	4720	367
	1	PB141	1	A77	6000	360	5840	372	5600	384	5340	396
	1 1/2	PB141	1	A77	6700	400	6700	422	6560	433	6320	444
	2	PB141	1	A77	6700	400	6700	422	6700	442	6700	462
ED143	1	PB183	1	A91	7920	270	7610	279	7210	292	6790	307
	1 1/2	PB183	1	A91	9070	309	8820	316	8460	328	8130	339
	2	PB183	1	A91	9980	340	9770	346	9450	356	9130	367
	3	PB184	1	AX92	11420	389	11280	393	10990	402	10710	411
ES143	1	PB183	1	A91	7760	277	7420	285	7040	298	6660	311
	1 1/2	PB183	1	A91	8770	317	8590	323	8280	334	7930	345
	2	PB183	1	A91	9250	325	9250	345	9230	363	8930	373
ED213	1 1/2	PB184	1	AX92	11470	246	11130	251	10570	262	10040	272
	2	PB184	1	AX92	12620	270	12360	275	11850	284	11350	293
	3	PB186	2	A95	14450	310	14300	312	13850	320	13400	328
	5	PB186	2	A95	17130	367	17120	367	16720	374	16340	380
	7 1/2	PB187	2	A97	NOT RECOMMENDED			18680	412	18680	425	
ES213	1 1/2	PB184	1	AX92	11440	245	10930	254	10430	263	9870	273
	2	PB184	1	AX92	12590	270	12130	277	11670	286	11180	294
	3	PB184	1	AX92	14000	295	14010	315	13600	323	13220	330
	5	PB186	2	A95	14000	295	14000	315	14000	330	14000	345

Shaded Areas: Do not exceed listed RPM, water entrainment may result.

NOT RECOMMENDED

• Performance shown is for installation type B: Free inlet, Ducted outlet.

• Performance ratings include the effects of evaporative media in the airstream.

Pump Specifications

Pump Model #	Use in Cooler Models	Volts	Amps	Watts	GPM At 5' Head
EP200	ED/ES830	120	.8	44	2.45
EP400	ED/ES830	240	.4	44	2.45
EP280	ED/ES143/213	120	1.2	80	5
EP480	ED/ES143/213	230	.6	80	5

Note: Pumps are available in 120 volt and 240 volt models. As a result, transforming or separate circuiting may be required for other voltages.

⁴ CFM	⁴ RPM	⁵ CFM	⁵ RPM	⁶ CFM	⁶ RPM	⁷ CFM	⁷ RPM	⁸ CFM	⁸ RPM	⁹ CFM	⁹ RPM	^{1.0} CFM	^{1.0} RPM
4560	381	4220	399	3730	425	3140	457	2640	487	2200	513	1800	536
5250	407	4960	422	4660	438	4260	459	3720	489	3210	518	2780	544
6270	452	6060	463	5840	475	5560	489	5300	503	4980	521	4470	548
7070	488	6870	499	6680	509	6500	520	6240	533	5990	545	5770	558
8290	549	8140	557	7950	566	7780	575	7620	584	7470	594	7250	604
4360	383	3950	401	3370	429	2760	462	2310	482	1910	502	1540	520
5110	408	4740	424	4370	440	3890	463	3280	496	2820	519	2420	536
6100	454	5890	465	5620	477	5280	492	4960	506	4560	525	3990	554
6700	480	6680	501	6500	511	6280	521	5950	535	5650	548	5380	561
6330	323	5880	337	5420	353	4920	372	4170	400	3470	430	3060	450
7750	353	7350	366	6950	379	6560	392	6140	407	5720	423	5080	446
8820	378	8480	390	8110	402	7750	414	7380	426	7050	437	6630	452
10440	420	10170	430	9870	441	9590	451	9240	462	8920	472	8600	483
6220	326	5790	342	5280	360	4480	389	3910	412	3460	433	3090	453
7600	357	7210	370	6830	384	6460	397	5930	416	5220	442	4700	462
8620	384	8300	395	7950	407	7620	419	7270	431	6950	444	6300	466
9520	282	8940	293	8350	305	7550	320	6650	341	5390	369	4600	388
10870	302	10410	312	9870	322	9330	333	8680	346	7890	362	6900	384
12960	336	12550	344	12130	352	11700	361	11230	370	10760	380	10290	390
15960	388	15600	395	15240	401	14890	408	14530	415	14190	422	13800	429
18680	436	18350	442	18030	448	17710	454	17400	460	17100	466	16790	472
9340	285	8730	295	8080	309	7250	326	5940	355	5260	372	4680	388
10690	305	10190	315	9640	324	9070	337	8410	349	7330	374	6330	396
12760	338	12330	346	11930	356	11450	364	10970	373	10460	383	9900	394
14000	360	14000	375	14000	388	14000	400	14000	412	13920	426	13510	433

• Power rating (BHP) does not include drive losses.

- Some motors are available in either single-speed or two-speed versions. All data for these motors is high speed only. Low speed CFM or RPM = .67 x High Speed CFM or RPM.
- Belt tension should be 20 pounds for "A" section belts.

Water Sizing Data

Model	Motor HP	Total Water Usage* (GPH) (includes bleed off)	Bleed Off (GPH)
ED/ES830	3/4	28	6.1
	1	31	6.7
	1 1/2	35	7.7
	2	39	8.4
ED830	3	44	9.6

Model	Motor HP	Total Water Usage* (GPH) (includes bleed off)	Bleed Off (GPH)
ED/ES143	1	41	8.9
	1 1/2	46	10.2
	2	51	11.1
ED143	3	59	12.8
ED/ES213	1 1/2	59	12.9
	2	65	14.1
	3	74	16.2
	5	88	19.2
ED213	7 1/2	96	20.9

*Based on 40°F wet bulb depression

Water Evaporated:

GPH = (CFM/1000) x ((DB-WB)/10) where (DB-WB) is wet bulb depression

Bleed off rate:

GPH = approx. 28% of water evaporated.

Sheave Selection

Motor HP	Browning Part #	Bore	Blower RPM / Sheave Turns Open											Arctic Circle Package #
			5	4 1/2	4	3 1/2	3	2 1/2	2	1 1/2	1	1/2	0	
ED/ES830 Single Phase Motor														
Blower RPM @ 1725 Motor RPM / Sheave Turns Open														
3/4, 1	1VL40	5/8	296	308	320	333	345	357	370	382	394	407	419	EL110
3/4, 1	1VL44	5/8	345	357	370	382	394	407	419	431	444	456	468	ESH2411
1 1/2, 2	1VL44	7/8	345	357	370	382	394	407	419	431	444	456	468	EL685
3/4, 1	1VP50	5/8	419	431	444	456	468	481	493	506	518	530	542	693
1 1/2, 2	1VP50	7/8	419	431	444	456	468	481	493	506	518	530	542	686
1 1/2, 2	1VP56	7/8	493	506	518	530	542	554	567	579	591	604	616	695
ED/ES830 Three Phase Motor														
Blower RPM @ 1750 Motor RPM / Sheave Turns Open														
3/4	1VL40	5/8	303	316	329	341	354	366	379	392	404	417	430	EL110
1	1VL40	7/8	303	316	329	341	354	366	379	392	404	417	430	EL112
1, 1 1/2, 2	1VL44	7/8	354	366	379	392	404	417	430	442	455	468	480	EL685
3/4	1VP50	5/8	430	442	455	468	480	493	505	518	531	543	556	693
1, 1 1/2, 2	1VP50	7/8	430	442	455	468	480	493	505	518	531	543	556	686
1 1/2, 2	1VP56	7/8	505	518	531	543	556	569	581	594	606	619	632	695
3	1VP56	1 1/8	505	518	531	543	556	569	581	594	606	619	632	EL118
ED/ES143 Single Phase Motor														
Blower RPM @ 1725 Motor RPM / Sheave Turns Open														
1	1VL44	5/8	268	278	288	297	307	316	326	335	345	355	364	ESH2411
1 1/2, 2	1VL44	7/8	268	278	288	297	307	316	326	335	345	355	364	EL685
1	1VP50	5/8	326	335	345	355	364	374	383	393	403	412	422	693
1 1/2, 2	1VP50	7/8	326	335	345	355	364	374	383	393	403	412	422	686
1	1VP56	5/8	383	393	403	412	422	431	441	450	460	470	479	694
1 1/2, 2	1VP56	7/8	383	393	403	412	422	431	441	450	460	470	479	695
ED/ES143 Three Phase Motor														
Blower RPM @ 1750 Motor RPM / Sheave Turns Open														
1, 1 1/2, 2	1VL44	7/8	272	282	292	301	311	321	331	340	350	360	369	EL685
1, 1 1/2, 2	1VP50	7/8	331	340	350	360	369	379	389	399	408	418	428	686
1, 1 1/2, 2	1VP56	7/8	389	399	408	418	428	438	447	457	467	476	486	695
3	1VP56	1 1/8	389	399	408	418	428	438	447	457	467	476	486	EL118
ED/ES213 Single Phase Motor														
Blower RPM @ 1725 Motor RPM / Sheave Turns Open														
1 1/2, 2	1VL40	7/8	230	240	249	259	268	278	288	297	307	316	326	EL112
1 1/2, 2	1VL44	7/8	268	278	288	297	307	316	326	335	345	355	364	EL685
1 1/2, 2	1VP50	7/8	326	335	345	355	364	374	383	393	403	412	422	686
ED/ES213 Three Phase Motor														
Blower RPM @ 1750 Motor RPM / Sheave Turns Open														
1 1/2, 2	1VL40	7/8	233	243	253	263	272	282	292	301	311	321	331	EL112
1 1/2, 2	1VL44	7/8	272	282	292	301	311	321	331	340	350	360	369	EL685
3	1VL44	1 1/8	272	282	292	301	311	321	331	340	350	360	369	684
1 1/2, 2	1VP50	7/8	331	340	350	360	369	379	389	399	408	418	428	686
3	1VP50	1 1/8	331	340	350	360	369	379	389	399	408	418	428	685
3, 5	2VP42	1 1/8	253	263	272	282	292	301	311	321	331	340	350	687
3, 5	2VP50	1 1/8	331	340	350	360	369	379	389	399	408	418	428	688
5	2VP60	1 1/8	408	418	428	438	447	457	467	476	486	496	506	689
7 1/2	2VP60	1 3/8	408	418	428	438	447	457	467	476	486	496	506	692

Electrical Specifications

HP	Speed	Phase	Voltage	Amperage	NEMA Frame	Shaft Diameter	Motor Kit #
3/4	1	1	115/230	13.8/6.9	56	5/8	EJ006
3/4	2	1	230	6.9	56	5/8	EJ020
3/4	1	3	208-230/460	3.1-2.8/1.4	56	5/8	EJ883
1	1	1	115/230	16/8	56	5/8	EJ007
1	2	1	230	8	56	5/8	EJ021
1	1	3	208-230/460	4.0-3.6/1.8	143T	7/8	EJ665
1 1/2	1	1	115/230	20/10	145T	7/8	EJ212
1 1/2	1	3	208-230/460	5.7-5.2/2.6	145T	7/8	EJ666
2	1	1	115/230	24/12	145T	7/8	EJ213
2	1	3	208-230/460	7.5-6.8/3.4	145T	7/8	EJ667
3	1	3	208-230/460	10.6-9.6/4.8	182T	1 1/8	EJ668
5	1	3	208-230/460	16.7-15.2/7.6	184T	1 1/8	EJ659
7 1/2	1	3	208-230/460	24.2-22/11	213T	1 3/8	EJ675

- Amperage from National Electric Code.
- See nameplate on actual motor for amperage in figuring overload protector.
- Single phase motors rated 230 volts can be operated at nameplate amps at 208 volts.
- All 3-phase motors listed are suitable for use on evaporative coolers at 200 volts.



Commercial/Industrial Arctic Circle Project Submittal Sheet

Models ED830, ES830, ED143, ES143, ED213, and ES213

Project SHL*

Location

Architect

Engineer

Contractor

Submitted By Date

*Total design sensible heat load of project.

Cabinet – Motor – Motor Sheave – Pulley and Belt Kit – Pump

Ref. No.	Cabinet				Motor Specifications				Kits		Pump
	Qty.	Model No.	CFM	Static Pressure	HP	Volts	Phase	Amps	Motor Sheave	Pulley-Belt Kit No.	Model No.
1											
2											
3											
4											

*NOTE: Each unit (ready to operate) consists of one cabinet, one blower motor, one pulley-belt kit, one motor sheave, and one pump.

Your local Arctic Circle Representative of AdobeAir, Inc., is ready to assist you in unit selection and application.

Since AdobeAir, Inc. follows a policy of continuous product improvement, we reserve the right to change specifications and design without notice.

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Arctic Circle evaporative coolers and components are designed and tested in accordance with one or more of the following standards or agencies:

Air Delivery: Data published derived from tests conducted in accordance with A.M.C.A. (Air Movement and Control Assoc.) Standard 210.

Aspen Pads: Built to Federal Specification PP-E-911 for Type 1, Class A, Grade 4.

Sealant: Water Immersion: per ASTM D870. Flexibility: per ASTM D756. Corrosion Resistance: per ASTM B117. Cycle Freeze/Thaw: per ASTM C117.

POLYBOND®: Corrosion Resistance: per ASTM B117. Pencil Hardness: per ASTM D3363. Adhesion: per ASTM D3359. Impact Resistance: per ASTM D2794. Flexibility: per ASTM D522. Specular Gloss: per ASTM D523. Surface Burning Characteristics of Building Materials (best rating) per U/L 723 and ASTM E-84.

Pumps: Recognized under the U/L component recognition program for the application – construction, thermal overload, running overload, and locked rotor protection.

Blower Motors: U/L recognized general purpose drip-proof.

Polymeric Materials: Tested in accordance with U/L 94 and 746C. Covered by City of Los Angeles Research Reports (C.O.L.A.) RR930224 (for all single phase applications), or RR930190 (for 3 phase applications) Electrical, and RR8141 Mechanical.

Designed and Manufactured in the United States by:

AdobeAir, Inc.

500 S. 15th Street

Phoenix, AZ 85034

www.AdobeAir.com