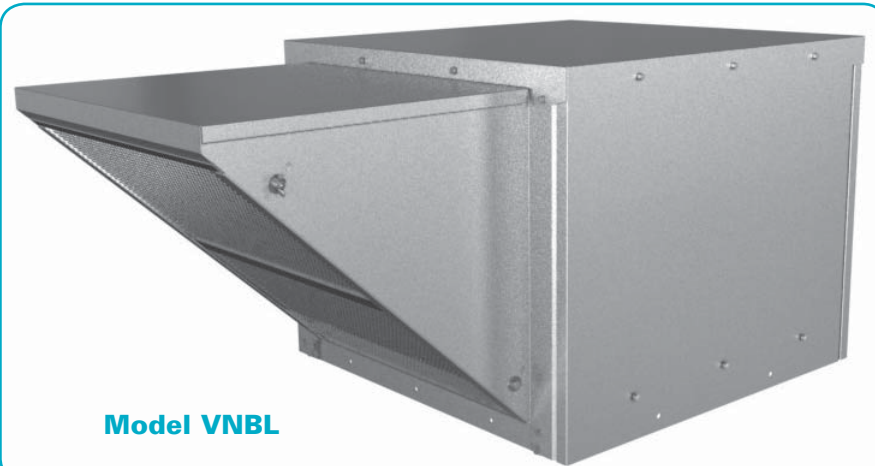


## **FILTERED SUPPLY CENTRIFUGAL - BELT DRIVE**



**Model VNBL**

The Carnes model VNBL is a belt drive, roof mounted supply air fan designed to provide filtered, non-tempered air for a variety of applications.

- Available in sizes from 10" to 20" with CFM capabilities ranging from 1,000 to 13,000 and static pressures up to 1.5 inches W. G.
- Double width, forward curved blowers are designed to maximize efficiency.
- Washable aluminum filters are standard to provide long operational life.
- All VNBL units are licensed to bear the AMCA seal to assure accurate performance specifications. Testing is performed in an AMCA Accredited Laboratory.
- VNBL units incorporate the Carnes SLIDE-RITE design. This drastically reduces the amount of fasteners required while resulting in an easy to maintain, durable, aesthetically superior design.
- The optional UL/cUL 705 listing insures that the units meet strict manufacturing and operational safety guidelines.

### **▼ TYPICAL SPECIFICATIONS**

- All fans bear the AMCA certified ratings seal for sound and air performance.
- Unit base has pre-punched mounting holes. Bottom pan has conduit opening to facilitate field power wiring.
- Blower and motor assembly is mounted on rubber shear vibration isolators.
- Permanent, washable 1" aluminum filters are standard.
- Disconnect (NEMA 1) is factory mounted within the unit housing.
- Blowers are DWDI-FC constructed of heavy-gauge steel, statically and dynamically balanced for vibration free operation.
- Fan shaft is ground and polished and mounted in heavy-duty, permanently lubricated and sealed ball bearings with minimum average life  $L_{50} = 200,000$  hours at operating speed.
- Drives are selected for minimum of 150% of motor horsepower. Motors are adjustable for final system balancing.
- Motors are permanently lubricated sealed ball bearing type and carefully matched to the specified fan performance, enclosure type and electrical specification.
- Motor mounting base is adjustable for proper belt maintenance. Belts are non-static conducting, oil resistant V-belts.
- Motors and drives are factory mounted. All units are factory run-tested and adjusted to proper RPM.

**CONSTRUCTION FEATURES**

**GALVANIZED STEEL HOUSING**

Encloses Blower, Motor, Drives and Filters

**ADJUSTABLE MOTOR PLATE**

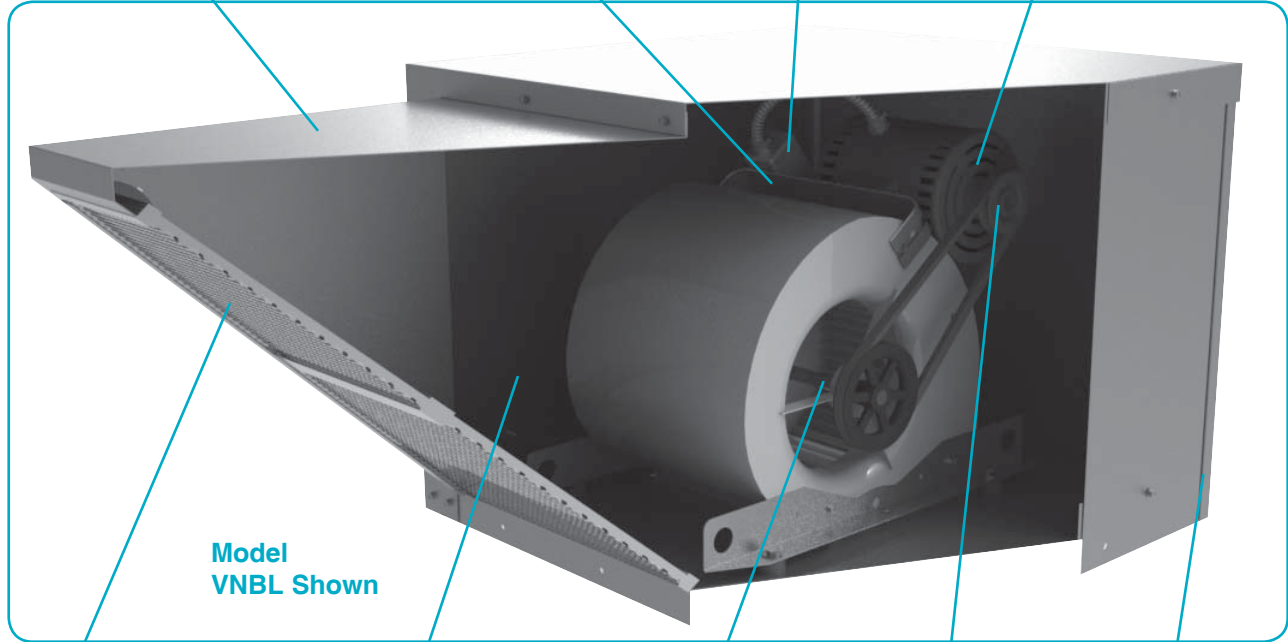
Pivots for Maintaining Proper Belt Tension

**DISCONNECT SWITCH**

Standard On All Units  
NEMA 1 Mounted

**MOTORS**

Heavy-duty Ball Bearing Motors Matched To The Specified Fan Load



Model VNBL Shown

**FILTERS**

Permanent/Washable  
1 Inch Aluminum  
Easily Removable With Pivoting Rails

**INTERNAL CONDUIT OPENING**

Facilities Field Wiring

**BEARINGS**

Permanently Sealed and Lubricated Average Life  
L<sub>50</sub> = 200,000 Hours

**ADJUSTABLE MOTOR SHEAVE**

For Final System Balancing

**CARNES SLIDE-RITE DESIGN**

Reduces Fasteners

**AMCA LICENSED AIR and SOUND DATA**

Licensed to bear the AMCA Seal for both air and sound.

The Carnes Company certifies that the Model VNBL 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 AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program



**UL OPTION**

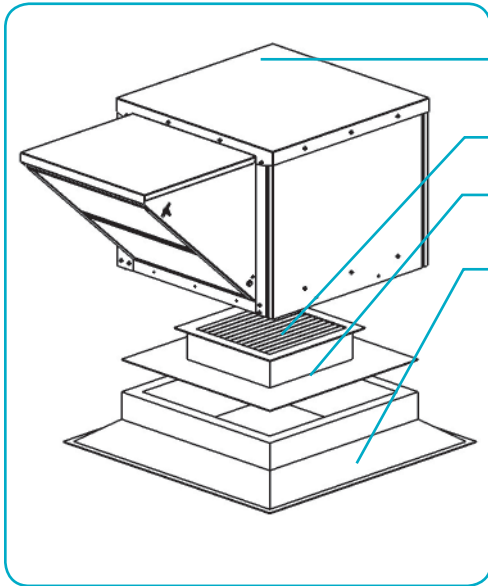
Model VNBL is listed to UL Standard 705 and to CSA Standard C22.2 No. 113-12. File Number E27827. UL listing may be optional and must be specified when required.



**POWER VENTILATOR**

**COMPUTERIZED FAN SELECTION:** Make the right choice with Carnes FAN-C-LECT™. The Model VNBL, as well as the comprehensive offering of CARNES powered ventilators, are included in CARNES user friendly fan selection program.

**TYPICAL INSTALLATION**



**VNBL** filtered supply unit with pre-punched mounting holes for securing unit to roof curb.

Supply duct *(by others)*.

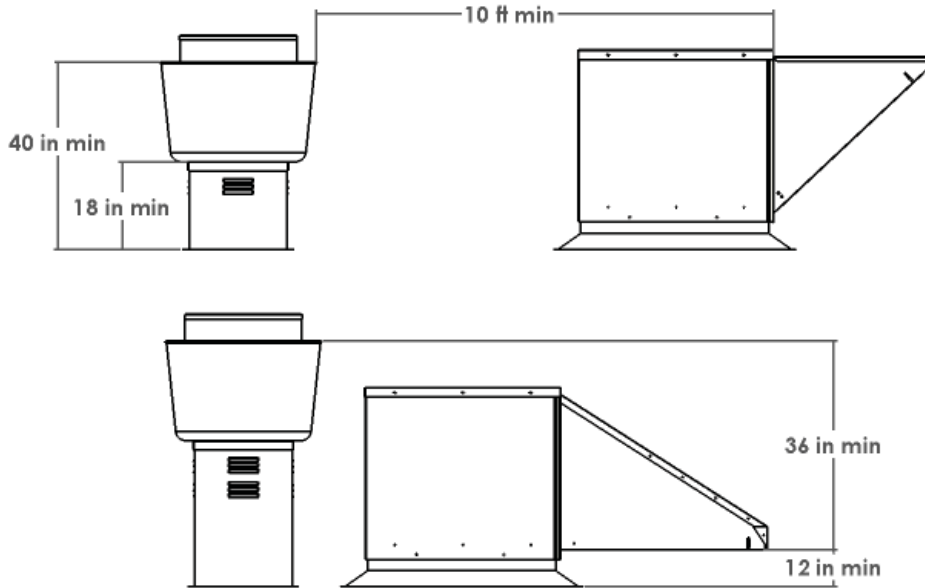
Duct adapter *(optional)* facilitates completion of supply duct prior to setting unit on curb.

Roof curb - shown without field installed roofing felts and flashing.

**NOTES:**

1. For locations where extreme snow depths may occur, an extended height roof curb should be specified. Also, condensate pans or ductwork drains may be required.
2. Installations with backdraft dampers require a duct access door, a roof curb extension with access panel, or other means of access to service the damper.

**SYSTEM DESIGN CONSIDERATIONS**



When using the VNBL for kitchen supply applications it is recommended that supply CFM be 80-90% of exhaust CFM. This creates a light vacuum in the kitchen keeping odors out of the dining area.

NFPA guidelines for restaurant supply and exhaust applications:

- Outlet of exhaust fan must be minimum 40 inches from roof.
- Distance from roof to top of curb cap must be minimum 18 inches.
- Distance from outlet of exhaust to intake of supply must be a minimum of 10 feet.
  - Alternately, outlet of exhaust must be minimum 36 inches from top of supply intake.

*\*Consult your local code authority for all installation requirements.*

**VNBL - 10**

Max. Fan  
RPM = 1800

Max. Motor  
Frame = 145T

Tip Speed (Ft./Min.)  
= RPM x 2.78

Unit Weight  
(Less Motor) = 180 Lbs.

RPM Range/ Motor HP	RPM	0		0.125		0.25		0.5		0.75		1		1.25	
		CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones
K1 (1/6) L1 (1/4) M1 (1/3) P1 (1/2) R1 (3/4)	500	1577	0.16 10	1235	0.12 8.5										
	550	1735	0.21 11	1427	0.17 11	1019	0.11 8.0								
	600	1892	0.27 14	1612	0.23 13	1299	0.17 11								
	650	2050	0.35 16	1794	0.30 16	1518	0.24 14								
L2 (1/4) M2 (1/3) P2 (1/2) R2 (3/4) S2 (1) T2 (1-1/2)	700	2208	0.44 19	1971	0.39 18	1719	0.33 18								
	750	2365	0.54 21	2146	0.49 21	1913	0.42 21								
	800	2523	0.65 23	2318	0.60 23	2101	0.53 24	1576	0.37 23						
	850	2681	0.78 26	2487	0.72 26	2286	0.65 27	1845	0.49 25						
P3 (1/2) R3 (3/4) S3 (1) T3 (1-1/2) V3 (2) W3 (3)	900	2838	0.93 28	2656	0.87 29	2467	0.80 31	2069	0.63 31						
	950	2996	1.09 31	2823	1.03 32	2646	0.96 34	2272	0.79 36	1745	0.56 30				
	1000	3154	1.27 34	2990	1.20 36	2824	1.13 37	2471	0.96 42	2041	0.75 36				
	1050	3311	1.47 36	3155	1.40 39	2998	1.33 41	2665	1.15 46	2307	0.95 43				
	1100	3469	1.69 40	3320	1.62 42	3170	1.54 44	2854	1.36 51	2524	1.15 50	2037	0.88 43		
S4 (1) T4 (1-1/2) V4 (2) W4 (3)	1150	3627	1.93 43	3485	1.86 45	3341	1.78 48	3041	1.59 55	2728	1.38 57	2331	1.13 50		
	1200	3784	2.20 46	3648	2.12 49	3511	2.03 52	3225	1.84 59	2928	1.63 66	2599	1.39 59	2054	1.04 52

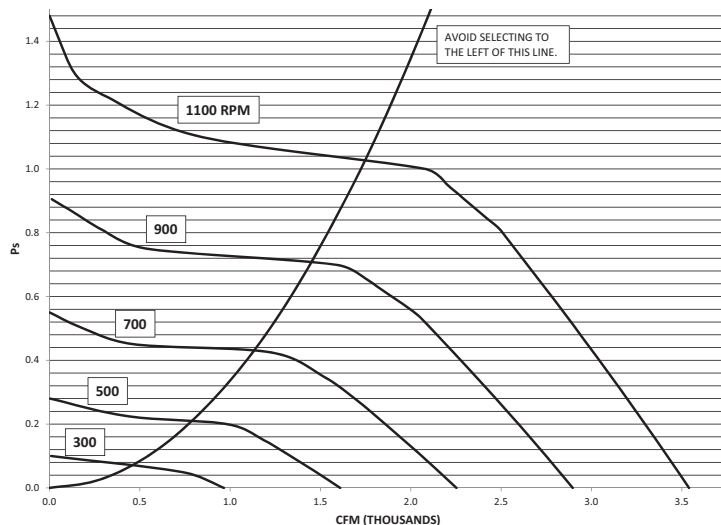
Performance and sound certification is for installation type B - free inlet, ducted outlet.

Performance ratings (bhp) do not include transmission losses.

Performance ratings do not include the effects of accessories.

The sound ratings shown are loudness values in sones at 1.5 m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301. Values shown are for: Installation type B: ducted outlet hemispherical sone levels. Ratings do not include the effect of duct end correction.

**PERFORMANCE CURVES**



Filtered Supply Vents

**VNBL - 12**

Max. Fan  
RPM = 1500

Max. Motor  
Frame = 145T

Tip Speed (Ft./Min.)  
= RPM x 3.30

Unit Weight  
(Less Motor) = 230 Lbs.

RPM Range/ Motor HP	RPM	0		0.125		0.25		0.5		0.75		1	
		CFM Sones	BHP	CFM Sones	BHP	CFM Sones	BHP	CFM Sones	BHP	CFM Sones	BHP	CFM Sones	BHP
L1 (1/4) M1 (1/3) P1 (1/2) R1 (3/4) S1 (1)	500	2505 12	0.34	2105 10	0.27	1628 7.6	0.19						
	550	2755 14	0.45	2406 12	0.38	2000 10	0.30						
	600	3005 17	0.58	2700 15	0.51	2316 13	0.41						
	650	3256 19	0.74	2975 18	0.66	2624 16	0.56	1776 12	0.34				
M2 (1/3) P2 (1/2) R2 (3/4) S2 (1) T2 (1-1/2) V2 (2)	700	3506 21	0.93	3246 20	0.84	2934 19	0.73	2243 15	0.51				
	750	3757 22	1.14	3515 23	1.05	3237 21	0.94	2647 18	0.72				
	800	4007 26	1.39	3782 25	1.29	3534 24	1.18	2970 21	0.93	2216 17	0.64		
	850	4258 29	1.66	4046 28	1.56	3826 27	1.45	3285 24	1.18	2686 20	0.90		
S3 (1) T3 (1-1/2) V3 (2) W3 (3)	900	4508 32	1.97	4309 31	1.86	4102 29	1.75	3592 27	1.45	3099 23	1.21		
	950			4571 34	2.20	4375 33	2.08	3903 30	1.78	3447 27	1.52	2825 23	1.16

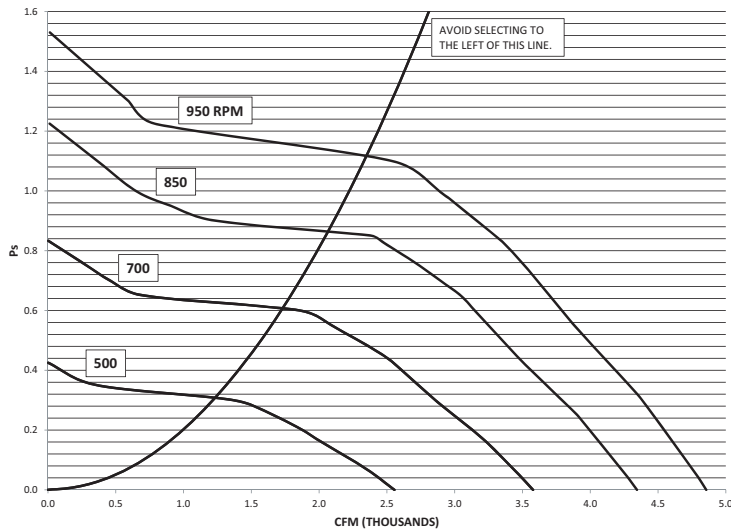
Performance and sound certification is for installation type B - free inlet, ducted outlet.

Performance ratings (bhp) do not include transmission losses.

Performance ratings do not include the effects of accessories.

The sound ratings shown are loudness values in sones at 1.5 m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301. Values shown are for: Installation type B: ducted outlet hemispherical sone levels. Ratings do not include the effect of duct end correction.

**PERFORMANCE CURVES**



Filtered Supply Vents

**VNBL - 15**

Max. Fan  
RPM = 1200

Max. Motor  
Frame = 184T

Tip Speed (Ft./Min.)  
= RPM x 3.93

Unit Weight  
(Less Motor) = 250 Lbs.

RPM Range/ Motor HP	RPM	0		0.125		0.25		0.5		0.75		1	
		CFM Sones	BHP	CFM Sones	BHP	CFM Sones	BHP	CFM Sones	BHP	CFM Sones	BHP	CFM Sones	BHP
K1 (1/6) L1 (1/4) M1 (1/3) P1 (1/2) R1 (3/4) S1 (1)	300	2034	0.11 6.4	1255	0.06 3.9								
	350	2373	0.17 8.4	1775	0.12 6.3								
	400	2712	0.26 11	2218	0.20 8.6	1426	0.12 6.6						
	450	3051	0.36 13	2630	0.31 11	2069	0.23 10						
M2 (1/3), P2 (1/2), R2 (3/4), S2 (1), T2 (1-1/2)	500	3390	0.50 16	3029	0.44 14	2557	0.36 13						
	550	3729	0.67 18	3408	0.61 17	3005	0.51 16						
P3 (1/2), R3 (3/4), S3 (1), T3 (1-1/2), V3 (2)	600	4068	0.87 21	3776	0.80 20	3422	0.71 19	2511	0.49 16				
	650	4407	1.10 24	4139	1.03 23	3829	0.94 22	3078	0.71 19				
S4 (1), T4 (1-1/2), V4 (2), W4 (3), X4 (5)	700	4746	1.37 27	4498	1.30 26	4227	1.21 26	3551	0.97 23	2850	0.68 19		
	750	5085	1.69 14	4855	1.61 30	4614	1.53 29	4004	1.27 27	3250	0.99 23		
T5 (1-1/2) V5 (2) W5 (3) X5 (5)	800	5424	2.05 34	5210	1.97 34	4984	1.88 30	4436	1.61 30	3812	1.33 28	2851	0.98 24
	850					5350	2.28 37	4851	2.01 36	4281	1.71 32	3568	1.39 29

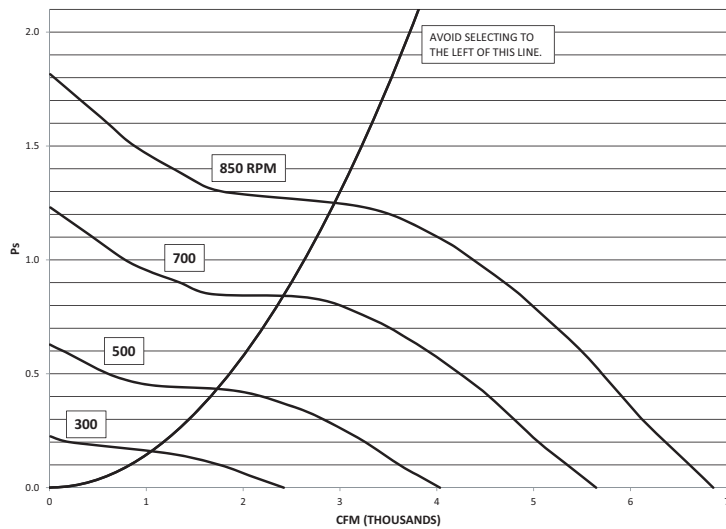
Performance and sound certification is for installation type B - free inlet, ducted outlet.

Performance ratings (bhp) do not include transmission losses.

Performance ratings do not include the effects of accessories.

The sound ratings shown are loudness values in sones at 1.5 m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301. Values shown are for: Installation type B: ducted outlet hemispherical sone levels. Ratings do not include the effect of duct end correction.

**PERFORMANCE CURVES**



**VNBL - 18**

Max. Fan  
RPM = 1000

Max. Motor  
Frame = 184T

Tip Speed (Ft./Min.)  
= RPM x 4.72

Unit Weight  
(Less Motor) = 310 Lbs.

RPM Range/ Motor HP	RPM	0		0.125		0.25		0.5		0.75		1		1.25		1.5	
		CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones
K1 (1/6) L1 (1/4) M1 (1/3) P1 (1/2) R1 (3/4) S1 (1) T1 (1-1/2)	300	3170	0.24 6.6	2307	0.17 4.5												
	350	3698	0.39 8.6	3003	0.30 7												
	400	4227	0.58 11	3622	0.48 10	2878	0.37 7.4										
	450	4755	0.82 14	4221	0.71 13	3634	0.59 11										
R2 (3/4) S2 (1) T2 (1-1/2) V2 (2)	500	5283	1.13 18	4806	1.00 17	4310	0.88 15										
	550	5811	1.50 22	5381	1.36 21	4931	1.22 19	3785	0.90 15								
S3 (1), T3 (1-1/2), V3 (2), W3 (3), X3 (5)	600	6340	1.95 25	5948	1.80 24	5536	1.64 22	4615	1.33 18								
	650	6868	2.48 30	6510	2.31 28	6130	2.15 27	5332	1.82 23	4199	1.39 18						
T4 (1-1/2), V4 (2), W4 (3), X4 (5), Y4 (7-1/2)	700	7396	3.09 32	7067	2.92 31	6714	2.74 29	6006	2.40 26	5113	1.99 21						
	750	7925	3.81 37	7620	3.62 35	7291	3.42 34	6631	3.05 31	5872	2.65 27	4838	2.13 22				
V5 (2) W5 (3) X5 (5) Y5 (7-1/2)	800	8453	4.62 43	8170	4.42 41	7862	4.21 39	7244	3.81 36	6586	3.41 33	5756	2.92 28	4592	2.24 24		
	850			8718	5.34 47	8428	5.11 45	7847	4.68 42	7263	4.27 38	6548	3.79 34	5623	3.18 29	4286	2.33 25

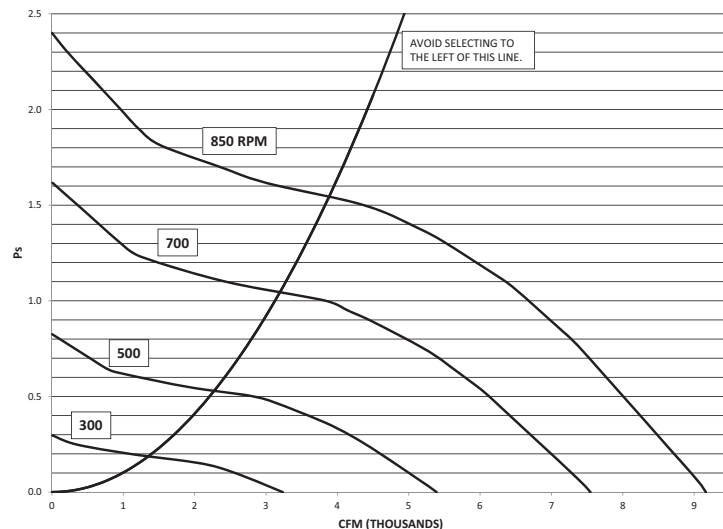
Performance and sound certification is for installation type B - free inlet, ducted outlet.

Performance ratings (bhp) do not include transmission losses.

Performance ratings do not include the effects of accessories.

The sound ratings shown are loudness values in sones at 1.5 m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301. Values shown are for: Installation type B: ducted outlet hemispherical sone levels. Ratings do not include the effect of duct end correction.

**PERFORMANCE CURVES**



Filtered Supply Vents

**VNBL - 20**

Max. Fan  
RPM = 900

Max. Motor  
Frame = 215T

Tip Speed (Ft./Min.)  
= RPM x 5.24

Unit Weight  
(Less Motor) = 550 Lbs.

RPM Range/ Motor HP	RPM	0		0.125		0.25		0.5		0.75		1		1.25		1.5	
		CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones	CFM	BHP Sones
L1 (1/4) M1 (1/3) P1 (1/2) R1 (3/4) S1 (1)	200	3602	0.19 5.1	1721	0.07 2.8												
	250	4502	0.37 7.5	3307	0.24 5.3												
	300	5403	0.64 10	4442	0.49 8.4	3214	0.32 6.9										
M2 (1/3), P2 (1/2), R2 (3/4), S2 (1), T2 (1-1/2), V2 (2)	350	6603	1.01 14	5512	0.84 12	4593	0.66 11										
	400	7204	1.51 18	6537	1.32 16	5744	1.11 15										
T3 (1-1/2) V3 (2) W3 (3) X3 (5)	450	8104	2.15 23	7515	1.94 21	6840	1.71 19	5314	1.23 17								
	500	9005	2.94 28	8479	2.71 26	7901	2.46 24	6614	1.96 22								
V4 (2) W4 (3) X4 (5) Y4 (7-1/2)	550	9905	3.92 33	9431	3.67 30	8934	3.40 28	7769	2.83 26	6476	2.25 24						
	600	10806	5.09 39	10375	4.81 36	9919	4.53 33	8883	3.90 31	7807	3.31 29	6428	2.58 28				
W5 (3) X5 (5) Y5 (7-1/2) C5 (10)	650	11706	6.47 45	11312	6.17 42	10892	5.86 39	9966	5.20 36	8976	4.54 34	7902	3.86 33	6314	2.92 30		
	700	12607	8.08 52	12245	7.76 49	11854	7.43 45	11025	6.73 41	10109	5.99 40	9185	5.32 38	8071	4.50 38	6403	3.38 34
X6 (5) Y6 (7-1/2) C6 (10)	750	13507	9.93 59	13174	9.60 55	12809	9.24 52	12065	8.52 46	11211	7.72 45	10352	6.97 43	9487	6.24 43	8352	5.29 41
	800							13074	10.56 55	12289	9.72 54	11487	8.88 52	10679	8.11 51	9789	7.26 49

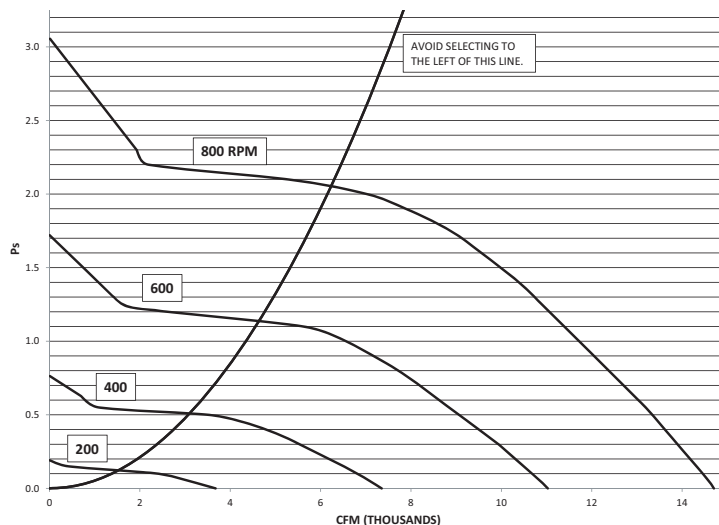
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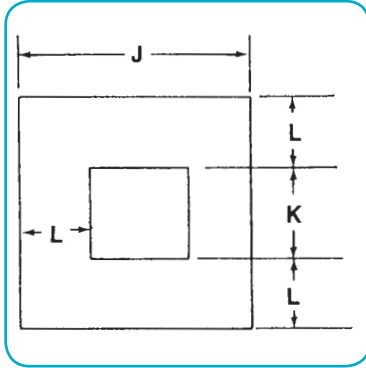
**PERFORMANCE CURVES**



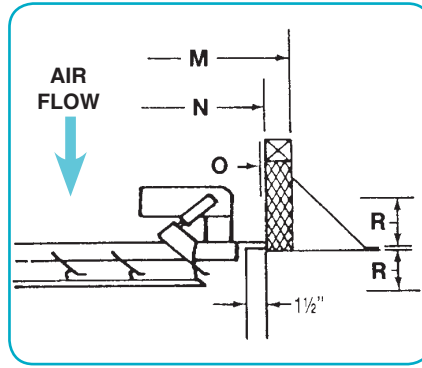
Filtered Supply Vents



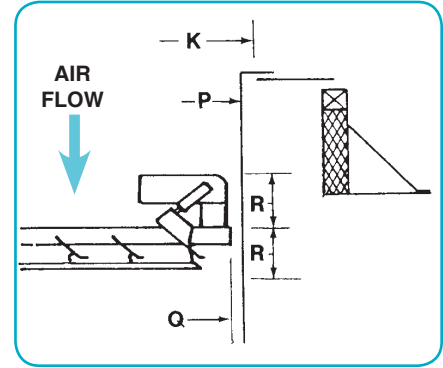
**ACCESSORIES**



**Duct Adapter**



**VXGA Curb Mtd. Damper**  
(Requires 1-1/2" damper shelf)  
Shown with optional motor pack

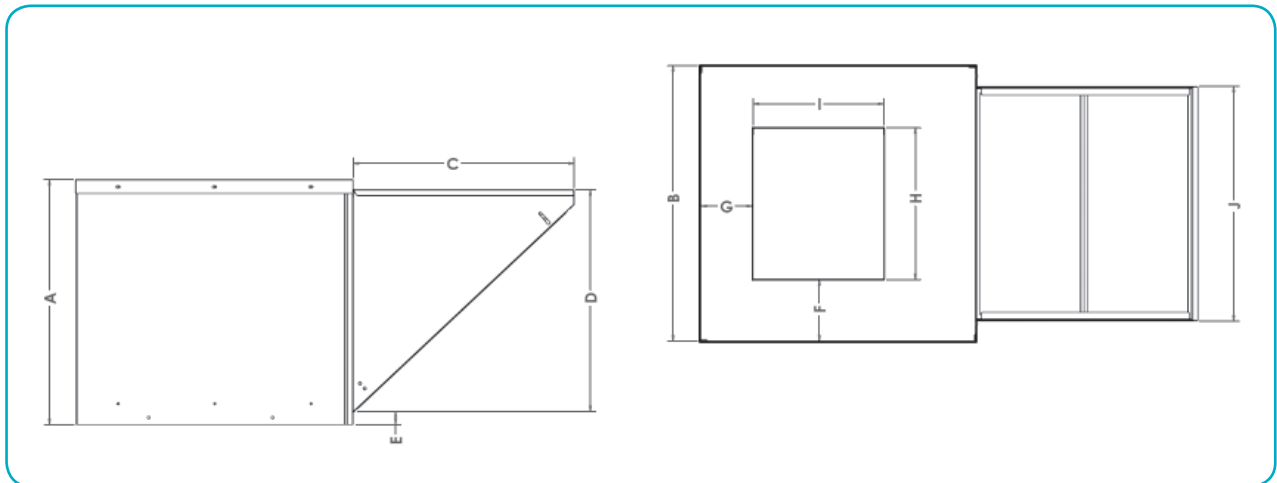


**VXHA Duct Mtd. Damper**  
Shown with optional motor pack

**DIMENSIONS LISTED IN INCHES**

Unit Size	J Sq.	K Sq.	L	Roof Curb Sq.		VXGA Damper		P Duct Sq. I.D.	VXHA Damper		R Damper Clearance	1" Filters Qty. - Size
				M O.D.	N I.D.	Size	O Sq.O.D.		Size	Q Sq. O.D.		
10	28	14	7	28-1/2	25-1/2	24-1/2	24-1/4	13-3/4	14	13-1/2	7	1 - 23 x 28-1/4
12	32	16-1/2	7-3/4	32-1/2	29-1/2	28-1/2	28-1/4	16-1/4	16	16	7	2 - 19-1/4 x 27
15	32	19-1/2	6-1/4	32-1/2	29-1/2	28-1/2	28-1/4	19-1/4	19	19	7	2 - 19-1/4 x 27
18	38	25-1/2	6-1/4	38-1/2	35-1/2	34-1/2	34-1/4	25-1/4	25	25	7	3 - 14-3/16 x 33
20	44	33-1/2	5-1/4	44-1/2	41-1/2	40-1/2	40-1/4	33-1/4	33	33	7	3 - 19 x 39

**DIMENSIONS**

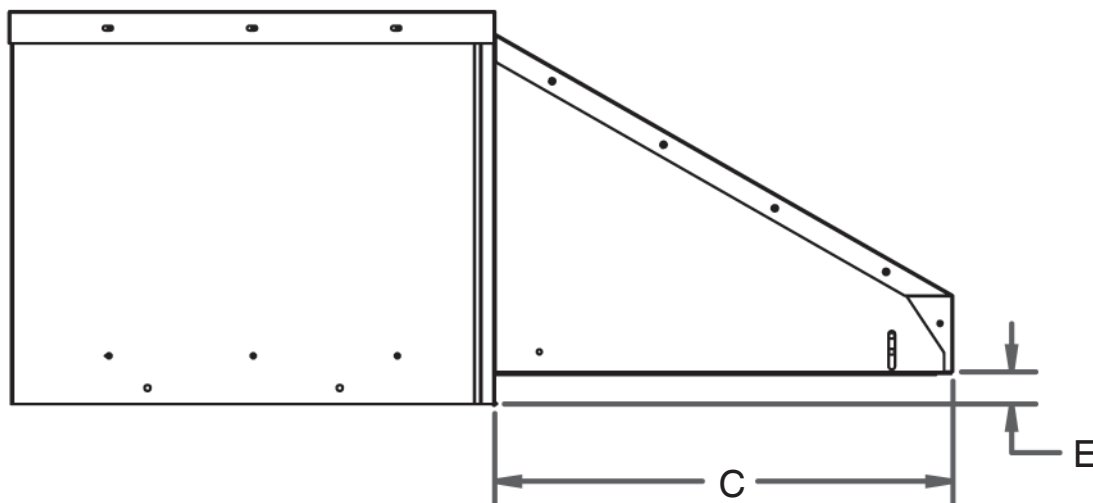


**DIMENSIONS LISTED IN INCHES**

Size	A	B Sq.	C	D	E	F	G	H	I	J
10	24-1/2	29-3/4	21-3/4	21-1/8	1-7/8	8-7/8	9-1/4	13-7/8	11-5/8	23-3/4
12	31-1/2	33-3/4	29	28-1/8	1-7/8	9-1/8	10-1/8	15-3/4	13-5/8	27-3/4
15	31-1/2	33-3/4	29	28-1/8	1-7/8	7-5/8	9-7/8	18-7/8	16-1/8	27-3/4
18	35-1/2	39-3/4	32-1/8	32-1/8	1-7/8	9	13-1/4	22-1/8	19-1/8	33-3/4
20	47-1/2	45-3/4	40-1/8	44-1/8	1-7/8	11-1/2	14-1/2	23	25	39-3/4

**OPTIONS**

**90° Intake**

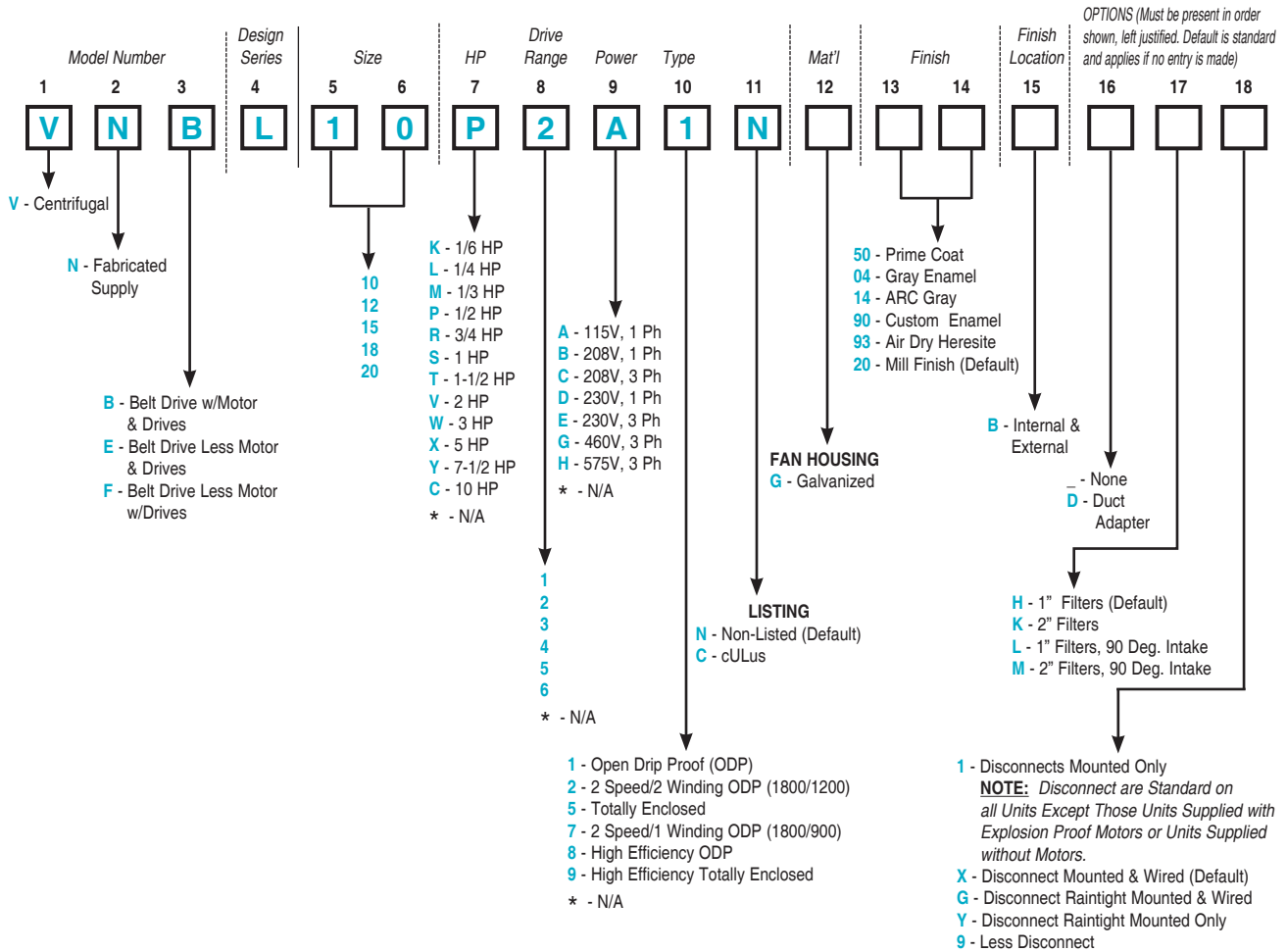


*Intake must be a minimum of 12" above roof for optimum performance.*

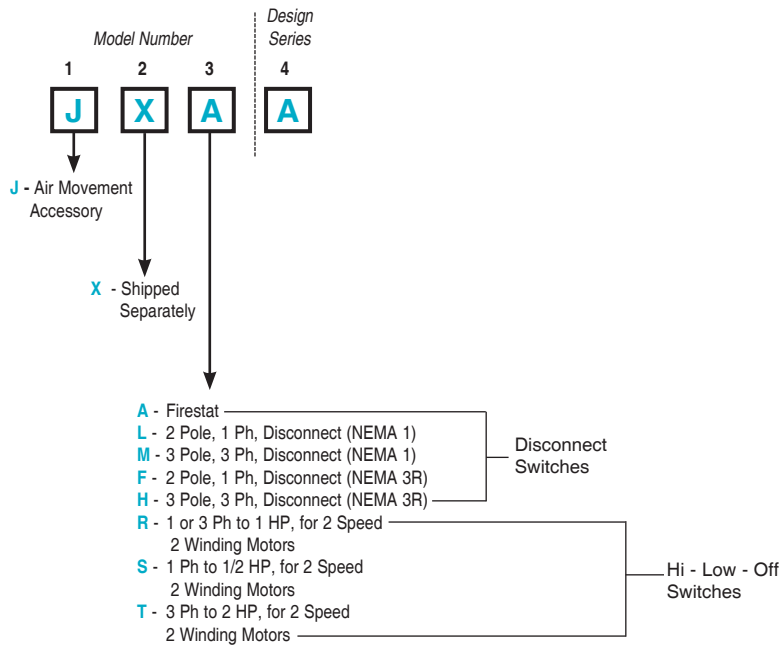
**DIMENSIONS for 90° Intake**

Size	C	E
10	28-5/8	1-7/8
12	38-7/8	1-7/8
15	38-7/8	1-7/8
18	42-3/4	1-7/8
20	57-1/8	1-7/8

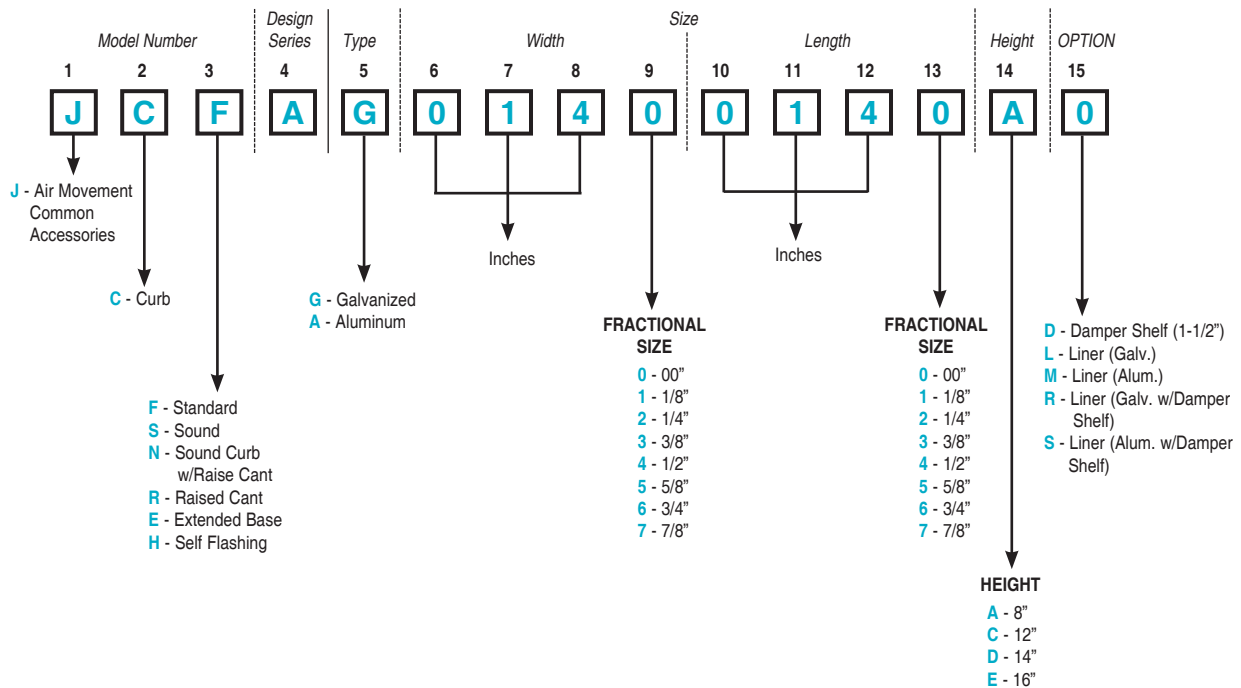
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