

University of Illinois Department of Agricultural and Biological Engineering
 Bioenvironmental and Structural Systems Lab
 Final Report

Project Number: 22230
 Test Date: April 27, 2022

Fan:		Motor:		Shutter:	
Make-	Better Air	Make-	AG-I	Material-	plastic
Model-	24" ECM	Model-	ECN48B13BNZ1/EC06F	# Doors-	9 per column
Blade dia.-	24.3"	Hp-	375 Watt	# Columns-	2
Orifice dia.-	25.5	RPM-	1800	Door length-	14.6"
		Volts-	115 / 230	Location-	intake
Blade:		Amps-	5.43 / 3.2		
Number-	3	Hz-	-	Guards:	
Shape-	propeller	Phase-	-	Description-	wire
Material-	plastic	S. F.-	-	Spacing-	2" concentric
Pitch-	-			Location-	exhaust
Clearance-	0.6"	Housing:		Discharge Cone:	
		Material-	plastic	Depth-	19"
Drive Sheaves:		Intake area-	29.1" x 29.1"	Minor dia.-	25.5"
Drive dia.-	direct	Discharge-	25.5"	Major dia.-	30.8"
Axle dia.-	drive	Depth-	28" top 25" bottom		

Notes: * 230 VAC, 1 phase, 60 Hz input. Speed controlled by 0-10 VDC signal.

Test Conditions:

T(wb) F:	58 Barometric pressure, recorded	29.60
T(db) F:	73 Barometric Pressure, corrected	29.48 (In. Hg)

Static Pressure (in.H2O)	Airflow (cfm)	rpm	Volts	Amps	Watts	cfm/Watt	SI Units Static Pressure (Pa)
Full speed - 10 VDC							
0.00	8460	1746	229.4	4.73	628	13.5	0
0.05	8080	1719	229.4	4.66	618	13.1	12
0.10	7670	1694	229.3	4.61	610	12.6	25
0.15	7240	1671	229.4	4.55	602	12.0	37
0.20	6830	1653	229.4	4.51	596	11.5	50
0.25	6380	1643	229.6	4.47	593	10.8	62
0.30	5890	1643	230.2	4.47	593	9.9	75
1575 rpm - 6.5 VDC							
0.00	7640	1570	230.6	3.52	457	16.7	0
0.05	7310	1570	230.4	3.65	475	15.4	12
0.10	7000	1570	230.2	3.76	491	14.2	25
0.15	6680	1570	230.2	3.85	505	13.2	37
0.20	6320	1570	230.2	3.92	514	12.3	50

0.25	5840	1570	230.2	3.94	518	11.3	62
1526 rpm - 6.3 VDC							
0.00	7400	1523	230.6	3.24	417	17.7	0
0.05	7060	1523	230.5	3.35	435	16.2	12
0.10	6780	1523	230.7	3.46	448	15.1	25
0.15	6410	1523	230.7	3.54	462	13.9	37
0.20	6000	1522	230.2	3.61	470	12.8	50
0.25	5440	1523	230.2	3.62	472	11.5	62
1190 rpm - 5.2 VDC							
0.00	5730	1191	230.6	1.69	207	27.7	0
0.05	5280	1191	230.7	1.78	220	24.0	12
0.10	4750	1191	230.8	1.84	229	20.7	25
0.15	4080	1189	230.8	1.83	229	17.8	37
0.20	3150	1191	230.7	1.80	220	14.3	50
0.25	2180	1191	231.1	1.88	232	9.4	62
840 rpm - 4.1 VDC							
0.00	3820	841	231.1	0.70	79	48.3	0
0.05	3010	841	231.1	0.74	87	34.6	12
0.10	1780	841	231.1	0.74	84	21.2	25
0.15	920	841	231.1	0.80	92	10.0	37
0.20	400	841	231.1	0.88	101	3.9	50
450 rpm - 2.8 VDC							
0.00	1370	448	231.5	0.18	18	76.2	0
0.04	250	448	231.5	0.19	22	11.5	10

Airflow (m ³ /hr.)	(m ³ /hr)/W	W/1000m ³ /hr
14400	22.9	44
13700	22.2	45
13000	21.4	47
12300	20.4	49
11600	19.5	51
10800	18.3	55
10000	16.9	59
13000	28.4	35
12400	26.2	38
11900	24.2	41
11300	22.5	45
10700	20.9	48

9900	19.2	52
12600	30.1	33
12000	27.6	36
11500	25.7	39
10900	23.6	42
10200	21.7	46
9200	19.6	51
9700	47.1	21
9000	40.8	25
8100	35.2	28
6900	30.2	33
5300	24.3	41
3700	15.9	63
6500	82.1	12
5100	58.8	17
3000	36	28
1600	17	59
700	6.7	150
2300	129.4	8
400	19.5	51