

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

Project Number: 24222  
 Test Date: April 11, 2024

<b>Fan:</b>	<b>Motor:</b>	<b>Shutter:</b>
Make- <i>Better Air</i>	Make- <i>NA Pacific</i>	Material- <i>plastic</i>
Model- <i>FW-54EC w/cone</i>	Model- <i>NPM23-230T</i>	# Doors- <i>19 per column</i>
Blade dia.- <i>54"</i>	Hp- <i>3.0 ( 2.2 kW)</i>	# Columns- <i>3</i>
Orifice dia.- <i>54.5"</i>	RPM- <i>500</i>	Door length <i>20.1"</i>
	Volts- <i>230</i>	Location- <i>intake</i>
	Amps- <i>10</i>	
<b>Blade:</b>	Hz- <i>50 // 60</i>	<b>Guards:</b>
Number- <i>3</i>	Phase- <i>3</i>	Description- <i>wire</i>
Shape- <i>propeller</i>	S. F.- <i>1.2</i>	Spacing- <i>2" concentric</i>
Material- <i>poly w/ alum. hub</i>		Location- <i>exhaust</i>
Pitch- <i>45 deg.</i>		
Clearance- <i>0.3"</i>		
	<b>Housing:</b>	<b>Discharge Cone:</b>
	Material- <i>fiberglass</i>	Intake area- <i>60.8" x 60.8"</i>
<b>Drive Sheaves:</b>	Intake area- <i>60.8" x 60.8"</i>	Depth- <i>31.6"</i>
Drive dia.- <i>direct</i>	Discharge- <i>54.5" dia.</i>	Minor dia.- <i>36.8"</i>
Axle dia.- <i>drive</i>	Depth- <i>28" top</i>	Major dia.- <i>44.3"</i>
	<i>24" bottom</i>	

Notes: \*230V 3 phase, 60 Hz input. Speed controlled with Phason SSV-DC

Test Conditions:

T(wb) F: 58.2  
 T(db) F: 73  
 Barometric Pressure 28.75 (In. Hg)

Static Pressure (in.H2O)	Airflow (cfm)	rpm	Volts	Amps	Watts	cfm/Watt	SI Units			
							Static Pressure (Pa)	Airflow (m <sup>3</sup> /hr.)	(m <sup>3</sup> /hr)/W	W/1000m <sup>3</sup> /hr
<b>Max motor rpm 575, 100% speed</b>										
0.000	31700	580	229.6	5.62	1471	21.6	0	53900	36.6	27
0.05	29500	580	229.8	5.67	1496	19.7	12	50100	33.5	30
0.10	27200	580	229.5	5.68	1495	18.2	25	46300	31	32
0.15	24500	580	229.7	5.64	1477	16.6	37	41600	28.1	36
0.20	22000	580	229.7	5.59	1463	15.0	50	37400	25.5	39
0.25	18300	580	229.8	5.50	1462	12.5	62	31000	21.2	47
<b>85% speed</b>										
0.00	29600	549	230.2	4.83	1249	23.7	0	50300	40.3	25
0.05	27400	549	230.2	4.91	1266	21.6	12	46500	36.7	27
0.10	24900	548	230.2	4.87	1265	19.7	25	42300	33.4	30
0.15	21900	548	230.3	4.80	1248	17.6	37	37200	29.8	34
0.20	19000	548	230.3	4.79	1247	15.2	50	32200	25.8	39
0.25	10000	548	230.2	5.13	1350	7.4	62	17000	12.6	80
<b>80% speed</b>										
0.00	26800	505	230.8	3.91	983	27.3	0	45500	46.3	22
0.05	24400	505	230.7	3.93	1001	24.4	12	41500	41.4	24
0.10	21500	505	230.7	3.91	983	21.9	25	36600	37.2	27
0.15	18600	505	230.7	3.85	973	19.1	37	31600	32.4	31
0.20	9500	505	230.7	4.12	1049	9.1	50	16200	15.4	65
<b>70% speed</b>										
0.00	21700	422	231.6	2.50	583	37.2	0	36900	63.2	16
0.05	18100	422	231.6	2.48	579	31.3	12	30800	53.1	19
0.10	14700	422	231.2	2.46	579	25.3	25	24900	43.1	23
0.15	7000	422	231.1	2.72	650	10.8	37	12000	18.4	54