

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

Project Number: 24221  
 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</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>	
<b>Blade:</b>		Amps- <i>10</i>			
Number- <i>3</i>		Hz- <i>50 // 60</i>		<b>Guards:</b>	
Shape- <i>propeller</i>		Phase- <i>3</i>		Description- <i>wire</i>	
Material- <i>poly w/ alum. hub</i>		S. F.- <i>1.2</i>		Spacing- <i>2" concentric</i>	
Pitch- <i>45 deg.</i>				Location- <i>exhaust</i>	
Clearance- <i>0.3"</i>		<b>Housing:</b>			
		Material- <i>fiberglass</i>		<b>Discharge Cone:</b>	
<b>Drive Sheaves:</b>		Intake area- <i>60.8" x 60.8"</i>		Depth- <i>none</i>	
Drive dia.- <i>direct</i>		Discharge- <i>54.5" dia.</i>		Minor dia.- <i>-</i>	
Axle dia.- <i>drive</i>		Depth- <i>28" top</i>		Major dia.- <i>-</i>	
		<i>24" bottom</i>			

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

**Test Conditions:**

T(wb) F: 57.6  
 T(db) F: 71.9  
 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	28400	579	230.8	5.66	1496	19.0	0	48300	32.3	31
0.05	26700	579	230.7	5.66	1485	18.0	12	45300	30.5	33
0.10	24500	579	230.7	5.61	1477	16.6	25	41700	28.2	35
0.15	22200	579	230.7	5.56	1459	15.2	37	37600	25.8	39
0.20	18900	579	230.7	5.51	1435	13.2	50	32200	22.4	45
0.25	12300	580	230.7	5.58	1467	8.4	62	20800	14.2	70
<b>85% speed</b>										
0.00	26800	551	230.8	5.01	1284	20.9	0	45600	35.5	28
0.05	25100	550	231.0	4.97	1273	19.7	12	42700	33.5	30
0.10	22600	550	230.7	5.01	1266	17.9	25	38400	30.3	33
0.15	19500	550	230.6	4.92	1231	15.8	37	33100	26.9	37
0.20	15500	550	230.4	4.76	1194	13.0	50	26300	22	45
0.25	9800	550	230.3	5.28	1373	7.1	62	16700	12.1	82
<b>80% speed</b>										
0.00	24500	507	230.7	4.07	1001	24.4	0	41600	41.5	24
0.05	22300	507	230.7	4.06	1001	22.3	12	37900	37.8	26
0.10	19400	507	230.7	3.98	974	19.9	25	32900	33.8	30
0.15	15500	507	230.5	3.91	963	16.1	37	26400	27.4	37
0.20	9500	507	230.7	4.23	1054	9.1	50	16200	15.4	65
<b>70% speed</b>										
0.00	19800	424	231.1	2.61	597	33.1	0	33600	56.2	18
0.05	16700	424	231.1	2.54	579	28.8	12	28300	48.9	20
0.10	12500	424	230.9	2.47	566	22.1	25	21200	37.5	27
0.15	6500	424	231.1	2.83	667	9.7	37	11000	16.5	60