

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

Project Number: 20085
 Test Date: January 27, 2020

Fan:		Motor:		Shutter:	Butterfly damper
Make- <i>Chore-Time</i>		Make- <i>Lafert</i>		Material- <i>Poly</i>	
Model- <i>56555-2</i>		Model- <i>HPS 90 630 70</i>		# Doors- <i>2</i>	
Blade dia.- <i>56.8"</i>		Hp- <i>2.06 kW</i>		# Columns- <i>-</i>	
Orifice dia.- <i>57.3"</i>		RPM- <i>630</i>		Door length- <i>-</i>	
		Volts- <i>230</i>		Location- <i>exhaust</i>	
Blade:		Amps- <i>7</i>			
Number- <i>3</i>		Hz- <i>-</i>		Guards:	
Shape- <i>propeller</i>		Phase- <i>3</i>		Description- <i>wire</i>	
Material- <i>galvanized steel</i>		S. F.- <i>-</i>		Spacing- <i>1.3" x 2" / 5.5" concentric</i>	
Pitch- <i>-</i>				Location- <i>intake / exhaust</i>	
Clearance- <i>0.2"</i>		Housing:			
		Material- <i>Poly</i>		Discharge Cone:	
Drive Sheaves:		Intake area- <i>57.5" x 57.5"</i>		Depth- <i>34.8"</i>	
Drive dia.- <i>direct</i>		Discharge- <i>56.6"</i>		Minor dia.- <i>56.6"</i>	
Axle dia.- <i>drive</i>		Depth- <i>10.5" + 6.5" wood frame</i>		Major dia.- <i>70"</i>	

Notes: speed control: Invertek Optidrive E3 ODE-3-120070-301A. Fan sub-assembly part no. 56555-1P.
 Three phase 230V 60 Hz AC input to drive

Test Conditions:

T(wb): 55	Barometric pressure, recorded	29.32
T(db): 77	Barometric Pressure, corrected	29.19

Static Pressure (in.H2O)	Airflow (cfm)	rpm	Volts	Amps	Watts	cfm/Watt	SI Units			
							Static Pressure (Pa)	Airflow (m ³ /hr.)	(m ³ /hr)/W	W/1000m ³ /hr
42 Hz										
0.00	34900	631	230.5	5.35	1435	24.3	0	59300	41.3	24
0.05	33500	631	229.8	5.55	1501	22.3	12	57000	38	26
0.10	32100	631	229.7	5.90	1604	20.0	25	54500	34	29
0.15	30400	631	229.6	6.24	1712	17.7	37	51600	30.1	33
0.20	28700	631	229.4	6.62	1823	15.8	50	48800	26.8	37
0.25	26900	631	230.0	7.03	1911	14.1	62	45600	23.9	42
0.30	24800	632	229.9	7.38	2026	12.3	75	42200	20.8	48
38.2 Hz										
0.00	32200	576	230.0	4.13	1062	30.3	0	54700	51.5	19
0.05	30600	576	230.2	4.46	1163	26.3	12	51900	44.7	22
0.10	28800	576	229.7	4.83	1260	22.8	25	48900	38.8	26
0.15	27100	575	229.8	5.10	1367	19.9	37	46100	33.7	30
0.20	24900	576	229.8	5.43	1459	17.1	50	42300	29	34
0.25	22800	576	230.0	5.67	1540	14.8	62	38700	25.2	40
33.2 Hz										
0.00	28300	500	229.8	2.96	724	39.0	0	48000	66.3	15
0.05	26400	500	229.5	3.27	799	33.0	12	44800	56	18
0.10	24400	500	230.1	3.47	883	27.6	25	41400	46.9	21
0.15	21900	500	230.9	3.82	963	22.7	37	37200	38.6	26
0.20	19300	500	230.2	4.04	1038	18.6	50	32900	31.6	32
0.25	14800	500	230.3	4.11	1088	13.6	62	25100	23.1	43
28.2 Hz										
0.00	24100	425	230.0	1.94	466	51.7	0	41000	87.9	11
0.05	21200	425	229.9	2.34	544	38.9	12	36000	66.2	15
0.10	18300	425	230.0	2.55	612	29.9	25	31100	50.8	20
0.15	14700	425	229.9	2.73	656	22.4	37	25000	38.1	26
0.20	9700	425	229.7	2.85	691	14.0	50	16500	23.9	42
23.2 Hz										
0.00	19300	350	230.2	1.31	282	68.5	0	32800	116.4	9
0.05	16000	350	230.1	1.52	337	47.4	12	27100	80.5	12
0.10	11400	350	230.0	1.67	374	30.5	25	19400	51.8	19
0.15	6500	350	230.0	1.84	418	15.5	37	11000	26.4	38