

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

Project Number: 21079
 Test Date: February 5, 2021

Fan:	Motor:	Shutter: Butterfly damper
Make- <i>Chore-Time</i>	Make- <i>Lafert</i>	Material- <i>Poly</i>
Model- <i>56911-1</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>
	Amps- <i>7.0</i>	
Blade:		Guards:
Number- <i>3</i>	Hz- <i>-</i>	Description- <i>wire</i>
Shape- <i>propeller</i>	Phase- <i>3</i>	Spacing- <i>1.3" x 2" / 5.5" concentric</i>
Material- <i>galvanized steel</i>	S. F.- <i>-</i>	Location- <i>intake / exhaust</i>
Pitch- <i>-</i>		
Clearance- <i>0.2"</i>	Housing:	Discharge Cone:
	Material- <i>Poly</i>	Depth- <i>34.8"</i>
Drive Sheaves:	Intake area- <i>55.7" x 55.7"</i>	Minor dia.- <i>56.6"</i>
Drive dia.- <i>direct</i>	Discharge- <i>56.6"</i>	Major dia.- <i>70"</i>
Axle dia.- <i>drive</i>	Depth- <i>10.5" + 12" galv. Box</i>	

Notes: *speed control: Invertek Optidrive E3 ODE-3-120070-101A. Fan sub-assembly part no. 56911-1P*
Single phase 230V 60 Hz AC input to drive

Test Conditions:

T(wb): 52	Barometric pressure, recorded	29.05
T(db): 77	Barometric Pressure, corrected	28.92

							SI Units			
Static Pressure (in.H2O)	Airflow (cfm)	rpm	Volts	Amps	Watts	cfm/Watt	Static Pressure (Pa)	Airflow (m ³ /hr.)	(m ³ /hr)/W	W/1000m ³ /hr
42 Hz										
0.00	35200	635	229.6	10.57	1513	23.2	0	59800	39.5	25
0.05	33700	635	229.3	11.34	1634	20.6	12	57300	35.1	29
0.10	32200	635	228.9	11.95	1731	18.6	25	54800	31.7	32
0.15	30700	635	229.9	12.32	1802	17.0	37	52200	28.9	35
0.20	29000	635	229.5	12.98	1909	15.2	50	49300	25.8	39
0.25	27200	635	229.3	13.63	2013	13.5	62	46200	22.9	44
0.30	25200	635	229.4	14.24	2120	11.9	75	42800	20.2	50
38.3 Hz										
0.00	32400	580	231.6	8.34	1163	27.9	0	55100	47.4	21
0.05	30800	580	230.7	9.00	1263	24.4	12	52400	41.5	24
0.10	29200	580	230.7	9.52	1348	21.7	25	49600	36.8	27
0.15	27500	580	230.5	10.06	1436	19.2	37	46800	32.6	31
0.20	25400	580	230.7	10.60	1525	16.6	50	43100	28.3	35
0.25	23100	580	230.3	11.18	1617	14.3	62	39300	24.3	41
33.3 Hz										
0.00	28600	504	230.7	5.93	784	36.4	0	48500	61.9	16
0.05	26800	504	230.3	6.46	861	31.1	12	45500	52.8	19
0.10	24600	504	230.2	6.98	941	26.2	25	41800	44.5	22
0.15	22400	504	229.8	7.47	1016	22.0	37	38000	37.4	27
0.20	19800	504	229.8	7.92	1085	18.2	50	33600	31	32
0.25	16000	504	229.4	8.22	1134	14.1	62	27300	24	42
28.3 Hz										
0.00	24500	428	230.7	3.89	490	50.1	0	41700	85.1	12
0.05	22200	428	230.7	4.37	558	39.9	12	37800	67.7	15
0.10	19700	428	230.5	4.79	619	31.8	25	33400	54	19
0.15	16500	428	230.3	5.18	677	24.4	37	28100	41.5	24
0.20	10900	428	230.3	5.38	703	15.5	50	18500	26.3	38
23.3 Hz										
0.00	19500	353	231.3	2.52	300	65.1	0	33200	110.6	9
0.05	16400	352	231.1	2.89	351	46.8	12	27900	79.6	13
0.10	12400	353	231.1	3.16	389	31.9	25	21100	54.3	18
0.15	7200	352	230.8	3.42	427	16.9	37	12200	28.7	35