

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

Project Number: 21080
 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>56911-2</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>
	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-3-120070-301A. Fan sub-assembly part no. 56911-1P*
Three 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	35100	632	230.7	5.45	1451	24.2	0	59600	41.1	24
0.05	33600	632	230.9	5.87	1579	21.3	12	57200	36.2	28
0.10	32100	632	230.9	6.22	1682	19.1	25	54500	32.4	31
0.15	30500	632	230.4	6.50	1767	17.3	37	51900	29.4	34
0.20	29000	632	230.0	6.89	1877	15.5	50	49300	26.3	38
0.25	27000	632	229.6	7.25	1973	13.7	62	46000	23.3	43
0.30	24900	632	229.6	7.56	2067	12.0	75	42200	20.4	49
38.3 Hz										
0.00	32300	578	230.6	4.46	1149	28.1	0	54800	47.7	21
0.05	30700	578	230.8	4.76	1248	24.6	12	52200	41.8	24
0.10	29200	578	230.8	5.06	1333	21.9	25	49600	37.2	27
0.15	27300	578	230.9	5.38	1430	19.1	37	46300	32.4	31
0.20	25300	578	230.9	5.64	1508	16.8	50	43000	28.5	35
0.25	23100	578	230.7	5.94	1594	14.5	62	39200	24.6	41
33.3 Hz										
0.00	28500	502	231.4	3.15	786	36.2	0	48300	61.5	16
0.05	26500	502	231.4	3.42	866	30.6	12	45100	52.1	19
0.10	24700	502	231.2	3.66	933	26.5	25	42000	45	22
0.15	22400	502	231.0	3.94	1014	22.1	37	38000	37.5	27
0.20	19600	502	230.9	4.15	1075	18.2	50	33200	30.9	32
0.25	15500	502	231.0	4.29	1116	13.9	62	26400	23.7	42
28.3 Hz										
0.00	24400	427	230.9	2.19	489	49.9	0	41500	84.9	12
0.05	22100	427	230.9	2.43	554	39.9	12	37600	67.8	15
0.10	19500	427	230.9	2.64	613	31.8	25	33200	54.1	18
0.15	16300	427	230.9	2.82	666	24.5	37	27800	41.7	24
0.20	10600	427	230.9	2.93	702	15.0	50	17900	25.5	39
23.3 Hz										
0.00	19500	351	231.4	1.46	297	65.6	0	33100	111.4	9
0.05	16300	351	230.6	1.65	348	46.7	12	27600	79.4	13
0.10	12100	351	230.2	1.74	380	31.9	25	20600	54.3	18
0.15	7100	351	229.6	1.96	426	16.6	37	12000	28.1	36