

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

Project Number: 20084
 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>56555-1</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 -	
		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 fra</i>		Major dia.- <i>70"</i>	

Notes: speed control: Invertek Optidrive E3 ODE-3-120070-101A. Fan sub-assembly part no. 56555-1P.
 Single phase 230V 60 Hz AC input to drive

Test Conditions:

T(wb): 55	Barometric pressure, recorded	29.29
T(db): 77	Barometric Pressure, corrected	29.16

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
41.8 Hz										
0.00	34700	631	230.4	9.82	1392	24.9	0	59000	42.4	24
0.05	33600	631	230.3	10.44	1513	22.2	12	57100	37.7	26
0.10	32000	631	229.5	11.15	1618	19.7	25	54300	33.6	30
0.15	30500	632	229.6	11.80	1730	17.6	37	51900	30	33
0.20	28900	632	229.5	12.44	1832	15.8	50	49200	26.8	37
0.25	27100	632	230.6	13.00	1935	14.0	62	46100	23.8	42
0.30	24900	632	230.3	13.70	2051	12.2	75	42400	20.6	48
38.1 Hz										
0.00	32100	576	230.4	7.87	1077	29.8	0	54600	50.7	20
0.05	30600	576	230.2	8.42	1181	25.9	12	52000	44.1	23
0.10	28900	576	230.0	9.07	1280	22.5	25	49000	38.3	26
0.15	27100	576	229.8	9.66	1376	19.7	37	46100	33.5	30
0.20	25100	576	229.8	10.25	1465	17.1	50	42600	29.1	34
0.25	22700	576	229.5	10.85	1553	14.6	62	38600	24.9	40
33.0 Hz										
0.00	28200	500	230.1	5.42	725	39.0	0	48000	66.2	15
0.05	26400	500	230.0	6.02	800	33.0	12	44900	56.2	18
0.10	24400	500	229.9	6.54	885	27.5	25	41400	46.8	21
0.15	22100	500	229.6	7.07	960	23.0	37	37600	39.1	26
0.20	19400	500	229.5	7.54	1042	18.6	50	33000	31.6	32
0.25	15200	500	229.6	7.87	1083	14.1	62	25900	23.9	42
28.1 Hz										
0.00	24100	425	229.7	3.70	463	52.1	0	41000	88.5	11
0.05	21300	425	229.8	4.27	539	39.6	12	36200	67.2	15
0.10	18200	425	229.6	4.75	612	29.8	25	31000	50.6	20
0.15	14800	425	229.6	5.05	657	22.5	37	25200	38.3	26
0.20	9800	425	229.7	5.27	692	14.1	50	16600	24	42
23.2 Hz										
0.00	19800	351	229.7	2.35	271	73.2	0	33700	124.3	8
0.05	16100	350	229.8	2.78	337	47.7	12	27300	81.1	12
0.10	11900	350	229.7	3.06	375	31.8	25	20300	54	19
0.15	6600	350	229.6	3.43	417	15.9	37	11300	27	37