The University of Georgia

College of Agricultural and Environmental Sciences
Cooperative Extension

Poultry Housing Tips

Best Performing Tunnel Fans - 2018

Volume 31 Number 4 **2019**

When building a new house or retrofitting an older one, tunnel fan selection is one of the most, if not the most important decision a producer has to make. A house's fans are essentially the engine of the ventilation system and as a result have a significant effect on a producer's ability to maintain the proper environmental conditions throughout the year. Furthermore, with rising electricity prices, selecting the right energy-efficient fan can save a producer thousands of dollars a year. As a result, when selecting fans it is crucial that a producer compares fans not just on initial cost, but on fan performance and operating costs as well.

The University of Illinois BESS Laboratory website is the leading source for agricultural fan performance data (www.bess.uiuc.edu). Along with a fan's air-moving capacity at various static pressures, BESS Laboratory provides producers information on a fan's energy-efficiency rating (cfm/watt), air-flow ratio (an indicator of how well the fan holds up under high static pressures), shutter location/type, motor model number, fan speed, and a variety of other potentially valuable details.

When selecting a tunnel fan it is crucial to know the maximum static pressure the fans will be operating under. The higher the static pressure, the lower the amount of air moved by the fans, and the greater the number of fans required to provide the necessary amount of fresh air/wind speed to keep the birds cool during hot weather. For broiler houses, the maximum static pressure typically ranges between 0.10" and 0.20". Though factors such as pad area/maintenance, deflector-curtain installation, and tunnel door installation/operation will have an effect on the maximum operating static pressure, the primary factor which determines the maximum expected static pressure is air speed. The higher the target air speed, the higher the static pressure will tend to be due to the exponential relationship between tunnel air speed and work (static pressure) required to pull air into and down a house. Table 1 illustrates the typical pressure range the tunnel fans will experience under various

design air velocities. The actual maximum pressure experienced can vary significantly with the aforementioned variables as well as house length, fan maintenance, and house tightness.

Air speed	Design Static Pressure
500 ft/min	0.09" - 0.12"
600 ft/min	0.12" - 0.15"
700 ft/min	0.15" - 0.18"
800 ft/min	0.18" - 0.21"

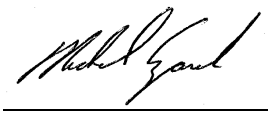
Table 1. Air velocity and corresponding design static pressure for a traditional tunnel-ventilated broiler house.

A fan's energy efficiency rating is similar to a car's mileage rating. Instead of speaking in terms of miles per gallon, when comparing fans we look at how many cubic feet per minute the fan can move with a single watt of power (cfm/watt). As with a car's mileage rating, the higher the cfm/watt the more energy efficient the fan. A 2 cfm/watt difference between two fans typically results in approximately a 10% difference in electricity usage. In general, energy-efficiency ratings vary from approximately 15 cfm/watt to over 30 cfm/watt. As with the case of a fan's air moving capacity, comparing fans' energy efficiency ratings should be done at a static pressure of 0.10".

A fan's air-flow ratio is another important factor to consider when purchasing a fan. A fan's air-flow ratio is an indicator of how well the fan will hold up as static pressure increases due to factors such as dirty shutters, dirty pads, or the presence of baffle curtains. A fan's air-flow ratio is determined by dividing how much air it moves at 0.05" by how much air it moves at a static pressure of 0.20". The higher the rating the less the fan is affected by high static pressure. Air-flow ratios typically vary from 0.50 to 0.85. To put this into perspective, the air moving capacity of a fan with an air-flow ratio of 0.50 will decrease as much as 50% in a worse case scenario (a static pressure of 0.20"), whereas a fan with an air-flow ratio of 0.85 would decrease only 15%.

Table 2 lists the top performing tunnel fans (48" to 62", 230V/Single phase, 60 hz) based on the published test results produced by the BESS Laboratory through December 31, 2018. The fans in Table 2 have an energy-efficiency rating of at least 20.8 cfm/watt @ 0.10" static pressure and have an air-flow ratio of at least 0.76, representing approximately the top 10% of all tunnel fans tested by the BESS Laboratory.

Though fan performance is of course very important, it is important to keep in mind that there are other factors to consider when purchasing a fan, such as quality of construction, local dealer reputation, warranty, and type of shutter. Though it can be difficult balancing all the factors when it comes to purchasing fans for a tunnel-ventilated house, in the long run you will find that it is time well spent.



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Manufacturer	Test #	Model	Diameter	Cone	Shutter	cfm (0.05")	cfm/W (0.05")	cfm (0.10")	cfm/W (0.10")	AFR
Acme	07204	BDR54J	54"	Y	A	25,100	27.7	23,500	24.5	0.76
Acme	07206	BDR54J1	54"	Y	A	27,400	25.4	25,900	22.7	0.81
Acme	02207	BDRV54J2-C2	54"	Y	A	27,400	25.5	25,800	22.5	0.79
Acme	02210	BDRV54J-C2	54"	Y	A	26,100	25.8	24,400	22.4	0.77
Acme	02214	BDRV54J-C3	54"	Y	A	25,900	25.3	24,200	22.2	0.76
Acme	02217	BDRV54J2-C3	54"	Y	A	27,100	25.2	25,400	22.2	0.79
Acme	04274	DDPSV54J-C	54"	Y	A	25,500	25.4	23,800	22.1	0.77
Acme	04278	DDPGV54J-C	54"	Y	A	26,500	25.2	24,700	21.8	0.76
Acme	00245	BDR54J-C	54"	Y	A	26,100	24.2	24,500	21.4	0.79
Acme	00207	DDPS48J-C	48"	Y	A	20,400	23.9	19,100	21.3	0.77
Acme	02209	BDRV54J1-C2	54"	Y	A	27,100	24	25,500	21.1	0.77
Acme	17355	BDR54J-7	54"	Y	A	27,900	23.2	26,400	20.8	0.81
Acme	17354	BDR54J-6	54"	Y	A	27,600	23.4	23,200	21.3	0.81
Acme	17336	BDR54J1-1	54"	Y	A	27,900	23.4	26,500	21.1	0.81
Acme	17338	BDR54J1-2	54"	Y	A	27,600	23.2	26,100	21.5	0.82
Airstream	14183	77-0149-IB, 77-0161-IB	54"	Y	B	27,600	24.4	25,800	21.6	0.77
Airstream	14158	77-0148-IB, 77-0160-IB	54"	Y	B	27,900	24.1	26,100	21.2	0.78
Airstream	15334	77-0173	54"	Y	B	27,600	23.9	26,000	21.2	0.80
Airstream	15336	77-0175	54"	Y	B	28,200	23.7	26,500	21	0.81
Airstream	17304	77-0183, 77-0183-K	58"	Y	B	28,900	25.4	26,700	22.6	0.78
American Coolair	10238	MNBCC54L	55"	Y	A	26,900	25.6	25,600	23	0.77
American Coolair	10255	MNEFCE54M	55"	Y	A	27,900	24.5	26,000	21.5	0.80
American Coolair	10236	MNBCCE54M	55"	Y	A	29,800	23.7	28,100	21.5	0.81
American Coolair	16346	FGXM54M	54"	Y	B	30,400	23.9	28,300	21	0.79
Chore-Time	12614	53464-22	57"	Y	B	28,900	26.1	27,100	23	0.78
Chore-Time	12620	53464-42 variable speed	57"	Y	B	28,500	25.3	26,400	22	0.77
Chore-Time	09081	52157-22	54"	Y	B	27,700	25.3	25,800	22	0.78
Chore-Time	13591	54659-22	57"	Y	B	28,300	24.7	26,400	21.7	0.77
Chore-Time	04336	49451-22	48"	Y	B	21,200	24.8	19,700	21.6	0.76
Chore-Time	04326	49515-22	48"	Y	B	21,100	24.4	19,600	21.3	0.77
Chore-Time	05192	49511-22	52"	Y	B	26,400	23.9	24,600	21.2	0.76
Chore-Time	05186	49519-22	52"	Y	B	26,400	23.6	24,500	20.8	0.76
Hired Hand	08154	6603-7082	54"	Y	A	27,400	26.7	25,800	23.8	0.81
Hired Hand	08155	6603-7090	54"	Y	A	28,000	25.8	26,700	23.4	0.83
Hired Hand	04343	6603-0606	52"	Y	A	27,000	23.3	25,300	20.8	0.78
Multifan	16162	C4E14K1	54"	Y	A	28,200	25.4	26,700	22.8	0.79
Multifan	16190	C4E14K2	54"	Y	A	31,800	23.3	30,100	20.8	0.82
Multifan	17403	G4E14K2-cone	54"	Y	G	23,900	23.6	22,200	20.9	0.76
Multifan	16860	C4E14K2	54"	Y	P	30,600	23.7	29,000	21.1	0.81
Multifan	16682	S4E14K0	54"	Y	A	27,700	23.3	26,000	20.9	0.80
Multifan	16683	S4E14K0	54"	Y	P	27,700	23.4	26,100	21	0.79
Multifan	16832	C4E14P1	54"	Y	P	32,600	23.7	31,300	21.3	0.85
Multifan	16835	C4E14P4	54"	Y	A	33,400	24.5	32,000	21.6	0.86
Multifan	16840	C4E14P2	54"	Y	P	30,600	26.1	29,100	23.1	0.82
Multifan	16837	C4E14P5	54"	Y	A	29,400	29.3	27,800	25.5	0.78
Munters Aerotech	06141	WF541T1CEJ	54"	Y	A	27,800	25	26,000	22.3	0.77
Munters Aerotech	15181	WM541F1CB	54"	Y	B	29,100	25	27,200	22.3	0.77
Munters Aerotech	06139	WF541T1CEP	54"	Y	P	27,400	24.2	25,600	21.7	0.76
Munters Aerotech	07390	WF541V1CD	54"	Y	B	27,800	24.6	25,900	21.7	0.77
Munters Aerotech	12791	VX55DF21CT-HE	55"	Y	P	31,100	23.7	28,900	21.1	0.76
Munters Aerotech	15003	WM541G1CD	54"	Y	B	28,700	23.4	27,000	21.1	0.80
Munters Aerotech	06115	WF541T1CJ	54"	Y	A	27,300	23.6	25,400	20.9	0.77
Pro Terra Systems	09081p	A52157-22	54"	Y	B	27,700	25.3	25,800	22	0.78
Pro Terra Systems	04336p	A49451-22	48"	Y	B	21,200	24.8	19,700	21.6	0.76
Pro Terra Systems	04326p	A49515-22	48"	Y	B	21,100	24.4	19,600	21.3	0.77
Pro Terra Systems	05192p	A49511-22	52"	Y	B	26,400	23.9	24,600	21.2	0.76
Pro Terra Systems	05186p	A49519-22	52"	Y	B	26,400	23.6	24,500	20.8	0.76
Skov	16814	DA 1700-5 LPC	55"	Y	B	31,000	26.6	29,300	23.3	0.81
Skov	16813	DA 1700-5E LPC	55"	Y	B	27,900	31.1	25,900	26.2	0.76
Val-Co	15646	954205	54"	Y	A	28,500	24.3	27,100	22.3	0.79
Val-Co	05203	HGS48G340NGA	48"	Y	A	21,900	25.4	20,300	22.1	0.76
Val-Co	15647	954200	54"	Y	A	28,900	24.6	27,000	21.9	0.76
Val-Co	15664	954206	54"	Y	A	28,100	23.9	26,600	21.8	0.80
Val-Co	17057	954725	54"	Y	A	29,300	24.8	27,300	22.1	0.76
Val-Co	16534	954290	54"	Y	A	28,200	22.8	26,500	20.8	0.79
Val-Co	16521	954605	54"	Y	A	28,900	23.9	27,200	21.4	0.81
Val-Co	16556	954606	54"	Y	A	28,800	23.6	27,200	21.3	0.81
Val-co	16539	954710	54"	Y	A	28,700	23.8	27,000	21.6	0.78

Table 2. Alphabetical listing of top performing tunnel fans as tested by BESS Labs 2018
(A=Aluminum Shutter, G=Galvanized Shutter, P=Plastic Shutter, R=Roll Seal Shutter, B=Butterfly Shutter, D=Door)
New tests for 2017-18