

PSC FOR HAF (HORIZONTAL AIR FLOW)¹

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Most of the small fans used for moving air in greenhouses are inefficient. They have *shaded pole* motors. These motors are only 40-50% efficient.

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Permanent split capacitor (PSC) motors, on the other hand, are perhaps 60-80% efficient. These motors are only a bit more expensive than shaded pole motors.

The pay back time for PSC motors is very short in comparison with other investments. Assuming 75% efficiency versus 50% for shaded pole, only 2/3 as much

energy is required to move the same amount of air. A 1/15 HP motor with a 16" blade should operate at about 75 watts. If four fans are placed in a 100 x 30' greenhouse, the load is 300 watts. Shaded pole motors would require 450 watts so the savings is 150 watts. At 6¢/KWH, 0.9¢/hour less electricity is used. In just 200 hours of operation the savings is \$18.00, just about the extra cost for four PSC motors.

There are not many investments that will be paid back in just eight days of operation.

There are several sources of PSC motors for fans. For reference, the following specifications on a Dayton fan were taken from the Grainger catalog.

Motor #3M499, PSC 1/15 HP, 1625 RPM, 5/16" shaft, 115 V, 1.2 Amp. ca	\$19.00
Capacitor #4x426 and Kit #3M533	2.30
Fan Blade, aluminum 3-wing, 1580 cfm @ 1550 RPM #2C406	4.00
Belly-band mount #2C680	1.00
Blade guard (necessary if less than 7 feet above floor)	_____?
	\$27.30+

Larger fans that are belt-driven (exhaust fans) usually have capacitor start, induction-run motors that have an efficiency rating similar to PSC motors. These fans are generally more efficient in larger, ridge and furrow greenhouses. The cost is comparable.

For instance, assume that two houses, 25x100' are gutter connected. To provide HAF with 1/15 HP fans as described above, eight fans would be used for a total cost of about \$220. If one 24", ¼ HP fan (such as Grainger #7F137) is placed in each greenhouse (blowing the air down one and back the other), the cost would be about \$270.

Air delivery from these fans using the "Free Air" rating would be (8x1580) 12,640 cfm for the small fans and (2x5400) 10,800 cfm for the 2¼ HP fans. Power usage might be 600 watts (8x75) for the small fans and 500 watts (2x250) for the ¼ HP fans. The air movement attained may be better with the small fans if the houses are low and many plants are grown overhead. It should be better using the large fans in high, open houses.

In either of the above installations the air should move at least 50 feet per minute. A speed of over 100 fpm is not necessary. Overhead convection tubes do not provide minimal recommended air movement.

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