



UNIVERSITY OF
FLORIDA

Florida Cooperative Extension Service

Fact Sheet EES-33

November 1992



Whole House Fans: Installation¹

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A properly sized whole house fan is designed to pull large quantities of outside air through screened windows and doors and push it through the attic. When there is insufficient clearance in attic exhaust areas, the whole house fan can be installed to exhaust directly outside through the wall. Maximum benefit is obtained when the fan exhausts through the attic because it cools both the attic and the occupants. This differs from attic fans which are designed to cool the attic only and are not cost effective if the attic is well insulated. (See Figure 1).

SIZING

A whole house fan should be sized to provide an air flow rate between 1.5 and 4 cubic feet per minute (CFM) per square foot (SF) of floor area of the residence. A 2000 SF home should have a fan capable of delivering between 3000 and 8000 CFM. Two smaller fans of the same size properly located and installed may be used, but care must be taken to operate them at the same time to avoid reverse flow. The high end of the scale will provide the best return in savings. (Refer to Table 1.)

Fans can either be direct or belt drive. Belt driven fans are usually of larger sizes with greater capacities, and they may require more maintenance. A feature you should insist on in either case is a high

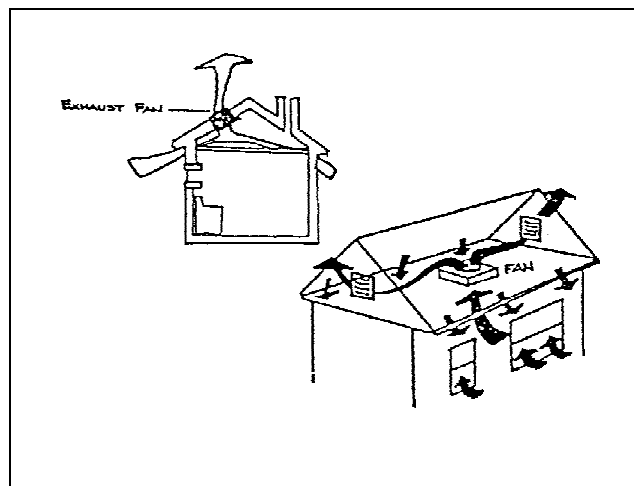


Figure 1. Exhaust Fans vs. Attic Fans

temperature switch which automatically shuts the fan off in case of fire.

The Florida Model Energy Efficiency Code allows 5 credit points for a whole house fan providing at least 1.5 CFM/SF. This is a significant bonus for residential builders looking for ways to reduce their Energy Performance Index (EPI). The lower the EPI the better the energy performance of a residence. Bonus points are subtracted from the gross EPI points.

1. This document is Fact Sheet EES-33, a series of the Florida Energy Extension Service, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: November 1992.
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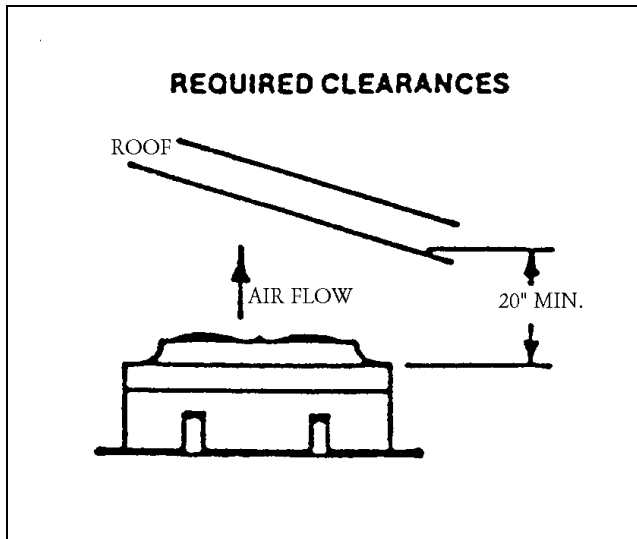


Figure 2. Required Clearances

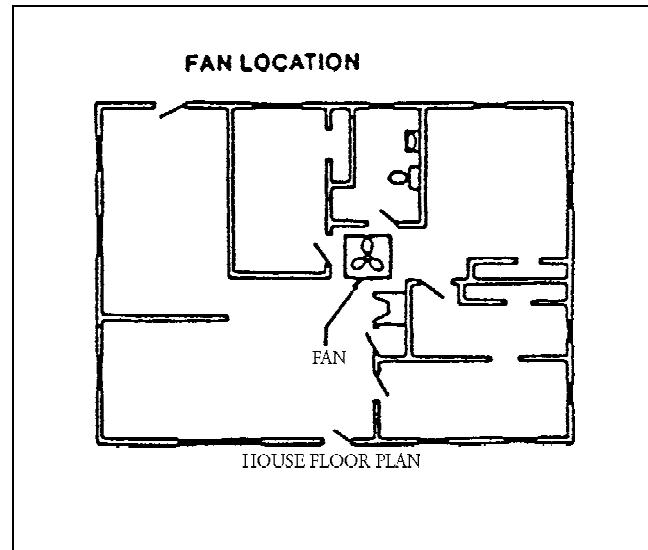


Figure 3. Fan Location.

INSTALLATION GUIDELINES

These are general guidelines for location and placement of a whole house fan. If these general guidelines can be met, the fan may be purchased, and the specific installation instructions of the manufacturer should then be followed.

The whole house fan should be located properly within the house and have enough clearance behind the blades to reduce back pressure. There should be ample exhaust openings in the attic to minimize back pressure.

To be most effective, the fan should be placed horizontally in the ceiling, provided there is a vertical space of at least 20 inches above the blades (Figure 2). Obstructions such as the roof or a chimney create a back pressure. This will reduce the fan efficiency and increase the noise. The fan should be located in or near a central hallway (Figure 3) or central portion of the house so that it can ventilate the entire house.

Generally, the 24" fans will fit between ceiling joists. The larger fans (30"-42") must straddle the joists in the manner shown in Figure 4.

CAUTION: It is very important that structural members (ceiling joists or trusses) not be cut to the point they are weakened.

If ceiling installation is found to be unsuitable, you may consider installation through an outside wall. Before attempting this alternative, consult a knowledgeable fan supplier or builder.

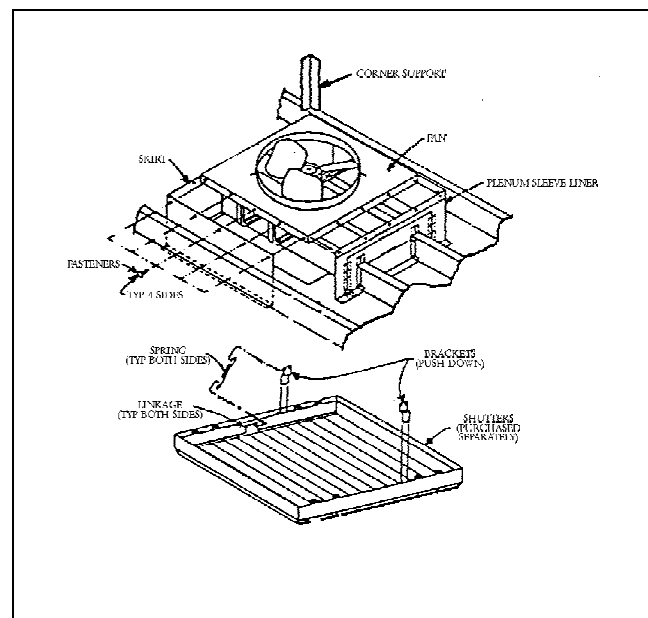


Figure 4. Ceiling Fans and Joists.

Shutters that open automatically when the fan is turned on should be installed to reduce infiltration and heat exchange to and from the attic when the fan is not in operation. Some builders will install prefinished sheets of foam insulation that will slide on a track. This sheet fits in front of the shutters and must be slid out of the way before the fan is turned on. This is more effective at reducing heat transfer than the shutters alone and it can be made to look more attractive.

House Size (SF)	Whole House Fan Capacity 1.5 CFM/SF	Range 4 CFM/SF	Fan Size Dia. HP
1000	1500	4000	24"(1/4 HP)
1200	1800	4800	24"-30"(1/4-1/3 HP)
1400	2100	5600	24"-30"(1/4-1/2 HP)
1600	2400	6400	24"-36"(1/4-1/2 HP)
1800	2700	7200	24"-36"(1/4-1/2 HP)
2200	3300	8800	30"-36"(1/2-1/2 HP)
2600	3900	10,400	30"-42"(1/2-3/4 HP)

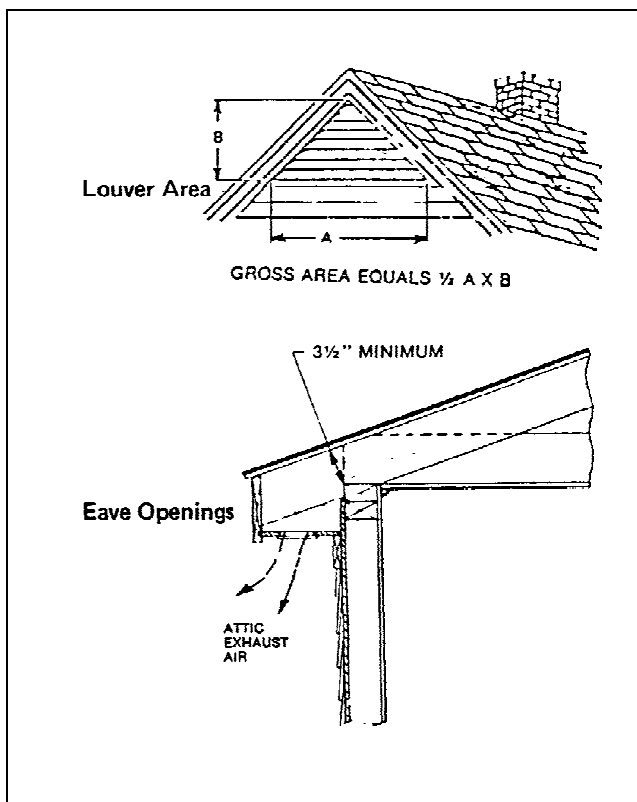


Figure 5.Attic Exhaust Openings.

Attic exhaust openings must have enough open area to allow the air to get out of the attic. Openings may be a combination of several types: louvered shuttered openings at gable ends or dormers and soffit or eave vents. Metal louvers give less resistance to air flow than wood slots or louvers.

Whole house fan manufacturers require a certain amount of free or unobstructed exhaust area to minimize back pressure and fan overload. Since most attic openings are obstructed with screen and louvers, extra gross area must be provided. Table 2 is a

Table 2.. Net screen opening requirements.

Fan Diameter	Minimum Screened Area (SF)
24"	5.8
30"	8.2
36"	11.5
42"	16.2
Note: Only 50% of the gross area of wood louvers is considered free area. Only 64% of the gross area of metal louvers is considered free area. Remember, these are general guidelines to determine if your residence will suitably accommodate a whole house fan. The manufacturer's specific installation instructions take precedence over these guidelines and should be followed.	

general guideline for determining the net screened opening required.

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