



TECHNICAL SHEET

Whole House Fans



Use Up to 90% Less Energy than a Compressor-Based Air Conditioner

In the summertime, the air inside your home is heated during the hot part of the day. In the morning or late evening, the outside air is frequently cooler than the inside of your home. This is the best time to open screened windows and doors and operate your Whole House Fan.

How It Works

A Whole House Fan can help reduce the mean radiant temperature of the surfaces inside your home by flushing the heat out of your living and attic space and replacing it with cool outside air. By cooling surface temperatures for added comfort, the Whole House Fan differs from a conventional central air conditioner that recycles indoor air and generally does not provide attic cooling.

Before the temperature rises during the day, or as stated in the manufacturers recommendations, close and shade all the windows and doors to trap the cool air in your home. This will delay the operation of your cooling system. When the temperature outside drops below the interior temperature of your home, open your windows and operate your Whole House Fan. Operating your fan in this way may shorten the number of days you will need to use your central air conditioner, saving energy and money.

Whole House Fan Capacity	Minimum Fresh Air Openings
1,000 cfm	4 sq ft
1,600 cfm	7 sq ft
3,000 cfm	12 sq ft
3,600 cfm	15 sq ft
4,200 cfm	17 sq ft
4,800 cfm	19 sq ft
5,400 cfm	22 sq ft
6,000 cfm	24 sq ft
6,600 cfm	27 sq ft
7,200 cfm	29 sq ft

For peak fan operation, an adequate amount of cool fresh air must be supplied through open screened windows and doors. Use this table as a guideline to help you determine how many windows and doors to open.

Example

If your Whole House Fan has a 3,000 cubic feet per minute (cfm) capacity, you will need a minimum of 12 square feet of fresh air opening. In this case, you will need to open the following minimum amount of screened windows:

One window measuring 2 ft x 4 ft = 8 sq ft
 One window measuring 2 ft x 2 ft = 4 sq ft
 Opening both windows = 12 sq ft

Features

Most fans are available with the following options:

- Wall-mounted controls
- Two speed/variable speeds
- Belt or direct drive
- Horizontal or vertical mount
- Insulated louver covers (during winter when fan is not in use)

Consider a fan with at least a high and a low speed. The high speed can be used for flushing the initial heat build-up from the home, and the low speed may be used for gentle air circulation and continued cooling.

A belt-driven fan is generally quieter than a higher R.P.M. direct-drive unit, but will require periodic maintenance of the belt and pulley assembly.

Selection and Sizing

Proper sizing will allow you to select the smallest fan to adequately cool your home. Check the manufacturer's specifications or use the following table as a guide:

To calculate the fan capacity for any sized area, use the following formula:
Floor Area (sq ft) x 3 = Cubic Feet per Minute (cfm) Fan Capacity

For ceiling heights other than eight feet, use this formula:

House Volume x 0.375 = Cubic Feet per Minute (cfm) Fan Capacity

Note: When the floor area of your home is between fan sizes, select the next larger fan capacity.

House Size Floor Area (square feet)	Fan Capacity 8 ft Ceilings (minimum cfm)
1,000 sq ft	3,000 cfm
1,200 sq ft	3,600 cfm
1,400 sq ft	4,200 cfm
1,600 sq ft	4,800 cfm
1,800 sq ft	5,400 cfm
2,000 sq ft	6,000 cfm
2,200 sq ft	6,600 cfm
2,400 sq ft	7,200 cfm



Pacific Gas and Electric Company®

Exhaust and Inlet Requirements

After selecting the proper fan size, verify that you have an adequate amount of net free vent area (NFVA) in your attic to allow the fan to work at peak efficiency. Use the NFVA figures recommended by the fan manufacturer, or make sure you have one square foot of NFVA per 750 cfm fan capacity, as shown in table to the left of the example.

After determining the minimum NFVA needed for your Whole House Fan, the existing vents in your attic will need to be measured to verify you have enough venting. Count and measure each type of attic vent and multiply by the reduction factor in the lower table. This will determine the actual NFVA needed in your attic.

Fan Capacity	Minimum Attic NFVA
3,000 cfm	4.0 sq ft
3,600 cfm	4.8 sq ft
4,200 cfm	5.6 sq ft
4,800 cfm	6.4 sq ft
5,400 cfm	7.2 sq ft
6,000 cfm	8.0 sq ft
6,600 cfm	8.8 sq ft
7,200 cfm	9.6 sq ft

* Values are calculated using the formula:
Fan Capacity (cfm) ÷ 750 = Minimum NFVA

Example

Your attic has 2 metal louvered gable vents with 1/4" screen, each measuring 18" x 24"

$$18" \times 24" = \frac{432 \text{ sq. in.} \times 1 \text{ ft.}}{144 \text{ sq. in.}} = \mathbf{3 \text{ sq ft}}$$

$$\mathbf{6 \text{ sq ft}}$$

Use the .75 reduction factor for metal louvers with 1/4" screen, so 6 sq ft x .75 = **4.5 sq ft**

In this example, there is a total of 4.5 sq ft of NFVA in the attic

If the 4.5 sq ft meets the minimum NFVA needed for the size fan being installed, no extra venting is required. If it does not, extra attic vents will need to be installed.



- Most Whole House Fans mount over the ceiling joist, and blocking is placed to create a frame support for the fan. Be careful, **do not** cut into any truss members! Engineered trusses are an integral component of your roof structure, and may not be altered in any way without additional engineering.
- Wall-mounted controls should be placed higher than regular light switches to prevent inadvertent operation of the fan.
- All electrical work must meet the California Electrical Code (CEC).
- During operation, Whole House Fans pressurize the attic, so care must be taken to seal cracks or gaps in the ceiling. This will prevent the hot air in the attic from being pushed back into the living space.
- If you have loose fill insulation in the attic, push back and block with flexible batt insulation to create a perimeter area of at least 14 1/2 inches surrounding the fan box.
- A building permit may be required. Check with your local building department for requirements and more information.

Safety

A Whole House Fan is capable of pulling large quantities of air in the home. If not enough windows are open, the fan could backdraft a combustion appliance—such as a gas water heater located inside a louvered closet door—pulling dangerous carbon monoxide gases into the living space.

In addition, please adhere to the following safety precautions:

- **Do not** install a Whole House Fan in an attic containing a gas water heater, or a gas furnace with a standing pilot. Installation of a Whole House Fan **may be** possible if the attic furnace is a closed combustion unit with an electronic ignition. However, **do not** run the Whole House Fan and the furnace at the same time.
- When installing a belt drive unit, a manual on/off switch should be wired into the fan circuit so the unit can be disabled during maintenance. The manual on/off switch should be installed in the attic near the fan.
- **Don't** use the fireplace while the Whole House Fan is in use, and close the fireplace damper to avoid blowing ashes.
- If allergies are a consideration or frequent dust is present a Whole House Fan may have drawbacks since it pulls outside air into the home.

For More Information

Visit www.pge.com/foryourhome or call PG&E's Smarter Energy Line at **1.800.933.9555**.

SUGGESTED SCREEN AND LOUVER REDUCTION FACTORS FOR AIR VENTS

1/4" Screen (Hardware Cloth)	1/4" Screen with Metal Louvers	1/4" Screen with Wood Louvers	Insect Screen (Mesh under 1/4")	Insect Screen with Metal Louvers	Insect Screen with Wood Louvers
0.90 (90%)	0.75 (75%)	0.25 (25%)	0.50 (50%)	0.50 (50%)	0.25 (25%)

Placement and Installation

The Whole House Fan should be placed as near the center of the home as possible. This will allow the fan to pull air equally from all intake locations (open doors and windows) around the house.



Typically, Whole House Fans are installed in a hallway ceiling (over the top of the ceiling joist) in a horizontal position to expel hot air from the house into the attic and out the attic vents. If the configuration of the house does

not allow for horizontal placement, vertically installed fans with mechanically operable louvers are available.

Always follow the manufacturer's suggested methods when installing a Whole House Fan. The following are some additional points to consider:



Visit www.pge.com/foryourhome

Funding for this Technical Sheet is provided by California utility customers and administered by Pacific Gas and Electric Company, under the auspices of the California Public Utilities Commission.

© 4.04 Pacific Gas and Electric Company.

