Cool Your Home with a Window or Attic Fan

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Window or attic fans are very effective when outside air is cooler than the temperature inside the home. Operated during the evening and night, these fans exhaust warm air and bring in fresh outside air through doors and windows.

**Fan size**

To be effective, a fan should be able to change the air in the house at least once each minute. Fans are rated by the volume of air they will exhaust per minute. Manufacturers furnish these ratings with each fan. They are given in cubic feet per minute (CFM). Large fans deliver a given amount of air more slowly than smaller fans and usually make less noise.

To determine the fan capacity you need, figure the volume of the rooms you intend to cool. For example, if you want to cool an area 30 x 40 feet having a ceiling height of 8 feet, the volume will be 30 x 40 x 8 = 9,600 cubic feet. You will need a fan that will exhaust at least 9,600 CFM. (See note under window fans.)

Table 1 gives typical attic and ceiling fan specifications. Use this table as a guide only. Always refer to the manufacturer's ratings.

**Table 1**
Attic and ceiling fan specifications.

<table>
<thead>
<tr>
<th>Motor</th>
<th>Fan size</th>
<th>Overall size</th>
<th>Exhaust rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 hp</td>
<td>24 inches</td>
<td>32 x 32 inches</td>
<td>5,400 CFM</td>
</tr>
<tr>
<td>1/4 hp</td>
<td>30 inches</td>
<td>37 x 37 inches</td>
<td>7,500 CFM</td>
</tr>
<tr>
<td>1/3 hp</td>
<td>36 inches</td>
<td>41 x 41 inches</td>
<td>10,500 CFM</td>
</tr>
<tr>
<td>1/3 hp</td>
<td>42 inches</td>
<td>47 x 47 inches</td>
<td>12,400 CFM</td>
</tr>
</tbody>
</table>

Increasing the speed of a fan increases its capacity but also greatly increases its power requirements. For example, doubling the speed of a fan almost doubles the amount of air delivered but increases the horsepower requirement eight times.

**Electrical controls**

Switches for manual control should be conveniently located, since fans may need to be shut off during the night. Fans can be shut off automatically by using appliance timers. These are time switches that can be set to shut off the power at a predetermined time. Temperature switches can also be used. These switches operate by thermostat and automatically start and stop the fan at predetermined air temperatures. Window fans are available with these temperature switches built into them.
Controlling air flow

Figure 1

The amount of cool air entering different rooms is controlled by adjusting window and door openings. If certain rooms are to be cooled, open windows and doors only in these rooms. Rooms "A" and "B" in Figure 1 are being cooled. Outside air can enter only through partly open windows in rooms "A" and "B." All other windows and doors are closed. The window in room "A" nearest the fan should be shut. Air entering this window would go directly to the fan and have little cooling effect. With this window closed, the entire fan capacity will be used for effective cooling.

Window fans

Window fans are easy to install. They are relatively small in size and vary from 8 to 20 inches in diameter. The small 8- inch size may have an exhaust rating of only 350 CFM, which is too small to cool even one room effectively. The 20- inch size may have a maximum exhaust rating of about 3,850 CFM. This capacity will cool three to four average rooms.

The rating you want is the exhaust rating
Window fans with switches giving two or more fan speeds are desirable. The best location is the side of the house opposite from the bedrooms or a window in a hallway. This allows air to be drawn across the bedrooms for effective cooling. It also places the fan noise some distance away. These fans can be used in single- or multiple-story homes. They can be located on either the first or second floors.

Attic fans

Figure 2

These fans can be installed in various ways, some of which are illustrated.

An attic fan can be mounted in the attic in one- or two-story homes as in Figure 2. The ceiling opening should be located above a hallway so that air can be drawn from all rooms. Refer to Table 2 for size of ceiling opening and exhaust opening at end of attic.

Table 2
Ceiling and exhaust openings for attic fans.

<table>
<thead>
<tr>
<th>Type of opening</th>
<th>Minimum area of opening per 1,000 CFM air delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood louver backed with 1/4-inch hardware cloth</td>
<td>2.25 square feet</td>
</tr>
<tr>
<td>Metal louver backed with 1/2-inch hardware cloth</td>
<td>1.80 square feet</td>
</tr>
<tr>
<td>Plain opening covered with 1/2-inch hardware cloth</td>
<td>1.15 square feet</td>
</tr>
</tbody>
</table>

Note
Insect screen over opening is not recommended because of its resistance to air flow. It also often becomes clogged with lint. If it is used, double the size of area recommended.

Figure 3

An attic or ceiling fan can be mounted in the attic in one- or two-story homes as in Figure 3. This installation will be easiest if the attic has a low ceiling. It should be mounted above a hallway so that air can be drawn from all rooms. Refer to Table 2 for size of exhaust opening in the end of the attic.
Attic fans can be mounted in a window or other opening on first or second floors of one-and-a-half or two-story homes. Figure 4 illustrates a fan on the second floor at the head of the stairway. It can also be mounted this way in one-story homes. When mounted in this way, it is similar to a large window fan.

Attic fans mounted as in Figure 5, left, can be used to cool the attic to reduce the load on an air conditioning unit. When used for this purpose, the fan is operated only during the day to keep the attic temperature from building up. Thermostatically controlled switches are available to control fan operation automatically.

**Note**
Do not install a fan in the attic, as in Figure 5, to cool the house. Attics have many cracks and places for air to leak through. The fan will pull air through these cracks and will do a poor job of ventilating the house.

**Size of intake and exhaust openings**

These openings should have at least one square foot of open area for each 1,000 CFM fan capacity. If openings are covered, use values given in Table 2.

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