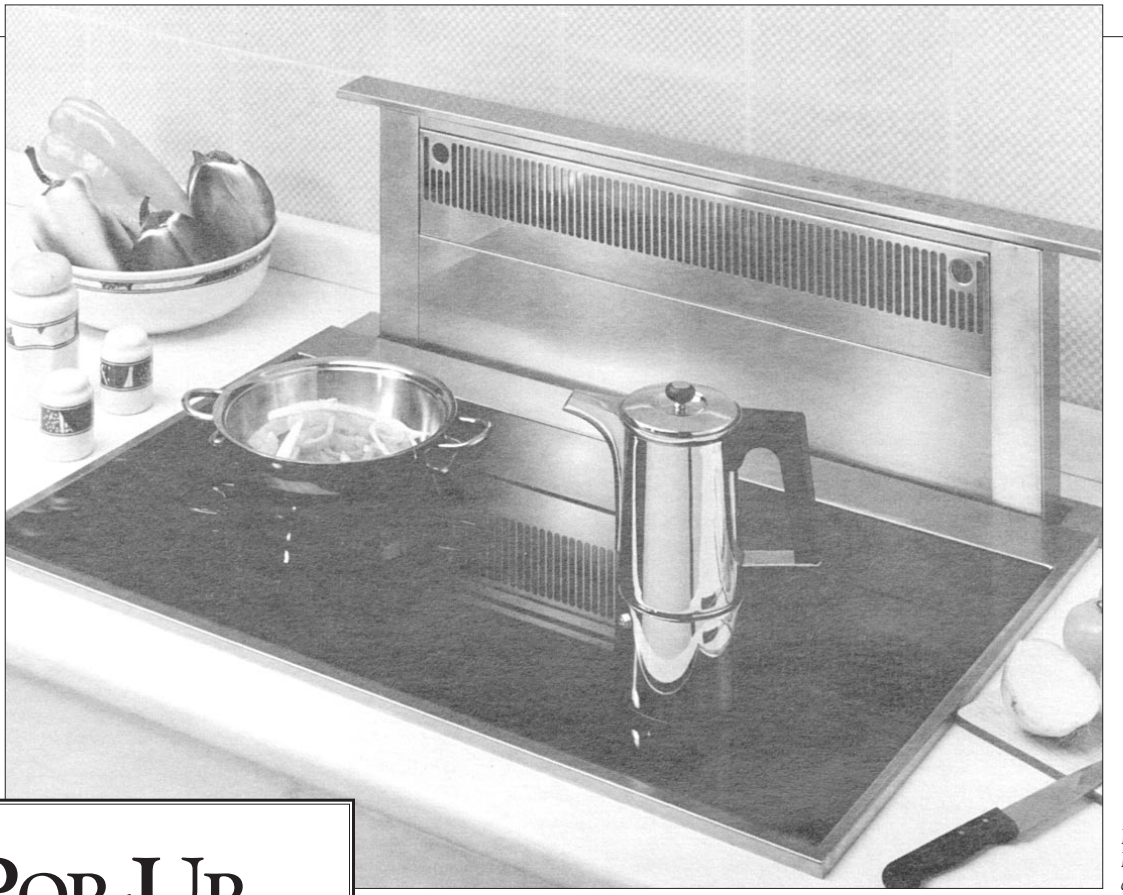


Best Model DD6 pop-up downdraft vent

Pop-Up Downdraft Vents

by Sal Alfano

Often, the most practical way to vent an island or peninsula cooktop is with a downdraft vent. Downdraft vents that have intakes flush with the surface of the burners have been built into ranges and cooktops for years, but several manufacturers now make pop-up units that can be installed behind virtually any drop-in cooktop. Some are also made to fit behind drop-in ranges, and at least one manufacturer makes a line of cooking appliances with built-in pop-up ventilators.

Features differ from manufacturer to manufacturer (see "Pop-Up Vent Specs and Features," facing page), but the main idea is the same. A narrow intake housing, usually located at the rear of the cooktop and matching its width, sits flush with the counter when not operating. When in use, the intake housing, or "scoop," rises to a height of about 8 inches above the cooking surface. The blower, which comes on either automatically or via a separate switch, is usually a squirrel-cage fan mounted in the cabinet below the cooktop or in a remote location, such as on an exterior wall or on the roof of the building. When the ventilator is turned off, the blower shuts down and the intake housing retracts back into the counter, either immediately or after a delay of a few minutes.

Part of the appeal of pop-up downdraft ventilators is that they are out of sight when not in use, and they are inconspicuous even when operating. This is especially true for cooktops in an island or peninsula. Ceiling-mounted vent hoods in these locations are often so large that they dominate the room. And since they work best when the hood is mounted at eye-level, overhead ventilators block the line of sight of people working at the range. Cabinet-mounted overhead vent hoods will work at islands or peninsulas, but there are often no overhead cabinets to attach them to. And with both undercabinet and ceiling-mounted hoods, finding a short, fairly straight route through the ceiling to the outdoors for the ductwork can present a major obstacle.

How Well Do They Work?

Downdraft ventilators solve many design and aesthetic problems, but neither the flush nor pop-up versions perform as well as an overhead hood.

Overhead hoods. Contrary to common belief, overhead vent hoods don't really pull air up off the range top. Rather, the hood passively captures warmed air as it rises from the range surface (see Figure 1, page 41). The blower then carries the captured air, including smoke and cooking odors, to the outdoors. Overhead hoods work best if they are no more than 24 inches from the range surface. Also, because warmed air expands as it rises, it helps if the hood is a few inches larger on each side than the cooking surface. The capacity of the blower in an overhead hood determines how fast it removes the collected air. As a general rule, an overhead blower should remove air at a rate of 40 cubic feet per minute (cfm) per linear foot, which means a blower rated between 120 cfm and 150 cfm is adequate for a 36-inch hood. If the blower is undersized or the filter is clogged, the contaminated air will spill out of the hood into the room.

Surface downdrafts. The intake of a surface downdraft ventilator, on the other hand, is flush with the cooking surface alongside the burners, not above them (see Figure 2, page 41). This means the blower must overcome the thermal buoyancy of the warmed air by pulling it down before it escapes into the room. Consequently, most downdraft ventilators have blowers

Where an overhead range hood won't do, a pop-up ventilator may answer your venting needs

Pop-Up Vent Specs and Features

The products included here represent many, but not all, pop-up downdraft vent manufacturers. Several companies manufacture products for other vendors as well as produce their own name-brand ventilator.

Blower ratings are taken from information distributed by the manufacturer. They are stated in cubic feet per minute (cfm) at an anticipated duct resistance of 0.1 feet static pressure, except for Dacor. This is approximately equivalent to a straight 6-foot length of 6-inch duct. Actual blower performance, however, will be affected by duct size, length of run, and the number of fittings. — S.A.

Best Model DD6
Manufacturer: The Best Consortium, 2323 New Hyde Park Rd., Lake Success, NY 11042; 516/328-7400 (eastern U.S.); Purcell-Murray Inc., 113 Park Ln., Brisbane, CA 94005; 415/468-6620 (western U.S.)
Width: 24, 30, 36, and 42 inches
Blower & Duct Size: 630 cfm, 3¼x10-inch duct
Max. Shelf Depth: 14 inches
Controls: 7 lighted buttons on top

The BEST DD6 is designed and manufactured in Italy. Separate lighted buttons built into the cover let you raise and lower the intake housing, turn the blower on and off (including a delay/off switch that allows the blower to operate for 10 minutes before shutting off automatically), and select the blower speed (6 settings are available). After every 30 hours of operation, an indicator light comes on as a reminder to clean the filters.


Best Model DD6

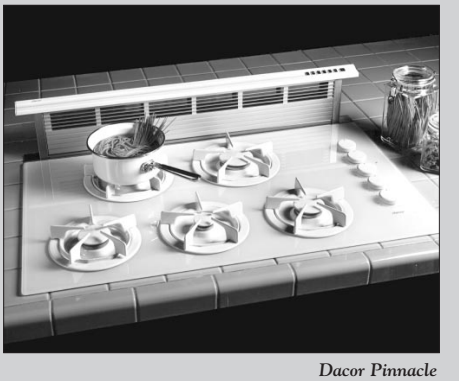
Broan Eclipse
Manufacturer: Broan Manufacturing Co., P.O. Box 140, Hartford, WI 53027; 414/673-4340
Width: 30 and 36 inches
Blower & Duct Size: 500 cfm, 6-inch round duct (interior mount); 900 cfm, 9-inch round duct (exterior mount)
Max. Shelf Depth: 12 inches
Controls: Push-button on/off on top; variable speed and on/off on side

The slim Broan Eclipse models are a significant improvement over bulky earlier versions, which occupied most of the cabinet space. Broan also manufactures pop-up downdraft ventilators for Magic Chef, Sears, GE, Creda, and White-Westinghouse.


Broan Eclipse

Dacor Pinnacle
Manufacturer: Dacor, 950 S. Raymond Ave., Pasadena, CA 91109; 818/799-1000
Width: 30, 36, and 46 inches
Blower & Duct Size: 600 cfm, 3¼x10-inch duct; 1,000 cfm, 8-inch round duct. Note: At 0.1 static pressure, the cfm ratings are 496 and 451, respectively.
Max. Shelf Depth: 14 inches for interior blowers, 17½ inches for exterior blowers
Controls: 7-button control panel on top

Dacor features an electronic control panel with lighted buttons to show which functions are operating. In addition to a switch to raise and lower the scoop and turn the blower off, you can choose from three fan speeds, and a "delay/off" switch to leave the blower running for a few minutes before it shuts off automatically. After every 40 hours of operation, an indicator light comes on to remind the user to clean the filters.


Dacor Pinnacle

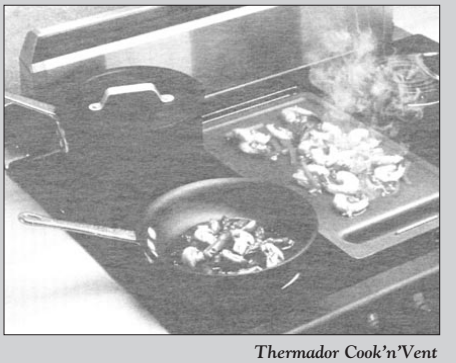
Kitchenaid Retractable Downdraft Vent
Manufacturer: Kitchenaid, 2000 M-63 North, Benton Harbor, MI 49022; 800/422-1230
Width: 30 and 36 inches
Blower & Duct Size: 450 cfm (interior mount), 900 cfm (exterior mount); 9-inch round or 3¼x14
Max. Shelf Depth: 12½ (interior blowers) and 17½ inches (exterior blowers)
Controls: On/off button on top, variable speed knob on the side

The on/off button automatically raises and lowers the intake housing as well as starts and stops the blower. Originally, Kitchenaid pop-ups were built in to specific range and cooktop units, but current models will work with other manufacturers' appliances.


Kitchenaid Retractable Downdraft Vent

Thermador Cook'n'Vent
Manufacturer: Thermador, 5119 District Blvd., Los Angeles, CA 90040; 213/562-1133
Width: 30 and 36 inches
Blower & Duct Size: 550 cfm; 3¼x10-inch duct
Max. Shelf Depth: 13 to 15 inches
Controls: 3 buttons (raise, lower, and blower speed) built into cooktop or range

The Thermador Cook'n'Vent is not a stand-alone ventilator; instead, it is incorporated into a separate line of ranges and cooktops, designated by the letters "CV" in the model number. Because the controls are located on the cooking appliance, the user doesn't have to reach over the cooking surface to operate the ventilator. When raising or lowering the intake housing, the user must keep a finger on the button. This takes a few seconds, but guards against accidental spills caused by pot handles or cooking utensils caught by the moving housing.


Thermador Cook'n'Vent

How Long Is Your Elbow?

It's important to keep duct runs as short and straight as possible because bends and changes in shape affect the ability of the blower to move a given volume of air. In many cases, however, a change in size or direction is unavoidable in a duct run. Since most blowers are rated for use with a maximum length of duct, you need to translate fittings into their straight-length equivalents to make sure you don't exceed the blower's capacity.

Use the accompanying chart to find the size and shape of the fittings you plan to use. When calculating the total length of your proposed duct run, add the straight-length equivalent of the fittings to the lengths of straight duct. If you have more than one duct size in the run, use the size that corresponds to the majority of the duct used.

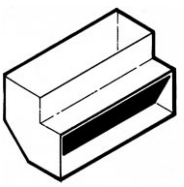
When planning a duct run, place a length of straight duct between fittings, if possible. And in new construction, plan the path of ductwork before the framing is completed so you won't have to add fittings just to avoid a stud or joist that's in the way.

— S.A.

Equivalent Lengths for Common Duct Fittings

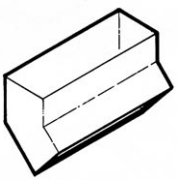
3¼x10-inch rectangular fittings

90-degree elbow



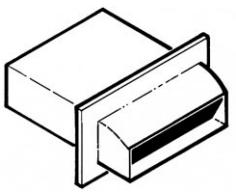
15 ft.

45-degree elbow



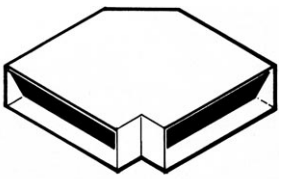
7 ft.

Wall cap



2 ft.

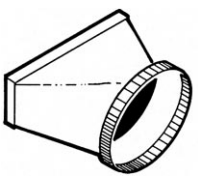
90-degree flat elbow



20 ft.

3¼x10-inch-to-round transitions

Straight transition



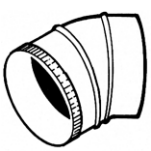
6-in. to 8-in. round = 4 ft.

90-degree transition

8-in. round = 25 ft.

Round fittings

45-degree elbow



6-in. round = 6 ft.
7-in. round = 5 ft.
8-in. round = 3 ft.

90-degree elbow

6-in. round = 12 ft.
7-in. round = 10 ft.
8-in. round = 7 ft.

rated at 500 cfm or higher. Even with more powerful blowers, however, it's more difficult to get good venting with a downdraft ventilator. This is especially true for a kitchen island or peninsula, where air cross-currents can divert cooking contaminants away from the vent. (In fact, cross-currents can affect overhead hoods, too, which is why any type of ventilator works better when mounted in a countertop that's against a wall.)

Pop-up downdrafts. Pop-up downdraft ventilators are usually located behind or to the side of the cooking elements, and like the surface-mounted variety, are equipped with powerful blowers (over 500-cfm). But because the intake is raised about 8 inches above the cooking surface, they have a better chance of overcoming the thermal buoyancy of escaping gases (see Figure 3). Pop-up downdraft ventilators work best with pots and pans 4 inches tall or less. And a pop-up ventilator located at the rear of the range will do a better job with the back burners than with the front burners.

Installing a Pop-Up Vent

The blower housing for most pop-up downdraft ventilators mounts in the cabinet under the cooktop. More powerful (900-cfm) blowers that mount on the wall or roof outside of the house are also available. Regardless of where the fan mounts, it's important to limit the length of the duct run and the number of bends, both of which can have a dramatic effect on performance (see "How Long Is Your Elbow?" facing page).

When pop-up downdraft ventilators were first introduced, the housings were very large and occupied most of the cabinet below the cooktop. More recent designs are much slimmer, allowing for shelves or drawers between 12 and 17 inches deep in front of the housing, depending on the model.

Most pop-up downdraft ventilators should be installed as close to the cooktop as possible to avoid an awkward, hard-to-clean strip of countertop between the cooktop and the intake housing. This leaves little room for error. You will have to temporarily position the cooktop before you can lay out the ventilator. Then it's simply a matter of cutting a slot in the countertop, sliding the ventilator into position, and anchoring it to the wall and floor of the cabinet.

As with most kitchen vents, the blower direction can be changed to allow ducting in several different locations. Some manufacturers recommend using a cabinet that is 6 inches wider than the vent to allow room at the sides for a 90-degree elbow. Most of the ventilators we looked at come with a plug end for use with a standard receptacle, but they can also be hard-wired. ■

Sal Alfano is a senior editor with The Journal of Light Construction.

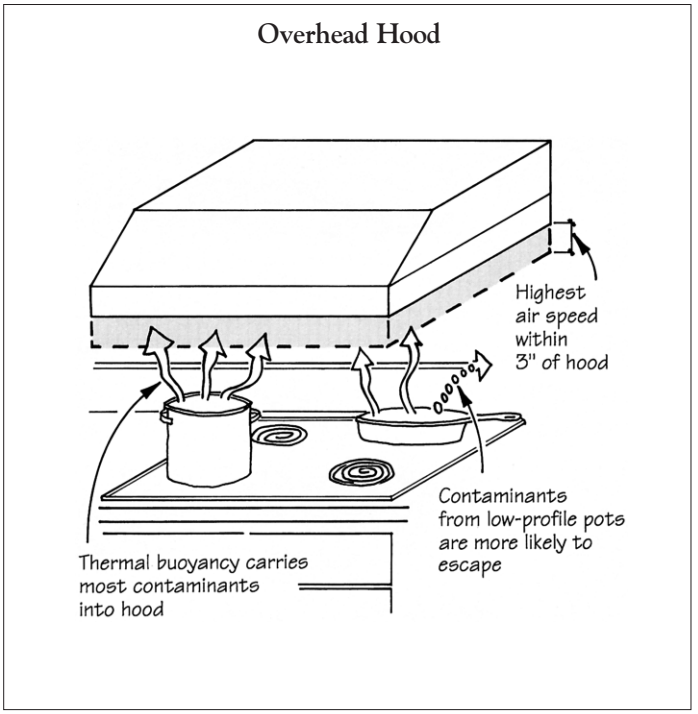


Figure 1. *Overhead hoods work well because warmed air from the cooking surface naturally rises toward the blower intake. For best results, the hood should be slightly larger than the cooking surface and mounted no more than 24 inches above it.*

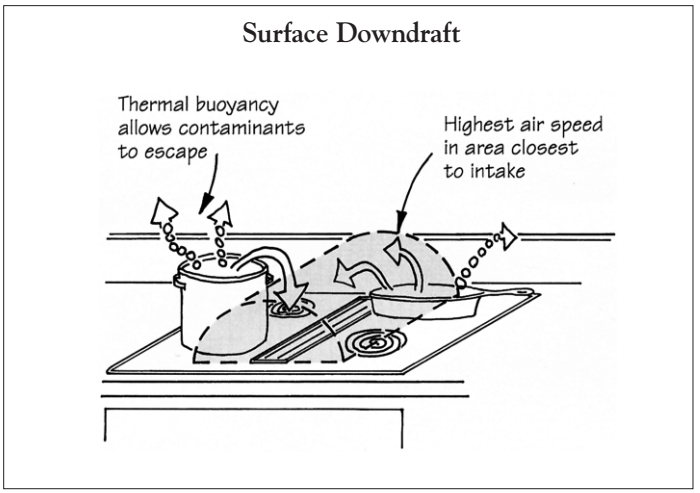


Figure 2. *Surface downdraft vents must overcome the thermal buoyancy of contaminants by pulling air down into the intake. They work best with shallow pots and pans.*

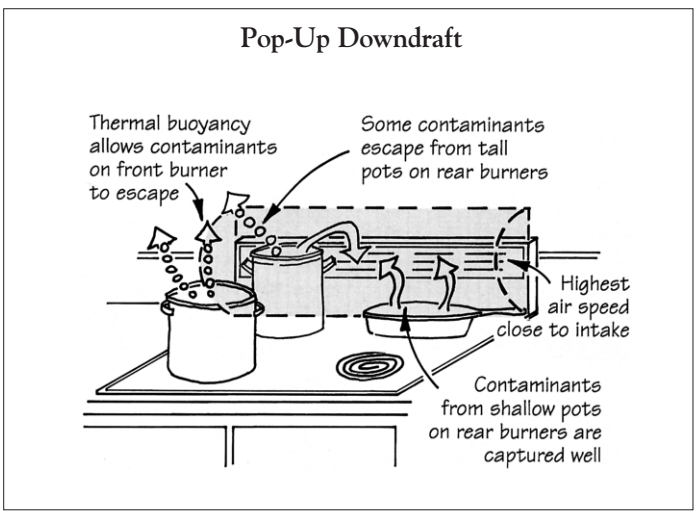


Figure 3. *Although a pop-up downdraft ventilator works best with a shallow pot, it can remove some contaminants from a tall pot as long as the tall pot is on the rear burner.*