

Assessing Your Bathroom Exhaust Fan



Introduction:

We want to help you assess the performance of your bathroom exhaust fan, considering both your household's need for bathroom and/or whole house ventilation, and the construction of your bathroom.

We will discuss best practices for all the components of a bathroom exhaust fan system.

Our focus is bath ventilation in existing homes, but the concepts apply to other situations as well.

This is the first of two presentations on bathroom exhaust fans. The second presentation focuses on installing or replacing a bathroom exhaust fan. Registration for that session is available on the ROCIS website. <https://rocis.org/bathroom-exhaust-fans>

The recommendations included in this session are provided by Livable Housing, Inc. unless otherwise stated.

Why do we need a functional bathroom exhaust fan?

- Moisture, moisture, and moisture! Moisture damages building components and leads to mold growth, especially in full baths.
- In both full baths and half-baths, controlling odors may be a concern.
- Exhaust fans can improve the indoor air quality by removing contaminants and VOCs, including those found in personal care and cleaning products.
- Possibly for whole house ventilation as outdoor air replaces the exhausted air.



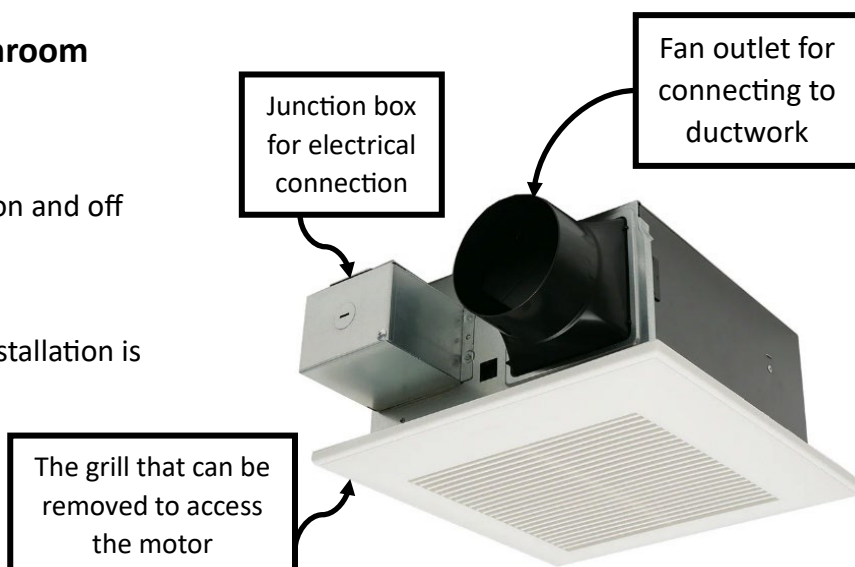
Bathroom exhaust fans manage moisture and odors by moving air outdoors. We prioritize exhaust in full bathrooms because bathing and showering generate so much moisture.

Four basic Components of a Bathroom Exhaust System

1. The Fan
2. A method of switching the fan on and off
3. Ductwork
4. A fan outlet with a damper

The choice of components and their installation is crucial, and our focus.

The photo to the right highlights a few fan components.



A step-by-step guide to determine if your bathroom exhaust fan is doing its job.

Question 1: Is there an existing exhaust fan?

Bathroom exhaust fans are most often located in the ceiling (as pictured above). Occasionally, you may find a wall-mounted fan. Exhaust fans are highly recommended in full bathrooms (containing a tub and/or a shower), but they can have value in half baths as well.



Question 2: Does the fan operate, and where does the exhaust air go?

Is there a switch for the fan, and does it turn the fan on?

Even when a fan makes noise, that is not proof the fan is moving any air. Look for a roof or wall outlet for the fan outside of your house. Have someone turn the fan on and off while you look on the outside for the outlet, and signs of the damper operating as the fan turns on and off.

If there is no sign of an outlet, you may need to look in the attic, crawlspace or other areas to determine if the fan is exhausting to somewhere other than the exterior. That can be a problem.

This is a good time to confirm that the damper is sealing the outlet to prevent pest access when the fan is not running.

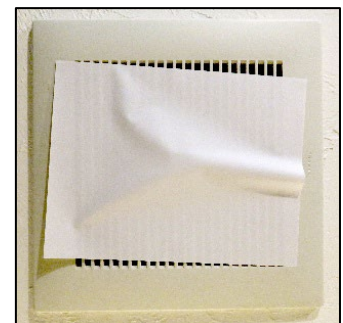


Question 3: Is the fan moving air, and how much?



A low-tech method for determining if a fan is moving air is the toilet paper test. Turn the fan on and let it run for 20 seconds. Fold together two pieces of double ply toilet paper. Using a ladder or step stool, hold them up to the fan grill. If the fan holds the paper against the grill, it is probably moving air at a rate of at least 50 cubic feet per minute (CFM). 50 CFM is a minimum air flow standard for a full bath.

If the fan holds the toilet paper in place, try holding up a sheet of copy paper. If the fan can hold the paper, it may be running at 80 CFM or higher. This would be a better CFM rating for a typical full bathroom.



Question 3: Is the fan moving air, and how much? (cont.)



There are more accurate tests that professionals use to determine how much air flow an exhaust fan is producing. At this stage of your assessment, they are unnecessary. If a more accurate diagnostic assessment is required, most weatherization or home performance professionals have the equipment to test fans for air flow. Two examples of such equipment are displayed to the left.

Question 4: If the fan is working, and you have moisture or indoor air quality problems in the bathroom, what might be causing the problem?

4a: Do household members use the fan?

Does everyone who uses the bathroom turn the fan on - and leave it running - long enough to remove excess moisture? We recommend running a fan that operates at 80 CFM for an additional 20 minutes after bathing/showering.

4b: Would a different switching method improve usage? (see the related "Installation" document)

Switching options for ensuring the fan is used:

- A motion detecting switch that turns the fan on when anyone enters the bathroom.
- The switch that controls the lights can also control the fan.
- A switch that senses the humidity level in the bathroom and turns the fan on when humidity reaches a certain level.
- The motion detecting and humidistat switching methods could limit the ability to run the fan at full speed for an extended period of time.

Options for ensuring the fan runs long enough to remove sufficient moisture:

- A switch with a timer that delays shutting the fan off for an adjustable number of minutes. Some exhaust fans have a built-in delay function.
- The switch that senses humidity also addresses this issue because the fan will run as long as necessary to remove moisture to the set humidity level.

4c: Does the fan require cleaning or repairs?

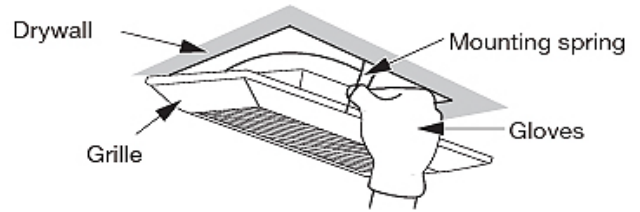
- Is the grill or the fan blade dirty? A combination of regularly vacuuming and wiping with a damp cloth can control the dust but make certain the circuit for the fan is turned off at the electrical panel before cleaning.
- Is the fan blade damaged?
- Is it noisy? Does the fan motor need replacement? It may be possible to replace the guts (motor and fan blades) without replacing the entire fan.



Dusty fan blade

4c: Does the fan require cleaning or repairs? (cont.)

You can access the fan motor and blade by pulling down on the grill cover, which will expose the mounting spring. The two mounting springs, which are spring-loaded hooks are located on opposite sides of the grill. Squeeze them together to release the grill from the fan body, as depicted in the illustration to the right.



4d: Is there a problem with the ductwork or the outlet?

This requires an inspection of the ductwork, which may be challenging.



- Is the ductwork obstructed in some way?
- Is it disconnected or not directing air outside?
- Is it installed so that it follows a direct route to the wall or roof outlet, or does it have unnecessary bends, twists, kinks, sharp turns, etc.?
- Is the outlet blocked or damaged?
- Are the seams between sections sealed, or are they leaking?
- Ideally, the ductwork will be smooth metal, not corrugated flex duct.
- At the fan outlet, the ductwork should run straight without any elbows for at least a foot.
- If the ductwork is in an attic, it should also be insulated, either by an insulation jacket or buried in insulation.

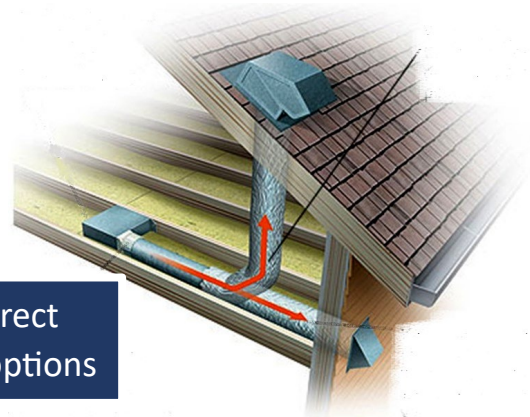


This poor duct installation is exhausting into the attic instead of outside, and is obstructed by a pipe, a double whammy

Repairs to consider:

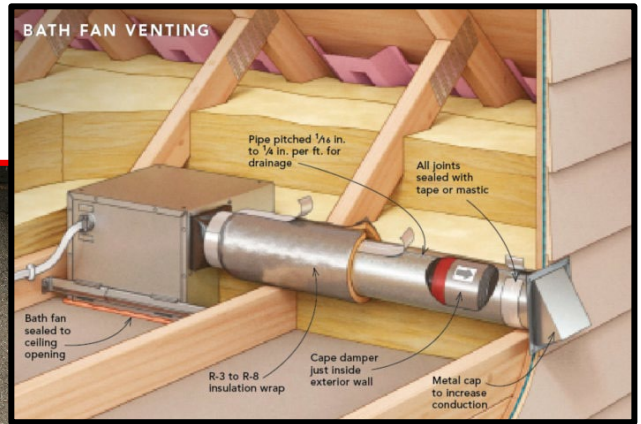
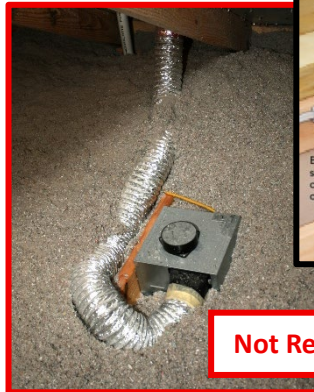
- Re-routing the ductwork so that it follows the most direct route possible, with a minimum number of bends (angled elbows).

Note Direct Route options



Repairs to consider: (cont.)

- Reinstalling the fan and rotating it so that the fan outlet points in a better direction.



- Replacing flex duct (#s 1 & 3) with smooth metal ductwork (#2) and sealing the seams.



- Insulating the ductwork.

- Replacing the outlet with one that is sturdy, weatherproof, pest proof, has minimal obstructions and seals well with a flap cover when the fan is not running.



Repairs to consider: (cont.)

- Sealing the fan box to the ceiling. The image on the left shows wide gaps between the fan body and the ceiling finish. The image on the right shows an assembly well sealed with caulk.



Summary:

1. Should you repair or replace your existing bathroom exhaust fan?
 - a. Does it function well and are people using it?
 - b. Is the noise level so loud that people don't use it?
 - c. Does it move sufficient air and is the air exhausting to the outside?
 - d. Is the ductwork functional?
 - e. Is the outlet working correctly?

If the answer to any of these questions is no, then consider either repair or replacement.

2. Is this a DIY project or do you need a contractor?

For more information on DIY or contractor installations of new bathroom exhaust fans and ductwork, check out our webinar and handout on the topic.

Resources:

- ROCIS Webpage for Bathroom Exhaust Ventilation Content – Registration and Handouts
<https://rocis.org/bathroom-exhaust-fans/>



- Registration for Webinar 1 – Assessing Your Bathroom Exhaust Fan
<https://attendee.gotowebinar.com/register/1884266513341189467>



- Registration for Webinar 2 – Installing or Replacing a Bathroom Exhaust Fan
<https://attendee.gotowebinar.com/register/1523134118221418589>

