



Ventilation in a Tiny House

Building science has taught us that any building can go to heck and ruin for one of two reasons:

- 1) Water on the outside, or
- 2) Water on the inside.

Today let's look at the inside. If a building stays below 60% relative humidity, it is not likely to grow mold. Mold needs three things to grow:

- 1) Food, like paper or wood fiber,
- 2) Moisture, and
- 3) Warmth.

If you take away any one of these three elements, you have no mold. You can't control the weather, but since most tiny houses use wood, let's control for moisture.

Humidity is relative to the temperature. Warmer air can hold more moisture than cooler air.

So how much ventilation do you need and how do you get it?

There are two basic scenarios for ventilating a building:

- You can bring fresh, cool, dry air in through openings like windows and doors or the small crevasses around them.
- You can bring fresh air in through a designated 'hole' in the building envelope. If you do it this way, you can heat the incoming air with the warmth from the outgoing air with an Energy Recovery Ventilator.

A lot of really smart scientists got together over the course of way too many years to come up with a formula to tell us how much ventilation you need in a building. That formula is outlined in a document called ASHRAE 62.2. Here is a link for those inclined to do more research. <https://resaveguide.lbl.gov/ashrae-standard-62-2>.

The simple answer is about 1/3 of an air change per hour (ACH) on a continual basis. Take the Volume of the building (i.e. Length x Width x Height) and multiply it by .33 (the ventilation rate) and divide by 60 (minutes) to determine the appropriate CFM (cubic feet per minute).

For example: 7'-7" x 23'-3" (inside dimension for an 8'-4" x 24' TH) = 176.31 SF x 10 feet (average height) = 1,763 cubic feet times .33 and divided by 60 minutes = 10 CFM. Not very much air.

For bath fans, the recommendation is 1 CFM per square foot, so 7'-3" x 2'-6" = 18 SF, so 20 CFM will work well.

For kitchen hoods, the recommendation is 100 to 175 CFM.

Since one of my Drivers for Design is KEEP it SIMPLE, why not use one fan for all three purposes.



My choice is a Panasonic Model FV-13VKM3. Around \$200.00.

This unit uses a very efficient DC motor and allows you to adjust the low speed setting.

<http://www2.panasonic.com/webapp/wcs/stores/servlet/ModelDetail?displayTab=O&storeId=11201&catalogId=13051&itemId=487158&catGroupId=119505&surfModel=FV-13VKM3>

Also see this the Lunos E2 unit and get more information on ventilation at 465 High Performance Building Supply. <http://foursevenfive.com/sizing-lunos-e2-through-wall-ventilation-units/>

