



Ventilation for SPF Contractors

Allison A. Bailes III, PhD

MARQUIS
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Do You Really Need to Run the Bath Fan in Winter?

Posted by [Allison Bailes](#) on January 22, 2018

You may have heard or read somewhere that you should run your bathroom exhaust fan whenever you take a shower and then let it run for a while after you're done with the shower. Showers increase the humidity in the bathroom. Sometimes it gets high enough to cause condensation to appear on the mirror...

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Two Rules for Preventing Humidity Damage

Posted by [Allison Bailes](#) on January 17, 2018

Because I've written so much about moisture in buildings, I get a lot of questions on the topic. Some are about walls. Some are about the attic. Some are about windows. Some are

ven·ti·la·tion

/,ven(t)ə'lāSH(ə)n/ 

noun

1. the provision of fresh air to a room, building, etc.
2. public discussion or examination of an opinion, issue, complaint, etc.

When Should You Ventilate?

1. During a spray foam job



2. After the spraying is finished



3. After occupancy



Why We Need Ventilation



Airtight
enclosures

Infiltration Doesn't Cut It

ATTIC

Insulation fibers,
dust, rodent poop

GARAGE

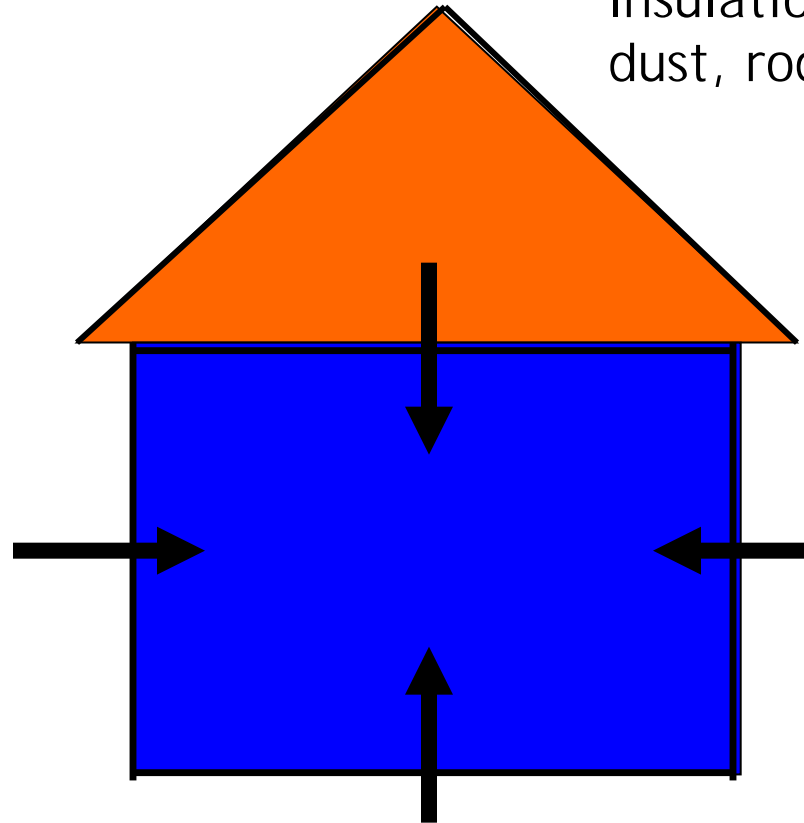
Carbon monoxide,
pesticides, gasoline,
fertilizers

OUTSIDE

Pollen, auto
fumes, dust

CRAWLSPACE

Mold, dust, lead, radon,
moisture, termiticide



Bad Stuff in the Air

CO₂

VOCs

Formaldehyde

NO_x

Radon

...and more!





3 Ways to Achieve Good IAQ

1. Source control

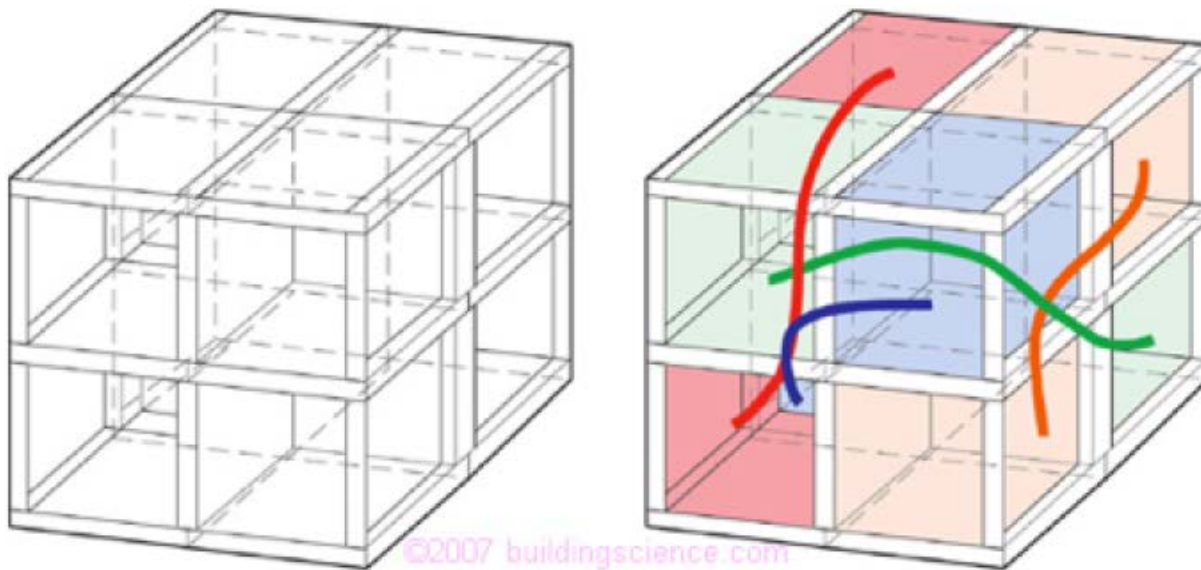
Keep it out!

*“If there is a pile of manure in a space,
do not try to remove the odor by
ventilation. Remove the pile of manure.”*

~ Max von Pettenkofer, 1858



Separate!



2. Ventilation

Dilute the contaminants!



3. Filtration

Remove the contaminants!



Build Tight Ventilate Right



Choosing a Residential Ventilation Method

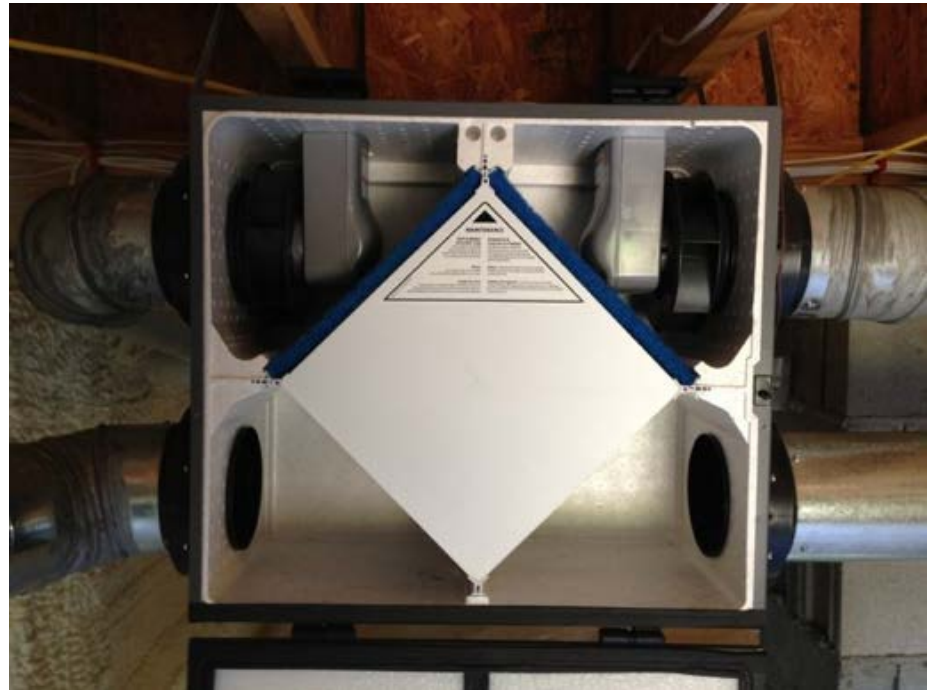
3 Types of People

1. Those who can do math
2. and those who can't.



3 Types of Ventilation

1. Whole house
2. Local
3. Buffer space



3 Types of Ventilation

1. Whole house
2. Local
3. Buffer space



Local Ventilation



Bathrooms

Kitchens

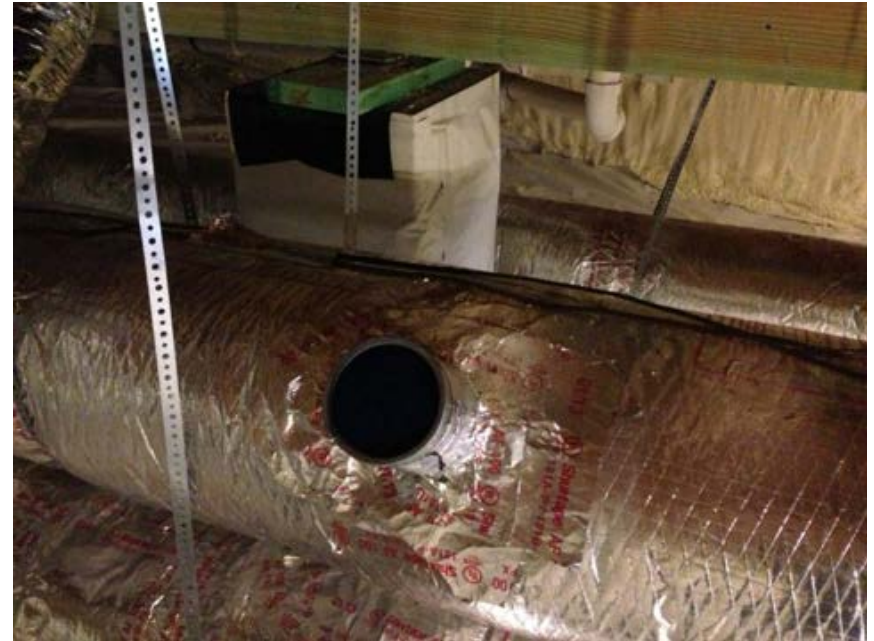


Buffer Space Ventilation

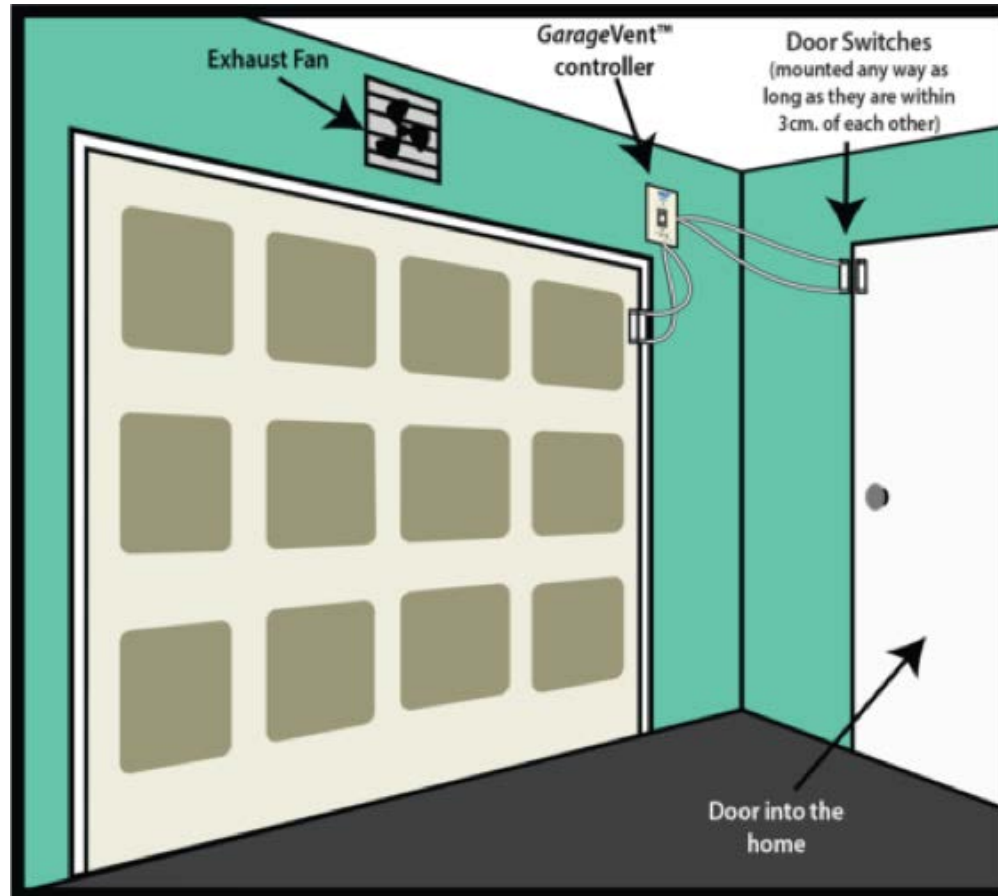
Radon



Crawl Space Ventilation

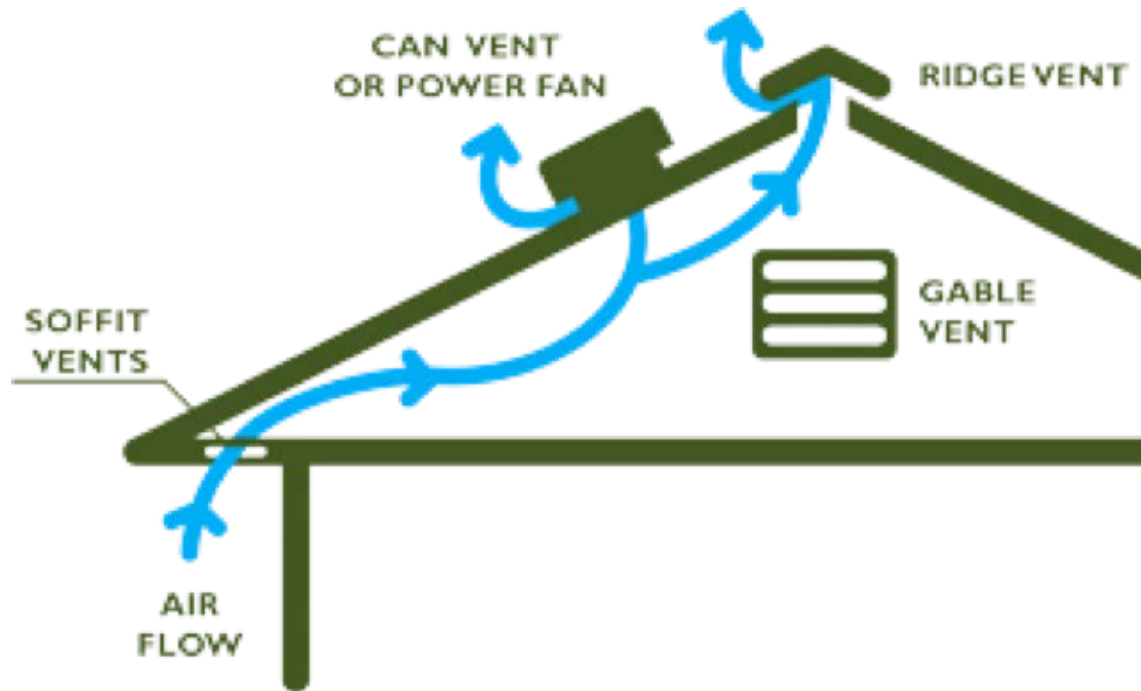


Garage



GarageVent
aircyclor.com

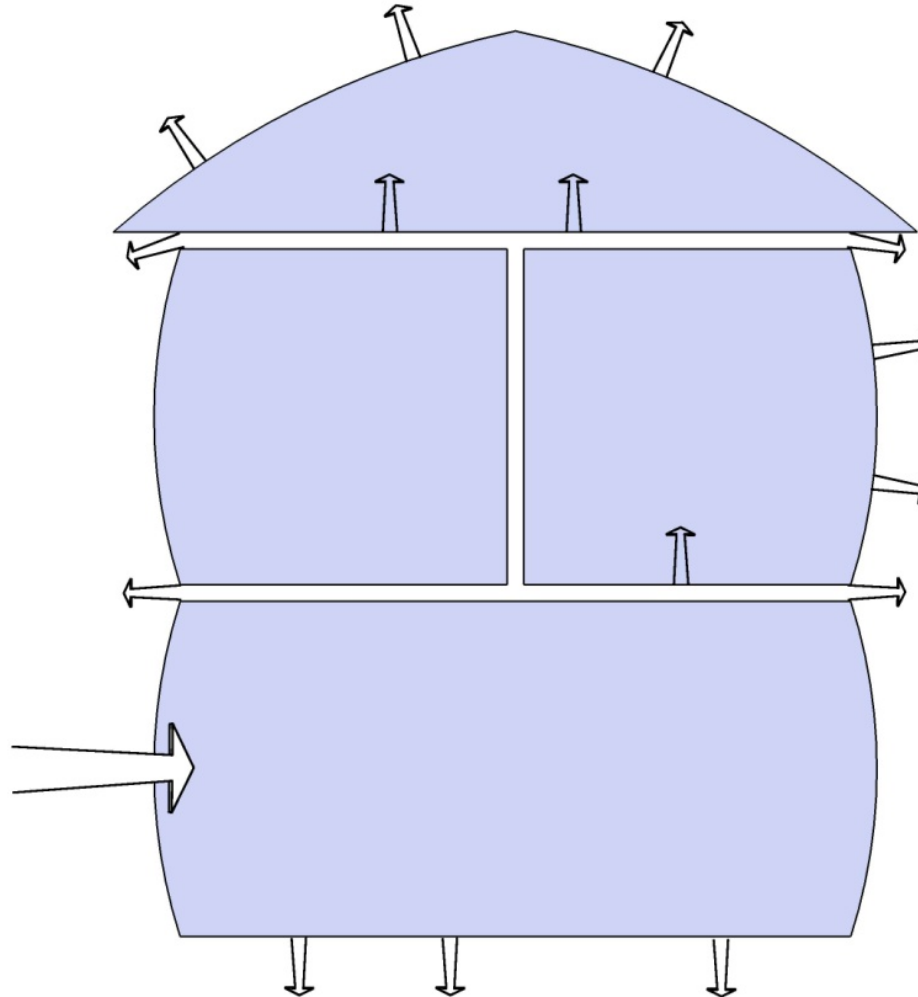
Attic Ventilation



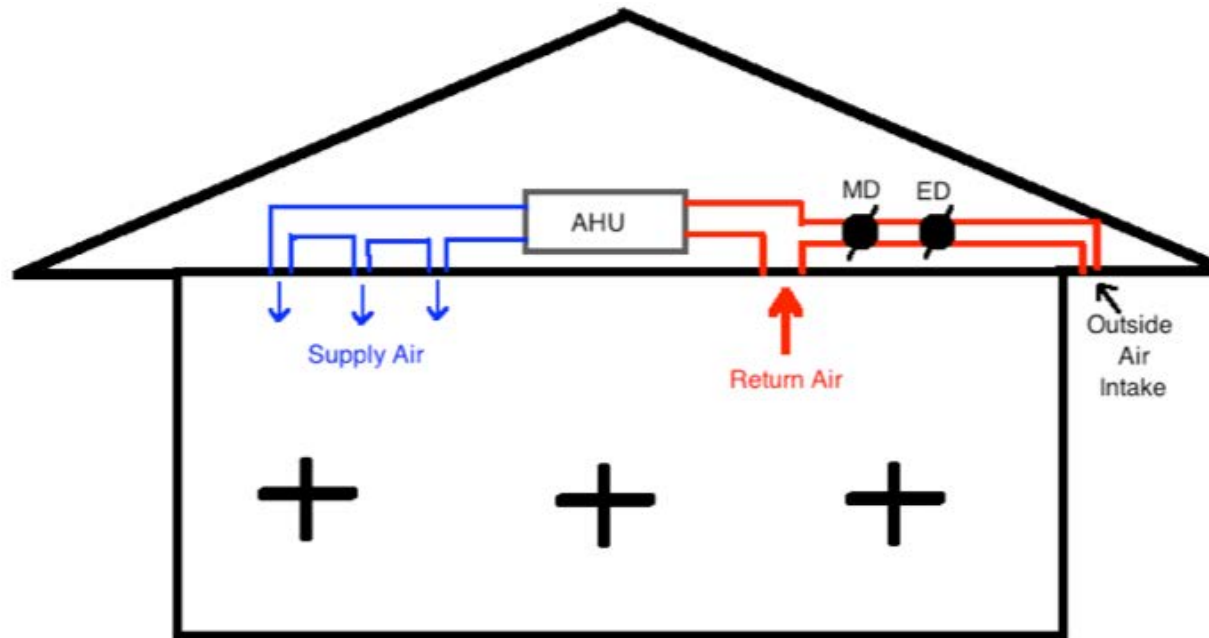
Step 1

Choose a Ventilation Method

Supply-Only Ventilation



Central Fan Integrated Supply (CFIS)



Positive Pressure
Mechanical Ventilation System

AHU = air handler unit, the blower unit in the heating & cooling system

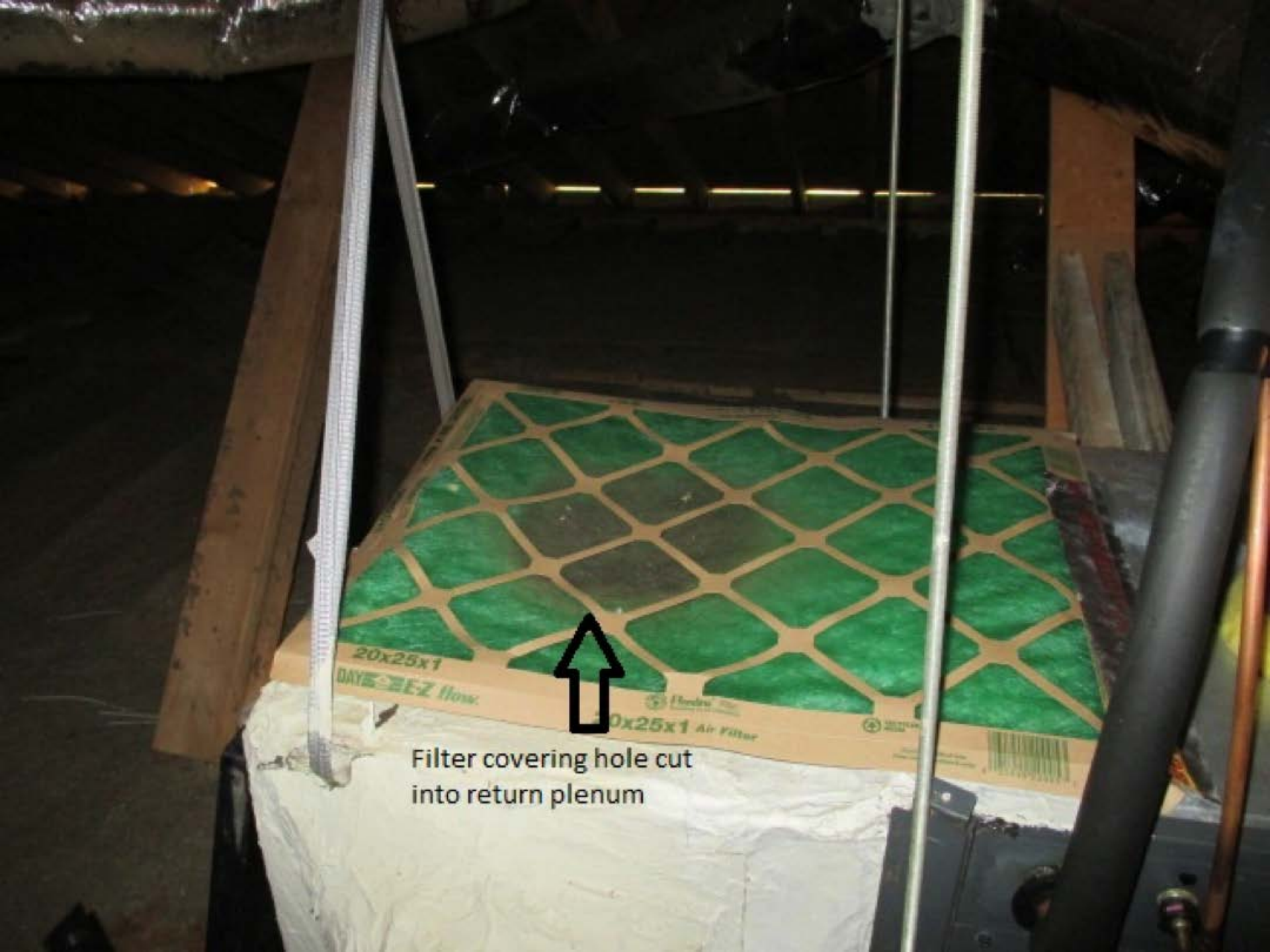
MD = mechanical damper, for controlling air flow rate

ED = electronic damper, for controlling when mech. ventilation system operates



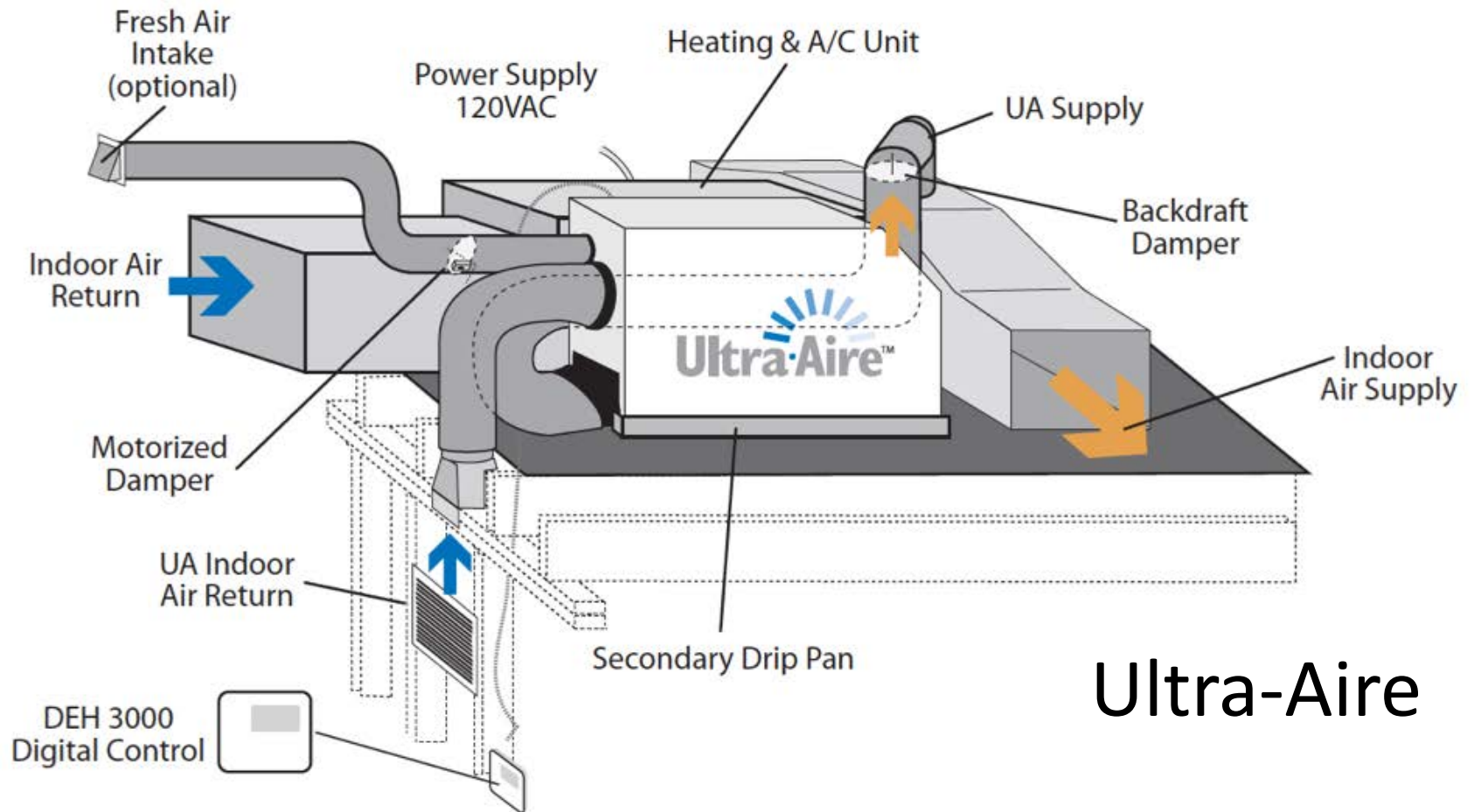
CFIS Controllers





Filter covering hole cut
into return plenum

Ventilating Dehumidifier



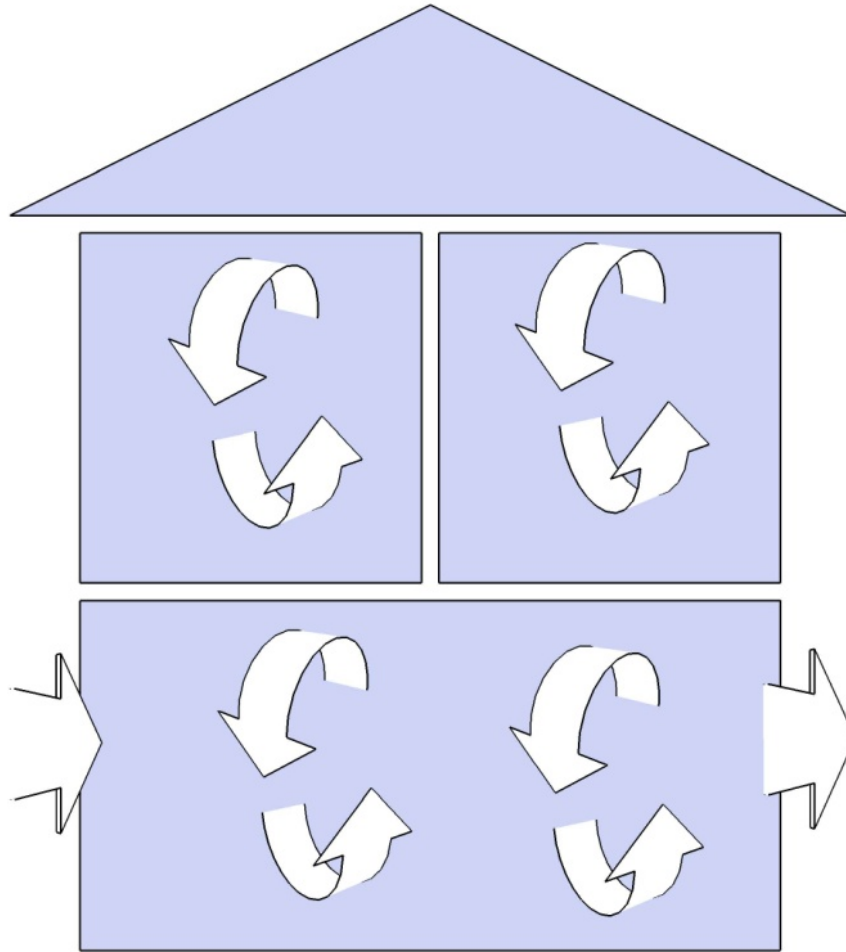
Ultra-Aire

ultra-aire.com

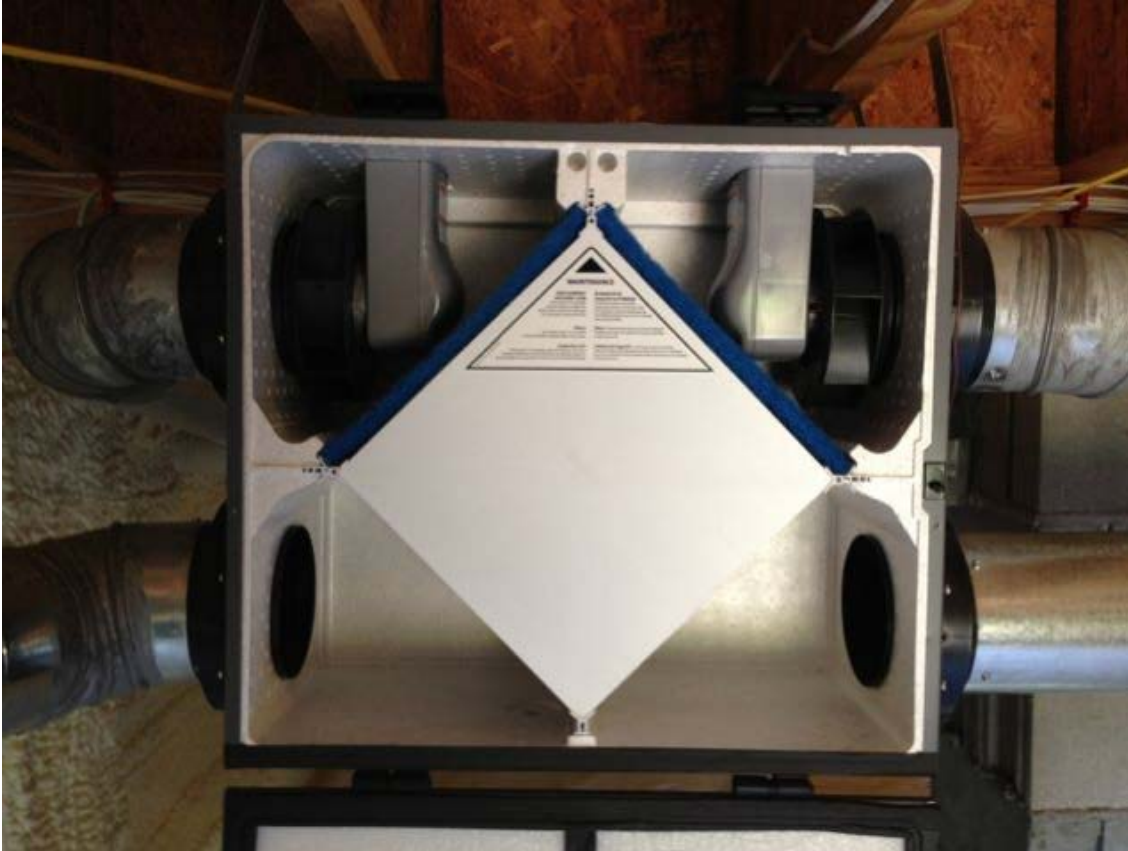
Supply Fans



Balanced Ventilation



Whole House Ventilation

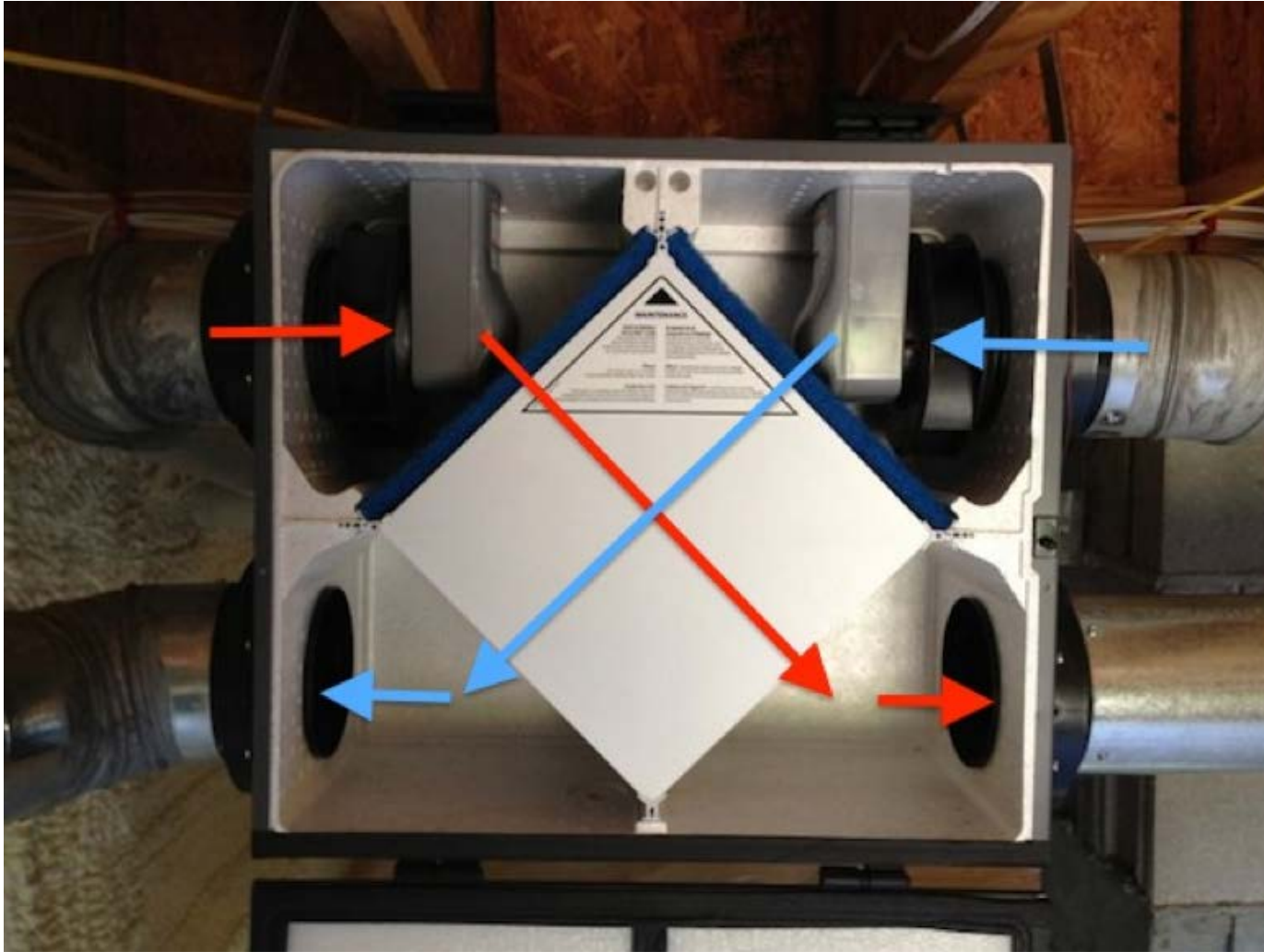


Balanced

- HRV
- ERV
- Balanced without recovery

Who looks at slide numbers anyway?

ERV & HRV Operation



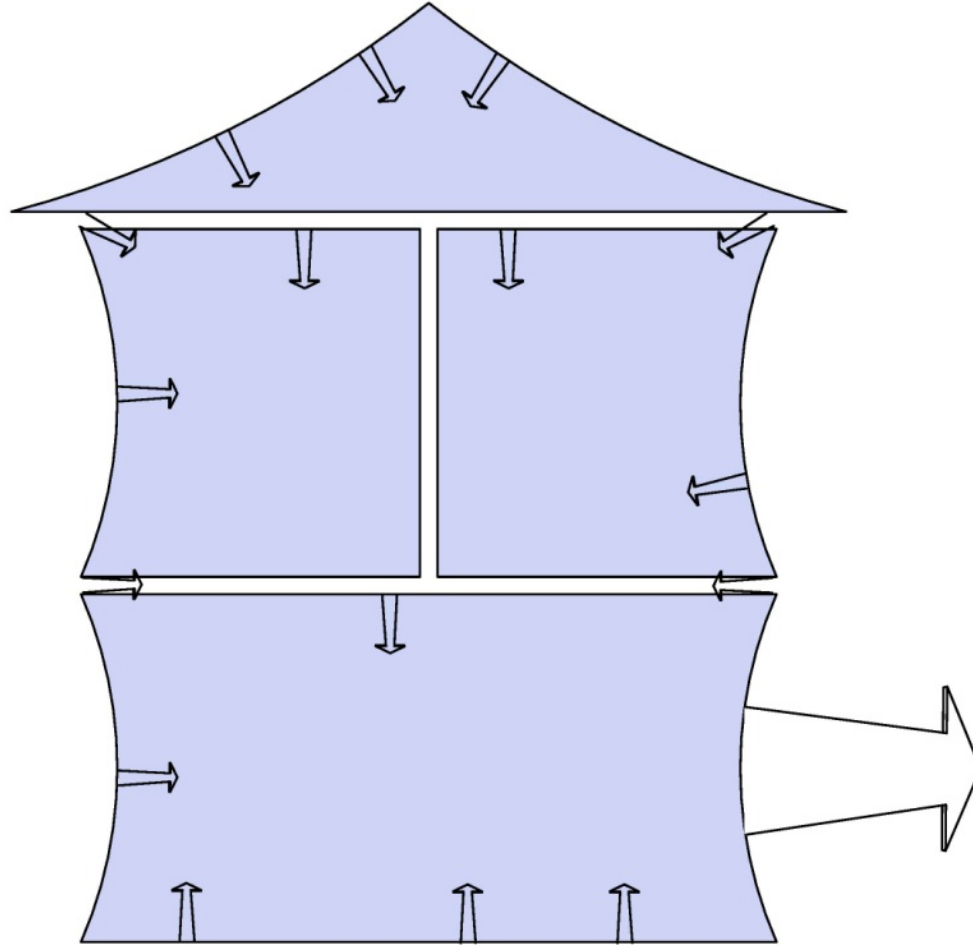
ERV & HRV Operation



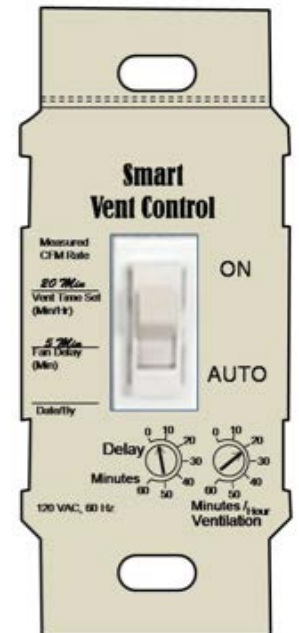
Lunos



Exhaust-Only Ventilation



Range Hoods & Bath Fans With Controls

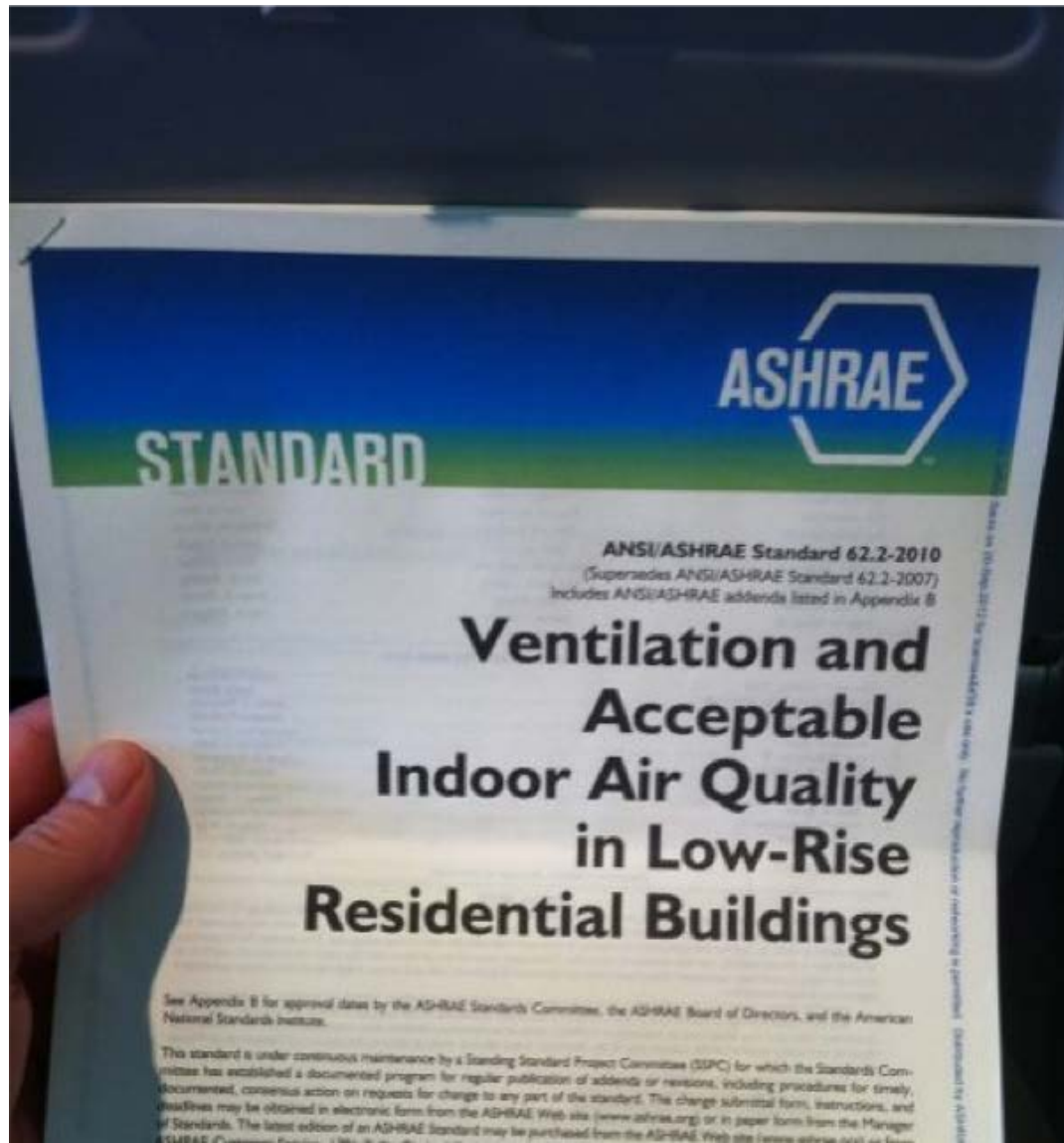




Step 2

Choose a Ventilation Rate

How Much to Ventilate?



62.2 Ventilation Rates

62.2-2010 $Q_v = 0.01 A_{\text{floor}} + 7.5 (N_{\text{br}} + 1)$

62.2-2013 $Q_v = 0.03 A_{\text{floor}} + 7.5 (N_{\text{br}} + 1)$

A_{floor} = cond. floor area, N_{br} = # of bedrooms




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RED Calc Free Tools

Getting Started

Tool Descriptions

Preferences

Ventilation

New


ASHRAE 62.2-2016

ASHRAE 62.2-2013

ASHRAE 62.2-2010

ASHRAE 62.2 CA

• Click the label of any input or result for Pop-Up Help •

 **ASHRAE 62.2-2016 Ventilation** Reset Print ?

New or existing construction Existing ▾

Dwelling unit is Detached ▾

Use infiltration credit No ▾

Floor area [ft2 ▾] 2500

Number of occupants 4 ▾

☐ **Use Local Ventilation Alternative Compliance**

BSC-01 Ventilation Rates

BSC-01 $Q_v = 0.01 A_{\text{floor}} + 7.5 (N_{\text{br}} + 1)$

A_{floor} = cond. floor area, N_{br} = # of bedrooms

BSC = Building Science Corp.

buildingscience.com

But wait...there's more!

BSC-01 Ventilation Rates

System Coefficient based on system type¹

System Type	Distributed	Not Distributed
Balanced	1.0	1.25
Not Balanced	1.25	1.5

¹ Where there is whole-building air mixing of at least 70% recirculation turnover each hour, the system coefficient may be reduced by 0.25.

Real Numbers

- 2,000 sf, 3 bedroom house
- 3 BR → 4 people

Method	Rate (cfm)
62.2-2010	50
62.2-2013	90
BSC-01	50, 63, or 75 (w/o mixing) 38, 47, or 56 (w/ mixing)

Is it possible to ventilate too much?

- Comfort
- Humidity
- Energy consumption
- System effectiveness
- Lack of data on health impacts

Where Do These Rates Come From?

- Odor control – 15 cfm/person, C.P. Yaglou research, 1936
- 0.35 ACH for residential since 62-1989
 - ‘expert judgment,’ not health data
- Long history, mostly commercial and institutional

Step 3

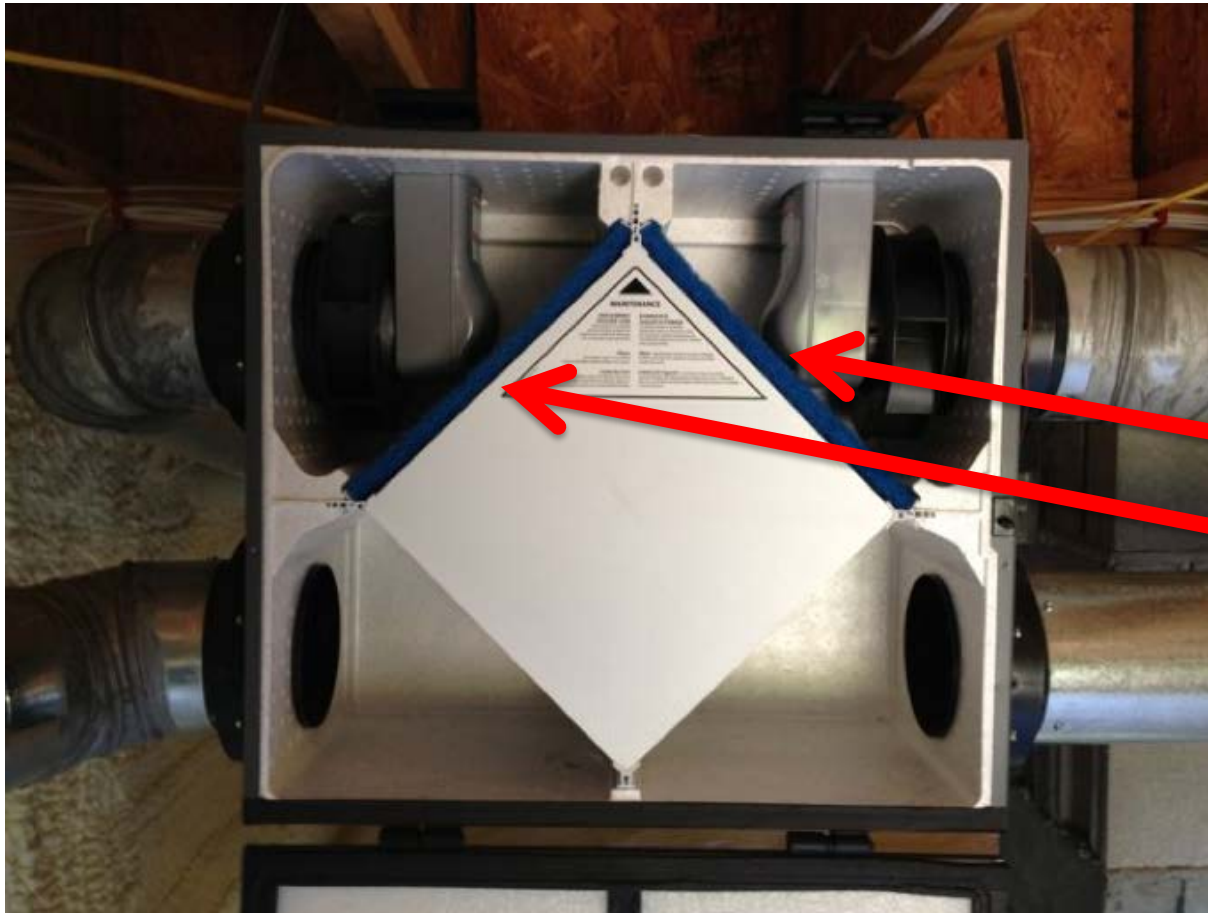
Commission & Maintain the System

Commissioning

- Measure the air flow at intakes and exhausts
- Make sure the controls work
- Look for correct installation



Maintenance



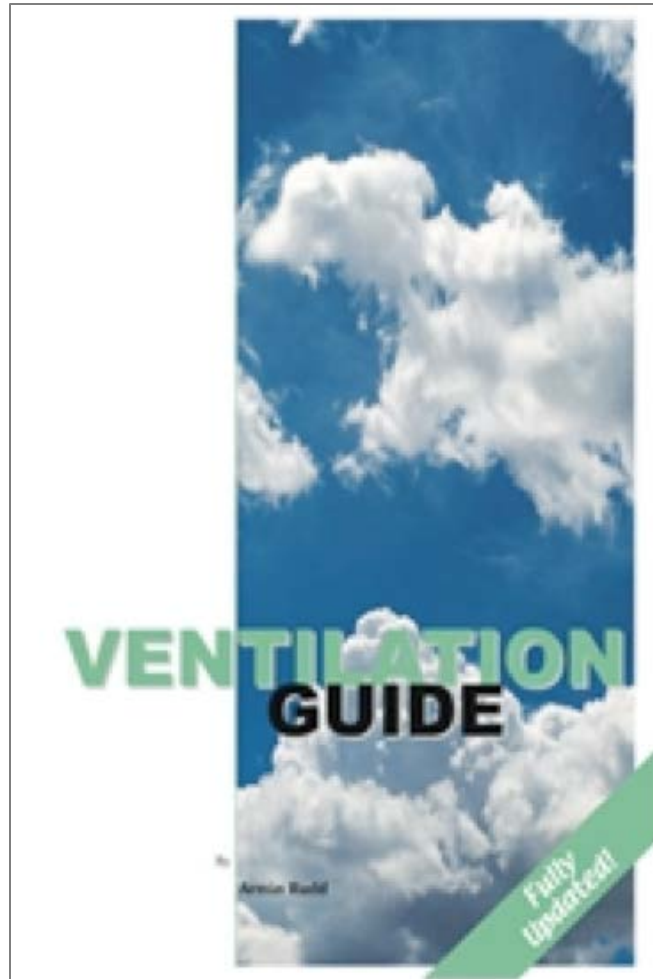
Filters

Only 33 more slides

Resources

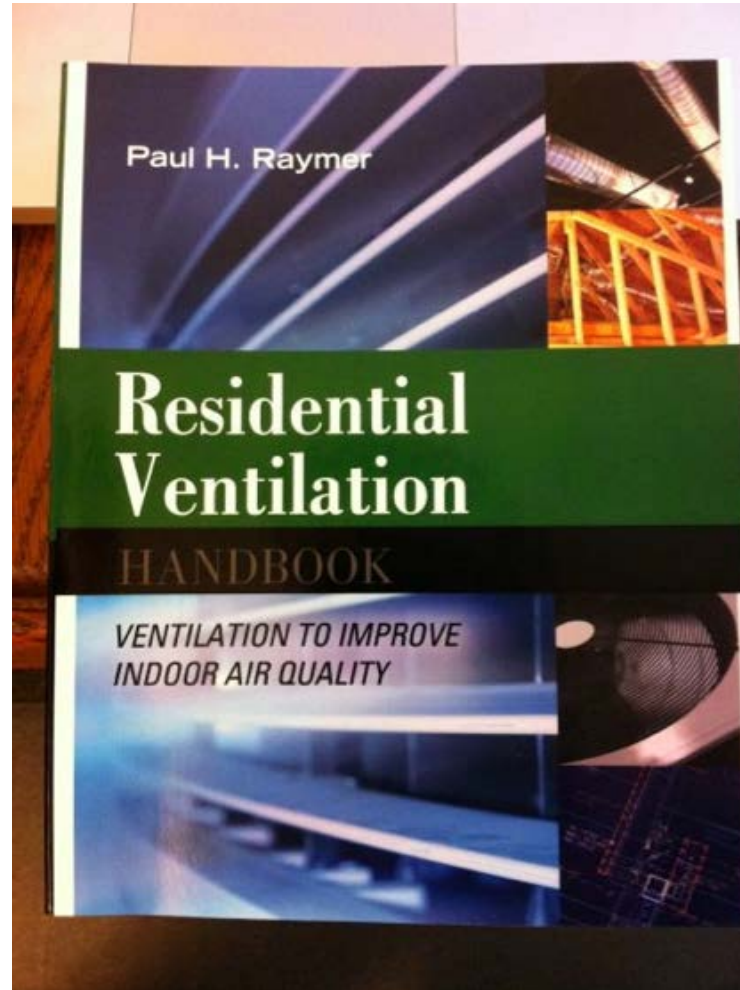
Ventilation Guide

by Armin Rudd



Residential Ventilation Handbook

by Paul Raymer





Contact Info

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