Ventilation for SPF Contractors
Allison A. Bailes III, PhD
Dear Allison A. Bailes:

Congratulations! Based on the reference value of your outstanding achievements, you have been selected for inclusion in the forthcoming Millennium Edition of Who’s Who of American Women. This unique compilation will chronicle the most accomplished women from across the United States and Canada who are leading us into a new era.
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...

Read more

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...
ventilation
/ˌven(t)əˈlāSH(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

$\text{CO}_2$

VOCs

Formaldehyde

$\text{NO}_x$

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
aircycler.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
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  \[ Q_v = 0.03 \, A_{\text{floor}} + 7.5 \, (N_{\text{br}} + 1) \]

\[ A_{\text{floor}} = \text{cond. floor area}, \quad N_{\text{br}} = \# \text{ of bedrooms} \]
BSC-01 Ventilation Rates

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

\( A_{\text{floor}} \) = cond. floor area, \( N_{br} \) = # of bedrooms

BSC = Building Science Corp.
buildingscience.com
But wait...there's more!
## BSC-01 Ventilation Rates

<table>
<thead>
<tr>
<th>System Type</th>
<th>Distributed</th>
<th>Not Distributed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanced</td>
<td>1.0</td>
<td>1.25</td>
</tr>
<tr>
<td>Not Balanced</td>
<td>1.25</td>
<td>1.5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Method</th>
<th>Rate (cfm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>62.2-2010</td>
<td>50</td>
</tr>
<tr>
<td>62.2-2013</td>
<td>90</td>
</tr>
<tr>
<td>BSC-01</td>
<td>50, 63, or 75 (w/o mixing)</td>
</tr>
<tr>
<td></td>
<td>38, 47, or 56 (w/ mixing)</td>
</tr>
</tbody>
</table>
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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