So Why 62.2?

Paul Francisco
University of Illinois at Urbana-Champaign
Who Decides?

- We have two choices for selecting a ventilation standard:
  - Make one up ourselves that seems about right
  - Let others who are focused on indoor air figure it out
Who Decides?

- We are best covered if we can point to something that “experts” have come up with

- It’s like a code – if you follow what the “experts” said then you are covered
Yes, but why 62.2?

- First reason:
  - It’s the only one in the U.S.
    - (and you don’t want to use one from another country)

- Second reason:
  - It’s become manageable for retrofit
Really?

Yes. Consider:

- Originally, compliance required a fan in every kitchen & bath
  - Now one fan can serve all needs

- Provides flexibility of options to meet on-site conditions
  - Exhaust isn’t ok? Use supply or balanced
  - Can use continuous or intermittent controls

- Can get credit for infiltration
  - If a house is still leaky after air sealing you don’t need a fan
Based on single-story, 1500 square foot house

CFM 50 = 4000

Desired ventilation = 75 CFM

Over-ventilation = wasted energy

Under-ventilation = IAQ concern

Ventilation Rate, CFM

Outdoor Temperature, degrees F
Based on single-story, 1500 square foot house

- CFM 50 = 4000
- CFM 50 = 1000 + 75 CFM
- CFM 50 = 2000
- Desired ventilation = 75 CFM
- CFM 50 = 1000

Ventilation Rate, CFM vs. Outdoor Temperature, degrees F
Ventilation – How Much?

- **Whole-House Base Rate**
  - For general contaminants
  - Based on floor area and occupancy

- **Local Exhaust Deficits**
  - Insufficient exhaust in kitchens & baths
  - Potentially increase fan flow requirement

- **Infiltration Credit**
  - Potentially decrease fan flow requirement
Other Requirements – Sound

- Sound
  - Continuous fans, and any fan used for whole-building ventilation, must be 1.0 sone or less
  - On-demand fans for local exhaust only must be 3.0 sones or less
  - Remote fans (air handler fans, attic-mounted in-line fans, etc.) are exempt
  - Existing fans used to comply with 62.2 are exempt

<table>
<thead>
<tr>
<th>Specifications:</th>
<th>FV-08VQ3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Pressure in inches w.g.</td>
<td>0.1&quot;</td>
</tr>
<tr>
<td>Air Volume (CFM)</td>
<td>80</td>
</tr>
<tr>
<td>Noise (sones)</td>
<td>0.3</td>
</tr>
</tbody>
</table>
Other Requirements – Verification

- All fans must have their flow measured
  - Exhaust fan flow meter for exhaust fans
  - Supply is harder
Other Requirements

- **Labeling**
  - Must label ventilation system as such – at control

- **Override**
  - Must allow “readily accessible” override
  - This CAN (but does not need) to be a wall switch
  - Intent:
    - Allow for fan service/maintenance
    - Allow for shutoff if outside air is “bad”
Other Requirements

- Air sealing
  - Should attempt to air seal between garages and living spaces
  - Helps to make sure that makeup air for exhaust doesn’t come from “bad” places
  - We do this anyway
Ventilation Options

- **Exhaust**
  - Bath Fans
  - Kitchen Fans
  - Centrally-located fans
  - Remote in-line fans

- **Supply**
  - Air intake connected to return ducts
  - Remote in-line fans

- **Balanced**
  - Heat Recovery Ventilators (HRVs)
  - Energy Recovery Ventilators (ERVs)
Exhaust Fans

- By far the most common option
- Good for source control
- Need to be careful about depressurization – combustion appliances
Exhaust Fans – Options

- Single-speed fan
  - Rated for continuous use

- Examples

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Flow</th>
<th>Sones</th>
<th>Duct</th>
<th>W</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/N*</td>
<td>QTXE(N)080</td>
<td>80</td>
<td>0.3</td>
<td>6”</td>
<td>23</td>
<td>~120</td>
</tr>
<tr>
<td>B/N*</td>
<td>QTRE(N)080</td>
<td>80</td>
<td>0.8</td>
<td>4”</td>
<td>23</td>
<td>~100</td>
</tr>
<tr>
<td>Panasonic</td>
<td>FV-08VK1</td>
<td>80</td>
<td>0.3</td>
<td>4”</td>
<td>11</td>
<td>~185</td>
</tr>
</tbody>
</table>

*B/N is Broan/Nutone – the Nutone version has the N in the model
Exhaust Fans – Options

- Multi-speed fan
  - Continuous at low level
  - “Boost” switch increases flow when needed

Example

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Flow</th>
<th>Sones</th>
<th>Duct</th>
<th>W</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panasonic</td>
<td>FV-08VKS2</td>
<td>30/80*</td>
<td>0.3</td>
<td>4”</td>
<td>5/11</td>
<td>~160</td>
</tr>
<tr>
<td>Broan</td>
<td>ZB80</td>
<td>30/80*</td>
<td>0.3</td>
<td>4”</td>
<td>4/8</td>
<td>~175</td>
</tr>
</tbody>
</table>

*Flow can be set anywhere 0-70; watts are at 30
Exhaust Fans – Options

- In-line
  - Mounted in attic
  - Draws from multiple locations (perhaps reduced “deficit”)
  - Quieter
  - Larger flows:
    - Panasonic min. 120 cfm
    - Fantech min. 108 cfm
    - Broan min. 110 cfm
  - (Fantech has adjustable speed control)
Exhaust Fans – Options

- Wall-mounted
  - If ceiling-mount isn’t possible

Example

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Flow</th>
<th>Sones</th>
<th>Duct</th>
<th>W</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panasonic</td>
<td>FV-08WQ1</td>
<td>70</td>
<td>1.1</td>
<td>N/A</td>
<td>18</td>
<td>~160</td>
</tr>
</tbody>
</table>
Exhaust Fan Controls – Single-speed Fans

- Can use capacitor with many fans to reduce to a lower continuous speed
### Airetrak 62.2 Matrix

Fan results for low cfm were tested @ 0.1 static pressure w.g. 622M_1

<table>
<thead>
<tr>
<th>MFGR/</th>
<th>Red</th>
<th>Blue</th>
<th>Brown</th>
<th>Yellow</th>
<th>Green</th>
<th>White</th>
<th>Violet</th>
<th>Orange</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Actual cfm</td>
<td>cfm</td>
<td>cfm</td>
<td>cfm</td>
<td>cfm</td>
<td>cfm</td>
<td>cfm</td>
<td>cfm</td>
<td>cfm</td>
</tr>
<tr>
<td>Air King</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AK110</td>
<td>110</td>
<td>N/A</td>
<td>19</td>
<td>30</td>
<td>35</td>
<td>44</td>
<td>74</td>
<td>92</td>
<td>102</td>
</tr>
<tr>
<td>AK150LS</td>
<td>150</td>
<td>N/A</td>
<td>N/A</td>
<td>32</td>
<td>43</td>
<td>58</td>
<td>93</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>AK80</td>
<td>80</td>
<td>N/A</td>
<td>26</td>
<td>34</td>
<td>48</td>
<td>53</td>
<td>60</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>AK80LS</td>
<td>80</td>
<td>N/A</td>
<td>N/A</td>
<td>41</td>
<td>53</td>
<td>68</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>AKF100LS</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>35</td>
<td>42</td>
<td>54</td>
<td>72</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>BFQ50</td>
<td>50</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>17</td>
<td>26</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>BFQ75</td>
<td>70</td>
<td>N/A</td>
<td>N/A</td>
<td>20</td>
<td>25</td>
<td>34</td>
<td>45</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ES80S</td>
<td>80</td>
<td>N/A</td>
<td>N/A</td>
<td>26</td>
<td>40</td>
<td>46</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ES130S</td>
<td>130</td>
<td>N/A</td>
<td>N/A</td>
<td>41</td>
<td>52</td>
<td>64</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>FRAK50</td>
<td>50</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>29</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Airzone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL9</td>
<td>88</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>36</td>
<td>42</td>
<td>N/A</td>
<td>61</td>
<td>N/A</td>
</tr>
<tr>
<td>Broan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>683</td>
<td>80</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>32</td>
<td>43</td>
<td>N/A</td>
</tr>
<tr>
<td>683L</td>
<td>80</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>32</td>
<td>43</td>
<td>N/A</td>
</tr>
<tr>
<td>80RDF</td>
<td>80</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>26</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>QTR140</td>
<td>140</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>43</td>
<td>82</td>
<td>113</td>
<td>N/A</td>
</tr>
<tr>
<td>QTRE080</td>
<td>80</td>
<td>N/A</td>
<td>N/A</td>
<td>30</td>
<td>42</td>
<td>47</td>
<td>55</td>
<td>65</td>
<td>67</td>
</tr>
<tr>
<td>QTRN110L</td>
<td>110</td>
<td>N/A</td>
<td>N/A</td>
<td>35</td>
<td>49</td>
<td>63</td>
<td>78</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>QTXEN080</td>
<td>80</td>
<td>N/A</td>
<td>N/A</td>
<td>40</td>
<td>44</td>
<td>56</td>
<td>64</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>QTXEN110</td>
<td>110</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>36</td>
<td>50</td>
<td>66</td>
<td>71</td>
<td>77</td>
</tr>
</tbody>
</table>
Exhaust Fan Controls – Single-speed Fans

- Can use control to operate intermittently on a schedule

AirCycler™ SmartExhaust™
Supply Fans

- You know where the air is coming from
- Counters depressurization issues
- May use a much higher-wattage fan
Supply Fans – Options

- In-line
  - Same fan as exhaust, just turned around
  - Need to have outlets selected and placed to avoid cold air blowing on residents
Controls for Ventilation Integrated with Furnace System

http://www.aircycler.com/
Ventilation Options - Balanced

- HRV/ERV most common
  - HRV: Heat Recovery Ventilator
    - Recovers up to about 70% of the heat in the exhaust stream
  - ERV: Energy Recovery Ventilator
    - Also transfers moisture
    - Better with high AC loads
Balanced Ventilation

- HRVs and ERVs typically
  - Supply to bedrooms, living/family rooms
  - Exhaust from kitchens, baths, laundry rooms

- May have dedicated supply system

- May have the supply air go into the return side of the forced-air conditioning system

- Panasonic has spot ERV (~40 cfm)
HRVs/ERVs

- Can provide both source control AND distribution
- No impact on pressures in home
- Substantial cost (~$2,000)
  - Spot ERV ~$340 + installation

- Good option for very tight houses where pressure impacts could be significant