Attics

“A HOT Topic”
Average Attic Temperature

Roof Color?  Ventilation?  Insulation?
Roof Color?
My neighbors home June 14–15, 2009
My home June 14–15, 2009
Compare Roof Colors

CT’s

Neighbor
Ventilation
Ventilation

Check for Proper Attic Ventilation
1 sq ft per 150 sq ft
or
1 sq ft per 300 sq ft of ceiling area

Powered attic fans, even solar ones, create a negative pressure without proper cross ventilation
Ventilation

Lack Of Adequate Cross Ventilation

As Attic Temperature Rises

-1 to 50

Negative Pressure Increases

[Diagram of ventilation system in a house]

Texas Home Energy Rating Organization
Attics

Fan was not exhausting air, it was simply moving it around
Look for disconnected exhaust fans or fans that are not exhausting outside.
### Table of Net Free Vent Area

<table>
<thead>
<tr>
<th>High Vent, Exhaust</th>
<th>Net Free Attic Vent Area (square inches approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter vent, 8’ length</td>
<td>144 sq. in. (18 per lineal foot)</td>
</tr>
<tr>
<td>Shingle vent, 4’ length</td>
<td>72 sq. in. (18 per lineal foot)</td>
</tr>
<tr>
<td>Roof louver</td>
<td>50 sq. in.</td>
</tr>
<tr>
<td>Wind turbine, 12”</td>
<td>112 sq. in.</td>
</tr>
<tr>
<td>Rectangular gable louvers</td>
<td></td>
</tr>
<tr>
<td>12” x 12”</td>
<td>56 sq. in.</td>
</tr>
<tr>
<td>12” x 18”</td>
<td>82 sq. in.</td>
</tr>
<tr>
<td>14” x 24”</td>
<td>145 sq. in.</td>
</tr>
<tr>
<td>18” x 24”</td>
<td>150 sq. in.</td>
</tr>
<tr>
<td>24” x 30”</td>
<td>324 sq. in.</td>
</tr>
<tr>
<td><strong>Low Vent, Intake</strong></td>
<td></td>
</tr>
<tr>
<td>16” x 8”, under eave</td>
<td>56 sq. in.</td>
</tr>
<tr>
<td>16” x 6”, under eave</td>
<td>42 sq. in.</td>
</tr>
<tr>
<td>16” x 4”, under eave</td>
<td>28 sq. in.</td>
</tr>
<tr>
<td>Continuous soffit vent, 8’ length</td>
<td>72 sq. in. (9 per lineal foot)</td>
</tr>
<tr>
<td>Vented drip edge, 10’ length</td>
<td>90 sq. in. (9 per lineal foot)</td>
</tr>
</tbody>
</table>

**Note:** Be sure to check manufacturer’s specifications for individual products to determine the actual net free vent area.

**Source:** Principles of Attic Ventilation, published by Air Vent, Inc., Dallas TX
Apply radiant barrier applied to the underside of the roof sheeting, draping over duct system, or as roof felt.

The “radiant barrier paint” isn’t really a radiant barrier and does not consider it to be an effective radiant barrier in this Standard.
## Radiant Barrier (DOE / ORNL Studies)

### TABLE A1
Average Reductions In Ceiling Heat Flow Due To Addition of Radiant Barrier to R-19 Attic Floor Insulation

<table>
<thead>
<tr>
<th>Radiant Barrier Location</th>
<th>Whole House Tests</th>
<th>Test Cell Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIMA</td>
<td>ORNL</td>
</tr>
<tr>
<td>Roof: attached to roof deck</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Roof: draped over rafters</td>
<td>20%**</td>
<td>-----</td>
</tr>
<tr>
<td>Roof: stapled between rafters</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Roof: stapled under rafters</td>
<td>24%</td>
<td>25 – 30%</td>
</tr>
<tr>
<td>Attic Floor***</td>
<td>35%</td>
<td>32 – 35%</td>
</tr>
</tbody>
</table>

*Tested at attic air space ventilation rate of five air changes per hour. Typical average ventilation rates are somewhat lower.

**Test was a simulation of draped configuration. The radiant barrier did not extend over the rafters, but was stapled near the joints between the rafters and the roof deck.

***Values are for new and undusted radiant barrier installations; percentages will be lower for aged radiant barriers.
Radiant Barrier (Studies/Information)

State Louisiana

DOE / ORNL Radiant Barrier Fact Sheet
http://www.ornl.gov/sci/roofs+walls/radiant/rb_02.html

Texas A&M
http://repository.tamu.edu/bitstream/handle/1969.1/6496/ESL-HH-87-09-26.pdf?sequence=3

Reflective Insulation Manufacturers Association–International Handbook
http://www.rimainternational.org/technical/index.html

PATH/ National Association of Home Builder Research Center
http://www.toolbase.org/TechInventory.techDetails.aspx?ContentDetailID=824

Florida Solar Energy Center
Insulation
Insulation

Measure in 4 locations
Insulation

“Cathedral-ize”
Install foil backed foam board insulation or sheathing to seal insulation and stop transfer through studs.
Absolutely never install plastic in hot-humid climates
Attic Walls

Chase created by an angled wall inside the home
Area was open to the attic between floors
Infiltration

Stack Effect causes a pressure imbalance, resulting in increased infiltration.

The radiation from the sun cause an attic without proper cross ventilation to increase the stack effect drastically.

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Infiltration

Sources of Air Leakage

- attic bypasses 24%
- fireplace 5%
- doors 7%
- exterior windows 12%
- basement 20%
- wall penetrations & vents 18%
- duct system 14%

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Infiltration

when inside the home, look for odd details such as extra-thick walls or angled walls - these can indicate the presence of an open chase to the attic.
Ceiling Penetrations

- Ceiling was lowered but not the duct boot
- Should be caulked
Recessed Lights
Shading?