Overview of UV Light

Air Management Practices Assessment Tool (AMPAT)

Funded by:

Project Team:
• Jay Harmon, Prof of Ag & Biosystems Engineering
• Steve Hoff, Professor of Ag & Biosystems Engineering
• Angie Rieck-Hinz, Extension Program Specialist

Application

• Used to reduce emissions from buildings

Basic Operation

• Photocatalytic Oxidation
  – Combine UV light with a Titanium Oxide coated filter.
  – Creates hydroxyl radicals which combine with bacteria and VOCs
  – Breaks down pollutants

Figure from www.peakpureair.com

Key factors

• UV intensity – UV-185 nm
• Exposure time – 1 second
• To a lesser degree:
  – Temperature
  – Reflectivity of the duct material
  – Humidity

Example

A 24” fan, rated to move 6000 cfm of air, would need a 32’ long tube to achieve a 1 second exposure time.
UV Light - Pros

- Very effective for VOCs and odor reduction.
- Potential to remove pathogens.

UV Light - Cons

- Technology is still not common and may require more development.
- Cost estimates are somewhat unknown.
- Filters may be needed to reduce the impact of dust on treatment surfaces.

Effectiveness

<table>
<thead>
<tr>
<th>Component</th>
<th>Reduction</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH₃</td>
<td>—</td>
<td>Field application under development</td>
</tr>
<tr>
<td>H₂S</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>38-100%</td>
<td></td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Volatile Organic Compounds (VOC)</td>
<td>80-99%</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>$$$</td>
<td></td>
</tr>
</tbody>
</table>

For Further Information:

- eXtension
  - If you are an educator and wish to have copies of PowerPoint files, contact Jay Harmon (jharmon@iastate.edu).