Indoor air quality – informative

Introduction
Indoor air quality (IAQ) refers to the quality of air in a non-industrial environment, such as offices and public buildings. Good air quality is generally regarded as air that has the following characteristics:

- Comfortable temperature
- Comfortable humidity (30-60 percent relative humidity)
- Sufficient outside air
- No disagreeable odors
- No harmful or irritating chemical or biological contaminants

Fundamental changes in the way we live have had a significant impact on the evolution of IAQ problems. The rise in IAQ issues can be attributed to changes in building materials, furnishings and a decrease in building ventilation.

Commercial building materials have shifted to lighter, synthetic construction material, which potentially off-gas chemicals into the workplace. Building furnishings, carpet and cleaning agents also introduce chemicals into the workplace, as do the increased use of office equipment. New building materials and furnishings (carpeting, upholstery, manufactured wood products and adhesives) can emit volatile organic compounds, including formaldehyde. Remodeling in occupied areas can also generate particulate exposure.

Ventilation has shifted to energy-efficient systems, including buildings with windows that cannot be opened, designed to reduce the amount of outdoor air brought into the building. Carbon dioxide, a product of respiration, can accumulate if there is not an adequate amount of outside air. While levels usually do not represent a health hazard, they are an indicator of over crowding or insufficient make up air supplied. Ventilation with minimal outdoor air cannot dilute indoor air contaminants and may allow them to accumulate.

The purpose of ventilation is to bring in outside air and mix it with a percentage of return (inside) air, and condition (heat, cool and humidify) the air as required. The National Institute for Occupational Safety and Health has found that more than 50 percent of IAQ problems are related to insufficient or ineffective ventilation.

Health problems
Two types of illnesses can result from poor indoor air – sick building syndrome and building-related illness, the most common being sick building syndrome or complaints of irritation.

<table>
<thead>
<tr>
<th>Sick building syndrome (SBS)</th>
<th>Building-related illness (BRI)</th>
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<tbody>
<tr>
<td><strong>Description</strong></td>
<td><strong>Description</strong></td>
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<tr>
<td>• Physical reaction to multiple low-level contaminants</td>
<td>• Physical reaction to a single identifiable contaminant found to be present in the indoor environment</td>
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<td>• Occupants experience acute health and comfort effects that appear to be linked to time spent in a building. Occupants report relief soon after leaving the building.</td>
<td>• Complaints may require prolonged recovery times after leaving the building</td>
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<td>• No specific illness or cause can be identified</td>
<td>• Symptoms are clinically defined and have clearly identifiable cause</td>
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<tr>
<td><strong>Symptoms</strong></td>
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<tr>
<td>• Headaches</td>
<td>• Cough</td>
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<tr>
<td>• Nausea</td>
<td>• Fever</td>
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<tr>
<td>• Fatigue</td>
<td>• Chills</td>
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<td>• Eye irritation</td>
<td>• Muscle aches</td>
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<td>• Upper respiratory irritation</td>
<td>• Chest tightness</td>
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Optimizing indoor air quality

Building managers and tenants must work together to improve indoor air quality where necessary. The following are areas to address:

- HVAC should be turned on hours prior to occupancy and shut off only after occupants have left. Be cautious of system shut down during periods of high humidity and in areas of paper storage. Accumulation of water anywhere in the system may foster harmful biological growth that can be distributed throughout the building. Check cooling towers, humidifiers and cooling drip pans.
- Maintain make up air at a minimum of 15 cfm per person and 20 cfm for office spaces. Estimated maximum occupancy in office space is 7 people per 1000 ft2.
- Identify pollution sources. Implement source removal or special ventilation for problem area such as smoking lounges.
- Maintain records of all HVAC system problems, as well as routine maintenance and inspection activities. Document all complaints and steps taken to remedy the situation, this may be helpful in handling future complaints.
- Air cleaners are important, but are not a substitute for source control or ventilation. All air cleaners must be properly sized and maintained to be effective. Office buildings require cleaners with high-filter efficiency and ability to handle large volumes of air.
- Prevention is the best approach in minimizing IAQ problems, good HVAC maintenance and pollution control.

Benefits

The cost associated with providing good air is minimal when compared to the costs of poor tenant and employee relations and complaints, absenteeism and lost productivity. It is vital to take a proactive approach to IAQ to prevent problems from occurring and to respond to complaints rapidly.

Additional information is available in the Travelers document “Indoor Air Quality Investigation.”

References


For more information, log in to the Risk Control Customer Portal at travelers.com/riskcontrol. (Need help? Read our Registration Quick Guide.) You also can contact your Risk Control consultant or email Ask-Risk-Control@travelers.com.