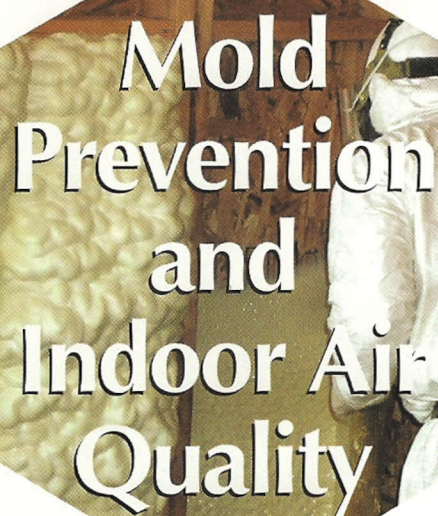


Healthy Building Practices Series



We'll change the way you think about



Mold  
Prevention  
and  
Indoor Air  
Quality

A person wearing a white protective suit and a respirator mask is working on a wall. The wall is covered with yellow insulation. The scene is framed within a hexagonal shape.

**The Icynene Insulation System<sup>®</sup>**  
Healthier, Quieter, More Energy Efficient<sup>®</sup>



# Mold & Indoor

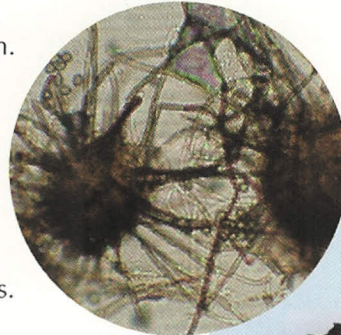
## **Mold and Indoor Air Pollution – No one wants them. No one has to put up with them.**

Nobody wants mold and indoor air pollution in their home or building. It's that simple. And if you apply modern building science principles and use appropriate new materials, no one has to put up with them. We're that certain. Here's why.

### **Mold and indoor air pollution in buildings are not new phenomena. Why the concern now?**

#### **Mold**

Mold has long been recognized as a potential allergen. The word mold describes a large family of microorganisms that produce spores. Airborne mold spores contain proteins that have been identified by the research community as having the ability to trigger adverse reactions in people who suffer from allergies, asthma or other respiratory problems. The familiar "mildew" smells that we associate with basements arise from these molds that are growing in damp spots.



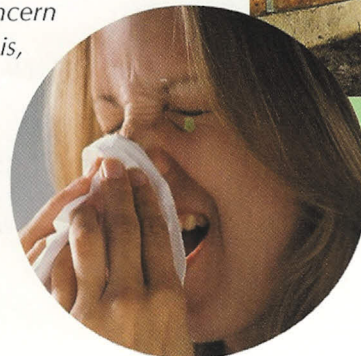
Some forms of indoor mold produce toxic compounds called "mycotoxins". Exposure to mycotoxins can represent a health risk to both non-allergic and allergic individuals. While it is not clear how much mold toxin exposure it takes to cause illness, or what kind of symptoms are likely, recent research does demonstrate that mold toxin is a potential health hazard.<sup>1</sup>

And mold is not going away anytime soon, unless changes are made by all disciplines involved in building design and construction. A recent survey of Indoor Air Quality Professionals indicated that the majority of these experts believe that mold problems will continue to increase over the next 3 years.

#### **Indoor Pollutants**

In 1994, the American Lung Association, the American Medical Association, the U.S. Consumer Product Safety Commission, and the U.S. Environmental Protection Agency (EPA) put health professionals on alert to recognize the many effects of indoor pollutants on human health. Studies from the United States and Europe show that individuals in industrialized nations spend more than 90 percent of their time indoors. The U.S. EPA underlines the seriousness of indoor pollution: "... the concentrations of many pollutants indoors exceed those outdoors. The locations of highest concern are those involving prolonged, continuing exposure – that is, the home, school and workplace."<sup>2</sup>

Companies specializing in indoor air quality investigations have seen an eight-fold increase in all types of mold related complaints over the past five years.<sup>3</sup>



Mistakes or oversights construction, use and/or to a mold or indoor



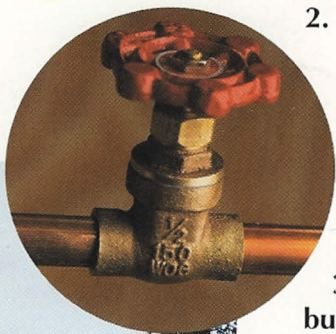
# Air Pollution

## Mold and Indoor Air Pollution: Why do they occur?

Mistakes or oversights in a building's design, construction, use and/or maintenance may contribute to a mold or indoor pollution problem. The problem comes to the forefront when we are presented with repairs that are extremely expensive and health consequences that are debilitating. Some of the conditions most often contributing to mold and IAQ problems include:

### 1. Rain leakage and other moisture penetration:

- Rain or melted snow can enter through leaks in the roof or exterior sheathing.
- Ground water can enter through the basement or crawlspace.



### 2. Plumbing problems:

- Plumbing pipes and fixtures may ultimately corrode and fail, given enough time. Without prompt repairs, the resulting leakage can cause considerable water damage and mold growth.
- Similarly, washing machines and dishwashers can malfunction and allow water leakage that often results in building damage and mold growth, particularly if it is not detected early.

### 3. Walls and ceilings that allow air to flow through "the building envelope":

- There can be a great deal of air leakage through outside walls and ceilings (together refers to "the building envelope"). Air leakage through this building envelope can allow moisture to condense within the walls and ceilings, depending on the outdoor temperature and humidity.
- In northern (winter) climates, moisture-laden air going out through the walls can cause condensation when it reaches the cold outer layers of the wall. In southern climates, warm, humid outside air leaks inward and can cause condensation when the air reaches air-conditioned materials inside (e.g. the backside of drywall, or cold air-conditioning ducts).

### 4. Poor insulation and "cold spots" that attract moisture:

- Some buildings may have no insulation, or there are places where the insulation is inadequate or has settled over time. In winter climates, this can leave cold spots that attract moisture condensation and cause mold growth. In humid southern climates, inadequate insulation may expose air-conditioned materials inside to the warm moist air from outside, again leading to condensation and mold growth.

### 5. Materials that emit pollutants:

- Building materials using adhesives such as urea-formaldehyde glue.
- Common household products such as cleaners and personal toiletries can be pollutants.
- White-board markers, candles and air fresheners.

### 6. Inadequate or faulty ventilation:

- Excess moisture from all the normal activities of daily living (showers/cooking) and stale air can accumulate without adequate controlled ventilation.



in a building's design, maintenance may contribute pollution problem







### **How to Minimize the Risk – A New Approach to Healthy Buildings**

In their simplest form, buildings are boxes of air that provide comfort and shelter from outdoor environments, but in reality, they are a complex, interconnected set of building materials and systems carefully woven together. Change one part of a building and you can affect many others. Any product used in constructing the building must be able to work in a positive and mutually beneficial manner with all the other building components.

This inter-dependency is the underlying principle behind the “systems approach”. The systems approach is a method of design, construction, inspection and testing that accounts for the interactions of the various building components, such as the foundation, walls, roofs, doors, insulation and mechanical systems, along with factors like site, climate and occupant behavior.<sup>4</sup> If these interactions are not accounted for, Mother Nature will prevail and problems inevitably occur.

Combining the systems approach with proven, new building materials allows designers and builders to create mold resistant, healthy buildings and homes that are good for the adults and children who occupy them.

Builders get fewer callbacks and complaints. Building owners get better value. Architects are assured that their concepts can become reality. All decrease their risk of property loss or damage and any associated liability, while building occupants avoid unnecessary health risks. These are results everyone can benefit from.

What are some of the most important procedures that are necessary to follow in order to create healthy buildings?

- ✓ Use a full rain-screen and drainage plane around the entire building.
- ✓ Establish good drainage away from the building.
- ✓ Eliminate air leakage in walls and ceilings.
- ✓ Insulate to provide a continuous thermal barrier.
- ✓ Choose low-emission materials.
- ✓ Install adequate ventilation.



# How The Icynene Helps Prevent Mold Growth a

## What Products Will Help You Accomplish This? The Icynene Insulation System® – a Key Factor in Creating Healthy Buildings

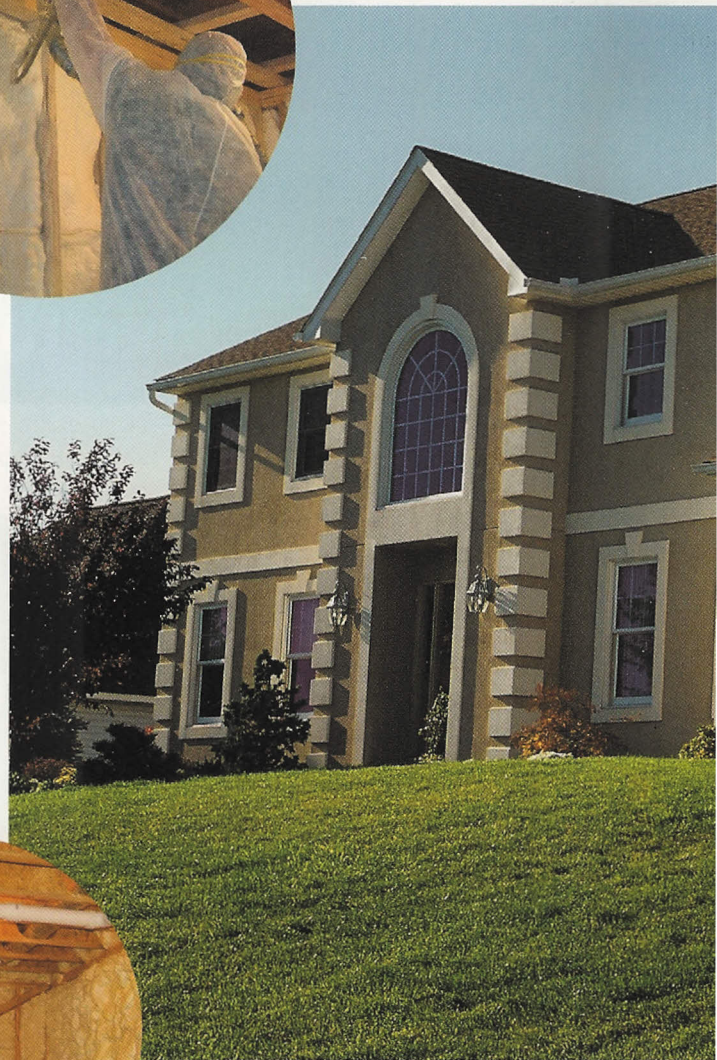
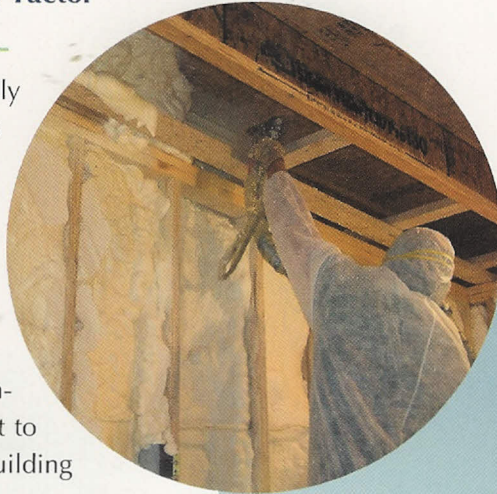
Building materials have evolved dramatically over the past ten years. Proven technologies that meet the needs of a systems approach to building design are readily available. The Icynene Insulation System®, a prime example, helps make buildings Healthier, Quieter and More Energy Efficient. Icynene® is a cost-effective, expanding soft foam insulation for use in all types of construction. Its unique characteristics allow it to simultaneously insulate and air-seal the building to form a protective barrier.

### Air & Moisture Control

Icynene® is applied by Licensed Dealers who create continuously insulated, tight walls and ceilings – exactly the leak-free “building envelope” that is needed to avoid moisture, condensation and mold. By eliminating air leakage, there is no moisture transport through the building envelope. This helps to prevent condensation and the potential for mold growth within the walls or ceilings. Icynene® has been tested by Texas Tech University and proven not to be a food source for mold.

### Continuous Thermal Barrier

Icynene® is sprayed into walls, ceilings, floors and basements as a liquid and expands 100 times its volume in seconds to fill all cracks and voids in the building envelope. The resulting blanket of soft foam insulation forms a continuous thermal barrier that eliminates cold spots and significantly reduces energy costs.

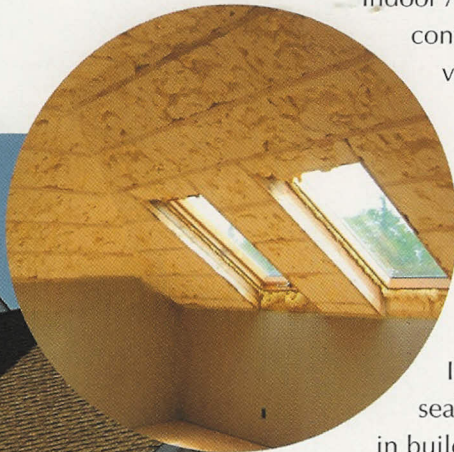




# Insulation System<sup>®</sup> and Improve Indoor Air Quality

## Healthy Base – No Harmful Emissions

The Icynene Insulation System<sup>®</sup> is the ideal base for a healthy indoor environment. The first insulation certified by the Envirodesic<sup>™</sup> Certification Program for Maximum Indoor Air Quality<sup>™</sup>, this foam insulation does not contain formaldehyde, CFCs, HCFCs nor any volatile organic compounds! Icynene<sup>®</sup> also minimizes the intrusion of mold spores, pollens and other outdoor pollutants. When combined with proper ventilation and other low-emission materials, Icynene<sup>®</sup> helps improve the quality of indoor air.

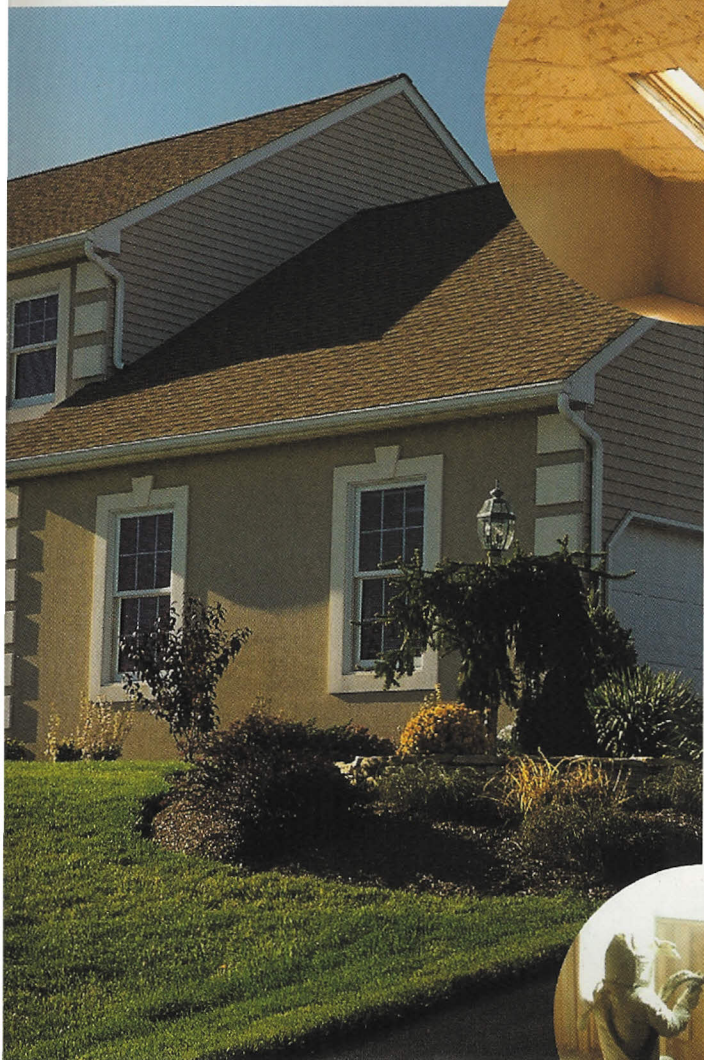


## Innovative Solutions – New Residential

Icynene<sup>®</sup>'s consistent insulation and air-sealing properties have also allowed innovations in building design and use. For example, in humid southern climates, ventilated attics have been prone to energy inefficient operation, condensation on air-conditioning ducts and mold growth. With Icynene<sup>®</sup>, insulation can be placed under the roof deck, and the attic becomes conditioned space allowing for right-sizing of air-conditioning units and additional energy savings.

## Innovative Solutions – Existing Residential

Icynene<sup>®</sup> has proven to be ideal for reconstructing older buildings and for rebuilding after mold remediation. Its consistent insulation and air-sealing properties help prevent mold re-growth. By using Icynene<sup>®</sup> in combination with proven design principles, any older building can be converted from a problem building into an efficient, healthy building.







### **Innovative Solutions – Commercial, Institutional, Industrial**

Icynene® has been used in dozens of different applications, from commercial construction to industrial and agricultural buildings, hotels, schools, stores and warehouses. Specific case studies can be found at [www.icynene.com](http://www.icynene.com). These studies describe how Icynene® has been used and the many measurable success stories.

For mold remediation, Icynene®'s highly trained Network of Licensed Dealers work closely with diagnostic and remediation experts to ensure that the building is rebuilt correctly.

### **The Bottom Line**

No one wants mold or indoor pollution in their home, school or workplace.

Now there are products like The Icynene Insulation System® that can help prevent mold and improve indoor air quality.

### **The Icynene Insulation System®**

Healthier, Quieter, More Energy Efficient®

We'll Change the Way you think about Insulation

Icynene® is ideal for residential, commercial, industrial and institutional indoor applications. The product is:

#### **Healthier**

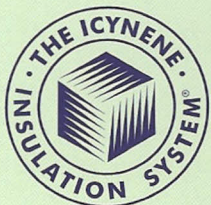
Water based. No CFCs, HCFCs, formaldehyde, or volatile organic compounds. Seals out dust, pollen and other allergens from entering the structure. Air-sealing minimizes the potential for condensation, mold and mildew.

#### **Quieter**

Air-sealing blocks out airborne noise from entering the structure. Minimizes noise in plumbing run walls.

#### **More Energy Efficient**

Up to 50 % energy savings versus traditional insulation when used in identical situations.



# **The Icynene Insulation System®**

**Healthier, Quieter, More Energy Efficient®**



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2. American Lung Association, American Medical Association, U.S. Consumer Product Safety Commission, and U.S. Environmental Protection Agency. "Indoor Air Pollution: An Introduction for Health Professionals". 1994. U.S. Government Printing Office 1994-523-217/81322. Available U.S. Environmental Protection Agency, (6607J) Washington, D.C. 20460. (page 1)
3. AERIAS®, <http://www.aerias.org>.  
Better health through indoor air-quality awareness.
4. R. Nicklas, Controlled Environments Inc.

#### Additional Literature:

- Canada Mortgage and Housing Corporation has a number of mold-related publications illustrated on its website <http://www.cmhc-schl.gc.ca> or through its Canadian Housing Information Centre at 1-800-668-2642, CMHC, 700 Montreal Road, Ottawa K1A 0P7.
- Indoor Air Quality Handbook, by Spengler, J.D., Samet, J.M., and McCarthy, J.F., eds., McGraw-Hill, 2001, ISBN 0-07-445549-4. Contains extensive bibliographies of scientific papers on all current indoor air quality issues.
- Ontario Lung Association, 2002. "Indoor Air Pollutants in Residential Settings: Respiratory Health Effects and Remedial Measures to Minimize Exposure". Available online at the Lung Association website [http://www.on.lung.ca/cando/IAPRS\\_contents.html](http://www.on.lung.ca/cando/IAPRS_contents.html). (see Section 2.3.2.3 "Summary of Selected Evidence [on mold]").
- American Academy of Pediatrics, Committee on Environmental Health. "Toxic effects of Indoor Molds". *Pediatrics* 1998; 101(4):712-714.

#### Photo credit:

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## The Icynene Insulation System®

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For more information, visit [Icynene.com](http://Icynene.com)

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