



**ICYNENE**<sup>™</sup>  
HEALTHIER, QUIETER, MORE ENERGY EFFICIENT\*

# THE ICYNENE<sup>®</sup> ADVANTAGE

## APPLICATION CASE STUDY:

***American Lung Association 'Health House'  
Promotes Tighter Building for Better Indoor Air***



### **Synopsis:**

- ✓ Supports Health House program guidelines
- ✓ Creates a superior air-seal to minimize airflow and accompanying moisture
- ✓ Protects home occupants from outdoor allergens and pollutants
- ✓ Uses 100% water-blown technology



**Overview:**

Indoor air can have four to five times more contaminants than outside air, according to the EPA (Environmental Protection Agency). And with poor indoor air quality leading to an increase in health problems, the American Lung Association (ALA) launched its Health House program with the aim of improving indoor air quality and helping homeowners take control of their indoor environment. The ALA devised a set of guidelines that would ensure in-home healthy air quality by focusing on three main elements: ventilation, filtration, and moisture control. Building a tighter envelope that minimizes random airflow will help the builder and homeowner address these areas.

**The Challenge: Improving Health & Comfort**

While working with the ALA to develop design guidelines for healthier office buildings, Minneapolis architect Chuck Knight became so intrigued with the Health House program for residential construction that he decided to build one in suburban Woodbury, Minnesota for himself and his family, which includes a daughter with asthma. Mr. Knight says he was especially affected by association statistics on poor indoor air quality leading to an increase in health problems. *“It hit my heart strings right away,”* Mr. Knight says. *“We have a mold epidemic, and we have an asthma epidemic.”*

Mr. Knight and his builder sought building materials and techniques that would address the possible sources of indoor pollution and create a healthier indoor environment for his daughter. The materials selected would also meet the requirements of the ALA’s Health House guidelines. Possible sources of indoor pollutants include excessive moisture, the intrusion of outdoor allergens and pollutants, harmful emissions produced by building products during construction, and insufficient mechanical ventilation.



While working with the ALA, Chuck Knight was inspired to build his own 5,200 sq. ft. Health House in Woodbury, Minnesota



ICYNENE LD-C-50™<sup>†</sup> spray foam insulation was installed because its air-sealing property helped improve indoor air quality and comfort for the Knight family, which includes a daughter with asthma.



## The Solution: Build Tight, Ventilate Right

40% of North American households contain one or more family members who suffers from allergies or asthma, according to the American Lung Association. It was essential for the Knight family to take control of the air in their interior space, considering the health risks that the outdoor air can cause for their daughter.

The key was to eliminate as many air leaks as possible and then introduce mechanical ventilation. By doing so, the Knights could control the temperature, humidity level, and overall quality of the air they breathe.

Air is accompanied by moisture. In fact, almost 99% of moisture travels through the air; and by reducing random airflow, the builder can effectively minimize this major source of moisture intrusion.

Other considerations for Mr. Knight's 5,200 square-foot Health House were the type of products used during construction. Building products needed to be healthy in composition and performance so as to minimize harmful emissions and lessen the environmental impact. These products should also integrate well with other installed components so that the Health House works as a system to achieve greater efficiency and a healthier structure.



*When sprayed in place, Icynene forms a continuous blanket of soft foam that restricts air movement around electrical boxes and through other openings in the structure.*



*Insulating with Icynene effectively minimizes the intrusion of outdoor allergens and pollutants, allowing the Knights to control the quality of their indoor air.*

One of the key “green” building products specified for this Health House was ICYNENE LD-C-50™, a 100% water-blown insulation and air barrier material which was used in the following applications:

- Icynene applied to the exterior walls
- Icynene applied to all cantilevered overhangs and the entire roof assembly
- Icynene applied to the interior, shared wall between the house and garage to keep carbon monoxide and other toxins from entering the home
- Icynene applied to the ceiling



Icynene's performance is two-fold in that it acts as both an insulation and air barrier. When sprayed in place, the material forms a continuous blanket of soft foam that restricts air movement around electrical boxes and through other openings in the structure. The air-sealing property of Icynene had a tremendous impact on indoor air quality, comfort, and moisture management.

## Results: A Healthy Haven

### Protective Air-seal

Mr. Knight addressed air quality concerns by applying Icynene to the exterior walls and roof assembly in his home. Icynene sprays on as a liquid and expands to 100 times its initial volume, curing within seconds. Unlike batts, the foam seeps into every gap or crevice and creates a superior air-seal with no seams or spaces. Icynene was so effective that Mr. Knight won permission from local building inspectors to reduce ceiling insulation to a total of R-19, far below what codes typically require.



*Icynene was so effective as an air barrier that Mr. Knight won permission from local building inspectors to reduce ceiling insulation to a total of R-19, far below what codes typically require.*



*Homes insulated with Icynene cost less to heat and cool because the product works as an air barrier to keep conditioned air inside the home.*

Having the entire building envelope encased by the leak-free air barrier will effectively minimize the intrusion of outdoor allergens and pollutants from entering the home. After two months in his new Health House, Mr. Knight says he can see and feel the difference. "We don't have as much dust as we used to," he says. The Knight family is no longer subject to outdoor weather and ozone conditions like smog and humidity. A consistent ambient temperature and ideal humidity levels can be maintained. Combined with proper mechanical ventilation, Icynene is the ideal base for those who suffer from respiratory illness or chemical sensitivity.

### Moisture Management

ICYNENE LD-C-50™ is an open-celled foam, which makes it an effective tool for minimizing airborne moisture build-up and related problems, such as mold growth or building failure. Because the material is comprised of open-celled air pockets, it does not entrap moisture. In the case of a roof leak, for instance, most of the water will drain through the material without spreading. The small surface area that does get



wet will easily dry without sacrificing the material's performance. In fact, Icynene remains unaffected by wetting so that it continues to operate at peak performance levels once dried. Because water is drawn down by gravity, it also makes it easier for Mr. Knight to detect the location of a leak.

#### Environmental Impact

In its cured form, Icynene does not emit harmful gases, whereas other insulation can continue to off-gas over time. Not only would these harmful emissions compromise indoor air quality for the Knight family, but they would also diminish the insulation's rated R-value. Icynene maintains its efficiency with no loss of R-value over time, providing total thermal comfort and a healthy living environment today and for years to come. By using materials that provide longevity, like Icynene, homeowners and builders can eliminate the need for re-installing additional material in the future. Upholding the principles of sustainable design and construction is no longer a challenge with Icynene.

#### Energy Conservation

Homes insulated with Icynene also cost less to heat and cool. Icynene allows homeowners to install a smaller, less expensive HVAC system because the insulation works as an air barrier to keep conditioned air inside the home; thereby reducing heating and cooling loads on HVAC equipment. Homeowners can enjoy energy savings of up to 50%.

### **Icynene Supports Health House Guidelines and Delivers Superior Results**

- ✓ Provides homeowners with control over the air they breathe indoors
- ✓ Minimizes the intrusion of outdoor allergens and pollutants
- ✓ Delivers advanced moisture management
- ✓ Reduces environmental impact

### **Icynene Insulation**

Icynene foam insulation products are sprayed into/onto walls, crawlspaces, underside of roofs, attics and ceilings by Icynene Licensed Dealers. They expand in seconds to create superior insulating and air-sealing results. Every crevice, crack, electrical box, duct and exterior penetration is effortlessly sealed to reduce energy-robbing random air leakage. Icynene products adhere to the construction material and remain flexible so that the integrity of the building envelope seal remains intact over time.

Icynene is ideal for residential, commercial, industrial and institutional indoor applications. The products are:

**Healthier:** Icynene spray foam products are CHPS (Collaborative for High Performance Schools) EQ 2.2 Section 01350 Compliant, meeting nationally recognized requirements as Low-Emitting Materials (LEM) and Environmentally Preferable Products (EPP). Icynene spray foam products are 100% water-blown and contain no HFCs or PBDEs. Icynene seals out dust,



pollen and other allergens from entering the structure. As air barriers, Icynene products minimize the potential for airborne moisture build-up and related problems such as mold and mildew.

**Quieter:** By air-sealing the building envelope, Icynene effectively minimizes airborne sounds. Icynene is perfect for reducing unwanted noises from home theaters, plumbing runs and playrooms.

**More Energy Efficient:** Icynene delivers up to 50% more energy savings versus traditional insulation.

Information about Icynene insulation can be obtained by calling Icynene Inc. (800-758-7325), visiting the website [icynene.com](http://icynene.com), or contacting your local Icynene Licensed Dealer.

† The Icynene product installed and addressed in this project example is Icynene's classic formula, ICYNENE LD-C-50™.



For more information, contact your local Icynene Licensed Dealer

**Visit our website: [icynene.com](http://icynene.com)  
or call**

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