

“We are confident the spray foam insulation will improve the comfort of our students and faculty, as well as significantly reduce our utility costs.”

— Grayson Gilbert, Human Resources Manager  
Winthrop Harbor School District No. 1

## Spray Foam Insulation Helps Improve School's Learning Environment

Lapolla's Foam-Lok™ 2000 4G with Honeywell Solstice® Liquid Blowing Agent Installed

### THE OPPORTUNITY

North Prairie Junior High School was experiencing ice dams, freezing pipes, and premature roof failures. Ceiling tiles were frequently damaged, particularly following heavy snowfalls, and the comfort of students and faculty was negatively impacted. Significant air leakage also contributed to high energy consumption.

### THE SOLUTION

Remove approximately 40,000 sq. ft. of fiberglass insulation and replace it with Lapolla's Foam-Lok™ 2000 4G closed-cell spray polyurethane foam (ccSPF) featuring Honeywell's Solstice® Liquid Blowing Agent (LBA). Air Barrier Solutions oversaw the school retrofit and conducted “before” and “after” blower door testing that demonstrated a 69% air tightness improvement.

### Preparing the School for Severe Cold Weather

North Prairie Junior High School, located in Winthrop Harbor, Ill., had faced decades' worth of severe cold weather and heavy snow. Despite numerous repair attempts, severe air leakage around the fibrous insulation caused losses in energy efficiency and resulted in ice damming and water leaks. Each year, a significant number of ceiling tiles were damaged. To prevent the potential for mold, the tiles had to be regularly replaced. Space heaters were required in the attic to prevent pipes from freezing. Also, student and faculty comfort was being impacted because of cold air drafts, potentially disrupting the learning environment. Achieving air tightness was critical to resolve these issues.

Fortunately, capital improvement funding of \$6.7 million for schools within the Winthrop Harbor School District No. 1 was allotted from 2016-2018. At the top of the project list, was a much-needed roof repair and insulation retrofit for North Prairie Junior High School. A Siemens engineer involved with the project recommended that Air Barrier Solutions (ABS), a firm that specializes in fixing defects in building enclosures, be brought into the project to investigate water intrusion and building envelope performance issues. It was determined that ccSPF could seal the detailing properly and would be an ideal solution.



Prior to ccSPF being installed, ceiling tiles within the school were frequently damaged due to moisture issues and had to be replaced.



Air Barrier Solutions conducted blower door testing pre-and post-retrofit to measure air tightness. Prior to retrofitting, the building air leakage was severe resulting in moisture problems, comfort issues, and significant energy losses. CcSPF was used to improve air tightness exceeding the International Green Construction Code requirements.

**“We select products like Solstice because we are an environmentally proactive firm.”**

— Larry Harmon, owner at ABS

## Fiberglass Insulation Out, Closed-Cell Spray Foam In

The school has a trussed hip roof with traditional shingles over the administration and classroom areas. A flat roof covers the gymnasium and multi-purpose room. The hip roofs have vented soffits and ridges. Prior to the retrofit, foil-faced fiberglass insulation had been installed in the trusses against the underside of the roof deck. Here is a recap of the problems identified by ABS and the resulting solutions:

| PROBLEM   | SOLUTION   |
|---|--|
| In the hip roof areas, no air barrier had been installed with the vented fiberglass insulation system, allowing considerable air flow and drastically reducing the system’s effectiveness | Removed existing fiberglass (approx. 40,000 ft <sup>2</sup> ) from the underside of the vented, slanted roof decks. Lapolla’s Foam-Lok 2000 4G ccSPF featuring Honeywell’s Solstice LBA was installed at a 4” thickness blocking off the previous roof deck venting. |
| In the flat roof areas, roof-wall joints revealed significant air leakage   | Roof-wall joints were sealed with two-component, closed-cell foam from a low-pressure applicator   |
| Unit heaters were used in attic spaces to prevent pipes from freezing, consuming considerable power   | Fluted decking was punched and filled with ccSPF to prevent topside air leakage. Pipes are no longer at risk of freezing   |

The retrofit was undertaken during the summer while school was out and took about a month and half to complete, including removal of the fiberglass insulation. Grayson Gilbert, HR manager at Winthrop Harbor School District No. 1, helped review the project bid and ensured the installation went smoothly. “It was a very positive process and the project was completed on time,” said Gilbert. “The spray foam crew was very professional and friendly. They did it fast and they did it well.” The SPF application took about two weeks and the system sprayed well, even at temperatures above 90° F.

### CcSPF with Solstice LBA earns an “A” Plus

Not only did ABS conduct the pre-and post-diagnostics for the project, it also served as the spray foam contractor on the job site. Larry Harmon, owner at ABS, said a deciding factor in the ccSPF selection was the use of Honeywell’s Solstice LBA. “We work closely with Spray Foam Distributors of New England and were familiar with Lapolla’s 4G system formulated with Solstice LBA,” said Harmon. “We select products like Solstice because we are an environmentally proactive firm. The project was technically complex and the resulting air tightness was the result of using ccSPF.”

“We are very pleased that Solstice LBA was a key factor in the school’s decision to select this spray foam system,” said Laura Reinhard, Honeywell’s global business manager for spray foam. “It provides both performance and environmental benefits. More and more formulators are converting from HFC blowing agents to our HFO-based technology.”

### Outstanding Results

Just like the approximately 260 students at the school who are eager to earn top marks, Harmon and others on the ABS team were excited to see test results after the retrofit was completed. Before work began, a baseline blower door test (ASTM E-779 protocol) had shown that the building tested at 0.661 CFM@75 ft<sup>2</sup> SA, well above acceptable air tightness standards. A post-retrofit blower door test was conducted to verify the project’s effectiveness. Test results were 0.203 CFM@75 ft<sup>2</sup> SA, an impressive 69% improvement in air tightness (also better than the USACE air tightness threshold of 0.25 CFM@75 ft<sup>2</sup> SA).

“The school district was so pleased with the results that they awarded us another project,” said Harmon. Gilbert echoed that sentiment saying, “I can’t wait to see our energy efficiency improvements and would definitely recommend the use of this system for future projects.”

### Solstice LBA benefits include:

- Based on hydrofluoro-olefin (HFO) technology, a next-generation replacement for hydrofluorocarbon (HFC) blowing agents
- Ultra-low GWP of 1, which is 99.9% lower than the HFC blowing agents and equal to carbon dioxide
- Non-ozone-depleting
- Nonflammable (ASTM E-681)
- Listed under the U.S. EPA’s Significant New Alternatives Policy (SNAP) program to replace ozone-depleting substances
- VOC-exempt per U.S. EPA
- Listed on the TSCA inventory and registered under REACH
- U.S.- based reliable supply from Honeywell



Foil-faced air permeable fiberglass insulation that had been installed under the roof deck was removed and replaced with ccSPF insulation.



CcSPF effectively sealed the complex roof structure providing the required air tightness.

### Contact Honeywell to Learn More

To learn more about the benefits of Solstice LBA for your next project, call 1-800-631-8138 or visit [www.honeywell-solstice.com](http://www.honeywell-solstice.com).

### Honeywell Advanced Materials

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2207 FP BA v2 | February 2018  
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