Improving Thermal Comfort & Stabilizing Temperatures in a Cold Climate with Templok® Ceilings

Winnacunnet High School

Building Type:	High School
Space Type:	Classrooms
Location:	New Hampshire
Climate:	Zone 5B, Cold Heating Season

Study Highlights

Comparison
Templok® ceilings were installed in Room 120, while Room 119 retained standard ceilings for a direct comparison

Performance
Temperature sensors placed on the Templok® ceiling panels confirmed the capture of daytime heat and the steady release of warmth during the coldest overnight hours

Comfort
Templok® ceilings greatly reduced cold peaks to maintain consistent thermal comfort for building occupants

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Challenge

A high school in New Hampshire struggled to maintain consistent, comfortable temperatures in classrooms during the cold winter months. Severe temperature drops overnight resulted in cold peaks and uncomfortable drafts during morning classes. This inconsistent thermal environment negatively impacted the learning experience, making it difficult for students and teachers to remain comfortable and focused throughout the school day.

Solution

To improve the indoor climate, Templok® ceilings were installed to regulate temperature fluctuations. These ceiling panels contain advanced Phase Change Material (PCM) which stores excess heat generated by sunlight and students during the day. The system then releases this stored heat at night to maintain warmer indoor temperatures and smooth the overall room climate.

Study Highlights

A set of neighboring classrooms were monitored for heating energy use in the month of February. Daily energy use was strongly correlated between the classrooms. On March 1, Templok® ceilings were installed in Room 120, and Room 119 was left alone for comparison.

In both classrooms, heating energy use was most intense overnight when the outdoor temperature was coldest (***Fig. 1***). Heating energy was moderate during the day, while the classrooms were filled with students generating heat and outdoor temperatures were warmer.

Before Templok

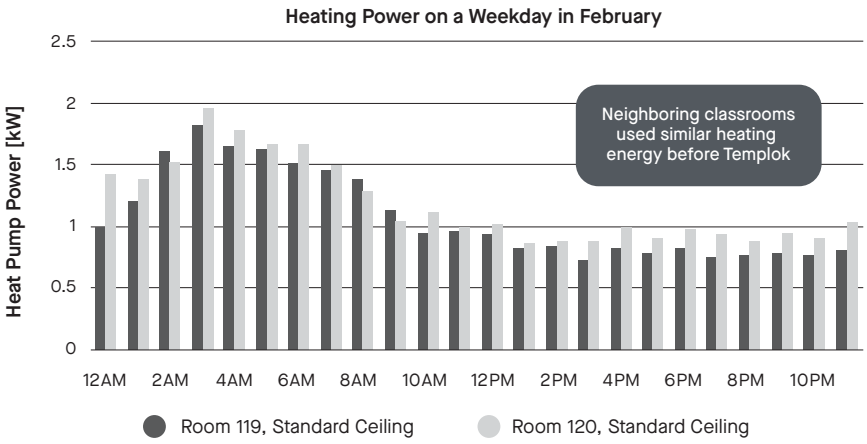

Fig. 1

After Templok was installed in Room 120, the classroom used less heating energy overnight compared to its neighbor without Templok (***Fig. 2***).

After Templok

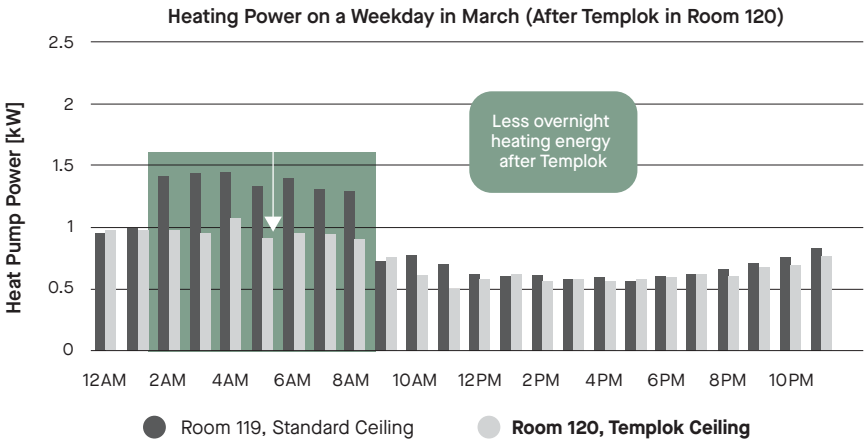

Fig. 2

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Temperature sensors placed on Templok panels indicated when the PCM was storing and releasing heat. Excess heat during the day was captured and then released at night, helping to keep the building warmer during the coldest hours.

Several months of data were analyzed before and after the Templok ceiling installation. After controlling for variables like outdoor air temperature, estimates ranged from **5 to 9% heating energy savings** from Templok ceilings (***Figs. 3 & 4***).

Results

The PCM in Templok® ceilings dramatically improved thermal comfort within the learning environment. Data collected over several months showed that the Templok® ceiling panels successfully smoothed temperature fluctuations and greatly reduced cold peaks in the room. By regulating the classroom climate, the solution eliminated uncomfortable morning chills and provided a highly stable, comfortable space for students and staff. As a secondary benefit, the facility also achieved a 5-9% reduction in nighttime heating energy use.

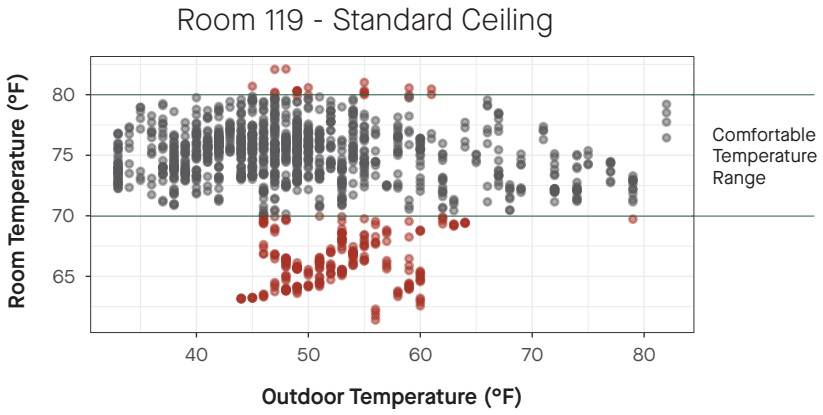

Fig. 3

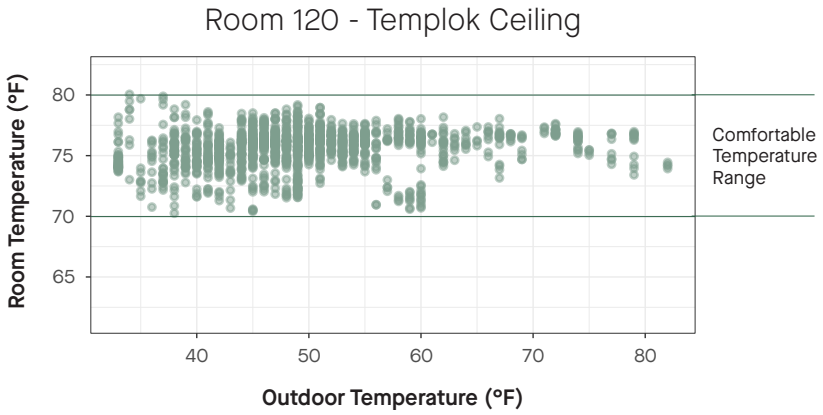

Fig. 4

See the Templok Technical Guide for detailed thermal comfort data and additional product information.

For more information about Templok® Energy Saving Ceilings, visit **armstrong.com/templok**

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