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Edward Little High School, ME

REHAU radiant heating delivers efficient comfort at one of Maine's largest schools.

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REHAU RAUPEX pipe system—backed by expert design services—helps meet the challenge of 193 different heat zones in new school building, delivering comfortable and efficient radiant heating

At 280,000 sq ft (26,013 sq m), Edward Little High School in Auburn, Maine is one of the largest high schools in the state. Thanks to architecture and engineering company Harriman Associates, a neighbor in Auburn as well as one of the most experienced firms of its kind in the country, the school is also one of the most comfortable and efficiently heated, with radiant floor heating provided throughout the building.

“Radiant heat is a very comfortable, very satisfying heat as compared to a forced air convection system, heating people and objects directly as opposed to blowing hot air on them,” explained Harriman principal and mechanical engineer David Story, PE, LEED AP. “It’s a lot like feeling the warmth of the sun. It’s more natural and I think people tend to feel better with it.”

In addition to the comfort aspect, the radiant heating system designed for Edward Little allows the use of much lower temperature water—about 130°F (54°C) as opposed to the 180°F (82°C) demanded by a traditional hydronic heating system using baseboards or radiators, for example. As an efficiency bonus, Harriman has designed the system to heat the water primarily through cost-effective geothermal energy.

“Radiant heating delivers this very high-quality heat at lower energy costs,” noted Story. “I think the technology is especially appropriate in a learning environment where maintaining comfort is especially important, and in a situation where spending is always under scrutiny.”



Radiant heating uses a network of specialized piping, installed strategically under the floor, to circulate warm water throughout a building. At Edward Little, Harriman selected REHAU to supply the 110,000 ft (32,528 m) of 1/2 in. RAUPEX O₂ barrier crosslinked polyethylene (PEXa) pipe in the radiant system design.

“We have specified radiant heating for years, it’s a specialty of ours, and we’ve worked with REHAU to deliver quality radiant installations from the beginning,” said Story. “They give us a good quality product backed by great service and responsiveness. They are definitely our number one preferred radiant supplier.”

Design challenge: 193 separate zones

Designing a radiant system requires meticulously mapping out the size and shape of the under-floor piping system loops for each zone, as well as quantifying such metrics as relative water flow, temperatures, pump sizes, pressure, locations of manifolds and more.

Sometimes it is relatively simple—a very large open space such as a hangar, warehouse or repair facility might literally be one zone. Not so for the Edward Little School—the architects divided the building into 193 individual heating zones, including disparate spaces such as classrooms, bathrooms, gymnasiums, kitchens, locker rooms and more. The optimal heating needs for each zone would be impacted by numerous variables, including the

size and shape of the room; height of the ceiling; equipment, furnishings and built-in cabinetry and the choice of floor covering or carpet. Further, since it was a new building, the details on each room kept changing.

Fortunately, REHAU provides expert radiant planning and design services as a value-add in support of their high-quality piping systems.

"REHAU sells the complete radiant heating system, but they are also the experts in piping design. And they provide us with this in-house engineering design knowledge that's very valuable," said Story. "We were very impressed by the radiant design work done for all the rooms. Our expectations frankly are very high and REHAU lived up to them in every way."

Part of REHAU's design success involved remaining flexible as room changes were invariably made throughout the process and managing all the back and forth—which often, as in this case, may be ongoing for years after the initial pipe selection is made.

"Having a reliable, responsive partner like this is probably among the most valuable things to us on any project," said Story.

Product lives up to high expectations too

With many different rooms, many relatively small, tight under-floor loops are the norm, and Story notes that relative bend radius becomes an especially important feature of the selected pipe.

"The piping is laid in serpentine circuits under the floor, and poor-quality piping has a wide bend radius around all those U-turns—maybe as much as 1-2 feet. That not only wastes space, but it's a recipe for kinks that can create leaks," Story said. "Contractors tell me REHAU pipe is tight and neat, fast to install and it can do the tightest U-turns even when it's cold."

Story also notes that the robustness of REHAU RAUPEX O₂ barrier pipe is something that keeps him and his team specifying it time and time again.



"Before it gets put in the slab, when it's laying around the construction site, pipe can be under constant attack—stepped on by heavy boots, getting run over by forklifts and more," he noted. "Poor quality piping will squish or puncture more easily, but REHAU pipe stands up to these realities. We don't hear about damaged pipe and leaks with REHAU."

Similarly, he notes that he gets an added feeling of confidence from REHAU's UV-resistant layer on RAUPEX pipe.

"Before installation, pipe is very susceptible to UV rays that can invisibly degrade it and you'd never know it," he said. "UV protection is a great feature."

Finally, Story says, he is glad that REHAU provides all the materials needed for a total installation, not just the pipe, but fittings, connectors, manifolds, controls and accessories as well. The project's contractors installed 101 PRO-BALANCE manifolds, which were joined to RAUPEX pipe with 445 EVERLOC+ R-20 connectors.

"It's not just pipe, it's a complete system with everything needed, all products are the same consistent high quality and designed to work together," he said. "REHAU is a single source for everything, so everything arrives on site in tandem. They are very thorough and consistent. We don't hear about anything missing or have to deal with finger-pointing between the connector guy and the pipe guy if there's an issue. It's all from REHAU and it's all high quality and reliable for the long term."

The radiant heating system is supported by Taco circulator pumps in the main mechanical room that contribute to the geothermal system as well. The first set of pumps circulates water between Tandem geothermal water-source heat pumps and the geothermal well field, which is the primary heating and cooling source for the whole school (Viessman gas-fired condensing boilers are used as a backup energy source for the geothermal system). The second set of Taco pumps circulates warm water generated by the heat pumps within the building to the radiant heating system and indoor air handlers. The final set of pumps circulates chilled water produced by the heat pumps, allowing the indoor air handlers to deliver air conditioning. Located in smaller mechanical rooms throughout the school, the indoor air handlers provide air conditioning and cooled air for ventilation during the summer and warmed air for ventilation in the winter.



An ongoing partnership

Story reports that his team frequently has radiant heating projects underway, and, for his money, REHAU is their go-to supplier for radiant heating products.

"When we design a building, we basically own all the issues of the building for the life of the building—that's our reputation," he said. "That's why we look for partners like REHAU. They meet our high expectations, give us good support and help us look good. We succeed together."

Project: Edward Little High School, Auburn, ME

Construction type: Education, opened 2023

Project scope: 110,000 ft (32,528 m) of radiant heating pipe

General contractor: AC Dudley

Mechanical engineer and architect: Harriman Associates

REHAU systems used: Radiant heating (RAUPEX® O₂ barrier pipe, PRO-BALANCE® manifolds, EVERLOC+® R-20 connectors)

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