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Belmont Farm Supply

Radiant heating keeps floor temperature right for fertilizer storage while efficiently conditioning expansive warehouse

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REHAU radiant heating used for temperature, condensation control of fertilizer warehouse

Ontario-based Belmont Farm Supply, located about 116 miles southwest of Toronto in Belmont, Ontario, provides fertilizer, crop protection products, seed as well as custom application and delivery services to farmers in Elgin, Middlesex and Oxford Counties. It has been a stalwart part of the area's farming community since the 1940s.

When owner-partners Graham Hutton, Brad Walker and Jeff Aarts decided to build a new fertilizer warehouse, they wanted a state-of-the-art building with a radiant floor heating system to maintain the floor at a constant temperature. "We were trying to keep the moisture from forming on the concrete when the humidity rises," Walker notes.

A floor temperature between 57°F and 60°F (14°C and 16°C) is essential when storing fertilizer. A lower floor temperature that allows outside temperatures to rise above it causes risk of condensation that can turn the fertilizer from a solid to a liquid.

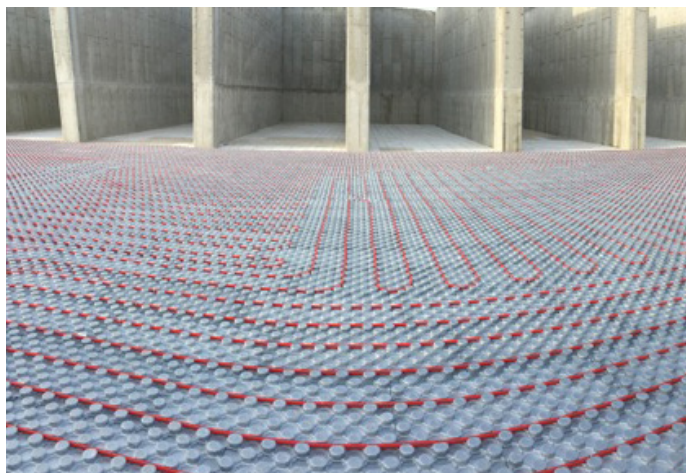
Walker selected St. Marys, Ontario-based IFH Design and Installations, headed up by Paul McRoberts with team members Brent McRoberts, Nick Muir and Andrew Wilhelm, to design and install the radiant floor heating system. McRoberts is a 47-year veteran in hydronic heating; after beginning an apprenticeship in 1972, he opened his own business in 1984 and was one of the first hydronic contractors in southeast Ontario to work with, and eventually specialize in, radiant floor heat. McRoberts says about 90 percent of IFH's business is radiant floor heating projects.

Don't forget the insulation

The ceiling height of the steel-constructed building is more than 36 ft (11 m). The concrete slab is 372 ft by 96 ft (113.4 m by 29.3 m). McRoberts says the customer felt that the most energy-efficient method to maintain a lower energy cost was to install a complete radiant floor system.

McRoberts has been a loyal REHAU user for about a dozen years and participates in the REHAU EDGE contractor rewards program. One of the perks for McRoberts is using his points to access the REHAU LoopCAD design software for his floor-heating projects. However, he sometimes taps the design folks at REHAU's Toronto office to help with larger projects. For the 20,000 ft² (1,858 m²) Belmont Farm Supply fertilizer warehouse, REHAU's Yajie Jiang did the pipe layout for IFH.

The radiant system uses RAUPEX O₂ barrier piping in 3/4, 1, 1 1/4, 1 1/2 and 2-in. sizes; PRO-BALANCE 1 1/4-in. stainless-steel manifolds; 3/4-in. R20 connectors; and EVERLOC+ compression-sleeve fittings. More than 4 miles (6.6 km) of PEX was installed in the building, McRoberts notes.



"Instead of doing all the large diameter supply and return piping above, we did it all below ground with 2-in. and 1 1/2-in. oxygen-barrier piping with the fittings," McRoberts explains. "Then we insulated all the piping with 1-in. foam insulation made for underground use."

The next step was the placement of 2-in (5-cm) HotRockPanels expanded polystyrene panels that double as insulation and a piping-installation method. The 3/4-in. by 500-ft (152.4-m) loops were walked into place on top of the boards at 9-in to 12-in (23-cm to 30-cm) spacing—increasing the productivity of the IFH install crew—then connected to the manifolds, which were encased in REHAU's premium stainless-steel cabinets to protect the system from the caustic environment. A 40% glycol solution runs through the PEX network.

The biggest challenge for IFH was the pit area. "There were two different areas on the project," McRoberts explains. "In the pit area, we had to figure out how to get the piping from it up into a manifold. We did underground piping from the pit up to the manifold, like sleeves. Then we could pull all the piping up through the sleeves and into the manifold area."



From the boiler room, all manifolds were supplied with 1 1/2-in. RAUPEX O₂ barrier supply lines, he adds. The longest supply lines were nearly 300 ft (91 m) from the heat source.

"In each area of the manifolds, we installed floor sensor wells with PEX piping so we could insert our sensors in after the concrete was installed," he says. "Before the concrete pour, the floor piping was pressurized to 100 psi to ensure there were no leaks under the floor, which also included the 1 1/2-in. and 2-in. RAUPEX O₂ barrier in-slab distribution piping with EVERLOC+ fittings. All this work was done on target to keep the project on schedule."

In the mechanical room, two IBC SL-40-399G3 boilers are the heat source for the radiant heating system — providing nearly 800,000 Btu (234 kWh) of energy to maintain the required floor temperature, McRoberts notes. They are 95% efficient and, combined with the low water temperatures, will help reduce Belmont Farm Supply's energy costs. Caleffi low-loss headers and a hydronic dirt separator provide hydraulic separation and protect the components.

A Taco 2400 series circulator distributes water to the five manifold stations. Webstone Isolation flange kits and Tekmar floor-sensing and pump controls round out the installed equipment.

Quality and reliability

McRoberts relies on the quality of REHAU products to ensure his radiant floor heat projects stand the test of time.

"When we switched to REHAU, we found its products outperformed the competition, and they've got the people behind them who will work with us," McRoberts said.

He adds that on the Belmont Farm Supply project, REHAU representatives made sure the products were ordered and delivered to the jobsite on time.

The IFH Design and Installations crew also prefer the EVERLOC+ fittings. "Each truck has its own tool for the 1/2-in. to 1-in. fittings; we also have the larger diameter tool to do the bigger pipes as well," McRoberts says.

The compression-sleeve fittings include four sealing edges for added security. When compressed with a PEXa sleeve, the connections are immediately ready for pressure testing. This saves time on jobsites and helps contractors meet often-tight construction timetables. "We had the heat running in the building even before the roof was on so the frost wouldn't get down underneath our slab," McRoberts notes.

After opening in April 2019, the team has gone through a winter season with the warehouse full and fine-tuned the floor temperatures in the spring. "We are extremely happy that we have the heated floor," Walker says. "It certainly helps maintain the quality of our products."



Project: Belmont Farm Supply, Belmont, Ontario
Construction type: Warehouse, opened in 2019
Project scope: 21,700 ft (6,614 m) of RAUPEX pipe
Architect/Engineer: Stone Crest Engineering
Mechanical contractor: IFH Designs and Installations, Inc
Distributor: Desco Plumbing & Heating and Hydronic Solutions
REHAU systems used: Radiant heating (RAUPEX® pipe, PRO-BALANCE® manifolds, EVERLOC+® compression-sleeve fittings)

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