REHAU®
Unlimited Polymer Solutions

YWCA TORONTO ELM CENTRE

Radiant Heating and Cooling
Project Profile

Radiant Heating and Cooling System in YWCA Toronto Elm Centre Project Features Innovative Thermally Activated Slab

Since opening its doors in 1873, YWCA Toronto has worked to improve the lives of women and girls. As part of this effort, the organization constructed Elm Centre, a 302-unit affordable and supportive permanent housing complex in the downtown Toronto core. Spaning an entire city block, the complex includes 5-, 10- and 17-story residential towers, a restaurant, boutique and other commercial space, and the new YWCA Toronto corporate offices.

Closely aligned with the City of Toronto's energy efficiency and energy consumption targets, the building complex features a multi-stage heat recovery system, and a geothermal water-to-water heat pump system integrated with an innovative thermally-activated slab radiant heating and cooling system.

The installation includes 236,000 ft (72,000 m) of 1/2 in. RAUPEX O_2 Barrier crosslinked polyethylene (PEXa) pipe embedded in the center of each of the suspended 8-in. concrete slabs through each level of the three residential towers.

The design also increases useable floor space in residential units and as a non forced-air system, radiant heating and cooling also minimizes the circulation of airborne particles such as dust and allergens to enhance the health of residence. With mechanical equipment located outside the suites overall building operation and maintenance costs are also significantly reduced.

The overall circuit/zone configuration of the system allows the ability for each suite to be individually controlled by thermostats integrated with the building automation system. A total of 110 PRO-BALANCE 5- to 12-circuit manifolds were installed in the corridor on every other floor of each building allowing for precise flow balancing and control to each circuit.

While a radiant floor system can achieve up to 32 Btu/hr·ft^2 in the heating mode and 16 Btu/hr·ft^2 in the cooling mode, both under ideal conditions, a thermally activated slab, because of its bidirectional output, can achieve output in the range of 50 Btu/hr·ft^2 in the heating mode, and 30 Btu/hr·ft^2 in the cooling mode. Thermally activated slab designs are ideal in multi-level structures, where the same concrete slab can be activated for heating from the upper side, and cooling from the underside.

Project: YWCA Toronto Elm Centre, Ontario

Type of Construction: Mixed use construction, completed in 2011

Scope of Project: 212,000 ft^2 (20,000 m^2); 236,000 ft (72,000 m) of RAUPEX pipe

Mechanical Contractor: Nekison Engineering and Contractors

Mechanical and Electrical Engineer: Lam and Associates

Supplier and Designer: Klimatrol Environmental Systems, Ltd

Architect: regional Architects with Hilditch Architects

REHAU Systems Used: Radiant heating and cooling (RAUPEX® pipe, compression-sleeve fitting system, PRO-BALANCE® manifolds)

The system, designed to deliver 3 million Btu/hr, is fed by a geothermal well field of 90 500-ft boreholes, and is estimated to reduce carbon emissions by 415 tons – or 45 percent – per year when compared with conventional mechanical systems.

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