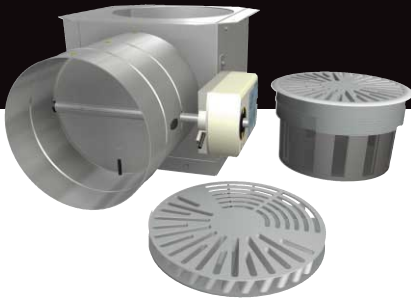


# UNDERFLOOR PRODUCTS CASE STUDY

# 3



## ► PROJECT

Okotoks Health  
& Wellness Centre

## ► DESIGNED BY

SSE Architects  
and Keen Engineering

## ► PRICE REPRESENTATIVE

E.H. Price Limited, Calgary



## The Okotoks Health and Wellness Centre • Okotoks, Alberta Canada

### ► THE CHALLENGE

Due in large part to the rapid growth of population within the City of Calgary and surrounding areas, The Calgary Health Region (CHR) recognized an urgent need for a new multi-service health and wellness center for the residents of the town of Okotoks, Alberta. Okotoks is a 15 minute drive south of the City of Calgary in the foothills of the Rocky Mountains.

From the very early stages of planning, the vision for the new facility was to offer residents of Okotoks localized treatment of non life threatening medical conditions within a building designed to respect the long term sustainability goals of the town itself. Architectural design elements included an arc shaped south exposure façade to harvest

the sun's natural light and warmth, as well as exterior landscape features selected to promote the responsible use of water. These are just two examples of how sensitive the building was designed with respect to the health and wellness of the people as well as the environment.

The CHR placed the responsibility of designing a mechanical HVAC system to compliment as well as enhance a building of this status in the capable hands of Keen Engineering of Calgary, Alberta. Keen Engineering has established itself as one of the leading Sustainable Engineering consultants in North America, and offers a comprehensive portfolio of highly successful "green design" projects in over 15 countries worldwide.

► THE SOLUTION

Tim McGinn, P. Eng., of Keen Engineering realized his client’s desire of having a building that promoted wellness and health for all users of the facility - patients and staff alike. With this in mind, they elected to implement an underfloor air distribution system for the North Community Services Wing of the health centre. The underfloor system would offer the following advantages compared to a conventional overhead air distribution system:

- **Reduced Staff Relocation Costs**
- **Increased Thermal Comfort**
- **Enhanced Indoor Air Quality**
- **Significant Energy Savings**

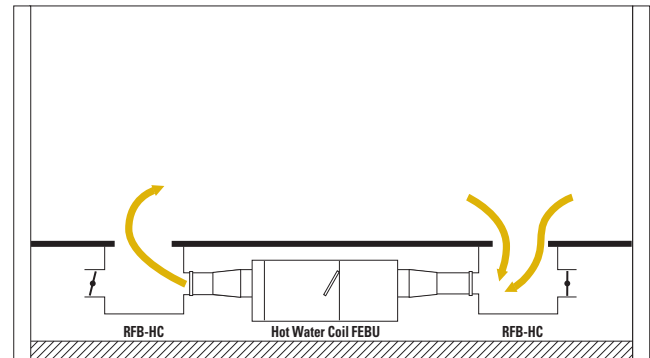
To assist in accomplishing this design goal, Keen enlisted the services of the local Price office in Calgary and described to Price a rather unique application for underfloor air distribution. Rather than simply design a traditional passive style underfloor air system, Keen wanted the ability to add variable volume heating, and deliver it from the floor as well. After some discussions between Keen, Price Calgary, and Winnipeg Application Engineering, a solution was developed that consisted of the following items.

The interior zones of the space were fitted with traditional, non ducted, passive, Price model ARFTDA floor diffusers. The perimeter zones included several Price model FEBU8000 underfloor fan terminals with filters, hot water reheat coils, and the Price model UMCB terminal controller . Ducted from both the inlet side and discharge side of the fan terminal were the Price model RFB-HC motorized damper/boot assembly, mounted beneath the raised floor

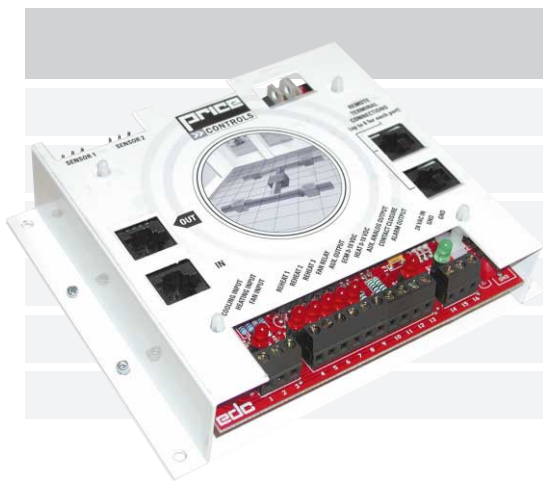
to the bottom of additional ARFTDA diffusers. The multiple RFB-HCs were easily field wired back to the UMCB associated with each fan terminal via factory supplied plenum rated modular plug-in control cables.

► SYSTEM OPERATION

When the perimeter zone calls for heating, the fan terminal powers up, and each of the RFB-HCs on the discharge side of the fan terminal modulate to close off the primary air supply from the underfloor pressurized plenum. Simultaneously, the RFB-HCs on the inlet side of the fan terminal will also modulate to a pre-programmed minimum position, in order to allow a portion of the primary pressurized plenum fresh air to mix with air drawn from the occupied space. The air is filtered and heated at the fan terminal, and then discharged back into the occupied space through the discharge ARFTDA diffusers (see Figure 1). The net result is a mixture of fresh plenum air mixed with re-circulated room air, that is filtered, tempered, and discharged back into the room near the perimeter wall, satisfying zone heat and ventilation requirements.



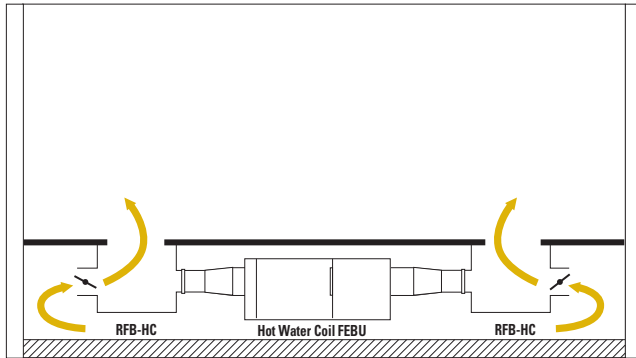
**Figure 1. Round Floor Diffusers: Heating/Cooling Changeover Heating Mode.**



**Product Highlight: UMCB - Underfloor Modulating Controller Box**

- Stand alone or networked operation (native BACnet option)
- Micro-processor based controller
- Dozens of configurable VAV algorithms
- Can control and power up to 12 RFBs
- Temperature, pressure and humidity sensors available
- Pre-programmed with the appropriate control application & specified zone points

When the perimeter zone is switched over to cooling mode, the fan terminal is deactivated, while the RFB-HC damper/boots modulate open. This allows supply air in the underfloor pressurized plenum to enter the space via the ARFTDA diffusers in a fashion typical of a traditional raised floor air distribution system. (see **Figure 2**)



**Figure 2. Round Floor Diffusers: Heating/Cooling Changeover Cooling Mode.**

As Tim explained, this method of heating the perimeter of the building using underfloor air delivery was selected to avoid a conventional perimeter heating system of either radiant panels or finned radiation. "This provides the owner with the ultimate in flexibility in reconfiguring spaces in the future", states Tim.

From an air distribution perspective, there is no question that delivering the air properly at low levels, directly into the occupied zone contributes to better indoor environmental air quality for the occupants. Underfloor air distribution systems also provide opportunities for reducing energy consumption when compared to a traditional overhead air delivery system.



**Underfloor System during installation. Shown are the FEBU 8000 and soon to be pressurized plenum.**



**Head on view of the raised plenum holding the Underfloor System and Terminal Unit products.**

## ► THE RESULTS

The CHR opened the doors of the Okotoks Health and Wellness Centre to the public in November of 2004.

Mr. Les Marles, project manager for the CHR has given the project his personal endorsement. He states, "In our business where we are trying to promote wellness, the building itself should also be a healthy place to be. We also wanted to make the building as environmentally friendly and as energy efficient as possible."


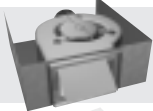

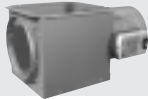



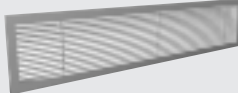



## **ARFTDA installed**

Due in large part to the overwhelming success of this project in terms of providing a facility that is healthy for staff, healthy for the public, and healthy for the environment, it has been stated that Okotoks Health and Wellness Centre will serve as a blueprint for future community health centres under the direction of the Calgary Health Region.

Once again, Price has demonstrated its commitment to providing leading edge products and services, and is proud to have been selected the "supplier of preference" for such a highly regarded project.

## OKOTOKS HEALTH AND WELLNESS CENTRE PRODUCT LIST

Product	Description	Image
ARFTDA - <b>Round Floor Turbulent Face Adjustable Diffuser</b>	<ul style="list-style-type: none"> <li>• Most popular adjustable underfloor diffuser</li> <li>• High air induction creates a comfortable environment</li> </ul>	
FEBU8000 - <b>Underfloor Fan Terminal Unit</b>	<ul style="list-style-type: none"> <li>• Electronically controlled units supply cool or heated air to a space</li> <li>• Low noise generation for quiet operation</li> </ul>	
UMCB - <b>Underfloor Modulating Control-Box</b>	<ul style="list-style-type: none"> <li>• Comes pre-programmed with control applications and specified zone set points</li> <li>• Modular wiring for easy connection between components</li> </ul>	
RFB-HC - <b>Round Floor Boot</b>	<ul style="list-style-type: none"> <li>• VAV cooling &amp; constant volume heating &amp; return</li> <li>• Modulating Damper with Electronic Actuator</li> <li>• Modular wiring for easy connection between components</li> </ul>	
SPD - <b>Square Plaque Diffuser</b>	<ul style="list-style-type: none"> <li>• Architecturally appealing</li> <li>• 360° radial air pattern</li> </ul>	
500 Series - <b>Steel Louvered Grilles</b>	<ul style="list-style-type: none"> <li>• Available in steel, stainless steel or aluminum</li> </ul>	
80 Series - <b>Egg Crate Return</b>	<ul style="list-style-type: none"> <li>• Popular ceiling return</li> <li>• High free area/low sound and pressure drops</li> </ul>	
LBPH - <b>Heavy Duty Linear Bar Grille</b>	<ul style="list-style-type: none"> <li>• Crisp styling</li> </ul>	
SDV5000 - <b>Single Duct Terminal Unit</b>	<ul style="list-style-type: none"> <li>• Provides VAV control</li> <li>• Accurate air volume measurements</li> </ul>	

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### AIR DISTRIBUTION PRODUCTS FOR WORLD CLASS CITIES



Grilles, Registers & Diffusers



Terminal Units



Underfloor Products



Security Products



Displacement Ventilation