



## Theatre Cercle Moliere

### Winnipeg, Manitoba

#### Project Summary

**Project Type:** New Construction

**LEED Silver Designation**

**Project Cost (construction cost):** \$8 million

**Year Completed:** 2010

**Building Square Footage:** 18,700

**Price Products Used:**

- DF1 Displacement Diffusers
- Price Silencers
- Price RGD: Custom Flow, RCD, SCD, 520

**Mechanical Engineer:** Epp Siepman Engineering

**Architect:** Cibinel Architects Ltd.

**Price Representative:** E.H. Price Sales, Winnipeg

The oldest continually operating theatre company in Canada, Le Cercle Moliere, completed construction of a new 125-seat live-performance theatre in the spring of 2010, opening its doors to public performances in October of the same year.

A symbol of Francophone culture in Manitoba, the design consultants chose to employ Price displacement ventilation to ensure maximum occupant comfort while accommodating the design challenges of the theatre environment. Price provided the applications support and product knowledge necessary to produce what one patron described as “the most comfortable theatre they have ever been in.”

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## The Challenge: Occupant Comfort and Mechanical Flexibility

The design of the theatre presented certain constraints for the way the air would be delivered, making overhead mixing ventilation an unattractive option. Firstly, the loads in the space would be highly variable both in terms of number of occupants and seating arrangement, as the theatre features a completely flexible seating arrangement and stage area. An HVAC solution that could adapt to variable loads without compromising comfort or energy efficiency would be valued.

In addition, a moveable catwalk along the length of the theatre made dropping diffusers from the ceiling unpractical.



Finally, a non-permeable curtain enclosed the perimeter of the theatre, eliminating the possibility of delivering mixing ventilation from the side wall. A system that could deliver air through the 400 mm gap at the base of the curtain was the most attractive solution.

A system that could minimize noise and avoid disrupting theatre effects, such as dry ice or smoke, was desired. Energy efficiency gains would also be valued, as the building is seeking LEED silver designation, and the high ceilings and lighting loads of the theatre threatened to waste energy if they were conditioned with mixing ventilation.

## Design Team Profile

**Epp Siepman Engineering** provides mechanical engineering consulting to clients in the building construction industry, with a range of project experience including post-secondary, healthcare, laboratories, and commercial projects.

Epp Siepman values integrated design on all projects to ensure the overall design objectives of the project are met, while optimizing the building mechanical system for comfort and energy efficiency.

**Cibinel Architects Ltd.** is a medium-size architectural office offering personalized service to institutional, cultural, and commercial clients, and has grown into a respected design studio with an international reputation for innovative design and green building expertise.

The services of Cibinel include Architecture, Master Planning, Interior Design, Feasibility Analyses, and Programming.

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The logo for Price HVAC, featuring the word "PRICE" in a bold, white, sans-serif font with a registered trademark symbol (®) to the upper right, set against a solid green rectangular background.

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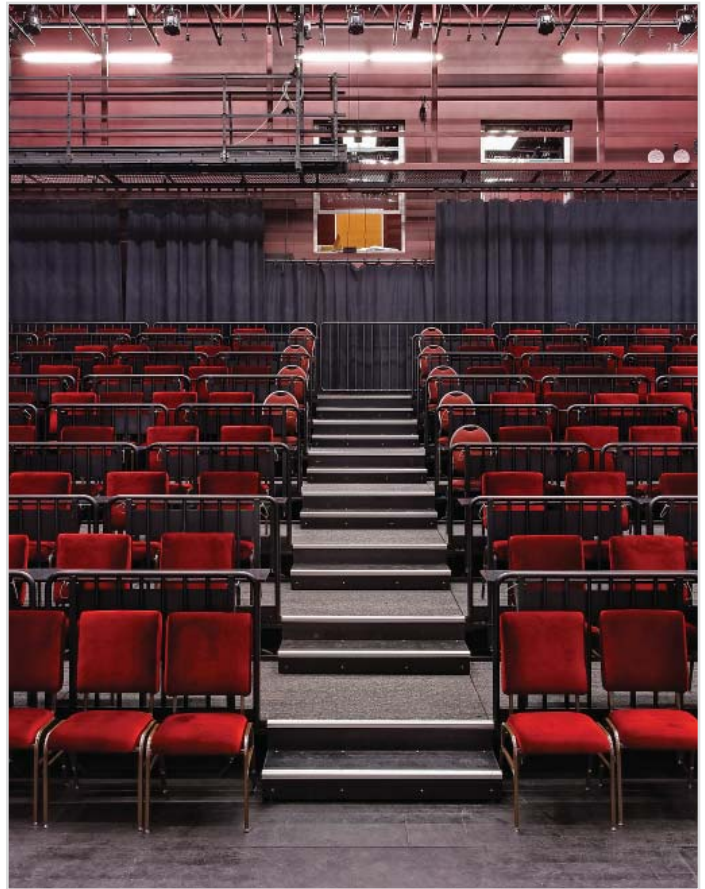
## Price Solution

Price displacement ventilation diffusers overcame the constraints presented by the catwalk and perimeter curtain to provide an exceptionally comfortable environment while saving energy, reducing operating costs and contributing to the buildings LEED designation.

Given the unique characteristics of the theatre, Price performed a Computational Fluid Dynamics analysis to ensure that displacement would meet the comfort criteria of the theatre. This analysis concluded that displacement would result in a comfortable theatre, well within industry guidelines, even when the space was fully occupied in a variety of layouts. The low face velocity of displacement ventilation ensures drafts are avoided and theatrical effects are not disrupted, while low noise levels ensure that the audience experience is not negatively impacted by the HVAC system.

The catwalk and perimeter curtains of the theater influenced the mechanical engineer to choose displacement ventilation for the Cercle Moliere. Price Displacement Ventilation injects air at low velocity a few inches from the floor, relying on buoyancy forces to drive the supply air to the cooling load. This eliminated the need to provide ventilation from overhead, avoiding the challenge presented by the catwalk. The perimeter curtain behaved as a plenum with the theatre wall, allowing the air supplied by the displacement diffusers to flow beneath the curtain, along the floor, and up through the open risers to the theatre occupants.

Along with maximizing occupant comfort and overcoming the physical obstacles of the space, displacement



provides a number of energy saving benefits that contributed to the buildings LEED designation. In all displacement applications, the reduced outdoor air requirement designated by ASHRAE 62 leads to a reduction in fan energy requirements and the higher supply air temperature increases economizer hours to take advantage of free cooling. In the case of Cercle Moliere, stratification of room air avoids conditioning the several feet of unoccupied space near the ceiling, including the high lighting load caused by the stage lighting near the ceiling.

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