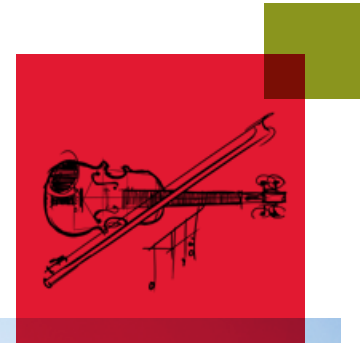


# Amphithéâtre Cogeco Trois-Rivières, Quebec

## Case Study



### Project Description

The Cogeco Amphitheatre is an award winning new outdoor auditorium located in Trois-Rivières Quebec. The project is the result of an open anonymous architectural competition won by Atelier Paul Laurendeau in 2011 to endow the city with a new public infrastructure to host summer shows and festivals. Located on the site of a former paper mill that was dismantled, at the junction of the Saint-Lawrence and Saint-Maurice rivers, the Amphitheatre is to become a landmark, the new signature of Trois-Rivières.

The Amphitheatre comprises a fixed seating area of 3,500 red seats with a sloped lawn greeting 5,500 people, for a total capacity of 9,000. The main feature, an imposing while delicate 80 x 90 meter roof, covers the fixed seating area and stage. The Amphitheatre was inaugurated in July 2015 with an exclusive show by the Cirque du Soleil. Acoustics played an important role in the project. As the amphitheatre

is an open air venue, sound emitted from the stage vanishes in air, lacking surfaces to bounce back and creating acoustical conditions. The peripheral surfaces around the stage proscenium—the side walls and the underside of the monumental roof—had to either project the sound outwards to avoid reflections or absorb it to prevent an echo in the crowd. Due to its great volume, namely the roof located 25 meters above the floor, the building surfaces angled towards the spectators had to absorb sound.

The architect worked closely with Octave, an acoustical consultant, to ensure the facility's sound performance was second to none. The underside of the roof that surrounds the Amphitheatre was constructed with 50% perforated metal. The sound that passes through the perforations is then absorbed by 2 inches (5.08 cm) of acoustic stone wool insulation. This reduces echo and ensures the building does not contribute to sound reflection.



## Project Assembly Specifics

### Soffit

The underside of the exterior roof above the public is made of custom prefabricated red painted steel panels measuring 806 x 1884 mm with a 51 mm fold on four sides forming a casing for the acoustical insulation. In the panels above the public where sound is transmitted, ROCKWOOL ROCKBOARD® 80 was used with a density of 128 kg/m<sup>3</sup> required by the acoustician to absorb sound energy. For the panels located at the back of the stage, ROCKWOOL AFB® with a density of 45 kg/m<sup>3</sup> was used in the casings for aesthetic purposes to prevent a see-through effect revealing the structure of the roof. Two metal wires were attached at the back of the panels to cross each other and hold tight the ROCKWOOL™ insulation against the strong winds brushing against the panels. After a first season of operation, no acoustical problems were reported.

### Soffit composition

#### Type 1

- Perforated galvanized steel panel, 16 gauge
- Glass fiber fabric
- 2" ROCKWOOL ROCKBOARD® 80
- Stainless steel cable

#### Type 2

- Perforated galvanized steel panel, 16 gauge
- Glass fiber fabric
- 2" ROCKWOOL AFB®
- Stainless steel cable

### Exterior walls

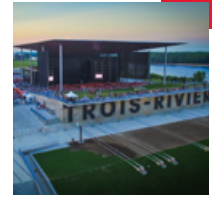
On each side of the proscenium at the front of the stage, angled exterior walls form the boundaries of the seating area. Behind the first wall sections, service stairs leading to the catwalks in the roof are hidden in an open shaft that would trap sound and create acoustical problems. Walls were thus designed to absorb sound.

### Wall composition

#### M10-1h (typical)

- Expanded steel panel
- Horizontal omega channel, 22 mm
- 2" ROCKWOOL ROCKBOARD® 80
- Glass woven fabric
- Vertical Z bar, 2" between each ROCKWOOL panel
- Horizontal Z bar, 3" @ 406 mm c/c
- 3" ROCKWOOL CAVITYROCK®
- Wind vapour barrier membrane
- Gypsum support panel, 16 mm
- Metal steel structural stud, 203 mm @ 406 mm c/c
- Gypsum interior panel, 2 layers, 16 mm





## Why was ROCKWOOL™ chosen for this project?

ROCKWOOL products were chosen for fire safety requirements, for their resistance to water and moisture when used outdoors in harsh and moist environments and for acoustical purposes because of their high density and thus capacity to absorb sound energy.

The challenge was to have an absorptive and porous material that could absorb the energy of the sound and withstand climatic conditions ranging from 30°C to -30°C, with high humidity rates due to two major rivers. ROCKWOOL stone wool insulation was used in the project for thermal insulation where walls had to be composed of non-combustible material and for acoustical purposes to absorb sound emitted from the stage and loudspeakers.

For acoustical applications, different types of perforated sheet metal were used to clad and protect the rock wool. The perforations had to be greater than 50% of the panel surface in order to let sound through and prevent reflections. The stone wool panels, visible through the perforated metal panels, were covered with a black fabric for aesthetic purposes.

### Architect:

Paul Laurendeau | François Beauchesne |  
Architectes en consortium  
24 Avenue du Mont-Royal O. #902, Montréal, QC H2T 2S2

### Engineer:

Groupelement Dessau-Pluritec  
1455 rue Champlain, Trois-Rivières, QC, G9A 5X4

### Acoustical Consultant:

Octave Acoustique  
963 Ch Royal à Saint-Laurent-Ile-D'Orléans, QC G0A 3Z0

### Client (owner/builder):

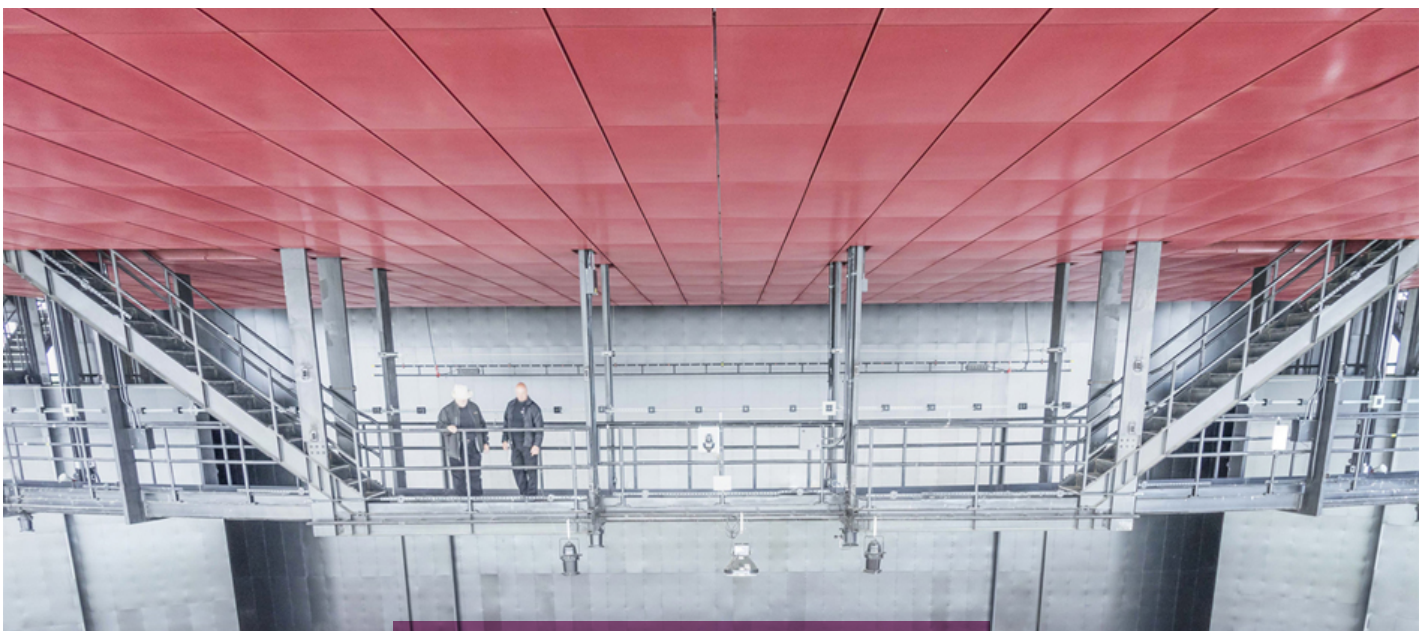
City of Trois-Rivières

### Project Management:

Groupelement Dessau-Pluritec (Verreault)

### Manufacturer of Roof Soffit Panels:

Mecart  
110 Rotterdam Street  
Saint-Augustin-de-Desmaures  
QC G3A 1T3



Photographer: Raphael Thibodeau





Photographer: Raphael Thibodeau

## ROCKWOOL™ Products used:

### Walls (interior and exterior) and ceilings (interior)

CAVITYROCK®	2.0"	12,400 ft <sup>2</sup>
CAVITYROCK®	3.0"	14,500 ft <sup>2</sup>
COMFORTBATT®	1.0"	3,300 ft <sup>2</sup>
COMFORTBATT®	3.0"	2,550 ft <sup>2</sup>
COMFORTBATT®	3.5"	120 ft <sup>2</sup>
COMFORTBATT®	4.0"	2,325 ft <sup>2</sup>
AFB®	3.0"	35,000 ft <sup>2</sup>
AFB®	3.5"	4,025 ft <sup>2</sup>
ROCKBOARD® 80	2.0"	2,520 ft <sup>2</sup>
ROCKBOARD® 80	3.0"	2,070 ft <sup>2</sup>
ROCKBOARD® 80	3.5"	7,780 ft <sup>2</sup>
ROCKBOARD® 80	4.0"	700 ft <sup>2</sup>

### Soffit

ROCKBOARD® 80	2.0"	95,250 ft <sup>2</sup>
AFB®	2.0"	36,600 ft <sup>2</sup>

### Project Size

Total building area: 150,000 ft<sup>2</sup>

Construction cost: 40.1 M\$

### Location:

100, Avenue des Draveurs  
Trois-Rivières, Québec, G9A 5H3

### Project Timeline:

October 2010 to July 2015

### Awards:

- Governor General's Medal in Architecture 2016
- Coup de coeur du jury 2015, CISC Canadian Institute of Steel Construction
- Award of Excellence 2012, Canadian Architect

## ROCKWOOL

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