Fletcher Insulation
Building Better, Together

CASE STUDY

Artist's impression by Impact Multimedia.
Courtesy of Sydney Coliseum

Fletcher Insulation Plays Supporting Role in Sydney Coliseum Theatre, West HQ Design

Officially opened in December 2019, the $100m Sydney Coliseum Theatre, West HQ will take centre stage as the premier venue for performing arts in Western Sydney. West HQ Limited Chief Executive Officer Richard Errington said, "Our objective was to provide something equal to the Sydney Opera House, the Lyric Theatre or the Capitol Theatre, so we can attract the same kind of shows they do."

From rock concerts to formal banquets and galas, the unique multi-mode theatre design incorporates a flexible performance space and function venue. This posed significant acoustic challenges, as well as ensuring thermal performance was not compromised with varying occupant numbers.

Fletcher Insulation products feature extensively in the metal roof and external walls of the theatre. Working in partnership with key contractors, Fletcher Insulation products were the ideal solution to achieve thermal, acoustic and condensation control for the building.

Sydney Coliseum Theatre

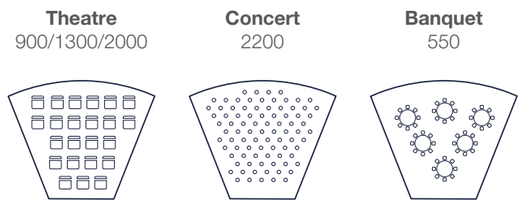
As the new home for performing arts in Sydney's West, the iconic Sydney Coliseum Theatre for performing arts and live entertainment is designed to attract both Australian and international acts with its immersive sound experience provided by the L'Acoustics L-ISA Hyperreal system, state of the art technology and full LED lighting in the performance space.

"It's been designed to host stage shows, large musicals, ballet, the symphony orchestra. Everything the major theatres can provide, we can now also accommodate in this amenity. Overall we want Sydney Coliseum Theatre, West HQ to offer a broad range of commercial and artistic performance types so we can make our theatre as accessible as possible to as broad an audience as we can," explained West HQ Limited Chief Executive Officer Richard Errington.

But blockbuster events are not all this facility will offer. One of the unique design features is the multi-mode operation of the theatre. By utilising a retractable stalls seating system, the main theatre auditorium features flexible operating modes ranging from 900 to 2000 seats in various configurations, increasing to 2200 capacity in standing mode. Banquet seating for up to 550 people is also a possibility in this versatile entertainment and function venue.

The success of this project relies on the complete integration of architectural design, engineering and acoustic design.

Multi-mode Configurations



The Acoustic Challenge

The flexible seating arrangements, and the range of performance types that will be staged at the venue created a difficult challenge for the acoustic engineers.

The acoustic design requirements were exacting. Bicci Henderson, Technical Operations Manager of the Sydney Coliseum said "Our brief was to ensure that we deliver a sound and lighting experience that offers a future-proof approach and that is the state of the art. After consulting with industry colleagues and hearing their enthusiasm, we will be installing a fully immersive 360-degree audio system that is truly the latest in sound capability. We're confident that the combination of this technology with the theatre's acoustic design will deliver an amazing audio experience for both the audience and the performers."

Audience seats play a significant role in sound absorption. The variable seating arrangement made the acoustic design particularly challenging, as different configurations and materials alter the way sound is absorbed and reflected within the space.

The theatre was not the only area with demanding acoustic standards, however. The venue also incorporates a technical workshop, rehearsal room, dressing room, green room and plant room, each of which needed to be acoustically isolated from each other.

Furthermore, the building is adjacent to a railway line and a busy road, so external sound insulation was also a factor.

Occupying a position in a residential area and with a hotel on the same site, the impact of the theatre on the surrounding community was another vital consideration. Noise emissions from patrons and performances were required to meet the consent conditions of Liquor and Gaming NSW at the residential locations surrounding the facility, and the L_{A10}, or A-weighted noise level that can be exceeded no more than 10% of the time, had to be less than 50dBA incident to the building facade of the existing West HQ Limited premises.

Testimonial

"We have used Fletcher Insulation for a long time. They give us the technical support we need, and we have confidence they will stand by their product. "

"On this project there were tight timeframes. We needed to feel comfortable that we would get the supply when promised and the supplier would jump to act if problems arose. Fletcher insulation gives us that comfort. "

Hugh Tabone, Director, Axis Metal Roofing

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Keeping the Audience Comfortable

While acoustic performance was the key driver for insulation selection, the building needed to conform with the energy efficiency requirements of the BCA National Construction Code, including minimum material R-Values for thermal insulation. The Fletcher Insulation range of products met those thermal performance requirements in combination with the excellent acoustic properties.

Summer temperatures regularly reach over 40°C in Sydney's western suburbs, so it was critical that passive solutions such as insulation were selected to complement the mechanical HVAC system for cooling.

Lighting design was at the forefront of technology. The theatre will be an LED-only venue for lighting luminaries and use smart power for power distribution. According to Bicci Henderson, "to the best of my knowledge we will be the first theatre in Australia with no traditional lighting dimmers and incandescent light globes."

Without the heavy heat load of traditional incandescent lighting, and the range of use from dinner functions to stand-up concerts, the main challenge for the building services team was to keep people warm in the cooler months. "The flexible seating and multiple operating modes means we can't use the underfloor displacement methods traditionally seen in theatres. This was particularly challenging in heating mode, where the warm air needs to be delivered from ceiling height to the audience. The large height of the space and acoustic constraints made this difficult", said Mikaila Ganado, Associate, GWA Consultants.

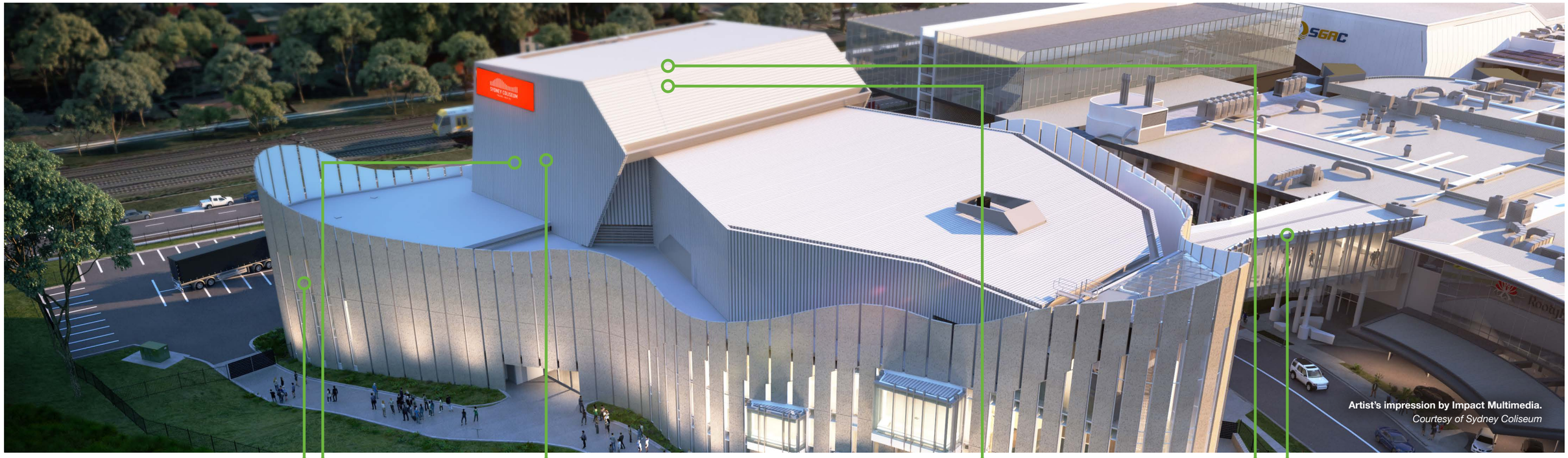
The Solutions

The specification for the acoustic solution to the project called for very tight tolerances applicable to the build to maintain the integrity of the sound insulating structure. Construction timeframes were tight, as bookings were being taken six months in advance of the opening performance, and there was no room for time overruns in the programme.

Axis Metal Roofing, a contractor experienced in theatre construction was selected by the lead contractor, Hansen Yuncken, for the installation of the metal wall and roof sections.

Axis Metal Roofing proposed Fletcher Insulation products because they had confidence that the products would perform as specified, that they would supply them when needed and be responsive if problems arose. Together with Fletcher Insulation they developed an insulation solution that would not just meet the product specifications outlined, but fulfil all of the acoustic engineer's performance requirements.

The key to Fletcher Insulation's approach is ensuring the right solution for the project, whether it's thermal performance, acoustic control, condensation prevention, indoor environment quality, or fire resistance.



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FI48 Rigid Glasswool 75mm R2.3

FI48 Rigid glasswool is a high density insulation suitable for use in wall and roofing applications offering superior thermal and acoustic performance properties than a standard insulation product.

Sisalation® Metal Roof 453 Heavy Duty Building Membrane

Sisalation® is a Heavy Duty pliable double-sided building membrane and sarking, providing an effective water and vapour barrier suitable for metal roof and in wall applications.

FI32 Semi Rigid 100mm R3.0, NRC=1.00

FI32 Semi-Rigid glasswool insulation is a high performing thermal and acoustic insulation used for walls and roofing applications.

Permastop® Heavy Duty 75mm R1.8

Permastop® Building Blanket glasswool insulation is faced with Sisalation® facing foil. Combining two effective types of insulation to offer one single product solution, offering an effective water and vapour barrier to provide excellent thermal and acoustic control for metal clad roof and wall applications.

Applications

- Metal Roof Insulation with Facing
- Wall Insulation with Facing
- Metal Roof Insulation
- Wall Insulation
- Ceiling Insulation
- Concrete Roof Insulation
- Metal Roof Membrane
- Wall Membrane
- HVAC Internal Duct Liner
- Process Equipment Insulation
- Plant Room Wall Insulation

Features

- Thermal Control
- Acoustic Control
- Fire Resistant
- Condensation Control

Commercial Roofing Solution

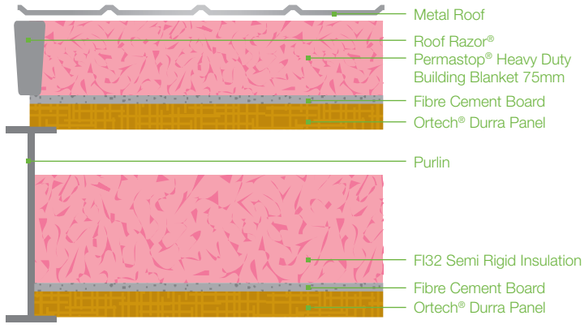
For the Sydney Coliseum project, the Fletcher Insulation team worked closely with long-time customer Axis Metal Roofing to understand the specific project performance requirements and selected the best products to meet these requirements. Together, they used FletcherSpec Pro®, Fletcher Insulation's online product selection tool, to help them choose the right products for the project.

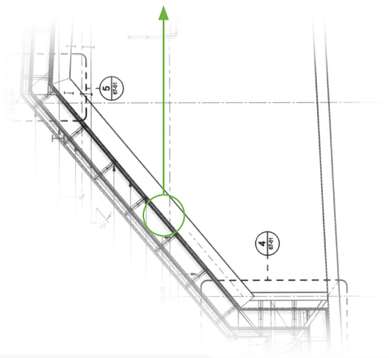
To achieve both the acoustic and thermal requirements of the roof structure, Permastop® Heavy Duty 75mm insulation was installed in conjunction with FI32 Semi-Rigid 100mm insulation above the Ortech® acoustic roof panels (Roof Schematic).

Permastop® Building Blanket glasswool insulation is manufactured with a Sisalation® foil facing to provide excellent thermal and acoustic control for metal clad roof applications. This Heavy Duty facing is strong, tear-resistant and complies with the requirements of AS/NZS4200-1:1994 to deliver an effective water and Class 1 vapour barrier. It also contributes to thermal performance by reducing radiant heat transfer.

FI32 Semi-Rigid glasswool insulation is a high performing thermal and acoustic solution providing exceptional NRC values of 1.00.

Roof Schematic



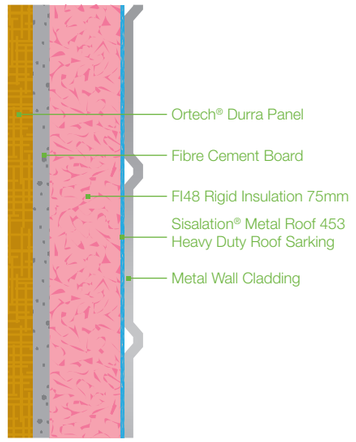


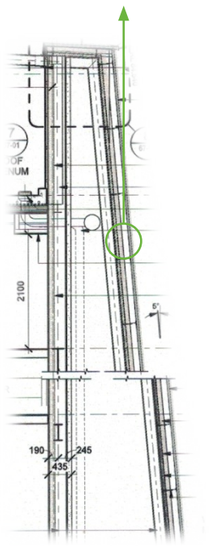
External Walls Solutions

The external Colorbond® walls behind the theatre space were lined with Sisalation® Metal Roof 453 Heavy Duty roof sarking and FI48 75mm Rigid glasswool insulation (Wall Schematic).

The Sisalation® roof sarking complies with the requirements of AS/NZS4200-1:1994 and provides exceptional water and vapour protection; whilst the FI48 Rigid glasswool insulation delivers excellent thermal and acoustic performance.

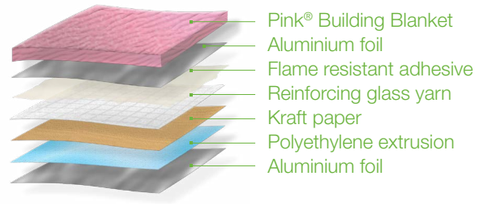
External Walls Schematic



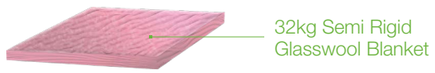


Product Summary

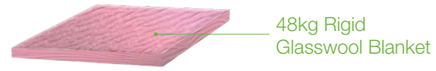
Permastop® Heavy Duty Building Blanket



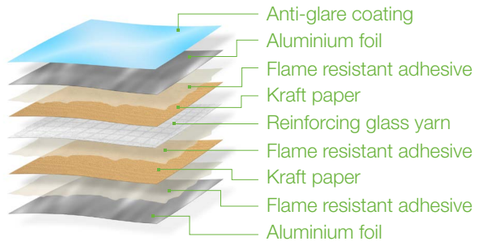
FI32 Semi-Rigid Insulation



FI48 Rigid Insulation



Sisalation® Metal Roof 453 Heavy Duty Roof Sarking



Fletcher Insulation Product	Location	Product Performance
F148 Rigid insulation 75mm	Behind Colorbond® external wall cladding surrounding the theatre space	Acoustic Control, Thermal Performance, R value = 2.3
F132 Semi Rigid insulation 100mm + Sisalation® Metal Roof 453 Heavy Duty Roof Sarking	Above the Ortech® acoustic roof panels	Acoustic Control, Thermal Performance, Condensation Management, FI32 Semi Rigid 100mm R Value= 3.0
Sisalation® Metal Roof 453 Heavy Duty Roof Sarking	Behind Colorbond® external wall cladding surrounding the theatre space	Thermal Performance, Waterproof Barrier, Condensation Management
60mm Roof Razor	Metal roof	Thermal & acoustic performance

Building Insulation Solutions

Fletcher Insulation has been at the forefront of insulation technology since the 1930's. With a national distribution footprint, we pride ourselves on providing excellent service to our customers. Whether you are designing or selecting materials for a residential, commercial or industrial project, you can trust Fletcher Insulation to deliver the best insulation solution for your building.

The Fletcher Insulation range has been tested to Australian Standards and Australian conditions. Designed to meet the strict requirements of the latest National Construction Code (NCC), our products meet and exceed the NCC's deemed to-satisfy requirements anywhere in Australia. Our specialist range of fire rated, thermal, acoustic, condensation control and indoor air quality solutions ensure your project is covered, with the full backing of our experienced sales and support team. Speak to a representative today to see how our clients and Fletcher Insulation are building better, together.

Thermal Performance
The right level of thermal performance can deliver better comfort levels as well as reducing the reliance on air conditioning and mechanical ventilation, which can significantly increase electricity costs for a building.
Selecting the right type of roofing insulation can optimise the performance and energy efficiency of a commercial building, resulting in reduced heating and cooling costs.
Fletcher Insulation product complies with thermal performance AS/NZS 4859.1.2002

Acoustic Control
Minimising noise is an important consideration when designing buildings. For projects located in high noise areas such as overheard traffic, under aircraft flight paths or for projects requiring high levels of acoustic control such as performing arts precincts and concert walls, Fletcher Insulation has a range of insulation and facing options with superior noise reduction properties. These solutions are ideal for noise control behind perforated ceilings by minimising sound transfer from the external roof environment.
For projects requiring high levels of acoustic control such as concert halls, studios and auditoriums, Fletcher Insulation has a range of solutions with superior noise reduction properties.

Condensation Control
Sisalation® Building Membrane products have been developed to distinctively address condensation control in buildings and significantly reduce the likelihood of condensation developing underneath metal roofs.
In tropical regions (climate zone 1) Sisalation® products with an antiglare foil are recommended to further reduce condensation in increasingly humid conditions. The antiglare foil can be positioned in an upwards direction to allow installation toward direct sunlight.
Condensation control is an important consideration when designing commercial buildings in high humidity areas. Fletcher Insulation has a range of faced building blankets and building membrane solutions which provide a superior water and vapour barrier for long term durability against condensation.

Fire Resistance
Sisalation® Building Membranes comply and meet the NCC Flammability Index AS1530.2-1993 (R2016). Fletcher Insulation products are non-combustible and fire rated according to Combustibility (AS1530.1-1994), Compliance with Ignitability, Flame Propagation, Heat Release and Smoke Release AS/NZS1530.3-1999 (R2016) and UL181.9 Burning Test (AS 4254) have also been met. Fletcher Insulation has a range products for fire prone areas and designed to comply with Bushfire Attack Level (BAL) requirements of low-40 in roof applications and low-40 in wall applications (in accordance with AS3959). In applications where the insulation is exposed and acts as the ceiling lining, Fletcher Insulation meets BCA compliance to AS ISO 9705 Fire tests - Full-scale room test for surface products for Group 1 with Permastop® Light Duty.

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