

Protected by



Insulated Panels

Middle East, Africa, Turkey &
Central Asia

Etihad Arena Case Study



The Project

Etihad Arena is the Middle East's largest state-of-the-art indoor entertainment venue built on the stunning waterfront of Yas Island—Abu Dhabi's leisure and holiday hub.

This indoor venue seats 18,000 guests and is designed to host world class concerts, sport events and corporate functions. It is Abu Dhabi's first large scale indoor live event arena.

The design of the arena is inspired by the woven mesh of the baskets used by the Bedouin tribes which reflects the well-known and world-famous Arabic hospitality. The project was awarded the Sustainable Design of the Year at the MENA Green Buildings Award in 2018.

Location

Abu Dhabi

Client

Miral

Products

20,000 m² of KingZip Standing Seam System
KingZip Walkways
Kingspan Safepro 2

Building Type

Arena

Architects

HOK

Main Contractor

BAM International bv Intl



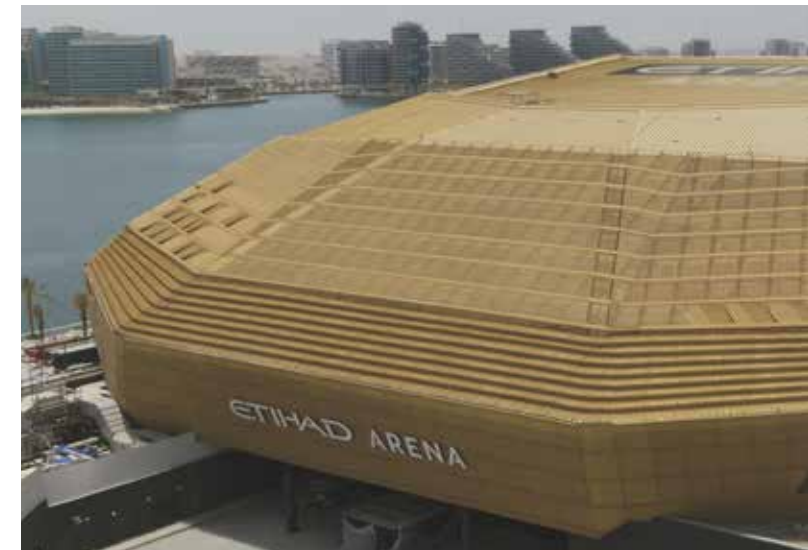


A Geometric Challenge

The building geometry was still being designed while Kingspan was invited to work on the project. In order to overcome this challenge, Kingspan used a parametric design approach on a BIM workflow where the multi layers of the KingZip system could be changed and adapted to the steel design development with regards to geometric interfacing and behavior.

One of the benefits of using the parametric design approach was that Kingspan was able to issue fabrication cut lists from the generated design automatically. This approach also minimized the time spent on detailing all the interfaces of KingZip roof system after the steel design was finalized.





Acoustic Performance

Designed as a multipurpose entertainment venue and being in close proximity to the new Abu Dhabi airport, the building envelope was required to have high sound insulation performance to block the sound of the airplanes flying over the stadium. Internally, the venue also needed to have high sound absorption properties due to the arena being used mainly for indoor concerts and events.

Kingspan technical team ran various acoustic modelling simulations backed by historical test evidence to develop and design the optimum buildup to meet the NRC and SRI requirements of the venue.

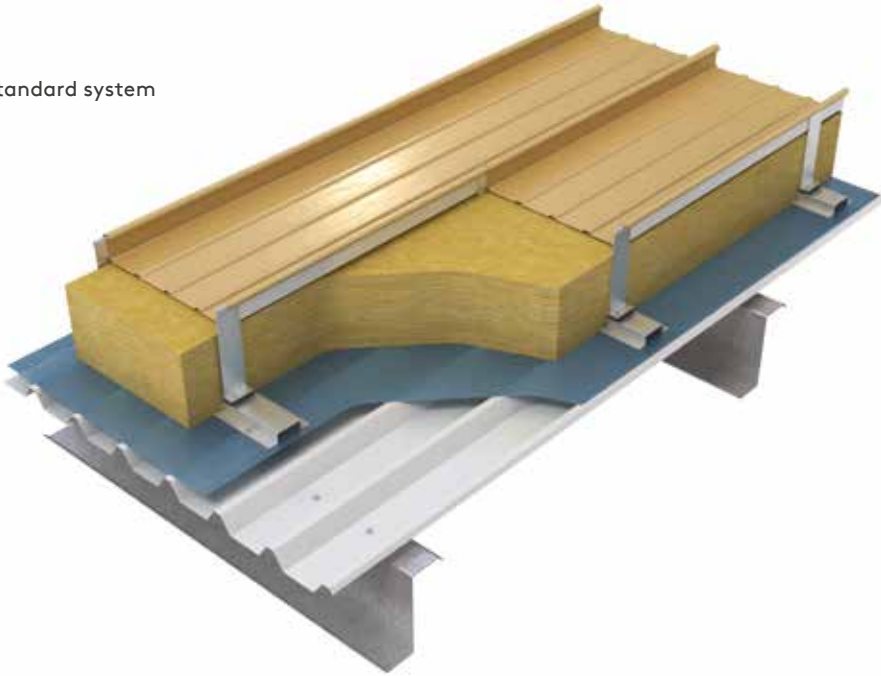
Customized Build-Ups

Meeting Every Design Requirement

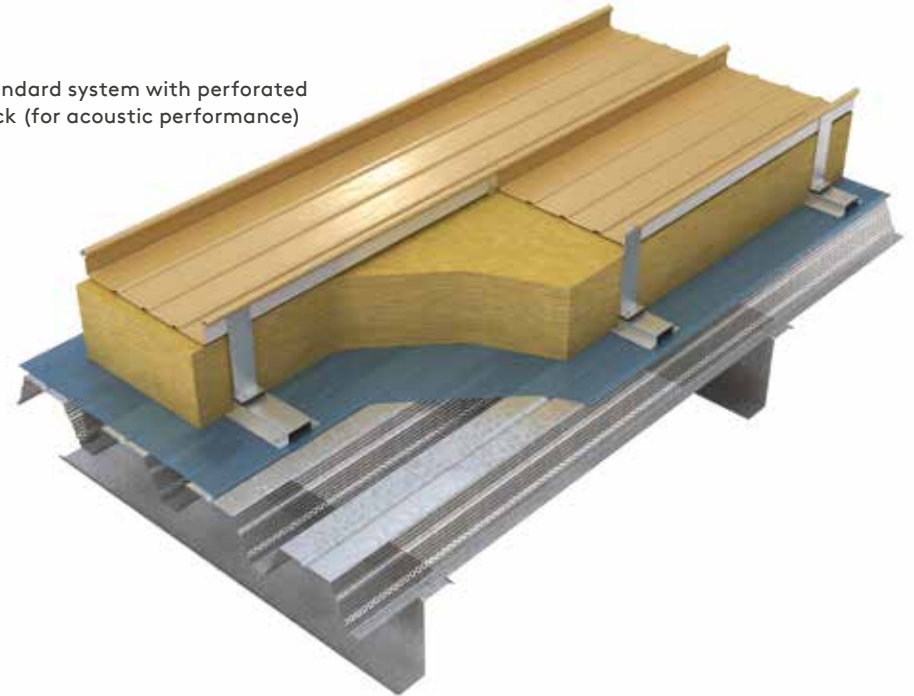
Four different KingZip buildup configurations were proposed to meet the performance requirements of a multilayered envelope system and to marry the design requirements with deep engineering.

After the initial analysis, Kingspan provided two solutions for standard system build ups, one with a perforated deck and the other, a plain deck over other non-acoustic areas. KingZip perforated decks with customized perforation patterns were used to meet the NRC requirements at the roof above the main concert hall.

Standard system



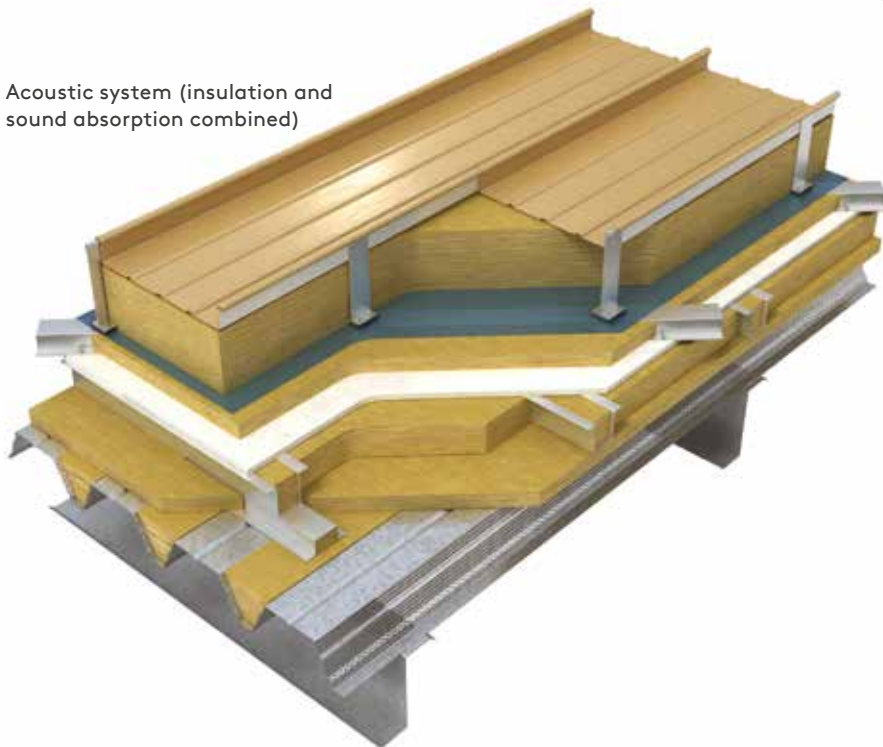
Standard system with perforated deck (for acoustic performance)



Multi-layer buildups including fiber cement and gypsum board linings were used to add mass to the advanced acoustic system to block the external noise.

Lastly, perforated KingZip top sheets were also used above mechanical rooms to improve ventilation wherever required.

Acoustic system (insulation and sound absorption combined)



Single skin, perforated for ventilation purposes



Performance



Thermal Performance

The building envelope required a U-Value of 0.19 W/m²k and was achieved by the standard KingZip system proposed for the project.

The high performance acoustic system achieved a U-value of 0.11 W/m²k which exceeded the project requirements significantly.

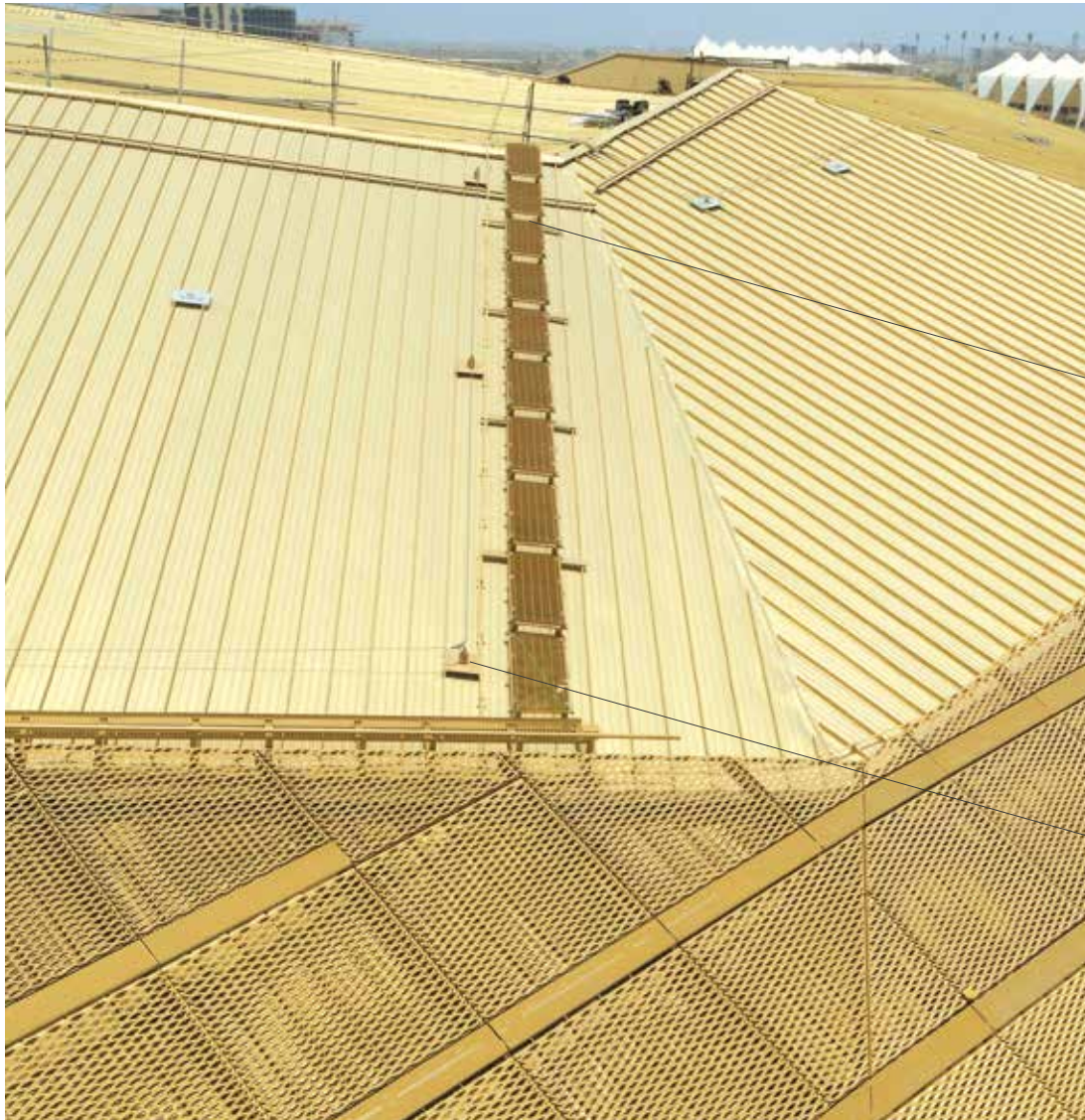
Fire Performance

All proposed KingZip systems for the project are non-combustible by default and also Abu Dhabi Civil Defense Approved, offering peace of mind to designers and contractors with complete regulatory compliance.

KingZip as a Weatherproof Substrate

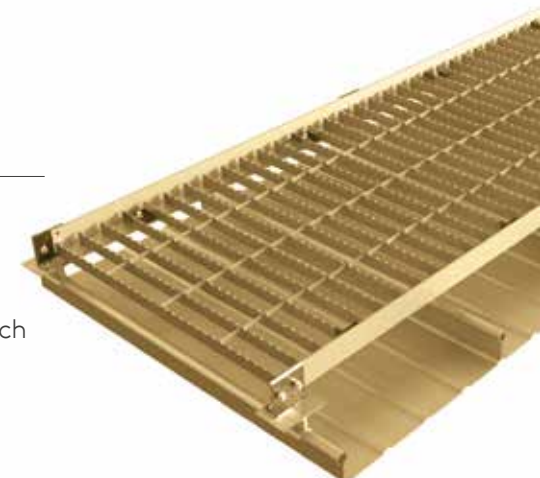
The vertical facades and sloped areas of the roof were designed to have 'mesh panel cladding' features as final finish. KingZip Systems have been used as a weatherproof substrate in these areas.

Kingspan designed and engineered the load bearing calculations to support the additional cladding layer. The mesh cladding was installed on the KingZip substrate with the help of Kingspan Zipclip accessories.



KingZip Walkways

Kingspan also designed and engineered the walkway system used on the building envelope which had the capability to fit on the steep sloped surfaces around the geometry.



Safepro2

Kingspan Safepro2 fall arrest system was used on top of KingZip sheets as part of the complete envelope system offering.



Contact Details

UAE

**Kingspan Insulated Panels
Manufacturing LLC**
P.O. Box 60493,
Dubai Investments Park,
Jebel Ali, Dubai, UAE

T: +971 (0) 4-8854 232
E: info@kingspanpanels.ae
www.kingspanpanels.ae



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