Georgia-Pacific DensDeck® Roof Board

Sika®

CASE STUDY

DENSDECK® PRIME ROOF BOARDS SUPPORT A DURABLE ROOFING SOLUTION AT EAST MIDLANDS AIRPORT PASSENGER HALL EXTENSION



DENSDECK® PRIME ROOF BOARDS HELP INCREASE FLAT ROOF RESILIENCE AT EAST MIDLANDS AIRPORT PASSENGER HALL EXTENSION

DensDeck® Prime Roof Boards were specified as part of a SIKA approved system that helped match the unique resilience requirements of the flat roof of the passenger hall extension at East Midlands Airport.

This busy regional airport saw over 4.2 million passengers in 2024. As part of a £120 million investment programme to improve all aspects of the customer experience, the passenger hall has been extended to make way for the new state-of-the-art scanning equipment. This means customers will no longer have to take electrical items and liquids out of their bags, reducing waiting times and improving the customer experience.

To ensure the smooth and uninterrupted airport operation, no matter what challenges the airport roof is faced with from external conditions, a uniquely extra resistant roof system was required to face the extra durability challenges that a functioning airport roof would pose, including high levels of plant and maintenance traffic. The final specification included a single ply roofing system that utilised a SIKA Sarnafil® AT-18 FPO membrane and incorporated DensDeck® Prime Roof Boards. The membrane was selected for its plasticiser-free formulation and long-term stability, which aligns well with the low-maintenance, high-durability requirements of airport environments.

This is the first time this flat roof system was specified for a UK airport. The full airport flat roof system comprised:

- Tata D35 steel deck 0.7 mm thick
- S-Vap 5000 E SA AVCL self-adhesive layer
- DensDeck® Prime Roof Boards 12.5 mm
- Sika Primer 600
- Sikatherm® MW DD mineral wool insulation
- Sarnafil® AT-18 1.8 mm polymeric FPO membrane

> This is the first time that this system, using a combination of DensDeck® Prime Roof Boards and our Sarnafil® AT-18 single ply membrane, installed over mineral wool insulation, has been used for a UK airport roof. It met the client's requirements for a robust and durable roofing solution where all the products used, the roof design and its performance are backed by the reassurance of a Sika 25-year full system guarantee. It will help provide protection to a key facility that is vital for the overall success of the airport's efficiency and passenger experience.
>
> **BOBBY SINGH**
> SIKA Area Technical Manager



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As well as coping with a range of weather conditions, airport roofs must be robust enough to withstand much higher than usual footfall. Airport roofs tend to house more building services equipment, so footfall levels are generally quite significant due to regular maintenance activities. They must therefore be designed to be robust enough to cope with the extra loads imposed upon them.

The specified insulation was tapered mineral fibre, which typically offers lower compressive strength and reduced rigidity compared with PIR insulation boards. In environments such as airports, where higher-than-normal levels of maintenance access and footfall are common, this can lead to localised compression over time. Repeated personnel access can result in minor depressions within the insulation layer, which may create areas of increased stress on the waterproofing system and contribute to more localised wear.

In order to address the challenges of increased footfall, sections of galvanised metal sheets can be installed in areas designed as walkways before the single ply membrane is installed. However, as Charley Hartshorn, Contracts Manager at Advanced Roofing and Cladding, whose team installed the roofing system comments, this practice doesn't always solve the problem: "The placement of M&E equipment on a roof can change at the last minute and the walkways and areas designated for plant may no longer be in the right position. By using DensDeck® Prime Roof Boards over the insulation and mechanically fixing them through to the deck, it gave a really solid surface across the whole roof to help spread loads and provide robust walkways. You couldn't tell that it was mineral wool you were walking on."

Higher frequency of maintenance activities can increase the possibility of tools being dropped, risking potential damage of the waterproofing. Whilst the new addition of a SIKA's Sarnafil® AT membrane offers added robustness, the smooth, strong surface of the DensDeck® Roof Board increases the durability and resilience of the membrane, helping to reduce the risk of punctures that could compromise the watertightness of the roofing system associated with irregular levels of foot traffic.

The glass mat faced enhanced gypsum boards were also used on the upstands and Charley explained why:

> The upstands around the roof can come into contact with a lot of different equipment and materials during the construction phase and they can get damaged. Mechanically fixing DensDeck® Roof Boards gave the upstands extra protection. It also produced a neat, sharp corner where the upstands meet the roof and helped produce a quality finish that impressed the client.
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> **CHARLEY HARTSHORN**
> Contracts Manager, Advanced Roofing and Cladding



WHAT OTHER BENEFITS DOES THE SIKA ROOF SYSTEM WITH DENSDECK® PRIME ROOF BOARDS BRING TO THE AIRPORT ROOF?

There are several factors that influence the specification of airport roofs.

NON-COMBUSTIBLE MATERIALS

Airport roof designs aim to reduce the risk of fire spread through the use of non-combustible materials where appropriate. The enhanced gypsum core of DensDeck® Prime Roof Boards contains crystallised water in its structure. Should a fire break out, the energy from the heat would vaporise the crystallised water, calcining the gypsum. This creates a natural fire-resistance* that can help slow fire spread and penetration until it can be extinguished.

When the Sarnafil® AT-18 membrane was tested to TS 1187 as part of a whole roof assembly the build-up achieved the highest fire classification for a flat roof of BROOF(t4), so under the UK Building Regulations its use is unrestricted and is not subject to distance limitations from the boundary.

The specification of non-combustible mineral fibre insulation within the East Midlands Airport roof build-up, together with the inclusion of DensDeck® Roof Boards, supports the overall design approach aimed at limiting fire risk while delivering a robust and durable roofing solution. The combination of materials also contributes to enhanced acoustic performance for the flat roof.

*as described and tested in accordance with ASTM E136.

RESISTANCE TO CHEMICAL EXPOSURE

Airport environments can expose roofing materials to combustion-generated pollutants, such as those produced by aircraft jet engines. The selection of membrane technology should therefore consider resistance to these conditions to ensure long-term performance. The Sarnafil® AT-18 membrane, based on flexible polyolefin (FPO) technology, is designed to offer robust resistance to such exposures, making it well-suited for demanding applications such as airport roofs.

WIND UPLIFT

The roof membrane for the East Midlands Airport roof extension was mechanically fixed through the DensDeck® Prime Roof Boards and the mineral fibre insulation layer onto the steel deck below. The cover board provides a more rigid layer within the build-up compared to the insulation beneath and the membrane above, which can help reduce localised movement around fixings and support the overall robustness of the roofing system.

WHERE CAN I FIND OUT MORE INFORMATION ABOUT THE BENEFITS OF USING DENSDECK® PRIME ROOF BOARDS IN AIRPORT ROOF SYSTEMS?

At the East Midlands Airport extension, DensDeck® Prime Roof Boards were incorporated as part of a Sika roofing system designed to meet the specific performance requirements of the project. The inclusion of cover boards within a roof build-up is one of several design approaches that can be considered to support durability and in-service performance, depending on the application.

DensDeck® Prime Roof Boards are used in a wide range of roofing assemblies globally, including systems that have been tested by third-party organisations such as FM Approvals, where complete roof constructions are assessed for characteristics such as durability, resistance to footfall, water ingress and wind uplift.

If you are working on a roofing project for an airport, or any application with demanding performance requirements, our team can provide guidance on suitable system build-ups based on the specific needs of your project.





CONTACT US

buildgp.com/contact-us

GP Gypsum LLC, 133 Peachtree Street, N.E. I Atlanta, Georgia 30303

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FIRE SAFETY

CAUTION: Passing a fire test in a controlled laboratory setting and/or certifying or labelling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/ system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating or any product or assembly/system.