

CASE STUDY

# KAFD World Trade Center

Armacell's structural foam cores give the more than 3,000 façade panels the required stiffness while keeping them lightweight. The up to 15 metres long ArmaForm® cored panels are tailor-made to meet stringent high-speed wind loading criteria. **Armacell in action.**

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 **armacell**  
ArmaForm®

# 3,180 unique façade panels spanning an area of 47,000 square metres



The King Abdullah Financial District, in Riyadh, Kingdom of Saudi Arabia, is the leading financial centre in the Middle East, providing an attractive working environment for the growing workforce in the financial sector. The site consists of 59 towers in an area of 1.6 million square metres, providing more than 3.5 million square metres of space for various uses, 62,000 parking spaces and accommodation for 12,000 residents.

Situated at a prominent corner in the district, KAFD World Trade Center (WTC) is the second tallest tower, at a height of 303 metres. Envisioned by the architects as an iconic architectural landmark and gateway for international trade, the tower provides more than 137,000 square metres of office space and, at a height of 300 metres, a public observation deck.

BFG International, Bahrain, the Gulf region's leading supplier of composite products, was awarded the contract for design and manufacturing of the façade system of the King Abdullah KAFD WTC. The façade cladding was built out of advanced composite materials and covers a surface area of more than 40,000 square metres. To cope with the different challenges such an eye-catching façade structure entailed, BFG was searching for a sandwich solution, combining high structural strength with low weight.

"Our low density PET foam core, made of 100% post-consumer PET, turned out to be the core material of choice due to its reduced weight, while providing the required stiffness and strength properties."

(Henri Chapelle, Sales & Marketing Manager)



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The structural sandwich panels were made of fibreglass/ fire-retardant gelcoat polyester skins, cored with ArmaForm in  $70 \text{ kg/m}^3$ . The lightweight nature of our foam allowed façade panels of up to 15 metres in length. All in all, the longer the individual facade panel is, the less supporting structure is required, the easier and faster the handling during assembly and the lower the transport and installation costs. In addition, fewer joints and seams mean enhanced aesthetic appeal for the façade.

Manufacturing took place off-site in a large variety of panel geometries. To ensure smooth assembly and perfect alignment on the spot, the tight dimensional tolerances of the individual ArmaForm foam boards was a must. "All of the more than 3,000 panels were dimensionally perfect and were assembled with ease," said Matthew Sailesh, business development and project manager at BFG.

Stiffness and, at the same time, lightweight and dimensional tolerances were not the only challenges the designers and architects had to cope with: the Arabian climate, with its extremely large variations in temperature, from sub-zero at night to  $+55^\circ\text{C}$  during the summer, in combination with wind and sand, required the use of very robust materials. ArmaForm provided enough temperature stability to manage these temperature changes.

As in all public buildings, safety was another key issue; the materials in use needed to comply with stringent fire, smoke and toxicity standards. External testing of the entire façade panels proved that ArmaForm complies in all relevant aspects of ASTM E84 (class A) and NFPA 285. ■

**Project:** Façade cladding KAFD World Trade Center

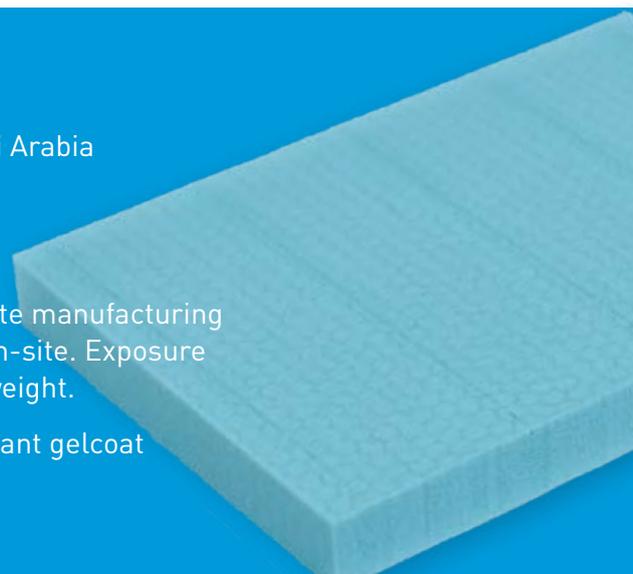
**Location:** King Abdullah Financial District, Riyadh, Kingdom of Saudi Arabia

**Architect:** Gensler

**Cladding:** BFG International, Bahrain

**Challenge:** The large variations in the geometry of the panels. Off-site manufacturing required tight dimensional tolerances to ensure smooth assembly on-site. Exposure to high-speed wind loads called for high structural strength at low weight.

**Solution:** Composite sandwich panels made of fibreglass/fire-retardant gelcoat polyester skins and cored with low-density ArmaForm of  $70 \text{ kg/m}^3$ .



All data and technical information are based on results achieved under typical application conditions. It is the customer's responsibility to verify if the product is suitable for the intended application. The responsibility for professional and correct installation and compliance with relevant building regulations lies with the customer. By ordering/receiving product you accept the Armacell General Terms and Conditions of Sale applicable in the region. Please request a copy if you have not received these.

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## ABOUT ARMACELL

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As the inventors of flexible foam for equipment insulation and a leading provider of engineered foams, Armacell develops innovative and safe thermal, acoustic and mechanical solutions that create sustainable value for its customers. Armacell's products significantly contribute to global energy efficiency making a difference around the world every day. With 3,100 employees and 24 production plants in 16 countries, the company operates two main businesses, Advanced Insulation and Engineered Foams. Armacell focuses on insulation materials for technical equipment, high-performance foams for high-tech and lightweight applications and next generation aerogel blanket technology.

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