

YEARS  
AHEAD

**permare® epw**

**WRAS**  
APPROVED  
PRODUCT

**Zamzam Water Tanks . Makkah Al Mukarramah . Saudi Arabia**

Client GRAND MOSQUES AUTHORITY

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Consultant DAR AL HANDASAH

Authorised Contractor ISSAM KABBANI PARTNERS & CO & SUW

Some 12,000m<sup>2</sup> of the high performance **Permare® EPW** tanking and lining membrane has been used to protect the holy Zamzam water tanks.

Located in Makkah - the world's holiest Muslim city, the sacred water from the well at Zamzam is offered to millions of pilgrims each year as they visit the grand mosques of both Makkah itself and Madinah. Demand is especially high during Ramadan and the haj holy festival. The water, which has been blessed for all humanity, flows endlessly and is famed for its healing properties.

The well's eight underground concrete water storage tanks required refurbishment following the failure of their existing sheet system. The failure had occurred in the joints between sections of the sheet and at details where complex angles required the system to be cut and bonded. This failure had allowed water penetration into the concrete, which if left untreated, would undermine the structural integrity of the tanks.

#### Meeting Client Requirements

Clients, the Grand Mosques Authority were looking for a Water Regulations Advisory Scheme (WRAS) approved coating system which was durable, seamless and liquid applied, to ensure effective detailing without any vulnerable joints. The system had to be easy to maintain, whilst not promoting the growth of aquatic micro-organisms. It was also vital that the chosen system would form a strong bond to the concrete substrate, so that should any unnoticed damage occur during maintenance in later years, it would remain localised and not allow water to spread underneath the membrane and cause greater damage.

Following a year long product study, in which **Permare® EPW** successfully met all the given criteria, and supported by its proven track record of successful applications throughout the Kingdom, the Grand Mosques Authority and Consulting Engineers Dar Al Handasah approved the system for use on this sensitive project.

Preparation of the substrate and application of the system was undertaken by experienced applicators Issam Kabbani & Co. Once they had shot blasted the concrete substrate, to thoroughly remove any contamination, including loose salt deposits, which could interfere with the system's bond to the substrate, the surface was evened out using grinders. The membrane was then applied to the concrete tanks using short-fleece rollers and brushes, in two coats to aid on-site quality control and ensure 100% integrity.



Application of membrane to underground reservoir

The use of **Permare® EPW** proved invaluable on this sensitive project. The **Permare® EPW** system's proven compatibility with potable water was essential and has helped ensure that the Zamzam water's unique flavour, chemical composition and curative properties are retained.

The system's tolerance of high temperatures, up to 55°C, and high humidity enabled the refurbishment to take place in July, one of the city's hottest months of the year, while its speed of application and cure allowed the vital storage tanks to be rapidly returned to service.

The Zamzam well has provided drinking water for millions of travelling pilgrims for many thousands of years. Stirling Lloyd are proud and honoured that the **Permare® EPW** system was selected for the important task of helping to protect and maintain the continued supply of this holy water. ■

Products in action

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