



Holy Mosque, the largest mosque in the world - Saudi Arabia

Only the best is good enough for the world's most holy Muslim location - the Holy Mosque, Makkah, Saudi Arabia, which has been using FlowCon valves continuously for the past 9 years.

FlowCon International started a long-term relationship with the Holy areas in Makkah in 2007 with the supply of PICVs used for the retrofit of Al Massa'a (Holy Mosque), Makkah. The initial supply has developed into an ongoing long-term supply and extended to cover numerous retrofits and expansion packages, which among others include: Shamiya'a, Between the Bridges, Haram and Piazza. In fact, the collaboration has been so successful that FlowCon International was even selected to supply valves for the holy ZamZam water distribution after meeting the extremely rigid requirements for origin, documentation and material usage.

The current Holy Mosque structure covers an area of 356,800m² (88.2 acres) including the outdoor and indoor praying spaces and is open at all times. The area can accommodate up to 820,000 worshippers during the Hajj.



Project configurations

FlowCon is the sole supplier of balancing valves and differential pressure control valves (DPCVs) to the Holy Mosque. The Al Massa'a project configurations alone are as per below:

Consultant: Dar Al Handaseh

Contractor: Advanced Vision Contracting

Project name: Al Massa'a (Holy Mosque), Makkah, Saudi Arabia

Configuration of building: AHUs in praying room and common areas

Number of valves: 184 FlowCon SM valves for air handling units

Valve model: FlowCon SM valves size DN25-DN125

Configuration: PICVs for cooling AHUs

Type of job/application: Retrofit and extension of existing building cooling

Date of installation: 2007 and continuously in all the years after that.

History of the Holy Mosque

The Mosque was built in the 7th century and has been modified, rebuilt, and expanded on a regular basis ever since. Major expansions took place in the 1980ies and further work is ongoing today.

Due to damaging rains in 1611, the Mosque was once again restored in 1629. It received a new stone arcade with slender columns and inscriptive medallions between the arches. The floor tiles around the Ka'ba were replaced with new coloured marble tiles and the Mosque was given seven minarets.

A major extension sponsored by King Fahd consisted of a new wing and an outdoor prayer area on the southeast side of the Mosque. In the two-story wing, air conditioning circulates below the tiled floor

are supplied through ventilation grids located at the base of each column. The facade of the extension blends in with the previous constructions, with grey marble facing from the Fatimah Mountains and carved white marble bands.

The building holds an integrated building management system including state-of-the-art heating, ventilation and air conditioning. As part of an agreement there should be used 27 multistage centrifugal chillers, which will make the expanded Mosque one of the more energy efficient tons structures of its kind. The 27 chillers use environmentally friendly R134A refrigerant and provide 135,000 tons of refrigeration capacity.

During the sales process, it was obviously that the project, being a holy site, had very restrictive requirements to the products as well as the vendor. These requirements were amongst others: **Origin, Serviceability, Performance, Reliability and Monitoring.** FlowCon International was one of the only companies capable of providing a complete package, and still meet the requirements.

Origin: All products were required to be 100% European/USA origin, including subcomponents. Materials for each process were required for documentation and to make sure it has the best quality. FlowCon International has delivered four dynamic valves to the district cooling installation which delivers 1200 l/sec each. They all supply the Mosque and are the biggest one ever installed.

Serviceability: The FlowCon International products supplied, are modular built and can be disassembled for service without removing the valves from the pipeline. Spare parts can furthermore be purchased and replaced by the local distributor MTTS or by staff from the FlowCon International office in Dubai. As only Muslims are allowed into Makkah service staff of Muslim faith were furthermore a requirement. Finally, all valves are supplied

with the unique actuator system allowing the same actuators to be installed on all SM valve sizes. This allowed training of on-site staff possible, minimizing spare parts and uniform the data input and output.

Performance: The SM valve has a $\pm 5\%$ accuracy, operates over a 2160° and holds 100% authority at all times making it the most accurate PICV in the world. The installation of these PICVs with VFD pumps versus the previous 3-way valves and constant speed pumps are estimated having saved more than 50% of the energy consumption. The valves installed can furthermore be programmed to follow a pre-defined sequence, allowing larger cooling load during for example religious festivals and prayers.



Reliability: The FlowCon SM valve has been installed in buildings globally for more than 10 years at the time of order, making it the most well proven PICV valve in the industry. The valves are furthermore close to industrial rating with PN40 pressure rating and IP54 rating for the electronics.

Monitoring: The valves installed featured a feedback function, which will allow the valve to perform self-diagnostics. In case of any issue, the valve can request service through this feature, before any effect is noticed/reported in the affected building.

FlowCon
international

A Griswold Controls LLC./FlowCon International Company

www.flowcon.com

DENMARK • DUBAI • USA • CHINA • SINGAPORE