



# World's tallest building stays cool with innovative ice-storage system

**Burj Khalifa, Dubai  
United Arab Emirates**

Alfa Laval plate heat exchangers were selected because of our vast experience in the district cooling market, our experience from applications in buildings of giant proportions and our well-established Middle East presence.  
Photo: Noel Lino Magpanta

The world's tallest building stays cool in the scorching desert sun thanks to an innovative thermal ice-storage system and Alfa Laval plate heat exchangers.

## **A first for everything**

There are not enough superlatives to describe the Burj Khalifa in Dubai, which, at 828 meters in height, is the tallest freestanding building in the world. The previous contender, Taipei 101, was 300 meters shorter. The Burj Khalifa opened in January 2010 after six years of construction at a cost of around USD 1.5 billion.

The 160-floor building includes the first Giorgio Armani designed hotel, offices, sports, shopping, dining, residential and entertainment facilities as well as the world's highest pool (on the 78th floor) and the world's highest mosque (on the 158th floor). The tower was built by a joint venture consisting of JV of Samsung BESIX and Arabtec for local Dubai developer Emaar Properties.

**Experience and quality**

Alfa Laval heat exchangers were selected for the HVAC, plumbing and swimming pool applications after an elaborate evaluation process.

This process took into account Alfa Laval’s extensive experience in the district cooling market, the high material quality of its products, the company’s well-established Middle East presence, and its experience from applications in buildings of giant proportions.

Under the scorching desert sun, with outside temperatures often reaching 50°C (122°F), Burj Khalifa requires massive air conditioning capacity. For this purpose, the complex has its own district cooling plant.

**Ice-storage saves energy and space**

The cooling system includes an innovative solution based on a thermal ice-storage facility that produces tons of ice slurry during off-peak hours (at night). Using Alfa Laval plate heat exchangers, the ice slurry, built up in a tank, store the cooling energy that is later released, through the pipelines, to the entire indoor air conditioning and tap water systems.

Apart from giving substantial energy savings, the ice storage solution also requires only a fraction of the space needed by conventional cooling equipment. In the case of the huge Burj Khalifa, this is a major consideration. The ice is used as adjunct during peak load hours and also provides backup security in the event of a daytime chiller failure.

**Plate heat exchangers installed**

Equipment used for general HVAC cooling:

- 3 installations of MX25-BFGS
- 3 installations of MX25-BFG
- 16 installations of MX25-BFD

Equipment used for the *pressure interceptor* application, where the static design pressures went as high as 34 bar. This is to meet a peak cooling load reaching up to 35 MW/hr:

- 8 installations of MX25-BFS

Equipment used for the *domestic water cooling* application in order to keep tap water at a comfortable temperature level during the torrid summer months:

- 5 installations of M10-BDFG

Equipment used for the dual *swimming pool heating/cooling* application, where pressure resistance requirements were high:

- 9 installations of plate heat exchangers models; T2, M3, T5, M6

The plate heat exchanger plate material is SS316 in all the units.



MX25-BFG

**Fast facts – Burj Khalifa**

**The customer** – Emaar Properties

**The task** – HVAC, plumbing and swimming pool applications in the world’s tallest building

**The challenge** – In a large scale system, even small energy losses along the distribution chain generate heavy annual costs and must therefore be kept at a minimum

**Products installed for air conditioning**

Plate heat exchangers MX25-BFG (3), MX25-BFD (24) and MX25-BFGS (3)

**Products installed for tap water cooling**

Plate heat exchangers M10-BDFG (5)

**Products installed for swimming pools**

Plate heat exchangers M6-FG (1), T2-BFG (2), T5-MFG (1), M6-MFG (1), M3-FG (1), M6-MFD (2)

Energy savings



Emissions savings



Cost savings



**How to contact Alfa Laval**

Up-to-date Alfa Laval contact details for all countries are always available on our website at [www.alfalaval.com](http://www.alfalaval.com)

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