OFFICES

United Arab Emirates

City: Abu Dhabi

System: Hydronic

Year: 2009

ALDAR HEADQUARTERS

Office building

Aldar Headquarters is the first round building in Middle East. Known as "The Big Seashell", it will host the headquarters of the biggest real estate company in Abu-Dhabi and of other very important multinational companies operating in the area.

The challenge

Aldar Headquarters is included in the Al Raha Beach Development, the developement project of over 14 billion dollars of the new urban district of Abu Dhabi. Designed by MZ & Partners Architects, Aldar Headquarters won the Best Futuristic Design award at the Exchange Building Conference in Valencia. The whole building looks like a large glass lens exposed to the Abu Dhabi desert climate with summer day temperature that can exceed 40° C. These challenging conditions and the high internal loads, make necessary the use of high performance and reliability air conditioning systems. The unusual architecture, a strong constraint since the project phase, has made impossible to use outdoor spaces for the equipment. For aesthetic and visual integration, just very small internal spaces have been dedicated to the service rooms. The contractor required also total quality of the air and maximum acoustic comfort. The big flexibility in the distribution of internal spaces would have been an awarding factor when selling the available surfaces. Aldar Headquarters has become a member of the prestigious U.S. Green Building Council, which certifies buildings designed according to rational use of energy and low environmental impact principles all over the world.

BUILDING

The building

» Lenticular building with aluminum and glass external walls

The size

» Total area 51.000 m^2
» Glass area more than 22.000 m^2
» Height 110 mi, 23 floors, 12 main lifts

TEAM

The team

» Developer Aldar / Laing O' Rouke (JV)
» Architectural design MZ&Partners, Quatar
» Technical and engineering direction ARUP / Conspel Emirates

SYSTEM

The System

» 17 Clivet AQ air handling units for over 1.200.000 m^3/h handled air
» Over 80 Clivet hydronic ductable terminal units for perimeter and service areas
» Connection to district cooling system through exchanger

The solution

The air conditioning system adopted is an hydronic system. The requie cooling capacity is provided by the district cooling network provided by Tabreed and serves the entire building. It is based on eight production plants and two independent networks which distribute the chilled water. Through specific heat exchangers, every building of the network takes the frigorific Energy from the chilled water network and send it to its terminal units. Aldar Headquarters uses very big hydronic air handling units for the air conditioning of all central and perimeter areas. All machines are placed in two separated areas on the first twenty-second floor. Each unit can handle up to 80,000 cubic meters of air, filtering, cooling and dehumidifying the fresh and return air according to the different areas needs. The variable airflow type (VAV) distribution system is controlled by a supervision system through inverter. The remaining back-of-house areas are served by over 80 hydronic fan coil units installed in the ceiling. The whole system is predisposed to provide supplementary chilled water, fresh air and exhaust system in order to be adapted to further individual needs.

The results

Thanks to the design choices, the air conditioning system is invisible from the outside and fully integrated into the architecture.
Despite the high performance requested to the air handling units and their consequent large size, the air handling units perfectly fitted to the small technical available spaces. Their modularity and to the technical and the constructive solutions adopted for a proper maintenance made it possible. Also the remaining smaller terminal units have been hidden from the view thanks to their installation in the ceiling with air distribution through ducts. The panels used on air handling units are equipped with thermal and acoustic insulation of 50 mm. This allowed the noise level and energy losses reduction. This is a decisive solution to achieve the quality standards required by the U.S. Green Building Council.