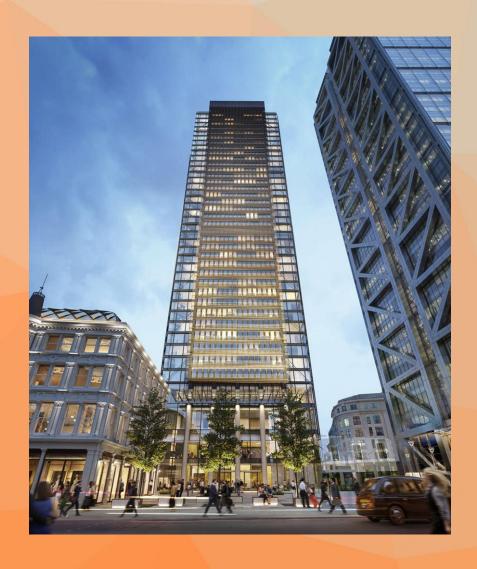


## **Case Study**

# One Bishopsgate Plaza, London







#### Introduction

One Bishopsgate Plaza is a mixed-use building that, in addition to an iconic hotel, incorporates, commercial, retail and residential spaces. It is located on Bishopsgate in London, opposite Liverpool Street station.

Such a prestigious development was to incorporate the latest technologies in the Mechanical & Electrical Services for it to achieve the best 'Green' credentials possible. The M&E consultant was WSP London who worked closely with the services contractor, GBE Services London.

## **Energy Recovery**

Buildings such as this will, despite the best design approaches, generate substantial internal gains from both occupancy, equipment use and solar radiation. These gains result in an increase in temperature, making the environment uncomfortable and therefore must be controlled. Such prestigious accommodation cannot tolerate poor internal environments. The first step on the environmental path is to minimise these gains by clever building design, although, it is not possible to eliminate all of them.

The traditional approach is to remove these surplus gains using a water-based cooling system, with the surplus energy being dissipated to the atmosphere. Such an approach is contrary to green credentials and a much superior answer would be to find a use for this surplus energy.

Within the complex is a Hotel and this, as well as the apartments and offices will have a year round requirement for domestic hot water. This water has to be stored at temperatures in excess of 60°C to prevent Legionella growth. Such temperatures are in excess of those used in the cooling system and therefore the hot water is produced using fossil fuel boilers. However, developments in heat pump technology have resulted in products being available that can use relatively warm source temperatures to generate water at temperatures up to 78°C. Such heat pumps can replace the fossil fuel boilers.



## Bishopsgate Plaza - Specific Design

At Bishopsgate Plaza, the cooling was to be performed by water cooled chillers that are located in the basement. The condenser water is designed to operate at 36°C, running to dry coolers on the roof and returning to the basement at 31°C.

A tapping was taken of the condenser water circuit to provide a supply of water at 36°C to two WHK, high temperature, water to water heat pumps. Using this source of energy, the two heat pumps can generate water at 75°C which is used, via a plate heat exchanger to generate the DHW for the building. Each heat pump has a capacity of 200 kW, giving a total DHW generation capacity of 440 kW. The Coefficient of Performance of the units, operating at these conditions, is 3.86.

A requirement of the client was that the units should be witness tested by the consultant and the contractor and this was performed in Hidros's factory in February 2019. On the following page is a copy of one of the test reports that confirm the temperatures achieved.



## **Summary**

**Building – Mixed use Hotel, commercial, retail and residential** 

**M&E Design – WSP London** 

**M&E Contractor – GBE Services London** 

Site maintained by Integral FM

Commissioned – 6<sup>th</sup> November 2020.

#### **Hidros UK Ltd**





#### CHILLER FINAL TEST REPORT

Value readings and checklist 36 DegC TEST

Mod. 10\_02

General informations Unit serial number Refrigerant Charge Voltage: R134a WHK 1402 233544 Chiller Heat Pump Refrigerant circuit UUML A Evaporating Press. Barg 6.0 B Evap. Temp. Dew/bubble press T 26.7 C Condensing Press. 21.5 D Cond. temp. Dew/bubble press Ť 73 E Suction Temperature τ 26.8 Disoharge Temperature 90.5 91.3 G Liquid Temperature 67.5 H Superheating ĸ 9.0 1 Subcooling ĸ Heat Pump Hydraulic circuit UUML Chiller User water inlet temp. 68.2 τ User water outlet temp. 75.2 Ť User water flow 27.0 m3/h User side capacity KW. 220.0 Source Inlet water temp. τ 35.1 Source outlet water temp. ĸ 31.4 Source water flow m3/h 37.2 kW Source side capacity 203.98 Т Ü ٧ Z Heat Pump Chiller UUML A2 A3 A2 Compressor absorption 1 A 45.9 46.8 45.2 Compressor absorption 2 49.0 49.8 Á 48.9 Compressor absorption 3 A Compressor absorption 4 Á Compressor absorption 5 A Compressor absorption 6 A Fans absorption Ä Pump absorption 1 Ā Pump absorption 2 Á Antifreeze kit absorption Á 95.7 Total unit absorption Á Unit absorbed power kw. 57.12 Voltage ٧ 391.6 Auxiliar voltage v Instruments used Remarks Power Factor Measured - 0.88 Client GBE - Ife Aderoba Client WSP - David Bownass Acoustic Test: Sound Pressure level @ 1m = 68 dB(A) Tester name Textor Sortal n. Date Luca Pilosio 19/02/2019







