



Case Study

One Bishopsgate Plaza, London



Hidros UK Ltd

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Management System
ISO 9001:2015
ISO 14001:2015
ISO 45001:2018



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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.

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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 – 6th November 2020.

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General information

Unit serial number	Model	Refrigerant	Charge	Voltage
233544	WHK 1402	R134a		

Refrigerant circuit	U.M.	Chiller			Heat Pump		
		C1	C2		C1	C2	
A Evaporating Press.	Barg				6.0		
B Evap. Temp. Dew/bubble press	°C				26.7		
C Condensing Press.	Barg				21.5		
D Cond. temp. Dew/bubble press.	°C				73		
E Suction Temperature	°C				26.8		
F Discharge Temperature	°C				90.5	91.3	
G Liquid Temperature	°C				67.5		
H Superheating	K				9.0		
I Subcooling	K						
Hydraulic circuit	U.M.	Chiller			Heat Pump		
L User water inlet temp.	°C				68.2		
M User water outlet temp.	°C				75.2		
N User water flow	m ³ /h				27.0		
O User side capacity	KW				220.0		
P Source Inlet water temp.	°C				36.1		
Q Source outlet water temp.	°C				31.4		
R Source water flow	m ³ /h				37.2		
S Source side capacity	KW				203.98		
T -							
U -							
V -							
Z -							
Electrical circuit	U.M.	Chiller			Heat Pump		
		A1	A2	A3	A1	A2	A3
Compressor absorption 1	A				45.9	46.8	46.2
Compressor absorption 2	A				49.0	49.8	48.9
Compressor absorption 3	A						
Compressor absorption 4	A						
Compressor absorption 5	A						
Compressor absorption 6	A						
Fans absorption	A						
Pump absorption 1	A						
Pump absorption 2	A						
Antifreeze kit absorption	A						
Total unit absorption	A					95.7	
Unit absorbed power	KW					57.12	
Voltage	V					391.6	
Auxiliar voltage	V						

Instruments used	Remarks	
Client GBE - Ite Aderoba Client WSP - David Bownass	Power Factor Measured = 0.88 SCOP = 3.86 Acoustic Test: Sound Pressure level @ 1m = 68 dB(A)	
Tester name	Tester Serial n.	Date
Luca Pilloso		19/02/2019

