



Heat pump

L731737 Patel

Kamal Patel
123 Barton Lane

Property Details

Year built

Post 2006

Design Data

Outside Design Temp – ODT (°C)

-4

Degree Days (DD)

2425

Mean air temp – MAT (°C)

9.8

Altitude (m)

130

Building Requirements

Space Heating load (W)

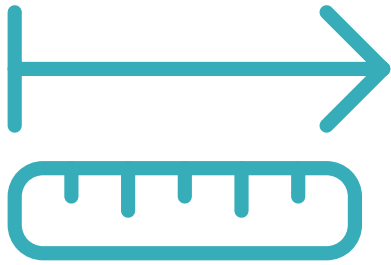
8448

Total area of building (m²)

324.02

Average Watts per metre square (W/m²) heat loss

26



Survey

Materials

Windows



PVC Double Glazed, low-E glass

U-value: 2.3

Doors



PVC-U door double glazed

U-value: 2.8

Radiators



Milano 1.6 x 472 K2



Milano 1.6 x 354 K2



Milano .6 x .6 K1



Milano 1.6 x 230 K2



Milano HTR

External walls



Cavity wall

U-value: 0.24

Internal walls



Plaster 13mm, brick 102.5mm, plaster 13mm

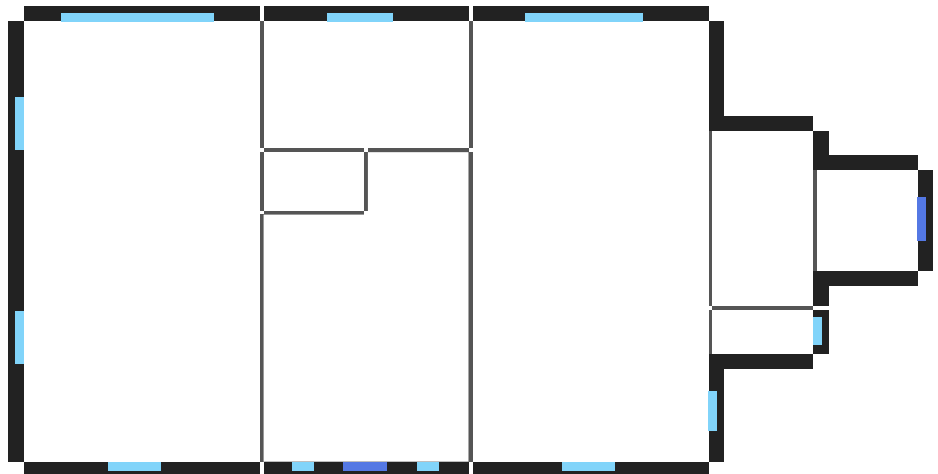
U-value: 1.76

Floor

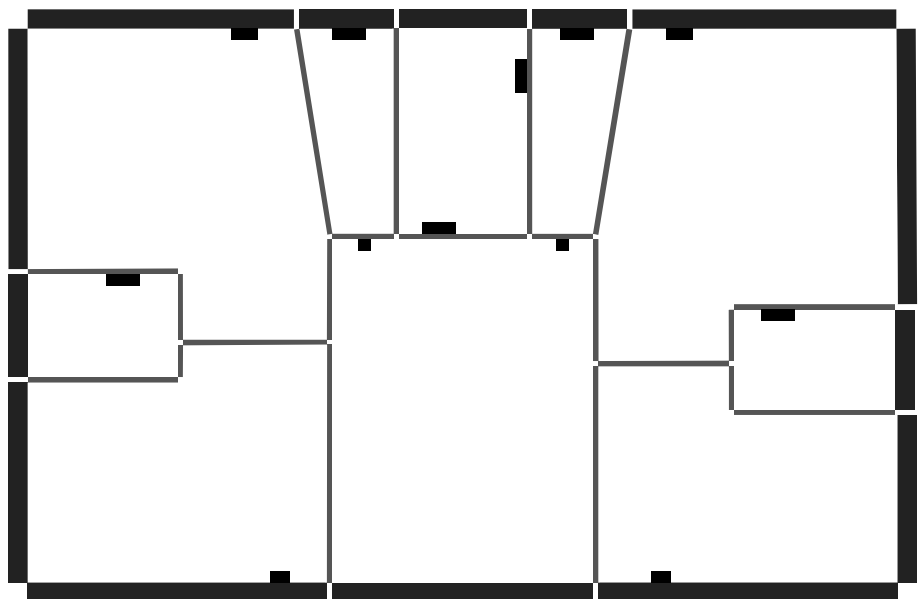


Solid floor with 100mm of insulation

Ground floor



First floor



Intermediate floors



Intermediate floors, boarding 19mm,
airspace between joists, 9.5mm
plasterboard

U-value: 1.41

Roof



Pitched roof - Slates or tiles, sarking felt,
ventilated air space, 300mm insulation
between joists, 9.5 mm plasterboard

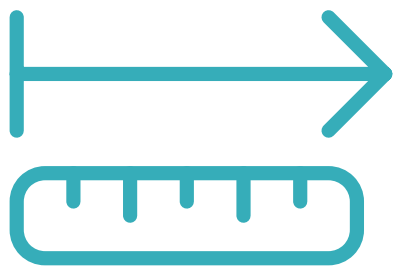
U-value: 0.12

Roof Glazing



Metal Double Glazed, low-E glass

U-value: 2.8



Room by room

Ground floor

Kitchen



Design temp: **18°C**
Air changes: **1.5/hr**
Area: **54.54 m²**
Heat loss: **2359 W**,
43 W/m²



Underfloor

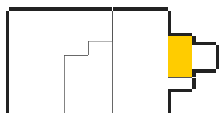
54.54m²
44 W/m², 2399 W

New

The expected heat loss is met.



Utility



Design temp: **18°C**
Air changes: **0.5/hr**
Area: **9.20 m²**
Heat loss: **351 W**,
38 W/m²



Underfloor

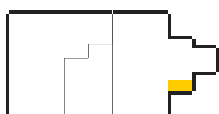
9.20m²
39 W/m², 358 W

New

The expected heat loss is met.



Store

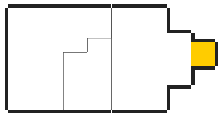


Design temp: **12°C**
Air changes: **0.5/hr**
Area: **2.30 m²**
Heat loss: **-10 W**,
-5 W/m²

The expected heat loss is met.



Hall - Porch

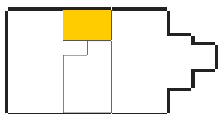


Design temp: **5°C**
Air changes: **0.5/hr**
Area: **5.29 m²**
Heat loss: **-23 W,**
-4 W/m²

The expected heat loss is met.



Family



Design temp: **21°C**
Air changes: **0.5/hr**
Area: **13.63 m²**
Heat loss: **601 W,**
44 W/m²



Underfloor

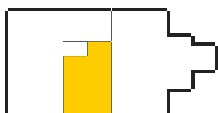
13.63m²
50 W/m², 681 W

New

The expected heat loss is met.



Hall



Design temp: **18°C**
Air changes: **0.5/hr**
Area: **29.94 m²**
Heat loss: **467 W,**
16 W/m²



Underfloor

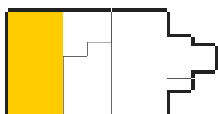
29.94m²
20 W/m², 598 W

New

The expected heat loss is met.



Living room



Design temp: **21°C**
Air changes: **0.5/hr**
Area: **54.54 m²**
Heat loss: **2229 W,**
41 W/m²



Underfloor

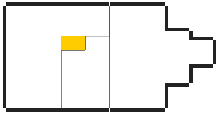
54.54m²
45 W/m², 2454 W

New

The expected heat loss is met.



Toilet



Design temp: **18°C**
Air changes: **1.5/hr**
Area: **3.05 m²**

Heat loss: **42 W**,
14 W/m²



Underfloor

3.05m²
15 W/m², 45 W

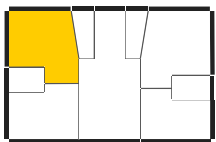
New

The expected heat loss is met.



First floor

Bedroom 2



Design temp: **18°C**
Air changes: **0.5/hr**
Area: **25.62 m²**

Heat loss: **298 W**,
12 W/m²



Milan

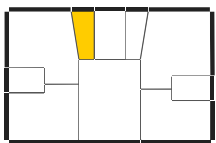
472 x 1600 mm
Output at 48°C, 544 W

As surveyed

The expected heat loss is met.



Dressing



Design temp: **18°C**
Air changes: **0.5/hr**
Area: **5.19 m²**

Heat loss: **47 W**,
9 W/m²



Milan

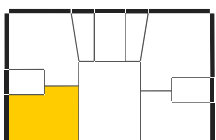
600 x 600 mm
Output at 48°C, 191 W

As surveyed

The expected heat loss is met.



Bedroom 3



Design temp: **18°C**
Air changes: **0.5/hr**
Area: **21.27 m²**

Heat loss: **265 W**,
12 W/m²



Milan

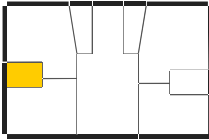
354 x 1600 mm
Output at 48°C, 408 W

As surveyed

The expected heat loss is met.



Shower



Design temp: **18°C**
Air changes: **1.5/hr**
Area: **5.00 m²**

Heat loss: **146 W**,
29 W/m²



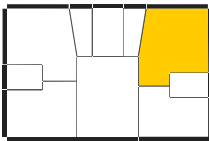
Milan 600 x 1200 mm
Output at 48°C, 177 W

As surveyed

The expected heat loss is met.



Bedroom 1



Design temp: **18°C**
Air changes: **0.5/hr**
Area: **28.04 m²**

Heat loss: **441 W**,
16 W/m²



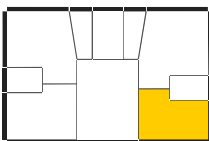
Milan 472 x 1600 mm
Output at 48°C, 544 W

As surveyed

The expected heat loss is met.



Bedroom 4



Design temp: **18°C**
Air changes: **0.5/hr**
Area: **18.40 m²**

Heat loss: **315 W**,
17 W/m²



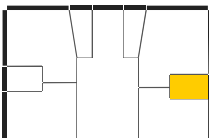
Milan 354 x 1600 mm
Output at 48°C, 408 W

As surveyed

The expected heat loss is met.



Shower 2



Design temp: **18°C**
Air changes: **1.5/hr**
Area: **5.22 m²**

Heat loss: **173 W**,
33 W/m²



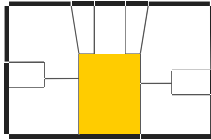
Milan 600 x 1200 mm
Output at 48°C, 177 W

As surveyed

The expected heat loss is met.



Landing



Design temp: **18°C**
Air changes: **0.5/hr**
Area: **29.11 m²**

Heat loss: **380 W**,
13 W/m²



Milan 230 x 1600 mm
Output at 48°C, 281 W

As surveyed



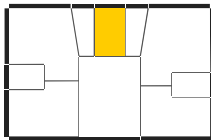
Milan 230 x 1600 mm
Output at 48°C, 281 W

As surveyed

The expected heat loss is met.



Bath



Design temp: **19°C**
Air changes: **1.5/hr**
Area: **8.51 m²**

Heat loss: **311 W**,
37 W/m²



Milan 600 x 1200 mm
Output at 48°C, 168 W

As surveyed



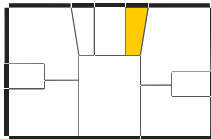
Milan 600 x 1200 mm
Output at 48°C, 168 W

As surveyed

The expected heat loss is met.



Dressing 2



Design temp: **18°C**
Air changes: **0.5/hr**
Area: **5.17 m²**

Heat loss: **51 W**,
10 W/m²

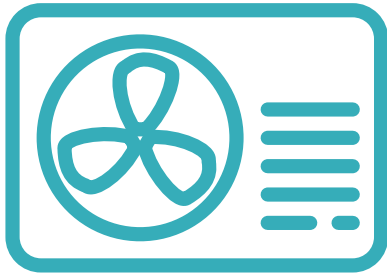


Milan 600 x 600 mm
Output at 48°C, 191 W

As surveyed

The expected heat loss is met.





Heat pump

Vaillant aroTHERM plus 10

Model: 0010037214

Specifications

ENA registration number	0010037214
Proposed flow temperature	48 °C
Nominal output	10.00 kW
Actual output at 48 °C	9.49 kW
Heating SCOP at 48 °C	3.96
Sound power level	60.0 dB



Heat pump sizing

The heat pump is sufficiently large to meet the maximum anticipated space heating demand.

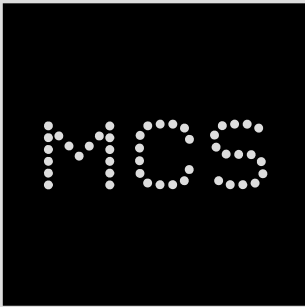




Sound level check

MCS020 sound level calculation

1. Sound power level (dB)	60.0
2. Sound pressure level (dB)	Q8 (three reflective surfaces)
3. Distance from heat pump to assessment position (meters)	58
4. dB Distance Reduction	-31
5. Barriers Between heat pump and assessment position	Visible
6. Sound pressure level @ assessment position (dB)	29
7. Background noise level (dB)	40
8. Differential between 6. & 7.	11
9. Decibel Correction (dB)	0.3
10. Final Result (dB)	41



The sound check assesses how much sound from the heat pump will be transmitted to neighbouring properties. If the likely sound level is less than 42dB then the installation can usually proceed without a planning application under the 'permitted development' rules.

Full details on the method used can be found in the MCS020 document on the MCS website.



Sound check

The max sound pressure at the assessment position is expected to be within the permitted development threshold of 42dB. A planning application is not required.





Performance Estimate

Flow Temp SCoP

35°C	5.03
36°C	4.94
37°C	4.85
38°C	4.76
39°C	4.67
40°C	4.58
41°C	4.49
42°C	4.40
43°C	4.31
44°C	4.22
45°C	4.13
46°C	4.07
47°C	4.02
48°C	3.96
49°C	3.91
50°C	3.85
51°C	3.80
52°C	3.74
53°C	3.69
54°C	3.63
55°C	3.58
56°C	0.00
57°C	0.00
58°C	0.00
59°C	0.00
60°C	0.00
61°C	0.00
62°C	0.00
63°C	0.00
64°C	0.00
65°C	0.00

Project Details

Installer Project Reference	L731737 Patel
Client	Kamal Patel
Installation Address	123 Barton Lane
Installation Postcode	CV13 0PY

Energy Performance Certificate (EPC) information

Does this estimate relate to a new build or proposal for extension or reduction in size of an existing building?	Yes
EPC Number	1810-0032-3009-0599-3206
Energy required to heat property	10978 kWh
Energy required for hot water	2478 kWh

New Renewable System Information

Type of Heat Pump System	Air Source Heat Pump
Manufacturer Name	Vaillant (mono)
Manufacturer Model	0010037214
MCS Certification Number	1234
Flow Temperature	48°C
MCS SCOP Heating	3.96
MCS SCOP Hot Water	1.75
Renewable System Provides	Heating and Hot Water
Hot Water Immersion Use	None
Size of Hot Water Cylinder	300ltr

Existing Heating system

Existing heating system fuel	Oil
Hot Water heated by	Oil
Age of existing system	Post-2007
Efficiency of existing system	90%

Estimated System Performance / Comparison

Energy Requirement For The Building

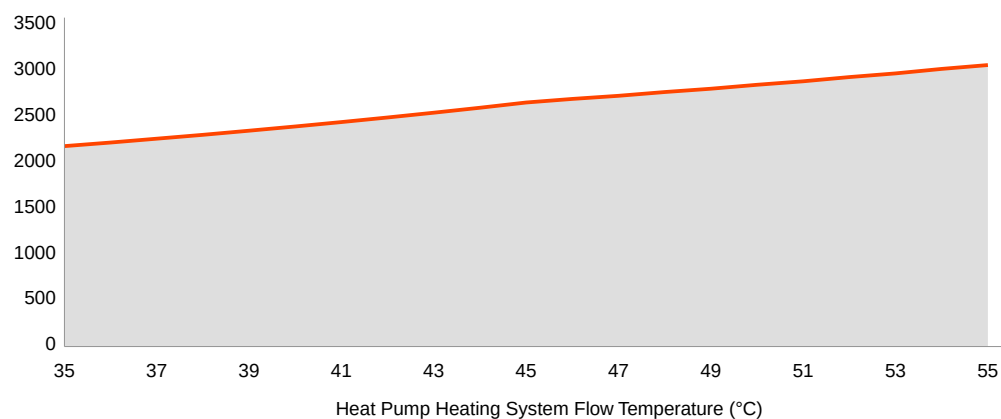
	Heating	Hot Water	Total	
Net energy required to heat property	10978	2478	13456	kWh
Existing system consumption	12198	3059	15257	kWh

New Heat Pump System Estimated Consumption

Full Heat Pump System

	Heating	Hot Water	Total	
Full Heat Pump System	2772	1416	4188	kWh

Electricity Consumption of Proposed Heat Pump for Space Heating versus Flow Temperature



SCoP = Seasonal Coefficient of Performance:

MCS SCoP is a theoretical indication of the anticipated efficiency of a heat pump aggregated over a year using standard climate data across Europe. It indicates the units of total heat energy generated (output) for each unit of energy (electricity) consumed (input). It is slightly different to ErP SCoP as it contains efficiency losses due to controls and brine pumps (for a GSHP). As a guide a heat pump with a MCS SCoP of 3 generates 3 kWh of heat energy for every 1 kWh of electrical energy it consumes.

This also means that 2/3rds of the heat output could be eligible for RHI payments. MCS SCoP is based on stringent factory based tests for equipment but does not specifically include the energy consumption of heating circulating pump(s) nor does it model the transient conditions typically experienced in practice in the consumers home and hence the overall final system efficiency is likely to be different from the MCS SCoP.

Important Information

This performance estimate should be accompanied by the Key Facts which explain the factors that can affect the performance of a heat pump.

Any technical variation to the specification could affect the performance of the Heat Pump System in which case the MCS Contractor MUST update and re-issue this document and advise the customer of their Consumer Rights.