

11/01/2024

Heat Loss Report

Project Reference: Flat 1 327 Archway Road N6 5AA

Heating Type: ASHP

Installation Address

, Client

Flat 1a

327 Archway Road

London

N6 5aa

This report has been completed by AIRA, Unit P, Acorn Estate, 0330 822 5493



The methods used in these calculations are from the Chartered Institution of Building Services Engineers (CIBSE) The Domestic Heating Design Guide 2014 and EN 12831. The UK standards for MCS MIS 3005 and MIS 3004 have also been met ensuring heat pumps and Biomass calculations can be presented.

It's important for the relevant persons to read this report and notify AIRA of any corrections that need to be made before the heating system is installed. AIRA is not liable for any inaccurate calculations made due to incorrect information, therefore it's important that the information provided is to the best knowledge available from the home owner, architect or builder.

11/01/2024

Heat Loss Report

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Appendix A

Summary of Results

When the external temperature is -2.4°C

The total heat source required to heat the building must provide an output of 4.09 kW

Heating Type: ASHP

Manufacture: Vaillant UK

Model: aroTHERM Plus 5kW

Output at designed external temperature: 5.8 kW

Maximum designed flow temperature: 45°C

Worst Performing Room

Room name: Bathroom 1

Floor Area: 3.57 m²

Power demand: 494.85 watts

Specific room heat loss: 138.61 W/m²

Emitter type: Standard Radiators

Seasonal Performance Factor (SPF): 3.77

Temperature Star Rating: ****

Calculated Energy using Degree Day Data: The energy calculation method is worst case scenario, therefore assuming all rooms to be heated to their designed temperatures throughout the heating season. Of course most people don't use all the rooms and don't have the heating on within all rooms throughout a year at maximum. As a result, the calculated energy figure can be overestimated, therefore running costs may be higher with this calculation than actual.

Appendix B

Room Features

Number of rooms: 5 and total floor area: 47.96 m²
Approx location (Degree Day): Thames Valley (Heathrow)
Approx City (Ext Temp): London -1.8C
Altitude adjustment 101.88 metres
Ground Temperature 11.3C
Outside Temperature -2.41C
Degree Day Data 2033
Is property > 2006? NO
If property has thermal bridging? NO
Does the building have MVHR? NO

Room Names	Designed Temperature	Fireplace	Throat restriction	Year room was built	Air Changes Per Hour	Exposed Location	Intermittent Heating	Vaulted Ceiling?	Vaulted Ceiling Type	Room Below	Room Above	Emitter Type
Kitchen	18	NO	NO	1890	2	NO	NO	NO	-	None	Room at 18C	Standard Radiators
Hall	18	NO	NO	1890	1.5	NO	NO	NO	-	None	Room at 18C	Standard Radiators
Landing	18	NO	NO	1890	1.5	NO	NO	NO	-	None	Neighbouring Property	Standard Radiators
Bathroom 1	22	NO	NO	1890	2	NO	NO	NO	-	None	Neighbouring Property	Standard Radiators
Bedroom 1	18	NO	NO	1890	1	NO	NO	NO	-	None	Neighbouring Property	Standard Radiators

Appendix C

Room Dimensions

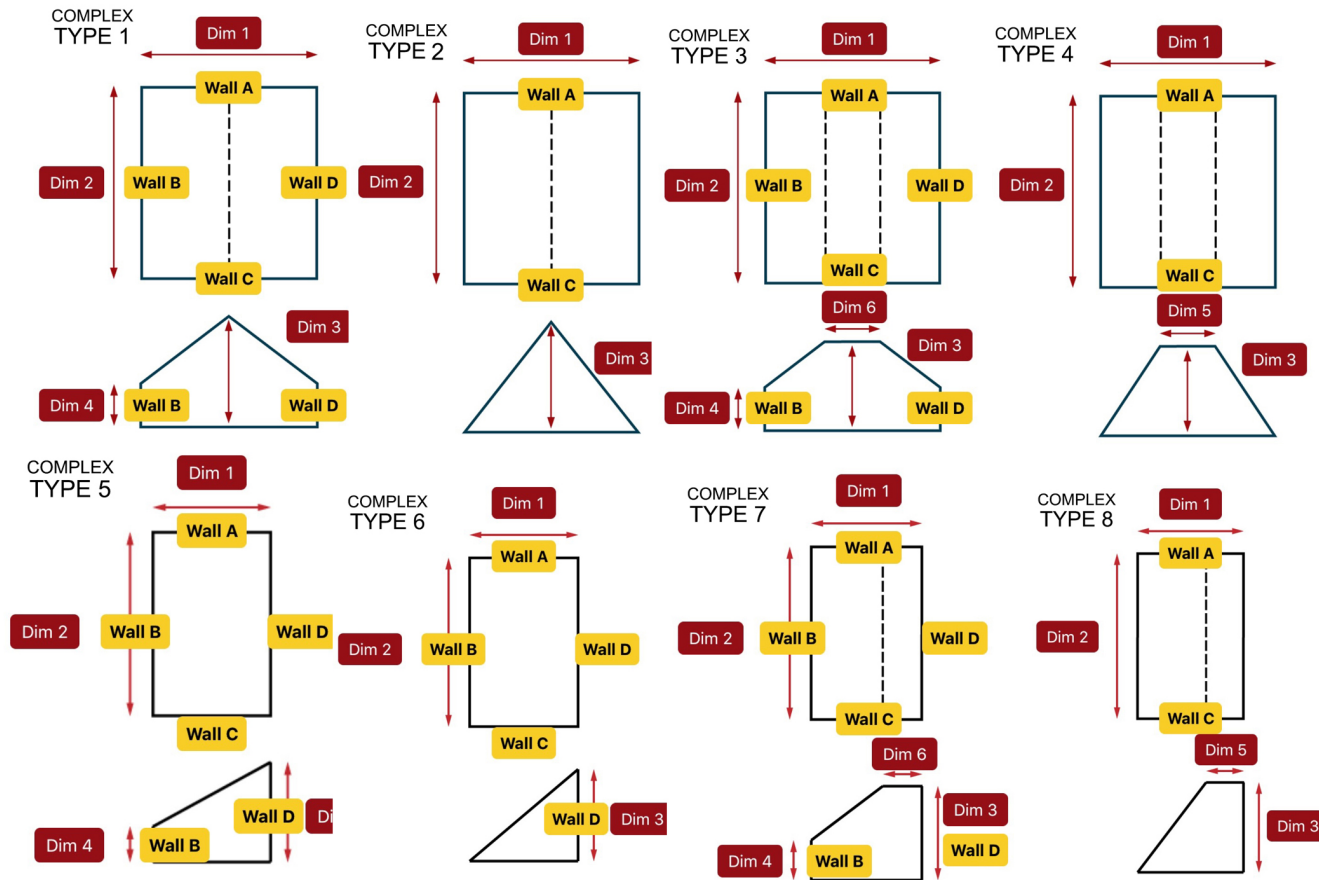
Room Names	Floor Areas m²	Room Height m	External wall(Type A) m	External wall(Type B) m	Window (Type A) m²	Window (Type B) m²	Internal Wall m	Party wall m	External Door Area m²	Roof Glazing Area m²	Lowest Parallel room temp	High ceiling % increase
Kitchen	23.100	3.81	3.35	0	3.560	0	3.62	14.1	2.100	0	18°C	0
Hall	3.220	2.31	0	0	0	0	8.25	0	0	0	18°C	0
Landing	6.650	2.64	1.48	0	1.120	0	4.15	3.05	0	0	18°C	0
Bathroom 1	3.570	2.58	1.45	0	0.530	0	6.38	0	0	0	18°C	0
Bedroom 1	11.420	2.64	6.89	0	3.930	0	3.53	3.38	0	0	18°C	0

Appendix D

Vaulted Rooms

Room Names	Vaulted Room Type	Dimensions						Wall Type or Roof			
		Dim 1	Dim 2	Dim 3	Dim 4	Dim 5	Dim 6	Wall A	Wall B	Wall C	Wall D
Kitchen	-	0	0	0	0	0	0	-	-	-	-
Hall	-	0	0	0	0	0	0	-	-	-	-
Landing	-	0	0	0	0	0	0	-	-	-	-
Bathroom 1	-	0	0	0	0	0	0	-	-	-	-
Bedroom 1	-	0	0	0	0	0	0	-	-	-	-

Complex Room Types



Appendix E

External Walls

Room Names	External Wall (A)	External Wall (B)	Internal Wall	Party Wall
Kitchen	solid brick wall, dense plaster (1.25)	-	Plaster, Brick 102.5mm, Plaster (1.76)	solid brick wall, 50mm sound proofing, dense plaster 12mm (0.6)
Hall	solid brick wall, dense plaster (1.25)	-	Plaster, Brick 102.5mm, Plaster (1.76)	solid brick wall, 50mm sound proofing, dense plaster 12mm (0.6)
Landing	solid brick wall, dense plaster (1.25)	-	Plaster, Brick 102.5mm, Plaster (1.76)	solid brick wall, 50mm sound proofing, dense plaster 12mm (0.6)
Bathroom 1	solid brick wall, dense plaster (1.25)	-	Plaster, Brick 102.5mm, Plaster (1.76)	solid brick wall, 50mm sound proofing, dense plaster 12mm (0.6)
Bedroom 1	solid brick wall, dense plaster (1.25)	-	Plaster, Brick 102.5mm, Plaster (1.76)	solid brick wall, 50mm sound proofing, dense plaster 12mm (0.6)

Appendix F

Internal and Party walls, Windows and doors

Room Names	Window Type (A)	Window Type (B)	Roof Glazing	Door
Kitchen	Standard Double Glazing Wood/PVC frame (2.8)	-	-	High Quality Door 50% glazing (2.2)
Hall	-	-	-	-
Landing	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Bathroom 1	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Bedroom 1	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-

Appendix G

Floors, Ceilings and Roof

Room Names	Floor	Roof or Ceiling
Kitchen	Ground Floor 50mm Insulation (0.43)	Party Floor Concrete without insulation (1.82)
Hall	Ground Floor 50mm Insulation (0.43)	Party Floor Concrete without insulation (1.82)
Landing	Ground Floor 50mm Insulation (0.43)	Party Floor Concrete without insulation (1.82)
Bathroom 1	Ground Floor 50mm Insulation (0.43)	Party Floor Concrete without insulation (1.82)
Bedroom 1	Ground Floor 50mm Insulation (0.43)	Party Floor Concrete without insulation (1.82)

Appendix H

Review of Heat Loss Part 1

Room Names	W/m ²	Floor (watts)	External wall Type A (watts)	External wall Type B (watts)	Window Type A (watts)	Window Type B (watts)	Internal Wall (watts)	Party Wall (watts)	External Door (watts)	Roof Glazing (watts)	Roof or Ceiling (watts)
Kitchen	86.66	79.46	181.23	0	203.45	0	0	257.86	94.29	0	0
Hall	26.79	11.08	0	0	0	0	0	0	0	0	0
Landing	70.8	22.88	71.11	0	64.01	0	0	38.65	0	0	96.82
Bathroom 1	138.61	18.42	97.98	0	36.22	0	115.88	0	0	0	77.97
Bedroom 1	91.06	39.28	363.8	0	224.59	0	0	42.83	0	0	166.28

Review of Heat Loss Part 2

Room Names	High Ceiling Increase (watts)	Amount of Air Heated per hour (m ³ /hour)	Ventilation (watts)	Exposed Location (watts)	Intermittent Heating (watts)	Thermal Bridges (watts)	Total Watts	Total kWh
Kitchen	0	176.02	1185.55	0	0	0	2001.84	4591.91
Hall	0	11.16	75.17	0	0	0	86.25	247.25
Landing	0	26.33	177.34	0	0	0	470.81	886.47
Bathroom 1	0	18.42	148.38	0	0	0	494.85	639.74
Bedroom 1	0	30.15	203.07	0	0	0	1039.85	2131.66

Appendix I

Summary of U values (W/m²K) Part 1

Room Names	Floor	External Wall Type A	External Wall Type B	Window Type A	Window Type B	Internal Wall	Party Wall	External Door
Kitchen	0.43	1.25	0	2.8	0	1.76	0.6	2.2
Hall	0.43	1.25	0	0	0	1.76	0.6	0
Landing	0.43	1.25	0	2.8	0	1.76	0.6	0
Bathroom 1	0.43	1.25	0	2.8	0	1.76	0.6	0
Bedroom 1	0.43	1.25	0	2.8	0	1.76	0.6	0

Summary of U values (W/m²K) Part 2

Room Names	Roof Glazing	Roof or Ceiling	Exposed Location	Intermittent Heating	Thermal Bridges	Room Temp Below (If none then average Ground temp)	Room Temp Above (through Ceiling or Roof)
Kitchen	0	1.82	0	0	0	10	18.00
Hall	0	1.82	0	0	0	10	18.00
Landing	0	1.82	0	0	0	10	10.00
Bathroom 1	0	1.82	0	0	0	10	10.00
Bedroom 1	0	1.82	0	0	0	10	10.00

Appendix J

DHW (Domestic Hot Water)

Number of bedrooms: 1
Number of occupants per bedroom: 1
Flow temperature for hot water (DHW): 55 °C (55 for heat pump others 70)
Hot water per occupant: 45 litres (if heat pump use 45, if other use 35)
η efficiency pipework loss to cylinder: 95 %
Electricity Cost: 37 pence per kWh
SHC Water: 4187 J/kgK
J to kWh: 3600000
water mains input temp: 10 C
kg to litres water: 1
Hot water energy demand per day: 5 kWh

OIL RESULTS

Oil hot water demand per day 7 kWh
Annual Demand 2555 kWh

LPG RESULTS

LPG hot water demand per day 7 kWh
Annual Demand 2555 kWh

DIRECT ELECTRIC RESULTS

Electric hot water demand per day 7 kWh
Annual Demand 2555 kWh

MAIN GAS RESULTS

Main gas hot water demand per day 7 kWh
Annual Demand 2555 kWh

Appendix K

Emitters and Performance

Room Names	Type of Emitter	Current Emitter watts (70°C)	Current Rad Oversize %	Flow Temperature °C	W/m²	Room Heat Loss watts	Oversize Factor based on heat pump flow temp	MCS Heat emitter guide watts1	Underfloor Heating Details			Likely SPF	Star Rating
									Floor Type	Floor Surface	Max Pipe Spacing	ASHP	
Kitchen	Standard Radiators	2112	-65.97%	45	86.66	2001.84	3.1	6205.7	0	0	N/A	3.77	****
Hall	Standard Radiators	0	-%	45	26.79	86.25	3.1	267.38	0	0	N/A	3.77	****
Landing	Standard Radiators	0	-%	45	70.8	470.81	3.1	1459.51	0	0	N/A	3.77	****
Bathroom 1	Standard Radiators	379	-75.29%	45	138.61	494.85	3.1	1534.04	0	0	N/A	3.77	****
Bedroom 1	Standard Radiators	880	-72.7%	45	91.06	1039.85	3.1	3223.53	0	0	N/A	3.77	****

Appendix L

Current Radiators

Room Temperature °C	Room Names	Radiator Type	Height (mm)	Length (mm)	Output at 50K MW-Air delta T	Mean (Flow/Return) Water Temperature and Outputs					
					70°C Watts	35°C Output Watts	40°C Output Watts	45°C Output Watts	50°C Output Watts	55°C Output Watts	60°C Output Watts
18	Kitchen	K2	600	1200	2112	520	726	948	1182	1428	1684
				Total Output:	2112	520	726	948	1182	1428	1684
18	Hall	-	-	-	-	-	-	-	-	-	-
				Total Output:	-	-	-	-	-	-	-
18	Landing	-	-	-	-	-	-	-	-	-	-
				Total Output:	-	-	-	-	-	-	-
22	Bathroom 1	Towel Rails straight chrome	1211	500	379	66	100	138	178	221	265
				Total Output:	379	66	100	138	178	221	265
18	Bedroom 1	K2	600	500	880	216	303	395	493	595	702
				Total Output:	880	216	303	395	493	595	702

Appendix M

Fuel Comparison

Heating Type	Efficiency %	Annual Energy Demand kWh			Number of kWh in unit			Price per Tonne	Price per unit		Pence per kWh	£ / kWh	Total annual running cost	CO2 emissions	
		Hot water	Heating	Total										factor (kg/kWh)	Total kg
Oil	85%	2555	8497.03	11052.03	10.35			0	65	Pence/Litre	6.28	0.06	£762.59	0.314	3470.34
Mains Gas	85%	2555	8497.03	11052.03	1			0	4.5	Pence/kWh	4.5	0.04	£508.39	0.227	2508.81
LPG	90%	2555	8497.03	11052.03	7.11			0	50	Pence/Litre	7.03	0.07	£851	0.259	2862.48
Direct Electric	100%	2555	8497.03	11052.03	1			0	14	Pence/kWh	14	0.14	£1547.28	0.233	2575.12
Biomass Wood Pellets	90%	2555	8497.03	11052.03	4.8			250	25	Kg	5.21	0.05	£607.86	0.08	884.16
Biomass Logs	90%	2555	8497.03	11052.03	4.1			150	15	Kg	3.66	0.04	£486.29	0.018	198.94
Biomass Chips	90%	2555	8497.03	11052.03	3.5	DHW SPF	Heating SPF	100	10	Kg	2.86	0.03	£364.72	0.018	198.94
Air Source Heat Pump	see SCOP	1825	8497.03	10322.03	see SPF	3.06	3.77	0	14	Pence/kWh	14	0.14	£399.04	0.233	664.11
Ground Source Heat Pump	see SCOP	1825	8497.03	10322.03	see SPF	3.06	3.7	0	14	Pence/kWh	14	0.14	£405.01	0.233	674.05

Appendix N

Heat Pump Summary

SPACE HEATING

101		Demand:	8497.03 kWh/yr
102	Heat supplied by HP, excluding auxiliary heaters:		8497.03 kWh/yr
103		SPF(2):	3.77
	Electricity consumed by HP, excluding auxiliary		
104		heaters:	2253.85 kWh/yr
105	Renewable heat supplied by HP:		6243.18 kWh/yr
	Remaining heat to be supplied by auxiliary heaters		
106		and other heat sources:	0
107	Remaining heat, supplied by other heat sources:		0
108	Remaining heat, supplied by auxiliary heaters:		0
	Electricity consumed by HP, including auxiliary		
109		heaters:	2253.85 kWh/yr

WHERE OTHER HEAT SOURCES ARE USED

110		Fuel used:	0
111	Efficiency of other heat sources:		N/A
112	Consumed by other heat sources:		N/A

WATER HEATING

	No. of bedrooms:		1 Rooms
	No of occupants / bedroom:		1 Person/s
	HP flow temperature in DHW mode:		55°C
	Hot water / occupant:		45 Litres/day
	Final HP secondary HW temperature:		50°C
201		Demand:	1879.75 kWh/yr
202	Heat supplied by HP, excluding immersion heater:		1825 kWh/yr
203		SPF(2):	3.06
	Electricity consumed by HP, excluding immersion		
204		heater:	596.41 kWh/yr
205	Renewable heat supplied by HP:		1228.59 kWh/yr
	Remaining heat to be supplied by immersion heater		
206		and other heat sources:	54.75 kWh/yr
207	Remaining heat, supplied by other heat sources:		0
208	Remaining heat, supplied by immersion heater:		54.75 kWh/yr
	Electricity consumed by HP, including immersion		
209		heater:	651.16 kWh/yr

WHERE OTHER HEAT SOURCES ARE USED

210		Fuel used:	0
211	Efficiency of other heat sources:		0
212	Consumed by other heat sources:		0

PROPORTIONS, ENERGY CONSUMPTION, AND PERFORMANCE

	Proportion of space heating and water heating		
	demand provided by heat pump (excluding		
301		auxiliary/immersion heaters):	99%
302		Renewable heat:	7471.77 kWh/yr
	Electricity consumed by HP (excluding auxiliary/		
303		immersion heaters):	2850.26 kWh/yr

304	Electricity consumed by auxiliary/immersion heaters (supplied as part of HP):	54.75 kWh/yr
305	Fuel consumed by other heat sources:	N/A
306	HP combined performance SPF(4):	N/A

RUNNING COST

401	Cost per unit of electricity for HP:	14 pence/kWh
402	Cost per unit of fuel for other heat sources:	N/A
403	Cost of electricity for HP (including auxiliary/immersion heaters):	406.7 £ / year
404	Cost of fuel for other heat sources:	N/A

Disclaimer:

'The performance of Microgeneration heat pump systems is impossible to predict with certainty due to the variability of the climate and its subsequent effect on both heat supply and demand. This estimate is based upon the best available information but is given as guidance only and should not be considered as a guarantee.'

Appendix O

New Radiators

Room Temperature °C	Room Names	Room Heat Loss	Radiator Type	Height (mm)	Length (mm)	Output at 50K MW-Air delta T	Custom defined MWT °C	Mean (Flow/Return) Water Temperature and Outputs					
						70°C Watts	42.5°C Output Watts	35°C Output Watts	40°C Output Watts	45°C Output Watts	50°C Output Watts	55°C Output Watts	60°C Output Watts
18	Kitchen	2001.84	K2	600	1200	2112		520	726	948	1182	1428	1684
					Total Output:	2112		520	726	948	1182	1428	1684
18	Kitchen	2001.84	Custom	600	1294	2893	1144	712	995	1299	1620	1956	2306
			Custom	1800	563	3046	1205	749	1048	1367	1705	2059	2428
					Total Output:	5939	2349	1461	2043	2666	3325	4015	4734
22	Bathroom 1	494.85	Towel Rails straight chrome	1211	500	379		66	100	138	178	221	265
					Total Output:	379		66	100	138	178	221	265
22	Bathroom 1	494.85	Custom	1500	563	2614	820	454	693	953	1230	1523	1830
					Total Output:	2614	820	454	693	953	1230	1523	1830
18	Bedroom 1	1039.85	K2	600	500	880		216	303	395	493	595	702
					Total Output:	880		216	303	395	493	595	702
18	Bedroom 1	1039.85	Custom	600	1294	2893	1144	712	995	1299	1620	1956	2306
					Total Output:	2893	1144	712	995	1299	1620	1956	2306