



Eastmere Stables

Energy Statement

September 2026

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Document Control Sheet	
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1 Executive Summary

NRG Consulting have been commissioned to undertake an Energy Statement on a proposed development at **Eastmere Stables, Eastergate Lane, Eastergate, PO20 3SJ**.

The scheme benefits from Planning Permission: **Ref: BN/128/24/RES**. The description of development is:

Approval of reserved matters (other than access) following the grant of BN/99/22/OUT (APP/C3810W/22/3312864) for 9 No. dwellings.

The report has been written to discharge **Planning Condition 10** which states:

10) No dwelling shall be occupied until a scheme, to incorporate decentralised, renewable, and low carbon energy supply systems, has been implemented in accordance with details that shall first have been submitted to and approved in writing by the Local Planning Authority. Thereafter the scheme shall be maintained in accordance with the approved details.

Renewable Energy

The on-site provision of renewable energy has been prioritised and following a feasibility review, the following technologies will be provided:

- Air Source Heat Pumps

	CO ₂ Emissions (Tonnes per Annum)
	Residential
Baseline Emissions (TER)	13.3
Proposed Emissions (DER)	5.1
CO ₂ Savings over Part L 2021	61.64%
CO ₂ Savings via Renewable Energy	55.58%
Table 1: Carbon Emissions Table	

2 Energy Calculations

2.1 Energy Calculations

To estimate the CO₂ emissions for the site, SAP calculations have been carried out by an accredited OCDEA Domestic Energy Assessor using Design SAP 10's online platform.

The baseline CO₂ emissions covered by Part L 2021 of the Building Regulations are expressed as the Target Emission Rate (TER) and the proposed actual emissions are the Dwelling Emission Rate (DER). These use the unit of measurement of kilograms of CO₂ per square-metre per annum (kg/CO₂/m²). To calculate the overall proposed emissions, these figures can be multiplied by the size of the dwellings and/or site and this figure is presented in tonnes/annum. This is the figure expressed within this report.

This covers regulated carbon emissions from:

- Heating (and Cooling)
- Hot Water
- Lighting
- Auxiliary (Pumps and Fans)

2.2 Passive Design Measures

Passive measures utilised in the concept and development of the design include:

- High levels of insulation more than the Part L 2021 notional values.
- Through good design, air infiltration will be minimised.
- Where possible, orientation and site layout to reduce energy demand.
- Provision of cross-ventilation.
- A high-performance glazing system to reduce heat demand and increase solar gains.

Element	Part L1 Limiting U-Vales	Proposed U-Values (W/m²K)
External Wall	0.26 W/m²K	0.18 W/m²K
Ground Floor	0.18 W/m²K	0.11 W/m²K
Main Roof	0.16 W/m²K	0.11 W/m²K
Windows	1.6 W/m²K	1.4 W/m²K
Front Door	1.6 W/m²K	1.2 W/m²K
Air Permeability	5 m³/(hm²) @50Pa	
Thermal Bridging	Recognised Construction Details	
Ventilation	Natural Ventilation	
Ventilation Details	Intermittent Fans and Trickle Vents	
Heating	Air Source Heat Pump	
Heating Controls	Time and Temperature Zone Control	
Smart Controls	Yes	
Heat Emitters	Radiators & Underfloor	
Hot Water	180 / 210 / 250ltr Cylinder (from Heat Pump)	
Cooling	No	
Lighting	85 lm/W	
Table 2: Construction Specification – Thermal Elements and M&E		

3 Renewable Energy

Renewable Energy is typically defined as:

“Energy derived from a source that is continually replenished, such as wind, wave, solar, hydroelectric and energy from plant material, but not fossil fuels or nuclear energy. Although not strictly renewable, geothermal energy is generally included.”

As per Renewable Energy Directive (2018/2001/EU) aerothermal and hydrothermal technologies are also officially included within the definition.

Based on recent legislation including the *Clean Air Act* and *The Future Homes and Buildings Standards: 2023 consultation* as well as the location of the scheme, the following technologies have been discounted and are not discussed further:

- Wind Turbines
- Hydropower / Wave Technology
- Biogas / Biofuel / Biomass
- Hydrogen
- Hybrid Heat Pumps

The feasibility of remaining renewable and low carbon technologies has been undertaken based on the following parameters:

1. Practicality of installation of the technology
2. Energy demand profile for the project
3. Environmental impact & land use
4. Economic feasibility and overall payback (including available financial incentives)
5. Planning and regulatory issues i.e. conservation and heritage areas and aspects
6. Noise & aesthetic considerations

It should be noted that due to decarbonisation and the decrease in carbon factor for electricity, factors such as energy security and lowering running costs are deemed equal or more important to that of the offset of CO₂.

Renewable Energy Tariffs

For new-build developments within England, there are no grants available for the installation of renewable technologies for non-self-build dwellings.

Feasibility Conclusion

Following a review of the available technologies, the following have been integrated into the scheme:

- Air Source Heat Pumps (Individual)

3.1 Air Source Heat Pumps (Individual)

Air Source Heat Pumps (ASHPs) provide heating by extracting low-grade heat from the outside air and upgrading it to a useful temperature. They operate effectively throughout the year, including during cold weather, although their efficiency varies with external air temperature and the temperature required by the heating system.

An ASHP uses a refrigerant cycle to absorb heat from the external air before a compressor raises its temperature. This heat is then transferred into the building's heating and/or hot water system. As the majority of the heat delivered is drawn from the surrounding air, ASHPs can provide significantly more heat energy than the electrical energy they consume.

ASHPs are most efficient when supplying heat at relatively low temperatures and are therefore well suited to modern, highly insulated buildings with low heating demands. Their performance is typically expressed as a Coefficient of Performance (COP) or Seasonal Coefficient of Performance (SCOP), representing the amount of heat delivered relative to the electricity consumed.

As ASHPs are electrically driven and do not require on-site combustion of fossil fuels, they provide a low-carbon alternative to conventional gas-fired heating. Their associated carbon emissions are also expected to reduce further as electricity generation continues to decarbonise.

Heat Pump - Scheme Specific Information

The Ideal Logic Air series of ASHP are proposed. These are between 4-8kW depending on the unit and all are over 500% efficient.

Ideal Logic Air heat pumps are also app controlled. Halo Air is a new generation of heat pump thermostats connected to your phone with options to connect to Ideal's customer service team. Halo Air automatically makes your heating system more efficient and enables remote control and 24/7 system performance data. All wrapped up in an easy-to-use controller.

ASHP System Details			
Number of Heat Pumps		9	1 per dwelling
Manufacturer Details		Ideal	Logic Air
Size and COP	1 & 9	4kW	5.34
Size and COP	2,3,4,5,8	5kW	5.34
Size and COP	6 & 7	8kW	5.19
Quiet Mark Certified		Yes	
Provides		Space Heating and Hot Water	
Refrigerant		R32	
Location		Rear Garden (shown on drawing in Appenix)	

Table 3: Proposed ASHP Specification



Figure: ASHP (External Condenser)

External Unit Location

In terms of the external unit, the following recommendations have been implemented concerning the positioning.

- The units have been placed in a location where they can operate efficiently.
- Installed away from main living areas and bedrooms.
- Use of the garage as shielding for noise.
- The external units are easily accessible for regular maintenance.

Noise Emissions

The system is Quiet Mark certified and the units have sound levels of:

4kW and 5kW - Sound power level 52dB(A)

8kW - Sound power level 55dB(A)

Quiet Mark certification is a global rating which acknowledges the quietest central heating products and is associated with the UK Noise Abatement Society.

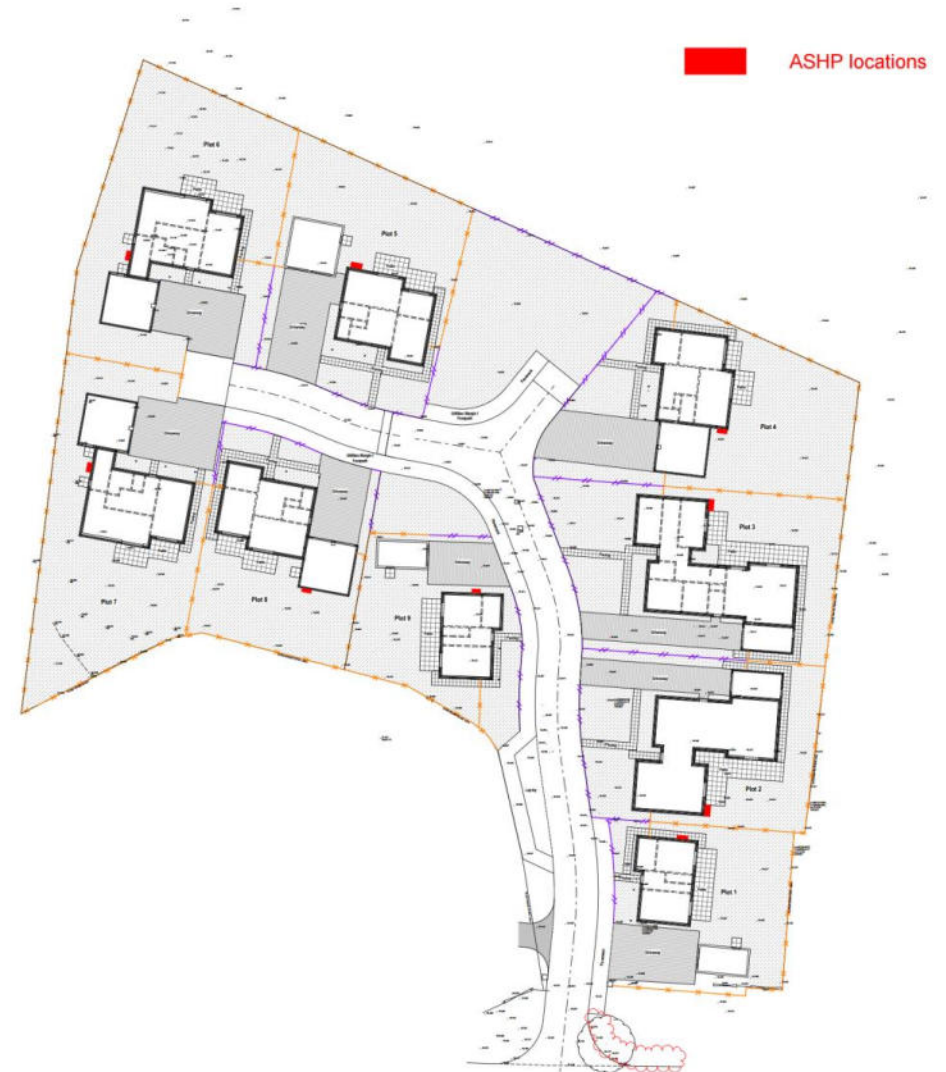


Figure: External Condenser Locations

4 Conclusion

An energy assessment has been undertaken on the proposed scheme in-line with the requirements of the Planning Condition.

Renewable Technologies

A feasibility on renewable technologies has been undertaken and the following systems are proposed for the scheme:

- Air Source Heat Pump (to each dwelling)

As per the CO₂ emissions shown on this page, the proposed scheme is a highly sustainable and low-carbon development that complies with the requirements of the **Planning Condition** and thus based on this report, the condition should be discharged.

	CO ₂ Emissions (Tonnes per Annum)
	Residential
Baseline Emissions (TER)	13.3
Proposed Emissions (DER)	5.1
CO ₂ Savings over Part L 2021	61.64%
CO ₂ Savings via Renewable Energy	55.58%
Table 4: Carbon Emissions Table	

Appendix 1



Project: Eastmere Stables

Plots	Floor Area	Target Emissions (TER) Part L Baseline	Total TER	Dwelling Emission Rate (DER) - Pre-Renewable Energy	Total DER Part L 2021 - Pre-Renewable Energy	Final Dwelling Emission Rate (DER)	Final DER Part L 2021
	m ²	kg/CO ₂ /m ² /year	kg/CO ₂ /year	kg/CO ₂ /m ² /year	kg/CO ₂ /year	kg/CO ₂ /m ² /year	kg/CO ₂ /year
1	129.62	10.36	1,343	7.90	1,024	4.20	544
2	151.81	8.02	1,218	8.87	1,347	3.62	550
3	151.81	8.70	1,321	9.45	1,435	3.83	581
4	171.93	8.85	1,522	7.21	1,240	3.15	542
5	171.93	9.54	1,640	7.78	1,338	3.87	665
6	192.2	8.52	1,638	7.04	1,353	3.04	584
7	192.2	8.64	1,661	7.15	1,374	3.08	592
8	171.93	9.54	1,640	7.78	1,338	3.36	578
9	129.62	10.08	1,307	7.93	1,028	3.56	461
Total Site Area (m ²):		1,463	13,288		11,475		5,098

Baseline			Overall Results - Part L 2021		
Baseline Emissions (TER) - Total Site	13,288	kg/CO ₂ /year	Final CO ₂ Emissions	5,098	kg/CO ₂ /year
Unregulated Energy - Total Site	1,269	kg/CO ₂ /year	CO ₂ Savings over Part L 2021	61.64	%

Renewable Energy			Overall Results - Carbon Savings		
CO ₂ Emissions Pre-Renewable Energy	11,475	kg/CO ₂ /year	Total CO ₂ savings via Renewable Energy	6,377	kg/CO ₂ /year
Final CO ₂ Emissions	5,098	kg/CO ₂ /year	Total CO ₂ savings over Part L 2021	8,190	kg/CO ₂ /year
CO ₂ Savings via Renewable Energy	55.58	%			

Appendix 2



Block Compliance



Block Reference	Default	Issued on Date	08/09/2026
Block Name			
Calculation Type	New Build (As Designed)	SAP Version	10.2
Assessor Details	Mr. Neil Rothon	Assessor ID	L759-0001
Client	NJS Partnership, Joe Shopland, Quarry Lane, Chichester, PO19 8NY		

Block Compliance Report - DER				
Block Reference: Default	Block Name:			
Property-Assessment Reference	Floor area (m ²)	DER (kgCO ₂ /m ²)	TER (kgCO ₂ /m ²)	% DER/TER
Plot 2 - Design Stage	151.81	3.62	8.02	54.86 %
Plot 3 - Design Stage	151.81	3.83	8.70	55.98 %
Plot 7 - Design Stage	192.20	3.08	8.64	64.35 %
Plot 6 - Design Stage	192.20	3.04	8.52	64.32 %
Plot 8 - Design Stage	171.93	3.36	9.54	64.78 %
Plot 4 - Design Stage	171.93	3.15	8.85	64.41 %
Plot 5 - Design Stage	171.93	3.87	9.54	59.43 %
Plot 1 - Design Stage	129.62	4.20	10.36	59.46 %
Plot 9 - Design Stage	129.62	3.56	10.08	64.68 %
Totals:	1463.05	31.71	82.25	
Average DER = 3.48 kgCO ₂ /m ²	% DER/TER	PASS		
Average TER = 9.08 kgCO ₂ /m ²	61.64 %			

Block Compliance Report - DFEE				
Block Reference: Default	Block Name:			
Property-Assessment Reference	Floor area (m ²)	DFEE (kWh/m ² /yr)	TFEE (kWh/m ² /yr)	% DFEE/TFEE
Plot 2 - Design Stage	151.81	41.04	48.33	15.10 %
Plot 3 - Design Stage	151.81	44.34	51.38	13.71 %
Plot 7 - Design Stage	192.20	35.54	41.59	14.54 %
Plot 6 - Design Stage	192.20	34.92	41.01	14.86 %
Plot 8 - Design Stage	171.93	38.36	44.35	13.50 %
Plot 4 - Design Stage	171.93	35.30	41.46	14.87 %

Block Compliance



Plot 5 - Design Stage	171.93	38.30	44.35	13.65 %
Plot 1 - Design Stage	129.62	37.20	42.31	12.07 %
Plot 9 - Design Stage	129.62	37.62	41.28	8.86 %
Totals:	1463.05	342.63	396.09	
Average DFEE = 37.90 kWh/m²/yr	% DFEE/TFEE	PASS		
Average TFEE = 43.90 kWh/m²/yr	13.67 %			

Block Compliance Report - DPER				
Block Reference: Default	Block Name:			
Property-Assessment Reference	Floor area (m ²)	DPER (kWh/m ² /yr)	TPER (kWh/m ² /yr)	% DPER/TPER
Plot 2 - Design Stage	151.81	37.48	44.59	15.95 %
Plot 3 - Design Stage	151.81	39.61	48.26	17.92 %
Plot 7 - Design Stage	192.20	31.90	45.68	30.17 %
Plot 6 - Design Stage	192.20	31.52	45.01	29.97 %
Plot 8 - Design Stage	171.93	34.79	50.29	30.82 %
Plot 4 - Design Stage	171.93	32.62	46.57	29.95 %
Plot 5 - Design Stage	171.93	40.32	50.29	19.83 %
Plot 1 - Design Stage	129.62	43.88	54.15	18.97 %
Plot 9 - Design Stage	129.62	36.94	52.69	29.89 %
Totals:	1463.05	329.06	437.53	
Average DPER = 36.15 kWh/m ² /yr	% DPER/TPER	PASS		
Average TPER = 48.31 kWh/m ² /yr	25.16 %			

Full SAP Calculation Printout



Plot Reference	Plot 1			Issued on Date	08/09/2026
Assessment Reference	Design Stage	Plot Type Ref			
Plot Address	Plot 1 Eastmere Stables , Eastergate Lane, Eastergate, West Sussex, PO20 3SJ			SAP Version	10.2
SAP Rating	80 C	DER	4.20	TER	10.36
Environmental	96 A	% DER < TER			59.46
CO ₂ Emissions (t/year)	0.47	DFEE	37.20	TFEE	42.31
Compliance Check	See BREL	% DFEE < TFEE			12.07
% DPER < TPER	18.97	DPER	43.88	TPER	54.15
Assessor Details	Mr. Neil Rothon			Assessor ID	L759-0001
Client	NJS, Joe Shopland				

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	64.8100 (1b)	x 2.4600 (2b)	= 159.4326 (1b) - (3b)
First floor	64.8100 (1c)	x 2.7400 (2c)	= 177.5794 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	129.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 337.0120 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1187 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2687 (18)
Number of sides sheltered	1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2485 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.3169	0.3107	0.3045	0.2734	0.2672	0.2361	0.2361	0.2299	0.2485	0.2672	0.2796	0.2920 (22b)
Effective ac	0.5502	0.5483	0.5463	0.5374	0.5357	0.5279	0.5279	0.5264	0.5309	0.5357	0.5391	0.5426 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Front door			1.9500	1.2000	2.3400		(26)
rooflight			1.4400	1.2357	1.7795		(27a)
Windows			24.6600	1.1450	28.2366		(27)
Heatloss Floor 1			64.8100	0.1200	7.7772	75.0000	4860.7500 (28a)
External Wall 1	146.8200	22.4100	124.4100	0.1600	19.9056	110.0000	13695.1000 (29a)
dormers	6.8000	4.2000	2.6000	0.1800	0.4680	9.0000	23.4000 (29a)
External Roof 1	56.1500		56.1500	0.1000	5.6150	9.0000	505.3500 (30)
sloping	19.8100	1.4400	18.3700	0.1700	3.1229	9.0000	165.3300 (30)
Total net area of external elements A _{um} (A, m ²)			294.3900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.2448		(33)
Main dwelling							
Internal Wall 1			215.8000			9.0000	1942.2000 (32c)
Internal Floor 1			64.8100			18.0000	1166.5800 (32d)
Internal Ceiling 1			64.8100			9.0000	583.2900 (32e)
Heat capacity C _m = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	22932.0000 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							176.9171 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

Full SAP Calculation Printout



E5 Ground floor (normal)	34.2600	0.0450	1.5417
E16 Corner (normal)	17.0000	0.0320	0.5440
E17 Corner (inverted - internal area greater than external area)	3.4200	-0.0700	-0.2394
E13 Gable (insulation at rafter level)	7.2000	0.0330	0.2376
E11 Eaves (insulation at rafter level)	13.7600	0.0200	0.2752
E12 Gable (insulation at ceiling level)	12.4000	0.0290	0.3596
E6 Intermediate floor within a dwelling	34.2600	0.0000	0.0000
E16 Corner (normal)	7.5600	0.1800	1.3608
R4 Ridge (vaulted ceiling)	2.7000	0.1200	0.3240
R9 Roof to wall (flat ceiling)	9.0000	0.3200	2.8800
R7 Flat ceiling (inverted)	5.4000	0.1200	0.6480
E2 Other lintels (including other steel lintels)	19.5200	0.0260	0.5075
E3 Sill	18.5900	0.0290	0.5391
E4 Jamb	44.8200	0.0240	1.0757
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			10.0538 (36)
Point Thermal bridges		(36a) =	0.0000
Total fabric heat loss		(33) + (36) + (36a) =	79.2986 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 61.1909	Feb 60.9740	Mar 60.7615	Apr 59.7632	May 59.5765	Jun 58.7070	Jul 58.7070	Aug 58.5460	Sep 59.0419	Oct 59.5765	Nov 59.9543	Dec 60.3493 (38)
Heat transfer coeff	140.4895	140.2727	140.0601	139.0618	138.8751	138.0056	138.0056	137.8446	138.3405	138.8751	139.2529	139.6479 (39)
Average = Sum(39)m / 12 =												139.0610
HLP	Jan 1.0839	Feb 1.0822	Mar 1.0805	Apr 1.0728	May 1.0714	Jun 1.0647	Jul 1.0647	Aug 1.0635	Sep 1.0673	Oct 1.0714	Nov 1.0743	Dec 1.0774 (40)
HLP (average)												1.0728
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.8940 (42)
Hot water usage for mixer showers	72.7427	71.6495	70.0565	67.0086	64.7594	62.2510	60.8253	62.4062	64.1392	66.8324	69.9457	72.4640 (42a)
Hot water usage for baths	31.4049	30.9385	30.2817	29.0707	28.1639	27.1584	26.6153	27.2675	27.9776	29.0536	30.2895	31.2988 (42b)
Hot water usage for other uses	44.2674	42.6577	41.0480	39.4383	37.8285	36.2188	36.2188	37.8285	39.4383	41.0480	42.6577	44.2674 (42c)
Average daily hot water use (litres/day)												136.4268 (43)
Daily hot water use	Jan 148.4151	Feb 145.2457	Mar 141.3862	Apr 135.5176	May 130.7518	Jun 125.6283	Jul 123.6594	Aug 127.5023	Sep 131.5551	Oct 136.9339	Nov 142.8930	Dec 148.0302 (44)
Energy conte	235.0532	206.8280	217.3054	185.5168	176.0171	154.4746	149.5553	157.8744	162.2206	185.8181	203.5772	231.7795 (45)
Energy content (annual)										Total = Sum(45)m =		2266.0203
Distribution loss (46)m = 0.15 x (45)m	35.2580	31.0242	32.5958	27.8275	26.4026	23.1712	22.4333	23.6812	24.3331	27.8727	30.5366	34.7669 (46)
Water storage loss (or HIU loss):												250.0000 (47)
Store volume												1.8000 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.9720 (55)
Enter (49) or (54) in (55)												
Total storage loss	30.1320	27.2160	30.1320	29.1600	30.1320	29.1600	30.1320	30.1320	29.1600	30.1320	29.1600	30.1320 (56)
If cylinder contains dedicated solar storage	30.1320	27.2160	30.1320	29.1600	30.1320	29.1600	30.1320	30.1320	29.1600	30.1320	29.1600	30.1320 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	288.4476	255.0552	270.6998	237.1888	229.4115	206.1466	202.9497	211.2688	213.8926	239.2125	255.2492	285.1739 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	288.4476	255.0552	270.6998	237.1888	229.4115	206.1466	202.9497	211.2688	213.8926	239.2125	255.2492	285.1739 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2894.6963 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
												0.0000 (64a)
Heat gains from water heating, kWh/month	120.8707	107.3521	114.9696	103.0220	101.2412	92.7004	92.4427	95.2088	95.2759	104.5000	109.0270	119.7822 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
(66)m	Jan 144.6999	Feb 144.6999	Mar 144.6999	Apr 144.6999	May 144.6999	Jun 144.6999	Jul 144.6999	Aug 144.6999	Sep 144.6999	Oct 144.6999	Nov 144.6999	Dec 144.6999 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	150.7234	166.8723	150.7234	155.7475	150.7234	155.7475	150.7234	150.7234	155.7475	150.7234	155.7475	150.7234 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	297.2620	300.3466	292.5734	276.0251	255.1359	235.5030	222.3871	219.3024	227.0756	243.6239	264.5131	284.1460 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599 (71)
Water heating gains (Table 5)	162.4606	159.7501	154.5290	143.0860	136.0769	128.7506	124.2509	127.9688	132.3277	140.4570	151.4264	160.9976 (72)
Total internal gains	676.8559	693.3790	664.2357	641.2686	608.3462	586.4111	563.7713	564.4045	581.5608	601.2143	638.0970	662.2769 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
East	1.4400	26.0000	0.4000	0.7000	1.0000	9.4349 (82)

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North			1.0100		10.6334		0.7200		0.7000		0.7700		3.7511 (74)
East			8.8100		19.6403		0.7200		0.7000		0.7700		60.4348 (76)
South			0.5600		46.7521		0.7200		0.7000		0.7700		9.1443 (78)
West			14.2800		19.6403		0.7200		0.7000		0.7700		97.9579 (80)

Solar gains	180.7230	351.5897	576.3726	839.7692	1030.5556	1056.0677	1004.9299	861.9201	669.7795	416.2991	224.9387	148.9035 (83)
Total gains	857.5789	1044.9687	1240.6083	1481.0379	1638.9018	1642.4787	1568.7012	1426.3246	1251.3403	1017.5133	863.0356	811.1804 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.3415	45.4116	45.4805	45.8070	45.8686	46.1575	46.1575	46.2115	46.0458	45.8686	45.7441	45.6147	
alpha	4.0228	4.0274	4.0320	4.0538	4.0579	4.0772	4.0772	4.0808	4.0697	4.0579	4.0496	4.0410	
util living area	0.9889	0.9754	0.9418	0.8497	0.6973	0.5170	0.3821	0.4354	0.6823	0.9141	0.9786	0.9910 (86)	
Living	19.3630	19.6454	20.0568	20.5353	20.8370	20.9627	20.9914	20.9856	20.8895	20.4364	19.8051	19.3122	
Non living	18.1045	18.4628	18.9771	19.5541	19.8841	20.0059	20.0262	20.0244	19.9469	19.4554	18.6729	18.0435	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	20.1626	19.6454	20.0568	20.5353	20.8370	20.9627	20.9914	20.9856	20.8895	20.4364	19.8051	19.5483 (87)	
Th 2	20.0140	20.0154	20.0168	20.0231	20.0243	20.0298	20.0298	20.0308	20.0276	20.0243	20.0219	20.0194 (88)	
util rest of house	0.9863	0.9698	0.9288	0.8192	0.6445	0.4459	0.3001	0.3477	0.6095	0.8887	0.9728	0.9889 (89)	
MIT 2	19.2528	18.4628	18.9771	19.5541	19.8841	20.0059	20.0262	20.0244	19.9469	19.4554	18.6729	18.3996 (90)	
Living area fraction										fLA = Living area / (4) =		0.2119 (91)	
MIT	19.4456	18.7134	19.2059	19.7620	20.0860	20.2087	20.2308	20.2281	20.1467	19.6633	18.9128	18.6430 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.4456	18.7134	19.2059	19.7620	20.0860	20.2087	20.2308	20.2281	20.1467	19.6633	18.9128	18.6430 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9844	0.9599	0.9155	0.8099	0.6481	0.4594	0.3173	0.3659	0.6190	0.8773	0.9637	0.9848 (94)	
Useful gains	844.2080	1003.0498	1135.8286	1199.5628	1062.1547	754.5561	497.8087	521.8978	774.6242	892.7088	831.7262	798.8324 (95)	
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)	
Heat loss rate W	2127.7959	1937.6469	1779.5945	1510.4947	1164.6090	774.0298	501.0692	527.6824	836.4993	1258.6648	1644.9737	2016.9362 (97)	
Space heating kWh	954.9894	628.0492	478.9618	223.8710	76.2260	0.0000	0.0000	0.0000	0.0000	272.2713	585.5382	906.2693 (98a)	
Space heating requirement - total per year (kWh/year)												4126.1761	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)	
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	954.9894	628.0492	478.9618	223.8710	76.2260	0.0000	0.0000	0.0000	0.0000	272.2713	585.5382	906.2693 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												4126.1761	
Space heating per m2										(98c) / (4) =		31.8329 (99)	

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													242.8494 (206)
Efficiency of main space heating system 2 (in %)													0.0000 (207)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	954.9894	628.0492	478.9618	223.8710	76.2260	0.0000	0.0000	0.0000	0.0000	272.2713	585.5382	906.2693 (98)	
Space heating efficiency (main heating system 1)	242.8494	242.8494	242.8494	242.8494	242.8494	0.0000	0.0000	0.0000	0.0000	242.8494	242.8494	242.8494 (210)	
Space heating fuel (main heating system)	393.2436	258.6168	197.2259	92.1851	31.3882	0.0000	0.0000	0.0000	0.0000	112.1153	241.1117	373.1817 (211)	
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)	
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)	
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)	
Water heating													
Water heating requirement	288.4476	255.0552	270.6998	237.1888	229.4115	206.1466	202.9497	211.2688	213.8926	239.2125	255.2492	285.1739 (64)	
Efficiency of water heater (217)m	172.1444	172.1444	172.1444	172.1444	172.1444	172.1444	172.1444	172.1444	172.1444	172.1444	172.1444	172.1444 (216)	
Fuel for water heating, kWh/month	167.5614	148.1635	157.2516	137.7848	133.2669	119.7521	117.8950	122.7277	124.2518	138.9603	148.2762	165.6597 (219)	
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)	
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)	
Lighting	36.1792	29.0243	26.1331	19.1463	14.7891	12.0828	13.4911	17.5363	22.7779	29.8858	33.7560	37.1847 (232)	
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)	
Electricity generated by wind turbines (Appendix M) (negative quantity) (234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity) (235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation) (235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)	
Electricity generated by PVs (Appendix M) (negative quantity) (233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)	
Electricity generated by wind turbines (Appendix M) (negative quantity) (234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity) (235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation) (235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)	

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Annual totals kWh/year	
Space heating fuel - main system 1	1699.0682 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	172.1444
Water heating fuel used	1681.5510 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
Total electricity for the above, kWh/year	0.0000 (231)
Electricity for lighting (calculated in Appendix L)	291.9865 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3672.6058 (238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1699.0682	0.1562	265.4628 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1681.5510	0.1410	237.0243 (264)
Space and water heating			502.4871 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	291.9865	0.1443	42.1427 (268)
Total CO2, kg/year			544.6298 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.2000 (273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1699.0682	1.5784	2681.7772 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1681.5510	1.5212	2557.9855 (278)
Space and water heating			5239.7628 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	291.9865	1.5338	447.8587 (282)
Total Primary energy kWh/year			5687.6215 (286)
Dwelling Primary energy Rate (DPER)			43.8800 (287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022) CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	64.8100 (1b)	x 2.4600 (2b)	= 159.4326 (1b) - (3b)
First floor	64.8100 (1c)	x 2.7400 (2c)	= 177.5794 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	129.6200		(4)
Dwelling volume		(3a) + (3b) + (3c) + (3d) + (3e) ... (3n) =	337.0120 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.1187 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =		0.3410 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												

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Effective ac	0.4348	0.4263	0.4178	0.3751	0.3666	0.3240	0.3240	0.3155	0.3410	0.3666	0.3837	0.4007 (22b)
	0.5945	0.5909	0.5873	0.5704	0.5672	0.5525	0.5525	0.5498	0.5582	0.5672	0.5736	0.5803 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Main dwelling							
TER Opaque door			1.9500	1.0000	1.9500		(26)
TER Opening Type			24.6600	1.1450	28.2366		(27)
TER Roof Light			1.4400	1.5918	2.9118		(27a)
Heatloss Floor 1			64.8100	0.1300	8.4253		(28a)
External Wall 1	146.8200	22.4100	124.4100	0.1800	22.3938		(29a)
dormers	6.8000	4.2000	2.6000	0.1800	0.4680		(29a)
External Roof 1	56.1500		56.1500	0.1100	6.1765		(30)
sloping	19.8100	1.4400	18.3700	0.1100	2.0207		(30)
Total net area of external elements Aum(A, m2)			294.3900				(31)
Fabric heat loss, W/K = Sum (A x U)					72.5827		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K

176.9171 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E5 Ground floor (normal)	34.2600	0.1600	5.4816
E16 Corner (normal)	17.0000	0.0900	1.5300
E17 Corner (inverted - internal area greater than external area)	3.4200	-0.0900	-0.3078
E13 Gable (insulation at rafter level)	7.2000	0.0800	0.5760
E11 Eaves (insulation at rafter level)	13.7600	0.0400	0.5504
E12 Gable (insulation at ceiling level)	12.4000	0.0600	0.7440
E6 Intermediate floor within a dwelling	34.2600	0.0000	0.0000
E16 Corner (normal)	7.5600	0.0900	0.6804
R4 Ridge (vaulted ceiling)	2.7000	0.0800	0.2160
R9 Roof to wall (flat ceiling)	9.0000	0.0400	0.3600
R7 Flat ceiling (inverted)	5.4000	0.0400	0.2160
E2 Other lintels (including other steel lintels)	19.5200	0.0500	0.9760
E3 Sill	18.5900	0.0500	0.9295
E4 Jamb	44.8200	0.0500	2.2410

Thermal bridges (Sum(L x Psi) calculated using Appendix K)

14.1931 (36)

Point Thermal bridges

(33) + (36) + (36a) = 86.7758 (37)

Total fabric heat loss

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	66.1207	65.7124	65.3123	63.4326	63.0810	61.4439	61.4439	61.1407	62.0745	63.0810	63.7924	64.5362 (38)
Heat transfer coeff	152.8965	152.4882	152.0881	150.2084	149.8568	148.2197	148.2197	147.9165	148.8503	149.8568	150.5682	151.3120 (39)
Average = Sum(39)m / 12 =												150.2068

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1796	1.1764	1.1733	1.1588	1.1561	1.1435	1.1435	1.1412	1.1484	1.1561	1.1616	1.1674 (40)
HLP (average)												1.1588
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.8940 (42)
Hot water usage for mixer showers	72.7427	71.6495	70.0565	67.0086	64.7594	62.2510	60.8253	62.4062	64.1392	66.8324	69.9457	72.4640 (42a)
Hot water usage for baths	31.4049	30.9385	30.2817	29.0707	28.1639	27.1584	26.6153	27.2675	27.9776	29.0536	30.2895	31.2988 (42b)
Hot water usage for other uses	44.2674	42.6577	41.0480	39.4383	37.8285	36.2188	36.2188	37.8285	39.4383	41.0480	42.6577	44.2674 (42c)
Average daily hot water use (litres/day)												136.4268 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	148.4151	145.2457	141.3862	135.5176	130.7518	125.6283	123.6594	127.5023	131.5551	136.9339	142.8930	148.0302 (44)
Energy conte	235.0532	206.8280	217.3054	185.5168	176.0171	154.4746	149.5553	157.8744	162.2206	185.8181	203.5772	231.7795 (45)
Energy content (annual)												2266.0203
Distribution loss (46)m = 0.15 x (45)m	35.2580	31.0242	32.5958	27.8275	26.4026	23.1712	22.4333	23.6812	24.3331	27.8727	30.5366	34.7669 (46)

Water storage loss (or HIU loss):

250.0000 (47)

Store volume

1.8903 (48)

a) If manufacturer declared loss factor is known (kWh/day):

Temperature factor from Table 2b

0.5400 (49)

Enter (49) or (54) in (55)

1.0208 (55)

Total storage loss

31.6444 28.5820 31.6444 30.6236 31.6444 30.6236 31.6444 31.6444 30.6236 31.6444 30.6236 31.6444 (56)

If cylinder contains dedicated solar storage

31.6444 28.5820 31.6444 30.6236 31.6444 30.6236 31.6444 31.6444 30.6236 31.6444 30.6236 31.6444 (57)

Primary loss 23.2624 21.0112 23.2624 22.5120 23.2624 22.5120 23.2624 23.2624 22.5120 23.2624 22.5120 23.2624 (59)

Combi loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (61)

Total heat required for water heating calculated for each month

289.9600 256.4212 272.2122 238.6525 230.9239 207.6102 204.4621 212.7812 215.3562 240.7249 256.7128 286.6863 (62)

WWHRS -33.2549 -29.4109 -30.7974 -25.5015 -23.7665 -20.3371 -19.0628 -20.2714 -21.0416 -24.8057 -28.1018 -32.6391 (63a)

PV diverter -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 (63b)

Solar input 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63c)

FGHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63d)

Output from w/h 256.7051 227.0103 241.4148 213.1510 207.1574 187.2731 185.3993 192.5098 194.3146 215.9192 228.6110 254.0472 (64)

12Total per year (kWh/year) Total per year (kWh/year) = Sum(64)m = 2603.5127 (64)

Electric shower(s) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (64a)

Heat gains from water heating, kWh/month 122.0806 108.4449 116.1795 104.1928 102.4511 93.8713 93.6526 96.4187 96.4468 105.7099 110.1979 120.9921 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	144.6999	144.6999	144.6999	144.6999	144.6999	144.6999	144.6999	144.6999	144.6999	144.6999	144.6999	144.6999 (66)

Full SAP Calculation Printout



Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	150.7234	166.8723	150.7234	155.7475	150.7234	155.7475	150.7234	155.7475	150.7234	155.7475	150.7234	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	297.2620	300.3466	292.5734	276.0251	255.1359	235.5030	222.3871	219.3024	227.0756	243.6239	264.5131	284.1460 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	37.4700	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	-115.7599	(71)
Water heating gains (Table 5)	164.0868	161.3763	156.1552	144.7123	137.7031	130.3768	125.8771	129.5950	133.9539	142.0833	153.0527	162.6238 (72)
Total internal gains	681.4822	698.0052	668.8620	645.8949	612.9724	588.0373	565.3975	566.0307	583.1870	605.8405	642.7232	666.9031 (73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d			Gains W
North					1.0100	10.6334	0.6300	0.7000	0.7700			3.2822 (74)
East					8.8100	19.6403	0.6300	0.7000	0.7700			52.8804 (76)
South					0.5600	46.7521	0.6300	0.7000	0.7700			8.0013 (78)
West					14.2800	19.6403	0.6300	0.7000	0.7700			85.7131 (80)
East					1.4400	26.0000	0.6300	0.7000	1.0000			14.8599 (82)
Solar gains	164.7370	321.3579	528.7116	772.9005	950.5072	974.8624	927.3227	794.0606	615.2689	381.0267	205.2039	135.6249 (83)
Total gains	846.2192	1019.3631	1197.5735	1418.7954	1563.4796	1562.8997	1492.7202	1360.0914	1198.4559	986.8672	847.9271	802.5281 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000 (85)											
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	41.6622	41.7737	41.8836	42.4077	42.5073	42.9767	42.9767	43.0648	42.7947	42.5073	42.3064	42.0985
alpha	3.7775	3.7849	3.7922	3.8272	3.8338	3.8651	3.8651	3.8710	3.8530	3.8338	3.8204	3.8066
util living area	0.9896	0.9787	0.9523	0.8781	0.7453	0.5690	0.4267	0.4825	0.7287	0.9285	0.9809	0.9915 (86)
MIT	19.1672	19.4422	19.8610	20.3864	20.7546	20.9361	20.9836	20.9740	20.8346	20.3103	19.6472	19.1293 (87)
Th 2	19.9364	19.9389	19.9414	19.9531	19.9553	19.9655	19.9655	19.9674	19.9615	19.9553	19.9508	19.9462 (88)
util rest of house	0.9871	0.9736	0.9409	0.8501	0.6919	0.4898	0.3309	0.3818	0.6538	0.9057	0.9755	0.9894 (89)
MIT 2	17.8046	18.1548	18.6821	19.3276	19.7412	19.9243	19.9588	19.9558	19.8388	19.2549	18.4261	17.7627 (90)
Living area fraction	fLA = Living area / (4) = 0.2119 (91)											
MIT	18.0934	18.4276	18.9320	19.5520	19.9560	20.1387	20.1760	20.1716	20.0498	19.4786	18.6849	18.0523 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.0934	18.4276	18.9320	19.5520	19.9560	20.1387	20.1760	20.1716	20.0498	19.4786	18.6849	18.0523 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9807	0.9637	0.9269	0.8376	0.6919	0.5036	0.3509	0.4024	0.6608	0.8925	0.9663	0.9839 (94)
Ext temp.	829.9184	982.3104	1110.0723	1188.3798	1081.8398	787.1095	523.7419	547.2945	791.9848	880.7627	819.3483	789.5843 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	2108.9574	2062.8053	1890.7555	1600.0191	1237.2127	820.9452	530.0309	557.8817	885.6343	1330.5121	1744.3210	2096.0243 (97)
Space heating requirement - total per year (kWh/year)	951.6050	726.0926	580.8283	296.3803	115.5974	0.0000	0.0000	0.0000	0.0000	334.6136	665.9804	971.9913 (98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	951.6050	726.0926	580.8283	296.3803	115.5974	0.0000	0.0000	0.0000	0.0000	334.6136	665.9804	971.9913 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	4643.0889											
Space heating per m2	(98c) / (4) = 35.8208 (99)											

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)											
Fraction of space heat from main system(s)	1.0000 (202)											
Efficiency of main space heating system 1 (in %)	92.3000 (206)											
Efficiency of main space heating system 2 (in %)	0.0000 (207)											
Efficiency of secondary/supplementary heating system, %	0.0000 (208)											
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating efficiency (main heating system 1)	951.6050	726.0926	580.8283	296.3803	115.5974	0.0000	0.0000	0.0000	0.0000	334.6136	665.9804	971.9913 (98)
Space heating fuel (main heating system)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating efficiency (main heating system 2)	1030.9913	786.6658	629.2831	321.1054	125.2410	0.0000	0.0000	0.0000	0.0000	362.5283	721.5389	1053.0783 (211)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating requirement	256.7051	227.0103	241.4148	213.1510	207.1574	187.2731	185.3993	192.5098	194.3146	215.9192	228.6110	254.0472 (64)
Efficiency of water heater (217)m	86.7221	86.4770	85.9538	84.7992	82.8058	79.8000	79.8000	79.8000	79.8000	85.0385	86.3124	79.8000 (216)
Fuel for water heating, kWh/month	296.0088	262.5094	280.8658	251.3597	250.1725	234.6781	232.3300	241.2404	243.5020	253.9076	264.8647	292.7750 (219)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP			
	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1	5030.4322	0.2100	1056.3908 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	3104.2138	0.2100	651.8849 (264)
Space and water heating			1708.2757 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	252.7489	0.1443	36.4795 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1165.6501	0.1350	-157.3886
PV Unit electricity exported	-2037.7465	0.1261	-256.9207
Total			-414.3093 (269)
Total CO ₂ , kg/year			1342.3751 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.3600 (273)

13a. Primary energy - Individual heating systems including micro-CHP			
	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1	5030.4322	1.1300	5684.3884 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	3104.2138	1.1300	3507.7616 (278)
Space and water heating			9192.1500 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	252.7489	1.5338	387.6746 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1165.6501	1.4990	-1747.3602
PV Unit electricity exported	-2037.7465	0.4628	-943.0914
Total			-2690.4516 (283)
Total Primary energy kWh/year			7019.4739 (286)
Target Primary Energy Rate (TPER)			54.1500 (287)

Appendix 3





Logic Air.

MONOBLOC AIR SOURCE HEAT PUMP



Designed for
the UK climate



364 days a year UK
customer service



Quiet Mark
certified



SCOP rating
up to 519%*



Hot water in
sunshine, rain,
ice and snow



HALO
AIR



The Logic Air.

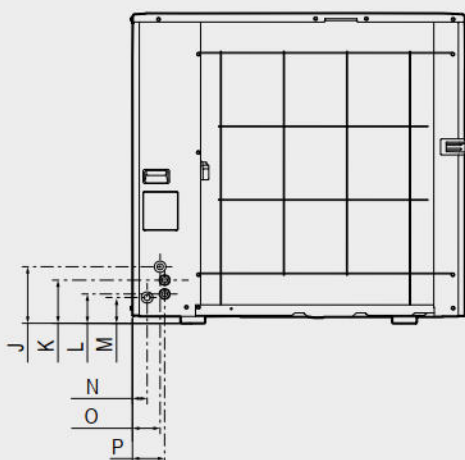
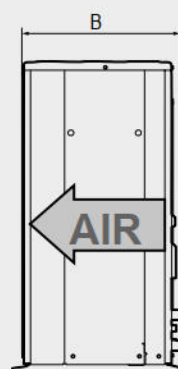
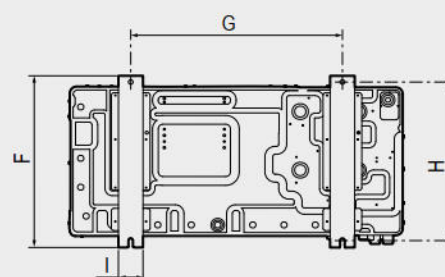
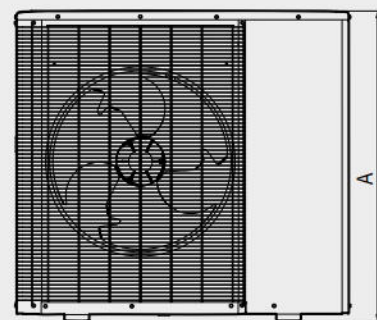
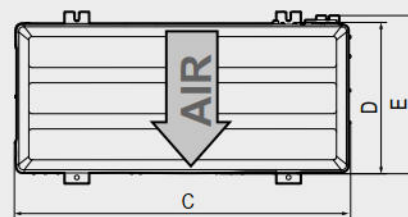
The Logic Air heat pump range is our new range of monobloc heat pumps, offering great efficiencies both in heating and hot water. The Logic Air is designed to deliver efficient, simple and reliable low carbon heating in homes throughout the UK.

Taking the learnings from the award winning Logic boiler, the Logic Air heat pump integrates seamlessly with UK homes, partnered with our best in class pre-plumbed hot water cylinder and our connected Halo Air room thermostat, the Logic Air is quick to install, easy to commission and simple to use.

Our new heat pumps are supported by our industry leading customer service and warranty team which is based in the UK and is open 364 days a year, providing customer service and technical support.

DIMENSIONS

	4kW & 5kW	8kW & 10kW
A	798	1008
B	518	518
C	1095	1095
D	499	499
E	518	518
F	558	558
G	688	688
H	516	516
I	80	80
J	184	184
K	140	140
L	95	95
M	84	84
N	48	48
O	90	90
P	103	105



KEY FEATURES

- Quiet operation
- Highly efficient: SCOP up to 5.19*
- Compatibility: radiator and underfloor heating systems
- Intuitive control: smart weather compensating controls
- Low carbon refrigerant: zero ozone depletion and low global warming potential
- Smart grid and solar PV compatible
- Monobloc technology enables easy installation and servicing
- Domestic hot water: hot, efficient and fast re-heat times with the Ideal heat pump cylinder range



HALO AIR

The Halo Air heat pump programmable room thermostat has a simple to use modern design with intelligent control.

- Simple, connected, and easy to use heat pump thermostat
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- Time and temperature zone control

4 models:

- Halo Air RF Single Zone [234819](#)
- Halo Air RF Two Zone [234791](#)
- Halo Air Wi-Fi Single Zone [234790](#)
- Halo Air Wi-Fi Two Zone [234792](#)

Technical Specification.

			Logic Air 4kW	Logic Air 5kW	Logic Air 8kW	Logic Air 10kW
Ideal Product Code			AH750664	AH750665	AH750666	AH750667
MCS Certification No.			KIWA 00027/024 HP	KIWA 00027/023 HP	KIWA 00027/021 HP	KIWA 00027/022 HP
Heat Pump Space Heating [35°C]*	ErP Rating		A+++	A+++	A+++	A+++
	η _s		195	200	203	205
	SCOP (EN14825)		4.96	5.07	5.16	5.19
Heat Pump Space Heating [55°C]*	ErP Rating		A++	A++	A++	A++
	η _s		136	143	145	146
	SCOP (EN14825)		3.48	3.65	3.7	3.73
Heating [A 7°C / W 35°C]*	Capacity (kW)		4.0	5.0	8.2	10.3
	Power Input (kW)		0.75	0.97	1.58	2.1
	COP		5.34	5.0	5.19	4.9
Heating [A 7°C / W 55°C]*	Capacity (kW)		4.0	5.0	8.2	10.3
	Power Input (kW)		1.33	1.64	2.67	3.42
	COP		3.00	3.04	3.07	3.01
Sound Power Level (EN 12102 - 1)	35°C	db(A)	52	52	55	55
	55°C	db(A)	52	52	55	55
Pipework Connection Sizes	Heating F/R (mm)		28mm	28mm	28mm	28mm
Dimensions Outdoor Unit (mm)	Width		1095	1095	1095	1095
	Depth		521	521	518	518
	Height		798	798	1008	1008
Weight (kg)	Outdoor Unit		86	86	110	110
Electrical Data	Electrical Supply (50 Hz)		230v	230v	230v	230v
	Phase		Single Phase	Single Phase	Single Phase	Single Phase
Refrigerant Charge (kg)*	R32		0.88	0.88	1.47	1.47
Certification	EN 14511:2018, EN 14825:2016, EN 12102 - 1:2022					

*Performance data in accordance with EN 14825 : 2016, EN 12102-1:2022, EN 14511 : 2018. The energy efficiency provided may not correspond to the actual energy once installed in a building, as the efficiency is influenced by other factors such as heat loss in the distribution system and the capacity of the products in relation to building size and characteristics.



INVESTMENT IN STATE-OF-THE ART TRAINING CENTRES

At Ideal we offer training at 16 locations throughout the UK alongside our unique mobile roadshow events. Our full time expert training managers offer a wide range of comprehensive courses, which can be customised to individual installation and service companies.

To support our UK wide training we have opened our first national training centre of excellence. With an investment of over £2m in state of the art heat pump training courses and equipment.

TRAINING LOCATIONS

OUR TRAINING CENTRES ARE ACCREDITED FOR BPEC AND CITY AND GUILDS.

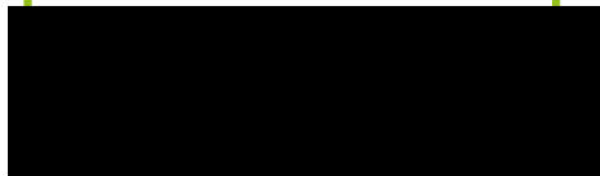
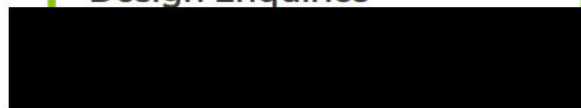
Since 2012 we have invested over £10m, providing free or low-cost training to heating installers across the UK and Ireland.



SUPPORT



Design Enquiries



Ideal Heating, PO Box 103,
National Avenue,
Kingston upon Hull,
East Yorkshire, HU5 4JN



idealheating.com

Logic Air.

MONOBLOC AIR SOURCE HEAT PUMP



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the UK climate



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HALO
AIR



The Logic Air.

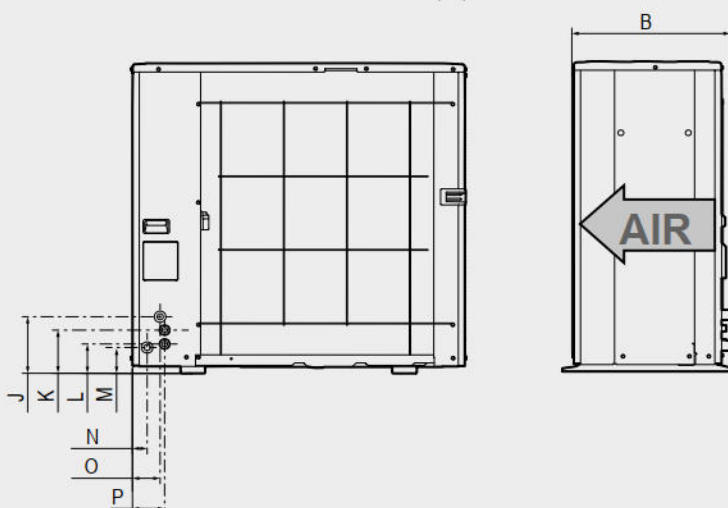
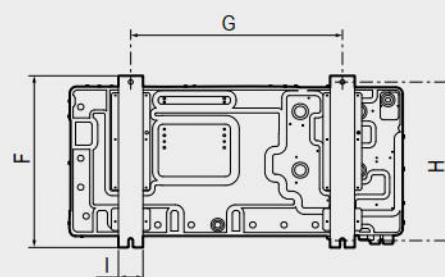
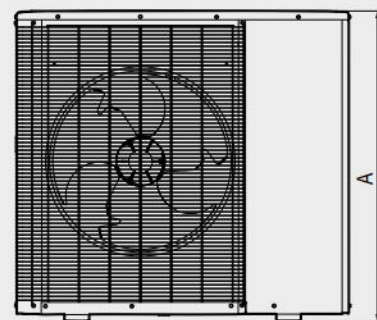
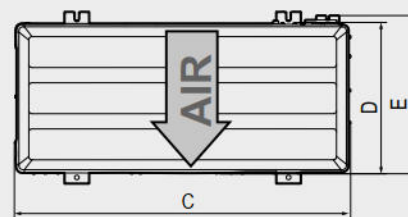
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Technical Specification.

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MCS Certification No.			KIWA 00027/024 HP	KIWA 00027/023 HP	KIWA 00027/021 HP	KIWA 00027/022 HP
Heat Pump Space Heating [35°C]*	ErP Rating		A+++	A+++	A+++	A+++
	ηs		195	200	203	205
	SCOP (EN14825)		4.96	5.07	5.16	5.19
Heat Pump Space Heating [55°C]*	ErP Rating		A++	A++	A++	A++
	ηs		136	143	145	146
	SCOP (EN14825)		3.48	3.65	3.7	3.73
Heating [A 7°C / W 35°C]*	Capacity (kW)		4.0	5.0	8.2	10.3
	Power Input (kW)		0.75	0.97	1.58	2.1
	COP		5.34	5.0	5.19	4.9
Heating [A 7°C / W 55°C]*	Capacity (kW)		4.0	5.0	8.2	10.3
	Power Input (kW)		1.33	1.64	2.67	3.42
	COP		3.00	3.04	3.07	3.01
Sound Power Level (EN 12102 - 1)	35°C	db(A)	52	52	55	55
	55°C	db(A)	52	52	55	55
Pipework Connection Sizes	Heating F/R (mm)		28mm	28mm	28mm	28mm
Dimensions Outdoor Unit (mm)	Width		1095	1095	1095	1095
	Depth		521	521	518	518
	Height		798	798	1008	1008
Weight (kg)	Outdoor Unit		86	86	110	110
Electrical Data	Electrical Supply (50 Hz)		230v	230v	230v	230v
	Phase		Single Phase	Single Phase	Single Phase	Single Phase
Refrigerant Charge (kg)*	R32		0.88	0.88	1.47	1.47
Certification	EN 14511:2018, EN 14825:2016, EN 12102 - 1:2022					

*Performance data in accordance with EN 14825 : 2016, EN 12102-1:2022, EN 14511 : 2018. The energy efficiency provided may not correspond to the actual energy once installed in a building, as the efficiency is influenced by other factors such as heat loss in the distribution system and the capacity of the products in relation to building size and characteristics.



INVESTMENT IN STATE-OF-THE ART TRAINING CENTRES

At Ideal we offer training at 16 locations throughout the UK alongside our unique mobile roadshow events. Our full time expert training managers offer a wide range of comprehensive courses, which can be customised to individual installation and service companies.

To support our UK wide training we have opened our first national training centre of excellence. With an investment of over £2m in state of the art heat pump training courses and equipment.

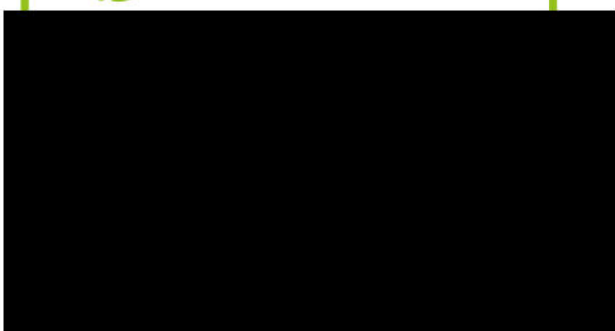
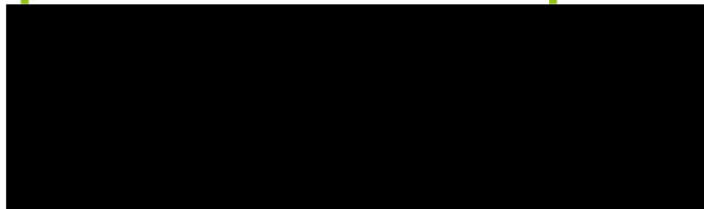
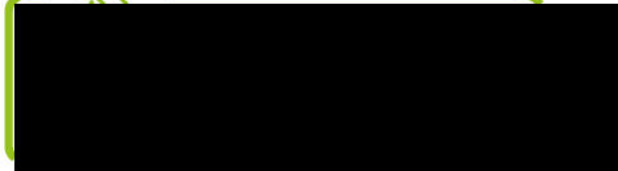
TRAINING LOCATIONS

OUR TRAINING CENTRES ARE ACCREDITED FOR BPEC AND CITY AND GUILDS.

Since 2012 we have invested over £10m, providing free or low-cost training to heating installers across the UK and Ireland.



SUPPORT



Ideal Heating, PO Box 103,
National Avenue,
Kingston upon Hull,
East Yorkshire, HU5 4JN
enquiries@idealheating.com

idealheating.com

Logic Air.

MONOBLOC AIR SOURCE HEAT PUMP



Designed for
the UK climate



364 days a year UK
customer service



Quiet Mark
certified



SCOP rating
up to 519%*



Hot water in
sunshine, rain,
ice and snow



HALO
AIR



The Logic Air.

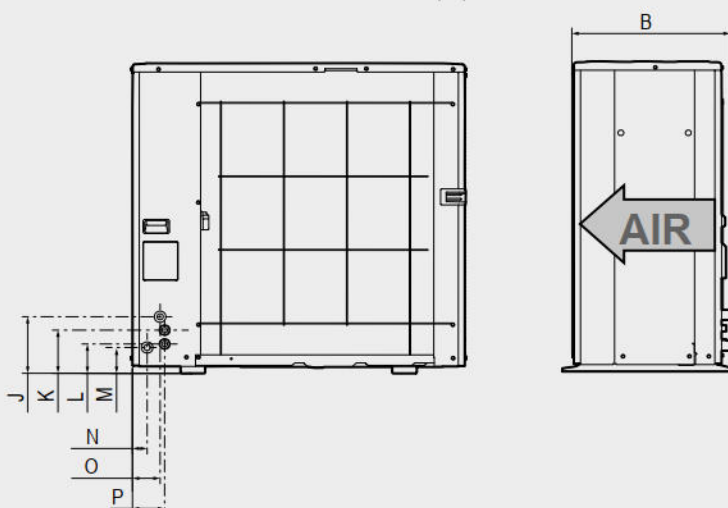
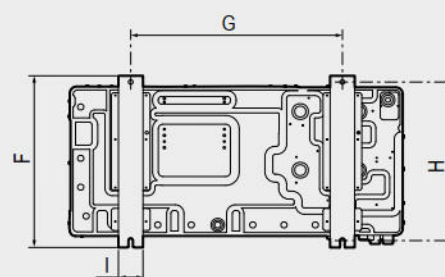
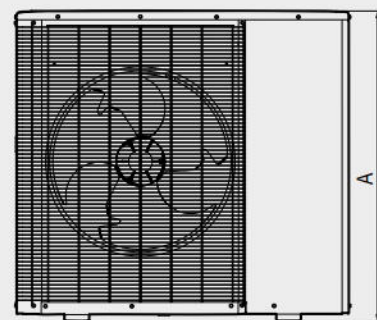
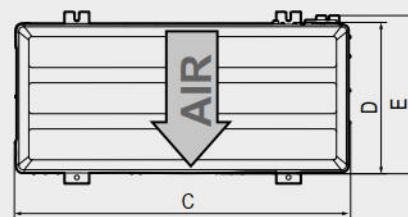
The Logic Air heat pump range is our new range of monobloc heat pumps, offering great efficiencies both in heating and hot water. The Logic Air is designed to deliver efficient, simple and reliable low carbon heating in homes throughout the UK.

Taking the learnings from the award winning Logic boiler, the Logic Air heat pump integrates seamlessly with UK homes, partnered with our best in class pre-plumbed hot water cylinder and our connected Halo Air room thermostat, the Logic Air is quick to install, easy to commission and simple to use.

Our new heat pumps are supported by our industry leading customer service and warranty team which is based in the UK and is open 364 days a year, providing customer service and technical support.

DIMENSIONS

	4kW & 5kW	8kW & 10kW
A	798	1008
B	518	518
C	1095	1095
D	499	499
E	518	518
F	558	558
G	688	688
H	516	516
I	80	80
J	184	184
K	140	140
L	95	95
M	84	84
N	48	48
O	90	90
P	103	105



KEY FEATURES

- Quiet operation
- Highly efficient: SCOP up to 5.19*
- Compatibility: radiator and underfloor heating systems
- Intuitive control: smart weather compensating controls
- Low carbon refrigerant: zero ozone depletion and low global warming potential
- Smart grid and solar PV compatible
- Monobloc technology enables easy installation and servicing
- Domestic hot water: hot, efficient and fast re-heat times with the Ideal heat pump cylinder range



HALO AIR

The Halo Air heat pump programmable room thermostat has a simple to use modern design with intelligent control.

- Simple, connected, and easy to use heat pump thermostat
- Remote control and remote diagnostics via mobile app
- Connected and non-connected options
- Time and temperature zone control

4 models:

- Halo Air RF Single Zone [234819](#)
- Halo Air RF Two Zone [234791](#)
- Halo Air Wi-Fi Single Zone [234790](#)
- Halo Air Wi-Fi Two Zone [234792](#)

Technical Specification.

			Logic Air 4kW	Logic Air 5kW	Logic Air 8kW	Logic Air 10kW
Ideal Product Code			AH750664	AH750665	AH750666	AH750667
MCS Certification No.			KIWA 00027/024 HP	KIWA 00027/023 HP	KIWA 00027/021 HP	KIWA 00027/022 HP
Heat Pump Space Heating [35°C]*	ErP Rating		A+++	A+++	A+++	A+++
	η _s		195	200	203	205
	SCOP (EN14825)		4.96	5.07	5.16	5.19
Heat Pump Space Heating [55°C]*	ErP Rating		A++	A++	A++	A++
	η _s		136	143	145	146
	SCOP (EN14825)		3.48	3.65	3.7	3.73
Heating [A 7°C / W 35°C]*	Capacity (kW)		4.0	5.0	8.2	10.3
	Power Input (kW)		0.75	0.97	1.58	2.1
	COP		5.34	5.0	5.19	4.9
Heating [A 7°C / W 55°C]*	Capacity (kW)		4.0	5.0	8.2	10.3
	Power Input (kW)		1.33	1.64	2.67	3.42
	COP		3.00	3.04	3.07	3.01
Sound Power Level (EN 12102 - 1)	35°C	db(A)	52	52	55	55
	55°C	db(A)	52	52	55	55
Pipework Connection Sizes	Heating F/R (mm)		28mm	28mm	28mm	28mm
Dimensions Outdoor Unit (mm)	Width		1095	1095	1095	1095
	Depth		521	521	518	518
	Height		798	798	1008	1008
Weight (kg)	Outdoor Unit		86	86	110	110
Electrical Data	Electrical Supply (50 Hz)		230v	230v	230v	230v
	Phase		Single Phase	Single Phase	Single Phase	Single Phase
Refrigerant Charge (kg)*	R32		0.88	0.88	1.47	1.47
Certification	EN 14511:2018, EN 14825:2016, EN 12102 - 1:2022					

*Performance data in accordance with EN 14825 : 2016, EN 12102-1:2022, EN 14511 : 2018. The energy efficiency provided may not correspond to the actual energy once installed in a building, as the efficiency is influenced by other factors such as heat loss in the distribution system and the capacity of the products in relation to building size and characteristics.



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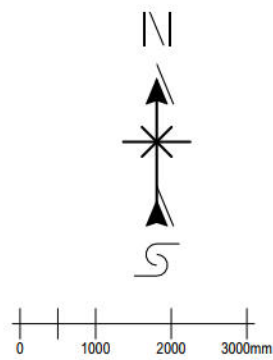


Ideal Heating, PO Box 103,
National Avenue,
Kingston upon Hull,
East Yorkshire, HU5 4JN
enquiries@idealheating.com

idealheating.com



Hard Landscape Plan
1:250



This drawing and its design content is copyright of Symmetry Architecture Ltd. It shall be read in conjunction with all other associated project information. Do not scale. All dimensions to be checked on site. If in doubt ASK.
Date printed: 25/11/2025

Safety, Health & Environmental

In addition to the hazards / risk normally associated with the type of works detailed on this drawing, please note the following information:

Notes

Landscape Key

- Tarmac
- 600x600 paving slabs
- Areas of soft landscape / Grass / Planting
- Shared Surface
- 1.8m high close board fence on Amis rails
- 450mm Knee rail

EASTMERE
PADDOCKS LTD.

C06	25/11/2025	OH	Pavement reduced to relevant length.
C05	07/06/2025	DS	Block paving changed to tarmac.
C04	24/07/2025	DS	Paving slabs added to garages.
C03	23/06/2025	MF	Garage areas updated to GA drawings.
C02	03/06/2025	MF	Brick plans removed from Plots 5 & 7.
Rev	Date	By	Description



SYMMETRY
architecture

www.symmetryarchitecture.co.uk
office@symmetryarch.co.uk
3A Station Approach Broadstone Dorset BH18 8AX
01202 973379

Client

Eastmere Paddocks Ltd

Project

Eastmere Stables
Eastergate Lane,
Eastergate

Title

Hard Landscape Plan

Scale Drawn / Checked

1:250 @ A1 MF / SA

Status / Purpose Date

A5 / January 2025

Construction Drawing Number Revision

1844 - SYM - XX - XX - DR - A - 0301 C06

Project Designer Date Issued Date

Appendix 4





Rated **Excellent**



★ Trustpilot

System Design Pack.

idealheating.com

Client Details

Client Name

SOL PLUMBING & HEATING SERVICES LTD

Client Address

EASTERGATE LANE
EASTERGATE
PO20 3SJ

Development Details

Development name

EASTMERE STABLES

Dwelling name/type

PLOTS 1 & 9

Design publish date

13/08/25

Design version number

-

Design reference number

20513-01

Heat Pump Terms & Conditions

General Provisions

1.0 Duty of Care and Compliance with Design Specifications

All parties engaged in the supply, installation, and commissioning of the heating system shall exercise a duty of care to ensure adherence to the design specifications provided. Ideal Heating shall not be liable for any reduction in system performance, operational deficiencies, or consequential losses arising from deviations in installation practices or the utilisation of materials not in conformity with the specified design.

Heat Loss

1.1 Basis of Heat Loss Calculations and System Design

The heat loss calculations and system design are calculated upon recognised industry standards and authoritative guidelines, including but not limited to BS 12831, CIBSE protocols, and MCS requirements. These calculations incorporate factors such as external ambient temperatures, air change rates, and thermal performance parameters, and are executed in accordance with prevailing methodologies and best practices applicable to the design of heating systems within the United Kingdom.

1.2 Reliance on Provided Drawings and U-Values

The heat loss calculations and system design are contingent upon the accuracy and completeness of drawings, information, and U-values supplied to Ideal Heating. Such data is presumed to account for thermal bridging as determined during the architectural design phase. Ideal Heating disclaims all liability for inaccuracies, omissions, or deficiencies in the provided U-values or associated information.

1.3 U-Values for Rooms Above Unheated Spaces

For rooms situated above unheated spaces, the heat loss calculations and system design rely upon the U-value specified for the floor separating the heated room from the unheated space beneath. It is assumed that said U-value is accurate and sufficient to enable the room to attain the designated internal temperature. Ideal Heating shall not be liable for any inaccuracies in the U-value or inadequacies in the insulation provided for such floors.

1.4 Operating Parameters and Temperature Standards

The system is engineered to deliver continuous heating, maintaining an internal comfort temperature of 21°C and a setback temperature of 18°C. These parameters constitute the operational baseline for the heating system, and no provision has been made for variations in heating demand or usage patterns diverging from this scope. Ideal Heating accepts no responsibility for performance issues resulting from deviations from these stipulated operating conditions.

Emitters

1.5 Standard Design Temperatures

The standard design utilises a mean water temperature of 42.5°C, incorporating a flow temperature of 45°C and a return temperature of 40°C, resulting in a delta T of 5°C.

1.6 Radiator Output Calculations

The calculation of radiator outputs and requisite adjustments for each room is based upon the mean water temperature, specified room design temperatures, radiator manufacturer data, and piping orientation.

1.7 Radiator Selection

Radiators shall be selected to align as closely as practicable with the heat loss calculations, based on data from the chosen radiator supplier. Ideal Heating reserves the right, at its sole discretion, to specify a radiator of greater capacity where necessary to meet the calculated heat loss requirements, particularly in instances of variation between manufacturers.

1.8 Towel Radiators

Towel radiators are dimensioned exclusively to satisfy the calculated heat loss requirements for the relevant room. Ideal Heating shall not be liable for deviations from these assumed operational parameters.

1.9 Electric Towel Radiators

Electric towel radiators shall be operated as a continuous heat source, consistent with the system design, and must incorporate independent time and temperature controls to ensure compliance with the specified heat loss calculations. Ideal Heating disclaims liability for performance issues arising from non-compliance with these parameters. Where electric towel radiators are specified by the developer, the rooms they serve shall be excluded from the heat pump's heat load calculation.

1.10 Thermostatic Radiator Valves (TRVs)

In systems incorporating thermostatic radiator valves (TRVs), radiators in rooms containing the programmable room thermostat shall be fitted exclusively with lockshield valves.

1.11 Radiator Installation Requirements

Radiators shall be installed with the minimum clearances specified in the manufacturer's instructions and a recommended minimum pipe size of 15mm helping to diminish potential issues arising from reduced bore pipework during installation, ensuring optimal flow and system efficiency. Ideal Heating disclaims liability for diminished performance resulting from improper installation or subsequent replacement of radiators with units deviating from the specified size and output.

1.12 Manifold Positioning and Design Specifications

The positioning of manifolds for underfloor heating systems shall be specified by the developer or the appointed underfloor heating design house, and Ideal Heating shall adhere strictly to these specifications. Ideal Heating shall ensure that the correct kilowatt (kW) output is delivered to each manifold in accordance with the provided design parameters. The design, installation, and performance of the manifold and all components downstream of the manifold, including but not limited to the manifold itself, pipework, associated fittings and controls are all outside the scope of Ideal Heating's design responsibility.

Cylinders

1.13 Sizing of Ideal Heating Cylinders

All cylinders supplied by Ideal Heating are dimensioned to satisfy the mandatory minimum volume requirements stipulated under BS 8558, ensuring compliance with applicable regulatory standards.

1.14 Compatibility and Performance of Heat Pump Cylinders

Ideal Heating heat pump cylinders are optimised for supporting hot water availability when paired with the Ideal Heating heat pump range. The system is configured for continuous domestic hot water (DHW) provision, with a DHW set point of 55°C and a hysteresis of 7°C. The DHW flow rate is engineered not to exceed 15 litres per minute. Ideal Heating shall not be liable for suboptimal performance where these conditions are not maintained.

1.15 Ideal Heating shall ensure that the recommended cylinder type and size are compatible with the designated cylinder cupboard space and adhere to the minimum clearances outlined in the manufacturer's instructions. However, these specifications do not include provisions for additional ancillary equipment. The responsibility for determining the location, orientation, and accessibility of such ancillary equipment rests solely with the installer.

1.16 Installation Clearances for Cylinders

Cylinders shall be installed with the minimum clearances prescribed in Section 2 of the Manufacturer's Instructions. The obligation to ensure the provision and maintenance of such clearances rests solely with the installer.

1.17 Third-Party Hot Water Cylinders

Where third-party hot water cylinders are employed, sizing shall be determined on the basis of a guideline providing 45 litres per bedroom, augmented by an additional 45 litres. The installer or developer bears full responsibility for ensuring that such cylinders conform to current and applicable British Standards.

1.18 Expansion Vessels

Expansion vessels shall be installed with sufficient access to facilitate routine maintenance. The duty to provide such access lies exclusively with the installer.

Pipework

1.19 Pipework Compliance

All pipework employed in central heating or water systems, whether copper, MLCP, pre-insulated, or plastic, shall comply with applicable WRAS approvals and relevant British Standards to ensure operational integrity and regulatory adherence.

1.20 Pre-Insulated Pipework

Where pre-insulated pipework is installed for underground sections of primary pipe runs, such installation shall conform to current British Standards and the manufacturer's instructions. Ideal Heating shall not be liable for performance issues arising from inadequate installation of such pipework.

1.21 Insulation of Pipework

All heating and water pipework shall be insulated and lagged in accordance with current mandatory British Standards, NHBC requirements, and the manufacturer's instructions, whilst adhering to prevailing industry best practices. Ideal Heating shall not be liable for performance issues arising from inadequate insulation or lagging.

1.22 Refrigerant Pipework

Ideal Heating provides indicative refrigerant pipework routing for heat pumps. Installers shall verify that rooms traversed by piping meet minimum volume requirements and calculate additional refrigerant, as per the Manufacturer's Instructions, for pipe lengths exceeding pre-charged capacity. Ideal Heating shall not be liable for diminished performance or safety non-conformities resulting from pipework arrangements contrary to regulation & recommended guidance

1.23 Cold Feed Pipework

Cold feed pipework is designed to accommodate a minimum dynamic pressure of 3 bar at the stop valve and a maximum velocity of 2m/s. Ideal Heating shall not be liable for performance issues attributable to insufficient dynamic pressure.

Controls

1.24 Positioning of Programmable Room Thermostats

The design incorporates indicative positioning of programmable room thermostat(s). Final positioning, accounting for house orientation, potential solar gains and adherence to manufacturer's instructions can be determined at the installation stage on site.

1.25 Third-Party Programmable Room Thermostats

Where third-party programmable room thermostats are utilised, such devices must provide functionality including a setback temperature not exceeding 3°C below the comfort temperature, a heating schedule with a minimum optimisation period of 2.5 hours, and a maximum cycle rate of one per hour to ensure compatibility with the heat pump system. Ideal Heating accepts no liability for performance deficiencies attributable to third-party thermostats lacking these specifications.

Heat Pump

1.26 Minimum Water Volume

The minimum free water volume as calculated during design stage must be consistently maintained to ensure the proper functioning of the heat pump system. The minimum volume is based on numerous factors including the specified pipe routes, any deviations from these designated routes may cause a reduction in free volume potentially affecting the system's overall performance. Ideal Heating shall not be liable for any reduction in minimum volume resulting from failure to adhere to the design pipe runs.

1.27 Heat Pump Positioning

The positioning of the heat pump is determined based on information provided to Ideal Heating via drawings, site plans, or request forms. Whilst Ideal Heating shall adhere to its manufacturer's instructions regarding airflow and maintenance clearances, it assumes no responsibility for verifying compliance with cupboard, boundary or noise regulations, which remain the obligation of the installer and/or developer.

Additional Systems and Requirements

1.28 Material Selection

Materials not supplied by Ideal Heating shall be selected in accordance with the developer's checklist. Liability for the suitability and compliance of such materials rests solely with the developer, and Ideal Heating disclaims all responsibility in this regard.

1.29 Fluid Medium

The design assumes water as the fluid medium for the system. Any substitution of an alternative medium must be expressly specified to ensure appropriate thermal properties are maintained. Ideal Heating shall not be liable for any reduction in efficiency resulting from failure to adhere to the specified medium.

1.30 Wastewater Heat Recovery Systems

The positioning of Wastewater Heat Recovery Systems, including associated hot and cold water pipework, is provided as a visual representation only. Ideal Heating shall not be responsible for the accuracy of sizing or performance of such systems.

1.31 Structural Modifications

All notching and drilling of floor joists shall comply with current British Standards. Ideal Heating disclaims liability for structural defects arising from exceedance of these limitations.

1.32 Water Softening

The necessity for water softening provisions shall be assessed at the installation and commissioning stage. Responsibility for determining and implementing such provisions rests with the installer.

1.33 Commissioning Requirements

Commissioning of the system shall be conducted in strict accordance with the manufacturer's instructions, including balancing & system cleaning to comply with relevant British Standards. Non-compliance may adversely affect system performance and efficiency, for which Ideal Heating shall not be liable.

1.34 Field Supply Equipment

All specified field supply equipment shall be installed in accordance with the relevant manufacturer's instructions, ensuring conformity with current British Standards and best practices. Ideal Heating disclaims liability for performance issues arising from inadequate equipment selection or installation.

1.35 Developer Specified Design Variations

Heating system designs are optimised for efficiency, performance, and cost-effectiveness. Where developers specify design requests that may negatively impact one of these outcomes, Ideal Heating will complete the design but shall not be liable for any reduced performance, efficiency, or longevity impacts. Developers are invited to consult Ideal Heating for guidance on efficiency-optimised designs.

Intellectual Property

1.36 Copyright Design Template

The design template embodied within these terms and conditions, including all associated specifications and recommendations, is the intellectual property of Ideal Heating and is protected by copyright. Any reproduction, adaptation, or distribution of this template without the express written consent of Ideal Heating is strictly prohibited.

Design Parameters			
Internal Temps and Air Change rates as per CIBSE/NHBC			
Flow 45°C / Return 40°C			
External Temp		U-Values	
PO20 3SJ	-2.80°C	Wall	0.16
Avg. Altitude	20	Floor	0.12
Ceiling Heights (m)		Roof	0.11
Ground Floor	2.460m	Window	1.2 / 1.4
First Floor	2.445m	Door	1.20
		Warm Roof	0.14

Heat Loss			
Ground Floor (kW)	First Floor (kW)	Second Floor (kW)	Total (kW)
2.13kW	2.02kW		4.15kW

Stelrad Compact Radiators / Kartell Krail Towel Rails					
Emitter No.	Room Name	Zone	Type	Height (mm)	Length (mm)
FF-1	Landing	1	Compact K2	700 mm	600 mm
FF-2	Study	1	Compact K1	600 mm	900 mm
FF-3	Bedroom 1	1	Compact K2	600 mm	1200 mm
FF-4	Bedroom 2	1	Compact K1	600 mm	1000 mm
FF-5	Bathroom	1	25mm Chrome	1600 mm	500 mm
FF-6	En-Suite	1	25mm Chrome	1800 mm	600 mm

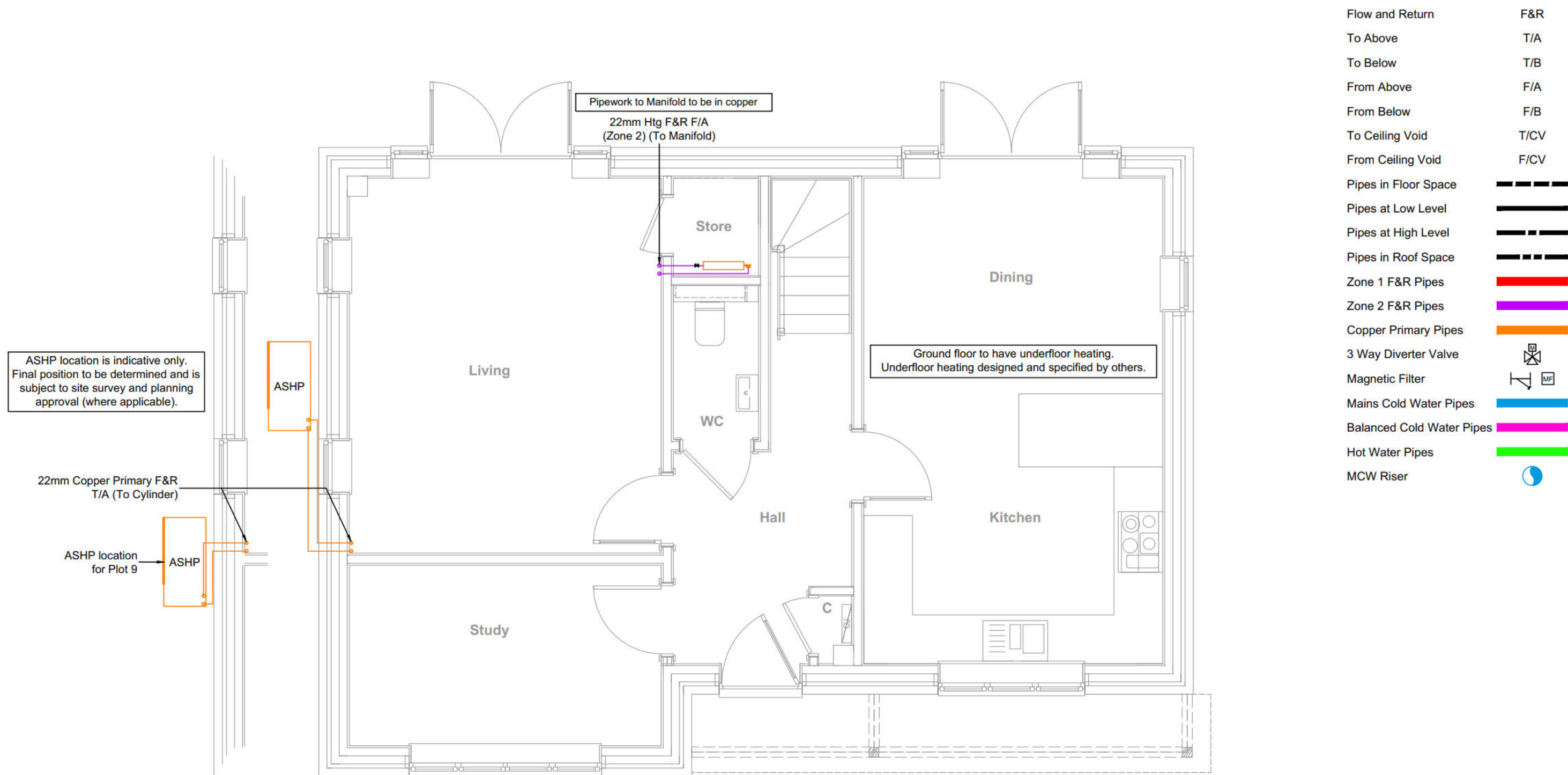
ESSENTIAL EQUIPMENT ASHP	
ASHP	Logic Air monobloc 4kW R32
Cylinder	Logic Air DHW pre-plumbed 180L & integrated buffer (2-zone)
Primary Circulator	Included with Heat Pump and Cylinder.
Programmer/Controls	Halo Air Wifi (234790)
UFH Controls	Third Party Controls
Outdoor Sensor	Included with Monobloc
Potable Expansion Vessel	Included with Cylinder
Heating Expansion Vessel	8L Heating expansion vessel (Field Supply)
Accessories	Anti-vibration rubber mounting feet (AH809536)
	Flexible hose - 500mm (236909) or 750mm (236910)
Electrical	Rotary Isolator IP65 Rated (Field Supply)
Frost Protection	Anti-Freeze Valves (Field Supply)
SECONDARY ANCILLARY EQUIPMENT ASHP	
T.R.V.s	To be specified by client
	To all radiators except room stat rooms.
Lockshield Valves	To be specified by client
Biocide & Inhibitor	Suitable Adey to be added in accordance with the manufacturers instructions and BS7593:2019.
Magnetic Filter	Magnetic system filter - Included with pre-plumbed cylinder.
Primary Pipework Insulation	Field Supply
Plastic Pipework	Pipework & fittings to be specified by client

Ground floor to have underfloor heating.
Underfloor heating designed and specified by others.

Weather Curve	
-1	1.10
-2	1.04
-3	1.00
-4	0.96
-5	0.92
-6	0.88

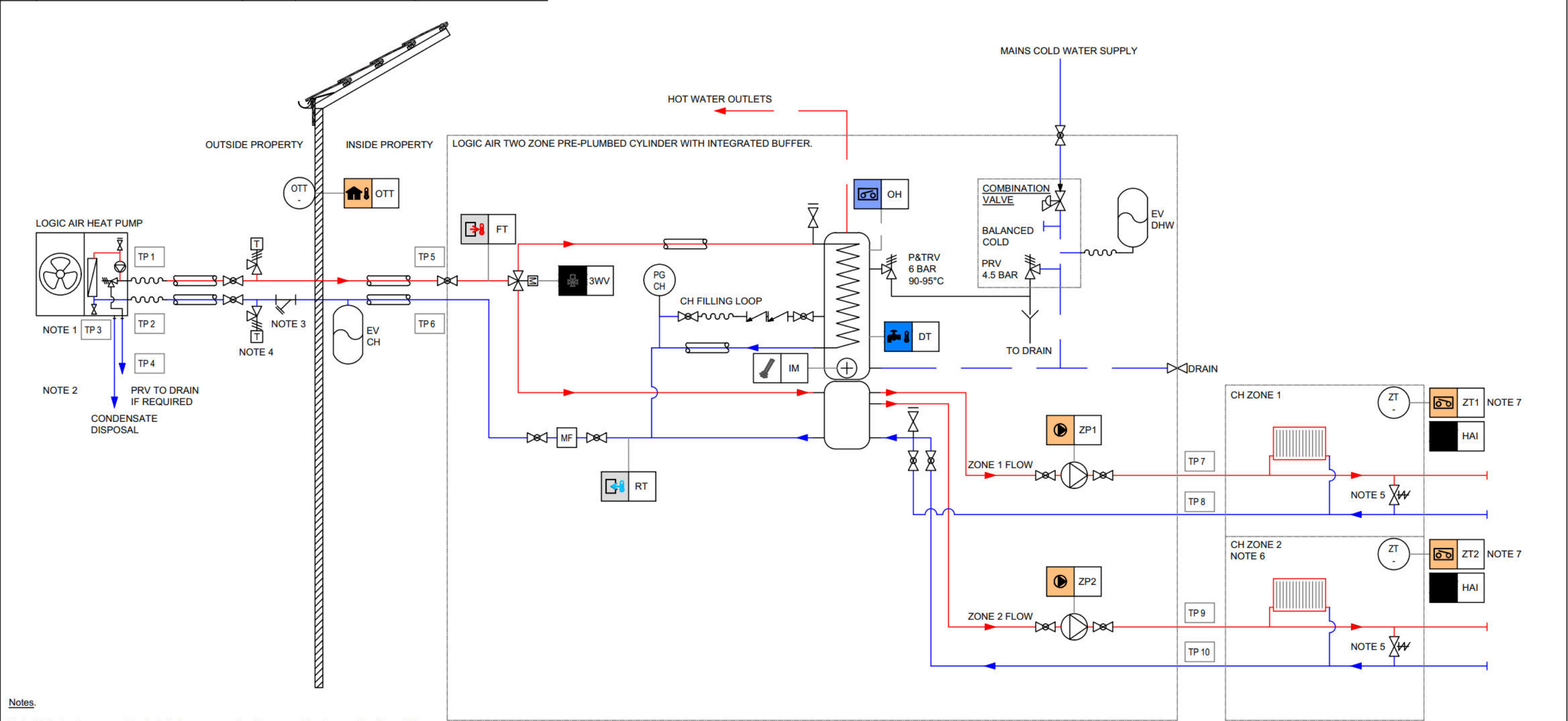


SCHEDULE OF EQUIPMENT	
DRAWN BY - SM	CHECKED BY - PM / NB / JS
SCALE - N/A	DATE - 13/08/25



CONNECTION POINT LIST				
TP No	DESCRIPTION	SIZE	MATERIAL	TYPE
1	HEAT PUMP FLOW	1" BSP	BRASS	BSP MALE
2	HEAT PUMP RETURN	1" BSP	BRASS	BSP MALE
3	HEAT PUMP CONDENSATE DISPOSAL	-	-	-
4	PRESSURE RELIEF VALVE (PRV)	15MM	COPPER	COPPER PIPE OUTLET
5	CYLINDER HEAT PUMP FLOW	28MM	BRASS	COMPRESSION
6	CYLINDER HEAT PUMP RETURN	28MM	BRASS	COMPRESSION
7	ZONE 1 FLOW	28MM	BRASS	COMPRESSION
8	ZONE 1 RETURN	28MM	BRASS	COMPRESSION
9	ZONE 2 FLOW	28MM	BRASS	COMPRESSION
10	ZONE 2 RETURN	28MM	BRASS	COMPRESSION

Logic Air + Two Zone Pre-plumbed Cylinder with Integrated Buffer.



Notes.

- Note 1. The heat pump must be installed on a secure level base capable of supporting its weight.
- Note 2. Refer to the installation manual for condensate and pressure relief discharge requirements.
- Note 3. A particle filter can be supplied as an option and it's recommended that a magnetic filter is installed. Logic Air Pre-plumbed cylinders are supplied complete with a combined magnetic and particle filter.
- Note 4. Anti-freeze valves are required if glycol is not used in the system.
- Note 5. Install an auto-bypass if no permanent open circuit is available to allow secondary side pump overrun and normal operation.
- Note 6. Logic Air single zone pre-plumbed arrangement is available.
- Note 7. Refer to the installation manual for smart or ON/OFF thermostat connection.
- Note 8. Free volume must be considered as any part of the un-valved system volume (excluding the zone 2 space heating circuit) with sections of pipework and radiators without thermostatic radiator valves.

This drawing is for information and guidance only. It is the heating designer/ installers responsibility to adhere to the latest relevant standards.

Refer to Logic Air monobloc heat pump system installation and maintenance manual in conjunction with these schematic drawings.