



ENERGY STRATEGY

PROJECT:

Bedford Road, Hitchin

PROJECT NUMBER:

L012

DOCUMENT REF:

L012-QRL-SW-XX-RP-O-98001

Revision	Date	Details	Authored	Checked
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1. Introduction

This Energy Strategy has been prepared by QuinnRoss London Ltd on behalf of Arte Developments Ltd, to accompany a full planning permission application for the proposed development at Bedford Road, Hitchin. The development consists of 37 houses and 11 flats, totalling 48 dwellings.

This report will outline how a fabric first approach to energy efficiency has been adopted to minimise demand and create inherent efficiency.

A Feasibility Study is presented in Appendix A, which investigates the most appropriate Low/Zero Carbon technology to include on the development, to ensure that primary energy and carbon emission are reduced further.

In addition to the Approved Document Part L (AD Part L) analysis, this report also outlines Energy Use Intensity (EUI) predictions and space heating demand calculations.

The analysis contained in this statement is aligned with related documents and assessments that are submitted as part of the application.

2. Planning Policy and Building Regulations

There are a wide range of energy-related planning policies that impact upon the design and construction of new developments. Specifically, this analysis looks to address the Energy Strategy requirements that are required by Sustainable Design Supplementary Planning Document (SPD) 2024.

To understand performance of the proposal it is essential to understand the Building regulation Approved Document Part L: Conservation of Fuel Power.

The Local Plan 2011 - 2031

The Local Plan 2011 – 2031 for North Hertfordshire District Council seeks to address the key issues facing North Hertfordshire and sets a strategic vision and spatial strategy for the district over the period 2011 to 2031.

Whilst there is no specific policy to address from a sustainability perspective, there are elements of policies that this report intends to address as follows:

- Policy SP1: Sustainable development in North Hertfordshire, asks that proposals include necessary mitigation measures that reduce the impact of development, including on climate change.
- Policy SP11: Natural resources and sustainability, supports the inclusion of renewable and low carbon energy.
- Policy D1: Sustainable design, asks that proposals reduce energy consumption and meet or exceed the nationally described space and water efficiency standards.



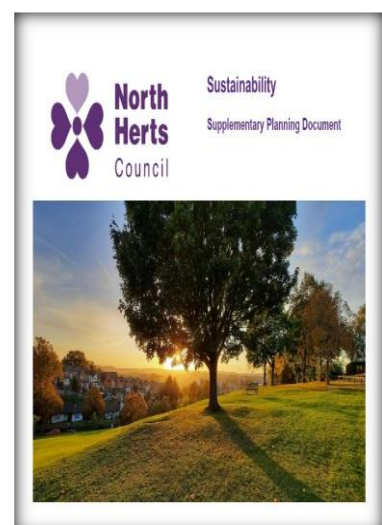
Sustainability SPD

This North Hertfordshire District Council Supplementary Planning Document sets out the standards required to meet the visions, objectives and policies of the North Herts Local Plan as sustainably as possible.

This document aims to provide further guidance and set out what our sustainability expectations are for different forms of development when applying the Local Plan policies.

This report focus on the following section of the SPD, but a separate report is provided that summarises performance within all sections of the SPD.

- Optimising Passive Design & Fabric Performance
- Achieving Low Carbon Energy

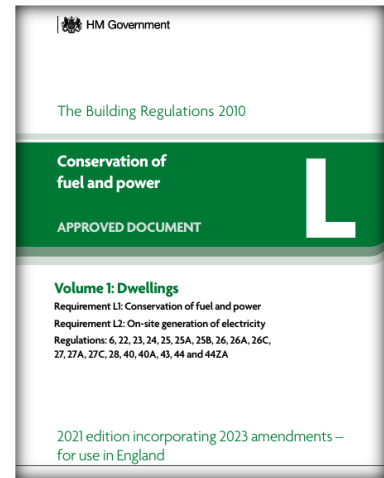


Approved Document Part L (Conservation of Fuel and Power)

Approved Document Part L (AD Part L) of the Building Regulations sets out the standards for the conservation of fuel and power in buildings. The current version, Approved Document L, Volume 1: Dwellings (June 2022, with subsequent amendments), provides guidance on achieving energy efficiency in both new and existing residential developments.

The regulations require that dwellings are designed and constructed to limit heat losses and gains, ensure efficient fixed building services, and reduce carbon emissions in line with national energy performance targets.

This report uses the regulatory baseline requirements of Approved Document Part L as a benchmark to assess and illustrate the energy performance of the proposed development.



3. Calculation Methodology

The schemes AD Part L performance has been calculated using the Standard Assessment Procedure (SAP), the Government's approved tools for assessing performance of dwellings, and is used to demonstrate compliance with *Building Regulations Part L: Conservation of Fuel and Power*.

SAP compliance is measured against a 'notional dwelling' which represents the regulatory minimum performance standard for a proposed dwelling. The 'notional' dwelling is based on the same size and shape as the proposed dwelling, but its specification is adjusted to standardised 'notional' values (for example, glazing area is limited to 25% of the total floor area). From this 'notional' dwelling, three target performance metrics are generated – Primary Energy Rate, Carbon Emission Rate, and Fabric Energy Efficiency – which the proposed dwelling must meet or exceed.

A representative sample of dwellings has been assessed using SAP. This report summarises the proposals against each metric, showing that AD Part L compliance is exceeded.

The energy calculations have been undertaken by an accredited Energy Assessor, licensed to use all applicable assessment software.

4. SAP Inputs

This section outlines the proposed specification with regard to SAP and AD Part L 2021.

Thermal envelope

Fundamental to achieving energy efficiency in any building is a suitably designed thermal envelope. Passive design features such as appropriate orientation, balancing solar gain and limiting heat loss are all proven techniques to reduce energy consumption. In addition, minimising thermal bridging and controlling air infiltration are important factors.

An air permeability target of 5 has been specified, ensuring uncontrolled air leakage will be minimised to excellent standards. Very low U-Values are specified throughout and non-repeating thermal bridging heat loss at building element junctions will be minimised. G-Value requirements were derived from an overheating assessment and are entered at 0.60 throughout.

The following table illustrates the proposed building fabric performance specification, with respect to the limiting values stipulated in Part L 2021. It is shown that the proposed specification represents a significant betterment of the minimum standards.

Element	Proposed (W/m ² K)	Part L Volume 1 2021 (W/m ² K)	Improvement
Ground and exposed floors	0.12	0.18	33%
External walls	0.18	0.26	31%
Internal heat loss walls to stairwell and corridors	0.24*	0.26	8%
Exposed roofs	0.09	0.16	44%
Openings	1.40	1.60	13%
Party walls to dwellings	Fully filled sealed cavities. No clear cavities.		

*Including resistance factor for sheltered space as calculated in BR 443 Section 5

At this early stage an estimation of what dwelling PSI value might be achieved are shown below. These values are taken from the Recognised Construction Details website, who provide the industry with a suite of independently assessed thermal junction details that have been certified for use in demonstrating compliance with Part L of the Building Regulations.

	Ref	Description	PSI Value (W/mK)
Facade junction	E1 / E2	Lintel	0.03
	E3	Sill	0.022
	E4	Jamb	0.017
	E5	Ground floor (normal)	0.068
	E6	Intermediate floor within a dwelling	0.001
	E7	Party floor between dwellings (in blocks of flats)	0.053
	E10	Eaves (insulation at ceiling level)	0.063
	E12	Gable (insulation at ceiling level)	0.055
	E16	Corner (normal)	0.041
	E17	Inverted Corner	-0.086
	E18	Party wall between dwellings	0.041
Party wall junctions	E25	Staggered party wall	0.03
	P1	Ground floor	0.042
	P2	Intermediate floor within a dwelling	0
	P3	Intermediate floor between dwellings	0
	P4	Roof (insulation at ceiling level)	0.033

It should also be noted that all specification is subject to review, and as such U, G, and PSI Values will be investigated further in the future the design stages, with the aim of limiting heat loss, and to reduce emissions as much as practically possible.

Building Services

Having first reduced the energy demand through a fabric-first approach, emissions are further minimised through the integration of low- and zero-carbon technologies into the proposals. [Appendix A](#) outlines the technologies considered and provides the rationale for discounting certain options.

The strategy chosen for the development is fully electric, ensuring a fossil fuel-free approach that supports compliance with Part L and aligns with the transition to low-carbon energy. Air Source Heat Pumps (ASHPs) are adopted throughout the development; however, for the apartments, Exhaust Air Heat Pumps (EAHPs) are utilised due to the constraints associated with locating external units.

The below table detail the proposed building services specification for the houses.

HVAC Details (Houses)	Specification
Description	Air Source Heat Pump (ASHP) providing heating and hot water
Controls	Time and temperature zone control
Cylinder capacity and losses	210lt with 1.8kWh/day losses
Lighting	Lighting with minimum efficacy of 105Lm/W
Ventilation	Decentralized Mechanical Extract Ventilation (DMEV)

The below table detail the proposed building services specification for the flats.

HVAC Details (Flats)	Specification
Description	Exhaust Air Heat Pump (EAHP) providing heating, hot water, ventilation and 'trim cooling'.
Controls	Programmer and room thermostat
Cylinder capacity and losses	Cylinder integral to EAHP.
Lighting	Lighting with minimum efficacy of 105Lm/W
Ventilation	Mechanical Ventilation with Heat Recovery (MVHR)

5. Results

This section outlines the results for the sample SAP assessment.

The below table shows results for each sample SAP carried out.

Plot Reference	DPER	TPER	% DPER < TPER	DER	TER	% DER < TER	DFEE	TFEE	% DFEE < TFEE
18	46.55	60.12	22.57	4.4	11.49	61.71	33.95	36.03	5.77
25	41.35	53.61	22.87	3.94	10.26	61.6	39.04	39.52	1.22
34	41.55	52.36	20.65	3.94	10.04	60.76	33.74	34.84	3.15
47	42.98	60.55	29.02	4.07	11.58	64.85	33.97	34.28	0.92
48	42.98	60.55	29.02	4.07	11.58	64.85	33.97	34.28	0.92
49	44.22	65	31.96	4.19	12.42	66.26	37.57	38.75	3.05
50	44.7	65	31.24	4.24	12.42	65.86	37.57	38.75	3.05
7	48.1	63.97	24.81	4.55	12.23	62.8	36.11	37.87	4.65
9	46.01	61.01	24.59	4.37	11.68	62.59	39.94	41.28	3.25

Most importantly, we can see from the above table that all dwellings surpass the minimum requirements of AD Part L.

Notably, the Design Fabric Energy Efficiency (DFEE) is often 3% lower than the corresponding Target Fabric Energy Efficiency (TFEE) showing good fabric design and commitment to prioritising energy demand reduction.

Furthermore, due to the specification of heat pump technology, the Design Primary Energy Rating (DPER) and Design Emissions Rate (DER) are approximately 60% lower than the corresponding notional targets.

Overall SAP compliance has been shown to be achieved comfortably.

A predicted EPC rating of B is achieved for all dwellings within the sample.

6. Energy Use Intensity and Space Heating Demand

Energy Use Intensity (EUI) is a measure of the total energy consumed in a building annually. It includes both regulated (fixed systems for lighting, heating, hot water, air conditioning and mechanical ventilation) and unregulated (cooking and all electrical appliances, and other small power) energy. It does not include energy use from electric vehicle charging or any reduction in EUI due to renewable energy generation on-site. EUI is expressed using gross internal area (GIA).

Space Heating Demand is self-explanatory and excludes any contribution from renewable energy generation.

Planning authorities are increasingly encouraging PHPP or TM54 methodology to calculate EUI, as Part L methodology has been shown to be inaccurate when calculating actual performance. It is expected that Part L methodology will be adapted to improve predictions, through the introduction of Future Homes Standards (FHS) and the Home Energy Model (HEM). However, these tools are yet to be developed adequately to allow for full analysis of the development. It follows that there is a misalignment between planning expectations and approved Part L software packages, with Part L data giving unrealistically low estimates.

SAP Appendix L has been used to calculate the unregulated appliance and cooking energy, and results combined with regulatory SAP energy figures to give the total EUI for each dwelling.

Space heating demand figures have been taken from SAP DER worksheets Section 8.

The below table summarises the results of the analysis:

Plot Reference	EUI (kWh/m ² /yr)	Space Heating Demand (kWh/m ² /yr)
18	64.32	24.21
25	55.88	31.21
34	58.27	24.98
47	62.92	24.05
48	62.92	24.05
49	63.70	26.68
50	64.00	27.53
7	66.10	25.5
9	62.03	31.29

7. Conclusion

This Energy Strategy has outlined the proposed preliminary specification for the development and the predicted performance in relation to SAP, the methodology for assessing compliance with AD Part L.

A fabric-first approach has been adopted to minimise energy demand, with strong performance demonstrated by the Dwelling Fabric Energy Efficiency (DFEE) being well within the Target Fabric Energy Efficiency (TFEE) standard.

A Feasibility Study has been carryout out, investigating the most appropriate Low/Zero Carbon technology to include on the development.

Heat pump technology has been specified to ensure the development is entirely fossil fuel-free, while delivering significant reductions in both primary energy use and carbon emissions.

Additional calculations have been carried out to assesses EUI and space heating demand, using the SAP methodology.

In relation to the North Hertfordshire Sustainability SPD checklist for Optimising Passive Design and Fabric Performance, the scheme been shown to achieve a very strong 'Bronze' standard. Some aspects of 'Silver' standard have been achieved although some elements have fallen a little short.

Appendices

Appendix A – Renewable Technology Considerations

Technology	Description	Considerations for this development	Feasibility
Photovoltaic (PV) panels	PV panels convert the sun's energy into electricity.	It is rare for PV to be infeasible. There is clearly roof space available for PV, and it is therefore a viable technology to include in the development.	
Solar hot water (SHW)	SHW panels use sunlight to heat the water, which can then be used within the building.	It is expected that 100% of heat will be provided by the heat pump, so integration of solar hot water would be technically and economically unfeasible given the system design.	
Wind energy	Wind turbines utilise kinetic energy of the air to move propeller-like blades around a rotor. The rotor is connected to a main shaft which in turn spins a generator converting rotational energy into electricity.	Wind turbines are very rarely included in an urban development such as this, due to low wind speed, and for aesthetic reasons. This technology is therefore not considered to be feasible.	
Ground/water source heat pumps	Heat pumps extract heat from air/ground/water via a reversed refrigeration cycle. Heat is absorbed and increased via compression. This useful heat is transferred to the building via a refrigerant to provide space and/or water heating.	There is no reliable water source near the site, so water source is clearly not feasible. The efficiencies of ground source heat pump are not generally significantly greater than alternative types of heat pump that are less challenging to integrate.	
Air Source Heat Pumps	As above	Air source heat pumps are feasible for houses due to adequate external space for unit installation. Exhaust Air heat pumps are considered a more feasible solution for the flats due to the lack of dedicated external space.	
Biofuels	Biofuel technology typically refers to the combustion of an organic product (solid, liquid or, gas) for heat generation in place of fossil fuels. Carbon dioxide released in combustion is taken to be recently fixated and then readily absorbed in the creation of the next fuel generation, e.g. tree plantation. Biofuels are therefore considered low carbon.	Combustion of biofuels can have significant impacts on local air quality, including NOx emission and particulate matter. Combustion of any fuel is generally discouraged, as grid supplied electricity is seen to be preferred. This is especially due to the recent and projected decarbonisation of the national grid. This technology is therefore not considered to be feasible.	



Appendix B – Sample SAP Calculations

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 22 Oct 2025 10:40:26

Project Information			
Assessed By	Chris Armstrong	Building Type	House, Semi-detached
OCDEA Registration	EES/027311	Assessment Date	2025-10-22

Dwelling Details			
Assessment Type	As designed	Total Floor Area	72 m ²
Site Reference	7	Plot Reference	Type A
Address	Type A		

Client Details	
Name	Arte Construction Ltd
Company	Arte Construction Ltd
Address	34 – 35 Berwick Street, London, 8RP

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	12.23 kgCO ₂ /m ²	
Dwelling carbon dioxide emission rate	4.55 kgCO ₂ /m ²	OK

1b Target primary energy rate and dwelling primary energy		
Target primary energy	63.97 kWh _{PE} /m ²	
Dwelling primary energy	48.1 kWh _{PE} /m ²	OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	37.9 kWh/m ²	
Dwelling fabric energy efficiency	36.1 kWh/m ²	OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.4	Opening (1.4)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	71.33	0.18
Party wall: Party Wall (1)	44	0 (!)
Ground floor: Heatloss Floor 1, Heatloss Floor 1	36.08	0.12
Exposed roof: Roof (1)	36.08	0.09 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Front Door	2.1	East	N/A	1.4
Opening, Glazing	2.1	West	0.7	1.4
Opening, Glazing	1.31	West	0.7	1.4
Opening, Glazing	1.5	West	0.7	1.4
Opening, Glazing	2.17	East	0.7	1.4
Opening, Glazing	2.17	East	0.7	1.4
Opening, Glazing	0.82	East	0.7	1.4
Opening, Glazing	1.5	West	0.7	1.4

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))	
Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.03 (!)	
External wall	E3: Sill	Calculated by person with suitable expertise	0.022 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.017 (!)	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.068	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.001 (!)	
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.063	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.055	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.041	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.041	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.042	
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.033 (!)	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	5 m ³ /hm ² , Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity		
Efficiency	284.5%	
Emitter type	Radiators	
Flow temperature	45°C	
System type	Heat Pump	
Manufacturer	Mitsubishi Electric Europe B.V.	
Model	Ecodan 8.5 kW	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water

Cylinder/store - type: Cylinder		
Capacity	210 litres	
Declared heat loss	1.8 kWh/day	
Primary pipework insulated	Yes	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		

Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	0.7 W/(l/s)	
Specific fan power	0.08 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	ISENSE-PLUS	
Commissioning		
9 Local generation		
N/A		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 22 Oct 2025 10:40:25

Project Information			
Assessed By	Chris Armstrong	Building Type	House, Detached
OCDEA Registration	EES/027311	Assessment Date	2025-10-22

Dwelling Details			
Assessment Type	As designed	Total Floor Area	94 m ²
Site Reference	9	Plot Reference	B
Address	Ba		

Client Details	
Name	Arte Construction Ltd
Company	Arte Construction Ltd
Address	34 – 35 Berwick Street, London, 8RP

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	11.68 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	4.37 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	61.01 kWh _{PE} /m ²		
Dwelling primary energy	46.01 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	41.3 kWh/m ²		
Dwelling fabric energy efficiency	39.9 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.18	Walls (1) (0.18)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.3	Opening (1.3)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))			
Name	Net area [m ²]	U-Value [W/m ² K]	
Exposed wall: Walls (1)	126	0.18	
Ground floor: Heatloss Floor 1, Heatloss Floor 1	47.04	0.12	
Exposed roof: Roof (1)	47.04	0.09 (!)	

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Front Door	2.1	East	N/A	1.3
Opening, Glazing	1.5	East	0.7	1.3
Opening, Glazing	0.7	East	0.7	1.3
Opening, Glazing	1.5	East	0.7	1.3
Opening, Glazing	1.5	East	0.7	1.3
Opening, Glazing	0.7	East	0.7	1.3
Opening, Glazing	1.5	East	0.7	1.3
Opening, Glazing	3.3	North	0.7	1.3
Opening, Glazing	1.3	North	0.7	1.3
Opening, Glazing	1.5	North	0.7	1.3
Opening, Glazing	2.2	South	0.7	1.3
Opening, Glazing	2.2	South	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.03 (!)	
External wall	E3: Sill	Calculated by person with suitable expertise	0.022 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.017 (!)	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.068	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.001 (!)	
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	
External wall	E12: Gable (insulation at ceiling level)	SAP table default	0.25	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.041	
External wall	E18: Party wall between dwellings	SAP table default	0.24	
Party wall	P1: Ground floor	SAP table default	0.32	
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	
External wall	E19: Ground floor (inverted)	SAP table default	0.1	
External wall	E25: Staggered party wall between dwellings	SAP table default	0.24	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	
External wall	E1: Steel lintel with perforated steel base plate	SAP table default	1	
3 Air permeability (better than typically expected values are flagged with a subsequent (!))				
Maximum permitted air permeability at 50Pa		8 m³/hm²		
Dwelling air permeability at 50Pa		5 m³/hm², Design value		OK
Air permeability test certificate reference				
4 Space heating				
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity				
Efficiency		299.6%		
Emitter type		Radiators		
Flow temperature		45°C		
System type		Heat Pump		
Manufacturer		Mitsubishi Electric Europe B.V.		
Model		Ecodan 8.5 kW		
Commissioning				
Secondary heating system: N/A				
Fuel		N/A		
Efficiency		N/A		
Commissioning				
5 Hot water				
Cylinder/store - type: Cylinder				
Capacity		210 litres		
Declared heat loss		1.8 kWh/day		
Primary pipework insulated		Yes		
Manufacturer				
Model				
Commissioning				
Waste water heat recovery system 1 - type: N/A				
Efficiency				
Manufacturer				
Model				

6 Controls		
Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	0.7 W/(l/s)	
Specific fan power	0.24 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	ISENSE-PLUS	
Commissioning		
9 Local generation		
N/A		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 22 Oct 2025 10:40:25

Project Information			
Assessed By	Chris Armstrong	Building Type	House, Semi-detached
OCDEA Registration	EES/027311	Assessment Date	2025-10-22

Dwelling Details			
Assessment Type	As designed	Total Floor Area	79 m ²
Site Reference	18	Plot Reference	HAA
Address	HAA		

Client Details	
Name	Arte Construction Ltd
Company	Arte Construction Ltd
Address	34 – 35 Berwick Street, London, 8RP

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	11.49 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	4.4 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	60.12 kWh _{PE} /m ²		
Dwelling primary energy	46.55 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	36.0 kWh/m ²		
Dwelling fabric energy efficiency	34.0 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.4	Opening (1.4)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	78.04	0.18
Party wall: Party Wall (1)	49	0 (!)
Ground floor: Heatloss Floor 1, Heatloss Floor 1	39.5	0.12
Exposed roof: Roof (1)	39.5	0.09 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Front Door	2.1	West	N/A	1.4
Opening, Glazing	0.78	West	0.7	1.4
Opening, Glazing	1.44	West	0.7	1.4
Opening, Glazing	1.44	West	0.7	1.4
Opening, Glazing	2.1	East	0.7	1.4
Opening, Glazing	1.44	East	0.7	1.4
Opening, Glazing	2.16	East	0.7	1.4

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))	
Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.03 (!)	
External wall	E3: Sill	Calculated by person with suitable expertise	0.022 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.017 (!)	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.068	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.001 (!)	
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.063	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.055	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.041	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.041	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.042	
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.033 (!)	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	5 m ³ /hm ² , Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity		
Efficiency	285.9%	
Emitter type	Radiators	
Flow temperature	45°C	
System type	Heat Pump	
Manufacturer	Mitsubishi Electric Europe B.V.	
Model	Ecodan 8.5 kW	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water

Cylinder/store - type: Cylinder		
Capacity	210 litres	
Declared heat loss	1.8 kWh/day	
Primary pipework insulated	Yes	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		

Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	0.7 W/(l/s)	
Specific fan power	0.23 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	ISENSE-PLUS	
Commissioning		
9 Local generation		
N/A		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 22 Oct 2025 10:40:26

Project Information			
Assessed By	Chris Armstrong	Building Type	House, Detached
OCDEA Registration	EES/027311	Assessment Date	2025-10-22

Dwelling Details			
Assessment Type	As designed	Total Floor Area	119 m ²
Site Reference	25	Plot Reference	Fa
Address	Type F		

Client Details	
Name	Arte Construction Ltd
Company	Arte Construction Ltd
Address	34 – 35 Berwick Street, London, 8RP

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	10.26 kgCO ₂ /m ²	
Dwelling carbon dioxide emission rate	3.94 kgCO ₂ /m ²	OK

1b Target primary energy rate and dwelling primary energy		
Target primary energy	53.61 kWh _{PE} /m ²	
Dwelling primary energy	41.35 kWh _{PE} /m ²	OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	39.5 kWh/m ²	
Dwelling fabric energy efficiency	39.0 kWh/m ²	OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.18	Walls (1) (0.18)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.3	Opening (1.3)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	137.61	0.18
Ground floor: Heatloss Floor 1, Heatloss Floor 1	59.52	0.12
Exposed roof: Roof (1)	59.52	0.09 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Front Door	2.1	West	N/A	1.3
Opening, Glazing	2.17	West	0.7	1.3
Opening, Glazing	1.5	West	0.7	1.3
Opening, Glazing	2.17	West	0.7	1.3
Opening, Glazing	0.72	West	0.7	1.3
Opening, Glazing	0.72	North	0.7	1.3
Opening, Glazing	0.72	South	0.7	1.3
Opening, Glazing	1.5	East	0.7	1.3
Opening, Glazing	1.5	East	0.7	1.3
Opening, Glazing	1.31	East	0.7	1.3
Opening, Glazing	4.98	East	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))	
Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.03 (!)	
External wall	E3: Sill	Calculated by person with suitable expertise	0.022 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.017 (!)	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.068	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.001 (!)	
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	
External wall	E12: Gable (insulation at ceiling level)	SAP table default	0.25	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.041	
External wall	E18: Party wall between dwellings	SAP table default	0.24	
Party wall	P1: Ground floor	SAP table default	0.32	
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	
External wall	E19: Ground floor (inverted)	SAP table default	0.1	
External wall	E25: Staggered party wall between dwellings	SAP table default	0.24	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	
External wall	E1: Steel lintel with perforated steel base plate	SAP table default	1	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	5 m ³ /hm ² , Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity

Efficiency	302.9%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Mitsubishi Electric Europe B.V.
Model	Ecodan 8.5 kW
Commissioning	

Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water

Cylinder/store - type: Cylinder

Capacity	210 litres
Declared heat loss	1.8 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	

Waste water heat recovery system 1 - type: N/A

Efficiency	
Manufacturer	
Model	

6 Controls		
Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	0.7 W/(l/s)	
Specific fan power	0.24 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	ISENSE-PLUS	
Commissioning		
9 Local generation		
N/A		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 22 Oct 2025 10:40:25

Project Information			
Assessed By	Chris Armstrong	Building Type	House, Semi-detached
OCDEA Registration	EES/027311	Assessment Date	2025-10-22

Dwelling Details			
Assessment Type	As designed	Total Floor Area	101 m ²
Site Reference	34	Plot Reference	HBa
Address	HBa		

Client Details	
Name	Arte Construction Ltd
Company	Arte Construction Ltd
Address	34 – 35 Berwick Street, London, 8RP

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	10.04 kgCO ₂ /m ²	
Dwelling carbon dioxide emission rate	3.94 kgCO ₂ /m ²	OK

1b Target primary energy rate and dwelling primary energy		
Target primary energy	52.36 kWh _{PE} /m ²	
Dwelling primary energy	41.55 kWh _{PE} /m ²	OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	34.8 kWh/m ²	
Dwelling fabric energy efficiency	33.7 kWh/m ²	OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.4	Opening (1.4)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	87.25	0.18
Party wall: Party Wall (1)	43.25	0 (!)
Ground floor: Heatloss Floor 1, Heatloss Floor 1	50.6	0.12
Exposed roof: Roof (1)	50.6	0.09 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Front Door	2.1	West	N/A	1.4
Opening, Glazing	2.2	West	0.7	1.4
Opening, Glazing	0.7	West	0.7	1.4
Opening, Glazing	2.2	West	0.7	1.4
Opening, Glazing	0.4	West	0.7	1.4
Opening, Glazing	1.5	East	0.7	1.4
Opening, Glazing	1.5	East	0.7	1.4
Opening, Glazing	1.3	East	0.7	1.4
Opening, Glazing	2.1	East	0.7	1.4

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))	
Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.03 (!)	
External wall	E3: Sill	Calculated by person with suitable expertise	0.022 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.017 (!)	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.068	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.001 (!)	
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.055	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.041	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.041	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.114	
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.101	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	5 m ³ /hm ² , Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity		
Efficiency	295.7%	
Emitter type	Radiators	
Flow temperature	45°C	
System type	Heat Pump	
Manufacturer	Mitsubishi Electric Europe B.V.	
Model	Ecodan 8.5 kW	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water

Cylinder/store - type: Cylinder		
Capacity	210 litres	
Declared heat loss	1.8 kWh/day	
Primary pipework insulated	Yes	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		

Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	0.7 W/(l/s)	
Specific fan power	0.23 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	ISENSE-PLUS	
Commissioning		
9 Local generation		
N/A		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 22 Oct 2025 10:40:26

Project Information			
Assessed By	Chris Armstrong	Building Type	Flat, Semi-detached
OCDEA Registration	EES/027311	Assessment Date	2025-10-22

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m ²
Site Reference	47-50 FF Flat_2	Plot Reference	47- 50 FF Flat
Address	Block A		

Client Details	
Name	Arte Construction Ltd
Company	Arte Construction Ltd
Address	34 – 35 Berwick Street, London, 8RP

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	11.58 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	4.07 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	60.55 kWh _{PE} /m ²		
Dwelling primary energy	42.98 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	34.3 kWh/m ²		
Dwelling fabric energy efficiency	34.0 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.19	Walls (2) (0.24)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	N/A	N/A	N/A
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.4	Opening (1.4)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	54.96	0.18
Exposed wall: Walls (2)	17.9	0.24
Exposed roof: Roof (1)	70.82	0.09 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Glazing	1.31	East	0.7	1.4
Opening, Glazing	1.31	East	0.7	1.4
Opening, Glazing	0.72	East	0.7	1.4
Opening, Glazing	1.5	South	0.7	1.4
Opening, Glazing	1.5	South	0.7	1.4
Opening, Glazing	1.5	North	0.7	1.4
Opening, Glazing	1.5	North	0.7	1.4
Opening, Front Door	2.1	West	N/A	1.4

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))	
Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.03 (!)	Facade
External wall	E3: Sill	Calculated by person with suitable expertise	0.022 (!)	Facade
External wall	E4: Jamb	Calculated by person with suitable expertise	0.017 (!)	Facade
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.068	Facade
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.035 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.043	Facade
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.052	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.042	
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.101	
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.053	Facade
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	
External wall	E13: Gable (insulation at rafter level)	SAP table default	0.25	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	5 m ³ /hm ² , Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with warm air distribution - Electricity		
Efficiency	307.0%	
Emitter type		
Flow temperature		
System type	Heat Pump	
Manufacturer	Nilan AS	
Model	Compact P	
Commissioning		
Main heating system 2: Room heaters - Electricity		
Efficiency	100.0%	
Emitter type		
Flow temperature		
System type	Panel, convector or radiant heaters	
Manufacturer	Nilan AS	
Model	Compact P	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water		
Cylinder/store - type: N/A		
Capacity	N/A	
Declared heat loss	N/A	
Primary pipework insulated	N/A	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		
6 Controls		
Main heating 1 - type: Programmer and room thermostat		
Function		
Ecodesign class		
Manufacturer		
Model		
Main heating 2 - type: Programmer and room thermostats		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	85%	OK
Manufacturer/Model	Compact P, 7512404	
Commissioning		
9 Local generation		
N/A		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	

b. Client Declaration
N/A

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 22 Oct 2025 10:40:26

Project Information			
Assessed By	Chris Armstrong	Building Type	Flat, Semi-detached
OCDEA Registration	EES/027311	Assessment Date	2025-10-22

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m ²
Site Reference	47-50 FF Flat	Plot Reference	47- 50 FF Flat
Address	Block A		

Client Details	
Name	Arte Construction Ltd
Company	Arte Construction Ltd
Address	34 – 35 Berwick Street, London, 8RP

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	11.58 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	4.07 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	60.55 kWh _{PE} /m ²		
Dwelling primary energy	42.98 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	34.3 kWh/m ²		
Dwelling fabric energy efficiency	34.0 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.19	Walls (2) (0.24)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	N/A	N/A	N/A
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.4	Opening (1.4)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))			
Name	Net area [m ²]	U-Value [W/m ² K]	
Exposed wall: Walls (1)	54.96	0.18	
Exposed wall: Walls (2)	17.9	0.24	
Exposed roof: Roof (1)	70.82	0.09 (!)	

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Glazing	1.31	West	0.7	1.4
Opening, Glazing	1.31	West	0.7	1.4
Opening, Glazing	0.72	West	0.7	1.4
Opening, Glazing	1.5	North	0.7	1.4
Opening, Glazing	1.5	North	0.7	1.4
Opening, Glazing	1.5	South	0.7	1.4
Opening, Glazing	1.5	South	0.7	1.4
Opening, Front Door	2.1	East	N/A	1.4

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))	
Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.03 (!)	Facade
External wall	E3: Sill	Calculated by person with suitable expertise	0.022 (!)	Facade
External wall	E4: Jamb	Calculated by person with suitable expertise	0.017 (!)	Facade
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.068	Facade
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.035 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.043	Facade
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.052	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.042	
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.101	
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.053	Facade
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	
External wall	E13: Gable (insulation at rafter level)	SAP table default	0.25	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	5 m ³ /hm ² , Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with warm air distribution - Electricity		
Efficiency	307.0%	
Emitter type		
Flow temperature		
System type	Heat Pump	
Manufacturer	Nilan AS	
Model	Compact P	
Commissioning		
Main heating system 2: Room heaters - Electricity		
Efficiency	100.0%	
Emitter type		
Flow temperature		
System type	Panel, convector or radiant heaters	
Manufacturer	Nilan AS	
Model	Compact P	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water		
Cylinder/store - type: N/A		
Capacity	N/A	
Declared heat loss	N/A	
Primary pipework insulated	N/A	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		
6 Controls		
Main heating 1 - type: Programmer and room thermostat		
Function		
Ecodesign class		
Manufacturer		
Model		
Main heating 2 - type: Programmer and room thermostats		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	85%	OK
Manufacturer/Model	Compact P, 7512404	
Commissioning		
9 Local generation		
N/A		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	

b. Client Declaration
N/A

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 22 Oct 2025 10:40:25

Project Information			
Assessed By	Chris Armstrong	Building Type	Flat, Semi-detached
OCDEA Registration	EES/027311	Assessment Date	2025-10-22

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m ²
Site Reference	47-50 GF Flat_2	Plot Reference	47- 50 GF Flat
Address	Block A		

Client Details	
Name	Arte Construction Ltd
Company	Arte Construction Ltd
Address	34 – 35 Berwick Street, London, 8RP

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	12.42 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	4.24 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	65.0 kWh _{PE} /m ²		
Dwelling primary energy	44.7 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	38.8 kWh/m ²		
Dwelling fabric energy efficiency	37.6 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.2	Walls (2) (0.24)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.4	Opening (1.4)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	52.28	0.18
Exposed wall: Walls (2)	17.9	0.24
Ground floor: Heatloss Floor 1, Heatloss Floor 1	70.82	0.12

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Glazing	1.31	East	0.7	1.4
Opening, Glazing	1.31	East	0.7	1.4
Opening, Glazing	0.72	East	0.7	1.4
Opening, Glazing	2.17	South	0.7	1.4
Opening, Glazing	2.17	South	0.7	1.4
Opening, Glazing	2.17	North	0.7	1.4
Opening, Glazing	2.17	North	0.7	1.4
Opening, Front Door	2.1	West	N/A	1.4

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))	
Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.03 (!)	Facade
External wall	E3: Sill	Calculated by person with suitable expertise	0.022 (!)	Facade
External wall	E4: Jamb	Calculated by person with suitable expertise	0.017 (!)	Facade
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.068	Facade
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.035 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.043	Facade
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.052	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.042	
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.101	
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.053	Facade
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	
External wall	E13: Gable (insulation at rafter level)	SAP table default	0.25	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.038 (!)	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	5 m ³ /hm ² , Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with warm air distribution - Electricity		
Efficiency	308.0%	
Emitter type		
Flow temperature		
System type	Heat Pump	
Manufacturer	Nilan AS	
Model	Compact P	
Commissioning		
Main heating system 2: Room heaters - Electricity		
Efficiency	100.0%	
Emitter type		
Flow temperature		
System type	Panel, convector or radiant heaters	
Manufacturer	Nilan AS	
Model	Compact P	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water		
Cylinder/store - type: N/A		
Capacity	N/A	
Declared heat loss	N/A	
Primary pipework insulated	N/A	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		
6 Controls		
Main heating 1 - type: Programmer and room thermostat		
Function		
Ecodesign class		
Manufacturer		
Model		
Main heating 2 - type: Programmer and room thermostats		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	85%	OK
Manufacturer/Model	Compact P, 7512404	
Commissioning		
9 Local generation		
N/A		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	

b. Client Declaration
N/A

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 22 Oct 2025 10:40:25

Project Information			
Assessed By	Chris Armstrong	Building Type	Flat, Semi-detached
OCDEA Registration	EES/027311	Assessment Date	2025-10-22

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m ²
Site Reference	47-50 GF Flat	Plot Reference	47- 50 GF Flat
Address	Block A		

Client Details	
Name	Arte Construction Ltd
Company	Arte Construction Ltd
Address	34 – 35 Berwick Street, London, 8RP

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	12.42 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	4.19 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	65.0 kWh _{PE} /m ²		
Dwelling primary energy	44.22 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	38.8 kWh/m ²		
Dwelling fabric energy efficiency	37.6 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.2	Walls (2) (0.24)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.4	Opening (1.4)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	52.28	0.18
Sheltered wall: Walls (2)	17.9	0.24
Ground floor: Heatloss Floor 1, Heatloss Floor 1	70.82	0.12

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Glazing	1.31	West	0.7	1.4
Opening, Glazing	1.31	West	0.7	1.4
Opening, Glazing	0.72	West	0.7	1.4
Opening, Glazing	2.17	North	0.7	1.4
Opening, Glazing	2.17	North	0.7	1.4
Opening, Glazing	2.17	South	0.7	1.4
Opening, Glazing	2.17	South	0.7	1.4
Opening, Front Door	2.1	East	N/A	1.4

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))	
Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.03 (!)	Facade
External wall	E3: Sill	Calculated by person with suitable expertise	0.022 (!)	Facade
External wall	E4: Jamb	Calculated by person with suitable expertise	0.017 (!)	Facade
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.068	Facade
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.035 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.043	Facade
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.052	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.042	
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.101	
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.053	Facade
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	
External wall	E13: Gable (insulation at rafter level)	SAP table default	0.25	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.038 (!)	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	5 m ³ /hm ² , Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with warm air distribution - Electricity		
Efficiency	308.0%	
Emitter type		
Flow temperature		
System type	Heat Pump	
Manufacturer	Nilan AS	
Model	Compact P	
Commissioning		
Main heating system 2: Room heaters - Electricity		
Efficiency	100.0%	
Emitter type		
Flow temperature		
System type	Panel, convector or radiant heaters	
Manufacturer	Nilan AS	
Model	Compact P	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water		
Cylinder/store - type: N/A		
Capacity	N/A	
Declared heat loss	N/A	
Primary pipework insulated	N/A	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		
6 Controls		
Main heating 1 - type: Programmer and room thermostat		
Function		
Ecodesign class		
Manufacturer		
Model		
Main heating 2 - type: Programmer and room thermostats		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	85%	OK
Manufacturer/Model	Compact P, 7512404	
Commissioning		
9 Local generation		
N/A		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	

b. Client Declaration
N/A