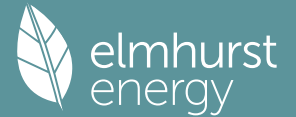


# Summary for Input Data



Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

**31.0 Thermal Store**

**32.0 Photovoltaic Unit**

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

**34.0 Small-scale Hydro**

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**Recommendations**

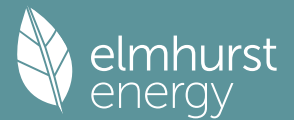
**Lower cost measures**

None

**Further measures to achieve even higher standards**

None

# Predicted Energy Assessment



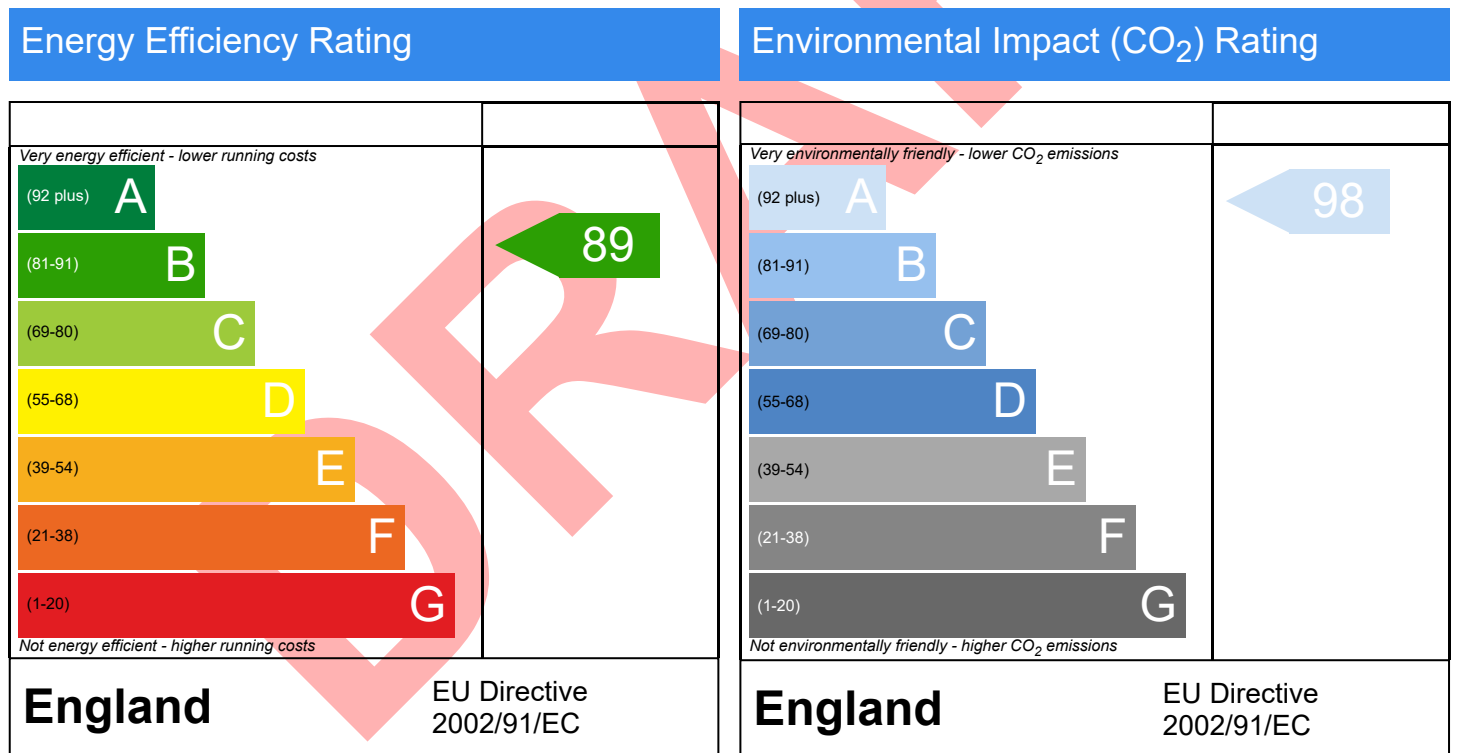
Flat 7, Luton, Bedfordshire, LU1 3HX

Dwelling type:  
Date of assessment:  
Produced by:  
Total floor area:  
DRRN:

Flat, End-Terrace  
05/07/2023  
Darren Coham  
55.23 m<sup>2</sup>

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

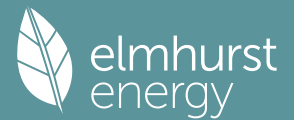
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

# Thermal Bridging



Property Reference	Flat 7	Issued on Date	05/07/2023
Assessment Reference	00007	Prop Type Ref	End-Terrace Flat
Property	Flat 7, Luton, Bedfordshire, LU1 3HX		

SAP Rating	89 B	DER	2.77	TER	15.12
Environmental	98 A	% DER < TER			81.68
CO <sub>2</sub> Emissions (t/year)	0.14	DFEE	30.50	TFEE	33.51
Compliance Check	See BREL	% DFEE < TFEE			8.99
% DPER < TPER	59.38	DPER	33.25	TPER	81.86

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	4.62	0.31	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	13.70	0.25	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	48.70	3.17	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	10.80	0.52	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	5.40	0.37	Knauf
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	17.10	0.00	Default
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	3.00	0.30	Default

Total: 106.02 W/mK:  
 Y-Value: 0.07 W/m<sup>2</sup>K:

# Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:15

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	97 m <sup>2</sup>
Site Reference	Flat 8	Plot Reference	00008
Address	Flat 8, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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	12.57 kgCO <sub>2</sub> /m <sup>2</sup>		
Dwelling carbon dioxide emission rate	2.86 kgCO <sub>2</sub> /m <sup>2</sup>		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	67.46 kWh <sub>PE</sub> /m <sup>2</sup>		
Dwelling primary energy	31.89 kWh <sub>PE</sub> /m <sup>2</sup>		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	35.4 kWh/m <sup>2</sup>		
Dwelling fabric energy efficiency	33.7 kWh/m <sup>2</sup>		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m <sup>2</sup> K]	Dwelling average U-Value [W/m <sup>2</sup> 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	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.18	pd1 (1.2)	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 <sup>2</sup> ]	U-Value [W/m <sup>2</sup> K]
Exposed wall: Walls (1)	59.48	0.18
Sheltered wall: Walls (2)	26.6649	0.18
Party wall: Party Wall (1)	20.52	0 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m <sup>2</sup> ]	Orientation	Frame factor	U-Value [W/m <sup>2</sup> K]
pd1, Windows	5.4	North West	0.75	1.2
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	3.24	North West	0.75	1.2
w2, Windows	6.48	North West	0.75	1.2
ed1, Entrance Doors	2.0951	South East	N/A	1 (!)
w3, Windows	5.04	South East	0.75	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1 - Main Dwelling: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
		expertise		
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf

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

Maximum permitted air permeability at 50Pa	8 m <sup>3</sup> /hm <sup>2</sup>	
Dwelling air permeability at 50Pa	3 m <sup>3</sup> /hm <sup>2</sup> , Design value (!)	OK
Air permeability test certificate reference		

### 4 Space heating

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

Efficiency	219.3%
Emitter type	Radiators
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

#### Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

### 5 Hot water

#### Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 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

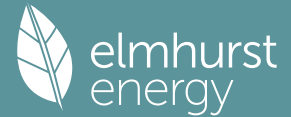
Manufacturer	
Model	

### 7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
<b>System type:</b> 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	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: <b>Photovoltaic system (1)</b>		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
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		

# Summary for Input Data



Property Reference	Flat 8		Issued on Date	05/07/2023	
Assessment Reference	00008	Prop Type Ref	Flat		
Property	Flat 8, Luton, Bedfordshire, LU1 3HX				
SAP Rating	87 B	DER	2.86	TER	12.57
Environmental	98 A	% DER < TER			77.25
CO <sub>2</sub> Emissions (t/year)	0.25	DFEE	33.67	TFEE	35.44
Compliance Check	See BREL	% DFEE < TFEE			4.98
% DPER < TPER	52.73	DPER	31.89	TPER	67.46
Assessor Details	Mr. Darren Coham			Assessor ID	R789-0001
Client					

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southeast	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	4	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m <sup>2</sup> K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m <sup>2</sup>	0.00 m
Ground floor:	42.15 m	97.20 m <sup>2</sup>	2.70 m
1st Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
2nd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
3rd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
4th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
5th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
6th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
7th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m

8.0 Living Area	37.01	m <sup>2</sup>
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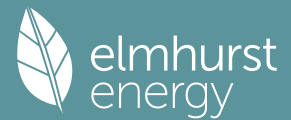
9.0 External Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area(m <sup>2</sup> )	Nett Area (m <sup>2</sup> )	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	85.05	59.49	0.00	None	25.56	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	28.76	26.66	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	20.52	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
	Internal Wall 1	Plasterboard on timber frame	9.00	153.40

10.1 Party Ceilings	
---------------------	--

# Summary for Input Data



Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	97.20

## 11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	97.20

## 12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m <sup>2</sup> K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

## 13.0 Openings

Name	Opening Type	Location	Orientation	Area (m <sup>2</sup> )	Pitch
pd1	Windows	External Wall 1	North West	10.80	0
w1	Windows	External Wall 1	North West	3.24	0
w2	Windows	External Wall 1	North West	6.48	0
ed1	Entrance Doors	Sheltered Wall	South East	2.10	0
w3	Windows	External Wall 1	South East	5.04	0

## 14.0 Conservatory

## 15.0 Draught Proofing

 %

## 16.0 Draught Lobby

## 17.0 Thermal Bridging

### 17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	11.67	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	28.10	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	84.30	0.07	0.07 Knauf	No
E16 Corner (normal)	Independently assessed	13.50	0.05	0.05 Knauf	No
E18 Party wall between dwellings	Independently assessed	5.40	0.07	0.07 Knauf	Yes
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	4.70	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.20	0.00	0.00	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	10.80	-0.09	-0.09 Knauf	No

Y-value  W/m<sup>2</sup>K

## 18.0 Pressure Testing

Designed AP<sub>50</sub>  m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

Designed AP<sub>50</sub>  m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

Property Tested?

Test Method

As Built AP<sub>50</sub>  m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

## 19.0 Mechanical Ventilation

### Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

SFP from Installer Commissioning Certificate

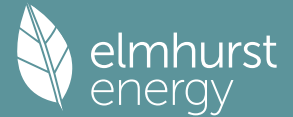
MVHR System Location

Duct Installation Specification

## 20.0 Fans, Open Fireplaces, Flues



# Summary for Input Data



**21.0 Fixed Cooling System**

**22.0 Lighting**

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

**24.0 Main Heating 1**

Percentage of Heat  %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Flow Temperature

Flow Temperature Value

Boiler Interlock

**25.0 Main Heating 2**

**26.0 Heat Networks**

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

**28.0 Water Heating**

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

Immersion Only Heating Hot Water

**28.3 Waste Water Heat Recovery System**

**29.0 Hot Water Cylinder**

Cylinder Stat

Cylinder In Heated Space

# Summary for Input Data



Independent Time Control	<input type="text" value="Yes"/>	
Insulation Type	<input type="text" value="Measured Loss"/>	
Cylinder Volume	<input type="text" value="150.00"/>	L
Loss	<input type="text" value="1.70"/>	kWh/day
Pipes insulation	<input type="text" value="Fully insulated primary pipework"/>	
In Airing Cupboard	<input type="text" value="No"/>	

**31.0 Thermal Store**

**32.0 Photovoltaic Unit**

Export Capable Meter?	<input type="text" value="Yes"/>
Connected To Dwelling	<input type="text" value="Yes"/>
Diverter	<input type="text" value="No"/>
Battery Capacity [kWh]	<input type="text" value="0.00"/>

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

**34.0 Small-scale Hydro**

Electricity Generated	<input type="text" value="0.00"/>	
Apportioned	<input type="text" value="0.00"/>	kWh/Year
Connected to dwelling's electricity meter	<input type="text" value="Yes"/>	
Electricity Generation	<input type="text" value="Annual"/>	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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**Recommendations**

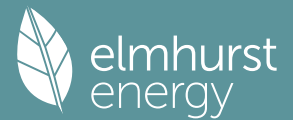
Lower cost measures

None

Further measures to achieve even higher standards

None

# Predicted Energy Assessment

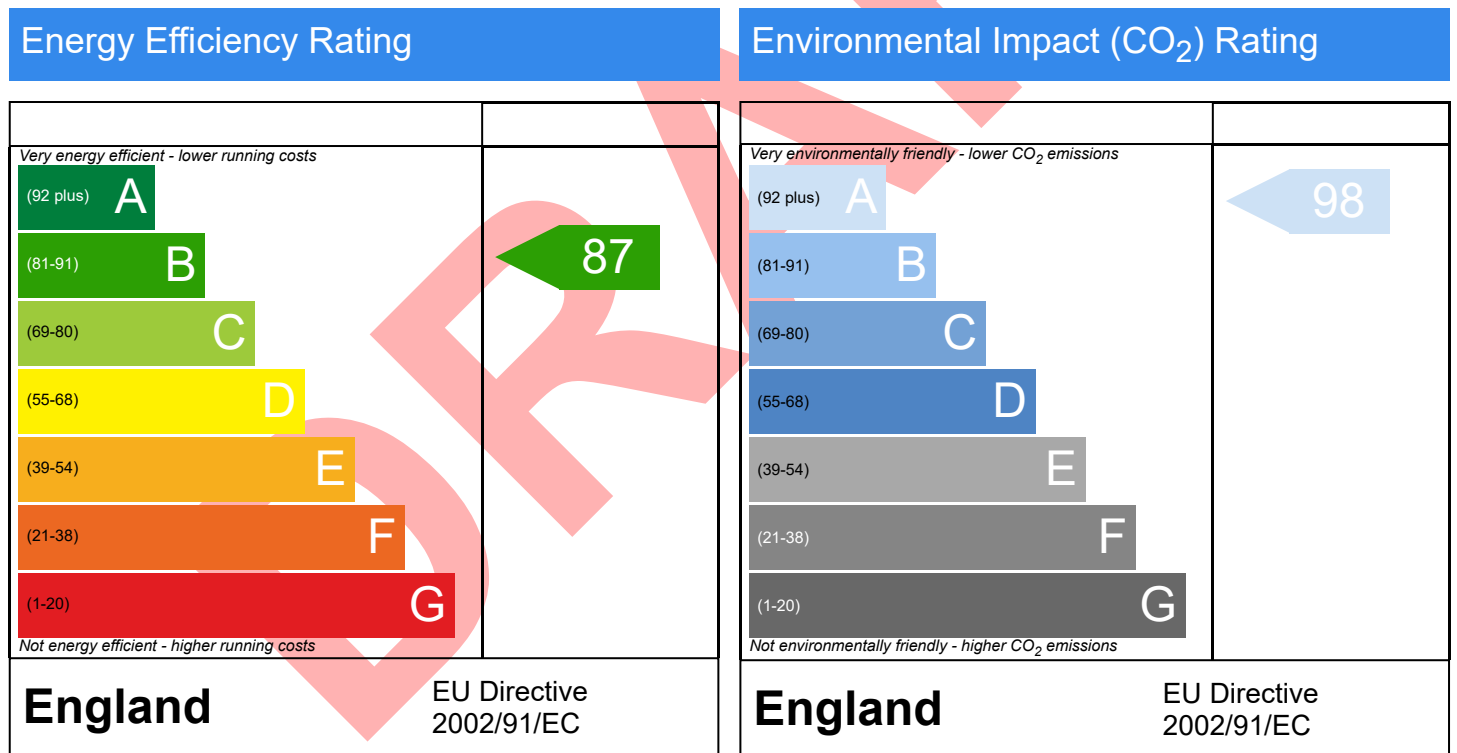


Flat 8, Luton, Bedfordshire, LU1 3HX

Dwelling type: Flat, End-Terrace  
 Date of assessment: 05/07/2023  
 Produced by: Darren Coham  
 Total floor area: 97.2 m<sup>2</sup>  
 DRRN:

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

# Thermal Bridging



Property Reference	Flat 8	Issued on Date	05/07/2023
Assessment Reference	00008	Prop Type Ref	End-Terrace Flat
Property	Flat 8, Luton, Bedfordshire, LU1 3HX		

SAP Rating	87 B	DER	2.86	TER	12.57
Environmental	98 A	% DER < TER			77.25
CO <sub>2</sub> Emissions (t/year)	0.25	DFEE	33.67	TFEE	35.44
Compliance Check	See BREL	% DFEE < TFEE			4.98
% DPER < TPER	52.73	DPER	31.89	TPER	67.46

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	11.67	0.79	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	28.10	0.51	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	84.30	5.48	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	13.50	0.65	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	5.40	0.37	Knauf
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	4.70	0.47	
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	15.20	0.00	
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	10.80	-0.97	Knauf

Total: 173.67 W/mK:  
 Y-Value: 0.06 W/m<sup>2</sup>K:

# Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:15

Project Information			
Assessed By	Darren Coham	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	68 m <sup>2</sup>
Site Reference	Flat 9	Plot Reference	00009
Address	Flat 9, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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	13.18 kgCO <sub>2</sub> /m <sup>2</sup>		
Dwelling carbon dioxide emission rate	2.73 kgCO <sub>2</sub> /m <sup>2</sup>		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	71.09 kWh <sub>PE</sub> /m <sup>2</sup>		
Dwelling primary energy	31.86 kWh <sub>PE</sub> /m <sup>2</sup>		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	30.2 kWh/m <sup>2</sup>		
Dwelling fabric energy efficiency	29.5 kWh/m <sup>2</sup>		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m <sup>2</sup> K]	Dwelling average U-Value [W/m <sup>2</sup> 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	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.18	pd1 (1.2)	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 <sup>2</sup> ]	U-Value [W/m <sup>2</sup> K]
Exposed wall: Walls (1)	28.87	0.18
Sheltered wall: Walls (2)	2.6349	0.18
Party wall: Party Wall (1)	23.9	0 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m <sup>2</sup> ]	Orientation	Frame factor	U-Value [W/m <sup>2</sup> K]
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	6.48	North West	0.75	1.2
w2, Windows	5.04	North East	0.75	1.2
ed1, Entrance Doors	2.0951	South East	N/A	1 (!)

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1 - Main Dwelling: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf

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

Maximum permitted air permeability at 50Pa	8 m <sup>3</sup> /hm <sup>2</sup>	
Dwelling air permeability at 50Pa	3 m <sup>3</sup> /hm <sup>2</sup> , Design value (!)	OK
Air permeability test certificate reference		

### 4 Space heating

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

Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

#### Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

### 5 Hot water

#### Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 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	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
<b>System type:</b> 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	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: <b>Photovoltaic system (1)</b>		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
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		

# Summary for Input Data

Property Reference	Flat 9		Issued on Date	05/07/2023	
Assessment Reference	00009	Prop Type Ref	Flat		
Property	Flat 9, Luton, Bedfordshire, LU1 3HX				
SAP Rating	89 B	DER	2.73	TER	13.18
Environmental	98 A	% DER < TER			79.29
CO <sub>2</sub> Emissions (t/year)	0.17	DFEE	29.52	TFEE	30.20
Compliance Check	See BREL	% DFEE < TFEE			2.26
% DPER < TPER	55.19	DPER	31.86	TPER	71.09
Assessor Details	Mr. Darren Coham			Assessor ID	R789-0001
Client					

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southeast	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	4	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m <sup>2</sup> K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m <sup>2</sup>	0.00 m
Ground floor:	18.71 m	68.21 m <sup>2</sup>	2.70 m
1st Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
2nd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
3rd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
4th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
5th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
6th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
7th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m

8.0 Living Area	29.20	m <sup>2</sup>
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9.0 External Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area (m <sup>2</sup> )	Nett Area (m <sup>2</sup> )	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	45.79	28.87	0.00	None	16.92	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	4.73	2.63	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	23.90	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
	Internal Wall 1	Plasterboard on timber frame	9.00	130.00

10.1 Party Ceilings	
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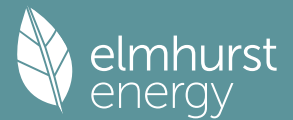


# Summary for Input Data



Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )						
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	68.21						
<b>11.1 Party Floors</b>									
Description	Storey Index	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )					
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	68.21					
<b>12.0 Opening Types</b>									
Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m <sup>2</sup> K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20
<b>13.0 Openings</b>									
Name	Opening Type	Location	Orientation	Area (m <sup>2</sup> )	Pitch				
pd1	Windows	External Wall 1	North West	5.40	0				
w1	Windows	External Wall 1	North West	6.48	0				
w2	Windows	External Wall 1	North East	5.04	0				
ed1	Entrance Doors	Sheltered Wall	South East	2.10	0				
<b>14.0 Conservatory</b>					<input type="text" value="None"/>				
<b>15.0 Draught Proofing</b>					<input type="text" value="100"/> %				
<b>16.0 Draught Lobby</b>					<input type="text" value="No"/>				
<b>17.0 Thermal Bridging</b>					<input type="text" value="Calculate Bridges"/>				
<b>17.1 List of Bridges</b>									
Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported				
E1 Steel lintel with perforated steel base plate	Independently assessed	8.07	0.07	0.07 Thermally Broken	Yes				
E4 Jamb	Independently assessed	18.50	0.02	0.02 Knauf	Yes				
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	37.42	0.07	0.07 Knauf	No				
E18 Party wall between dwellings	Independently assessed	10.80	0.07	0.07 Knauf	Yes				
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	4.50	0.10	0.10	No				
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	32.90	0.00	0.00	No				
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09 Knauf	No				
E16 Corner (normal)	Independently assessed	2.70	0.05	0.05 Knauf	No				
Y-value	<input type="text" value="0.09"/>	W/m <sup>2</sup> K							
Description	<input type="text" value="Arch"/>								
<b>18.0 Pressure Testing</b>					<input type="text" value="Yes"/>				
Designed AP <sub>50</sub>	<input type="text" value="3.00"/>	m <sup>3</sup> /(h.m <sup>2</sup> ) @ 50 Pa							
Property Tested?	<input type="text" value="Yes"/>								
Test Method	<input type="text" value="Blower Door"/>								
As Built AP <sub>50</sub>	<input type="text" value="0.10"/>	m <sup>3</sup> /(h.m <sup>2</sup> ) @ 50 Pa							
<b>19.0 Mechanical Ventilation</b>									
<b>Mechanical Ventilation</b>									
Mechanical Ventilation System Present	<input type="text" value="Yes"/>								
Approved Installation	<input type="text" value="No"/>								
Mechanical Ventilation data Type	<input type="text" value="Database"/>								
Type	<input type="text" value="Balanced mechanical ventilation with heat recovery"/>								
MV Reference Number	<input type="text" value="500082"/>								
Configuration	<input type="text" value="1"/>								
Manufacturer SFP	<input type="text" value="0.73"/>								
Duct Type	<input type="text" value="Rigid"/>								
MVHR Efficiency	<input type="text" value="90.00"/>								
Wet Rooms	<input type="text" value="1"/>								
SFP from Installer Commissioning Certificate	<input type="text" value="No"/>								
MVHR System Location	<input type="text" value="Inside heated envelope (installed exclusively)"/>								
Duct Installation Specification	<input type="text" value="Level 1"/>								
<b>20.0 Fans, Open Fireplaces, Flues</b>									

# Summary for Input Data



**21.0 Fixed Cooling System**

**22.0 Lighting**

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

**24.0 Main Heating 1**

SAP table

Percentage of Heat  %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

Boiler Interlock

**25.0 Main Heating 2**

**26.0 Heat Networks**

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

**28.0 Water Heating**

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

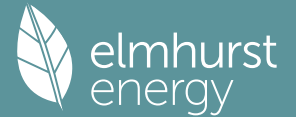
Immersion Only Heating Hot Water

**28.3 Waste Water Heat Recovery System**

**29.0 Hot Water Cylinder**

Cylinder Stat

# Summary for Input Data



Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

**31.0 Thermal Store**

**32.0 Photovoltaic Unit**

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

**34.0 Small-scale Hydro**

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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**Recommendations**

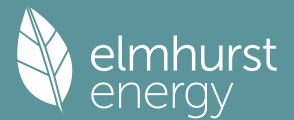
**Lower cost measures**

None

**Further measures to achieve even higher standards**

None

# Predicted Energy Assessment



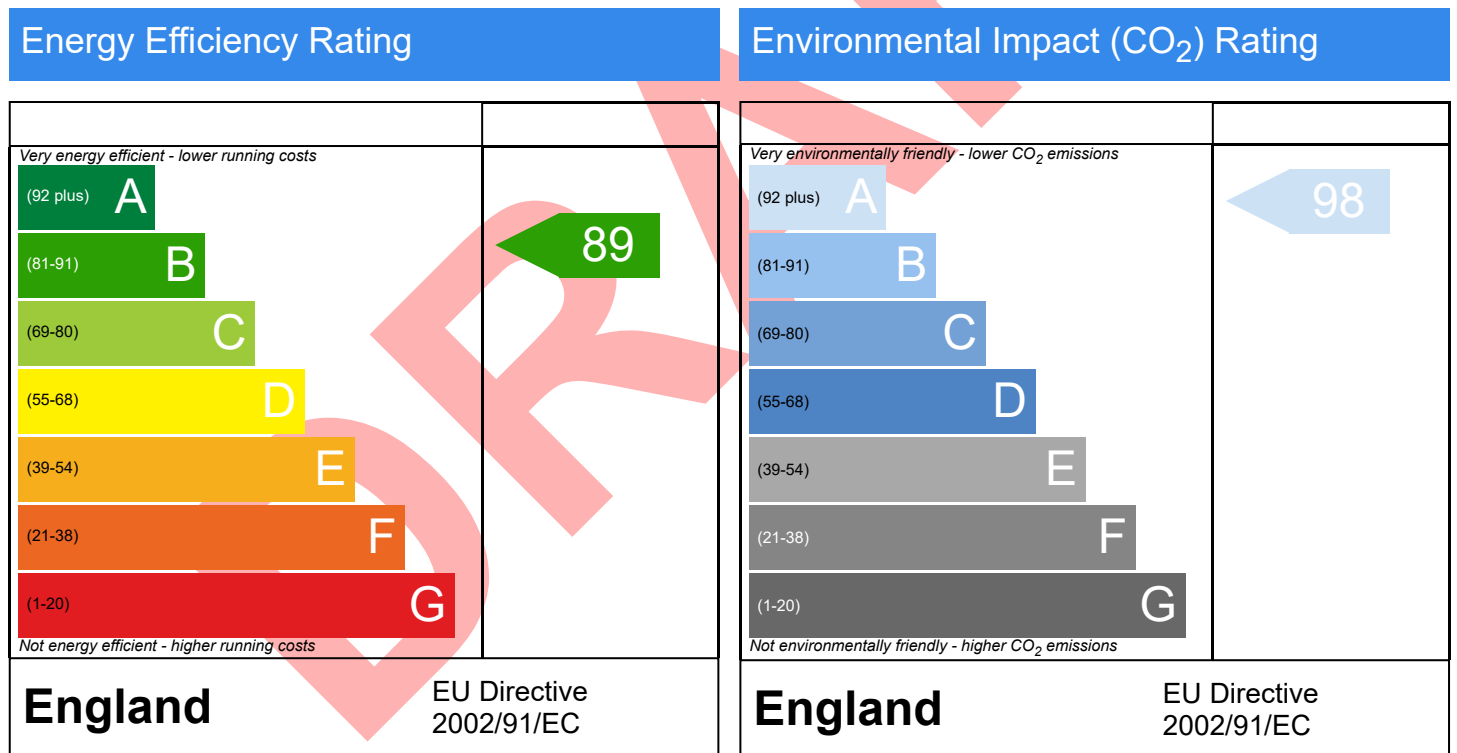
Flat 9, Luton, Bedfordshire, LU1 3HX

Dwelling type:  
Date of assessment:  
Produced by:  
Total floor area:  
DRRN:

Flat, Mid-Terrace  
05/07/2023  
Darren Coham  
68.21 m<sup>2</sup>

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

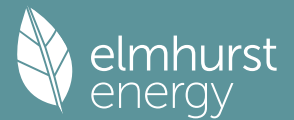
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

# Thermal Bridging



Property Reference	Flat 9	Issued on Date	05/07/2023
Assessment Reference	00009	Prop Type Ref	Mid-Terrace Flat
Property	Flat 9, Luton, Bedfordshire, LU1 3HX		

SAP Rating	89 B	DER	2.73	TER	13.18
Environmental	98 A	% DER < TER			79.29
CO <sub>2</sub> Emissions (t/year)	0.17	DFEE	29.52	TFEE	30.20
Compliance Check	See BREL	% DFEE < TFEE			2.26
% DPER < TPER	55.19	DPER	31.86	TPER	71.09

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	8.07	0.55	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	18.50	0.33	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	37.42	2.43	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	10.80	0.75	Knauf
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	4.50	0.45	
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	32.90	0.00	
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	2.70	0.13	Knauf

Total:  W/mK:  
 Y-Value:  W/m<sup>2</sup>K:

# Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:15

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	55 m <sup>2</sup>
Site Reference	Flat 10	Plot Reference	000010
Address	Flat 10, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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	15.12 kgCO <sub>2</sub> /m <sup>2</sup>	
Dwelling carbon dioxide emission rate	2.77 kgCO <sub>2</sub> /m <sup>2</sup>	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	81.86 kWh <sub>PE</sub> /m <sup>2</sup>	
Dwelling primary energy	33.25 kWh <sub>PE</sub> /m <sup>2</sup>	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	33.5 kWh/m <sup>2</sup>	
Dwelling fabric energy efficiency	30.5 kWh/m <sup>2</sup>	OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m <sup>2</sup> K]	Dwelling average U-Value [W/m <sup>2</sup> 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	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.16	pd1 (1.2)	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 <sup>2</sup> ]	U-Value [W/m <sup>2</sup> K]
Exposed wall: Walls (1)	35.78	0.18
Sheltered wall: Walls (2)	19.2349	0.18
Party wall: Party Wall (1)	23.08	0 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m <sup>2</sup> ]	Orientation	Frame factor	U-Value [W/m <sup>2</sup> K]
pd1, Windows	5.4	North East	0.75	1.2
w1, Windows	3.24	North East	0.75	1.2
ed1, Entrance Doors	2.0951	North West	N/A	1 (!)

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1 - Main Dwelling: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	Default
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	Default

3 Air permeability (better than typically expected values are flagged with a subsequent (!))				
Maximum permitted air permeability at 50Pa		8 m <sup>3</sup> /hm <sup>2</sup>		
Dwelling air permeability at 50Pa		3 m <sup>3</sup> /hm <sup>2</sup> , Design value (!)		OK
Air permeability test certificate reference				

4 Space heating	
<b>Main heating system 1:</b> Heat pump with radiators or underfloor heating - Electricity	
Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	
<b>Secondary heating system:</b> N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
<b>Cylinder/store</b> - type: Cylinder	
Capacity	150 litres
Declared heat loss	1.7 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
<b>Waste water heat recovery system 1</b> - type: N/A	
Efficiency	
Manufacturer	
Model	

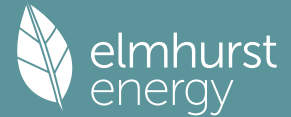
6 Controls	
<b>Main heating 1</b> - type: Time and temperature zone control by arrangement of plumbing and electrical services	
Function	
Ecodesign class	
Manufacturer	
Model	
<b>Water heating</b> - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
<b>System type:</b> 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	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: <b>Photovoltaic system (1)</b>		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
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		



# Summary for Input Data



Property Reference	Flat 10	Issued on Date	05/07/2023
Assessment Reference	000010	Prop Type Ref	Flat
Property	Flat 10, Luton, Bedfordshire, LU1 3HX		

SAP Rating	89 B	DER	2.77	TER	15.12
Environmental	98 A	% DER < TER			81.68
CO <sub>2</sub> Emissions (t/year)	0.14	DFEE	30.50	TFEE	33.51
Compliance Check	See BREL	% DFEE < TFEE			8.99
% DPER < TPER	59.38	DPER	33.25	TPER	81.86

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northwest	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	4	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m <sup>2</sup> K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m <sup>2</sup>	0.00 m
Ground floor:	24.35 m	55.23 m <sup>2</sup>	2.70 m
1st Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
2nd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
3rd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
4th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
5th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
6th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
7th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m

8.0 Living Area	26.61	m <sup>2</sup>
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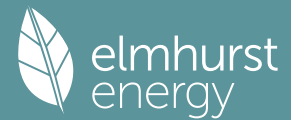
9.0 External Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area(m <sup>2</sup> )	Nett Area (m <sup>2</sup> )	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	44.42	35.78	0.00	None	8.64	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	21.33	19.23	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	23.08	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
	Internal Wall 1	Plasterboard on timber frame	9.00	90.00

10.1 Party Ceilings	
---------------------	--

# Summary for Input Data



Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	55.23

## 11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	55.23

## 12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

## 13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
pd1	Windows	External Wall 1	North East	5.40	0
w1	Windows	External Wall 1	North East	3.24	0
ed1	Entrance Doors	Sheltered Wall	North West	2.10	0

## 14.0 Conservatory

## 15.0 Draught Proofing

 %

## 16.0 Draught Lobby

## 17.0 Thermal Bridging

### 17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	4.62	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	13.70	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	48.70	0.07	0.07 Knauf	No
E16 Corner (normal)	Independently assessed	10.80	0.05	0.05 Knauf	No
E18 Party wall between dwellings	Independently assessed	5.40	0.07	0.07 Knauf	Yes
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09 Knauf	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	17.10	0.00	0.00 Default	No
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	3.00	0.10	0.10 Default	No

Y-value  W/m²K

Description

## 18.0 Pressure Testing

Designed AP<sub>50</sub>  m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP<sub>50</sub>  m³/(h.m²) @ 50 Pa

## 19.0 Mechanical Ventilation

### Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

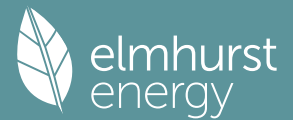
SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

## 20.0 Fans, Open Fireplaces, Flues

# Summary for Input Data



**21.0 Fixed Cooling System**

**22.0 Lighting**

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

**24.0 Main Heating 1**

SAP table

Percentage of Heat  %

Database Ref. No.

Fuel Type

SAP Code

    In Winter

    In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

Boiler Interlock

**25.0 Main Heating 2**

**26.0 Heat Networks**

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

**28.0 Water Heating**

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

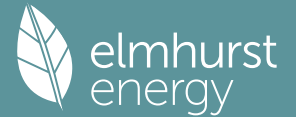
Immersion Only Heating Hot Water

**28.3 Waste Water Heat Recovery System**

**29.0 Hot Water Cylinder**

Cylinder Stat

# Summary for Input Data



Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

**31.0 Thermal Store**

**32.0 Photovoltaic Unit**

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

**34.0 Small-scale Hydro**

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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**Recommendations**

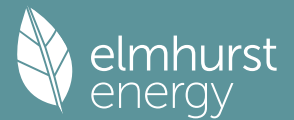
**Lower cost measures**

None

**Further measures to achieve even higher standards**

None

# Predicted Energy Assessment

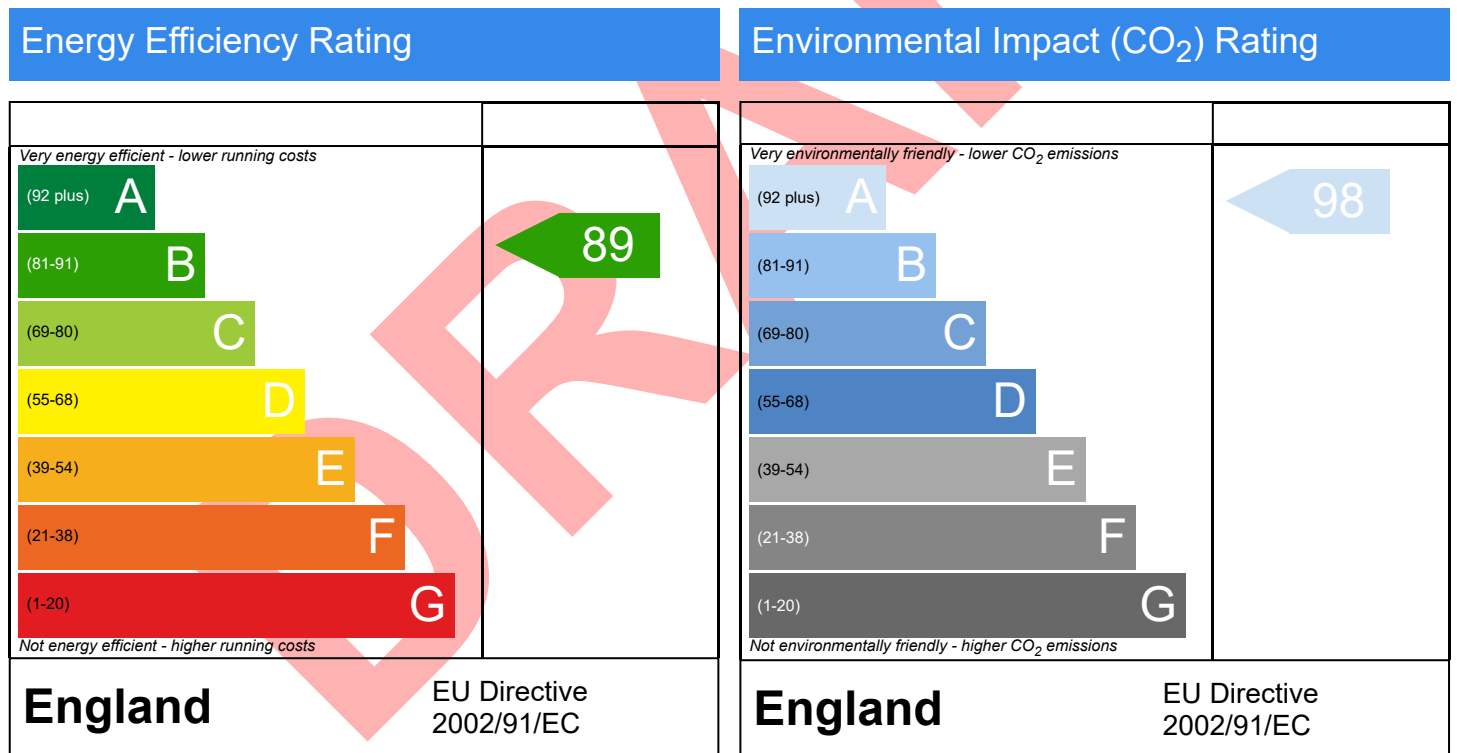


Flat 10, Luton, Bedfordshire, LU1 3HX

Dwelling type: Flat, End-Terrace  
 Date of assessment: 05/07/2023  
 Produced by: Darren Coham  
 Total floor area: 55.23 m<sup>2</sup>  
 DRRN:

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

# Thermal Bridging

Property Reference	Flat 10	Issued on Date	05/07/2023
Assessment Reference	000010	Prop Type Ref	End-Terrace Flat
Property	Flat 10, Luton, Bedfordshire, LU1 3HX		

SAP Rating	89 B	DER	2.77	TER	15.12
Environmental	98 A	% DER < TER			81.68
CO <sub>2</sub> Emissions (t/year)	0.14	DFEE	30.50	TFEE	33.51
Compliance Check	See BREL	% DFEE < TFEE			8.99
% DPER < TPER	59.38	DPER	33.25	TPER	81.86

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	4.62	0.31	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	13.70	0.25	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	48.70	3.17	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	10.80	0.52	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	5.40	0.37	Knauf
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	17.10	0.00	Default
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	3.00	0.30	Default

Total: 106.02 W/mK:  
 Y-Value: 0.07 W/m<sup>2</sup>K:

# Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:16

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	54 m <sup>2</sup>
Site Reference	Flat 11	Plot Reference	000011
Address	Flat 11, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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	17.34 kgCO <sub>2</sub> /m <sup>2</sup>		
Dwelling carbon dioxide emission rate	3.44 kgCO <sub>2</sub> /m <sup>2</sup>		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	93.78 kWh <sub>PE</sub> /m <sup>2</sup>		
Dwelling primary energy	40.1 kWh <sub>PE</sub> /m <sup>2</sup>		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	43.5 kWh/m <sup>2</sup>		
Dwelling fabric energy efficiency	40.7 kWh/m <sup>2</sup>		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m <sup>2</sup> K]	Dwelling average U-Value [W/m <sup>2</sup> 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	N/A	N/A	N/A
Roofs	0.16	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	1.6	1.17	pd1 (1.2)	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 <sup>2</sup> ]	U-Value [W/m <sup>2</sup> K]
Exposed wall: Walls (1)	48.14	0.18
Sheltered wall: Walls (2)	8.8449	0.18
Party wall: Party Wall (1)	14.99	0 (!)
Exposed roof: Roof (1)	59.63	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m <sup>2</sup> ]	Orientation	Frame factor	U-Value [W/m <sup>2</sup> K]
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	3.24	North West	0.75	1.2
ed1, Entrance Doors	2.0951	North East	N/A	1 (!)
w2, Windows	5.04	South East	0.75	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1 - Main Dwelling: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	Default
External wall	E14: Flat roof	Calculated by person with suitable expertise	0.052	

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

Maximum permitted air permeability at 50Pa	8 m <sup>3</sup> /hm <sup>2</sup>	
Dwelling air permeability at 50Pa	3 m <sup>3</sup> /hm <sup>2</sup> , Design value (!)	OK
Air permeability test certificate reference		

### 4 Space heating

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

Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

#### Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

### 5 Hot water

#### Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 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	

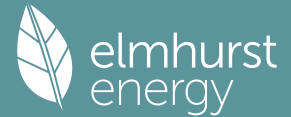
### 7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	



8 Mechanical ventilation		
<b>System type:</b> 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	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: <b>Photovoltaic system (1)</b>		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
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		

# Summary for Input Data



Property Reference	Flat 11	Issued on Date	05/07/2023
Assessment Reference	000011	Prop Type Ref	Flat
Property	Flat 11, Luton, Bedfordshire, LU1 3HX		

SAP Rating	87 B	DER	3.44	TER	17.34
Environmental	98 A	% DER < TER			80.16
CO <sub>2</sub> Emissions (t/year)	0.17	DFEE	40.72	TFEE	43.54
Compliance Check	See BREL	% DFEE < TFEE			6.48
% DPER < TPER	57.24	DPER	40.10	TPER	93.78

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northeast	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	5	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m <sup>2</sup> K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m <sup>2</sup>	0.00 m
Ground floor:	26.95 m	53.72 m <sup>2</sup>	2.70 m
1st Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
2nd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
3rd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
4th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
5th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
6th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
7th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m

8.0 Living Area	25.93	m <sup>2</sup>
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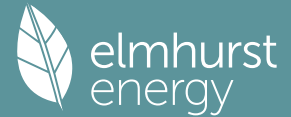
9.0 External Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area (m <sup>2</sup> )	Nett Area (m <sup>2</sup> )	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	61.83	48.15	0.00	None	13.68	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	10.94	8.84	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	14.99	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
	Internal Wall 1	Plasterboard on timber frame	9.00	78.46

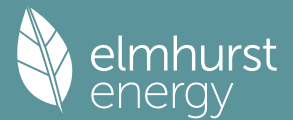
10.0 External Roofs	
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# Summary for Input Data



Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings Area	
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	59.63	0.00	None	0.00	Enter Gross Area	0.00	
<b>10.1 Party Ceilings</b>											
Description	Construction									Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted									30.00	53.72
<b>11.1 Party Floors</b>											
Description	Storey Index	Construction								Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted								30.00	53.72
<b>12.0 Opening Types</b>											
Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)		
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00		
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20		
<b>13.0 Openings</b>											
Name	Opening Type	Location	Orientation	Area (m²)		Pitch					
pd1	Windows	External Wall 1	North West	5.40		0					
w1	Windows	External Wall 1	North West	3.24		0					
ed1	Entrance Doors	Sheltered Wall	North East	2.10		0					
w2	Windows	External Wall 1	South East	5.04		0					
<b>14.0 Conservatory</b>											
			<input type="text" value="None"/>								
<b>15.0 Draught Proofing</b>											
			<input type="text" value="100"/>						%		
<b>16.0 Draught Lobby</b>											
			<input type="text" value="No"/>								
<b>17.0 Thermal Bridging</b>											
			<input type="text" value="Calculate Bridges"/>								
<b>17.1 List of Bridges</b>											
Bridge Type	Source Type	Length	Psi	Adjusted Reference:			Imported				
E1 Steel lintel with perforated steel base plate	Independently assessed	6.72	0.07	0.07	0.07	Thermally Broken	Yes				
E4 Jamb	Independently assessed	18.50	0.02	0.02	0.02	Knauf	Yes				
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	53.90	0.07	0.07	0.07	Knauf	No				
E16 Corner (normal)	Independently assessed	10.80	0.05	0.05	0.05	Knauf	No				
E18 Party wall between dwellings	Independently assessed	5.40	0.07	0.07	0.07	Knauf	Yes				
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.40	-0.09	-0.09	-0.09	Knauf	No				
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	2.40	0.10	0.10	0.10		No				
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	11.10	0.00	0.00	0.00	Default	No				
E14 Flat roof	Independently assessed	25.08	0.05	0.05	0.05		No				
Y-value	<input type="text" value="0.05"/>		W/m²K								
Description	<input type="text" value="Arch"/>										
<b>18.0 Pressure Testing</b>											
			<input type="text" value="Yes"/>								
Designed AP <sub>50</sub>	<input type="text" value="3.00"/>		m³/(h.m²) @ 50 Pa								
Property Tested?	<input type="text" value="Yes"/>										
Test Method	<input type="text" value="Blower Door"/>										
As Built AP <sub>50</sub>	<input type="text" value="0.10"/>		m³/(h.m²) @ 50 Pa								
<b>19.0 Mechanical Ventilation</b>											
<b>Mechanical Ventilation</b>											
Mechanical Ventilation System Present	<input type="text" value="Yes"/>										
Approved Installation	<input type="text" value="No"/>										
Mechanical Ventilation data Type	<input type="text" value="Database"/>										
Type	<input type="text" value="Balanced mechanical ventilation with heat recovery"/>										
MV Reference Number	<input type="text" value="500082"/>										
Configuration	<input type="text" value="1"/>										
Manufacturer SFP	<input type="text" value="0.73"/>										
Duct Type	<input type="text" value="Rigid"/>										
MVHR Efficiency	<input type="text" value="90.00"/>										

# Summary for Input Data



Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

## 20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

## 22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

## 24.0 Main Heating 1

SAP table	<input type="text" value="SAP table"/>
Percentage of Heat	<input type="text" value="100.00"/> %
Database Ref. No.	<input type="text" value="0"/>
Fuel Type	<input type="text" value="Electricity"/>
SAP Code	<input type="text" value="224"/>
In Winter	<input type="text" value="170.00"/>
In Summer	<input type="text" value="170.00"/>
Controls SAP Code	<input type="text" value="2207"/>
Delayed Start Stat	<input type="text" value="No"/>
HETAS approved System	<input type="text" value="No"/>
Oil Pump Inside	<input type="text" value="No"/>
Fan Assisted Flue	<input type="text" value="No"/>
Is MHS Pumped	<input type="text" value="Pump in heated space"/>
Heating Pump Age	<input type="text" value="2013 or later"/>
Heat Emitter	<input type="text" value="Underfloor"/>
Underfloor Heating	<input type="text" value="Yes - Pipes in thin screed"/>
Flow Temperature	<input type="text" value="Enter value"/>
Flow Temperature Value	<input type="text" value="45.00"/>
Boiler Interlock	<input type="text" value="No"/>

25.0 Main Heating 2

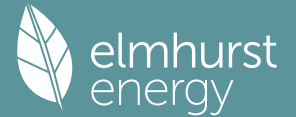
26.0 Heat Networks

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

## 28.0 Water Heating

Water Heating	<input type="text" value="Main Heating 1"/>
SAP Code	<input type="text" value="901"/>
Flue Gas Heat Recovery System	<input type="text" value="No"/>
Waste Water Heat Recovery Instantaneous System 1	<input type="text" value="No"/>
Waste Water Heat Recovery Instantaneous System 2	<input type="text" value="No"/>
Waste Water Heat Recovery Storage System	<input type="text" value="No"/>
Solar Panel	<input type="text" value="No"/>
Water use <= 125 litres/person/day	<input type="text" value="Yes"/>
Summer Immersion	<input type="text" value="No"/>
Cold Water Source	<input type="text" value="From mains"/>
Bath Count	<input type="text" value="1"/>

# Summary for Input Data



Supplementary Immersion   
 Immersion Only Heating Hot Water

## 28.3 Waste Water Heat Recovery System

**29.0 Hot Water Cylinder**   
 Cylinder Stat   
 Cylinder In Heated Space   
 Independent Time Control   
 Insulation Type   
 Cylinder Volume  L  
 Loss  kWh/day  
 Pipes insulation   
 In Airing Cupboard

**31.0 Thermal Store**

**32.0 Photovoltaic Unit**   
 Export Capable Meter?   
 Connected To Dwelling   
 Diverter   
 Battery Capacity [kWh]

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

**34.0 Small-scale Hydro**   
 Electricity Generated   
 Apportioned  kWh/Year  
 Connected to dwelling's electricity meter   
 Electricity Generation

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

## Recommendations

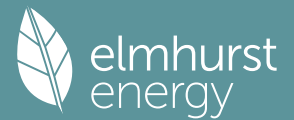
**Lower cost measures**

None

**Further measures to achieve even higher standards**

None

# Predicted Energy Assessment



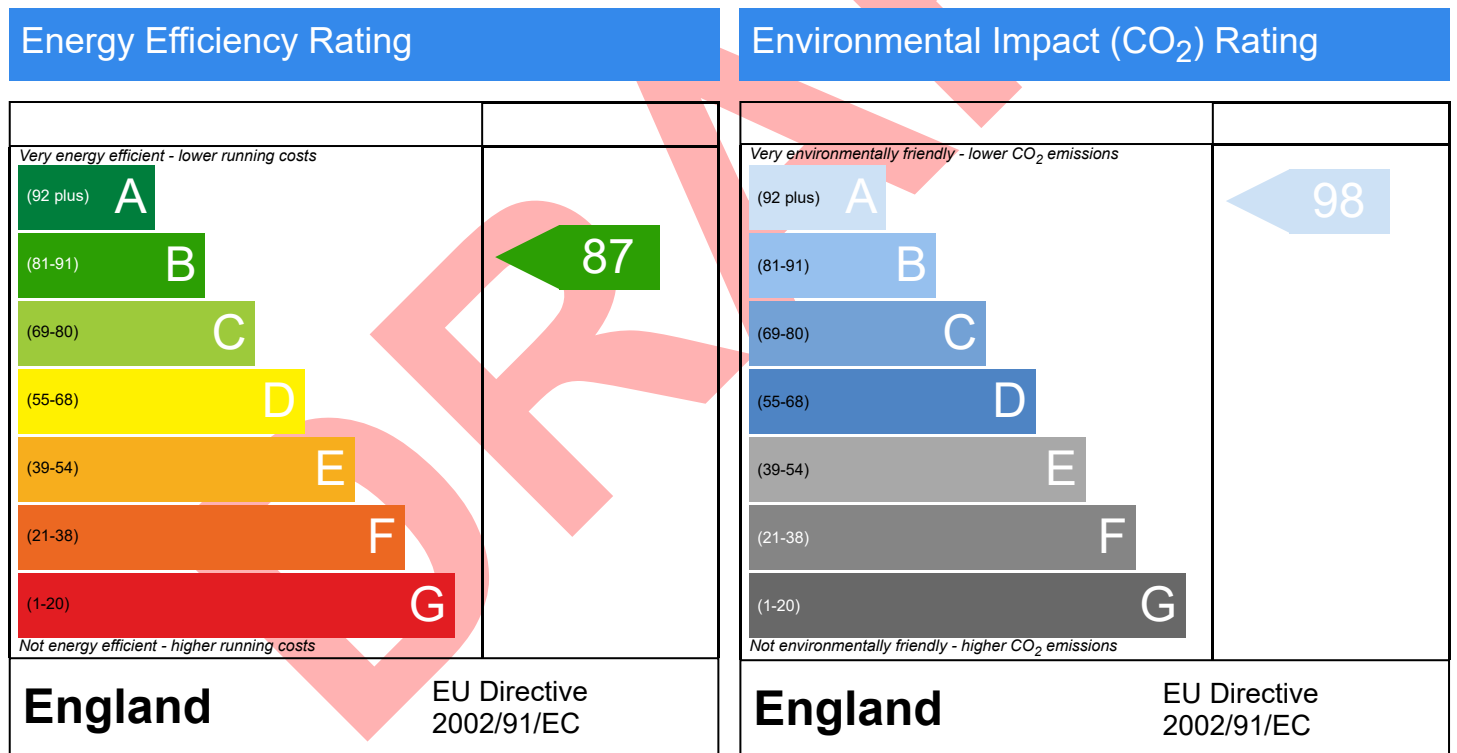
Flat 11, Luton, Bedfordshire, LU1 3HX

Dwelling type:  
Date of assessment:  
Produced by:  
Total floor area:  
DRRN:

Flat, End-Terrace  
05/07/2023  
Darren Coham  
53.72 m<sup>2</sup>

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

# Thermal Bridging

Property Reference	Flat 11	Issued on Date	05/07/2023
Assessment Reference	000011	Prop Type Ref	End-Terrace Flat
Property	Flat 11, Luton, Bedfordshire, LU1 3HX		

SAP Rating	87 B	DER	3.44	TER	17.34
Environmental	98 A	% DER < TER			80.16
CO <sub>2</sub> Emissions (t/year)	0.17	DFEE	40.72	TFEE	43.54
Compliance Check	See BREL	% DFEE < TFEE			6.48
% DPER < TPER	57.24	DPER	40.10	TPER	93.78

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	6.72	0.46	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	18.50	0.33	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	53.90	3.50	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	10.80	0.52	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	5.40	0.37	Knauf
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	5.40	-0.49	Knauf
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	2.40	0.24	
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	11.10	0.00	Default
External wall	E14 Flat roof	Independently assessed	0.052	25.08	1.30	

Total:  W/mK:  
 Y-Value:  W/m<sup>2</sup>K:

# Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:16

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	97 m <sup>2</sup>
Site Reference	Flat 12	Plot Reference	000012
Address	Flat 12, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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	12.22 kgCO <sub>2</sub> /m <sup>2</sup>	
Dwelling carbon dioxide emission rate	2.86 kgCO <sub>2</sub> /m <sup>2</sup>	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	65.61 kWh <sub>PE</sub> /m <sup>2</sup>	
Dwelling primary energy	31.96 kWh <sub>PE</sub> /m <sup>2</sup>	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	33.8 kWh/m <sup>2</sup>	
Dwelling fabric energy efficiency	31.8 kWh/m <sup>2</sup>	OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m <sup>2</sup> K]	Dwelling average U-Value [W/m <sup>2</sup> 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	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.18	pd1 (1.2)	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 <sup>2</sup> ]	U-Value [W/m <sup>2</sup> K]
Exposed wall: Walls (1)	41.18	0.18
Sheltered wall: Walls (2)	36.7849	0.18
Party wall: Party Wall (1)	35.5	0 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m <sup>2</sup> ]	Orientation	Frame factor	U-Value [W/m <sup>2</sup> K]
pd1, Windows	5.4	North West	0.75	1.2
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	6.48	North West	0.75	1.2
w1, Windows	6.48	North West	0.75	1.2
ed1, Entrance Doors	2.0951	South East	N/A	1 (!)

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1 - Main Dwelling: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf



Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.002 (!)	Knauf
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	Default
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf

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

Maximum permitted air permeability at 50Pa	8 m <sup>3</sup> /hm <sup>2</sup>	
Dwelling air permeability at 50Pa	3 m <sup>3</sup> /hm <sup>2</sup> , Design value (!)	OK
Air permeability test certificate reference		

### 4 Space heating

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

Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

#### Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

### 5 Hot water

#### Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 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

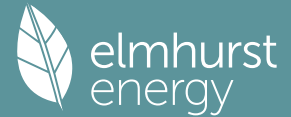
Manufacturer	
Model	

### 7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
<b>System type:</b> Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.84 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	89%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: <b>Photovoltaic system (1)</b>		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
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		

# Summary for Input Data



Property Reference	Flat 12	Issued on Date	05/07/2023
Assessment Reference	000012	Prop Type Ref	Flat
Property	Flat 12, Luton, Bedfordshire, LU1 3HX		

SAP Rating	87 B	DER	2.86	TER	12.22
Environmental	98 A	% DER < TER			76.60
CO <sub>2</sub> Emissions (t/year)	0.25	DFEE	31.85	TFEE	33.77
Compliance Check	See BREL	% DFEE < TFEE			5.69
% DPER < TPER	51.29	DPER	31.96	TPER	65.61

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southeast	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	5	
2.0 Number of Storeys	2	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m <sup>2</sup> K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m <sup>2</sup>	0.00 m
Ground floor:	16.75 m	49.18 m <sup>2</sup>	2.70 m
1st Storey:	21.70 m	47.50 m <sup>2</sup>	2.70 m
2nd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
3rd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
4th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
5th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
6th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
7th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m

8.0 Living Area	34.39	m <sup>2</sup>
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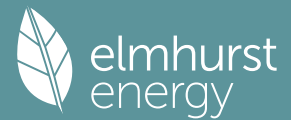
9.0 External Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area (m <sup>2</sup> )	Nett Area (m <sup>2</sup> )	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	64.94	41.18	0.00	None	23.76	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	38.88	36.78	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	35.50	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
	Internal Wall 1	Plasterboard on timber frame	9.00	125.44

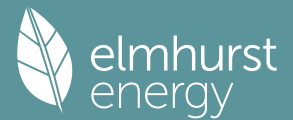
10.1 Party Ceilings	
---------------------	--

# Summary for Input Data



Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )						
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	47.50						
<b>10.2 Internal Ceilings</b>									
Description	Storey	Construction	Area (m <sup>2</sup> )						
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	49.18						
<b>11.1 Party Floors</b>									
Description	Storey Index	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )					
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	49.18					
<b>11.2 Internal Floors</b>									
Description	Storey Index	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )					
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	47.50					
<b>12.0 Opening Types</b>									
Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m <sup>2</sup> K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20
<b>13.0 Openings</b>									
Name	Opening Type	Location	Orientation	Area (m <sup>2</sup> )	Pitch				
pd1	Windows	External Wall 1	North West	10.80	0				
w1	Windows	External Wall 1	North West	12.96	0				
ed1	Entrance Doors	Sheltered Wall	South East	2.10	0				
<b>14.0 Conservatory</b>				<input type="text" value="None"/>					
<b>15.0 Draught Proofing</b>				<input type="text" value="100"/> %					
<b>16.0 Draught Lobby</b>				<input type="text" value="No"/>					
<b>17.0 Thermal Bridging</b>				<input type="text" value="Calculate Bridges"/>					
<b>17.1 List of Bridges</b>									
Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported				
E1 Steel lintel with perforated steel base plate	Independently assessed	10.92	0.07	0.07 Thermally Broken	Yes				
E4 Jamb	Independently assessed	23.30	0.02	0.02 Knauf	Yes				
E6 Intermediate floor within a dwelling	Independently assessed	21.70	0.00	0.00 Knauf	Yes				
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	16.75	0.07	0.07 Knauf	Yes				
E16 Corner (normal)	Independently assessed	16.20	0.05	0.05 Knauf	No				
E18 Party wall between dwellings	Independently assessed	10.80	0.07	0.07 Knauf	Yes				
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	22.80	0.00	0.00	No				
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	4.70	0.10	0.10 Default	No				
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.40	-0.09	-0.09 Knauf	No				
Y-value	<input type="text" value="0.04"/> W/m <sup>2</sup> K								
Description	<input type="text" value="Arch"/>								
<b>18.0 Pressure Testing</b>				<input type="text" value="Yes"/>					
Designed AP <sub>50</sub>	<input type="text" value="3.00"/> m <sup>3</sup> /(h.m <sup>2</sup> ) @ 50 Pa								
Property Tested?	<input type="text" value="Yes"/>								
Test Method	<input type="text" value="Blower Door"/>								
As Built AP <sub>50</sub>	<input type="text" value="0.10"/> m <sup>3</sup> /(h.m <sup>2</sup> ) @ 50 Pa								
<b>19.0 Mechanical Ventilation</b>									
<b>Mechanical Ventilation</b>									
Mechanical Ventilation System Present	<input type="text" value="Yes"/>								
Approved Installation	<input type="text" value="No"/>								
Mechanical Ventilation data Type	<input type="text" value="Database"/>								
Type	<input type="text" value="Balanced mechanical ventilation with heat recovery"/>								
MV Reference Number	<input type="text" value="500082"/>								
Configuration	<input type="text" value="2"/>								
Manufacturer SFP	<input type="text" value="0.84"/>								
Duct Type	<input type="text" value="Rigid"/>								
MVHR Efficiency	<input type="text" value="89.00"/>								

# Summary for Input Data



Wet Rooms	2
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

## 20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No
---------------------------	----

## 22.0 Lighting

No Fixed Lighting	No
-------------------	----

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

## 24.0 Main Heating 1

SAP table	SAP table
Percentage of Heat	100.00 %
Database Ref. No.	0
Fuel Type	Electricity
SAP Code	224
In Winter	170.00
In Summer	170.00
Controls SAP Code	2207
Delayed Start Stat	No
HETAS approved System	No
Oil Pump Inside	No
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Underfloor
Underfloor Heating	Yes - Pipes in thin screed
Flow Temperature	Enter value
Flow Temperature Value	45.00
Boiler Interlock	No

25.0 Main Heating 2	None
---------------------	------

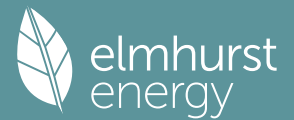
26.0 Heat Networks	None
--------------------	------

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

## 28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1

# Summary for Input Data



Supplementary Immersion   
 Immersion Only Heating Hot Water

## 28.3 Waste Water Heat Recovery System

### 29.0 Hot Water Cylinder

Hot Water Cylinder   
 Cylinder Stat   
 Cylinder In Heated Space   
 Independent Time Control   
 Insulation Type   
 Cylinder Volume  L  
 Loss  kWh/day  
 Pipes insulation   
 In Airing Cupboard

### 31.0 Thermal Store

### 32.0 Photovoltaic Unit

Export Capable Meter?   
 Connected To Dwelling   
 Diverter   
 Battery Capacity [kWh]

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

### 34.0 Small-scale Hydro

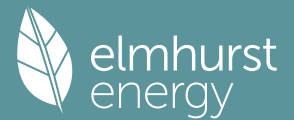
Electricity Generated   
 Apportioned  kWh/Year  
 Connected to dwelling's electricity meter   
 Electricity Generation

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

### Recommendations

**Lower cost measures**  
 None  
**Further measures to achieve even higher standards**  
 None

# Predicted Energy Assessment



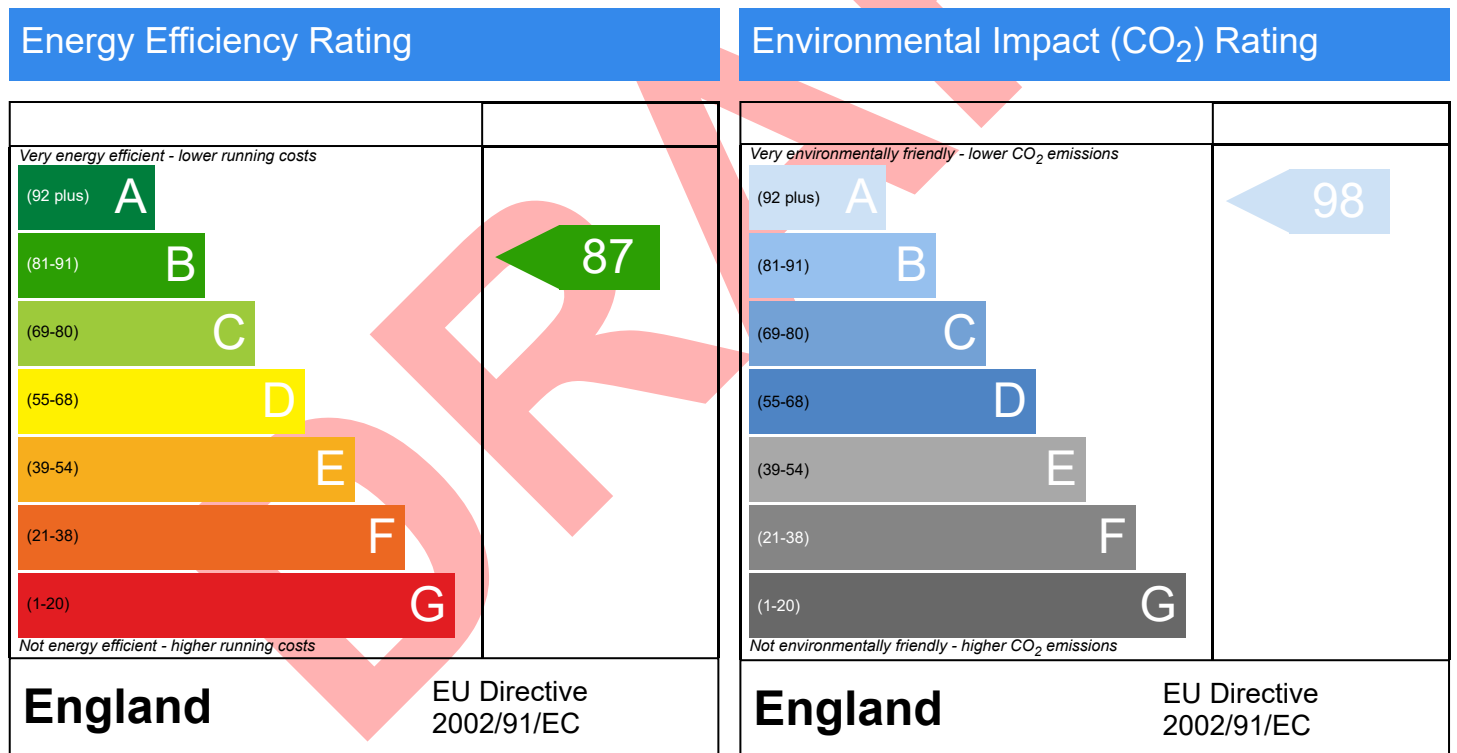
Flat 12, Luton, Bedfordshire, LU1 3HX

Dwelling type:  
Date of assessment:  
Produced by:  
Total floor area:  
DRRN:

Flat, End-Terrace  
05/07/2023  
Darren Coham  
96.68 m<sup>2</sup>

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

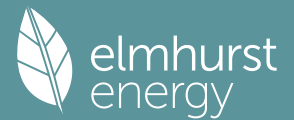
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

# Thermal Bridging



Property Reference	Flat 12	Issued on Date	05/07/2023
Assessment Reference	000012	Prop Type Ref	End-Terrace Flat
Property	Flat 12, Luton, Bedfordshire, LU1 3HX		

SAP Rating	87 B	DER	2.86	TER	12.22
Environmental	98 A	% DER < TER			76.60
CO <sub>2</sub> Emissions (t/year)	0.25	DFEE	31.85	TFEE	33.77
Compliance Check	See BREL	% DFEE < TFEE			5.69
% DPER < TPER	51.29	DPER	31.96	TPER	65.61

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	10.92	0.74	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	23.30	0.42	Knauf
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.002	21.70	0.04	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	16.75	1.09	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	16.20	0.78	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	10.80	0.75	Knauf
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	22.80	0.00	
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	4.70	0.47	Default
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	5.40	-0.49	Knauf

Total:  W/mK:  
 Y-Value:  W/m<sup>2</sup>K:



# Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:16

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	96 m <sup>2</sup>
Site Reference	Flat 13	Plot Reference	000013
Address	Flat 13, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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	11.91 kgCO <sub>2</sub> /m <sup>2</sup>	
Dwelling carbon dioxide emission rate	2.75 kgCO <sub>2</sub> /m <sup>2</sup>	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	63.94 kWh <sub>PE</sub> /m <sup>2</sup>	
Dwelling primary energy	30.88 kWh <sub>PE</sub> /m <sup>2</sup>	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	32.3 kWh/m <sup>2</sup>	
Dwelling fabric energy efficiency	31.5 kWh/m <sup>2</sup>	OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m <sup>2</sup> K]	Dwelling average U-Value [W/m <sup>2</sup> 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	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.18	pd1 (1.2)	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 <sup>2</sup> ]	U-Value [W/m <sup>2</sup> K]
Exposed wall: Walls (1)	53.98	0.18
Sheltered wall: Walls (2)	7.2449	0.18
Party wall: Party Wall (1)	20.36	0 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m <sup>2</sup> ]	Orientation	Frame factor	U-Value [W/m <sup>2</sup> K]
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	6.48	North West	0.75	1.2
w2, Windows	5.04	North East	0.75	1.2
ed1, Entrance Doors	2.0951	South West	N/A	1 (!)
w3, Windows	3.24	North East	0.75	1.2
pd2, Windows	5.4	South East	0.75	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1 - Main Dwelling: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
		expertise		
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	Default
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	Default
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf

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

Maximum permitted air permeability at 50Pa	8 m <sup>3</sup> /hm <sup>2</sup>	
Dwelling air permeability at 50Pa	3 m <sup>3</sup> /hm <sup>2</sup> , Design value (!)	OK
Air permeability test certificate reference		

### 4 Space heating

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

Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

#### Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

### 5 Hot water

#### Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 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

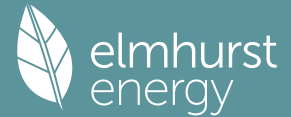
Manufacturer	
Model	

### 7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
<b>System type:</b> 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	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: <b>Photovoltaic system (1)</b>		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
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		

# Summary for Input Data



Property Reference	Flat 13		Issued on Date	05/07/2023	
Assessment Reference	000013	Prop Type Ref	Flat		
Property	Flat 13, Luton, Bedfordshire, LU1 3HX				
SAP Rating	88 B	DER	2.75	TER	11.91
Environmental	98 A	% DER < TER			76.91
CO <sub>2</sub> Emissions (t/year)	0.24	DFEE	31.54	TFEE	32.29
Compliance Check	See BREL	% DFEE < TFEE			2.29
% DPER < TPER	51.70	DPER	30.88	TPER	63.94
Assessor Details	Mr. Darren Coham			Assessor ID	R789-0001
Client					

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	5	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m <sup>2</sup> K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m <sup>2</sup>	0.00 m
Ground floor:	32.92 m	96.00 m <sup>2</sup>	2.70 m
1st Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
2nd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
3rd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
4th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
5th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
6th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
7th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m

8.0 Living Area	28.73	m <sup>2</sup>
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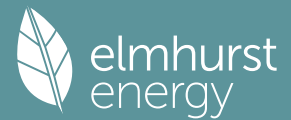
9.0 External Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area(m <sup>2</sup> )	Nett Area (m <sup>2</sup> )	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	79.54	53.98	0.00	None	25.56	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	9.34	7.24	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	20.36	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
	Internal Wall 1	Plasterboard on timber frame	9.00	234.00

10.1 Party Ceilings	
---------------------	--

# Summary for Input Data



Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	96.00

## 11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	96.00

## 12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m <sup>2</sup> K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

## 13.0 Openings

Name	Opening Type	Location	Orientation	Area (m <sup>2</sup> )	Pitch
pd1	Windows	External Wall 1	North West	5.40	0
w1	Windows	External Wall 1	North West	6.48	0
w2	Windows	External Wall 1	North East	5.04	0
ed1	Entrance Doors	Sheltered Wall	South West	2.10	0
w3	Windows	External Wall 1	North East	3.24	0
pd2	Windows	External Wall 1	South East	5.40	0

## 14.0 Conservatory

## 15.0 Draught Proofing

 %

## 16.0 Draught Lobby

## 17.0 Thermal Bridging

### 17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	11.67	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	28.10	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	65.84	0.07	0.07 Knauf	No
E16 Corner (normal)	Independently assessed	8.10	0.05	0.05 Knauf	No
E18 Party wall between dwellings	Independently assessed	5.40	0.07	0.07 Knauf	Yes
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.08	0.00	0.00 Default	No
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	11.80	0.10	0.10 Default	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09 Knauf	No

Y-value  W/m<sup>2</sup>K

Description

## 18.0 Pressure Testing

Designed AP<sub>50</sub>  m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

Property Tested?

Test Method

As Built AP<sub>50</sub>  m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

## 19.0 Mechanical Ventilation

### Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

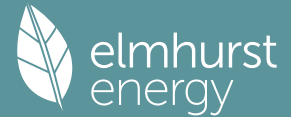
Wet Rooms

SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

# Summary for Input Data



## 20.0 Fans, Open Fireplaces, Flues

### 21.0 Fixed Cooling System

No

### 22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

### 24.0 Main Heating 1

SAP table

Percentage of Heat

100.00

%

Database Ref. No.

0

Fuel Type

Electricity

SAP Code

224

In Winter

170.00

In Summer

170.00

Controls SAP Code

2207

Delayed Start Stat

No

HETAS approved System

No

Oil Pump Inside

No

Fan Assisted Flue

No

Is MHS Pumped

Pump in heated space

Heating Pump Age

2013 or later

Heat Emitter

Underfloor

Underfloor Heating

Yes - Pipes in thin screed

Flow Temperature

Enter value

Flow Temperature Value

45.00

Boiler Interlock

No

### 25.0 Main Heating 2

None

### 26.0 Heat Networks

None

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

### 28.0 Water Heating

Water Heating

Main Heating 1

SAP Code

901

Flue Gas Heat Recovery System

No

Waste Water Heat Recovery Instantaneous System 1

No

Waste Water Heat Recovery Instantaneous System 2

No

Waste Water Heat Recovery Storage System

No

Solar Panel

No

Water use <= 125 litres/person/day

Yes

Summer Immersion

No

Cold Water Source

From mains

Bath Count

1

Supplementary Immersion

No

Immersion Only Heating Hot Water

No

### 28.3 Waste Water Heat Recovery System

### 29.0 Hot Water Cylinder

Hot Water Cylinder

# Summary for Input Data



Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

**31.0 Thermal Store**

**32.0 Photovoltaic Unit**

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

**34.0 Small-scale Hydro**

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**Recommendations**

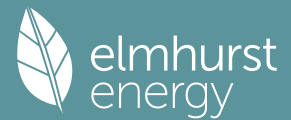
**Lower cost measures**

None

**Further measures to achieve even higher standards**

None

# Predicted Energy Assessment



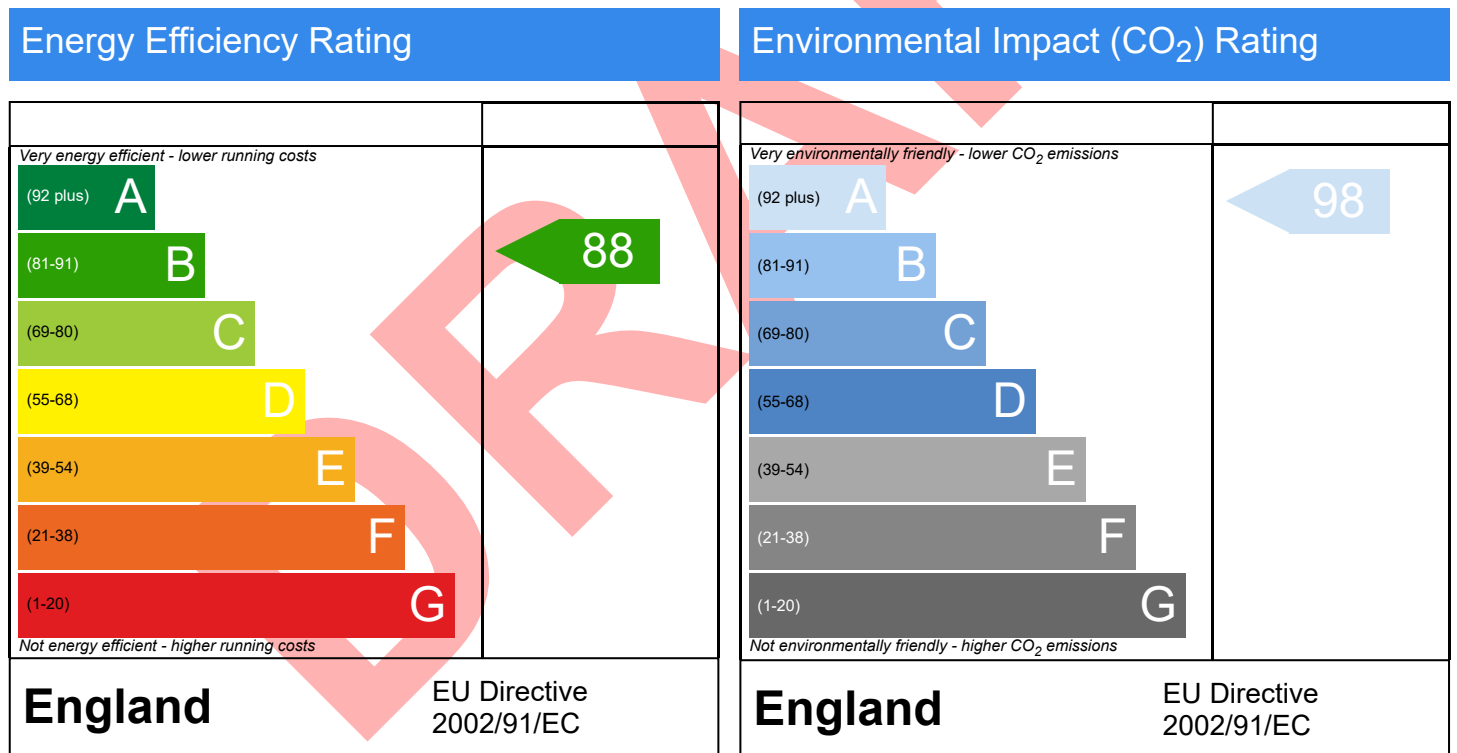
Flat 13, Luton, Bedfordshire, LU1 3HX

Dwelling type:  
Date of assessment:  
Produced by:  
Total floor area:  
DRRN:

Flat, End-Terrace  
05/07/2023  
Darren Coham  
96 m<sup>2</sup>

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.



# Thermal Bridging

Property Reference	Flat 13	Issued on Date	05/07/2023
Assessment Reference	000013	Prop Type Ref	End-Terrace Flat
Property	Flat 13, Luton, Bedfordshire, LU1 3HX		

SAP Rating	88 B	DER	2.75	TER	11.91
Environmental	98 A	% DER < TER			76.91
CO <sub>2</sub> Emissions (t/year)	0.24	DFEE	31.54	TFEE	32.29
Compliance Check	See BREL	% DFEE < TFEE			2.29
% DPER < TPER	51.70	DPER	30.88	TPER	63.94

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	11.67	0.79	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	28.10	0.51	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	65.84	4.28	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	8.10	0.39	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	5.40	0.37	Knauf
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	15.08	0.00	Default
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	11.80	1.18	Default
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf

Total:  W/mK:  
 Y-Value:  W/m<sup>2</sup>K:

# Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:16

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	96 m <sup>2</sup>
Site Reference	Flat 14	Plot Reference	000014
Address	Flat 14, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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	11.91 kgCO <sub>2</sub> /m <sup>2</sup>		
Dwelling carbon dioxide emission rate	2.75 kgCO <sub>2</sub> /m <sup>2</sup>	OK	
1b Target primary energy rate and dwelling primary energy			
Target primary energy	63.94 kWh <sub>PE</sub> /m <sup>2</sup>		
Dwelling primary energy	30.88 kWh <sub>PE</sub> /m <sup>2</sup>	OK	
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	32.3 kWh/m <sup>2</sup>		
Dwelling fabric energy efficiency	31.5 kWh/m <sup>2</sup>	OK	

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m <sup>2</sup> K]	Dwelling average U-Value [W/m <sup>2</sup> 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	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.18	pd1 (1.2)	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 <sup>2</sup> ]	U-Value [W/m <sup>2</sup> K]
Exposed wall: Walls (1)	53.98	0.18
Sheltered wall: Walls (2)	7.2449	0.18
Party wall: Party Wall (1)	20.36	0 (!)

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m <sup>2</sup> ]	Orientation	Frame factor	U-Value [W/m <sup>2</sup> K]
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	6.48	North West	0.75	1.2
w2, Windows	5.04	North East	0.75	1.2
ed1, Entrance Doors	2.0951	South West	N/A	1 (!)
w3, Windows	3.24	North East	0.75	1.2
pd2, Windows	5.4	South East	0.75	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1 - Main Dwelling: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
		expertise		
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	Default
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	Default
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf

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

Maximum permitted air permeability at 50Pa	8 m <sup>3</sup> /hm <sup>2</sup>	
Dwelling air permeability at 50Pa	3 m <sup>3</sup> /hm <sup>2</sup> , Design value (!)	OK
Air permeability test certificate reference		

### 4 Space heating

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

Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

#### Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

### 5 Hot water

#### Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 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

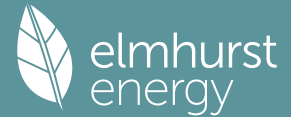
Manufacturer	
Model	

### 7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
<b>System type:</b> 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	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: <b>Photovoltaic system (1)</b>		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
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		

# Summary for Input Data



Property Reference	Flat 14	Issued on Date	05/07/2023
Assessment Reference	000014	Prop Type Ref	Flat
Property	Flat 14, Luton, Bedfordshire, LU1 3HX		

SAP Rating	88 B	DER	2.75	TER	11.91
Environmental	98 A	% DER < TER			76.91
CO <sub>2</sub> Emissions (t/year)	0.24	DFEE	31.54	TFEE	32.29
Compliance Check	See BREL	% DFEE < TFEE			2.29
% DPER < TPER	51.70	DPER	30.88	TPER	63.94

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southwest	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	7	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m <sup>2</sup> K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m <sup>2</sup>	0.00 m
Ground floor:	32.92 m	96.00 m <sup>2</sup>	2.70 m
1st Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
2nd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
3rd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
4th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
5th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
6th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
7th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m

8.0 Living Area	28.73	m <sup>2</sup>
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9.0 External Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area(m <sup>2</sup> )	Nett Area (m <sup>2</sup> )	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	79.54	53.98	0.00	None	25.56	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	9.34	7.24	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	20.36	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
	Internal Wall 1	Plasterboard on timber frame	9.00	234.00

10.1 Party Ceilings	
---------------------	--

# Summary for Input Data



Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	96.00

### 11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	96.00

### 12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m <sup>2</sup> K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

### 13.0 Openings

Name	Opening Type	Location	Orientation	Area (m <sup>2</sup> )	Pitch
pd1	Windows	External Wall 1	North West	5.40	0
w1	Windows	External Wall 1	North West	6.48	0
w2	Windows	External Wall 1	North East	5.04	0
ed1	Entrance Doors	Sheltered Wall	South West	2.10	0
w3	Windows	External Wall 1	North East	3.24	0
pd2	Windows	External Wall 1	South East	5.40	0

### 14.0 Conservatory

None

### 15.0 Draught Proofing

100 %

### 16.0 Draught Lobby

No

### 17.0 Thermal Bridging

Calculate Bridges

### 17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	11.67	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	28.10	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	65.84	0.07	0.07 Knauf	No
E16 Corner (normal)	Independently assessed	8.10	0.05	0.05 Knauf	No
E18 Party wall between dwellings	Independently assessed	5.40	0.07	0.07 Knauf	Yes
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.08	0.00	0.00 Default	No
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	11.80	0.10	0.10 Default	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09 Knauf	No

Y-value: 0.08 W/m<sup>2</sup>K

Description: Arch

### 18.0 Pressure Testing

Yes

Designed AP<sub>50</sub>: 3.00 m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

Property Tested?: Yes

Test Method: Blower Door

As Built AP<sub>50</sub>: 0.10 m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

### 19.0 Mechanical Ventilation

#### Mechanical Ventilation

Mechanical Ventilation System Present: Yes

Approved Installation: No

Mechanical Ventilation data Type: Database

Type: Balanced mechanical ventilation with heat recovery

MV Reference Number: 500082

Configuration: 1

Manufacturer SFP: 0.73

Duct Type: Rigid

MVHR Efficiency: 90.00

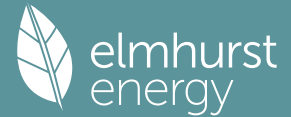
Wet Rooms: 1

SFP from Installer Commissioning Certificate: No

MVHR System Location: Inside heated envelope (installed exclusively)

Duct Installation Specification: Level 1

# Summary for Input Data



## 20.0 Fans, Open Fireplaces, Flues

### 21.0 Fixed Cooling System

No

### 22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

### 24.0 Main Heating 1

SAP table

Percentage of Heat

100.00

%

Database Ref. No.

0

Fuel Type

Electricity

SAP Code

224

In Winter

170.00

In Summer

170.00

Controls SAP Code

2207

Delayed Start Stat

No

HETAS approved System

No

Oil Pump Inside

No

Fan Assisted Flue

No

Is MHS Pumped

Pump in heated space

Heating Pump Age

2013 or later

Heat Emitter

Underfloor

Underfloor Heating

Yes - Pipes in thin screed

Flow Temperature

Enter value

Flow Temperature Value

45.00

Boiler Interlock

No

### 25.0 Main Heating 2

None

### 26.0 Heat Networks

None

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

### 28.0 Water Heating

Water Heating

Main Heating 1

SAP Code

901

Flue Gas Heat Recovery System

No

Waste Water Heat Recovery Instantaneous System 1

No

Waste Water Heat Recovery Instantaneous System 2

No

Waste Water Heat Recovery Storage System

No

Solar Panel

No

Water use <= 125 litres/person/day

Yes

Summer Immersion

No

Cold Water Source

From mains

Bath Count

1

Supplementary Immersion

No

Immersion Only Heating Hot Water

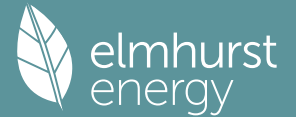
No

### 28.3 Waste Water Heat Recovery System

### 29.0 Hot Water Cylinder

Hot Water Cylinder

# Summary for Input Data



Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

**31.0 Thermal Store**

**32.0 Photovoltaic Unit**

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

**34.0 Small-scale Hydro**

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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**Recommendations**

**Lower cost measures**

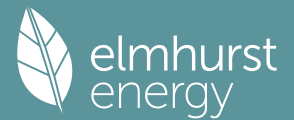
None

**Further measures to achieve even higher standards**

None



# Predicted Energy Assessment



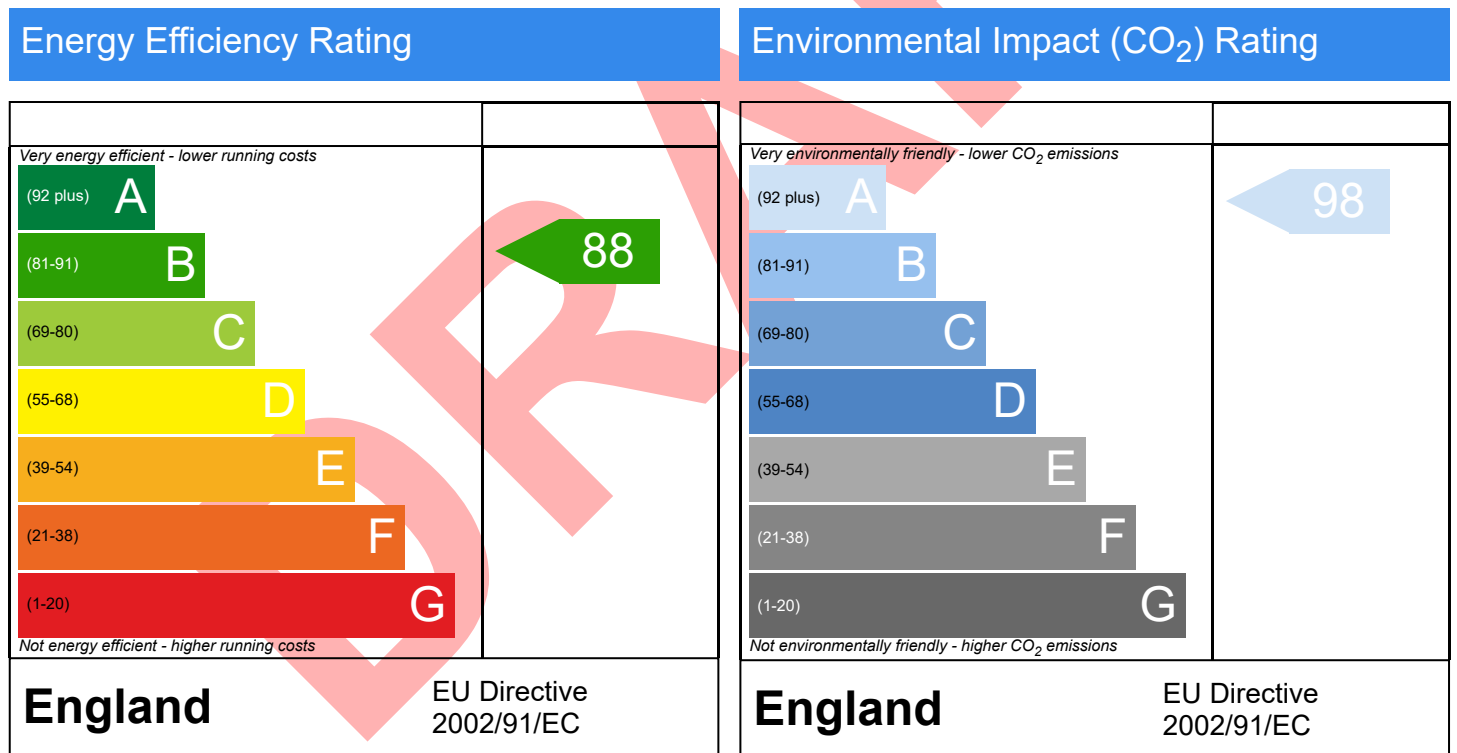
Flat 14, Luton, Bedfordshire, LU1 3HX

Dwelling type:  
Date of assessment:  
Produced by:  
Total floor area:  
DRRN:

Flat, End-Terrace  
05/07/2023  
Darren Coham  
96 m<sup>2</sup>

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

# Thermal Bridging

Property Reference	Flat 14	Issued on Date	05/07/2023
Assessment Reference	000014	Prop Type Ref	End-Terrace Flat
Property	Flat 14, Luton, Bedfordshire, LU1 3HX		

SAP Rating	88 B	DER	2.75	TER	11.91
Environmental	98 A	% DER < TER			76.91
CO <sub>2</sub> Emissions (t/year)	0.24	DFEE	31.54	TFEE	32.29
Compliance Check	See BREL	% DFEE < TFEE			2.29
% DPER < TPER	51.70	DPER	30.88	TPER	63.94

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	11.67	0.79	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	28.10	0.51	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	65.84	4.28	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	8.10	0.39	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	5.40	0.37	Knauf
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	15.08	0.00	Default
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	11.80	1.18	Default
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf

Total:  W/mK:  
 Y-Value:  W/m<sup>2</sup>K:

# Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:16

Project Information			
Assessed By	Darren Coham	Building Type	Flat, Detached
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	116 m <sup>2</sup>
Site Reference	Flat 15	Plot Reference	000015
Address	Flat 15, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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	13.06 kgCO <sub>2</sub> /m <sup>2</sup>		
Dwelling carbon dioxide emission rate	3.44 kgCO <sub>2</sub> /m <sup>2</sup>		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	69.97 kWh <sub>PE</sub> /m <sup>2</sup>		
Dwelling primary energy	37.35 kWh <sub>PE</sub> /m <sup>2</sup>		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	41.7 kWh/m <sup>2</sup>		
Dwelling fabric energy efficiency	41.4 kWh/m <sup>2</sup>		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m <sup>2</sup> K]	Dwelling average U-Value [W/m <sup>2</sup> 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	N/A	N/A	N/A
Roofs	0.16	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	1.6	1.19	w1 (1.2)	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 <sup>2</sup> ]	U-Value [W/m <sup>2</sup> K]
Exposed wall: Walls (1)	62.9	0.18
Sheltered wall: Walls (2)	19.3649	0.18
Exposed roof: Roof (1)	116.04	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m <sup>2</sup> ]	Orientation	Frame factor	U-Value [W/m <sup>2</sup> K]
w1, Windows	6.48	North West	0.75	1.2
w1, Windows	6.48	North West	0.75	1.2
ed1, Entrance Doors	2.0951	South West	N/A	1 (!)
w3, Windows	5.04	North East	0.75	1.2
w2, Windows	4.32	North West	0.75	1.2
w4, Windows	3.24	North East	0.75	1.2
w5, Windows	5.4	South East	0.75	1.2
w6, Windows	3.48	South East	0.75	1.2
w7, Windows	5.4	South West	0.75	1.2

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

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E14: Flat roof	Calculated by person with suitable expertise	0.052	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	Default

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

Maximum permitted air permeability at 50Pa	8 m <sup>3</sup> /hm <sup>2</sup>	
Dwelling air permeability at 50Pa	3 m <sup>3</sup> /hm <sup>2</sup> , Design value (!)	OK
Air permeability test certificate reference		

### 4 Space heating

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

Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

#### Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

### 5 Hot water

#### Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 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

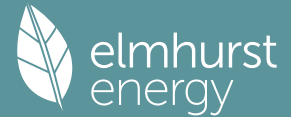
Manufacturer	
Model	

### 7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
<b>System type:</b> Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.84 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	89%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: <b>Photovoltaic system (1)</b>		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
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		

# Summary for Input Data



Property Reference	Flat 15	Issued on Date	05/07/2023
Assessment Reference	000015	Prop Type Ref	Flat
Property	Flat 15, Luton, Bedfordshire, LU1 3HX		

SAP Rating	84 B	DER	3.44	TER	13.06
Environmental	97 A	% DER < TER			73.66
CO <sub>2</sub> Emissions (t/year)	0.37	DFEE	41.37	TFEE	41.68
Compliance Check	See BREL	% DFEE < TFEE			0.76
% DPER < TPER	46.61	DPER	37.35	TPER	69.97

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southwest	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	7	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	0	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m <sup>2</sup> K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m <sup>2</sup>	0.00 m
Ground floor:	46.00 m	116.04 m <sup>2</sup>	2.70 m
1st Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
2nd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
3rd Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
4th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
5th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
6th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m
7th Storey:	0.00 m	0.00 m <sup>2</sup>	0.00 m

8.0 Living Area	48.78	m <sup>2</sup>
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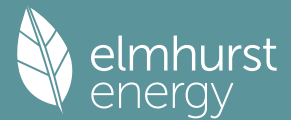
9.0 External Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area (m <sup>2</sup> )	Nett Area (m <sup>2</sup> )	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	102.74	62.90	0.00	None	39.84	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	21.46	19.36	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	20.36	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
	Internal Wall 1	Plasterboard on timber frame	9.00	190.73

10.0 External Roofs	
---------------------	--

# Summary for Input Data



Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area (m <sup>2</sup> )	Nett Area (m <sup>2</sup> )	Shelter Code	Shelter Factor	Calculation Type	Openings Area
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	116.04	0.00	None	0.00	Enter Gross Area	0.00

## 11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	116.04

## 12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m <sup>2</sup> K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

## 13.0 Openings

Name	Opening Type	Location	Orientation	Area (m <sup>2</sup> )	Pitch
w1	Windows	External Wall 1	North West	12.96	0
ed1	Entrance Doors	Sheltered Wall	South West	2.10	0
w3	Windows	External Wall 1	North East	5.04	0
w2	Windows	External Wall 1	North West	4.32	0
w4	Windows	External Wall 1	North East	3.24	0
w5	Windows	External Wall 1	South East	5.40	0
w6	Windows	External Wall 1	South East	3.48	0
w7	Windows	External Wall 1	South West	5.40	0

## 14.0 Conservatory

## 15.0 Draught Proofing

 %

## 16.0 Draught Lobby

## 17.0 Thermal Bridging

### 17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted	Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	17.62	0.07	0.07	Thermally Broken	Yes
E4 Jamb	Independently assessed	42.50	0.02	0.02	Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	46.00	0.07	0.07	Knauf	Yes
E14 Flat roof	Independently assessed	46.00	0.05	0.05	Knauf	Yes
E16 Corner (normal)	Independently assessed	13.50	0.05	0.05	Knauf	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09	Knauf	No
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	13.00	0.10	0.10	Default	No

Y-value  W/m<sup>2</sup>K

Description

## 18.0 Pressure Testing

Designed AP<sub>50</sub>  m<sup>2</sup>/(h.m<sup>2</sup>) @ 50 Pa

Property Tested?

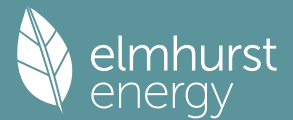
Test Method

As Built AP<sub>50</sub>  m<sup>2</sup>/(h.m<sup>2</sup>) @ 50 Pa

## 19.0 Mechanical Ventilation

Mechanical Ventilation	
Mechanical Ventilation System Present	<input type="text" value="Yes"/>
Approved Installation	<input type="text" value="No"/>
Mechanical Ventilation data Type	<input type="text" value="Database"/>
Type	<input type="text" value="Balanced mechanical ventilation with heat recovery"/>
MV Reference Number	<input type="text" value="500082"/>
Configuration	<input type="text" value="2"/>
Manufacturer SFP	<input type="text" value="0.84"/>
Duct Type	<input type="text" value="Rigid"/>
MVHR Efficiency	<input type="text" value="89.00"/>
Wet Rooms	<input type="text" value="2"/>
SFP from Installer Commissioning Certificate	<input type="text" value="No"/>
MVHR System Location	<input type="text" value="Inside heated envelope (installed exclusively)"/>

# Summary for Input Data



Duct Installation Specification

Level 1

## 20.0 Fans, Open Fireplaces, Flues

### 21.0 Fixed Cooling System

No

### 22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

### 24.0 Main Heating 1

SAP table

Percentage of Heat 100.00 %

Database Ref. No. 0

Fuel Type Electricity

SAP Code 224

In Winter 170.00

In Summer 170.00

Controls SAP Code 2207

Delayed Start Stat No

HETAS approved System No

Oil Pump Inside No

Fan Assisted Flue No

Is MHS Pumped Pump in heated space

Heating Pump Age 2013 or later

Heat Emitter Underfloor

Underfloor Heating Yes - Pipes in thin screed

Flow Temperature Enter value

Flow Temperature Value 45.00

Boiler Interlock No

### 25.0 Main Heating 2

None

### 26.0 Heat Networks

None

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

### 28.0 Water Heating

Water Heating Main Heating 1

SAP Code 901

Flue Gas Heat Recovery System No

Waste Water Heat Recovery Instantaneous System 1 No

Waste Water Heat Recovery Instantaneous System 2 No

Waste Water Heat Recovery Storage System No

Solar Panel No

Water use <= 125 litres/person/day Yes

Summer Immersion No

Cold Water Source From mains

Bath Count 1

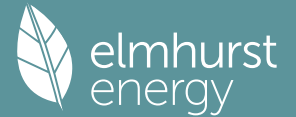
Supplementary Immersion No

Immersion Only Heating Hot Water No

### 28.3 Waste Water Heat Recovery System



# Summary for Input Data



## 29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

## 31.0 Thermal Store

None

## 32.0 Photovoltaic Unit

Multiple Dwellings – Connected	
Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

## 34.0 Small-scale Hydro

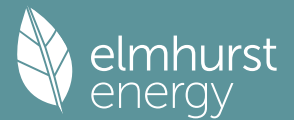
None		
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

## Recommendations

- Lower cost measures
  - None
- Further measures to achieve even higher standards
  - None

# Predicted Energy Assessment



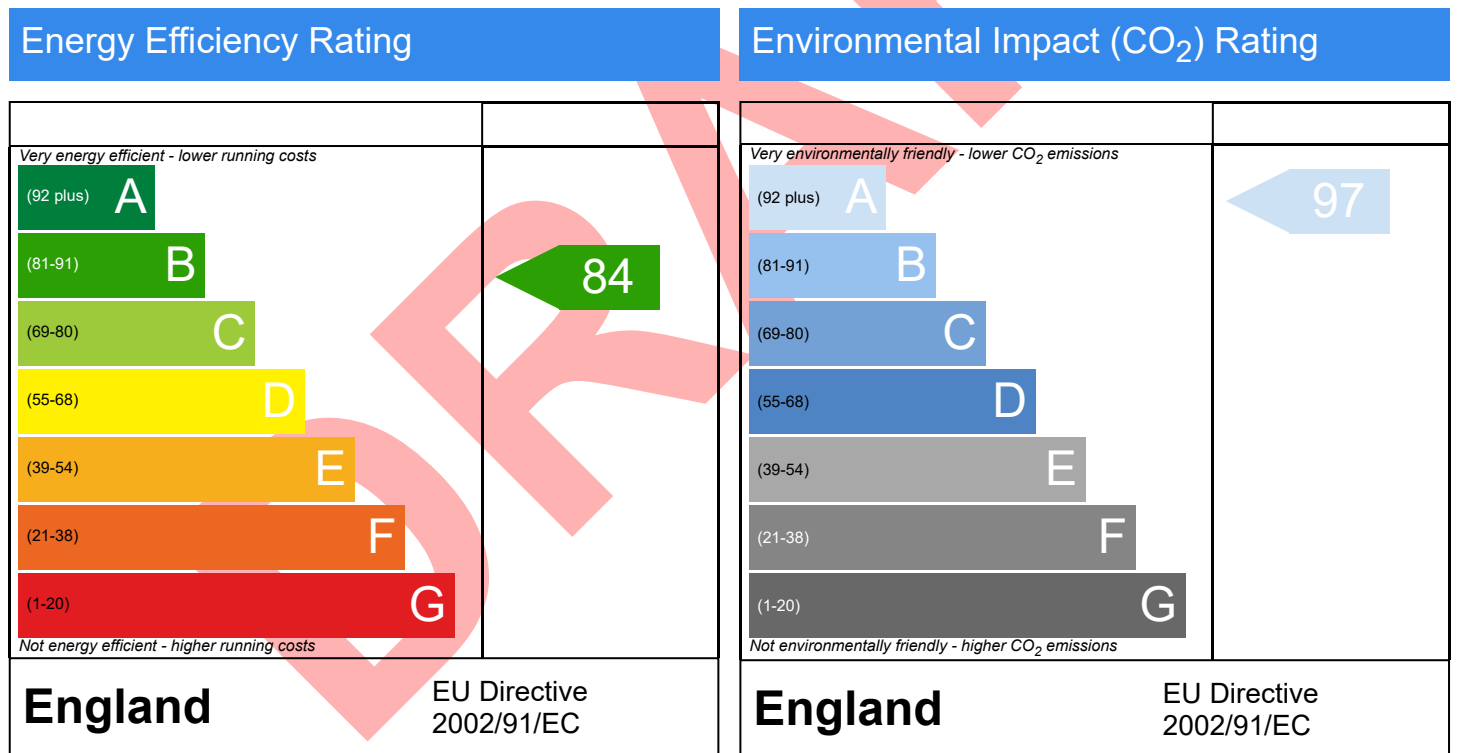
Flat 15, Luton, Bedfordshire, LU1 3HX

Dwelling type:  
Date of assessment:  
Produced by:  
Total floor area:  
DRRN:

Flat, Detached  
05/07/2023  
Darren Coham  
116.04 m<sup>2</sup>

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

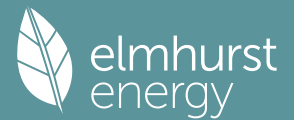
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

# Thermal Bridging



Property Reference	Flat 15	Issued on Date	05/07/2023
Assessment Reference	000015	Prop Type Ref	Detached Flat
Property	Flat 15, Luton, Bedfordshire, LU1 3HX		

SAP Rating	84 B	DER	3.44	TER	13.06
Environmental	97 A	% DER < TER			73.66
CO <sub>2</sub> Emissions (t/year)	0.37	DFEE	41.37	TFEE	41.68
Compliance Check	See BREL	% DFEE < TFEE			0.76
% DPER < TPER	46.61	DPER	37.35	TPER	69.97

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	17.62	1.20	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	42.50	0.76	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	46.00	2.99	Knauf
External wall	E14 Flat roof	Independently assessed	0.052	46.00	2.39	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	13.50	0.65	Knauf
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	13.00	1.30	Default

Total: 181.32 W/mK:  
 Y-Value: 0.04 W/m²K:



## **Appendix B - Part L 2021 BRUKL Document for Non-Domestic Areas**

## Project name

**Units 1 & 2**

As designed

Date: Wed Jul 05 13:40:36 2023

## Administrative information

## Building Details

Address: Units 1 &amp; 2, 2 Gloucester road, Luton, LU1 3HX

## Certifier details

Name: Darren Coham

Telephone number: 01206 489019

Address: Suite 3, Aster House, Elmstead Market, CO7 7FD

## Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.5"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.5

BRUKL compliance module version: v6.1.e.0

Foundation area [m<sup>2</sup>]: 153.57The CO<sub>2</sub> emission and primary energy rates of the building must not exceed the targets

Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> annum	1.63
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> annum	1.31
Target primary energy rate (TPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	17.35
Building primary energy rate (BPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	13.47
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER   BPER ≤ TPER

## The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U <sub>a-Limit</sub>	U <sub>a-Calc</sub>	U <sub>i-Calc</sub>	First surface with maximum value
Walls*	0.26	0.18	0.18	External Wall - Pro
Floors	0.18	0.18	0.18	Ground Floor
Pitched roofs	0.16	-	-	No pitched roofs in project
Flat roofs	0.18	-	-	No flat roofs in project
Windows** and roof windows	1.6	1.2	1.2	Door 1b
Rooflights***	2.2	-	-	No rooflights in project
Personnel doors <sup>^</sup>	1.6	-	-	No personnel doors in project
Vehicle access & similar large doors	1.3	-	-	No vehicle access or similar large doors in project
High usage entrance doors	3	-	-	No high usage entrance doors in project

U<sub>a-Limit</sub> = Limiting area-weighted average U-values [W/(m<sup>2</sup>K)]  
U<sub>a-Calc</sub> = Calculated area-weighted average U-values [W/(m<sup>2</sup>K)]  
U<sub>i-Calc</sub> = Calculated maximum individual element U-values [W/(m<sup>2</sup>K)]

\* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.  
\*\* Display windows and similar glazing are excluded from the U-value check. \*\*\* Values for rooflights refer to the horizontal position.  
<sup>^</sup> For fire doors, limiting U-value is 1.8 W/m<sup>2</sup>K  
NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	8	3

## Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

### 1- vrf mechanical ventilation (5 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	4	6	-	-	0.8
<b>Standard value</b>	2.5*	5	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					NO

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

### 2- Extract (4 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	1	-	-	-	-
<b>Standard value</b>	N/A	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					NO

### 3- Natural Ventilation

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	1	-	-	-	-
<b>Standard value</b>	N/A	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					NO

### 1- pou

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	1	0
<b>Standard value</b>	1	N/A

### Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]										HR efficiency	
	A	B	C	D	E	F	G	H	I	Zone	Standard	
<b>ID of system type</b>												
<b>Standard value</b>	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
Unit 1 - Office 1	-	-	-	-	1.6	-	-	-	-	-	N/A	
Unit 1 - Office 2	-	-	-	-	1.6	-	-	-	-	-	N/A	
Unit 1 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A	

Zone name	SFP [W/(l/s)]									HR efficiency	
	A	B	C	D	E	F	G	H	I	Zone	Standard
<b>ID of system type</b>	<b>0.3</b>	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
<b>Standard value</b>	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1 - Toilet	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 2 - Office 1	-	-	-	-	1.6	-	-	-	-	-	N/A
Unit 2 - Office 2	-	-	-	-	1.6	-	-	-	-	-	N/A
Unit 2 - Office 3	-	-	-	-	1.6	-	-	-	-	-	N/A
Unit 2 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 2 - Toilet	0.3	-	-	-	-	-	-	-	-	-	N/A

Zone name	General lighting and display lighting	General luminaire	Display light source	
		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
<b>Standard value</b>	95	80	0.3	
Unit 1 - Office 1	100	-	-	
Unit 1 - Office 2	100	-	-	
Unit 1 - Entrance	100	-	-	
Unit 1 - Corridor	100	-	-	
Unit 1 - Kitchenette	100	-	-	
Unit 1 - Toilet	100	-	-	
Unit 2 - Entrance	100	-	-	
Unit 2 - Office 1	100	-	-	
Unit 2 - Office 2	100	-	-	
Unit 2 - Office 3	100	-	-	
Unit 2 - Kitchenette	100	-	-	
Unit 2 - Toilet	100	-	-	
Unit 2 - Store	100	-	-	
Unit 1 - Store	100	-	-	

**The spaces in the building should have appropriate passive control measures to limit solar gains in summer**

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Unit 1 - Office 1	NO (-34%)	NO
Unit 1 - Office 2	NO (-13%)	NO
Unit 1 - Kitchenette	N/A	N/A
Unit 2 - Office 1	NO (-56%)	NO
Unit 2 - Office 2	NO (-35%)	NO
Unit 2 - Office 3	NO (-17%)	NO
Unit 2 - Kitchenette	N/A	N/A

**Regulation 25A: Consideration of high efficiency alternative energy systems**

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

	Actual	Notional
Floor area [m <sup>2</sup> ]	311	311
External area [m <sup>2</sup> ]	377	377
Weather	LON	LON
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	3	3
Average conductance [W/K]	140	144
Average U-value [W/m <sup>2</sup> K]	0.37	0.38
Alpha value* [%]	36.33	21.33

\* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

## Building Use

### % Area Building Type

	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
<b>100</b>	<b>Offices and Workshop Businesses</b>
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

## Energy Consumption by End Use [kWh/m<sup>2</sup>]

	Actual	Notional
Heating	2.67	2.46
Cooling	3.34	4.3
Auxiliary	2.22	2.05
Lighting	8.25	8.13
Hot water	2.41	2.29
Equipment*	36.41	36.41
<b>TOTAL**</b>	<b>18.89</b>	<b>19.23</b>

\* Energy used by equipment does not count towards the total for consumption or calculating emissions.

\*\* Total is net of any electrical energy displaced by CHP generators, if applicable.

## Energy Production by Technology [kWh/m<sup>2</sup>]

	Actual	Notional
Photovoltaic systems	10.29	7.46
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>10.29</i>	<i>7.46</i>

## Energy & CO<sub>2</sub> Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	88.34	89.06
Primary energy [kWh <sub>PE</sub> /m <sup>2</sup> ]	13.47	17.35
Total emissions [kg/m <sup>2</sup> ]	1.31	1.63



## HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
<b>[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
<b>Actual</b>	11.1	89.7	0.8	4.2	2.8	4	6	4	6
<b>Notional</b>	12.1	89.4	1.3	5.6	2.7	2.64	4.4	----	----
<b>[ST] Unflued radiant heater, [HS] Unflued radiant heater, [HFT] Electricity, [CFT] Electricity</b>									
<b>Actual</b>	29.6	0	8.2	0	0	1	0	1	0
<b>Notional</b>	43.9	0	9.1	0	0	1.34	0	----	----
<b>[ST] Unflued radiant heater, [HS] Unflued radiant heater, [HFT] Electricity, [CFT] Electricity</b>									
<b>Actual</b>	43.8	0	12.2	0	0	1	0	1	0
<b>Notional</b>	39.3	0	8.2	0	0	1.34	0	----	----

### Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

# Energy Performance Certificate

## Non-Domestic Building



Units 1 & 2

2 Gloucester road

Luton

LU1 3HX

Certificate Reference Number:

6913-6907-2550-6837-9952

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at [www.gov.uk/government/collections/energy-performance-certificates](http://www.gov.uk/government/collections/energy-performance-certificates).

### Energy Performance Asset Rating

More energy efficient

A+

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Net zero CO<sub>2</sub> emissions

7 This is how energy efficient the building is.

Less energy efficient

### Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Air Conditioning
Total useful floor area (m <sup>2</sup> ):	311
Building complexity:	Level 5
Building emission rate (kgCO <sub>2</sub> /m <sup>2</sup> per year):	1.31
Primary energy use (kWh <sub>PE</sub> /m <sup>2</sup> per year):	13.47

### Benchmarks

Buildings similar to this one could have ratings as follows:

8 If newly built

33 If typical of the existing stock

## Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

<b>Assessment Software:</b>	TAS v9.5.5 using calculation engine TAS v9.5.5
<b>Property Reference:</b>	UPRN-123456789012
<b>Assessor Name:</b>	Darren Coham
<b>Assessor Number:</b>	LCEA159477
<b>Accreditation Scheme:</b>	CIBSE Certification Limited
<b>Assessor Qualifications:</b>	NOS5
<b>Employer/Trading Name:</b>	Elmstead Energy Assessors & Building Services
<b>Employer/Trading Address:</b>	Suite 3, Aster House, Lanswood Park, Elmstead Market
<b>Issue Date:</b>	05 Jul 2023
<b>Valid Until:</b>	04 Jul 2033 (unless superseded by a later certificate)
<b>Related Party Disclosure:</b>	Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 4106-1511-2132-7745-0233

## About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at [www.cibsecertification.com](http://www.cibsecertification.com).

A copy of this certificate has been lodged on a national register as a requirement under the Energy Performance of Buildings Regulations 2012 as amended. It will be made available via the online search function at [www.ndepcregister.com](http://www.ndepcregister.com). The certificate (including the building address) and other data about the building collected during the energy assessment but not shown on the certificate, for instance heating system data, will be made publicly available at [www.opendatacommunities.org](http://www.opendatacommunities.org).

This certificate and other data about the building may be shared with other bodies (including government departments and enforcement agencies) for research, statistical and enforcement purposes. For further information about how data about the property are used, please visit [www.ndepcregister.com](http://www.ndepcregister.com). To opt out of having information about your building made publicly available, please visit [www.ndepcregister.com/optout](http://www.ndepcregister.com/optout).

There is more information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government website at: [www.gov.uk/government/collections/energy-performance-certificates](http://www.gov.uk/government/collections/energy-performance-certificates). It explains the content and use of this document and advises on how to identify the authenticity of a certificate and how to make a complaint.

## Opportunity to benefit from a Green Deal on this property

The Green Deal can help you cut your energy bills by making energy efficiency improvements at no upfront costs. Use the Green Deal to find trusted advisors who will come to your property, recommend measures that are right for you and help you access a range of accredited installers. Responsibility for repayments stays with the property - whoever pays the energy bills benefits so they are responsible for the payments.

To find out how you could use Green Deal finance to improve your property please call 0300 123 1234.