



SAP Report Submission for Building Regulations Compliance

Client: Salma Khatun

Project: 221, Wensley Rd
Reading, Berkshire, RG1 6EE

Contact: David Rutledge

david@xpertenergy.co.uk

Report Issue Date: 02/07/2020

EXCELLENCE
IN ENERGY
ASSESSMENT

PREDICTED ENERGY ASSESSMENT

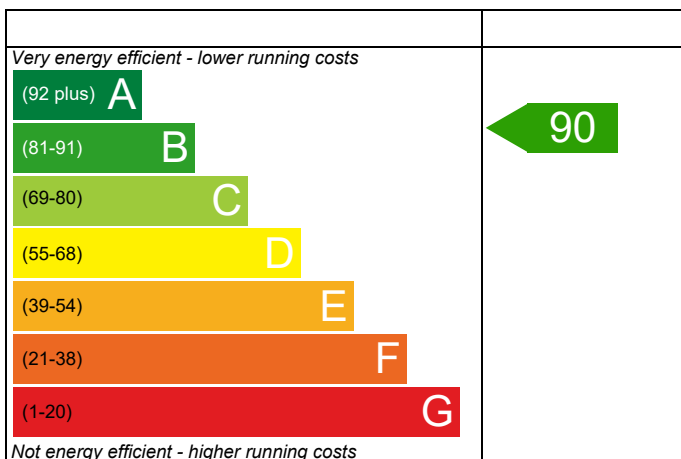
221, Wensley Rd,
Reading,
Berkshire,
RG1 6EE

Dwelling type: House, Semi-Detached
Date of assessment: 02/07/2020
Produced by: David Rutledge
Total floor area: 85.72 m²
DRRN: 4172-2703-0200

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 SAP2012 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 (CO₂) emissions.

Energy Efficiency Rating

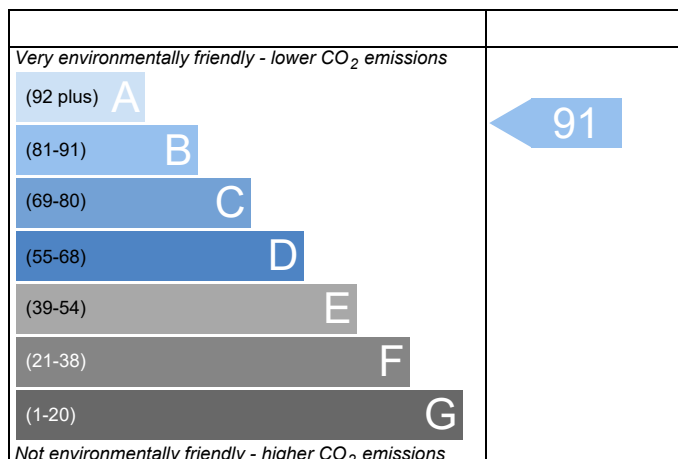


England

EU Directive
2002/91/EC

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.

Environmental Impact (CO₂) Rating



England

EU Directive
2002/91/EC

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

This report has been produced by an accredited Elmhurst member whose work is subject to quality assurance audits. The data used to produce the report has been verified by the Elmhurst members' portal.

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)

Property Reference	221 Wensley Rd, RG1 6EE				Issued on Date	02/07/2020
Assessment Reference	001	Prop Type Ref				
Property	221, Wensley Rd, Reading, Berkshire, RG1 6EE					
SAP Rating	90 B	DER	11.22	TER	24.09	
Environmental	91 B	% DER<TER	53.43			
CO ₂ Emissions (t/year)	0.77	DFEE	44.19	TFEE	46.65	
General Requirements Compliance	Pass	% DFEE<TFEE	5.28			
Assessor Details	Mr. David Rutledge, David Rutledge, Tel: 07496355317, davejrutledge@gmail.com				Assessor ID	B535-0001
Client						

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	24.09	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	11.22	kgCO ₂ /m ²	Pass
	-12.87 (-53.4%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	46.65	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	44.19	kWh/m ² /yr	
	-2.5 (-5.4%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.16 (max. 0.30)	0.16 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.11 (max. 0.25)	0.11 (max. 0.70)	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.60 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated using user-specified γ -value of 0.040

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	m ³ /(h.m ²) @ 50 Pa	
Maximum	10.0	m ³ /(h.m ²) @ 50 Pa	Pass

Limiting System Efficiencies

4 Heating efficiency

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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)

Main heating system

Heat pump with radiators or underfloor - Electric
Samsung Electronics AE080RXYDEG

Secondary heating system

None

5 Cylinder insulation

Hot water storage

Measured cylinder loss: 1.77 kWh/day
Permitted by DBSCG 1.89

Pass

6 Controls

Space heating controls

Time and temperature zone control

Pass

Hot water controls

No cylinder

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100 %

Minimum

75 %

Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)

Slight

Pass

Based on:

Overshading

Average

Windows facing North

5.52 m², No overhang

Windows facing South

10.03 m², No overhang

Windows facing West

6.47 m², No overhang

Air change rate

4.00 ach

Blinds/curtains

None

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Solid Wall

0.00 W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.00 (design value) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Party wall U-value

0.00 W/m²K

Roof U-value

0.11 W/m²K

Floor U-value

0.11 W/m²K

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RECOMMENDATIONS

	Typical cost	Typical savings per year	Energy efficiency	Environmental impact	Result
Low energy lights			0	0	Already installed
Solar water heating			B 91	A 92	SAP increase too small
Photovoltaic	£3,500 - £5,500	£342	A 100	A 100	Recommended
Wind turbine			0	0	Not applicable
Totals	£3,500 - £5,500	£342	A 100	A 100	

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U-VALUE CALCULATOR REPORT

Property Reference	221 Wensley Rd, RG1 6EE	Issued on Date	02/07/2020
Assessment Reference	001	Prop Type Ref	
Project	221, Wensley Rd, Reading, Berkshire, RG1 6EE		
Calculation Type	New Build (As Designed)		

SAP Rating	90 B	DER	11.22	TER	24.09
Environmental	91 B	% DER<TER	53.43		
CO ₂ Emissions (t/year)	0.77	DFEE	44.19	TFEE	46.65
General Requirements Compliance	Pass	% DFEE<TFEE	5.28		

Assessor Details	Mr. David Rutledge, David Rutledge, Tel: 07496355317, davejrutledge@gmail.com	Assessor ID	B535-0001
Client			

Building Elements

Roof 000002

Roof Type: Pitched Roof, insulated sloping ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Mineral wool				
	Main construction	200	0.0400	5.0000	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 2	Mineral wool				
	Main construction	200	0.0400	5.0000	91.67
	Main construction	200	0.1300	1.5385	8.33
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	Plaster, standard				
	Main construction	12	0.4000	0.0300	100.00
Int surface				0.1000	

Total resistance: Upper limit = 9.751 m² K/W Lower limit = 9.381 m² K/W Average = 9.566 m² K/W
Total correction = 0.0047 m² K/W U-value (unrounded) = 0.11 W/m² K

Unheated space: None

Total thickness: 412 mm

U-value: 0.11 W/m² K

Kappa: n/a

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Client	
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Building Elements

Wall 000001

Wall Type: Standard Wall

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Brick, outer leaf				
	Main construction	100	0.7700	0.1299	82.81
	Main construction	100	0.9407	0.1063	17.19
Layer 2	Celotex GA4000				
	Main construction	100	0.0220	4.5455	100.00
	Corrections - Air Gap: Level 1, Fasteners: Wall ties, Cross sectional area: 0.00 mm ² , Lambda: 0.000 W/m.K, per m ² : 2.500				
Layer 3	7N Celcon Solar Block				
	Main construction	100	0.1100	0.9091	98.62
	Main construction	100	0.8803	0.1136	1.38
Layer 4	Celotex TB4012				
	Main construction	12	0.0220	0.5455	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 5	Plaster, standard				
	Main construction	13	0.4000	0.0325	100.00
Layer 6	Plaster, standard				
	Main construction	2.5	0.4000	0.0063	100.00
Int surface				0.1300	

Total resistance:	Upper limit = 6.322 m ² K/W	Lower limit = 6.254 m ² K/W	Average = 6.288 m ² K/W
	Total correction = 0.0053 m ² K/W	U-value (unrounded) = 0.16 W/m ² K	

Unheated space: None		
Total thickness: 328 mm	U-value: 0.16 W/m² K	Kappa: n/a

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Client	
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Building Elements

Floor 000003 - Floor - suspended beam-and-block floor

Floor Type: Suspended Floor

Area = 50.27 m², Perimeter = 21.35 m, Wall thickness = 300.00 mm, Soil: Clay

Depth of underfloor space below ground: 0.200 m Floor wind shielding: Average (suburban)

Floor height above ground: h = 0.000 m

U-value of walls above ground: U_w = 1.500 m

Ventilation openings per perimeter length: e = 0.0015 %

Mean wind speed: v = 5.000 m/s

Resistance on solum: R_g = 0.000 m²K/W

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.1700	
Layer 1	AAC (600 kg/m ³)/ concrete				
	Main construction	150	0.1800	0.8333	86.30
	Main construction	150	1.3500	0.1111	13.70
Layer 2	Celotex FR5000				
	Main construction	150	0.0220	6.8182	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	Screed				
	Main construction	60	1.1500	0.0522	100.00
Int surface				0.1700	

Total resistance: Upper limit = 7.936 m² K/W Lower limit = 7.651 m² K/W Average = 7.794 m² K/W

Total correction = 0.0077 m² K/W

U-value (unrounded) = 0.11 W/m² K

Unheated space: None

Total thickness: 360 mm

U-value: 0.11 W/m² K

Kappa: n/a

BASIC COMPLIANCE REPORT

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1a TER and DER

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Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	24.09	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	11.22	kgCO ₂ /m ²	Pass
	-12.87 (-53.4%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	46.65	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	44.19	kWh/m ² /yr	
	-2.5 (-5.4%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.16 (max. 0.30)	0.16 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.11 (max. 0.25)	0.11 (max. 0.70)	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.60 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated using user-specified γ -value of 0.040

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Samsung Electronics AE080RXYDEG	
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

5 Cylinder insulation

Hot water storage

Measured cylinder loss: 1.77 kWh/day
Permitted by DBSCG 1.89

Pass

6 Controls

Space heating controls

Time and temperature zone control

Pass

Hot water controls

No cylinder

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100 %

Minimum

75 %

Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)

Slight

Pass

Based on:

Overshading

Average

Windows facing North

5.52 m², No overhang

Windows facing South

10.03 m², No overhang

Windows facing West

6.47 m², No overhang

Air change rate

4.00 ach

Blinds/curtains

None

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Solid Wall

0.00 W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00 W/m²K

Roof U-value

0.11 W/m²K

Floor U-value

0.11 W/m²K

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

SUMMARY FOR INPUT DATA

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

Orientation	West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	House, Semi-Detached
2.0 Number of Storeys	2
3.0 Date Built	2020
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	21.35 m	50.27 m ²	2.41 m
1st Storey:	18.50 m	35.45 m ²	2.69 m

7.0 Living Area	26.00	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Medium	
Thermal Mass	250.00	kJ/m ² K

9.0 External Walls

Description	Type	Construction	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Cavity Wall	Other	0.16	101.22	77.52

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall	Other	0.00	96.90

10.0 External Roofs

Description	Type	Construction	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	50.27	50.27

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Heat Loss Floor 1	Ground Floor - Solid	Suspended concrete floor, carpeted	0.11	50.27

11.1 Party Floors

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Construction	Area (m²)
Party Floor 1	Timber I-joists, carpeted	50.27

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.38

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Entrance Door	Solid Door	[1] External Wall 1	West							1.68	
Windows North	Window	[1] External Wall 1	North	None	0.00					5.52	
Windows West	Window	[1] External Wall 1	West	None	0.00					6.47	
Windows South	Window	[1] External Wall 1	South	None	0.00					10.03	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Length	Imported
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Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested ?

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				2
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Total number of L.E.L. fittings	10	
Percentage of L.E.L. fittings	100.00	%
External		
External lights fitted	No	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	Database	
Description	Air Source Heat Pump	
Percentage of Heat	100	%
Database Ref. No.	104369	
Fuel Type	Electricity	
Main Heating	PET	
SAP Code	224	
In Winter	320.4	
In Summer	465.8	
Controls	CHD Time and temperature zone control	
PCDF Controls	0	
Sap Code	2207	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	≤ 35°C	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HWP From main heating 1	
Water Heating	Main Heating 1	
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	
SAP Code	901	
Immersion Only Heating Hot Water	No	
29.0 Hot Water Cylinder	Internal Store	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.770	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)



	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar photovoltaic panels, 2.5 kWp	£3,500 - £5,500	£342	A 100	