



Energy Consultants,
Architectural Design &
Surveyors



SAP Report Submission for Building Regulations Compliance

Client: Redmile Homes

Project: Plot 8 (Wardlow) Goldthorpe Road
Goldthorpe, Barnsley, S63 9

Contact: ESAP Energy Consultants Arch Des & Surv
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esapenquiry@gmail.com

Report Issue Date: 27/03/2022

PREDICTED ENERGY ASSESSMENT

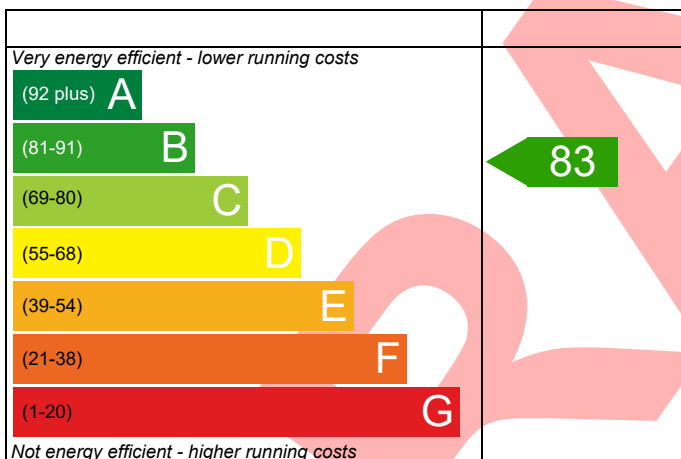
Goldthorpe Road,
Goldthorpe,
Barnsley,
S63 9

Dwelling type: House, Semi-Detached
Date of assessment: 27/03/2022
Produced by: ESAP Energy Consultants Arch Des
& Surv
Total floor area: 74.5 m²

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

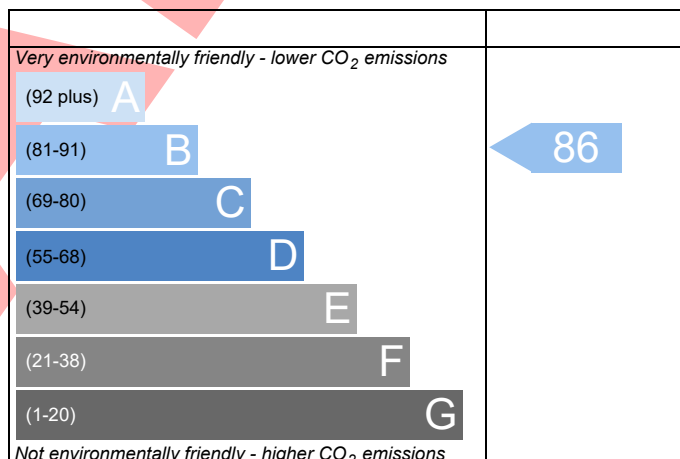


England

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

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)

Property Reference	000598	Issued on Date	27/03/2022
Assessment Reference	Plot 8 As Design	Prop Type Ref	Plot 8 - Wardlow
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	83 B	DER	18.64
Environmental	86 B	% DER<TER	2.92
CO ₂ Emissions (t/year)	1.19	DFEE	47.73
General Requirements Compliance	Pass	% DFEE<TFEE	11.89
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com		Assessor ID
			H883-0001
Client	Redmile Homes, Redmile Homes		

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	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	19.20	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.64	kgCO ₂ /m ²	Pass
	-0.56 (-2.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	54.16	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	47.73	kWh/m ² /yr	
	-6.5 (-12.0%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.27 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	6.00 (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

Boiler system with radiators or underfloor - Mains gas
Data from database
Vaillant ecoFIT sustain 825 VUW 256/6-3 (H-GB)
Combi boiler
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0%

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

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 (East Pennines)

Not significant

Pass

Based on:

Overshading

Average

Windows facing North

7.74 m², No overhang

Windows facing South

3.34 m², No overhang

Windows facing West

1.20 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

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

6.00 (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

0.10

W/m²K

Thermal bridging ψ -value

0.033

W/m²K

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THERMAL BRIDGING

Calculation Type: New Build (As Designed)

Property Reference	000598	Issued on Date	27/03/2022
Assessment Reference	Plot 8 As Design	Prop Type Ref	Plot 8 - Wardlow
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	83 B	DER	18.64
Environmental	86 B	TER	19.20
CO ₂ Emissions (t/year)	1.19	% DER<TER	2.92
General Requirements Compliance	Pass	DFEE	47.73
		TFEE	54.16
		% DFEE<TFEE	11.89
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com		Assessor ID
			H883-0001
Client	Redmile Homes, Redmile Homes		

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.030	10.91	0.33	
External wall	E3 Sill	Independently assessed	0.016	9.89	0.16	
External wall	E4 Jamb	Independently assessed	0.011	25.20	0.28	
External wall	E5 Ground floor (normal)	Independently assessed	0.056	17.29	0.97	
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.000	7.96	0.00	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	9.14	0.55	
External wall	E12 Gable (insulation at ceiling level)	Independently assessed	0.055	8.15	0.45	
External wall	E16 Corner (normal)	Independently assessed	0.054	10.06	0.54	
External wall	E18 Party wall between dwellings	Independently assessed	0.038	10.06	0.38	
Party wall	P1 Party wall - Ground floor	Table K1 - Default	0.160	8.15	1.30	
Party wall	P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	0.000	8.15	0.00	
Party wall	P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.041	8.15	0.33	

Total: **5.29** W/mK:
Y-Value: **0.033** W/m²K:

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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Assessment Reference	Plot 8 As Design	Prop Type Ref	Plot 8 - Wardlow		
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9				
SAP Rating	83 B	DER	18.64	TER	19.20
Environmental	86 B	% DER<TER	2.92		
CO ₂ Emissions (t/year)	1.19	DFEE	47.73	TFEE	54.16
General Requirements Compliance	Pass	% DFEE<TFEE	11.89		
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com			Assessor ID	H883-0001
Client	Redmile Homes, Redmile Homes				

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

DWELLING AS DESIGNED

Semi-Detached House, total floor area 75 m²

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

1a TER and DER

Fuel for main heating: Mains gas
Fuel factor: 1.00 (mains gas)
Target Carbon Dioxide Emission Rate (TER) 19.20 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 18.64 kgCO₂/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 54.2 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE) 47.7 kWh/m²/yr OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.27 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	OK
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	OK
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals: 6.00 (design value)
Maximum 10.0 OK

4 Heating efficiency

Main heating system: Boiler system with radiators or underfloor - Mains gas
Data from database
Vaillant ecoFIT sustain 825 VUW 256/6-3 (H-GB)
Combi boiler
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK

Secondary heating system: None

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

Space heating controls: Programmer, room thermostat and TRVs OK

Hot water controls: No cylinder

Boiler interlock Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100%
Minimum 75% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (East Pennines): Not significant OK
Based on:
Overshading: Average
Windows facing North: 7.74 m², No overhang
Windows facing South: 3.34 m², No overhang
Windows facing West: 1.20 m², No overhang
Air change rate: 4.00 ach
Blinds/curtains: None

10 Key features

Party wall U-value 0.00 W/m²K
Roof U-value 0.10 W/m²K
Thermal bridging y-value 0.033 W/m²K

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	37.2500 (1b)	x 2.4000 (2b)	= 89.4000 (1b) - (3b)
First floor	37.2500 (1c)	x 2.6300 (2c)	= 97.9675 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 187.3675 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					30.0000 / (5) = 0.1601 (8)
Pressure test					Yes
Measured/design AP50					6.0000
Infiltration rate					0.4601 (18)
Number of sides sheltered					2 (19)
Shelter factor					(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor					(21) = (18) x (20) = 0.3911 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4986	0.4889	0.4791	0.4302	0.4204	0.3715	0.3715	0.3618	0.3911	0.4204	0.4400	0.4595 (22b)
Effective ac	0.6243	0.6195	0.6148	0.5925	0.5884	0.5690	0.5690	0.5654	0.5765	0.5884	0.5968	0.6056 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Entrance Door			2.1500	1.4000	3.0100		(26a)
Windows (Uw = 1.40)			8.4800	1.3258	11.2424		(27)
Patio Doors (Uw = 1.40)			3.8000	1.3258	5.0379		(27)
Main Floor			37.2500	0.1400	5.2150	75.0000	2793.7500 (28a)
Main Wall	86.9700	14.4300	72.5400	0.2700	19.5858	60.0000	4352.4000 (29a)
Main Roof	37.2500		37.2500	0.1000	3.7250	9.0000	335.2500 (30)
Total net area of external elements Aum(A, m ²)			161.4700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	47.8161		(33)
Party Wall			40.9900	0.0000	0.0000	110.0000	4508.9000 (32)
Stud Walls			153.6100			9.0000	1382.4900 (32c)
First Floor			37.2500			18.0000	670.5000 (32d)
Ground Floor Ceiling			37.2500			18.0000	670.5000 (32e)

Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss
(28)...(30) + (32) + (32a)...(32e) = 14713.7900 (34)
197.5005 (35)
5.2913 (36)
(33) + (36) = 53.1074 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	38.6028	38.3043	38.0117	36.6374	36.3803	35.1833	35.1833	34.9617	35.6444	36.3803	36.9004	37.4443 (38)
Heat transfer coeff	91.7102	91.4117	91.1191	89.7448	89.4877	88.2907	88.2907	88.0691	88.7518	89.4877	90.0079	90.5517 (39)
Average = Sum(39)m / 12 =												89.7436 (39)
HLP	1.2310	1.2270	1.2231	1.2046	1.2012	1.1851	1.1851	1.1821	1.1913	1.2012	1.2082	1.2155 (40)
HLP (average)												1.2046 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3502 (42)
Average daily hot water use (litres/day)												90.0183 (43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	99.0201	95.4194	91.8186	88.2179	84.6172	81.0164	81.0164	84.6172	88.2179	91.8186	95.4194	99.0201 (44)
Energy conte	146.8439	128.4306	132.5289	115.5419	110.8652	95.6683	88.6507	101.7280	102.9429	119.9701	130.9567	142.2105 (45)
Energy content (annual)										Total = Sum(45)m =		1416.3379 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	22.0266	19.2646	19.8793	17.3313	16.6298	14.3502	13.2976	15.2592	15.4414	17.9955	19.6435	21.3316 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	1.6722	1.4093	1.3994	1.1722	1.0788	0.8913	0.8259	0.9899	1.0444	1.2668	1.4370	1.6194 (61)
Total heat required for water heating calculated for each month	148.5161	129.8399	133.9283	116.7141	111.9441	96.5596	89.4767	102.7179	103.9873	121.2369	132.3937	143.8299 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	148.5161	129.8399	133.9283	116.7141	111.9441	96.5596	89.4767	102.7179	103.9873	121.2369	132.3937	143.8299 (64)
Heat gains from water heating, kWh/month	49.2436	43.0555	44.4157	38.7107	37.1324	32.0325	29.6828	34.0720	34.4896	40.2067	43.9024	47.6898 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1431.1445 (64)												

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.1944	17.0483	13.8646	10.4964	7.8462	6.6241	7.1576	9.3037	12.4874	15.8556	18.5058	19.7279	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	207.5642	209.7181	204.2904	192.7355	178.1496	164.4408	155.2825	153.1287	158.5564	170.1112	184.6972	198.4059	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	(71)
Water heating gains (Table 5)	66.1877	64.0707	59.6985	53.7649	49.9091	44.4896	39.8963	45.7957	47.9022	54.0413	60.9755	64.0993	(72)
Total internal gains	354.2000	352.0908	339.1072	318.2505	297.1586	276.8082	263.5901	269.4817	280.1996	301.2618	325.4322	343.4868	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	Specific data or Table 6c	Access factor Table 6d	Gains W
North	3.9400	10.6334	0.7600	0.7000	0.7700	15.4459 (74)
South	3.3400	46.7521	0.7600	0.7000	0.7700	57.5695 (78)
West	1.2000	19.6403	0.7600	0.7000	0.7700	8.6891 (80)
North	3.8000	10.6334	0.7600	0.7000	0.7700	14.8971 (74)

Solar gains	96.6015	169.2685	246.6277	334.8367	404.6884	415.5868	394.8588	340.1130	276.4861	190.8891	116.5056	82.1862 (83)
Total gains	450.8015	521.3593	585.7349	653.0872	701.8469	692.3949	658.4489	609.5947	556.6857	492.1509	441.9378	425.6729 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.5661	44.7116	44.8552	45.5421	45.6729	46.2921	46.2921	46.4086	46.0516	45.6729	45.4090	45.1363	
alpha	3.9711	3.9808	3.9903	4.0361	4.0449	4.0861	4.0861	4.0939	4.0701	4.0449	4.0273	4.0091	
util living area	0.9945	0.9896	0.9779	0.9445	0.8636	0.7146	0.5599	0.6168	0.8391	0.9627	0.9902	0.9956 (86)	
MIT	19.3911	19.5791	19.8865	20.2993	20.6620	20.8945	20.9703	20.9563	20.7823	20.3170	19.7857	19.3645 (87)	
Th 2	19.8953	19.8985	19.9016	19.9163	19.9191	19.9319	19.9319	19.9343	19.9270	19.9191	19.9135	19.9077 (88)	
util rest of house	0.9930	0.9867	0.9715	0.9273	0.8201	0.6276	0.4374	0.4941	0.7721	0.9478	0.9869	0.9944 (89)	
MIT 2	18.4358	18.6251	18.9314	19.3442	19.6800	19.8776	19.9227	19.9192	19.7962	19.3697	18.8431	18.4188 (90)	
Living area fraction									fLA = Living area / (4) =			0.2086 (91)	
MIT	18.6351	18.8241	19.1306	19.5434	19.8848	20.0897	20.1412	20.1355	20.0019	19.5673	19.0397	18.6161 (92)	
Temperature adjustment												0.0000	
adjusted MIT	18.6351	18.8241	19.1306	19.5434	19.8848	20.0897	20.1412	20.1355	20.0019	19.5673	19.0397	18.6161 (93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9906	0.9829	0.9657	0.9200	0.8185	0.6416	0.4627	0.5189	0.7776	0.9415	0.9834	0.9924 (94)	
Ext temp.	446.5566	512.4400	565.6198	600.8669	574.4643	444.2382	304.6472	316.3152	432.8775	463.3662	434.5901	422.4505 (95)	
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)	
Month fracti	1314.6742	1272.8227	1150.8924	955.1897	732.4424	484.6894	312.6571	328.9862	523.8021	802.4656	1074.6668	1305.3999 (97)	
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)	
Space heating per m2	645.8794	510.9772	435.4428	255.1125	117.5357	0.0000	0.0000	0.0000	0.0000	252.2899	460.8552	656.9144 (98)	
												3335.0072 (98)	
												(98) / (4) = 44.7652 (99)	

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													3697.3472 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	645.8794	510.9772	435.4428	255.1125	117.5357	0.0000	0.0000	0.0000	0.0000	252.2899	460.8552	656.9144	(98)
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)	716.0526	566.4936	482.7526	282.8298	130.3056	0.0000	0.0000	0.0000	0.0000	279.7006	510.9260	728.2864	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	148.5161	129.8399	133.9283	116.7141	111.9441	96.5596	89.4767	102.7179	103.9873	121.2369	132.3937	143.8299	(64)
Efficiency of water heater (217)m	86.9071	86.6422	86.0957	84.8051	82.0848	75.0000	75.0000	75.0000	75.0000	84.6328	86.2969	87.0318	(216)
Fuel for water heating, kWh/month	170.8906	149.8577	155.5575	137.6264	136.3762	128.7461	119.3022	136.9572	138.6497	143.2504	153.4165	165.2614	(219)
Water heating fuel used												1735.8919	(219)
Annual totals kWh/year													
Space heating fuel - main system												3697.3472	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
central heating pump												30.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												75.0000	(231)
Electricity for lighting (calculated in Appendix L)												338.9800	(232)
Total delivered energy for all uses												5847.2190	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	3697.3472	0.2160	798.6270 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1735.8919	0.2160	374.9526 (264)
Space and water heating			1173.5796 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	338.9800	0.5190	175.9306 (268)
Total CO2, kg/year			1388.4352 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			18.6400 (273)

16 CO2 EMISSIONS ASSOCIATED WITH APPLIANCES AND COOKING AND SITE-WIDE ELECTRICITY GENERATION TECHNOLOGIES

DER		18.6400	ZC1
Total Floor Area	TFA	74.5000	
Assumed number of occupants	N	2.3502	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		16.5098	ZC2
CO2 emissions from cooking, equation (L16)		2.3544	ZC3
Total CO2 emissions		37.5043	ZC4
Residual CO2 emissions offset from biofuel CHP		0.0000	ZC5
Additional allowable electricity generation, kWh/m²/year		0.0000	ZC6
Resulting CO2 emissions offset from additional allowable electricity generation		0.0000	ZC7
Net CO2 emissions		37.5043	ZC8

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF TARGET EMISSIONS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	37.2500 (1b)	x 2.4000 (2b)	= 89.4000 (1b) - (3b)
First floor	37.2500 (1c)	x 2.6300 (2c)	= 97.9675 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 187.3675 (5)

2. Ventilation rate

										main	secondary	other	total	m3 per hour			
										heating	heating						
Number of chimneys										0	+	0	+	0	=	0 * 40 =	0.0000 (6a)
Number of open flues										0	+	0	+	0	=	0 * 20 =	0.0000 (6b)
Number of intermittent fans																3 * 10 =	30.0000 (7a)
Number of passive vents																0 * 10 =	0.0000 (7b)
Number of flueless gas fires																0 * 40 =	0.0000 (7c)
										Air changes per hour							
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =										30.0000 / (5) =							0.1601 (8)
Pressure test										Yes							
Measured/design AP50																	5.0000
Infiltration rate																	0.4101 (18)
Number of sides sheltered																	2 (19)
Shelter factor										(20) = 1 - [0.075 x (19)] =							0.8500 (20)
Infiltration rate adjusted to include shelter factor										(21) = (18) x (20) =							0.3486 (21)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)				
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)				
Adj infilt rate	0.4445	0.4357	0.4270	0.3835	0.3747	0.3312	0.3312	0.3225	0.3486	0.3747	0.3922	0.4096	(22b)				
Effective ac	0.5988	0.5949	0.5912	0.5735	0.5702	0.5548	0.5548	0.5520	0.5608	0.5702	0.5769	0.5839	(25)				

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K					
TER Semi-glazed door			2.1500	1.2000	2.5800			(26a)				
TER Opening Type (Uw = 1.40)			12.2800	1.3258	16.2803			(27)				
Main Floor			37.2500	0.1300	4.8425			(28a)				
Main Wall	86.9700	14.4300	72.5400	0.1800	13.0572			(29a)				
Main Roof	37.2500		37.2500	0.1300	4.8425			(30)				
Total net area of external elements Aum(A, m2)			161.4700					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26) ... (30) + (32) =	41.6025			(33)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								250.0000 (35)				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								9.2428 (36)				
Total fabric heat loss						(33) + (36) =		50.8453 (37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 37.0229	Feb 36.7857	Mar 36.5533	Apr 35.4614	May 35.2571	Jun 34.3062	Jul 34.3062	Aug 34.1301	Sep 34.6725	Oct 35.2571	Nov 35.6704	Dec 36.1024 (38)
Heat transfer coeff	87.8682	87.6310	87.3986	86.3067	86.1024	85.1515	85.1515	84.9754	85.5178	86.1024	86.5157	86.9477 (39)
Average = Sum(39)m / 12 =												86.3057 (39)
HLP	Jan 1.1794	Feb 1.1763	Mar 1.1731	Apr 1.1585	May 1.1557	Jun 1.1430	Jul 1.1430	Aug 1.1406	Sep 1.1479	Oct 1.1557	Nov 1.1613	Dec 1.1671 (40)
HLP (average)												1.1585 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3502 (42)
Average daily hot water use (litres/day)												90.0183 (43)
Daily hot water use	Jan 99.0201	Feb 95.4194	Mar 91.8186	Apr 88.2179	May 84.6172	Jun 81.0164	Jul 81.0164	Aug 84.6172	Sep 88.2179	Oct 91.8186	Nov 95.4194	Dec 99.0201 (44)
Energy conte	146.8439	128.4306	132.5289	115.5419	110.8652	95.6683	88.6507	101.7280	102.9429	119.9701	130.9567	142.2105 (45)
Energy content (annual)										Total = Sum(45)m =		1416.3379 (45)
Distribution loss (46)m = 0.15 x (45)m												
	22.0266	19.2646	19.8793	17.3313	16.6298	14.3502	13.2976	15.2592	15.4414	17.9955	19.6435	21.3316 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Total heat required for water heating calculated for each month	50.4596	43.9191	46.7898	43.5047	43.1200	39.9533	41.2851	43.1200	43.5047	46.7898	47.0561	50.4596 (61)
Solar input	197.3035	172.3497	179.3187	159.0466	153.9852	135.6216	129.9358	144.8480	146.4477	166.7598	178.0128	192.6701 (62)
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Heat gains from water heating, kWh/month	197.3035	172.3497	179.3187	159.0466	153.9852	135.6216	129.9358	144.8480	146.4477	166.7598	178.0128	192.6701 (64)
	61.4405	53.6830	55.7633	49.2939	47.6427	41.7980	39.7976	44.6046	45.1047	51.5875	55.3071	59.8999 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	117.5121	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.1944	17.0483	13.8646	10.4964	7.8462	6.6241	7.1576	9.3037	12.4874	15.8556	18.5058	19.7279	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	207.5642	209.7181	204.2904	192.7355	178.1496	164.4408	155.2825	153.1287	158.5564	170.1112	184.6972	198.4059	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	34.7512	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	-94.0097	(71)
Water heating gains (Table 5)	82.5813	79.8853	74.9507	68.4637	64.0359	58.0528	53.4914	59.9524	62.6454	69.3380	76.8155	80.5106	(72)
Total internal gains	370.5936	367.9054	354.3594	332.9493	311.2853	290.3714	277.1852	283.6384	294.9428	316.5585	341.2721	359.8981	(73)

6. Solar gains

[Jan]			Area m2		Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
North			7.7400		10.6334		0.6300		0.7000		0.7700		25.1527 (74)
South			3.3400		46.7521		0.6300		0.7000		0.7700		47.7220 (78)
West			1.2000		19.6403		0.6300		0.7000		0.7700		7.2028 (80)
Solar gains	80.0775	140.3147	204.4414	277.5620	335.4654	344.4996	327.3172	281.9358	229.1924	158.2370	96.5770	68.1280	(83)
Total gains	450.6712	508.2201	558.8007	610.5113	646.7507	634.8709	604.5024	565.5741	524.1352	474.7955	437.8491	428.0261	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	58.8792	59.0386	59.1956	59.9445	60.0867	60.7577	60.7577	60.8836	60.4975	60.0867	59.7997	59.5025	
alpha	4.9253	4.9359	4.9464	4.9963	5.0058	5.0505	5.0505	5.0589	5.0332	5.0058	4.9866	4.9668	
util living area	0.9979	0.9958	0.9902	0.9704	0.9087	0.7652	0.5975	0.6543	0.8795	0.9799	0.9959	0.9984	(86)
MIT	19.7240	19.8649	20.1037	20.4312	20.7317	20.9253	20.9830	20.9737	20.8372	20.4583	20.0357	19.7013	(87)
Th 2	19.9365	19.9390	19.9416	19.9534	19.9556	19.9659	19.9659	19.9678	19.9619	19.9556	19.9511	19.9464	(88)
util rest of house	0.9972	0.9944	0.9866	0.9584	0.8703	0.6753	0.4683	0.5252	0.8151	0.9696	0.9942	0.9979	(89)
MIT 2	18.2386	18.4460	18.7952	19.2734	19.6826	19.9138	19.9594	19.9564	19.8251	19.3189	18.7045	18.2125	(90)
Living area fraction	18.5484	18.7420	19.0682	19.5149	19.9014	20.1248	20.1729	20.1686	20.0362	19.5566	18.9822	18.5231	(91)
MIT	18.5484	18.7420	19.0682	19.5149	19.9014	20.1248	20.1729	20.1686	20.0362	19.5566	18.9822	18.5231	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5484	18.7420	19.0682	19.5149	19.9014	20.1248	20.1729	20.1686	20.0362	19.5566	18.9822	18.5231	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	448.7851	504.1657	548.9242	581.1275	561.2941	438.4084	299.4499	312.1649	430.1271	457.7744	434.2638	426.6279	(94)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1251.9819	1212.9857	1098.4383	916.1374	706.1640	470.4447	304.2385	320.2408	507.6531	771.1836	1027.9976	1245.3604	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	597.5784	476.3271	408.8385	241.2071	107.7832	0.0000	0.0000	0.0000	0.0000	233.1764	427.4884	609.1370	(98)
Space heating												3101.5361	(98)
Space heating per m2												41.6314	(99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												93.4000 (206)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement												3320.7025 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	597.5784	476.3271	408.8385	241.2071	107.7832	0.0000	0.0000	0.0000	0.0000	233.1764	427.4884	609.1370 (98)
Space heating efficiency (main heating system 1)	93.4000	93.4000	93.4000	93.4000	93.4000	0.0000	0.0000	0.0000	0.0000	93.4000	93.4000	93.4000 (210)
Space heating fuel (main heating system)	639.8055	509.9861	437.7286	258.2518	115.3996	0.0000	0.0000	0.0000	0.0000	249.6536	457.6963	652.1810 (211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating requirement	197.3035	172.3497	179.3187	159.0466	153.9852	135.6216	129.9358	144.8480	146.4477	166.7598	178.0128	192.6701 (64)
Efficiency of water heater (217)m	87.6631	87.4767	87.0614	86.0969	84.1722	80.3000	80.3000	80.3000	80.3000	85.8952	87.1764	80.3000 (216)
Fuel for water heating, kWh/month	225.0701	197.0237	205.9681	184.7298	182.9408	168.8936	161.8130	180.3835	182.3757	194.1434	204.1984	87.7479 (217)
Water heating fuel used												219.5722 (219)
Annual totals kWh/year												2307.1122 (219)
Space heating fuel - main system												3320.7025 (211)
Space heating fuel - secondary												0.0000 (215)
Electricity for pumps and fans:												
central heating pump												30.0000 (230c)
main heating flue fan												45.0000 (230e)
Total electricity for the above, kWh/year												75.0000 (231)
Electricity for lighting (calculated in Appendix L)												338.9800 (232)
Total delivered energy for all uses												6041.7947 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	3320.7025	0.2160	717.2717 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2307.1122	0.2160	498.3362 (264)
Space and water heating			1215.6080 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	338.9800	0.5190	175.9306 (268)
Total CO2, kg/m2/year			1430.4636 (272)
Emissions per m2 for space and water heating			16.3169 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.3615 (272b)
Emissions per m2 for pumps and fans			0.5225 (272c)
Target Carbon Dioxide Emission Rate (TER) = (16.3169 * 1.00) + 2.3615 + 0.5225, rounded to 2 d.p.			19.2000 (273)

U-VALUE CALCULATOR REPORT

Property Reference	000598	Issued on Date	27/03/2022
Assessment Reference	Plot 8 As Design	Prop Type Ref	Plot 8 - Wardlow
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	83 B	DER	18.64	TER	19.20
Environmental	86 B	% DER<TER	2.92		
CO ₂ Emissions (t/year)	1.19	DFEE	47.73	TFEE	54.16
General Requirements Compliance	Pass	% DFEE<TFEE	11.89		

Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com	Assessor ID	H883-0001
Client	Redmile Homes, Redmile Homes		

Building Elements

Roof 000004 - 300mm Mineral Wool

Roof Type: Pitched Roof, insulated flat 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	300	0.0400	7.5000	100.00
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 2	Mineral wool				
	Main construction	100	0.0400	2.5000	88.89
	Main construction	100	0.1300	0.7692	11.11
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 3	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 4	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

Total resistance: Upper limit = 9.981 m² K/W Lower limit = 9.707 m² K/W Average = 9.844 m² K/W
Total correction = 0.0000 m² K/W U-value (unrounded) = 0.1 W/m² K

Unheated space: None

Total thickness: 416 mm

U-value: 0.10 W/m² K

Kappa: n/a

U-VALUE CALCULATOR REPORT

Property Reference	000598	Issued on Date	27/03/2022
Assessment Reference	Plot 8 As Design	Prop Type Ref	Plot 8 - Wardlow
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	83 B	DER	18.64	TER	19.20
Environmental	86 B	% DER<TER	2.92		
CO ₂ Emissions (t/year)	1.19	DFEE	47.73	TFEE	54.16
General Requirements Compliance	Pass	% DFEE<TFEE	11.89		

Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com	Assessor ID	H883-0001
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Client	Redmile Homes, Redmile Homes
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Building Elements

Wall 000001 - Newlay with Supafil 34

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	102.5	0.7700	0.1331	82.81
	Main construction	102.5	0.9407	0.1090	17.19
Layer 2	Supafil 34				
	Main construction	100	0.0340	2.9412	100.00
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 3	Newlay, Newlite				
	Main construction	100	0.4300	0.2326	100.00
Layer 4	airspace/plaster dabs				
	Main construction	15	0.0882	0.1700	80.00
	Main construction	15	0.0882	0.1700	20.00
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 5	Plaster, standard				
	Main construction	12.5	0.4000	0.0313	100.00
Layer 6	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1300	

Total resistance:	Upper limit = 3.681 m ² K/W	Lower limit = 3.681 m ² K/W	Average = 3.681 m ² K/W
	Total correction = 0.0000 m ² K/W	U-value (unrounded) = 0.27 W/m ² K	

Unheated space: None

Total thickness: 333 mm

U-value: 0.27 W/m² K

Kappa: n/a

U-VALUE CALCULATOR REPORT

Property Reference	000598	Issued on Date	27/03/2022
Assessment Reference	Plot 8 As Design	Prop Type Ref	Plot 8 - Wardlow
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	83 B	DER	18.64	TER	19.20
Environmental	86 B	% DER<TER	2.92		
CO ₂ Emissions (t/year)	1.19	DFEE	47.73	TFEE	54.16
General Requirements Compliance	Pass	% DFEE<TFEE	11.89		

Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com	Assessor ID	H883-0001
Client	Redmile Homes, Redmile Homes		

Building Elements

Floor 000005 - Floor - suspended beam-and-block floor

Floor Type: Suspended Floor

Area = 37.25 m², Perimeter = 17.29 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	100	0.1800	0.5556	86.30
	Main construction	100	1.3500	0.0741	13.70
Layer 2	Kooltherm K3 Floorboard (45mm +)				
	Main construction	100	0.0200	5.0000	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	Screed				
	Main construction	65	1.1500	0.0565	100.00
Int surface				0.1700	

Total resistance: Upper limit = 5.881 m² K/W Lower limit = 5.690 m² K/W Average = 5.786 m² K/W

Total correction = 0.0075 m² K/W

U-value (unrounded) = 0.14 W/m² K

Unheated space: None

Total thickness: 265 mm

U-value: 0.14 W/m² K

Kappa: n/a

ASSESSMENT NOTES

Calculation Type: New Build (As Designed)

Property Reference	000598	Issued on Date	27/03/2022
Assessment Reference	Plot 8 As Design	Prop Type Ref	Plot 8 - Wardlow
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		

SAP Rating	83 B	DER	18.64	TER	19.20
Environmental	86 B	% DER<TER	2.92		
CO ₂ Emissions (t/year)	1.19	DFEE	47.73	TFEE	54.16
General Requirements Compliance	Pass	% DFEE<TFEE	11.89		

Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com	Assessor ID	H883-0001
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Client	Redmile Homes, Redmile Homes
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ASSESSMENT NOTES - Last time updated on: 27.03.2022

SUMMARY:-

- Walls to be Brick outer 100mm Knauf Crown Supafil 34 Insulation with 100mm Newlay Newlite Block or similar
- Min. 100mm Kingspan insulation above beam and block floors with 65mm Screed floating floor finish.
- Roof to be insulated with min 400mm Mineral Wool Insulation.
- Doors, Windows and Patio Doors to achieve min 1.4W/m2K or better
- 100% Low E-Lighting
- Air Test of 6.0 or lower
- Assumed Boiler to be a Valliant ECOFIT Sustain 825 with Programmer TRVs & Room Stats or similar, and Boiler Interlock.
- CBA Accredited Thermal Bridging details to be used.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	000598	Issued on Date	27/03/2022
Assessment Reference	Plot 8 As Design	Prop Type Ref	Plot 8 - Wardlow
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	83 B	DER	18.64
Environmental	86 B	% DER<TER	2.92
CO ₂ Emissions (t/year)	1.19	DFEE	47.73
General Requirements Compliance	Pass	% DFEE<TFEE	11.89
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com		Assessor ID
			H883-0001
Client	Redmile Homes, Redmile Homes		

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	19.20	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.64	kgCO ₂ /m ²	Pass
	-0.56 (-2.9%)	kgCO ₂ /m ²	

1b TFE and DFEE

Target Fabric Energy Efficiency (TFEE)	54.16	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	47.73	kWh/m ² /yr	
	-6.5 (-12.0%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.27 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	6.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Main heating system

Boiler system with radiators or underfloor - Mains gas
Data from database
Vaillant ecoFIT sustain 825 VUW 256/6-3 (H-GB)
Combi boiler
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0%

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

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 (East Pennines)

Not significant

Pass

Based on:

Overshading

Average

Windows facing North

7.74 m², No overhang

Windows facing South

3.34 m², No overhang

Windows facing West

1.20 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

Filled Cavity with Edge Sealing

0.00 W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

6.00 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00 W/m²K

Roof U-value

0.10 W/m²K

Thermal bridging ψ -value

0.033 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

Calculation Type: New Build (As Designed)

Property Reference	000598	Issued on Date	27/03/2022
Assessment Reference	Plot 8 As Design	Prop Type Ref	Plot 8 - Wardlow
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	83 B	DER	18.64
Environmental	86 B	% DER<TER	2.92
CO ₂ Emissions (t/year)	1.19	DFEE	47.73
General Requirements Compliance	Pass	% DFEE<TFEE	11.89
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com		Assessor ID
Client	Redmile Homes, Redmile Homes		

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

Orientation	South
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, Semi-Detached
2.0 Number of Storeys	2
3.0 Date Built	2019
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground Floor:	17.29 m	37.25 m ²
	1st Storey:	17.29 m	37.25 m ²

7.0 Living Area	15.54	m ²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	197.5	kJ/m ² K

9.0 External Walls			U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type	Construction				
Main Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.27	60.00	86.97	72.54

9.1 Party Walls			U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)
Description	Type	Construction			
Party Wall	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	40.99

9.2 Internal Walls			Kappa (kJ/m ² K)	Area (m ²)
Description	Construction			
Stud Walls	Plasterboard on timber frame		9.00	153.61

10.0 External Roofs			U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type	Construction				
Main Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	37.25	37.25

10.2 Internal Ceilings

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Ground Floor Ceiling	Plasterboard ceiling, carpeted chipboard floor	9.00	37.25

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Main Floor	Ground Floor - Solid	Suspended concrete floor, carpeted	0.14	75.00	37.25

11.2 Internal Floors

Description	Construction	Kappa (kJ/m²K)	Area (m²)
First Floor	Plasterboard ceiling, carpeted chipboard floor	18.00	37.25

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Entrance Door	Manufacture	Half Glazed Door	Double glazed			0.76		0.70	1.40
Windows	Manufacture	Window	Double glazed			0.76		0.70	1.40
Patio Doors	Manufacture	Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Front Elevation	Half Glazed Door	[1] Main Wall	South							2.15	
Front Elevation	Window	[1] Main Wall	South	None	0.00					3.34	
Rear Elevation	Window	[1] Main Wall	North	None	0.00					3.80	
Rear Elevation	Window	[1] Main Wall	North	None	0.00					3.94	
Side Elevation	Window	[1] Main Wall	West	None	0.00					1.20	

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

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	10.91	0.030	No
Independently assessed	E3 Sill	9.89	0.016	No
Independently assessed	E4 Jamb	25.20	0.011	No
Independently assessed	E5 Ground floor (normal)	17.29	0.056	No
Independently assessed	E6 Intermediate floor within a dwelling	7.96	0.000	No
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	9.14	0.060	No
Independently assessed	E12 Gable (insulation at ceiling level)	8.15	0.055	No
Independently assessed	E16 Corner (normal)	10.06	0.054	No
Independently assessed	E18 Party wall between dwellings	10.06	0.038	No
Table K1 - Default	P1 Party wall - Ground floor	8.15	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	8.15	0.000	No
Independently assessed	P4 Party wall - Roof (insulation at ceiling level)	8.15	0.041	No

Y-value 0.033 W/m²K

18.0 Pressure Testing

Yes

Designed AP₅₀ 6.00 m³/(h.m²) @ 50 Pa

Property Tested ?

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Summer Overheating

Windows open in hot weather	Windows half open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	4.00

Mechanical Ventilation

Mechanical Ventilation System Present	No
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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				3
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings	8	
Total number of L.E.L. fittings	8	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

0 Main Heating 1		Database	
Description		Condensing Boiler	
Percentage of Heat		100	%
Database Ref. No.		17958	
Fuel Type		Mains gas	
Main Heating		BGW	
SAP Code		104	
In Winter		90.2	
In Summer		75.0	
Controls		CBE Programmer, room thermostat and TRVs	
PCDF Controls		0	
Delayed Start Stat		No	
Sap Code		2106	
Flue Type		Balanced	
Fan Assisted Flue		Yes	
Is MHS Pumped		Pump in heated space	
Heat Emitter		Radiators	
Flow Temperature		Normal (> 45°C)	
Combi boiler type		Standard Combi	
Combi keep hot type		None	

25.0 Main Heating 2

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

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
29.0 Hot Water Cylinder	None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£26	B 85	
	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar photovoltaic panels, 2.5 kWp	£3,500 - £5,500	£318	A 96	

DWELLING SIGN OFF REPORT

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode	S63 9	
Street	Goldthorpe Road	
Locality	Goldthorpe	
Town	Barnsley	
County		

Dwelling Orientation South (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type House, Semi-Detached

Comments

Overshading (called Sunlight/shade in assessment) Average or unknown

Comments

Section 2: Dwelling Construction Details

Thermal Mass Parameter Precise calculation

Thermal Mass 197.5 kJ/m²K

Comments

External Walls

Type Cavity Wall

Construction Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure

U-value 0.27 W/m²K

Gross Area 86.97 m²

Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m ² K/W)	Bridging
Brick, outer leaf	102.5	0.7700	0.1331	82.81 Mortar
Supafil 34	100	0.0340	2.9412	100.00
Newlay, Newlite	100	0.4300	0.2326	100.00
airspace/plaster dabs	15	0.0882	0.1700	80.00 Mortar
Plaster, standard	12.5	0.4000	0.0313	100.00
Plaster, standard	3	0.4000	0.0075	100.00

Comments

Party Walls

DWELLING SIGN OFF REPORT

Type	Construction	U-Value (W/m²K)	Area (m²)
Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	40.99
Comments			

External Roofs

Type	External Plane Roof			
Construction	Plasterboard, insulated at ceiling level			
U-value	0.10	W/m²K		
Gross Area	37.25	m²		
Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m²K/W)	Bridging
Mineral wool	300	0.0400	7.5000	100.00
Mineral wool	100	0.0400	2.5000	88.89 Timber
Plasterboard, standard	12.5	0.2100	0.0595	100.00
Plaster, standard	3	0.4000	0.0075	100.00
Comments				

Heat Loss Floors

Type	Ground Floor - Solid			
Construction	Suspended concrete floor, carpeted			
U-value	0.14	W/m²K		
Area	37.25	m²		
Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m²K/W)	Bridging
AAC (600 kg/m³)/ concrete	100	0.1800	0.5556	86.30 Mortar
Kooltherm K3 Floorboard (45mm +)	100	0.0200	5.0000	100.00
Screed	65	1.1500	0.0565	100.00
Comments				

Opening Types

Description	Type	Glazing	Frame Type	U Value (W/m²K)
Entrance Door	Half Glazed Door	Double glazed		1.40
Windows	Window	Double glazed		1.40
Patio Doors	Window	Double glazed		1.40
Comments				

DWELLING SIGN OFF REPORT

Openings

Name	Opening Type	Location	Orientation	Area (m ²)
Front Elevation	Half Glazed Door	[1] Main Wall	South	2.15
Front Elevation	Window	[1] Main Wall	South	3.34
Rear Elevation	Window	[1] Main Wall	North	3.80
Rear Elevation	Window	[1] Main Wall	North	3.94
Side Elevation	Window	[1] Main Wall	West	1.20
Comments				

Thermal Bridging

Calculate Bridges

List of Bridges

Bridge Type	Source Type	Length (m)	Psi (W/mK)	Reference
E1 Steel lintel with perforated steel base plate	Independently assessed	10.91	0.030	
E3 Sill	Independently assessed	9.89	0.016	
E4 Jamb	Independently assessed	25.20	0.011	
E5 Ground floor (normal)	Independently assessed	17.29	0.056	
E6 Intermediate floor within a dwelling	Independently assessed	7.96	0.000	
E10 Eaves (insulation at ceiling level)	Table K1 - Approved	9.14	0.060	
E12 Gable (insulation at ceiling level)	Independently assessed	8.15	0.055	
E16 Corner (normal)	Independently assessed	10.06	0.054	
E18 Party wall between dwellings	Independently assessed	10.06	0.038	
P1 Party wall - Ground floor	Table K1 - Default	8.15	0.160	
P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	8.15	0.000	
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	8.15	0.041	

Y-value 0.033 W/m²K

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing

Yes

As Built AP₅₀

m³/(h.m²) @ 50 Pa

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

DWELLING SIGN OFF REPORT

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				3
Number of passive vents				0
Number of flueless gas fires				0
Comments				

Internal Lighting

Total number of light fittings	8	
Total number of L.E.L. fittings	8	
Percentage of L.E.L. fittings	100.00	%
Comments		

External Lighting

External lights fitted	Yes
Light and motion sensor	Yes
Comments	

Electricity Tariff

Electricity Tariff	Standard
Comments	

Main Heating 1

Database	
Fuel Type	Mains gas
Main Heating	Mains gas BGW Post 98 Combi condens. with auto ign.
Efficiency (Split Efficiencies)	89.3 %
Brand, Model	Vaillant, ecoFIT sustain 825
Flue Type	Balanced
Fan Assisted Flue	Yes
Heat Emitter	Radiators
Flow Temperature	Normal (> 45°C)
Comments	

Heating Controls

Description	CBE Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	No
Compensator	
Comments	

Main Heating 2

Main Heating 2	None
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DWELLING SIGN OFF REPORT

Comments

Water Heating System	HWP From main heating 1
Water Heating	Main Heating 1
Supplementary Immersion	
Comments	

Section 4: Dwelling Renewable Energy

Section 5: Declaration

I confirm that all details provided above are accurate to the best of my knowledge.

Signed

Date