



Energy Consultants,
Architectural Design &
Surveyors



SAP Report Submission for Building Regulations Compliance

Client: Redmile Homes

Project: Plot 5 (Hathersage B) Land at 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

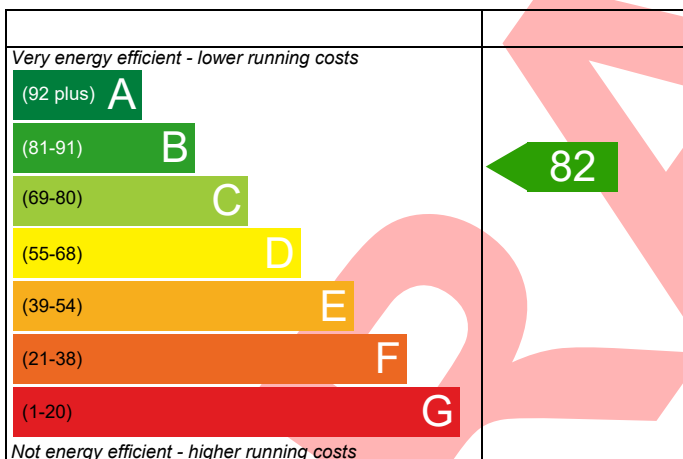
Goldthorpe Road,
Goldthorpe,
Barnsley,
S63 9

Dwelling type: House, End-Terrace
Date of assessment: 27/03/2022
Produced by: ESAP Energy Consultants Arch Des & Surv
Total floor area: 66.31 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

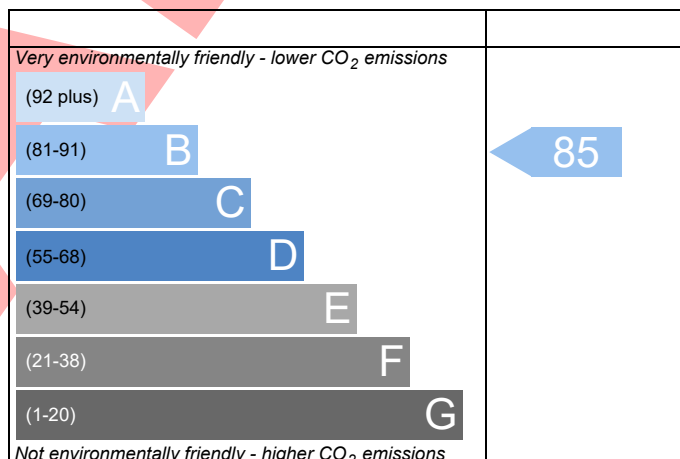


England

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	000595	Issued on Date	27/03/2022
Assessment Reference	Plot 5 As Design	Prop Type Ref	Plot 5 - Hathersage B
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	82 B	DER	20.21
Environmental	85 B	TER	20.51
CO ₂ Emissions (t/year)	1.17	% DER<TER	1.48
General Requirements Compliance	Pass	DLEE	51.65
		TLEE	58.58
		% DLEE<TLEE	11.84
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 TLEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	20.51	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.21	kgCO ₂ /m ²	Pass
	-0.30 (-1.5%)	kgCO ₂ /m ²	

1b TLEE and DLEE

Target Fabric Energy Efficiency (TLEE)	58.58	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DLEE)	51.65	kWh/m ² /yr	
	-7.0 (-11.9%)	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	0.15 (max. 0.25)	0.15 (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	5.20 (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 East

7.60 m², No overhang

Windows facing West

2.63 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

5.20 (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 y-value

0.033

W/m²K

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THERMAL BRIDGING

Calculation Type: New Build (As Designed)

Property Reference	000595				Issued on Date	27/03/2022
Assessment Reference	Plot 5 As Design	Prop Type Ref	Plot 5 - Hathersage B			
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9					
SAP Rating	82 B	DER	20.21	TER	20.51	
Environmental	85 B	% DER<TER	1.48			
CO ₂ Emissions (t/year)	1.17	DFEE	51.65	TFEE	58.58	
General Requirements Compliance	Pass	% DFEE<TFEE	11.84			
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	8.28	0.25	
External wall	E3 Sill	Independently assessed	0.015	7.26	0.11	
External wall	E4 Jamb	Independently assessed	0.010	16.80	0.17	
External wall	E5 Ground floor (normal)	Independently assessed	0.056	23.68	1.33	
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.000	16.84	0.00	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	8.95	0.54	
External wall	E12 Gable (insulation at ceiling level)	Independently assessed	0.055	7.89	0.43	
External wall	E16 Corner (normal)	Independently assessed	0.059	14.84	0.88	
External wall	E18 Party wall between dwellings	Independently assessed	0.038	5.24	0.20	
Party wall	P7 Party Wall - Exposed floor (normal)	Table K1 - Default	0.160	8.94	1.43	
Party wall	P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.041	7.89	0.32	

Total: **5.65** W/mK:
Y-Value: **0.033** W/m²K:

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9					
SAP Rating	82 B	DER	20.21	TER	20.51	
Environmental	85 B	% DER<TER	1.48			
CO ₂ Emissions (t/year)	1.17	DFEE	51.65	TFEE	58.58	
General Requirements Compliance	Pass	% DFEE<TFEE	11.84			
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com				Assessor ID	H883-0001
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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

End-Terrace House, total floor area 66 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) 20.51 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 20.21 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)58.6 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)51.6 kWh/m²/yrOK

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	0.15 (max. 0.25)	0.15 (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: 5.20 (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 East: 7.60 m², No overhang
Windows facing West: 2.63 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	31.1700 (1b)	x 2.4000 (2b)	= 74.8080 (1b) - (3b)
First floor	35.1400 (1c)	x 2.6200 (2c)	= 92.0668 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.3100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 166.8748 (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) = 0.1798 (8)
Pressure test					Yes
Measured/design AP50					5.2000
Infiltration rate					0.4398 (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) =		0.3738 (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	0.4766	0.4673	0.4579	0.4112	0.4018	0.3551	0.3551	0.3458	0.3738	0.4018	0.4205	0.4392 (22b)
Effective ac	0.6136	0.6092	0.6048	0.5845	0.5807	0.5631	0.5631	0.5598	0.5699	0.5807	0.5884	0.5965 (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)			5.0100	1.3258	6.6420		(27)
Patio Doors (Uw = 1.40)			5.2200	1.3258	6.9205		(27)
Main Floor			31.1700	0.1500	4.6755	75.0000	2337.7500 (28a)
Exposed Floor			3.9700	0.1500	0.5955	20.0000	79.4000 (28b)
Main Wall	100.9500	12.3800	88.5700	0.2700	23.9139	60.0000	5314.2000 (29a)
Main Roof	35.1400		35.1400	0.1000	3.5140	9.0000	316.2600 (30)
Total net area of external elements Aum(A, m ²)			171.2300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	49.2714		(33)
Party Wall			23.4200	0.0000	0.0000	110.0000	2576.2000 (32)
Stud Walls			119.8500			9.0000	1078.6500 (32c)
First Floor			31.1700			18.0000	561.0600 (32d)
Ground Floor Ceiling			31.1700			18.0000	561.0600 (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) = 12824.5800 (34)
193.4034 (35)
5.6509 (36)
(33) + (36) = 54.9223 (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	33.7889	33.5460	33.3079	32.1898	31.9806	31.0067	31.0067	30.8263	31.3818	31.9806	32.4038	32.8462 (38)
Heat transfer coeff	88.7112	88.4683	88.2302	87.1121	86.9029	85.9290	85.9290	85.7486	86.3041	86.9029	87.3261	87.7685 (39)
Average = Sum(39)m / 12 =												87.1111 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.3378	1.3342	1.3306	1.3137	1.3106	1.2959	1.2959	1.2931	1.3015	1.3106	1.3169	1.3236 (40)
HLP (average)												1.3137 (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
Average daily hot water use (litres/day)
2.1533 (42)
85.3414 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	93.8755	90.4619	87.0482	83.6346	80.2209	76.8073	76.8073	80.2209	83.6346	87.0482	90.4619	93.8755 (44)
Energy conte	139.2147	121.7581	125.6434	109.5390	105.1053	90.6978	84.0449	96.4427	97.5946	113.7371	124.1529	134.8220 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Energy content (annual)	Total = Sum (45)m = 1342.7524 (45)										
Distribution loss (46)m = 0.15 x (45)m											
20.8822	18.2637	18.8465	16.4308	15.7658	13.6047	12.6067	14.4664	14.6392	17.0606	18.6229	20.2233 (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	1.5029	1.2667	1.2578	1.0535	0.9696	0.8011	0.7424	0.8897	0.9387	1.1386	1.4555 (61)
Total heat required for water heating calculated for each month											
140.7176	123.0247	126.9012	110.5925	106.0749	91.4990	84.7872	97.3325	98.5332	114.8756	125.4445	136.2775 (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 (63)
Solar input (sum of months) = Sum (63)m =	0.0000 (63)										
Output from w/h											
140.7176	123.0247	126.9012	110.5925	106.0749	91.4990	84.7872	97.3325	98.5332	114.8756	125.4445	136.2775 (64)
Heat gains from water heating, kWh/month											
46.6646	40.8012	42.0909	36.6851	35.1899	30.3573	28.1305	32.2896	32.6849	38.1022	41.6037	45.1922 (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	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.6646	15.6896	12.7596	9.6599	7.2209	6.0962	6.5871	8.5622	11.4921	14.5919	17.0309	18.1556	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	188.5365	190.4929	185.5628	175.0672	161.8183	149.3663	141.0475	139.0911	144.0212	154.5169	167.7657	180.2177	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	(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)	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	(71)
Water heating gains (Table 5)	62.7213	60.7161	56.5738	50.9515	47.2983	42.1629	37.8098	43.4001	45.3956	51.2127	57.7830	60.7422	(72)
Total internal gains	327.2222	325.1984	313.1960	293.9784	274.6373	255.9252	243.7443	249.3532	259.2088	278.6212	300.8794	317.4154	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W				
East					2.3800	19.6403	0.7600	0.7000	0.7700	17.2333 (76)				
West					2.6300	19.6403	0.7600	0.7000	0.7700	19.0436 (80)				
East					5.2200	19.6403	0.7600	0.7000	0.7700	37.7975 (76)				
Solar gains	74.0743	144.9051	238.6381	348.0395	426.5354	436.6349	415.6942	357.0752	277.5460	171.9421	92.3620	60.9151 (83)		
Total gains	401.2965	470.1035	551.8341	642.0178	701.1727	692.5601	659.4385	606.4284	536.7548	450.5634	393.2414	378.3305 (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	40.1571	40.2673	40.3760	40.8943	40.9927	41.4573	41.4573	41.5445	41.2771	40.9927	40.7940	40.5884
alpha	3.6771	3.6845	3.6917	3.7263	3.7328	3.7638	3.7638	3.7696	3.7518	3.7328	3.7196	3.7059
util living area	0.9940	0.9887	0.9740	0.9318	0.8408	0.6911	0.5409	0.5989	0.8285	0.9613	0.9897	0.9952 (86)
MIT	19.2072	19.4097	19.7695	20.2413	20.6358	20.8808	20.9643	20.9477	20.7483	20.2160	19.6283	19.1761 (87)
Th 2	19.8113	19.8142	19.8170	19.8301	19.8326	19.8441	19.8441	19.8462	19.8396	19.8326	19.8276	19.8224 (88)
util rest of house	0.9923	0.9855	0.9665	0.9112	0.7918	0.5989	0.4130	0.4701	0.7568	0.9456	0.9863	0.9939 (89)
MIT 2	18.1920	18.3953	18.7527	19.2190	19.5802	19.7842	19.8334	19.8288	19.6908	19.2058	18.6240	18.1694 (90)
Living area fraction									fLA = Living area / (4) =			0.1944 (91)
MIT	18.3894	18.5925	18.9504	19.4177	19.7854	19.9973	20.0532	20.0463	19.8964	19.4022	18.8192	18.3651 (92)
Temperature adjustment												0.0000
adjusted MIT	18.3894	18.5925	18.9504	19.4177	19.7854	19.9973	20.0532	20.0463	19.8964	19.4022	18.8192	18.3651 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
0.9895	0.9811	0.9592	0.9023	0.7895	0.6123	0.4374	0.4941	0.7609	0.9379	0.9823	0.9915	0.9915	(94)
Useful gains	397.0978	461.2020	529.3198	579.2736	553.6001	424.0290	288.4664	299.6449	408.4159	422.6048	386.2625	375.1160	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1249.8853	1211.3487	1098.5021	916.2198	702.6406	463.7876	296.7304	312.6647	500.2534	764.9324	1023.3911	1243.2486	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	634.4739	504.0986	423.4717	242.6013	110.8861	0.0000	0.0000	0.0000	0.0000	254.6918	458.7326	645.8907	(98)
Space heating												3274.8466	(98)
Space heating per m2												49.3869	(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													3630.6504 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	634.4739	504.0986	423.4717	242.6013	110.8861	0.0000	0.0000	0.0000	0.0000	254.6918	458.7326	645.8907	(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)	703.4079	558.8676	469.4808	268.9593	122.9336	0.0000	0.0000	0.0000	0.0000	282.3634	508.5728	716.0650	(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	140.7176	123.0247	126.9012	110.5925	106.0749	91.4990	84.7872	97.3325	98.5332	114.8756	125.4445	136.2775	(64)
Efficiency of water heater (217)m	86.9994	86.7510	86.1732	84.8175	82.0682	75.0000	75.0000	75.0000	75.0000	84.8545	86.4382	87.1236	(216)
Fuel for water heating, kWh/month	161.7456	141.8137	147.2630	130.3887	129.2522	121.9986	113.0497	129.7766	131.3776	135.3796	145.1262	156.4186	(219)
Water heating fuel used												1643.5900	(219)
Annual totals kWh/year													
Space heating fuel - main system												3630.6504	(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)												311.9632	(232)
Total delivered energy for all uses												5661.2035	(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	3630.6504	0.2160	784.2205 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1643.5900	0.2160	355.0154 (264)
Space and water heating			1139.2359 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	311.9632	0.5190	161.9089 (268)
Total CO2, kg/year			1340.0698 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			20.2100 (273)

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

DER		20.2100	ZC1
Total Floor Area	TFA	66.3100	
Assumed number of occupants	N	2.1533	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		16.8486	ZC2
CO2 emissions from cooking, equation (L16)		2.5740	ZC3
Total CO2 emissions		39.6325	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		39.6325	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	31.1700 (1b)	x 2.4000 (2b)	= 74.8080 (1b) - (3b)
First floor	35.1400 (1c)	x 2.6200 (2c)	= 92.0668 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.3100		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 166.8748 (5)
Dwelling volume			

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					2 * 10 = 20.0000 (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) =					20.0000 / (5) = 0.1199 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3699 (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) =	0.3144 (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	0.4008	0.3930	0.3851	0.3458	0.3380	0.2987	0.2987	0.2908	0.3144	0.3380	0.3537	0.3694 (22b)
Effective ac	0.5803	0.5772	0.5742	0.5598	0.5571	0.5446	0.5446	0.5423	0.5494	0.5571	0.5625	0.5682 (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
TER Semi-glazed door			2.1500	1.2000	2.5800		(26a)
TER Opening Type (Uw = 1.40)			10.2300	1.3258	13.5625		(27)
Main Floor			31.1700	0.1300	4.0521		(28a)
Exposed Floor			3.9700	0.1300	0.5161		(28b)
Main Wall	100.9500	12.3800	88.5700	0.1800	15.9426		(29a)
Main Roof	35.1400		35.1400	0.1300	4.5682		(30)
Total net area of external elements Aum(A, m ²)			171.2300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	41.2215	(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.4434 (36)
Total fabric heat loss						(33) + (36) =	51.6649 (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	31.9580	31.7863	31.6179	30.8270	30.6791	29.9902	29.9902	29.8627	30.2556	30.6791	30.9784	31.2913 (38)
Heat transfer coeff	83.6229	83.4512	83.2828	82.4919	82.3440	81.6551	81.6551	81.5276	81.9205	82.3440	82.6433	82.9562 (39)
Average = Sum(39)m / 12 =												82.4912 (39)
HLP	1.2611	1.2585	1.2560	1.2440	1.2418	1.2314	1.2314	1.2295	1.2354	1.2418	1.2463	1.2510 (40)
HLP (average)												1.2440 (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												2.1533 (42)
Average daily hot water use (litres/day)												85.3414 (43)
Daily hot water use	93.8755	90.4619	87.0482	83.6346	80.2209	76.8073	76.8073	80.2209	83.6346	87.0482	90.4619	93.8755 (44)
Energy conte	139.2147	121.7581	125.6434	109.5390	105.1053	90.6978	84.0449	96.4427	97.5946	113.7371	124.1529	134.8220 (45)
Energy content (annual)										Total = Sum(45)m =		1342.7524 (45)
Distribution loss (46)m = 0.15 x (45)m	20.8822	18.2637	18.8465	16.4308	15.7658	13.6047	12.6067	14.4664	14.6392	17.0606	18.6229	20.2233 (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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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	0.0000 (57)
Combi loss	47.8379	41.6372	44.3588	41.2444	40.8797	37.8775	39.1401	40.8797	41.2444	44.3588	44.6113	47.8379	(61)
Total heat required for water heating calculated for each month	187.0526	163.3953	170.0022	150.7834	145.9850	128.5754	123.1850	137.3224	138.8390	158.0959	168.7642	182.6599	(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	187.0526	163.3953	170.0022	150.7834	145.9850	128.5754	123.1850	137.3224	138.8390	158.0959	168.7642	182.6599	(64)
Heat gains from water heating, kWh/month	58.2484	50.8939	52.8661	46.7328	45.1674	39.6264	37.7300	42.2871	42.7613	48.9073	52.4337	56.7878	(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	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	107.6661	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.6646	15.6896	12.7596	9.6599	7.2209	6.0962	6.5871	8.5622	11.4921	14.5919	17.0309	18.1556	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	188.5365	190.4929	185.5628	175.0672	161.8183	149.3663	141.0475	139.0911	144.0212	154.5169	167.7657	180.2177	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	33.7666	(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)	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	-86.1329	(71)
Water heating gains (Table 5)	78.2908	75.7349	71.0566	64.9067	60.7089	55.0367	50.7123	56.8375	59.3907	65.7356	72.8245	76.3277	(72)
Total internal gains	342.7918	340.2172	327.6789	307.9335	288.0479	268.7989	256.6468	262.7907	273.2039	293.1442	315.9210	333.0009	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
East					7.6000	19.6403	0.6300	0.7000			0.7700			45.6176
West					2.6300	19.6403	0.6300	0.7000			0.7700			15.7861 (80)
Solar gains	61.4037	120.1187	197.8184	288.5064	353.5754	361.9474	344.5886	295.9965	230.0710	142.5310	76.5632	50.4954	(83)	
Total gains	404.1955	460.3359	525.4973	596.4399	641.6233	630.7463	601.2354	558.7872	503.2749	435.6752	392.4842	383.4963	(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	55.0670	55.1803	55.2919	55.8220	55.9223	56.3940	56.3940	56.4822	56.2114	55.9223	55.7197	55.5095	
alpha	4.6711	4.6787	4.6861	4.7215	4.7282	4.7596	4.7596	4.7655	4.7474	4.7282	4.7146	4.7006	
util living area	0.9978	0.9956	0.9885	0.9626	0.8897	0.7408	0.5757	0.6345	0.8703	0.9795	0.9958	0.9983	(86)
MIT	19.6212	19.7705	20.0438	20.4096	20.7285	20.9228	20.9817	20.9714	20.8225	20.4015	19.9451	19.5942	(87)
Th 2	19.8714	19.8735	19.8755	19.8849	19.8867	19.8950	19.8950	19.8965	19.8918	19.8867	19.8831	19.8794	(88)
util rest of house	0.9971	0.9941	0.9842	0.9478	0.8452	0.6452	0.4421	0.4998	0.8008	0.9687	0.9941	0.9977	(89)
MIT 2	18.0433	18.2625	18.6610	19.1897	19.6177	19.8430	19.8883	19.8847	19.7458	19.1875	18.5248	18.0093	(90)
Living area fraction	18.3500	18.5556	18.9298	19.4269	19.8336	20.0529	20.1008	20.0959	19.9551	19.4235	18.8009	0.1944	(91)
MIT	18.3500	18.5556	18.9298	19.4269	19.8336	20.0529	20.1008	20.0959	19.9551	19.4235	18.8009	18.3174	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3500	18.5556	18.9298	19.4269	19.8336	20.0529	20.1008	20.0959	19.9551	19.4235	18.8009	18.3174	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	402.3764	456.3637	514.4736	560.5576	540.6632	416.4176	281.4422	293.7894	405.4281	419.2584	389.1427	382.1375	(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	1174.9051	1139.5792	1035.1866	868.3818	669.7549	445.2559	285.8593	301.3201	479.6557	726.5625	967.0015	1171.1287	(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	574.7613	459.1208	387.4105	221.6334	96.0442	0.0000	0.0000	0.0000	0.0000	228.6343	416.0583	587.0095	(98)
Space heating												2970.6723	(98)
Space heating per m2												44.7998	(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												3180.5913 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	574.7613	459.1208	387.4105	221.6334	96.0442	0.0000	0.0000	0.0000	0.0000	228.6343	416.0583	587.0095 (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)	615.3761	491.5640	414.7864	237.2949	102.8311	0.0000	0.0000	0.0000	0.0000	244.7905	445.4585	628.4898 (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	187.0526	163.3953	170.0022	150.7834	145.9850	128.5754	123.1850	137.3224	138.8390	158.0959	168.7642	182.6599 (64)
Efficiency of water heater (217)m	87.6918	87.5109	87.0603	86.0195	84.0253	80.3000	80.3000	80.3000	80.3000	85.9791	87.2337	80.3000 (216)
Fuel for water heating, kWh/month	213.3069	186.7142	195.2695	175.2899	173.7392	160.1188	153.4060	171.0117	172.9004	183.8771	193.4621	208.0889 (219)
Water heating fuel used												2187.1846 (219)
Annual totals kWh/year												
Space heating fuel - main system												3180.5913 (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)												311.9632 (232)
Total delivered energy for all uses												5754.7390 (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	3180.5913	0.2160	687.0077 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2187.1846	0.2160	472.4319 (264)
Space and water heating			1159.4396 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	311.9632	0.5190	161.9089 (268)
Total CO2, kg/m2/year			1360.2735 (272)
Emissions per m2 for space and water heating			17.4851 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.4417 (272b)
Emissions per m2 for pumps and fans			0.5870 (272c)
Target Carbon Dioxide Emission Rate (TER) = (17.4851 * 1.00) + 2.4417 + 0.5870, rounded to 2 d.p.			20.5100 (273)

U-VALUE CALCULATOR REPORT

Property Reference	000595	Issued on Date	27/03/2022
Assessment Reference	Plot 5 As Design	Prop Type Ref	Plot 5 - Hathersage B
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	82 B	DER	20.21	TER	20.51
Environmental	85 B	% DER<TER	1.48		
CO ₂ Emissions (t/year)	1.17	DFEE	51.65	TFEE	58.58
General Requirements Compliance	Pass	% DFEE<TFEE	11.84		

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	000595	Issued on Date	27/03/2022
Assessment Reference	Plot 5 As Design	Prop Type Ref	Plot 5 - Hathersage B
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	82 B	DER	20.21	TER	20.51
Environmental	85 B	% DER<TER	1.48		
CO ₂ Emissions (t/year)	1.17	DFEE	51.65	TFEE	58.58
General Requirements Compliance	Pass	% DFEE<TFEE	11.84		

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	000595	Issued on Date	27/03/2022
Assessment Reference	Plot 5 As Design	Prop Type Ref	Plot 5 - Hathersage B
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	82 B	DER	20.21	TER	20.51
Environmental	85 B	% DER<TER	1.48		
CO ₂ Emissions (t/year)	1.17	DFEE	51.65	TFEE	58.58
General Requirements Compliance	Pass	% DFEE<TFEE	11.84		

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

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

Floor Type: Suspended Floor

Area = 31.17 m², Perimeter = 23.68 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) = 0.15 W/m² K

Unheated space: None

Total thickness: 265 mm

U-value: 0.15 W/m² K

Kappa: n/a

U-VALUE CALCULATOR REPORT

Property Reference	000595	Issued on Date	27/03/2022
Assessment Reference	Plot 5 As Design	Prop Type Ref	Plot 5 - Hathersage B
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	82 B	DER	20.21	TER	20.51
Environmental	85 B	% DER<TER	1.48		
CO ₂ Emissions (t/year)	1.17	DFEE	51.65	TFEE	58.58
General Requirements Compliance	Pass	% DFEE<TFEE	11.84		

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

Floor 000006 - Passageway ceiling

Floor Type: Exposed Floor

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)	Density (kg/m ³)	Heat Cap. (J/kgK)
Ext surface				0.0400			
Layer 1	Plaster, standard						
	Main construction	3	0.4000	0.0075	100.00		
Layer 2	Plasterboard, standard						
	Main construction	12.5	0.2100	0.0595	100.00		
Layer 3	Extruded polystyrene						
	Main construction	100	0.0270	3.7037	88.89		
	Main construction	100	0.1300	0.7692	11.11		
	Corrections - Air Gap: Level 1, Fasteners: None or plastic						
Layer 4	Mineral wool						
	Main construction	150	0.0400	3.7500	88.89		
	Main construction	150	0.1300	1.1538	11.11		
	Corrections - Air Gap: Level 1, Fasteners: None or plastic						
Layer 5	Chipboard						
	Main construction	22	0.1300	0.1692	100.00		
Layer 6	Foam backed carpet						
	Main construction	20	0.0600	0.3333	100.00		
Int surface				0.1700			

Total resistance:	Upper limit = 7.316 m ² K/W	Lower limit = 6.381 m ² K/W	Average = 6.848 m ² K/W
	Total correction = 0.0034 m ² K/W	U-value (unrounded) = 0.15 W/m ² K	

Unheated space: None

Total thickness: 308 mm

U-value: 0.15 W/m² K

Kappa: 0.00 kJ/m² K

ASSESSMENT NOTES

Calculation Type: New Build (As Designed)

Property Reference	000595	Issued on Date	27/03/2022
Assessment Reference	Plot 5 As Design	Prop Type Ref	Plot 5 - Hathersage B
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		

SAP Rating	82 B	DER	20.21	TER	20.51
Environmental	85 B	% DER<TER	1.48		
CO ₂ Emissions (t/year)	1.17	DFEE	51.65	TFEE	58.58
General Requirements Compliance	Pass	% DFEE<TFEE	11.84		

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 5.2 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	000595	Issued on Date	27/03/2022
Assessment Reference	Plot 5 As Design	Prop Type Ref	Plot 5 - Hathersage B
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	82 B	DER	20.21
Environmental	85 B	TER	20.51
CO ₂ Emissions (t/year)	1.17	% DER<TER	1.48
General Requirements Compliance	Pass	DfEE	51.65
		TfEE	58.58
		% DfEE<TfEE	11.84
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)	20.51	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.21	kgCO ₂ /m ²	Pass
	-0.30 (-1.5%)	kgCO ₂ /m ²	

1b TfEE and DfEE

Target Fabric Energy Efficiency (TfEE)	58.58	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DfEE)	51.65	kWh/m ² /yr	
	-7.0 (-11.9%)	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	0.15 (max. 0.25)	0.15 (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	5.20 (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 East

7.60 m², No overhang

Windows facing West

2.63 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

5.20 (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 y-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	000595	Issued on Date	27/03/2022
Assessment Reference	Plot 5 As Design	Prop Type Ref	Plot 5 - Hathersage B
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	82 B	DER	20.21
Environmental	85 B	TER	20.51
CO ₂ Emissions (t/year)	1.17	% DER<TER	1.48
General Requirements Compliance	Pass	DfEE	51.65
		TFEE	58.58
		% DfEE<TFEE	11.84
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)

Orientation	West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, End-Terrace
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:	23.68 m	31.17 m ²	2.40 m
	1st Storey:	16.84 m	35.14 m ²	2.62 m

7.0 Living Area	12.89	m ²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	193.4	kJ/m ² K

9.0 External Walls						
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Main Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.27	60.00	100.95	88.57

9.1 Party Walls						
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	
Party Wall	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	23.42	

9.2 Internal Walls						
Description	Construction			Kappa (kJ/m ² K)	Area (m ²)	
Stud Walls	Plasterboard on timber frame			9.00	119.85	

10.0 External Roofs							
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)	
Main Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	35.14	35.14	

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	31.17

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	0.15	75.00	31.17
Exposed Floor	Exposed Floor - Timber	Timber exposed floor, insulation between joists	0.15	20.00	3.97

11.2 Internal Floors

Description	Construction	Kappa (kJ/m²K)	Area (m²)
First Floor	Plasterboard ceiling, carpeted chipboard floor	18.00	31.17

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	Manufacturer	Half Glazed Door	Double glazed			0.76		0.70	1.40
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Patio Doors	Manufacturer	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	West							2.15	
Front Elevation	Window	[1] Main Wall	West	None	0.00					2.63	
Rear Elevation	Window	[1] Main Wall	East	None	0.00					5.22	
Rear Elevation	Window	[1] Main Wall	East	None	0.00					2.38	

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	8.28	0.030	No
Independently assessed	E3 Sill	7.26	0.015	No
Independently assessed	E4 Jamb	16.80	0.010	No
Independently assessed	E5 Ground floor (normal)	23.68	0.056	No
Independently assessed	E6 Intermediate floor within a dwelling	16.84	0.000	No
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	8.95	0.060	No
Independently assessed	E12 Gable (insulation at ceiling level)	7.89	0.055	No
Independently assessed	E16 Corner (normal)	14.84	0.059	No
Independently assessed	E18 Party wall between dwellings	5.24	0.038	No
Table K1 - Default	P7 Party Wall - Exposed floor (normal)	8.94	0.160	No
Independently assessed	P4 Party wall - Roof (insulation at ceiling level)	7.89	0.041	No

Y-value

0.033

W/m²K

18.0 Pressure Testing

Yes

Designed AP₅₀

5.20

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	10	
Total number of L.E.L. fittings	10	
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
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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	£25	B 84	
	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 (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type

Property Type

Comments

Overshading (called Sunlight/shade in assessment)

Comments

Section 2: Dwelling Construction Details

Thermal Mass Parameter

Thermal Mass kJ/m²K

Comments

External Walls

Type

Construction

U-value W/m²K

Gross Area 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	23.42
Comments			

External Roofs

Type	External Plane Roof			
Construction	Plasterboard, insulated at ceiling level			
U-value	0.10	W/m²K		
Gross Area	35.14	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	0.15	W/m²K		
Area	31.17	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
Type	Exposed Floor - Timber			
Construction	Timber exposed floor, insulation between joists			
U-value	0.15	W/m²K		
Area	3.97	m²		
Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m²K/W)	Bridging
Plaster, standard	3	0.4000	0.0075	100.00
Plasterboard, standard	12.5	0.2100	0.0595	100.00
Extruded polystyrene	100	0.0270	3.7037	88.89 Timber
Mineral wool	150	0.0400	3.7500	88.89 Timber
Chipboard	22	0.1300	0.1692	100.00
Foam backed carpet	20	0.0600	0.3333	100.00
Comments				

DWELLING SIGN OFF REPORT

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				

Openings

Name	Opening Type	Location	Orientation	Area (m²)
Front Elevation	Half Glazed Door	[1] Main Wall	West	2.15
Front Elevation	Window	[1] Main Wall	West	2.63
Rear Elevation	Window	[1] Main Wall	East	5.22
Rear Elevation	Window	[1] Main Wall	East	2.38
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	8.28	0.030	
E3 Sill	Independently assessed	7.26	0.015	
E4 Jamb	Independently assessed	16.80	0.010	
E5 Ground floor (normal)	Independently assessed	23.68	0.056	
E6 Intermediate floor within a dwelling	Independently assessed	16.84	0.000	
E10 Eaves (insulation at ceiling level)	Table K1 - Approved	8.95	0.060	
E12 Gable (insulation at ceiling level)	Independently assessed	7.89	0.055	
E16 Corner (normal)	Independently assessed	14.84	0.059	
E18 Party wall between dwellings	Independently assessed	5.24	0.038	
P7 Party Wall - Exposed floor (normal)	Table K1 - Default	8.94	0.160	
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	7.89	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

DWELLING SIGN OFF REPORT

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

	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	10	
Total number of L.E.L. fittings	10	
Percentage of L.E.L. fittings	100.00	%

Comments

External Lighting

External lights fitted	Yes
Light and motion sensor	Yes

Comments

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

DWELLING SIGN OFF REPORT

Delayed Start Stat

No

Compensator

Comments

Main Heating 2

None

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