



Energy Consultants,
Architectural Design &
Surveyors



SAP Report Submission for Building Regulations Compliance

Client: Redmile Homes

Project: Plot 61 (Tissington) Land at Goldthorpe Road
Goldthorpe, Barnsley, S63 9

Contact: ESAP Energy Consultants Arch Des & Surv
07909711677
esapenquiry@gmail.com

Report Issue Date: 27/03/2022

PREDICTED ENERGY ASSESSMENT

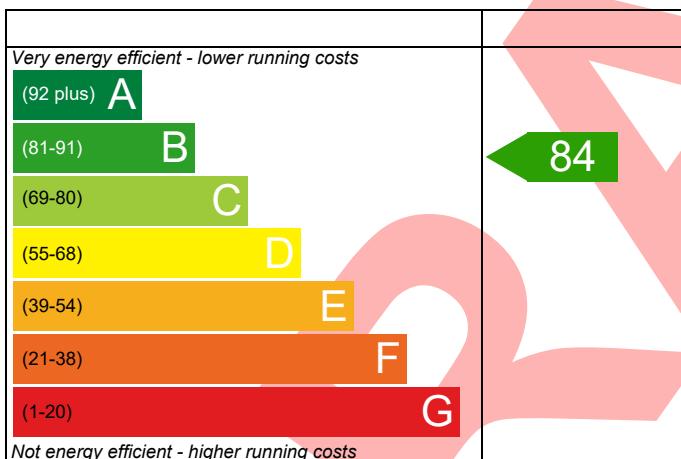
Goldthorpe Road,
Goldthorpe,
Barnsley,
S63 9

Dwelling type: House, Detached
Date of assessment: 27/03/2022
Produced by: ESAP Energy Consultants Arch Des & Surv
Total floor area: 116.2 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

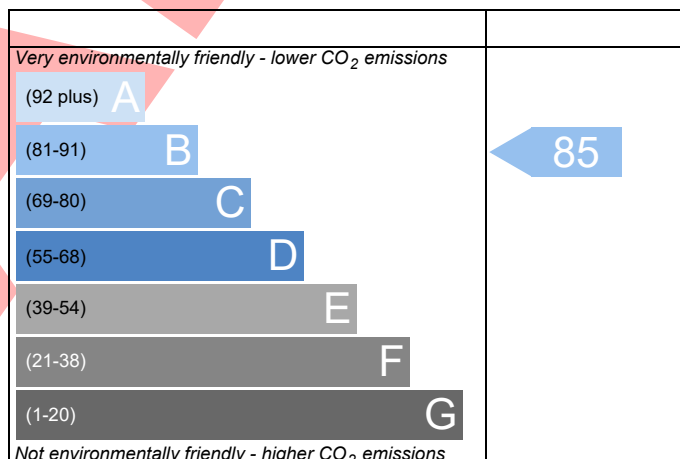


England

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	000651			Issued on Date	27/03/2022
Assessment Reference	Plot 61 As Design	Prop Type Ref	Plot 61 - Tissington		
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9				
SAP Rating	84 B	DER	16.74	TER	17.12
Environmental	85 B	% DER<TER	2.22		
CO ₂ Emissions (t/year)	1.72	DFEE	49.04	TFEE	56.44
General Requirements Compliance	Pass	% DFEE<TFEE	13.12		
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)	17.12	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.74	kgCO ₂ /m ²	Pass
	-0.38 (-2.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	56.44	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	49.04	kWh/m ² /yr	
	-7.4 (-13.1%)	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
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	4.90 (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 615 VU 156/6-3 (H-GB)

Efficiency: 89.8% SEDBUK2009
Minimum: 88.0%

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

Nominal cylinder loss: 1.79 kWh/day
Permitted by DBSCG 2.30

Pass

Primary pipework insulated

Yes

Pass

6 Controls

Space heating controls

Time and temperature zone control

Pass

Hot water controls

Cylinderstat

Pass

Independent timer for DHW

Pass

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

0.60 m², No overhang

Windows facing East

7.09 m², No overhang

Windows facing South

0.60 m², No overhang

Windows facing West

8.56 m², No overhang

Air change rate

8.00 ach

Blinds/curtains

None

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

4.90 (design value) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Roof U-value

0.10 W/m²K

Thermal bridging y-value

0.021 W/m²K

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THERMAL BRIDGING

Calculation Type: New Build (As Designed)

Property Reference	000651				Issued on Date	27/03/2022
Assessment Reference	Plot 61 As Design			Prop Type Ref	Plot 61 - Tissington	
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9					
SAP Rating	84 B	DER	16.74	TER	17.12	
Environmental	85 B	% DER<TER	2.22			
CO ₂ Emissions (t/year)	1.72	DFEE	49.04	TFEE	56.44	
General Requirements Compliance	Pass	% DFEE<TFEE	13.12			
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	15.43	0.46	
External wall	E3 Sill	Independently assessed	0.015	14.41	0.22	
External wall	E4 Jamb	Independently assessed	0.010	27.90	0.28	
External wall	E5 Ground floor (normal)	Independently assessed	0.056	32.85	1.84	
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.001	31.28	0.03	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	15.70	0.94	
External wall	E12 Gable (insulation at ceiling level)	Independently assessed	0.058	19.52	1.13	
External wall	E16 Corner (normal)	Independently assessed	0.059	27.30	1.61	
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.111	7.38	-0.82	

Total: **5.69** W/mK:
Y-Value: **0.021** W/m²K:

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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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

Detached House, total floor area 116 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) 17.12 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 16.74 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)56.4 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)49.0 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.27 (max. 0.70)	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: 4.90 (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 615 VU 156/6-3 (H-GB)

Efficiency: 89.8% SEDBUK2009

Minimum: 88.0% OK

Secondary heating system: None

5 Cylinder insulation

Hot water storage Nominal cylinder loss: 1.79 kWh/day
Permitted by DBSCG 2.30 OK
Primary pipework insulated: Yes OK

6 Controls

Space heating controls: Time and temperature zone control OK

Hot water controls:

Cylinderstat OK
Independent timer for DHW OK

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: 0.60 m², No overhang
Windows facing East: 7.09 m², No overhang
Windows facing South: 0.60 m², No overhang
Windows facing West: 8.56 m², No overhang
Air change rate: 8.00 ach
Blinds/curtains: None

10 Key features

Roof U-value 0.10 W/m²K
Thermal bridging y-value 0.021 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	58.8100 (1b)	x 2.4000 (2b)	= 141.1440 (1b) - (3b)
First floor	57.3900 (1c)	x 2.5800 (2c)	= 148.0662 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	116.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 289.2102 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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					4 * 10 = 40.0000 (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) =					40.0000 / (5) = 0.1383 (8)
Pressure test					Yes
Measured/design AP50					4.9000
Infiltration rate					0.3833 (18)
Number of sides sheltered					1 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.3546 (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	0.4521	0.4432	0.4343	0.3900	0.3812	0.3368	0.3368	0.3280	0.3546	0.3812	0.3989	0.4166 (22b)
Effective ac	0.6022	0.5982	0.5943	0.5761	0.5726	0.5567	0.5567	0.5538	0.5629	0.5726	0.5796	0.5868 (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)			13.0500	1.3258	17.3011		(27)
Patio Doors (Uw = 1.40)			3.8000	1.3258	5.0379		(27)
Main Floor			58.8100	0.1400	8.2334	75.0000	4410.7500 (28a)
Main Wall	159.5400	19.0000	140.5400	0.2700	37.9458	60.0000	8432.4000 (29a)
Main Roof	58.8100		58.8100	0.1000	5.8810	9.0000	529.2900 (30)
Total net area of external elements Aum(A, m ²)			277.1600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		77.4092		(33)
Block Walls			42.5800			75.0000	3193.5000 (32c)
Stud Walls			177.3400			9.0000	1596.0600 (32c)
First Floor			57.3900			18.0000	1033.0200 (32d)
Ground Floor Ceiling			57.3900			18.0000	1033.0200 (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) =	20228.0400 (34)
	174.0795 (35)
	5.6946 (36)
(33) + (36) =	83.1038 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	
(38)m	Jan 57.4717 Feb 57.0931 Mar 56.7219 Apr 54.9784 May 54.6522 Jun 53.1337 Jul 53.1337 Aug 52.8525 Sep 53.7186 Oct 54.6522 Nov 55.3121 Dec 56.0020 (38)
Heat transfer coeff	140.5756 140.1969 139.8257 138.0823 137.7561 136.2376 136.2376 135.9564 136.8225 137.7561 138.4159 139.1058 (39)
Average = Sum(39)m / 12 =	138.0807 (39)

HLP	Jan 1.2098 Feb 1.2065 Mar 1.2033 Apr 1.1883 May 1.1855 Jun 1.1724 Jul 1.1724 Aug 1.1700 Sep 1.1775 Oct 1.1855 Nov 1.1912 Dec 1.1971 (40)
HLP (average)	1.1883 (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												2.8474 (42)
Average daily hot water use (litres/day)												101.8247 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
	112.0071	107.9342	103.8612	99.7882	95.7152	91.6422	91.6422	95.7152	99.7882	103.8612	107.9342	112.0071 (44)
Energy conte	166.1034	145.2751	149.9108	130.6959	125.4058	108.2157	100.2778	115.0702	116.4445	135.7048	148.1324	160.8622 (45)
Energy content (annual)	Total = Sum(45)m =											1602.0986 (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	24.9155	21.7913	22.4866	19.6044	18.8109	16.2324	15.0417	17.2605	17.4667	20.3557	22.2199	24.1293 (46)
Water storage loss:												
Store volume												210.0000 (47)
b) If manufacturer declared loss factor is not known :												
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0103 (51)
Volume factor from Table 2a												0.8298 (52)
Temperature factor from Table 2b												0.5400 (53)
Enter (49) or (54) in (55)												0.9682 (55)
Total storage loss	30.0132	27.1087	30.0132	29.0450	30.0132	29.0450	30.0132	30.0132	29.0450	30.0132	29.0450	30.0132 (56)
If cylinder contains dedicated solar storage	30.0132	27.1087	30.0132	29.0450	30.0132	29.0450	30.0132	30.0132	29.0450	30.0132	29.0450	30.0132 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	219.3790	193.3950	203.1865	182.2530	178.6814	159.7727	153.5534	168.3458	168.0015	188.9804	199.6895	214.1378 (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)
Solar input (sum of months) = Sum(63)m =												0.0000 (63)
Output from w/h	219.3790	193.3950	203.1865	182.2530	178.6814	159.7727	153.5534	168.3458	168.0015	188.9804	199.6895	214.1378 (64)
Total per year (kWh/year) = Sum(64)m =												2229.3760 (64)
Heat gains from water heating, kWh/month	97.8499	86.7999	92.4658	84.7020	84.3179	77.2274	75.9628	80.8813	79.9634	87.7423	90.4997	96.1072 (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	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	26.5945	23.6210	19.2099	14.5431	10.8711	9.1779	9.9170	12.8905	17.3016	21.9684	25.6404	27.3336 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	280.1802	283.0876	275.7610	260.1637	240.4749	221.9701	209.6078	206.7005	214.0270	229.6243	249.3132	267.8179 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368 (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)	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942 (71)
Water heating gains (Table 5)	131.5186	129.1665	124.2821	117.6417	113.3306	107.2602	102.1006	108.7115	111.0603	117.9333	125.6940	129.1763 (72)
Total internal gains	507.0036	504.5854	487.9633	461.0588	433.3869	407.1186	390.3358	397.0128	411.0993	438.2363	469.3578	493.0381 (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					0.6000	10.6334		0.7600	0.7000	0.7700		2.3522 (74)
East					7.0900	19.6403		0.7600	0.7000	0.7700		51.3379 (76)
South					0.6000	46.7521		0.7600	0.7000	0.7700		10.3418 (78)
West					4.7600	19.6403		0.7600	0.7000	0.7700		34.4667 (80)
West					3.8000	19.6403		0.7600	0.7000	0.7700		27.5154 (80)

Solar gains	126.0140	243.1103	394.2853	569.0893	694.4576	710.1173	676.3467	582.5676	456.3152	286.6588	156.4570	104.0860 (83)
Total gains	633.0176	747.6956	882.2486	1030.1481	1127.8445	1117.2359	1066.6825	979.5804	867.4145	724.8951	625.8148	597.1241 (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	39.9707	40.0786	40.1850	40.6924	40.7888	41.2434	41.2434	41.3287	41.0671	40.7888	40.5943	40.3930
alpha	3.6647	3.6719	3.6790	3.7128	3.7193	3.7496	3.7496	3.7552	3.7378	3.7193	3.7063	3.6929
util living area	0.9940	0.9884	0.9730	0.9291	0.8352	0.6827	0.5316	0.5899	0.8210	0.9592	0.9894	0.9952 (86)
MIT	19.1982	19.4069	19.7723	20.2478	20.6423	20.8845	20.9658	20.9497	20.7549	20.2224	19.6259	19.1672 (87)
Th 2	19.9122	19.9148	19.9173	19.9294	19.9316	19.9421	19.9421	19.9441	19.9381	19.9316	19.9271	19.9223 (88)
util rest of house	0.9925	0.9855	0.9660	0.9099	0.7902	0.5991	0.4166	0.4739	0.7553	0.9445	0.9863	0.9940 (89)
MIT 2	17.5066	17.8120	18.3426	19.0255	19.5567	19.8515	19.9252	19.9167	19.7158	19.0036	18.1405	17.4677 (90)
Living area fraction									fLA = Living area / (4) =			0.1281 (91)
MIT	17.7232	18.0162	18.5257	19.1820	19.6957	19.9838	20.0585	20.0490	19.8488	19.1596	18.3307	17.6853 (92)
Temperature adjustment												-0.1500
adjusted MIT	17.5732	17.8662	18.3757	19.0320	19.5457	19.8338	19.9085	19.8990	19.6988	19.0096	18.1807	17.5353 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.9873	0.9873	0.9771	0.9517	0.8892	0.7710	0.5896	0.4127	0.4685	0.7374	0.9265	0.9783	0.9896 (94)
Useful gains	625.0047	730.5646	839.6735	915.9896	869.5660	658.7034	440.2644	458.9254	639.6205	671.6232	612.2536	590.9361 (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	1865.8883	1817.8245	1660.5257	1399.0507	1080.7996	713.0334	450.7355	475.7067	766.0455	1158.4801	1533.7467	1855.0228 (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												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

	923.2174	730.6387	610.7140	347.8039	157.1578	0.0000	0.0000	0.0000	0.0000	362.2216	663.4750	940.4805 (98)
Space heating												4735.7089 (98)
Space heating per m2											(98) / (4) =	40.7548 (99)

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 %)												93.2000 (206)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement												5081.2328 (211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	923.2174	730.6387	610.7140	347.8039	157.1578	0.0000	0.0000	0.0000	0.0000	362.2216	663.4750	940.4805 (98)
Space heating efficiency (main heating system 1)	93.2000	93.2000	93.2000	93.2000	93.2000	0.0000	0.0000	0.0000	0.0000	93.2000	93.2000	93.2000 (210)
Space heating fuel (main heating system)	990.5766	783.9471	655.2726	373.1802	168.6242	0.0000	0.0000	0.0000	0.0000	388.6498	711.8831	1009.0992 (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	219.3790	193.3950	203.1865	182.2530	178.6814	159.7727	153.5534	168.3458	168.0015	188.9804	199.6895	214.1378 (64)
Efficiency of water heater (217)m	88.5294	88.3304	87.8697	86.8126	84.7749	80.1000	80.1000	80.1000	80.1000	86.8236	88.0780	80.1000 (216)
Fuel for water heating, kWh/month	247.8035	218.9449	231.2361	209.9383	210.7717	199.4666	191.7021	210.1695	209.7397	217.6603	226.7188	241.6773 (219)
Water heating fuel used												2615.8289 (219)
Annual totals kWh/year												
Space heating fuel - main system												5081.2328 (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)		469.6668 (232)
Total delivered energy for all uses		8241.7285 (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	5081.2328	0.2160	1097.5463 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2615.8289	0.2160	565.0190 (264)
Space and water heating			1662.5653 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	469.6668	0.5190	243.7571 (268)
Total CO2, kg/year			1945.2474 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			16.7400 (273)

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

DER		16.7400 ZC1
Total Floor Area	TFA	116.2000
Assumed number of occupants	N	2.8474
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190
CO2 emissions from appliances, equation (L14)		14.2882 ZC2
CO2 emissions from cooking, equation (L16)		1.6122 ZC3
Total CO2 emissions		32.6404 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		32.6404 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	58.8100 (1b)	x 2.4000 (2b)	= 141.1440 (1b) - (3b)
First floor	57.3900 (1c)	x 2.5800 (2c)	= 148.0662 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	116.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 289.2102 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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					4 * 10 = 40.0000 (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)					40.0000 / (5) = 0.1383 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3883 (18)
Number of sides sheltered					1 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.3592 (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	0.4580	0.4490	0.4400	0.3951	0.3861	0.3412	0.3412	0.3322	0.3592	0.3861	0.4041	0.4220 (22b)
Effective ac	0.6049	0.6008	0.5968	0.5781	0.5745	0.5582	0.5582	0.5552	0.5645	0.5745	0.5816	0.5891 (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)			16.8500	1.3258	22.3390		(27)
Main Floor			58.8100	0.1300	7.6453		(28a)
Main Wall	159.5400	19.0000	140.5400	0.1800	25.2972		(29a)
Main Roof	58.8100		58.8100	0.1300	7.6453		(30)
Total net area of external elements Aum(A, m ²)			277.1600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	65.5068		(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)							12.0490 (36)
Total fabric heat loss						(33) + (36) =	77.5558 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	57.7278	57.3392	56.9583	55.1690	54.8343	53.2759	53.2759	52.9873	53.8762	54.8343	55.5115	56.2195 (38)
Average = Sum(39)m / 12 =	135.2836	134.8950	134.5141	132.7248	132.3901	130.8317	130.8317	130.5431	131.4320	132.3901	133.0673	133.7753 (39)
												132.7232 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1642	1.1609	1.1576	1.1422	1.1393	1.1259	1.1259	1.1234	1.1311	1.1393	1.1452	1.1513 (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												2.8474 (42)
Average daily hot water use (litres/day)												101.8247 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	112.0071	107.9342	103.8612	99.7882	95.7152	91.6422	91.6422	95.7152	99.7882	103.8612	107.9342	112.0071 (44)
Energy content (annual)	166.1034	145.2751	149.9108	130.6959	125.4058	108.2157	100.2778	115.0702	116.4445	135.7048	148.1324	160.8622 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1602.0986 (45)
Water storage loss:	24.9155	21.7913	22.4866	19.6044	18.8109	16.2324	15.0417	17.2605	17.4667	20.3557	22.2199	24.1293 (46)
Store volume												210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7016 (48)
Temperature factor from Table 2b												0.5400 (49)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Enter (49) or (54) in (55)												0.9188 (55)
Total storage loss	28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842 (56)
If cylinder contains dedicated solar storage	28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	217.8499	192.0139	201.6574	180.7732	177.1524	158.2930	152.0243	166.8168	166.5218	187.4514	198.2098	212.6088 (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	217.8499	192.0139	201.6574	180.7732	177.1524	158.2930	152.0243	166.8168	166.5218	187.4514	198.2098	212.6088 (64)
Heat gains from water heating, kWh/month	96.6266	85.6950	91.2426	83.5183	83.0947	76.0436	74.7396	79.6581	78.7797	86.5191	89.3159	94.8840 (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	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	142.3677	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	26.5945	23.6210	19.2099	14.5431	10.8711	9.1779	9.9170	12.8905	17.3016	21.9684	25.6404	27.3336	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	280.1802	283.0876	275.7610	260.1637	240.4749	221.9701	209.6078	206.7005	214.0270	229.6243	249.3132	267.8179	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	37.2368	(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)	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	-113.8942	(71)
Water heating gains (Table 5)	129.8745	127.5224	122.6379	115.9976	111.6864	105.6161	100.4565	107.0674	109.4162	116.2891	124.0499	127.5322	(72)
Total internal gains	505.3595	502.9412	486.3192	459.4147	431.7428	405.4744	388.6917	395.3686	409.4551	436.5922	467.7137	491.3940	(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			0.6000		10.6334		0.6300		0.7000		0.7700		1.9498 (74)
East			7.0900		19.6403		0.6300		0.7000		0.7700		42.5564 (76)
South			0.6000		46.7521		0.6300		0.7000		0.7700		8.5728 (78)
West			8.5600		19.6403		0.6300		0.7000		0.7700		51.3799 (80)

Solar gains	104.4590	201.5256	326.8418	471.7450	575.6688	588.6499	560.6558	482.9179	378.2613	237.6250	129.6946	86.2818	(83)
Total gains	609.8184	704.4669	813.1609	931.1597	1007.4116	994.1243	949.3475	878.2865	787.7164	674.2172	597.4083	577.6759	(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	59.6483	59.8202	59.9896	60.7983	60.9520	61.6780	61.6780	61.8144	61.3964	60.9520	60.6418	60.3209
alpha	4.9766	4.9880	4.9993	5.0532	5.0635	5.1119	5.1119	5.1210	5.0931	5.0635	5.0428	5.0214
util living area	0.9989	0.9975	0.9926	0.9722	0.9065	0.7572	0.5870	0.6495	0.8887	0.9861	0.9977	0.9992 (86)
MIT	19.6698	19.8150	20.0772	20.4329	20.7425	20.9314	20.9850	20.9756	20.8323	20.4234	19.9859	19.6504 (87)
Th 2	19.9487	19.9514	19.9541	19.9665	19.9688	19.9797	19.9797	19.9817	19.9755	19.9688	19.9641	19.9592 (88)
util rest of house	0.9985	0.9967	0.9898	0.9609	0.8677	0.6677	0.4607	0.5223	0.8275	0.9786	0.9968	0.9989 (89)
MIT 2	18.1681	18.3822	18.7662	19.2860	19.7073	19.9321	19.9740	19.9712	19.8325	19.2803	18.6415	18.1471 (90)
Living area fraction									fLA = Living area /	(4) =		0.1281 (91)
MIT	18.3604	18.5657	18.9341	19.4329	19.8398	20.0601	20.1035	20.0998	19.9605	19.4267	18.8137	18.3396 (92)
Temperature adjustment												0.0000
adjusted MIT	18.3604	18.5657	18.9341	19.4329	19.8398	20.0601	20.1035	20.0998	19.9605	19.4267	18.8137	18.3396 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	608.3757	700.8670	801.6539	887.5389	868.2677	671.5579	452.5655	472.5493	650.9466	655.9569	594.4747	576.6357	(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	1902.1442	1843.4319	1672.5562	1397.9785	1077.6318	714.3533	458.3668	482.9876	770.2588	1168.5639	1558.7054	1891.5286	(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	962.5638	767.8036	647.9513	367.5166	155.7669	0.0000	0.0000	0.0000	0.0000	381.3796	694.2461	978.2803	(98)
Space heating												4955.5082	(98)
Space heating per m ²												42.6464	(99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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 %)													93.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													5300.0088 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	962.5638	767.8036	647.9513	367.5166	155.7669	0.0000	0.0000	0.0000	0.0000	381.3796	694.2461	978.2803	(98)
Space heating efficiency (main heating system 1)	93.5000	93.5000	93.5000	93.5000	93.5000	0.0000	0.0000	0.0000	0.0000	93.5000	93.5000	93.5000	(210)
Space heating fuel (main heating system)	1029.4799	821.1803	692.9960	393.0658	166.5956	0.0000	0.0000	0.0000	0.0000	407.8926	742.5092	1046.2891	(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	217.8499	192.0139	201.6574	180.7732	177.1524	158.2930	152.0243	166.8168	166.5218	187.4514	198.2098	212.6088	(64)
Efficiency of water heater (217)m	88.3146	88.1358	87.7086	86.6685	84.4729	79.8000	79.8000	79.8000	79.8000	86.6704	87.8829	88.3842	(216)
Fuel for water heating, kWh/month	246.6750	217.8613	229.9175	208.5801	209.7150	198.3622	190.5067	209.0436	208.6740	216.2809	225.5385	240.5506	(219)
Water heating fuel used												2601.7053	(219)
Annual totals kWh/year													
Space heating fuel - main system												5300.0088	(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)												469.6668	(232)
Total delivered energy for all uses												8446.3809	(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	5300.0088	0.2160	1144.8019 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2601.7053	0.2160	561.9683 (264)
Space and water heating			1706.7702 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	469.6668	0.5190	243.7571 (268)
Total CO2, kg/m2/year			1989.4523 (272)
Emissions per m2 for space and water heating			14.6882 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.0977 (272b)
Emissions per m2 for pumps and fans			0.3350 (272c)
Target Carbon Dioxide Emission Rate (TER) = (14.6882 * 1.00) + 2.0977 + 0.3350, rounded to 2 d.p.			17.1200 (273)

U-VALUE CALCULATOR REPORT

Property Reference	000651	Issued on Date	27/03/2022
Assessment Reference	Plot 61 As Design	Prop Type Ref	Plot 61 - Tissington
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	DER	16.74	TER	17.12
Environmental	85 B	% DER<TER	2.22		
CO ₂ Emissions (t/year)	1.72	DFEE	49.04	TFEE	56.44
General Requirements Compliance	Pass	% DFEE<TFEE	13.12		

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	000651	Issued on Date	27/03/2022
Assessment Reference	Plot 61 As Design	Prop Type Ref	Plot 61 - Tissington
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	DER	16.74	TER	17.12
Environmental	85 B	% DER<TER	2.22		
CO ₂ Emissions (t/year)	1.72	DFEE	49.04	TFEE	56.44
General Requirements Compliance	Pass	% DFEE<TFEE	13.12		

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	000651	Issued on Date	27/03/2022
Assessment Reference	Plot 61 As Design	Prop Type Ref	Plot 61 - Tissington
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	DER	16.74	TER	17.12
Environmental	85 B	% DER<TER	2.22		
CO ₂ Emissions (t/year)	1.72	DFEE	49.04	TFEE	56.44
General Requirements Compliance	Pass	% DFEE<TFEE	13.12		

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 = 58.81 m², Perimeter = 32.85 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	000651	Issued on Date	27/03/2022
Assessment Reference	Plot 61 As Design	Prop Type Ref	Plot 61 - Tissington
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		

SAP Rating	84 B	DER	16.74	TER	17.12
Environmental	85 B	% DER<TER	2.22		
CO ₂ Emissions (t/year)	1.72	DFEE	49.04	TFEE	56.44
General Requirements Compliance	Pass	% DFEE<TFEE	13.12		

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 Block or similar
- Min. 100mm Kingspan insulation above beam and block floors with 65mm Screed 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 4.9 or lower
- Assumed Boiler to be a Vaillant Vaillant ecoFIT sustain 615 Condensing Gas Boiler with full Zone Controls or similar, Delay Start and Boiler Interlock, 210Lt unvented foam insulated cylinder.
- CBA Accredited Thermal Bridging details to be used.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	000651	Issued on Date	27/03/2022
Assessment Reference	Plot 61 As Design	Prop Type Ref	Plot 61 - Tissington
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	84 B	DER	16.74
Environmental	85 B	TER	17.12
CO ₂ Emissions (t/year)	1.72	% DER<TER	2.22
General Requirements Compliance	Pass	DFEE	49.04
		TFEE	56.44
		% DFEE<TFEE	13.12
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)	17.12	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.74	kgCO ₂ /m ²	Pass
	-0.38 (-2.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	56.44	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	49.04	kWh/m ² /yr	
	-7.4 (-13.1%)	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
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	4.90 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoFIT sustain 615 VU 156/6-3 (H-GB) Efficiency: 89.8% SEDBUK2009 Minimum: 88.0%	Pass
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Secondary heating system

None

5 Cylinder insulation

Hot water storage

Nominal cylinder loss: 1.79 kWh/day
Permitted by DBSCG 2.30

Pass

Primary pipework insulated

Yes

Pass

6 Controls

Space heating controls

Time and temperature zone control

Pass

Hot water controls

Cylinderstat

Pass

Independent timer for DHW

Pass

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

0.60 m², No overhang

Windows facing East

7.09 m², No overhang

Windows facing South

0.60 m², No overhang

Windows facing West

8.56 m², No overhang

Air change rate

8.00 ach

Blinds/curtains

None

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

4.90 (design value)

Maximum

10.0

Pass

10 Key features

Roof U-value

0.10

W/m²K

Thermal bridging y-value

0.021

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	000651	Issued on Date	27/03/2022
Assessment Reference	Plot 61 As Design	Prop Type Ref	Plot 61 - Tissington
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	84 B	DER	16.74
Environmental	85 B	TER	17.12
CO ₂ Emissions (t/year)	1.72	% DER<TER	2.22
General Requirements Compliance	Pass	DFEE	49.04
		TFEE	56.44
		% DFEE<TFEE	13.12
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	East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2022
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground Floor:	32.85 m	58.81 m ²	2.40 m
	1st Storey:	31.28 m	57.39 m ²	2.58 m

7.0 Living Area	14.88	m ²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	174.08	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	159.54	140.54

9.2 Internal Walls				
Description	Construction	Kappa (kJ/m ² K)	Area (m ²)	
Block Walls	Dense block, plasterboard on dabs	75.00	42.58	
Stud Walls	Plasterboard on timber frame	9.00	177.34	

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	58.81	58.81

10.2 Internal Ceilings				
Description	Construction	Kappa (kJ/m ² K)	Area (m ²)	
Ground Floor Ceiling	Plasterboard ceiling, carpeted chipboard floor	9.00	57.39	

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

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	58.81

11.2 Internal Floors

Description	Construction	Kappa (kJ/m²K)	Area (m²)
First Floor	Plasterboard ceiling, carpeted chipboard floor	18.00	57.39

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	East							2.15	
Front Elevation	Window	[1] Main Wall	East	None	0.00					7.09	
Side Elevation	Window	[1] Main Wall	South	None	0.00					0.60	
Side Elevation	Window	[1] Main Wall	North	None	0.00					0.60	
Rear Elevation	Window	[1] Main Wall	West	None	0.00					3.80	
Rear Elevation	Window	[1] Main Wall	West	None	0.00					4.76	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	15.43	0.030	No
Independently assessed	E3 Sill	14.41	0.015	No
Independently assessed	E4 Jamb	27.90	0.010	No
Independently assessed	E5 Ground floor (normal)	32.85	0.056	No
Independently assessed	E6 Intermediate floor within a dwelling	31.28	0.001	No
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	15.70	0.060	No
Independently assessed	E12 Gable (insulation at ceiling level)	19.52	0.058	No
Independently assessed	E16 Corner (normal)	27.30	0.059	No
Independently assessed	E17 Corner (inverted – internal area greater than external area)	7.38	-0.111	No

Y-value	0.021	W/m²K
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18.0 Pressure Testing

Designed AP ₅₀	4.90	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	Yes

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings	13	
Total number of L.E.L. fittings	13	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

24.0 Main Heating 1

	Database	
Description	Condesning Boiler	
Percentage of Heat	100	%
Database Ref. No.	18403	
Fuel Type	Mains gas	
Main Heating	BGB	
SAP Code	102	
In Winter	90.8	
In Summer	80.1	
Controls	CBI Time and temperature zone control	
PCDF Controls	0	
Delayed Start Stat	Yes	
Sap Code	2110	
Flue Type	Balanced	
Fan Assisted Flue	Yes	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	36° - 45°C	

25.0 Main Heating 2

Community Heating

28.0 Water Heating

	HWP From main heating 1
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Instantaneous System 1

Waste Water Heat Recovery

No

Instantaneous System 2

Waste Water Heat Recovery

No

Storage System

Solar Panel

No

Water use <= 125 litres/person/day

Yes

SAP Code

901

29.0 Hot Water Cylinder

Hot Water Cylinder

Cylinder Stat

Yes

Cylinder In Heated Space

Yes

Independent Time Control

Yes

Insulation Type

Foam

Insulation Thickness

100 mm

Cylinder Volume

210.00

L

Pipes insulation

Fully insulated primary pipework

31.0 Thermal Store

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	£37	B 86	
	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 94	

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 East (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type House, Detached

Comments

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

Comments

Section 2: Dwelling Construction Details

Thermal Mass Parameter Precise calculation

Thermal Mass 174.08 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 159.54 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

External Roofs

Type External Plane Roof

Construction Plasterboard, insulated at ceiling level

DWELLING SIGN OFF REPORT

U-value W/m²K

Gross Area 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

Construction

U-value W/m²K

Area 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

Openings

Name	Opening Type	Location	Orientation	Area (m²)
Front Elevation	Half Glazed Door	[1] Main Wall	East	2.15
Front Elevation	Window	[1] Main Wall	East	7.09
Side Elevation	Window	[1] Main Wall	South	0.60
Side Elevation	Window	[1] Main Wall	North	0.60
Rear Elevation	Window	[1] Main Wall	West	3.80
Rear Elevation	Window	[1] Main Wall	West	4.76

Comments

DWELLING SIGN OFF REPORT

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	15.43	0.030	
E3 Sill	Independently assessed	14.41	0.015	
E4 Jamb	Independently assessed	27.90	0.010	
E5 Ground floor (normal)	Independently assessed	32.85	0.056	
E6 Intermediate floor within a dwelling	Independently assessed	31.28	0.001	
E10 Eaves (insulation at ceiling level)	Table K1 - Approved	15.70	0.060	
E12 Gable (insulation at ceiling level)	Independently assessed	19.52	0.058	
E16 Corner (normal)	Independently assessed	27.30	0.059	
E17 Corner (inverted – internal area greater than external area)	Independently assessed	7.38	-0.111	

Y-value 0.021 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

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

Comments

Internal Lighting

Total number of light fittings	13	
Total number of L.E.L. fittings	13	
Percentage of L.E.L. fittings	100.00	%

Comments

DWELLING SIGN OFF REPORT

External Lighting

External lights fitted

Light and motion sensor

Comments

Electricity Tariff

Comments

Main Heating 1

Fuel Type

Main Heating

Efficiency (Split Efficiencies) %

Brand, Model

Flue Type

Fan Assisted Flue

Heat Emitter

Flow Temperature

Comments

Heating Controls

Description

Boiler Interlock

Delayed Start Stat

Compensator

Comments

Main Heating 2

Comments

Water Heating System

Water Heating

Supplementary Immersion

Comments

DWELLING SIGN OFF REPORT

Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	Yes	
Cylinder Stat	Yes	
Insulation Type	Foam	
Insulation Thickness	100 mm	
Cylinder Volume	210.00	L
Measured Loss		kWh/day
Pipes insulation	Fully insulated primary pipework	
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