elmhurst energy

Energy Consultants, Architectural Design & Surveyors

cabe chartered association of building engineers

SAP Report Submission for Building Regulations Compliance

Client: Redmile Homes

Project: Plot 16 (Dormer Bungalow) land at Goldthorpe Rd
Goldthorpe, Barnsley, S63

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

Report Issue Date: 27/03/2022

PREDICTED ENERGY ASSESSMENT

Design SAP
elmhurst energy

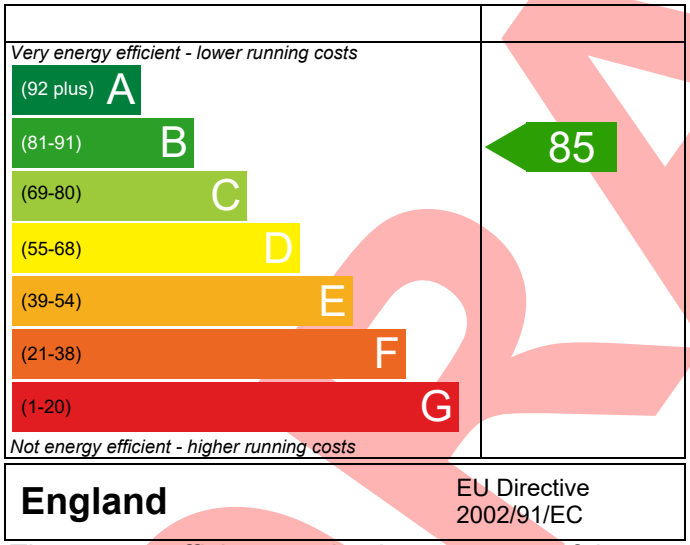
Goldthorpe Rd,
Goldthorpe,
Barnsley,
S63

Dwelling type:	Bungalow, Semi-Detached
Date of assessment:	27/03/2022
Produced by:	ESAP Energy Consultants Arch Des & Surv
Total floor area:	107.46 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 (CO_2) emissions.

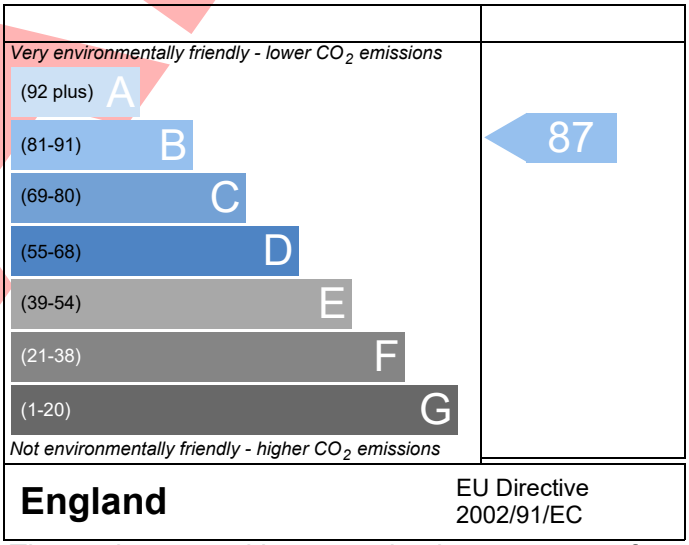
Energy Efficiency Rating



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 (CO_2) 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

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BUILDING REGULATION COMPLIANCE
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	000606	**Issued on Date**	27/03/2022
Assessment Reference	Plot 16 - As Design	**Prop Type Ref**	Plot 16 - Dormer Bungalow
Property	Goldthorpe Rd, Goldthorpe, Barnsley, S63		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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		

SUMARY 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)	15.95	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	15.60	$kgCO_2/m^2$	Pass
	-0.35 (-2.2%)	$kgCO_2/m^2$	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	47.98	$kWh/m^2/yr$	
Dwelling Fabric Energy Efficiency (DFEE)	40.54	$kWh/m^2/yr$	
	-7.5 (-15.6%)	$kWh/m^2/yr$	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.27 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Roof	0.13 (max. 0.20)	0.15 (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	4.70 (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

DRAFT

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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: 1.53 kWh/day Permitted by DBSCG 1.99		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 Windows facing South Windows facing West	6.40 m², No overhang 4.52 m², No overhang 3.26 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	4.70 (design value)	m³/(h.m²) @ 50 Pa	
Maximum	10.0	m³/(h.m²) @ 50 Pa	Pass

DRAFT

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10 Key features

Party wall U-value	0.00	W/m²K
Roof U-value	0.10	W/m²K
Thermal bridging y-value	0.039	W/m²K

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THERMAL BRIDGING
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	000606	**Issued on Date**	27/03/2022
Assessment Reference	Plot 16 - As Design	**Prop Type Ref**	Plot 16 - Dormer Bungalow
Property	Goldthorpe Rd, Goldthorpe, Barnsley, S63		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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	11.00	0.33	
External wall	E3 Sill	Independently assessed	0.016	9.98	0.16	
External wall	E4 Jamb	Independently assessed	0.011	22.76	0.25	
External wall	E5 Ground floor (normal)	Independently assessed	0.056	21.67	1.21	
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.000	9.07	0.00	
External wall	E11 Eaves (insulation at rafter level)	Independently assessed	-0.002	10.52	-0.02	
External wall	E12 Gable (insulation at ceiling level)	Independently assessed	0.055	5.39	0.30	
External wall	E13 Gable (insulation at rafter level)	Independently assessed	0.056	7.64	0.43	
External wall	E16 Corner (normal)	Independently assessed	0.054	7.20	0.39	
External wall	E18 Party wall between dwellings	Independently assessed	0.038	7.20	0.27	
Party wall	P1 Party wall - Ground floor	Table K1 - Default	0.160	10.52	1.68	
Party wall	P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	0.000	2.06	0.00	
Party wall	P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.041	8.76	0.36	
External roof	R6 Flat ceiling	Table K1 - Default	0.060	18.98	1.14	
External roof	R8 Roof to wall (rafter)	Table K1 - Default	0.060	18.98	1.14	

Total: **7.64** **W/mK:**

Y-Value: **0.039** **W/m²K:**

FULL SAP CALCULATION PRINTOUT
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	000606	**Issued on Date**	27/03/2022
Assessment Reference	Plot 16 - As Design	**Prop Type Ref**	Plot 16 - Dormer Bungalow
Property	Goldthorpe Rd, Goldthorpe, Barnsley, S63		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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		

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

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

DWELLING AS DESIGNED

Semi-Detached Bungalow, total floor area 107 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) 15.95 kgCO□/m²
Dwelling Carbon Dioxide Emission Rate (DER) 15.60 kgCO□/m²OK

1b TFEE and DFEE
Target Fabric Energy Efficiency (TFEE)48.0 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)40.5 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.27 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	OK
Roof	0.13 (max. 0.20)	0.15 (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: 4.70 (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: 1.53 kWh/day
Permitted by DBSCG 1.99 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: 6.40 m², No overhang
Windows facing South: 4.52 m², No overhang
Windows facing West: 3.26 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 0.039 W/m²K

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 (m2)		Storey height (m)		Volume (m3)	
Ground floor	58.6500	(1b)	x 2.4000	(2b) =	140.7600	(1b) - (3b)
First floor	48.8100	(1c)	x 2.2000	(2c) =	107.3820	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	107.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		248.1420	(5)

2. Ventilation rate

	main heating		secondary heating		other		total	m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =	0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =	0.0000	(6b)
Number of intermittent fans							3 * 10 =	30.0000	(7a)
Number of passive vents							0 * 10 =	0.0000	(7b)
Number of flueless gas fires							0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1209	(8)
Pressure test		Yes	
Measured/design AP50		4.7000	
Infiltration rate		0.3559	(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) =	0.3025	(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	0.3857	0.3781	0.3706	0.3328	0.3252	0.2874	0.2874	0.2798	0.3025	0.3252	0.3403	0.3555	(22b)
Effective ac	0.5744	0.5715	0.5687	0.5554	0.5529	0.5413	0.5413	0.5392	0.5458	0.5529	0.5579	0.5632	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Windows (Uw = 1.40)			10.3800	1.3258	13.7614			(27)
Patio Doors (Uw = 1.40)			3.8000	1.3258	5.0379			(27)
Main Floor			58.6500	0.1400	8.2110	75.0000	4398.7500	(28a)
Main Wall	71.9600	14.1800	57.7800	0.2700	15.6006	60.0000	3466.8000	(29a)
Loft Walls	26.5700		26.5700	0.2500	6.6425	9.0000	239.1300	(29a)
Main roof (Voids)	27.2500		27.2500	0.1000	2.7250	9.0000	245.2500	(30)
Roof Slopes	36.2500		36.2500	0.1500	5.4375	9.0000	326.2500	(30)
Total net area of external elements Aum(A, m2)			220.6800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		57.4158			(33)
Party Wall			29.7800	0.0000	0.0000	110.0000	3275.8000	(32)
Stud Walls			148.8900			9.0000	1340.0100	(32c)
Internal Floor			48.8100			18.0000	878.5800	(32d)
Internal Ceiling			48.8100			18.0000	878.5800	(32e)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	15049.1500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		140.0442 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)		7.6392 (36)
Total fabric heat loss	(33) + (36) =	65.0550 (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	47.0345	46.7980	46.5662	45.4772	45.2735	44.3250	44.3250	44.1494	44.6904	45.2735	45.6856	46.1165	(38)
Heat transfer coeff	112.0895	111.8530	111.6212	110.5322	110.3285	109.3800	109.3800	109.2044	109.7454	110.3285	110.7406	111.1715	(39)
Average = Sum(39)m / 12 =												110.5312	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0431	1.0409	1.0387	1.0286	1.0267	1.0179	1.0179	1.0162	1.0213	1.0267	1.0305	1.0345	(40)
HLP (average)												1.0286	(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	2.7987 (42)
Average daily hot water use (litres/day)	100.6689 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	110.7357	106.7090	102.6822	98.6555	94.6287	90.6020	90.6020	94.6287	98.6555	102.6822	106.7090	110.7357	(44)
Energy conte	164.2179	143.6260	148.2092	129.2124	123.9824	106.9873	99.1395	113.7640	115.1227	134.1644	146.4510	159.0363	(45)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Energy content (annual)												Total = Sum(45)m =	1583.9132 (45)
Distribution loss (46)m = 0.15 x (45)m													
	24.6327	21.5439	22.2314	19.3819	18.5974	16.0481	14.8709	17.0646	17.2684	20.1247	21.9676	23.8554	(46)
Water storage loss:													
Store volume													165.0000 (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													0.8993 (52)
Temperature factor from Table 2b													0.5400 (53)
Enter (49) or (54) in (55)													0.8244 (55)
Total storage loss													
	25.5558	23.0826	25.5558	24.7314	25.5558	24.7314	25.5558	25.5558	24.7314	25.5558	24.7314	25.5558	(56)
If cylinder contains dedicated solar storage													
	25.5558	23.0826	25.5558	24.7314	25.5558	24.7314	25.5558	25.5558	24.7314	25.5558	24.7314	25.5558	(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													
	213.0361	187.7199	197.0274	176.4558	172.8005	154.2307	147.9577	162.5822	162.3661	182.9826	193.6944	207.8544	(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													
	213.0361	187.7199	197.0274	176.4558	172.8005	154.2307	147.9577	162.5822	162.3661	182.9826	193.6944	207.8544	(64)
											Total per year (kWh/year) = Sum(64)m =	2158.7077	(64)
Heat gains from water heating, kWh/month													
	93.6570	83.0307	88.3341	80.7578	80.2787	73.3680	72.0184	76.8811	76.0730	83.6642	86.4897	91.9341	(65)

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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	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	25.9532	23.0514	18.7467	14.1924	10.6090	8.9566	9.6779	12.5797	16.8844	21.4387	25.0221	26.6745	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	267.8549	270.6344	263.6302	248.7190	229.8963	212.2056	200.3871	197.6076	204.6119	219.5231	238.3458	256.0365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	(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)													
	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	(71)
Water heating gains (Table 5)													
	125.8831	123.5576	118.7286	112.1636	107.9014	101.9000	96.7989	103.3348	105.6570	112.4519	120.1245	123.5673	(72)
Total internal gains													
	487.6715	485.2238	469.0858	443.0554	416.3870	391.0425	374.8443	381.5024	395.1336	421.3939	451.4727	474.2586	(73)

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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	2.6000	10.6334	0.7600	0.7000	0.7700	10.1927	(74)
South	4.5200	46.7521	0.7600	0.7000	0.7700	77.9084	(78)
West	3.2600	19.6403	0.7600	0.7000	0.7700	23.6053	(80)
North	3.8000	10.6334	0.7600	0.7000	0.7700	14.8971	(74)

Solar gains	126.6034	221.7187	320.0539	425.4762	503.6409	512.0889	488.6636	428.3805	356.1890	249.4905	152.7325	107.6479	(83)
Total gains	614.2750	706.9424	789.1397	868.5315	920.0280	903.1314	863.5079	809.8830	751.3226	670.8844	604.2052	581.9066	(84)

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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	37.2945	37.3733	37.4510	37.8199	37.8898	38.2183	38.2183	38.2798	38.0911	37.8898	37.7487	37.6024	
alpha	3.4863	3.4916	3.4967	3.5213	3.5260	3.5479	3.5479	3.5520	3.5394	3.5260	3.5166	3.5068	
util living area													
	0.9861	0.9764	0.9567	0.9106	0.8195	0.6722	0.5240	0.5715	0.7828	0.9314	0.9770	0.9884	(86)
MIT	19.2514	19.4653	19.8059	20.2421	20.6224	20.8707	20.9599	20.9451	20.7649	20.2749	19.6847	19.2106	(87)
Th 2	20.0476	20.0494	20.0512	20.0596	20.0611	20.0685	20.0685	20.0698	20.0656	20.0611	20.0580	20.0547	(88)
util rest of house													
	0.9834	0.9719	0.9481	0.8918	0.7801	0.6010	0.4257	0.4734	0.7232	0.9131	0.9718	0.9862	(89)
MIT 2	17.6991	18.0104	18.5030	19.1274	19.6450	19.9558	20.0445	20.0345	19.8391	19.1847	18.3368	17.6442	(90)
Living area fraction										fLA = Living area / (4) =		0.1205	(91)
MIT	17.8861	18.1857	18.6600	19.2618	19.7628	20.0660	20.1548	20.1442	19.9506	19.3160	18.4993	17.8330	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8861	18.1857	18.6600	19.2618	19.7628	20.0660	20.1548	20.1442	19.9506	19.3160	18.4993	17.8330	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9744	0.9594	0.9312	0.8722	0.7658	0.6008	0.4353	0.4818	0.7149	0.8943	0.9595	0.9782	(94)
Useful gains	598.5393	678.2265	734.8089	757.5025	704.5123	542.6439	375.8768	390.1861	537.0996	599.9936	579.7209	569.2469	(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													
	1522.8643	1486.0453	1357.3113	1145.3079	889.5534	597.8741	388.8245	408.8847	642.0811	961.6278	1262.3626	1515.6005	(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													

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

	687.6978	542.8542	463.1418	279.2199	137.6706	0.0000	0.0000	0.0000	0.0000	269.0559	491.5020	704.0871 (98)
Space heating												3575.2292 (98)
Space heating per m2											(98) / (4) =	33.2703 (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 %)												90.8000 (206)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement												3937.4771 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement												
	687.6978	542.8542	463.1418	279.2199	137.6706	0.0000	0.0000	0.0000	0.0000	269.0559	491.5020	704.0871 (98)
Space heating efficiency (main heating system 1)												
	90.8000	90.8000	90.8000	90.8000	90.8000	0.0000	0.0000	0.0000	0.0000	90.8000	90.8000	90.8000 (210)
Space heating fuel (main heating system)												
	757.3764	597.8570	510.0680	307.5109	151.6196	0.0000	0.0000	0.0000	0.0000	296.3170	541.3018	775.4263 (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												
Water heating requirement												
	213.0361	187.7199	197.0274	176.4558	172.8005	154.2307	147.9577	162.5822	162.3661	182.9826	193.6944	207.8544 (64)
Efficiency of water heater												80.1000 (216)
(217)m	88.0191	87.7868	87.3188	86.3341	84.5163	80.1000	80.1000	80.1000	80.1000	86.1420	87.4960	88.1171 (217)
Fuel for water heating, kWh/month												
	242.0339	213.8361	225.6414	204.3872	204.4582	192.5477	184.7162	202.9740	202.7043	212.4198	221.3751	235.8843 (219)
Water heating fuel used												2542.9783 (219)
Annual totals kWh/year												
Space heating fuel - main system												3937.4771 (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)												458.3415 (232)
Total delivered energy for all uses												7013.7969 (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	3937.4771	0.2160	850.4950	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	2542.9783	0.2160	549.2833	(264)
Space and water heating			1399.7784	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	458.3415	0.5190	237.8793	(268)
Total CO2, kg/year			1676.5826	(272)
Dwelling Carbon Dioxide Emission Rate (DER)			15.6000	(273)

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

DER		15.6000	ZC1
Total Floor Area	TFA	107.4600	
Assumed number of occupants	N	2.7987	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		14.7706	ZC2
CO2 emissions from cooking, equation (L16)		1.7324	ZC3
Total CO2 emissions		32.1031	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		32.1031	ZC8

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 (m2)		Storey height (m)		Volume (m3)	
Ground floor	58.6500 (1b)	x	2.4000 (2b)	=	140.7600 (1b) - (3b)	
First floor	48.8100 (1c)	x	2.2000 (2c)	=	107.3820 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	107.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	248.1420	(5)

2. Ventilation rate

	main heating		secondary heating		other		total	m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =	0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =	0.0000	(6b)
Number of intermittent fans							4 * 10 =	40.0000	(7a)
Number of passive vents							0 * 10 =	0.0000	(7b)
Number of flueless gas fires							0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.1612	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.4112	(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) =	0.3495	(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	0.4456	0.4369	0.4282	0.3845	0.3757	0.3320	0.3320	0.3233	0.3495	0.3757	0.3932	0.4107	(22b)
Effective ac	0.5993	0.5954	0.5917	0.5739	0.5706	0.5551	0.5551	0.5523	0.5611	0.5706	0.5773	0.5843	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Opening Type (Uw = 1.40)			14.1800	1.3258	18.7992			(27)
Main Floor			58.6500	0.1300	7.6245			(28a)
Main Wall	71.9600	14.1800	57.7800	0.1800	10.4004			(29a)
Loft Walls	26.5700		26.5700	0.1800	4.7826			(29a)
Main roof (Voids)	27.2500		27.2500	0.1300	3.5425			(30)
Roof Slopes	36.2500		36.2500	0.1300	4.7125			(30)
Total net area of external elements Aum(A, m2)			220.6800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	49.8617			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	12.2600	(36)
Total fabric heat loss (33) + (36) =	62.1217	(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	49.0744	48.7587	48.4492	46.9956	46.7236	45.4575	45.4575	45.2231	45.9452	46.7236	47.2738	47.8490	(38)
Heat transfer coeff	111.1962	110.8804	110.5710	109.1173	108.8453	107.5793	107.5793	107.3448	108.0669	108.8453	109.3955	109.9707	(39)
Average = Sum(39)m / 12 =												109.1160	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0348	1.0318	1.0289	1.0154	1.0129	1.0011	1.0011	0.9989	1.0056	1.0129	1.0180	1.0234	(40)
HLP (average)												1.0154	(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	2.7987 (42)
Average daily hot water use (litres/day)	100.6689 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	110.7357	106.7090	102.6822	98.6555	94.6287	90.6020	90.6020	94.6287	98.6555	102.6822	106.7090	110.7357	(44)
Energy conte	164.2179	143.6260	148.2092	129.2124	123.9824	106.9873	99.1395	113.7640	115.1227	134.1644	146.4510	159.0363	(45)
Energy content (annual)										Total = Sum(45)m =		1583.9132	(45)
Distribution loss (46)m = 0.15 x (45)m	24.6327	21.5439	22.2314	19.3819	18.5974	16.0481	14.8709	17.0646	17.2684	20.1247	21.9676	23.8554	(46)

Water storage loss:	
Store volume	165.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.4741 (48)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7960	(55)
Total storage loss													
	24.6765	22.2884	24.6765	23.8805	24.6765	23.8805	24.6765	24.6765	23.8805	24.6765	23.8805	24.6765	(56)
If cylinder contains dedicated solar storage													
	24.6765	22.2884	24.6765	23.8805	24.6765	23.8805	24.6765	24.6765	23.8805	24.6765	23.8805	24.6765	(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													
	212.1568	186.9257	196.1481	175.6048	171.9212	153.3798	147.0784	161.7029	161.5152	182.1033	192.8434	206.9752	(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													
	212.1568	186.9257	196.1481	175.6048	171.9212	153.3798	147.0784	161.7029	161.5152	182.1033	192.8434	206.9752	(64)
								Total per year (kWh/year) = Sum(64)m =				2148.3548	(64)
Heat gains from water heating, kWh/month													
	92.9536	82.3954	87.6307	80.0771	79.5752	72.6873	71.3150	76.1776	75.3923	82.9608	85.8089	91.2307	(65)

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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	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	139.9344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	25.9532	23.0514	18.7467	14.1924	10.6090	8.9566	9.6779	12.5797	16.8844	21.4387	25.0221	26.6745	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	267.8549	270.6344	263.6302	248.7190	229.8963	212.2056	200.3871	197.6076	204.6119	219.5231	238.3458	256.0365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	36.9934	(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)													
	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	-111.9476	(71)
Water heating gains (Table 5)													
	124.9376	122.6121	117.7831	111.2182	106.9560	100.9545	95.8535	102.3893	104.7115	111.5064	119.1791	122.6219	(72)
Total internal gains													
	486.7260	484.2783	468.1403	442.1099	415.4416	390.0970	373.8988	380.5569	394.1881	420.4485	450.5272	473.3132	(73)

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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		6.4000	10.6334	0.6300	0.7000	0.7700		20.7981	(74)
South		4.5200	46.7521	0.6300	0.7000	0.7700		64.5819	(78)
West		3.2600	19.6403	0.6300	0.7000	0.7700		19.5676	(80)

Solar gains	104.9476	183.7931	265.3079	352.6973	417.4918	424.4947	405.0764	355.1049	295.2619	206.8145	126.6072	89.2345	(83)
Total gains	591.6736	668.0714	733.4482	794.8073	832.9334	814.5917	778.9752	735.6619	689.4500	627.2629	577.1344	562.5476	(84)

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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	67.1111	67.3022	67.4906	68.3897	68.5606	69.3675	69.3675	69.5190	69.0544	68.5606	68.2158	67.8590	
alpha	5.4741	5.4868	5.4994	5.5593	5.5707	5.6245	5.6245	5.6346	5.6036	5.5707	5.5477	5.5239	
util living area													
	0.9987	0.9971	0.9926	0.9754	0.9172	0.7696	0.5926	0.6461	0.8797	0.9830	0.9971	0.9990	(86)
MIT	19.8698	20.0005	20.2178	20.5117	20.7775	20.9447	20.9895	20.9834	20.8751	20.5380	20.1536	19.8500	(87)
Th 2	20.0545	20.0569	20.0593	20.0705	20.0726	20.0824	20.0824	20.0842	20.0786	20.0726	20.0684	20.0639	(88)
util rest of house													
	0.9983	0.9962	0.9899	0.9656	0.8832	0.6872	0.4768	0.5299	0.8197	0.9744	0.9960	0.9987	(89)
MIT 2	18.5362	18.7290	19.0472	19.4782	19.8420	20.0429	20.0782	20.0768	19.9722	19.5215	18.9615	18.5142	(90)
Living area fraction										fLA = Living area / (4) =		0.1205	(91)
MIT	18.6969	18.8822	19.1883	19.6027	19.9547	20.1516	20.1880	20.1861	20.0810	19.6440	19.1052	18.6752	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6969	18.8822	19.1883	19.6027	19.9547	20.1516	20.1880	20.1861	20.0810	19.6440	19.1052	18.6752	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9973	0.9944	0.9863	0.9591	0.8780	0.6940	0.4907	0.5435	0.8199	0.9689	0.9941	0.9979	(94)
Useful gains	590.0664	664.3058	723.4133	762.3133	731.3121	565.3440	382.2088	399.8641	565.2675	607.7692	573.7394	561.3838	(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													
	1600.8829	1550.3512	1402.9535	1167.8510	898.4871	597.2368	385.9972	406.4147	646.3505	984.3936	1313.3149	1591.8444	(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													
	752.0474	595.4225	505.5779	291.9871	124.3782	0.0000	0.0000	0.0000	0.0000	280.2086	532.4944	766.6627	(98)
Space heating												3848.7788	(98)
Space heating per m2											(98) / (4) =	35.8159	(99)

8c. Space cooling requirement

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												4116.3410	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	752.0474	595.4225	505.5779	291.9871	124.3782	0.0000	0.0000	0.0000	0.0000	280.2086	532.4944	766.6627	(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)													
	804.3288	636.8155	540.7250	312.2857	133.0248	0.0000	0.0000	0.0000	0.0000	299.6884	569.5127	819.9601	(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													
Water heating requirement													
	212.1568	186.9257	196.1481	175.6048	171.9212	153.3798	147.0784	161.7029	161.5152	182.1033	192.8434	206.9752	(64)
Efficiency of water heater												79.8000	(216)
(217)m	87.9065	87.6907	87.2306	86.1613	83.9673	79.8000	79.8000	79.8000	79.8000	85.9600	87.3848	87.9919	(217)
Fuel for water heating, kWh/month													
	241.3437	213.1648	224.8615	203.8095	204.7477	192.2053	184.3087	202.6352	202.4000	211.8467	220.6830	235.2207	(219)
Water heating fuel used												2537.2268	(219)
Annual totals kWh/year													
Space heating fuel - main system												4116.3410	(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)												458.3415	(232)
Total delivered energy for all uses												7186.9094	(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	4116.3410	0.2160	889.1297	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	2537.2268	0.2160	548.0410	(264)
Space and water heating			1437.1707	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	458.3415	0.5190	237.8793	(268)
Total CO2, kg/m2/year			1713.9749	(272)
Emissions per m2 for space and water heating			13.3740	(272a)
Fuel factor (mains gas)			1.0000	
Emissions per m2 for lighting			2.2137	(272b)
Emissions per m2 for pumps and fans			0.3622	(272c)
Target Carbon Dioxide Emission Rate (TER) = (13.3740 * 1.00) + 2.2137 + 0.3622, rounded to 2 d.p.			15.9500	(273)

U-VALUE CALCULATOR REPORT

Design SAP
elmhurst energy

Property Reference	000606	**Issued on Date**	27/03/2022
Assessment Reference	Plot 16 - As Design	**Prop Type Ref**	Plot 16 - Dormer Bungalow
Project	Goldthorpe Rd, Goldthorpe, Barnsley, S63		
Calculation Type	New Build (As Designed)		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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 000002 - 400mm Mineral Wool

Roof Type: Pitched Roof, insulated flat ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/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: RoomInRoof

Total thickness: 416 mm **U-value: 0.10 W/m² K** **Kappa: n/a**

U-VALUE CALCULATOR REPORT

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elmhurst energy

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Project	Goldthorpe Rd, Goldthorpe, Barnsley, S63		
Calculation Type	New Build (As Designed)		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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 000003 - 125mm K7, 37.5mm K18

Roof Type: Pitched Roof, insulated sloping ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	**Tiling, concrete**				
	Main construction	35	1.5000	0.0233	100.00
Layer 2	**airspace/timber battens**				
	Main construction	22	0.1222	0.1800	89.63
	Main construction	22	0.1375	0.1600	10.37
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 3	**Breather membrane**				
	Main construction	1	0.0000	0.0000	100.00
Layer 4	**Standard cavity**				
	Main construction	25	0.0737	0.3392	91.67
	Main construction	25	0.1300	0.1923	8.33
	Corrections - Cavity Unventilated, Emissivity: Low Emissivity (BR443)				
Layer 5	**Kooltherm K7 Pitched roof board (125mm)**				
	Main construction	125	0.0200	6.2500	91.67
	Main construction	125	0.1300	0.9615	8.33
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 6	**Kooltherm K18 Insulated Plasterboard (37.5mm)**				
	Main construction	37.5	0.0300	1.2500	100.00
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 7	**Plaster, standard**				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

Total resistance: **Upper limit =** 7.093 m² K/W **Lower limit =** 6.203 m² K/W **Average =** 6.648 m² K/W

Total correction = 0.0000 m² K/W **U-value (unrounded) =** 0.15 W/m² K

Unheated space: None

Total thickness: 249 mm **U-value: 0.15 W/m² K** **Kappa: n/a**

U-VALUE CALCULATOR REPORT

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elmhurst energy

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Assessment Reference	Plot 16 - As Design	**Prop Type Ref**	Plot 16 - Dormer Bungalow
Project	Goldthorpe Rd, Goldthorpe, Barnsley, S63		
Calculation Type	New Build (As Designed)		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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

Wall 000001 - Newlay Newlite with Supafil 34

Wall Type: Standard Wall

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	**Brick, outer leaf**				
	Main construction	102.5	0.7700	0.1331	100.00
Layer 2	**Supafil 34**				
	Main construction	100	0.0340	2.9412	100.00
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 3	**Blockwork, Newlay (Newlite)**				
	Main construction	100	0.4300	0.2326	93.43
	Main construction	100	0.8803	0.1136	6.57
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 =** 3.678 m² K/W **Lower limit =** 3.671 m² K/W **Average =** 3.674 m² K/W

Total correction = 0.0000 m² K/W **U-value (unrounded) =** 0.27 W/m² K

Unheated space: None

Total thickness: 333 mm **U-value: 0.27 W/m² K** **Kappa: n/a**

U-VALUE CALCULATOR REPORT

Design SAP
elmhurst energy

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Project	Goldthorpe Rd, Goldthorpe, Barnsley, S63		
Calculation Type	New Build (As Designed)		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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

Wall 000005 - Timber Framed warm frame or hybrid

Wall Type: Timber framed Wall with I-beams

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	**Kooltherm K12 Frame board (45mm +)**				
	Main construction	100	0.0200	5.0000	88.89
	Main construction	100	0.1300	0.7692	11.11
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 2	**Vapour control layer**				
	Main construction	1	0.0000	0.0000	100.00
Layer 3	**Plywood**				
	Main construction	12	0.1300	0.0923	100.00
Layer 4	**Plasterboard,**				
	Main construction	12.5	0.2100	0.0595	100.00
Int surface				0.1300	

Total resistance: **Upper limit =** 3.719 m² K/W **Lower limit =** 3.425 m² K/W **Average =** 3.572 m² K/W

Total correction = 0.0000 m² K/W **U-value (unrounded) =** 0.25 W/m² K

Unheated space: RoomInRoof

Total thickness: 126 mm **U-value: 0.25 W/m² K** **Kappa: n/a**

U-VALUE CALCULATOR REPORT

Design SAP
elmhurst energy

Property Reference	000606	**Issued on Date**	27/03/2022
Assessment Reference	Plot 16 - As Design	**Prop Type Ref**	Plot 16 - Dormer Bungalow
Project	Goldthorpe Rd, Goldthorpe, Barnsley, S63		
Calculation Type	New Build (As Designed)		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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

Floor 000004 - Floor - suspended beam-and-block floor

Floor Type: Suspended Floor
Area = 58.65 m², Perimeter = 21.67 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:Uw = 1.500 m
Ventilation openings per perimeter length:e = 0.0015 %
Mean wind speed:v = 5.000 m/s
Resistance on solum:Rg = 0.000 m²K/W

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.1700	
Layer 1	**AAC (600 kg/m3)/ 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)

Design SAP
elmhurst energy

Property Reference	000606	**Issued on Date**	27/03/2022
Assessment Reference	Plot 16 - As Design	**Prop Type Ref**	Plot 16 - Dormer Bungalow
Property	Goldthorpe Rd, Goldthorpe, Barnsley, S63		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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		

ASSESSMENT NOTES - Last time updated on: 28.03.2022

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. Loft wall to have 100mm kingspan between.
- Roof Voids to be insulated with min 400mm Mineral Wool Insulation, Roof slopes to be insulated with min 125mm between and an addition 25mm under the rafters.
- Doors, Windows and Patio Doors to achieve min 1.4W/m2K or better
- 100% Low E-Lighting
- Air Test of 4.7 or lower
- Assumed Boiler to be a Vaillant Vaillant ecoFIT sustain 615 Condensing Gas Boiler with full Zone Controls or similar, and Boiler Interlock, 165Lt unvented foam insulated cylinder.
- CBA Accredited Thermal Bridging details to be used.

BASIC COMPLIANCE REPORT
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	000606	**Issued on Date**	27/03/2022
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Property	Goldthorpe Rd, Goldthorpe, Barnsley, S63		

SAP Rating	85 B	**DER**	15.60	**TER**	15.95
Environmental	87 B	**% DER<TER**	2.19		
CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

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		

SUMARY 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)	15.95	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	15.60	$kgCO_2/m^2$	Pass
	-0.35 (-2.2%)	$kgCO_2/m^2$	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	47.98	$kWh/m^2/yr$	
Dwelling Fabric Energy Efficiency (DFEE)	40.54	$kWh/m^2/yr$	
	-7.5 (-15.6%)	$kWh/m^2/yr$	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.27 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Roof	0.13 (max. 0.20)	0.15 (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	4.70 (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
Secondary heating system	None		

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 1.53 kWh/day Permitted by DBSCG 1.99		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 Windows facing South Windows facing West	6.40 m², No overhang 4.52 m², No overhang 3.26 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	4.70 (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	0.039	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)

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CO_2 Emissions (t/year)	1.49	**DFEE**	40.54	**TFEE**	47.98
General Requirements Compliance	Pass	**% DFEE<TFEE**	15.51		

Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com	**Assessor ID**	H883-0001
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	Bungalow, Semi-Detached
2.0 Number of Storeys	2
3.0 Date Built	2022
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:	21.67 m	58.65 m²	2.40 m
1st Storey:	31.18 m	48.81 m²	2.20 m

7.0 Living Area	12.95	m²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	140.04	kJ/m²K

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
Main Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.27	60.00	71.96	57.78
Loft Walls	Timber Frame	Timber framed wall (one layer of plasterboard)	0.25	9.00	26.57	26.57

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Party Wall	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	29.78

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Stud Walls	Plasterboard on timber frame	9.00	148.89

10.0 External Roofs

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

Design SAP
elmhurst energy

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
Main roof (Voids)	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	27.25	27.25
Roof Slopes	External Slope Roof	Plasterboard, insulated slope	0.15	9.00	36.25	36.25

10.2 Internal Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Ceiling	Plasterboard ceiling, carpeted chipboard floor	9.00	48.81

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	58.65

11.2 Internal Floors

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor	Plasterboard ceiling, carpeted chipboard floor	18.00	48.81

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	Window	[1] Main Wall	South	None	0.00					4.52	
Side elevation	Window	[1] Main Wall	West	None	0.00					2.14	
Side Elevation	Window	[1] Main Wall	West	None	0.00					1.12	
Rear Eleavtion	Window	[1] Main Wall	North	None	0.00					2.60	
Rear Elevation	Window	[1] Main Wall	North	None	0.00					3.80	

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	11.00	0.030	No
Independently assessed	E3 Sill	9.98	0.016	No
Independently assessed	E4 Jamb	22.76	0.011	No
Independently assessed	E5 Ground floor (normal)	21.67	0.056	No
Independently assessed	E6 Intermediate floor within a dwelling	9.07	0.000	No
Independently assessed	E11 Eaves (insulation at rafter level)	10.52	-0.002	No
Independently assessed	E12 Gable (insulation at ceiling level)	5.39	0.055	No
Independently assessed	E13 Gable (insulation at rafter level)	7.64	0.056	No
Independently assessed	E16 Corner (normal)	7.20	0.054	No
Independently assessed	E18 Party wall between dwellings	7.20	0.038	No
Table K1 - Default	P1 Party wall - Ground floor	10.52	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	2.06	0.000	No
Independently assessed	P4 Party wall - Roof (insulation at ceiling level)	8.76	0.041	No
Table K1 - Default	R6 Flat ceiling	18.98	0.060	No
Table K1 - Default	R8 Roof to wall (rafter)	18.98	0.060	No

Y-value	0.039	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	4.70	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 half open	
Cross ventilation possible	Yes	
Night Ventilation	Yes	
Air change rate	4.00	
Mechanical Ventilation		
Mechanical Ventilation System Present	No	

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	12	
Total number of L.E.L. fittings	12	
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	Database	
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	No	
Sap Code	2110	
Flue Type	Balanced	
Fan Assisted Flue	Yes	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	

Flow Temperature	Normal (> 45°C)	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HWP From main heating 1	
Water Heating	Main Heating 1	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	901	
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	165.00	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 95	

DWELLING SIGN OFF REPORT

Design SAP
elmhurst energy

Section 1: Dwelling Information

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

House Name		
House Number		
Postcode	S63	
Street	Goldthorpe Rd	
Locality	Goldthorpe	
Town	Barnsley	
County		

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

Comments

Terrain Type Suburban

Property Type Bungalow, Semi-Detached

Comments

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

Comments

Section 2: Dwelling Construction Details

Thermal Mass Parameter Precise calculation

Thermal Mass 140.04 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: 71.96 m²

Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m²K/W)	Bridging
Brick, outer leaf	102.5	0.7700	0.1331	100.00
Supafil 34	100	0.0340	2.9412	100.00
Blockwork, Newlay (Newlite)	100	0.4300	0.2326	93.43 Mortar
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

Type: Timber Frame

Construction: Timber framed wall (one layer of plasterboard)

U-value: 0.25 W/m²K

Gross Area: 26.57 m²

Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m²K/W)	Bridging
Kooltherm K12 Frame board (45mm +)	100	0.0200	5.0000	88.89 Timber
Vapour control layer	1	0.0000	0.0000	100.00
Plywood	12	0.1300	0.0923	100.00
Plasterboard,	12.5	0.2100	0.0595	100.00

Comments

Party Walls

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	29.78

Comments

External Roofs

Type: External Plane Roof
Construction: Plasterboard, insulated at ceiling level
U-value: 0.10 W/m²K
Gross Area: 27.25 m²

Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m²K/W)	Bridging
Mineral wool	300	0.0400	7.5000	100.00
Mineral wool	100	0.0400	2.5000	88.89 Timber
Plasterboard, standard	12.5	0.2100	0.0595	100.00
Plaster, standard	3	0.4000	0.0075	100.00

Type: External Slope Roof
Construction: Plasterboard, insulated slope
U-value: 0.15 W/m²K
Gross Area: 36.25 m²

Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m²K/W)	Bridging
Tiling, concrete	35	1.5000	0.0233	100.00
airspace/timber battens	22	0.1222	0.1800	89.63 Timber
Breather membrane	1	0.0000	0.0000	100.00
Standard cavity	25	0.0737	0.3392	91.67 Timber
Kooltherm K7 Pitched roof board (125mm)	125	0.0200	6.2500	91.67 Timber
Kooltherm K18 Insulated Plasterboard (37.5mm)	37.5	0.0300	1.2500	100.00
Plaster, standard	3	0.4000	0.0075	100.00

Comments

Heat Loss Floors

Type: Ground Floor - Solid
Construction: Suspended concrete floor, carpeted
U-value: 0.14 W/m²K
Area: 58.65 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	Window	[1] Main Wall	South	4.52
Side elevation	Window	[1] Main Wall	West	2.14
Side Elevation	Window	[1] Main Wall	West	1.12
Rear Eleavtion	Window	[1] Main Wall	North	2.60
Rear Elevation	Window	[1] Main Wall	North	3.80

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	11.00	0.030	
E3 Sill	Independently assessed	9.98	0.016	
E4 Jamb	Independently assessed	22.76	0.011	
E5 Ground floor (normal)	Independently assessed	21.67	0.056	
E6 Intermediate floor within a dwelling	Independently assessed	9.07	0.000	
E11 Eaves (insulation at rafter level)	Independently assessed	10.52	-0.002	
E12 Gable (insulation at ceiling level)	Independently assessed	5.39	0.055	
E13 Gable (insulation at rafter level)	Independently assessed	7.64	0.056	
E16 Corner (normal)	Independently assessed	7.20	0.054	
E18 Party wall between dwellings	Independently assessed	7.20	0.038	
P1 Party wall - Ground floor	Table K1 - Default	10.52	0.160	
P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	2.06	0.000	
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	8.76	0.041	
R6 Flat ceiling	Table K1 - Default	18.98	0.060	
R8 Roof to wall (rafter)	Table K1 - Default	18.98	0.060	

Y-value	0.039	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 AP_{50}		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				3
Number of passive vents				0
Number of flueless gas fires				0

Comments

Internal Lighting

Total number of light fittings	12	
Total number of L.E.L. fittings	12	
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 BGB Post 98 Regular condens. with auto ign.	
Efficiency (Split Efficiences)	89.8	%
Brand, Model	Vaillant, ecoFIT sustain 615	
Flue Type	Balanced	
Fan Assisted Flue	Yes	
Heat Emitter	Radiators	

Flow Temperature	Normal (> 45°C)

Comments

Heating Controls

Description	CBI Time and temperature zone control
Boiler Interlock	Yes
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

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	Yes	
Cylinder Stat	Yes	
Insulation Type	Foam	
Insulation Thickness	100 mm	
Cylinder Volume	165.00	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 . . . . . .