

PREDICTED ENERGY ASSESSMENT

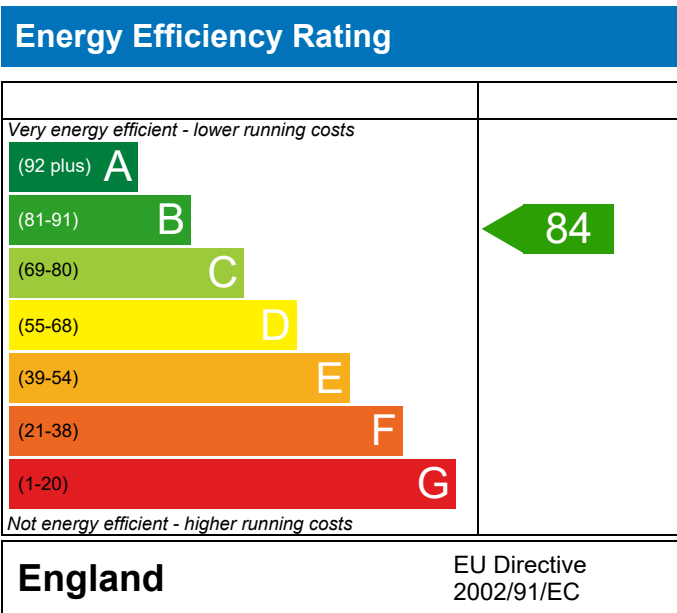


518 - PRJ009194 - MF

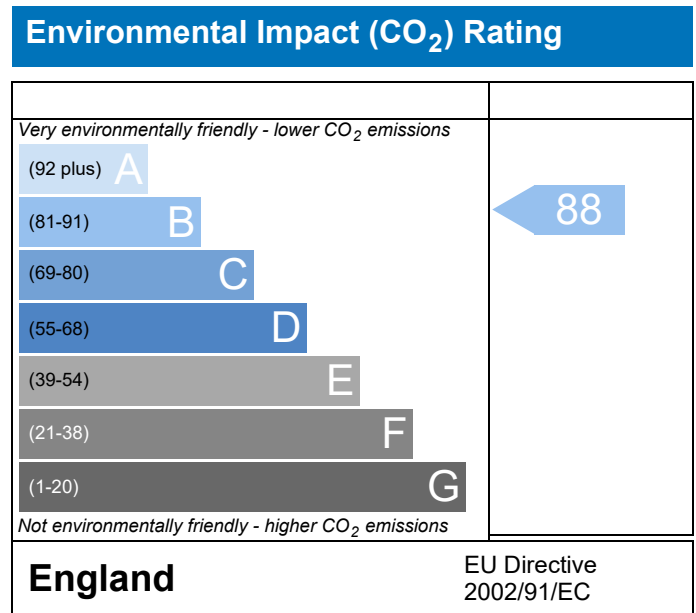
Dwelling type: Flat, Detached
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 67.16 m²

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.



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.



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	518 - PRJ009194 - MF	Issued on Date	26/02/2021
Assessment Reference	518 D	Prop Type Ref	Block B - MF
Property	518 - PRJ009194 - MF		

SAP Rating	84 B	DER	16.79	TER	17.84
Environmental	88 B	% DER<TER	5.90		
CO ₂ Emissions (t/year)	0.92	DFEE	41.93	TFEE	46.07
General Requirements Compliance	Pass	% DFEE<TFEE	8.99		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
------------------	--	-------------	-----------

Client	
--------	--

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	17.84	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.79	kgCO ₂ /m ²	Pass
	-1.05 (-5.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	46.07	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	41.93	kWh/m ² /yr	
	-4.2 (-9.1%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Openings	1.38 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (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

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP1 30 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
---------------------	---	------

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)



Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

5.61 m², No overhang

Windows facing South East

5.50 m², No overhang

Windows facing South West

4.85 m², No overhang

Air change rate

4.55 ach

Blinds/curtains

Dark-coloured curtain or roller blind, closed 100% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

m³/(h.m²) @ 50 Pa

Maximum

10.0

m³/(h.m²) @ 50 Pa

Pass

10 Key features

None

N/A

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	518 - PRJ009194 - MF	Issued on Date	26/02/2021
Assessment Reference	518 D	Prop Type Ref	Block B - MF
Property	518 - PRJ009194 - MF		

SAP Rating	84 B	DER	16.79	TER	17.84
Environmental	88 B	% DER<TER	5.90		
CO ₂ Emissions (t/year)	0.92	DFEE	41.93	TFEE	46.07
General Requirements Compliance	Pass	% DFEE<TFEE	8.99		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
------------------	--	-------------	-----------

Client	
--------	--

CALCULATION OF HEAT DEMAND 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	67.1600 (1b)	x 2.4600 (2b)	= 165.2136 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 165.2136 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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				0 * 10 =	0.0000 (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) =				0.0000 / (5) =	0.0000 (8)								
Pressure test				Yes									
Measured/design AP50				5.0100									
Infiltration rate				0.2505	(18)								
Number of sides sheltered				0	(19)								
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)								
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (21)								
Wind speed	Jan 5.1000	Feb 4.7000	Mar 4.6000	Apr 4.3000	May 4.3000	Jun 4.0000	Jul 4.0000	Aug 3.9000	Sep 4.0000	Oct 4.5000	Nov 4.4000	Dec 4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infiltr rate	0.3194	0.2943	0.2881	0.2693	0.2693	0.2505	0.2505	0.2442	0.2505	0.2818	0.2756	0.2943	(22b)
Mechanical extract ventilation - decentralised													
If mechanical ventilation:													0.5000 (23a)
Effective ac	0.5694	0.5443	0.5381	0.5193	0.5193	0.5005	0.5005	0.5000	0.5005	0.5318	0.5256	0.5443	(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
Windows (Uw = 1.40)			15.9600	1.3258	21.1591		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Brick	64.7110	15.9640	48.7470	0.2600	12.6742	58.7400	2863.3988 (29a)
W1 - To Corridor	27.3800	2.1170	25.2630	0.2499	6.3135	106.6200	2693.5411 (29a)
Total net area of external elements Aum, (m ²)			92.0900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		42.6908		(33)
Party Floor			67.1550			40.0000	2686.2000 (32d)
Party Ceiling			67.1550			70.0000	4700.8500 (32b)
1st Floor Stud			129.5141			5.8200	753.7719 (32c)
Heat capacity Cm = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	13697.7618 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							203.9571 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0858 (36)
Total fabric heat loss						(33) + (36) =	49.7766 (37)

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



FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	31.0433	29.6775	29.3361	28.3118	28.3118	27.2875	27.2875	27.2602	27.2875	28.9947	28.6532	29.6775 (38)
Heat transfer coeff	80.8199	79.4541	79.1127	78.0884	78.0884	77.0641	77.0641	77.0368	77.0641	78.7713	78.4298	79.4541 (39)
Average = Sum(39)m / 12 =												78.3707 (39)
HLP	1.2034	1.1831	1.1780	1.1627	1.1627	1.1475	1.1475	1.1471	1.1475	1.1729	1.1678	1.1831 (40)
HLP (average)												1.1669 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1753 (42)
Average daily hot water use (litres/day)												85.8622 (43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Energy content (annual)												Total = Sum(45)m = 1350.9473 (45)
Distribution loss (46)m = 0.15 x (45)m	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013 (61)
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (64)
Total per year (kWh/year) = Sum(64)m =												1521.8541 (64)
RHI water heating demand												1522 (64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522 (65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabolic gains (Table 5), Watts	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268 (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)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101 (71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272 (72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g Specific data or Table 6c	FF Specific data or Table 6c	Access factor Table 6d	Gains W					
Northeast	5.6100	15.0428	0.5000	0.5000	0.0000	0.7700	32.4903 (75)					
Southeast	5.5040	46.3896	0.5000	0.5000	0.0000	0.7700	98.3014 (77)					
Southwest	4.8500	46.3896	0.5000	0.5000	0.0000	0.7700	86.6210 (79)					
Solar gains	217.4126	325.9366	469.0092	635.8236	718.8446	790.5682	736.5545	659.7623	553.8537	388.2250	260.0081	176.4402 (83)
Total gains	708.5747	813.3088	937.7664	1075.6779	1129.1995	1174.3009	1104.5588	1035.1516	945.7142	809.1845	713.3826	654.2528 (84)

7. Mean internal temperature (heating season)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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)												
tau	47.0792	47.8884	48.0951	48.7260	48.7260	49.3736	49.3736	49.3911	49.3736	48.3036	48.5139	47.8884
alpha	4.1386	4.1926	4.2063	4.2484	4.2484	4.2916	4.2916	4.2927	4.2916	4.2202	4.2343	4.1926
util living area	0.9575	0.9299	0.8615	0.7262	0.5552	0.3643	0.2576	0.2746	0.4771	0.7614	0.9145	0.9657 (86)
MIT	20.0576	20.2535	20.5511	20.8219	20.9526	20.9939	20.9990	20.9987	20.9816	20.8232	20.4524	20.0253 (87)
Th 2	19.9173	19.9336	19.9377	19.9499	19.9499	19.9623	19.9623	19.9626	19.9623	19.9417	19.9458	19.9336 (88)
util rest of house	0.9469	0.9140	0.8329	0.6800	0.4938	0.2982	0.1856	0.1980	0.3994	0.7049	0.8916	0.9568 (89)
MIT 2	19.1044	19.3037	19.5818	19.8246	19.9232	19.9600	19.9621	19.9623	19.9545	19.8262	19.5064	19.0872 (90)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Living area fraction										fLA = Living area / (4) =	0.2799 (91)	
MIT	19.3712	19.5696	19.8531	20.1038	20.2114	20.2494	20.2523	20.2524	20.2420	20.1053	19.7713	19.3498 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.2212	19.4196	19.7031	19.9538	20.0614	20.0994	20.1023	20.1024	20.0920	19.9553	19.6213	19.1998 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9385	0.9048	0.8258	0.6802	0.5005	0.3070	0.1954	0.2084	0.4093	0.7057	0.8833	0.9492 (94)
Useful gains	664.9846	735.9163	774.3864	731.6259	565.1421	360.5432	215.8001	215.6856	387.0971	571.0175	630.1035	621.0029 (95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000 (96)
Heat loss rate W												
Month fracti	1117.0274	1090.0754	981.2420	808.5110	582.6449	362.1543	215.9578	215.8900	392.4139	642.4010	880.0810	1088.5021 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating	336.3199	237.9949	153.9006	55.3572	13.0221	0.0000	0.0000	0.0000	0.0000	53.1093	179.9838	347.8194 (98)
RHI space heating demand												1377.5072 (98)
												1378 (98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	67.1600 (1b)	x 2.4600 (2b)	= 165.2136 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 165.2136 (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				0 * 10 =	0.0000 (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) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50				5.0100	
Infiltration rate				0.2505	(18)
Number of sides sheltered				0	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (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	0.3194	0.3131	0.3069	0.2756	0.2693	0.2380	0.2380	0.2317	0.2505	0.2693	0.2818	0.2943 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5694	0.5631	0.5569	0.5256	0.5193	0.5000	0.5000	0.5000	0.5005	0.5193	0.5318	0.5443 (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)			15.9600	1.3258	21.1591		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	64.7110	15.9640	48.7470	0.2600	12.6742	58.7400	2863.3988 (29a)
Wl - To Corridor	27.3800	2.1170	25.2630	0.2499	6.3135	106.6200	2693.5411 (29a)
Total net area of external elements Aum(A, m2)			92.0900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	42.6908			(33)
Party Floor			67.1550			40.0000	2686.2000 (32d)
Party Ceiling			67.1550			70.0000	4700.8500 (32b)
1st Floor Stud			129.5141			5.8200	753.7719 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 13697.7618 (34)
 Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 203.9571 (35)
 Thermal bridges (Sum(L x Psi) calculated using Appendix K) 7.0858 (36)
 Total fabric heat loss (33) + (36) = 49.7766 (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	31.0433	30.7018	30.3604	28.6532	28.3118	27.2602	27.2602	27.2602	27.2875	28.3118	28.9947	29.6775 (38)
Average = Sum(39)m / 12 =	80.8199	80.4784	80.1370	78.4298	78.0884	77.0368	77.0368	77.0368	77.0641	78.0884	78.7713	79.4541 (39)
HLP	1.2034	1.1983	1.1932	1.1678	1.1627	1.1471	1.1471	1.1471	1.1475	1.1627	1.1729	1.1831 (40)
HLP (average)												1.1694 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1753 (42)
Average daily hot water use (litres/day)												85.8622 (43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Energy content (annual)												Total = Sum(45)m = 1350.9473 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Water storage loss:	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013 (61)
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1521.8541 (64)												

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268 (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)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101 (71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272 (72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	Specific data FF or Table 6c	Access factor Table 6d	Gains W						
Northeast	5.6100	11.2829	0.5000	0.0000	0.7700	24.3695 (75)						
Southeast	5.5040	36.7938	0.5000	0.0000	0.7700	77.9676 (77)						
Southwest	4.8500	36.7938	0.5000	0.0000	0.7700	68.7033 (79)						
Solar gains	171.0403	299.4395	431.2068	570.3244	671.7049	681.3165	650.8404	572.9940	479.0360	336.7416	206.3410	145.4210 (83)
Total gains	662.2024	786.8117	899.9640	1010.1787	1082.0598	1065.0491	1018.8447	948.3833	870.8965	757.7011	659.7155	623.2337 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains for living area, nil,m (see Table 9a)	47.0792	47.2789	47.4804	48.5139	48.7260	49.3911	49.3911	49.3911	49.3736	48.7260	48.3036	47.8884
tau	4.1386	4.1519	4.1654	4.2343	4.2484	4.2927	4.2927	4.2927	4.2916	4.2484	4.2202	4.1926
util living area	0.9726	0.9464	0.8939	0.7829	0.6249	0.4537	0.3307	0.3702	0.5797	0.8364	0.9496	0.9777 (86)
MIT	19.8580	20.1073	20.4202	20.7421	20.9183	20.9838	20.9967	20.9947	20.9560	20.7089	20.2370	19.8209 (87)
Th 2	19.9173	19.9214	19.9254	19.9458	19.9499	19.9626	19.9626	19.9626	19.9623	19.9499	19.9417	19.9336 (88)
util rest of house	0.9658	0.9341	0.8710	0.7423	0.5669	0.3838	0.2537	0.2884	0.5033	0.7942	0.9358	0.9722 (89)
MIT 2	18.9097	19.1536	19.4518	19.7559	19.8996	19.9554	19.9617	19.9610	19.9403	19.7404	19.2997	18.8866 (90)
Living area fraction	19.1752	19.4205	19.7229	20.0319	20.1848	20.2433	20.2514	20.2504	20.2246	20.0115	19.5621	19.1481 (92)
Temperature adjustment	19.0252	19.2705	19.5729	19.8819	20.0348	20.0933	20.1014	20.1004	20.0746	19.8615	19.4121	-0.1500 (93)
adjusted MIT												18.9981 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	634.8994	727.8928	776.0724	747.1161	618.6961	418.2982	269.0777	283.9178	445.8488	598.6992	611.8148	601.9863 (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	1190.0878	1156.5183	1047.6215	861.3124	650.8498	423.1871	269.7386	285.0645	460.4268	723.2155	969.8398	1175.7718 (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	413.0602	288.0363	202.0325	82.2214	23.9223	0.0000	0.0000	0.0000	0.0000	92.6401	257.7779	426.8964 (98)
Space heating												1786.5872 (98)
Space heating per m2												(98) / (4) = 26.6020 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Not applicable

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
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 %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1974.1296 (211)
Space heating requirement	413.0602	288.0363	202.0325	82.2214	23.9223	0.0000	0.0000	0.0000	0.0000	92.6401	257.7779	426.8964	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	456.4201	318.2722	223.2404	90.8524	26.4335	0.0000	0.0000	0.0000	0.0000	102.3648	284.8375	471.7087	(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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(64)
Efficiency of water heater (217)m	89.6052	89.4501	89.1569	88.5468	87.8153	87.3000	87.3000	87.3000	87.3000	88.6099	89.3526	89.6446	(217)
Fuel for water heating, kWh/month	172.6219	151.6787	158.1024	140.3144	136.9006	120.5283	113.3686	127.7012	128.5182	145.5241	155.5747	167.6020	(219)
Water heating fuel used													1718.4350 (219)
Annual totals kWh/year													
Space heating fuel - main system													1974.1296 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													48.7873 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													123.7873 (231)
Electricity for lighting (calculated in Appendix L)													300.0549 (232)
Total delivered energy for all uses													4116.4068 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1974.1296	3.4800	68.6997 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1718.4350	3.4800	59.8015 (247)
Mechanical ventilation fans	48.7873	13.1900	6.4350 (249)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	300.0549	13.1900	39.5772 (250)
Additional standing charges			120.0000 (251)
Total energy cost			304.4060 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1399 (257)
SAP value		84.0985
SAP rating (Section 12)		84 (258)
SAP band		B

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	1974.1296	0.2160	426.4120 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1718.4350	0.2160	371.1820 (264)
Space and water heating			797.5940 (265)
Pumps and fans	123.7873	0.5190	64.2456 (267)
Energy for lighting	300.0549	0.5190	155.7285 (268)
Total kg/year			1017.5680 (272)
CO2 emissions per m2			15.1500 (273)
EI value			87.8429
EI rating			88 (274)
EI band			B

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8845 = 3.934$, stars = 4
Water heating environmental impact	$0.216 / 0.8845 = 0.2442$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	67.1600 (1b)	x 2.4600 (2b)	= 165.2136 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 165.2136 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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				0 * 10 =	0.0000 (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) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50					5.0100
Infiltration rate					0.2505 (18)
Number of sides sheltered					0 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000 (22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750 (22a)
Adj infilt rate	0.3194	0.2943	0.2881	0.2693	0.2693	0.2505	0.2505	0.2442	0.2505	0.2818	0.2756	0.2943 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5694	0.5443	0.5381	0.5193	0.5193	0.5005	0.5005	0.5000	0.5005	0.5318	0.5256	0.5443 (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
Windows (Uw = 1.40)			15.9600	1.3258	21.1591		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	64.7110	15.9640	48.7470	0.2600	12.6742	58.7400	2863.3988 (29a)
Wl - To Corridor	27.3800	2.1170	25.2630	0.2499	6.3135	106.6200	2693.5411 (29a)
Total net area of external elements Aum(A, m ²)			92.0900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	42.6908			(33)
Party Floor			67.1550			40.0000	2686.2000 (32d)
Party Ceiling			67.1550			70.0000	4700.8500 (32b)
1st Floor Stud			129.5141			5.8200	753.7719 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 13697.7618 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							203.9571 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0858 (36)
Total fabric heat loss							(33) + (36) = 49.7766 (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	31.0433	29.6775	29.3361	28.3118	28.3118	27.2875	27.2875	27.2602	27.2875	28.9947	28.6532	29.6775 (38)
Average = Sum(39)m / 12 =	80.8199	79.4541	79.1127	78.0884	78.0884	77.0641	77.0641	77.0368	77.0641	78.7713	78.4298	79.4541 (39)
HLP	1.2034	1.1831	1.1780	1.1627	1.1627	1.1475	1.1475	1.1471	1.1475	1.1729	1.1678	1.1831 (40)
HLP (average)												1.1669 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1753 (42)
Average daily hot water use (litres/day)												85.8622 (43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Energy content (annual)												Total = Sum(45)m = 1350.9473 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Water storage loss:	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013 (61)
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522 (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	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268 (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)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101 (71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272 (72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b g	Specific data or Table 6c FF	Access factor Table 6d	Gains W						
Northeast	5.6100	15.0428	0.5000	0.0000	0.7700	32.4903 (75)						
Southeast	5.5040	46.3896	0.5000	0.0000	0.7700	98.3014 (77)						
Southwest	4.8500	46.3896	0.5000	0.0000	0.7700	86.6210 (79)						
Solar gains	217.4126	325.9366	469.0092	635.8236	718.8446	790.5682	736.5545	659.7623	553.8537	388.2250	260.0081	176.4402 (83)
Total gains	708.5747	813.3088	937.7664	1075.6779	1129.1995	1174.3009	1104.5588	1035.1516	945.7142	809.1845	713.3826	654.2528 (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	47.0792	47.8884	48.0951	48.7260	48.7260	49.3736	49.3736	49.3911	49.3736	48.3036	48.5139	47.8884
alpha	4.1386	4.1926	4.2063	4.2484	4.2484	4.2916	4.2916	4.2927	4.2916	4.2202	4.2343	4.1926
util living area	0.9575	0.9299	0.8615	0.7262	0.5552	0.3643	0.2576	0.2746	0.4771	0.7614	0.9145	0.9657 (86)
MIT	20.0576	20.2535	20.5511	20.8219	20.9526	20.9939	20.9990	20.9987	20.9816	20.8232	20.4524	20.0253 (87)
Th 2	19.9173	19.9336	19.9377	19.9499	19.9499	19.9623	19.9623	19.9626	19.9623	19.9417	19.9458	19.9336 (88)
util rest of house	0.9469	0.9140	0.8329	0.6800	0.4938	0.2982	0.1856	0.1980	0.3994	0.7049	0.8916	0.9568 (89)
MIT 2	19.1044	19.3037	19.5818	19.8246	19.9232	19.9600	19.9621	19.9623	19.9545	19.8262	19.5064	19.0872 (90)
Living area fraction	19.3712	19.5696	19.8531	20.1038	20.2114	20.2494	20.2523	20.2524	20.2420	20.1053	19.7713	19.3498 (91)
Temperature adjustment	19.2212	19.4196	19.7031	19.9538	20.0614	20.0994	20.1023	20.1024	20.0920	19.9553	19.6213	-0.1500 (92)
adjusted MIT	19.2212	19.4196	19.7031	19.9538	20.0614	20.0994	20.1023	20.1024	20.0920	19.9553	19.6213	19.1998 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	664.9846	735.9163	774.3864	731.6259	565.1421	360.5432	215.8001	215.6856	387.0971	571.0175	630.1035	621.0029 (95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000 (96)
Heat loss rate W	1117.0274	1090.0754	981.2420	808.5110	582.6449	362.1543	215.9578	215.8900	392.4139	642.4010	880.0810	1088.5021 (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	336.3199	237.9949	153.9006	55.3572	13.0221	0.0000	0.0000	0.0000	0.0000	53.1093	179.9838	347.8194 (98)
Space heating												1377.5072 (98)
Space heating per m2												(98) / (4) = 20.5108 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Not applicable

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
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 %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1522.1074 (211)
Space heating requirement	336.3199	237.9949	153.9006	55.3572	13.0221	0.0000	0.0000	0.0000	0.0000	53.1093	179.9838	347.8194	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	371.6242	262.9778	170.0559	61.1682	14.3891	0.0000	0.0000	0.0000	0.0000	58.6843	198.8771	384.3308	(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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(64)
Efficiency of water heater (217)m	89.4669	89.3113	88.9415	88.2619	87.6027	87.3000	87.3000	87.3000	87.3000	88.2099	89.0771	89.5103	(216)
Fuel for water heating, kWh/month	172.8887	151.9143	158.4854	140.7674	137.2328	120.5283	113.3686	127.7012	128.5182	146.1841	156.0557	167.8535	(219)
Water heating fuel used													1721.4982 (219)
Annual totals kWh/year													
Space heating fuel - main system													1522.1074 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													48.7873 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													123.7873 (231)
Electricity for lighting (calculated in Appendix L)													300.0549 (232)
Total delivered energy for all uses													3667.4477 (238)

10a. Fuel costs - using BEDF prices (472)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1522.1074	3.8700	58.9056 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1721.4982	3.8700	66.6220 (247)
Mechanical ventilation fans	48.7873	18.9000	9.2208 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	300.0549	18.9000	56.7104 (250)
Additional standing charges			93.0000 (251)
Total energy cost			298.6337 (255)

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	1522.1074	0.2160	328.7752 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1721.4982	0.2160	371.8436 (264)
Space and water heating			700.6188 (265)
Pumps and fans	123.7873	0.5190	64.2456 (267)
Energy for lighting	300.0549	0.5190	155.7285 (268)
Total kg/year			920.5929 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1522.1074	1.2200	1856.9710 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1721.4982	1.2200	2100.2277 (264)
Space and water heating			3957.1988 (265)
Pumps and fans	123.7873	3.0700	380.0269 (267)
Energy for lighting	300.0549	3.0700	921.1686 (268)
Primary energy kWh/year			5258.3942 (272)
Primary energy kWh/m2/year			78.2965 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 84
Current environmental impact rating: B 88

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

(For testing purposes):

A		Not considered
B		Not considered
C		Not considered
D		Not considered
E	Low energy lighting	Already installed
F		Not considered
G		Not considered
H		Not considered
I		Not considered
J		Not considered
K		Not considered
M		Not considered
N	Solar water heating	Not applicable
O		Not considered
P		Not considered
R		Not considered
S		Not considered
T		Not considered
U	Solar photovoltaic panels	Not applicable
A2		Not considered
A3		Not considered
T2		Not considered
W		Not considered
X		Not considered
Y		Not considered
J2		Not considered
Q2		Not considered
Z1		Not considered
Z2		Not considered
Z3		Not considered
Z4		Not considered
Z5		Not considered
V2	Wind turbine	Not applicable
L2		Not considered
Q3		Not considered
O3		Not considered

Recommended measures: (none)	SAP change	Cost change	CO2 change
---------------------------------	------------	-------------	------------

Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0	0.00 kg/m ²	

Potential energy efficiency rating: B 84
 Potential environmental impact rating: B 88

Fuel prices for cost data on this page from database revision number 472 TEST (30 Jan 2021)
 Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£80	£80	£0
Mains gas	£219	£219	£0
Space heating	£175	£175	£0
Water heating	£67	£67	£0
Lighting	£57	£57	£0
Total cost of fuels	£299	£299	£0
Total cost of uses	£299	£299	£0
Delivered energy	55 kWh/m ²	55 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.9 tonnes	0.9 tonnes	0.0 tonnes
CO2 emissions per m ²	14 kg/m ²	14 kg/m ²	0 kg/m ²
Primary energy	78 kWh/m ²	78 kWh/m ²	0 kWh/m ²

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Property Reference	518 - PRJ009194 - MF	Issued on Date	26/02/2021
Assessment Reference	518 D	Prop Type Ref	Block B - MF
Property	518 - PRJ009194 - MF		

SAP Rating	84 B	DER	16.79	TER	17.84
Environmental	88 B	% DER<TER	5.90		
CO₂ Emissions (t/year)	0.92	DFEE	41.93	TFEE	46.07
General Requirements Compliance	Pass	% DFEE<TFEE	8.99		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
-------------------------	--	--------------------	-----------

Client	
---------------	--

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	17.84	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.79	kgCO ₂ /m ²	Pass
	-1.05 (-5.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	46.07	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	41.93	kWh/m ² /yr	
	-4.2 (-9.1%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Openings	1.38 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (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 Ideal LOGIC COMBI ESP1 30 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

5 Cylinder insulation

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

5.61 m², No overhang

Windows facing South East

5.50 m², No overhang

Windows facing South West

4.85 m², No overhang

Air change rate

4.55 ach

Blinds/curtains

Dark-coloured curtain or roller blind, closed 100% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

Maximum

10.0

Pass

10 Key features

None

N/A

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