

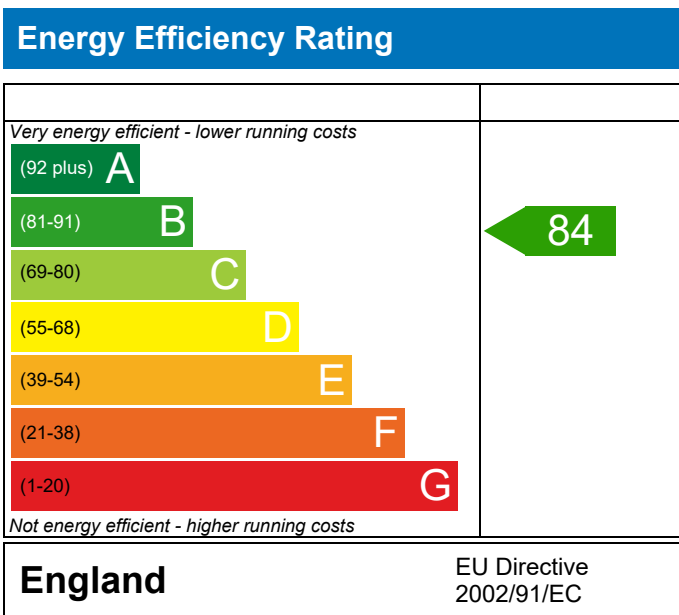
PREDICTED ENERGY ASSESSMENT

123 - PRJ009250 - MF

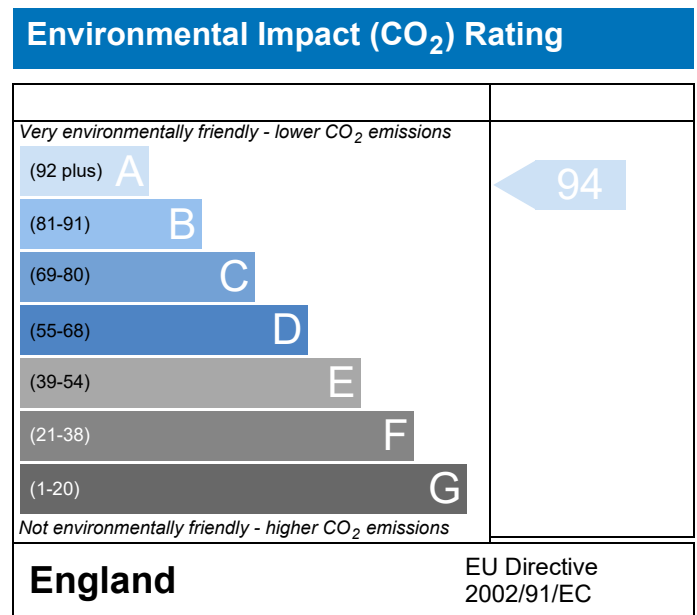
Dwelling type: Flat, Mid-Terrace
 Date of assessment: 13/10/2021
 Produced by: Michael Juckes
 Total floor area: 50.58 m²

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.

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Property Reference	123 - PRJ009250 - MF	Issued on Date	13/10/2021
Assessment Reference	123 M	Prop Type Ref	Block 1B - MF
Property	123 - PRJ009250 - MF		

SAP Rating	84 B	DER	9.99	TER	18.81
Environmental	94 A	% DER<TER	46.90		
CO ₂ Emissions (t/year)	0.32	DFEE	37.38	TTEE	42.52
General Requirements Compliance	Pass	% DFEE<TTEE	12.09		

Assessor Details	Chris Nicholls, , Tel: ,	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	50.5800 (1b)	x 2.5800 (2b)	= 130.4964 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.5800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 130.4964 (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	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2129 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.8000	4.5000	4.4000	3.9000	3.9000	3.6000	3.7000	3.5000	3.7000	4.0000	4.1000	4.4000 (22)
Wind factor	1.2000	1.1250	1.1000	0.9750	0.9750	0.9000	0.9250	0.8750	0.9250	1.0000	1.0250	1.1000 (22a)
Adj infilt rate	0.2555	0.2395	0.2342	0.2076	0.2076	0.1916	0.1970	0.1863	0.1970	0.2129	0.2182	0.2342 (22b)
Mechanical extract ventilation - centralised												
If mechanical ventilation:												0.5000 (23a)
Effective ac	0.5055	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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)			7.8600	1.3258	10.4205		(27)
Solid Door			2.3200	1.4000	3.2480		(26)
W1 - Brick	25.2060	7.8550	17.3510	0.1800	3.1232	14.0000	242.9140 (29a)
W1 - To Corridor	20.4050	2.3230	18.0820	0.1300	2.3507	14.0000	253.1480 (29a)
Total net area of external elements Aum(A, m ²)			45.6130				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	19.1423		(33)
Party Wall			35.7910	0.0000	0.0000	54.0300	1933.7877 (32)
Party Floor			50.5790			40.0000	2023.1600 (32d)
Party Ceiling			50.5790			70.0000	3540.5300 (32b)
1st Floor Stud			85.2377			5.8200	496.0831 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	8489.6229 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		167.8454 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)		5.4299 (36)
Total fabric heat loss	(33) + (36) =	24.5722 (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
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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

(38)m	21.7692	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	(38)
Heat transfer coeff	46.3414	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	(39)
Average = Sum(39)m / 12 =														(39)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
HLP	0.9162	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	(40)
HLP (average)														(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy														1.7072 (42)
Average daily hot water use (litres/day)														74.7457 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	82.2203	79.2304	76.2406	73.2508	70.2610	67.2711	67.2711	70.2610	73.2508	76.2406	79.2304	82.2203	82.2203	(44)
Energy conte	121.9303	106.6410	110.0440	95.9390	92.0558	79.4371	73.6102	84.4687	85.4776	99.6159	108.7385	118.0830	118.0830	(45)
Energy content (annual)														(45)
Distribution loss (46)m = 0.15 x (45)m	18.2895	15.9962	16.5066	14.3909	13.8084	11.9156	11.0415	12.6703	12.8216	14.9424	16.3108	17.7124	17.7124	(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	0.0000	(56)
If cylinder contains dedicated solar storage														
Combi loss	14.5177	13.0946	14.4686	13.9691	14.4109	13.9186	14.3655	14.3950	13.9461	14.4448	14.0168	14.5082	14.5082	(61)
Total heat required for water heating calculated for each month	136.4480	119.7356	124.5126	109.9081	106.4667	93.3557	87.9756	98.8637	99.4237	114.0606	122.7553	132.5912	132.5912	(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	0.0000	(63)
Output from w/h	136.4480	119.7356	124.5126	109.9081	106.4667	93.3557	87.9756	98.8637	99.4237	114.0606	122.7553	132.5912	132.5912	(64)
RHI water heating demand														(64)
Heat gains from water heating, kWh/month	44.1712	38.7318	40.2068	35.3920	34.2113	29.8925	28.0667	31.6846	31.9078	36.7335	39.6597	42.8896	42.8896	(65)

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

Metabolic gains (Table 5), Watts														
(66)m	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	34.7930	30.9028	25.1319	19.0264	14.2225	12.0072	12.9742	16.8644	22.6354	28.7408	33.5447	35.7600	35.7600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.0004	224.3040	218.4988	206.1403	190.5399	175.8777	166.0825	163.7788	169.5840	181.9425	197.5429	212.2051	212.2051	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	(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	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	(71)
Water heating gains (Table 5)	59.3699	57.6366	54.0414	49.1556	45.9829	41.5174	37.7241	42.5868	44.3164	49.3729	55.0830	57.6474	57.6474	(72)
Total internal gains	400.2574	396.9375	381.7661	358.4164	334.8394	313.4964	300.8749	307.3241	320.6298	344.1503	370.2647	389.7065	389.7065	(73)

6. Solar gains

[Jan]		Area	Solar flux	g	FF	Access	Gains							
		m2	Table 6a	Specific data	Specific data	factor	W							
			W/m2	or Table 6b	or Table 6c	Table 6d								
Northwest		7.8550	13.7622	0.7600	0.7000	0.7700	39.8546 (81)							
Solar gains	39.8546	72.6056	130.8646	225.8925	290.3466	329.7958	305.3821	247.0527	170.6622	95.1022	50.7459	31.4047	31.4047	(83)
Total gains	440.1120	469.5431	512.6307	584.3089	625.1859	643.2921	606.2569	554.3767	491.2920	439.2525	421.0106	421.1112	421.1112	(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)														
tau	50.8882	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	
alpha	4.3925	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	
util living area	0.9563	0.9412	0.8934	0.7735	0.5886	0.3970	0.2731	0.2902	0.5426	0.8052	0.9247	0.9603	0.9603	(86)
MIT	20.1467	20.2611	20.5127	20.7915	20.9486	20.9926	20.9989	20.9987	20.9732	20.7999	20.4526	20.1365	20.1365	(87)
Th 2	20.1538	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	(88)
util rest of house														
MIT 2	0.9479	0.9303	0.8742	0.7385	0.5378	0.3390	0.2095	0.2208	0.4736	0.7636	0.9084	0.9525	0.9525	(89)
Living area fraction	19.3950	19.5086	19.7477	19.9982	20.1251	20.1544	20.1575	20.1574	20.1441	20.0125	19.6955	19.3889	19.3889	(90)
MIT	19.7508	19.8647	20.1097	20.3737	20.5149	20.5511	20.5557	20.5556	20.5365	20.3852	20.0538	19.7427	19.7427	(92)
Temperature adjustment												-0.1500	-0.1500	

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

adjusted MIT 19.6008 19.7147 19.9597 20.2237 20.3649 20.4011 20.4057 20.4056 20.3865 20.2352 19.9038 19.5927 (93)

 8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9414	0.9236	0.8692	0.7414	0.5506	0.3559	0.2283	0.2413	0.4928	0.7678	0.9028	0.9462 (94)
Useful gains	414.3145	433.6645	445.5560	433.2119	344.2317	228.9624	138.4174	133.7659	242.1253	337.2370	380.0704	398.4643 (95)
Ext temp.	5.0000	5.4000	7.1000	9.5000	12.6000	15.4000	17.4000	17.5000	15.0000	11.7000	8.1000	5.2000 (96)
Heat loss rate W												
676.6208	659.9683	592.8870	494.4072	357.9941	230.5717	138.5768	133.9594	248.3420	393.5057	544.2048	663.5639 (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												
195.1559	152.0761	109.6142	44.0606	10.2392	0.0000	0.0000	0.0000	0.0000	41.8639	118.1767	197.2341 (98)	
Space heating												868.4209 (98)
RHI space heating demand												868 (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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	50.5800 (1b)	2.5800 (2b)	130.4964 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.5800		130.4964 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	130.4964 (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					2	(19)
Shelter factor					(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor					(21) = (18) x (20) =	0.2129 (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	0.2715	0.2662	0.2608	0.2342	0.2289	0.2023	0.2023	0.1970	0.2129	0.2289	0.2395	0.2502 (22b)
Mechanical extract ventilation - centralised	0.5000 (23a)											
If mechanical ventilation:	0.5000 (23a)											
Effective ac	0.5215	0.5162	0.5108	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002 (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 (U _w = 1.40)			7.8600	1.3258	10.4205		(27)
Solid Door			2.3200	1.4000	3.2480		(26)
W1 - Brick	25.2060	7.8550	17.3510	0.1800	3.1232	14.0000	242.9140 (29a)
W1 - To Corridor	20.4050	2.3230	18.0820	0.1300	2.3507	14.0000	253.1480 (29a)
Total net area of external elements A _{um} (m ²)			45.6130				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	19.1423			(33)
Party Wall			35.7910	0.0000	0.0000	54.0300	1933.7877 (32)
Party Floor			50.5790			40.0000	2023.1600 (32d)
Party Ceiling			50.5790			70.0000	3540.5300 (32b)
1st Floor Stud			85.2377			5.8200	496.0831 (32c)
Heat capacity C _m = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		8489.6229 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							167.8454 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.4299 (36)
Total fabric heat loss					(33) + (36) =		24.5722 (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	22.4569	22.2277	21.9984	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5400 (38)
Heat transfer coeff	47.0291	46.7999	46.5706	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1121 (39)
Average = Sum(39)m / 12 =	46.2787 (39)											
HLP	0.9298	0.9253	0.9207	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9117 (40)
HLP (average)	0.9150 (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	1.7072 (42)											
Average daily hot water use (litres/day)	74.7457 (43)											
Daily hot water use	82.2203	79.2304	76.2406	73.2508	70.2610	67.2711	67.2711	70.2610	73.2508	76.2406	79.2304	82.2203 (44)
Energy conte	121.9303	106.6410	110.0440	95.9390	92.0558	79.4371	73.6102	84.4687	85.4776	99.6159	108.7385	118.0830 (45)
Energy content (annual)	Total = Sum(45)m = 1176.0410 (45)											

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CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	18.2895	15.9962	16.5066	14.3909	13.8084	11.9156	11.0415	12.6703	12.8216	14.9424	16.3108	17.7124 (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	14.5177	13.0946	14.4686	13.9691	14.4109	13.9186	14.3655	14.3950	13.9461	14.4448	14.0168	14.5082 (61)
Total heat required for water heating calculated for each month	136.4480	119.7356	124.5126	109.9081	106.4667	93.3557	87.9756	98.8637	99.4237	114.0606	122.7553	132.5912 (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	136.4480	119.7356	124.5126	109.9081	106.4667	93.3557	87.9756	98.8637	99.4237	114.0606	122.7553	132.5912 (64)
Heat gains from water heating, kWh/month	44.1712	38.7318	40.2068	35.3920	34.2113	29.8925	28.0667	31.6846	31.9078	36.7335	39.6597	42.8896 (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	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	34.7930	30.9028	25.1319	19.0264	14.2225	12.0072	12.9742	16.8644	22.6354	28.7408	33.5447	35.7600 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.0004	224.3040	218.4988	206.1403	190.5399	175.8777	166.0825	163.7788	169.5840	181.9425	197.5429	212.2051 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503 (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)	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875 (71)
Water heating gains (Table 5)	59.3699	57.6366	54.0414	49.1556	45.9829	41.5174	37.7241	42.5868	44.3164	49.3729	55.0830	57.6474 (72)
Total internal gains	400.2574	396.9375	381.7661	358.4164	334.8394	313.4964	300.8749	307.3241	320.6298	344.1503	370.2647	389.7065 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains						
	m ²	Table 6a	Specific data	Specific data	factor	W						
		W/m ²	or Table 6b	or Table 6c	Table 6d							
Northwest	7.8550	11.2829	0.7600	0.7000	0.7700	32.6748 (81)						
Solar gains	32.6748	66.5106	119.8309	196.7967	264.5334	282.0206	263.8245	210.3240	146.0158	81.2812	41.1134	26.6839 (83)
Total gains	432.9322	463.4481	501.5970	555.2131	599.3728	595.5170	564.6994	517.6481	466.6456	425.4315	411.3781	416.3904 (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	50.1440	50.3897	50.6377	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1412
alpha	4.3429	4.3593	4.3758	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4094
util living area	0.9648	0.9500	0.9122	0.8171	0.6598	0.4839	0.3567	0.4049	0.6359	0.8604	0.9442	0.9690 (86)
MIT	20.0248	20.1684	20.4213	20.7223	20.9113	20.9817	20.9962	20.9934	20.9430	20.6977	20.3274	20.0108 (87)
Th 2	20.1422	20.1461	20.1499	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1576 (88)
util rest of house	0.9580	0.9407	0.8961	0.7867	0.6127	0.4243	0.2896	0.3329	0.5719	0.8292	0.9323	0.9630 (89)
MIT 2	19.2663	19.4091	19.6549	19.9385	20.0973	20.1482	20.1564	20.1553	20.1246	19.9235	19.5755	19.2654 (90)
Living area fraction									fLA = Living area / (4) =			0.4733 (91)
MIT	19.6253	19.7685	20.0176	20.3095	20.4826	20.5427	20.5539	20.5520	20.5120	20.2899	19.9314	19.6182 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.4753	19.6185	19.8676	20.1595	20.3326	20.3927	20.4039	20.4020	20.3620	20.1399	19.7814	19.4682 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9518	0.9340	0.8901	0.7868	0.6229	0.4412	0.3093	0.3540	0.5880	0.8285	0.9261	0.9572 (94)
Useful gains	412.0586	432.8399	446.4699	436.8166	373.3242	262.7212	174.6769	183.2471	274.3908	352.4536	380.9642	398.5628 (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	713.6803	688.8237	622.5396	519.1099	397.9962	267.0664	175.3745	184.5074	288.7026	439.8301	584.6633	704.0493 (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	224.4066	172.0212	130.9959	59.2512	18.3560	0.0000	0.0000	0.0000	0.0000	65.0081	146.6634	227.2820 (98)
Space heating												1043.9843 (98)
Space heating per m ²										(98) / (4) =		20.6403 (99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1153.5738 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	224.4066	172.0212	130.9959	59.2512	18.3560	0.0000	0.0000	0.0000	0.0000	65.0081	146.6634	227.2820	(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)	247.9630	190.0786	144.7468	65.4710	20.2829	0.0000	0.0000	0.0000	0.0000	71.8322	162.0590	251.1403	(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	136.4480	119.7356	124.5126	109.9081	106.4667	93.3557	87.9756	98.8637	99.4237	114.0606	122.7553	132.5912	(64)
Efficiency of water heater (217)m	89.2628	89.1588	88.9118	88.3948	87.7563	87.3000	87.3000	87.3000	87.3000	88.4352	89.0134	87.3000	(216)
Fuel for water heating, kWh/month	152.8609	134.2948	140.0405	124.3378	121.3208	106.9367	100.7739	113.2459	113.8874	128.9765	137.9066	148.4882	(219)
Water heating fuel used													1523.0701 (219)
Annual totals kWh/year													
Space heating fuel - main system													1153.5738 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
(MEVCentralised, Database: in-use factor = 1.3000, SFP = 0.3380)													
mechanical ventilation fans (SFP = 0.3380)													53.8115 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													128.8115 (231)
Electricity for lighting (calculated in Appendix L)													245.7821 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 0.92 * 951 * 1.00) =													-699.6534 (233)
Total delivered energy for all uses													2351.5840 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1153.5738	3.4800	40.1444 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1523.0701	3.4800	53.0028 (247)
Mechanical ventilation fans	53.8115	13.1900	7.0977 (249)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	245.7821	13.1900	32.4187 (250)
Additional standing charges			120.0000 (251)
Energy saving/generation technologies			
PV Unit	0.0000	0.0000	0.0000 (252)
Total energy cost			262.5561 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1537 (257)
SAP value		83.9055
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	1153.5738	0.2160	249.1719 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1523.0701	0.2160	328.9831 (264)
Space and water heating			578.1551 (265)
Pumps and fans	128.8115	0.5190	66.8532 (267)
Energy for lighting	245.7821	0.5190	127.5609 (268)
Energy saving/generation technologies			
PV Unit	-699.6534	0.5190	-363.1201 (269)
Total kg/year			409.4490 (272)
CO2 emissions per m2			8.1000 (273)
EI value			94.2597
EI rating			94 (274)
EI band			A

Calculation of stars for heating and DHW

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

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 $3.48 / 0.8829 = 3.942$, stars = 4
Water heating environmental impact $0.216 / 0.8829 = 0.2447$, stars = 4

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 (m2)	Storey height (m)	Volume (m3)
Ground floor	50.5800 (1b)	x 2.5800 (2b)	= 130.4964 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.5800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 130.4964 (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				2	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.8500 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2129 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.8000	4.5000	4.4000	3.9000	3.9000	3.6000	3.7000	3.5000	3.7000	4.0000	4.1000	4.4000 (22)
Wind factor	1.2000	1.1250	1.1000	0.9750	0.9750	0.9000	0.9250	0.8750	0.9250	1.0000	1.0250	1.1000 (22a)
Adj infilt rate				0.2076	0.2076	0.1916	0.1970	0.1863	0.1970	0.2129	0.2182	0.2342 (22b)
Mechanical extract ventilation - centralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5055	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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)			7.8600	1.3258	10.4205		(27)
Solid Door			2.3200	1.4000	3.2480		(26)
Wl - Brick	25.2060	7.8550	17.3510	0.1800	3.1232	14.0000	242.9140 (29a)
Wl - To Corridor	20.4050	2.3230	18.0820	0.1300	2.3507	14.0000	253.1480 (29a)
Total net area of external elements Aum(A, m2)			45.6130				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	19.1423		(33)
Party Wall			35.7910	0.0000	0.0000	54.0300	1933.7877 (32)
Party Floor			50.5790			40.0000	2023.1600 (32d)
Party Ceiling			50.5790			70.0000	3540.5300 (32b)
1st Floor Stud			85.2377			5.8200	496.0831 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	8489.6229 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							167.8454 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.4299 (36)
Total fabric heat loss						(33) + (36) =	24.5722 (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	21.7692	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319	21.5319 (38)
Heat transfer coeff	46.3414	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041	46.1041 (39)
Average = Sum(39)m / 12 =												46.1239 (39)
HLP	0.9162	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115	0.9115 (40)
HLP (average)												0.9119 (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												1.7072 (42)
Average daily hot water use (litres/day)												74.7457 (43)
Daily hot water use	82.2203	79.2304	76.2406	73.2508	70.2610	67.2711	67.2711	70.2610	73.2508	76.2406	79.2304	82.2203 (44)
Energy conte	121.9303	106.6410	110.0440	95.9390	92.0558	79.4371	73.6102	84.4687	85.4776	99.6159	108.7385	118.0830 (45)
Energy content (annual)												Total = Sum(45)m = 1176.0410 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

Distribution loss (46)m = 0.15 x (45)m	18.2895	15.9962	16.5066	14.3909	13.8084	11.9156	11.0415	12.6703	12.8216	14.9424	16.3108	17.7124 (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	14.5177	13.0946	14.4686	13.9691	14.4109	13.9186	14.3655	14.3950	13.9461	14.4448	14.0168	14.5082 (61)
Total heat required for water heating calculated for each month	136.4480	119.7356	124.5126	109.9081	106.4667	93.3557	87.9756	98.8637	99.4237	114.0606	122.7553	132.5912 (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	136.4480	119.7356	124.5126	109.9081	106.4667	93.3557	87.9756	98.8637	99.4237	114.0606	122.7553	132.5912 (64)
Heat gains from water heating, kWh/month	44.1712	38.7318	40.2068	35.3920	34.2113	29.8925	28.0667	31.6846	31.9078	36.7335	39.6597	42.8896 (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	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313	102.4313 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	34.7930	30.9028	25.1319	19.0264	14.2225	12.0072	12.9742	16.8644	22.6354	28.7408	33.5447	35.7600 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.0004	224.3040	218.4988	206.1403	190.5399	175.8777	166.0825	163.7788	169.5840	181.9425	197.5429	212.2051 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503	46.9503 (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)	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875	-68.2875 (71)
Water heating gains (Table 5)	59.3699	57.6366	54.0414	49.1556	45.9829	41.5174	37.7241	42.5868	44.3164	49.3729	55.0830	57.6474 (72)
Total internal gains	400.2574	396.9375	381.7661	358.4164	334.8394	313.4964	300.8749	307.3241	320.6298	344.1503	370.2647	389.7065 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m2	Table 6a	Specific data	Specific data	factor	W
		W/m2	or Table 6b	or Table 6c	Table 6d	
Northwest	7.8550	13.7622	0.7600	0.7000	0.7700	39.8546 (81)
Solar gains	39.8546	72.6056	130.8646	225.8925	290.3466	329.7958
Total gains	440.1120	469.5431	512.6307	584.3089	625.1859	643.2921

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	50.8882	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501	51.1501
alpha	4.3925	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100	4.4100
util living area	0.9563	0.9412	0.8934	0.7735	0.5886	0.3970	0.2731	0.2902	0.5426	0.8052	0.9247	0.9603 (86)
MIT	20.1467	20.2611	20.5127	20.7915	20.9486	20.9926	20.9989	20.9987	20.9732	20.7999	20.4526	20.1365 (87)
Th 2	20.1538	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577	20.1577 (88)
util rest of house	0.9479	0.9303	0.8742	0.7385	0.5378	0.3390	0.2095	0.2208	0.4736	0.7636	0.9084	0.9525 (89)
MIT 2	19.3950	19.5086	19.7477	19.9982	20.1251	20.1544	20.1575	20.1574	20.1441	20.0125	19.6955	19.3889 (90)
Living area fraction	fLA = Living area / (4) = 0.4733 (91)											
MIT	19.7508	19.8647	20.1097	20.3737	20.5149	20.5511	20.5557	20.5556	20.5365	20.3852	20.0538	19.7427 (92)
Temperature adjustment	-0.1500											
adjusted MIT	19.6008	19.7147	19.9597	20.2237	20.3649	20.4011	20.4057	20.4056	20.3865	20.2352	19.9038	19.5927 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9414	0.9236	0.8692	0.7414	0.5506	0.3559	0.2283	0.2413	0.4928	0.7678	0.9028	0.9462 (94)
Useful gains	414.3145	433.6645	445.5560	433.2119	344.2317	228.9624	138.4174	133.7659	242.1253	337.2370	380.0704	398.4643 (95)
Ext temp.	5.0000	5.4000	7.1000	9.5000	12.6000	15.4000	17.4000	17.5000	15.0000	11.7000	8.1000	5.2000 (96)
Heat loss rate W	676.6208	659.9683	592.8870	494.4072	357.9941	230.5717	138.5768	133.9594	248.3420	393.5057	544.2048	663.5639 (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	195.1559	152.0761	109.6142	44.0606	10.2392	0.0000	0.0000	0.0000	0.0000	41.8639	118.1767	197.2341 (98)
Space heating	868.4209 (98)											
Space heating per m2	(98) / (4) = 17.1693 (99)											

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

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													959.5811 (211)
Space heating requirement	195.1559	152.0761	109.6142	44.0606	10.2392	0.0000	0.0000	0.0000	0.0000	41.8639	118.1767	197.2341	(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)	215.6419	168.0399	121.1207	48.6858	11.3140	0.0000	0.0000	0.0000	0.0000	46.2585	130.5820	217.9382	(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	136.4480	119.7356	124.5126	109.9081	106.4667	93.3557	87.9756	98.8637	99.4237	114.0606	122.7553	132.5912	(64)
Efficiency of water heater (217)m	89.1553	89.0619	88.7695	88.1924	87.5717	87.3000	87.3000	87.3000	87.3000	88.1367	88.8408	87.3000	(216)
Fuel for water heating, kWh/month	153.0453	134.4408	140.2650	124.6232	121.5767	106.9367	100.7739	113.2459	113.8874	129.4133	138.1744	148.6685	(219)
Water heating fuel used													1525.0510 (219)
Annual totals kWh/year													
Space heating fuel - main system													959.5811 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
(MEV Centralised, Database: in-use factor = 1.3000, SFP = 0.3380)													
mechanical ventilation fans (SFP = 0.3380)													53.8115 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													128.8115 (231)
Electricity for lighting (calculated in Appendix L)													245.7821 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 0.92 * 1082 * 1.00) =													-796.0458 (233)
Total delivered energy for all uses													2063.1798 (238)

10a. Fuel costs - using BEDF prices (483)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	959.5811	3.7400	35.8883	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1525.0510	3.7400	57.0369	(247)
Mechanical ventilation fans	53.8115	19.1200	10.2888	(249)
Pumps and fans for heating	75.0000	19.1200	14.3400	(249)
Energy for lighting	245.7821	19.1200	46.9935	(250)
Additional standing charges			94.0000	(251)
Energy saving/generation technologies				
PV Unit	0.0000	0.0000	0.0000	(252)
Total energy cost			258.5475	(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	959.5811	0.2160	207.2695	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1525.0510	0.2160	329.4110	(264)
Space and water heating			536.6805	(265)
Pumps and fans	128.8115	0.5190	66.8532	(267)
Energy for lighting	245.7821	0.5190	127.5609	(268)
Energy saving/generation technologies				
PV Unit	-796.0458	0.5190	-413.1478	(269)
Total kg/year			317.9468	(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	959.5811	1.2200	1170.6889	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1525.0510	1.2200	1860.5622	(264)
Space and water heating			3031.2511	(265)
Pumps and fans	128.8115	3.0700	395.4513	(267)
Energy for lighting	245.7821	3.0700	754.5509	(268)
Energy saving/generation technologies				
PV Unit	-796.0458	3.0700	-2443.8607	(269)
Primary energy kWh/year			1737.3926	(272)
Primary energy kWh/m2/year			34.3494	(273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 84
Current environmental impact rating: A 94

(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: SAP change Cost change CO2 change
(none)

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

Potential energy efficiency rating: B 84
Potential environmental impact rating: A 94

Fuel prices for cost data on this page from database revision number 483 TEST (30 Sep 2021)
Recommendation texts revision number 4.9c (22 Feb 2014)

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

	Current	Potential	£0	Saving
Electricity	£72	£72	£0	
Mains gas	£187	£187	£0	
Space heating	£155	£155	£0	
Water heating	£57	£57	£0	
Lighting	£47	£47	£0	
Total cost of fuels	£259	£259	£0	
Total cost of uses	£259	£259	£0	
Delivered energy	41 kWh/m ²	41 kWh/m ²	0 kWh/m ²	
Carbon dioxide emissions	0.3 tonnes	0.3 tonnes	0.0 tonnes	
CO2 emissions per m ²	6 kg/m ²	6 kg/m ²	0 kg/m ²	
Primary energy	34 kWh/m ²	34 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	123 - PRJ009250 - MF		Issued on Date	13/10/2021
Assessment Reference	123 M	Prop Type Ref	Block 1B - MF	
Property	123 - PRJ009250 - MF			
SAP Rating	84 B	DER	9.99	TER 18.81
Environmental	94 A	% DER<TER	46.90	
CO₂ Emissions (t/year)	0.32	DFEE	37.38	TFEE 42.52
General Requirements Compliance	Pass	% DFEE<TFEE	12.09	
Assessor Details	Chris Nicholls, , Tel: ,		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)	18.81	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	9.99	kgCO ₂ /m ²	Pass
	-8.82 (-46.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	42.52	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	37.38	kWh/m ² /yr	
	-5.1 (-12.0%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.15 (max. 0.30)	0.18 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (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

Specific fan power

0.26

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (South East England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North West

7.86 m², No overhang

Air change rate

4.21 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

Maximum

10.0

Pass

10 Key features

External wall U-value

0.13

W/m²K

Party wall U-value

0.00

W/m²K

Photovoltaic array

0.92

kW

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