

PREDICTED ENERGY ASSESSMENT

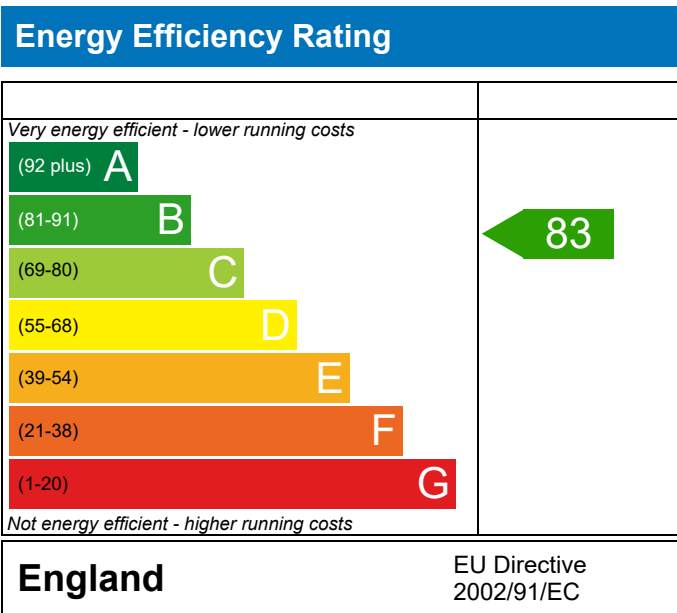


525 - PRJ009194 - TF

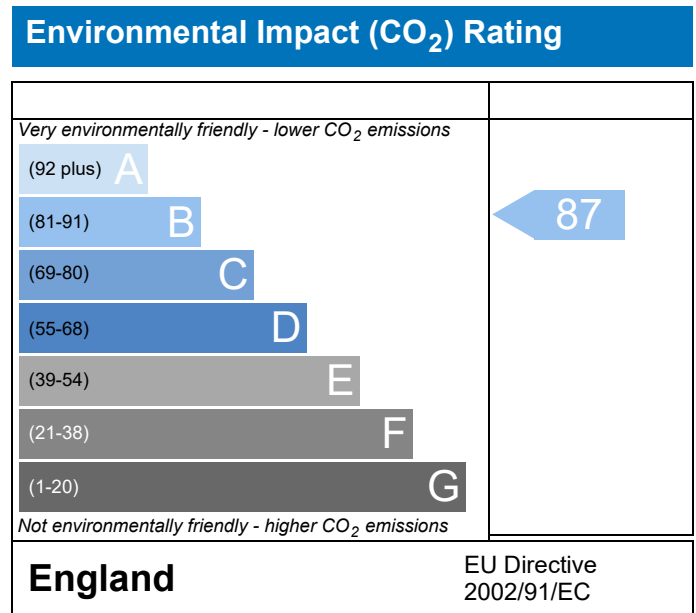
Dwelling type: Flat, End-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 69.37 m²

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	525 - PRJ009194 - TF		Issued on Date	26/02/2021	
Assessment Reference	525 E	Prop Type Ref	Block B - TF		
Property	525 - PRJ009194 - TF				
SAP Rating	83 B	DER	18.27	TER	19.58
Environmental	87 B	% DER<TER	6.68		
CO ₂ Emissions (t/year)	1.05	DFEE	47.22	TFEE	54.24
General Requirements Compliance	Pass	% DFEE<TFEE	12.94		
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)	19.58	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.27	kgCO ₂ /m ²	Pass
	-1.31 (-6.7%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	54.24	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	47.22	kWh/m ² /yr	
	-7.0 (-12.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.37 (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

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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Main heating system

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

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100 %

Minimum

75 %

Pass

8 Mechanical ventilation

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

7.06 m², No overhang

Windows facing North West

4.87 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) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.11

W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	525 - PRJ009194 - TF	Issued on Date	26/02/2021
Assessment Reference	525 E	Prop Type Ref	Block B - TF
Property	525 - PRJ009194 - TF		

SAP Rating	83 B	DER	18.27	TER	19.58
Environmental	87 B	% DER<TER	6.68		
CO ₂ Emissions (t/year)	1.05	DFEE	47.22	TTEE	54.24
General Requirements Compliance	Pass	% DFEE<TTEE	12.94		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
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Client	
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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	69.3700 (1b)	x 2.4700 (2b)	= 171.3439 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 171.3439 (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) =				Air changes per hour	0.0000 / (5) = 0.0000 (8)								
Pressure test				Yes									
Measured/design AP50				5.0100									
Infiltration rate				0.2505	(18)								
Number of sides sheltered				1	(19)								
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)								
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2317 (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 infilt rate	0.2954	0.2723	0.2665	0.2491	0.2491	0.2317	0.2317	0.2259	0.2317	0.2607	0.2549	0.2723	(22b)
Mechanical extract ventilation - decentralised													0.5000 (23a)
If mechanical ventilation:													
Effective ac	0.5454	0.5223	0.5165	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5049	0.5223	(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)			11.9400	1.3258	15.8163		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Brick	44.9920	11.9360	33.0560	0.2600	8.5946	58.7400	1941.7094 (29a)
W1 - To Corridor	27.1700	2.1170	25.0530	0.2499	6.2610	106.6200	2671.1509 (29a)
RF - Ins Joist	69.3710		69.3710	0.1100	7.6308	5.8200	403.7392 (30)
Total net area of external elements Aum(A, m ²)			141.5300				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		40.8467		(33)
Party Wall			13.8690	0.0000	0.0000	54.0300	749.3421 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
1st Floor Stud			135.1041			5.8200	786.3056 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		9327.0872 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							134.4542 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0517 (36)
Total fabric heat loss					(33) + (36) =		47.8983 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

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	30.8407	29.5305	29.2030	28.2717	28.2717	28.2717	28.2717	28.2717	28.2717	28.8754	28.5479	29.5305 (38)
Average = Sum(39)m / 12 =	78.7391	77.4289	77.1013	76.1701	76.1701	76.1701	76.1701	76.1701	76.1701	76.7738	76.4462	77.4289 (39)
												76.7449 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1351	1.1162	1.1115	1.0980	1.0980	1.0980	1.0980	1.0980	1.0980	1.1067	1.1020	1.1162 (40)
Days in month												1.1063 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2307 (42)
Average daily hot water use (litres/day)													87.1799 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)	
Energy content (annual)	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)	
Distribution loss (46)m = 0.15 x (45)m	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (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													
Combi loss	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)	
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)	
RHI water heating demand												1543 (64)	
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)	

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.9163	39.8942	32.4442	24.5623	18.3606	15.5008	16.7492	21.7712	29.2213	37.1031	43.3048	46.1646 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (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)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.8893	499.8771	480.5891	450.7360	420.2938	392.9204	376.8476	384.5103	401.6215	431.6737	465.0764	490.2321 (73)

6. Solar gains

[Jan]		Area	Solar flux	g	FF	Access	Gains					
		m2	Table 6a	Specific data	Specific data	factor data	W					
			W/m2	or Table 6b	or Table 6c	Table 6d						
Northeast		7.0620	15.0428	0.5000	0.0000	0.7700	40.8995 (75)					
Northwest		4.8740	15.0428	0.5000	0.0000	0.7700	28.2277 (81)					
Solar gains	69.1272	121.0743	217.8027	363.0600	463.4423	532.9268	487.3389	398.9308	281.2518	156.8420	86.3794	53.7753 (83)
Total gains	573.0165	620.9514	698.3918	813.7960	883.7361	925.8472	864.1865	783.4411	682.8732	588.5157	551.4558	544.0074 (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	32.9044	33.4611	33.6033	34.0141	34.0141	34.0141	34.0141	34.0141	34.0141	33.7466	33.8912	33.4611	
alpha	3.1936	3.2307	3.2402	3.2676	3.2676	3.2676	3.2676	3.2676	3.2676	3.2498	3.2594	3.2307	
util living area	0.9513	0.9369	0.8928	0.7899	0.6310	0.4402	0.3204	0.3515	0.5966	0.8291	0.9235	0.9560 (86)	
MIT	19.5362	19.7012	20.0664	20.5116	20.8220	20.9589	20.9893	20.9860	20.8925	20.5283	20.0180	19.5350 (87)	
Th 2	19.9723	19.9876	19.9915	20.0024	20.0024	20.0024	20.0024	20.0024	20.0024	19.9953	19.9992	19.9876 (88)	
util rest of house	0.9424	0.9256	0.8738	0.7554	0.5757	0.3686	0.2365	0.2603	0.5180	0.7896	0.9073	0.9479 (89)	
MIT 2	18.6709	18.8427	19.1971	19.6177	19.8831	19.9824	19.9993	19.9983	19.9433	19.6400	19.1635	18.6819 (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) =	0.4159 (91)	
MIT	19.0308	19.1997	19.5586	19.9895	20.2736	20.3885	20.4111	20.4090	20.3381	20.0094	19.5189	19.0367 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.8808	19.0497	19.4086	19.8395	20.1236	20.2385	20.2611	20.2590	20.1881	19.8594	19.3689	18.8867 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9305	0.9130	0.8611	0.7492	0.5828	0.3860	0.2586	0.2842	0.5335	0.7835	0.8950	0.9367 (94)
Useful gains	533.2005	566.9080	601.3557	609.6603	515.0082	357.3943	223.4684	222.6380	364.3146	461.0888	493.5780	509.5489 (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	1061.4634	1033.6542	933.5926	779.9407	573.0735	368.5491	225.5435	225.3905	395.1766	618.7527	838.5290	1036.5183 (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	393.0276	313.6535	247.1843	122.6019	43.2006	0.0000	0.0000	0.0000	0.0000	117.3020	248.3647	392.0652 (98)
RHI space heating demand												1877.3997 (98)
												1877 (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	69.3700 (1b)	x 2.4700 (2b)	= 171.3439 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 171.3439 (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				1	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2317 (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				0.2549	0.2491	0.2201	0.2201	0.2143	0.2317	0.2491	0.2607	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5396	0.5338	0.5049	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5223 (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)			11.9400	1.3258	15.8163		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	44.9920	11.9360	33.0560	0.2600	8.5946	58.7400	1941.7094 (29a)
Wl - To Corridor	27.1700	2.1170	25.0530	0.2499	6.2610	106.6200	2671.1509 (29a)
Rf - Ins Joist	69.3710		69.3710	0.1100	7.6308	5.8200	403.7392 (30)
Total net area of external elements A _{um} (A, m ²)			141.5300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	40.8467		(33)
Party Wall			13.8690	0.0000	0.0000	54.0300	749.3421 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
1st Floor Stud			135.1041			5.8200	786.3056 (32c)
Heat capacity C _m = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9327.0872 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							134.4542 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0517 (36)
Total fabric heat loss						(33) + (36) =	47.8983 (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	30.8407	30.5132	30.1856	28.5479	28.2717	28.2717	28.2717	28.2717	28.2717	28.2717	28.8754	29.5305 (38)
Heat transfer coeff	78.7391	78.4115	78.0840	76.4462	76.1701	76.1701	76.1701	76.1701	76.1701	76.1701	76.7738	77.4289 (39)
Average = Sum(39)m / 12 =												76.9087 (39)
HLP	1.1351	1.1303	1.1256	1.1020	1.0980	1.0980	1.0980	1.0980	1.0980	1.0980	1.1067	1.1162 (40)
HLP (average)												1.1087 (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												2.2307 (42)
Average daily hot water use (litres/day)												87.1799 (43)
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)
Energy conte	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)
Energy content (annual)												Total = Sum(45)m = 1371.6794 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (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	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1542.6949 (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	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.9163	39.8942	32.4442	24.5623	18.3606	15.5008	16.7492	21.7712	29.2213	37.1031	43.3048	46.1646 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (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)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.8893	499.8771	480.5891	450.7360	420.2938	392.9204	376.8476	384.5103	401.6215	431.6737	465.0764	490.2321 (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	7.0620	11.2829	0.5000	0.5000	0.0000	0.7700	30.6769 (75)					
Northwest	4.8740	11.2829	0.5000	0.5000	0.0000	0.7700	21.1723 (81)					
Solar gains	51.8492	105.5405	190.1504	312.2816	419.7677	447.5168	418.6428	333.7469	231.7013	128.9789	65.2397	42.3426 (83)
Total gains	555.7385	605.4176	670.7395	763.0176	840.0615	840.4372	795.4904	718.2572	633.3227	560.6525	530.3161	532.5747 (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)												
tau	32.9044	33.0418	33.1804	33.8912	34.0141	34.0141	34.0141	34.0141	34.0141	34.0141	33.7466	33.4611
alpha	3.1936	3.2028	3.2120	3.2594	3.2676	3.2676	3.2676	3.2676	3.2676	3.2676	3.2498	3.2307
util living area	0.9621	0.9482	0.9148	0.8329	0.6968	0.5345	0.4065	0.4627	0.6900	0.8775	0.9454	0.9662 (86)
MIT	19.3283	19.5232	19.8858	20.3738	20.7335	20.9171	20.9744	20.9609	20.8082	20.3499	19.7778	19.3063 (87)
Th 2	19.9723	19.9761	19.9800	19.9992	20.0024	20.0024	20.0024	20.0024	20.0024	20.0024	19.9953	19.9876 (88)
util rest of house	0.9554	0.9391	0.8996	0.8041	0.6480	0.4642	0.3201	0.3717	0.6224	0.8495	0.9343	0.9603 (89)
MIT 2	18.4660	18.6598	19.0151	19.4910	19.8119	19.9561	19.9927	19.9864	19.8824	19.4829	18.9271	18.4560 (90)
Living area fraction	18.8246	19.0188	19.3772	19.8582	20.1952	20.3558	20.4010	20.3917	20.2674	19.8435	19.2809	18.8097 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.6746	18.8688	19.2272	19.7082	20.0452	20.2058	20.2510	20.2417	20.1174	19.6935	19.1309	18.6597 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	525.0062	561.2125	594.5120	606.3871	546.2645	402.6594	272.1953	283.1953	399.5266	470.5642	489.2164	506.1126 (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	1131.8434	1095.3176	993.7886	826.2429	635.6515	426.9938	278.0950	292.6205	458.3488	692.6506	923.6547	1119.5953 (97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating kWh	451.4869	358.9186	297.0618	158.2962	66.5039	0.0000	0.0000	0.0000	0.0000	165.2322	312.7956	456.4311 (98)
Space heating												2266.7264 (98)
Space heating per m2												(98) / (4) = 32.6759 (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													2504.6700 (211)
Space heating requirement	451.4869	358.9186	297.0618	158.2962	66.5039	0.0000	0.0000	0.0000	0.0000	165.2322	312.7956	456.4311	(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)	498.8805	396.5952	328.2451	174.9129	73.4850	0.0000	0.0000	0.0000	0.0000	182.5771	345.6305	504.3438	(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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396	(64)
Efficiency of water heater (217)m	89.6527	89.5901	89.4352	89.0536	88.4037	87.3000	87.3000	87.3000	87.3000	89.0582	89.4812	89.6774	(217)
Fuel for water heating, kWh/month	174.9415	153.5516	159.7911	141.4248	137.8341	122.1399	114.8619	129.4153	130.2530	146.7739	157.5051	169.8751	(219)
Water heating fuel used													1738.3675 (219)
Annual totals kWh/year													
Space heating fuel - main system													2504.6700 (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)													50.5975 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													125.5975 (231)
Electricity for lighting (calculated in Appendix L)													317.2942 (232)
Total delivered energy for all uses													4685.9292 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2504.6700	3.4800	87.1625 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1738.3675	3.4800	60.4952 (247)
Mechanical ventilation fans	50.5975	13.1900	6.6738 (249)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	317.2942	13.1900	41.8511 (250)
Additional standing charges			120.0000 (251)
Total energy cost			326.0751 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1974 (257)
SAP value		83.2957
SAP rating (Section 12)		83 (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	2504.6700	0.2160	541.0087 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1738.3675	0.2160	375.4874 (264)
Space and water heating			916.4961 (265)
Pumps and fans	125.5975	0.5190	65.1851 (267)
Energy for lighting	317.2942	0.5190	164.6757 (268)
Total kg/year			1146.3569 (272)
CO2 emissions per m2			16.5300 (273)
EI value			86.5689
EI rating			87 (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	$3.48 / 0.8863 = 3.926$, stars = 4
Water heating environmental impact	$0.216 / 0.8863 = 0.2437$, 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 (m2)	Storey height (m)	Volume (m3)
Ground floor	69.3700 (1b)	x 2.4700 (2b)	= 171.3439 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 171.3439 (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				1	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2317 (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	0.2954	0.2723	0.2665	0.2491	0.2491	0.2317	0.2317	0.2259	0.2317	0.2607	0.2549	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5223	0.5165	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5049	0.5223 (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)			11.9400	1.3258	15.8163		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	44.9920	11.9360	33.0560	0.2600	8.5946	58.7400	1941.7094 (29a)
Wl - To Corridor	27.1700	2.1170	25.0530	0.2499	6.2610	106.6200	2671.1509 (29a)
Rf - Ins Joist	69.3710		69.3710	0.1100	7.6308	5.8200	403.7392 (30)
Total net area of external elements Aum(A, m2)			141.5300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	40.8467		(33)
Party Wall			13.8690	0.0000	0.0000	54.0300	749.3421 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
1st Floor Stud			135.1041			5.8200	786.3056 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9327.0872 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							134.4542 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0517 (36)
Total fabric heat loss						(33) + (36) =	47.8983 (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	30.8407	29.5305	29.2030	28.2717	28.2717	28.2717	28.2717	28.2717	28.2717	28.8754	28.5479	29.5305 (38)
Heat transfer coeff	78.7391	77.4289	77.1013	76.1701	76.1701	76.1701	76.1701	76.1701	76.1701	76.7738	76.4462	77.4289 (39)
Average = Sum(39)m / 12 =												76.7449 (39)
HLP	1.1351	1.1162	1.1115	1.0980	1.0980	1.0980	1.0980	1.0980	1.0980	1.1067	1.1020	1.1162 (40)
HLP (average)												1.1063 (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												2.2307 (42)
Average daily hot water use (litres/day)												87.1799 (43)
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)
Energy conte	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)
Energy content (annual)										Total = Sum(45)m =		1371.6794 (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	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (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	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1542.6949 (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	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.9163	39.8942	32.4442	24.5623	18.3606	15.5008	16.7492	21.7712	29.2213	37.1031	43.3048	46.1646 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (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)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.8893	499.8771	480.5891	450.7360	420.2938	392.9204	376.8476	384.5103	401.6215	431.6737	465.0764	490.2321 (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	7.0620	15.0428	0.5000	0.5000	0.0000	0.7700	40.8995 (75)					
Northwest	4.8740	15.0428	0.5000	0.5000	0.0000	0.7700	28.2277 (81)					
Solar gains	69.1272	121.0743	217.8027	363.0600	463.4423	532.9268	487.3389	398.9308	281.2518	156.8420	86.3794	53.7753 (83)
Total gains	573.0165	620.9514	698.3918	813.7960	883.7361	925.8472	864.1865	783.4411	682.8732	588.5157	551.4558	544.0074 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (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)	32.9044	33.4611	33.6033	34.0141	34.0141	34.0141	34.0141	34.0141	34.0141	33.7466	33.8912	33.4611 (85)
tau	3.1936	3.2307	3.2402	3.2676	3.2676	3.2676	3.2676	3.2676	3.2676	3.2498	3.2594	3.2307
alpha	0.9513	0.9369	0.8928	0.7899	0.6310	0.4402	0.3204	0.3515	0.5966	0.8291	0.9235	0.9560 (86)
util living area	19.5362	19.7012	20.0664	20.5116	20.8220	20.9589	20.9893	20.9860	20.8925	20.5283	20.0180	19.5350 (87)
MIT	19.9723	19.9876	19.9915	20.0024	20.0024	20.0024	20.0024	20.0024	20.0024	19.9953	19.9992	19.9876 (88)
Th 2	0.9424	0.9256	0.8738	0.7554	0.5757	0.3686	0.2365	0.2603	0.5180	0.7896	0.9073	0.9479 (89)
util rest of house	18.6709	18.8427	19.1971	19.6177	19.8831	19.9824	19.9993	19.9983	19.9433	19.6400	19.1635	18.6819 (90)
Living area fraction	19.0308	19.1997	19.5586	19.9895	20.2736	20.3885	20.4111	20.4090	20.3381	20.0094	19.5189	19.0367 (92)
MIT 2	18.8808	19.0497	19.4086	19.8395	20.1236	20.2385	20.2611	20.2590	20.1881	19.8594	19.3689	18.8867 (93)
Temperature adjustment adjusted MIT												-0.1500
adjusted MIT												18.8867 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9305	0.9130	0.8611	0.7492	0.5828	0.3860	0.2586	0.2842	0.5335	0.7835	0.8950	0.9367 (94)
Ext temp.	533.2005	566.9080	601.3557	609.6603	515.0082	357.3943	223.4684	222.6380	364.3146	461.0888	493.5780	509.5489 (95)
Heat loss rate W	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)
Month fracti	1061.4634	1033.6542	933.5926	779.9407	573.0735	368.5491	225.5435	225.3905	395.1766	618.7527	838.5290	1036.5183 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating per m2	393.0276	313.6535	247.1843	122.6019	43.2006	0.0000	0.0000	0.0000	0.0000	117.3020	248.3647	392.0652 (98)
Space heating												1877.3997 (98)
Space heating per m2												27.0636 (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													2074.4748 (211)
Space heating requirement	393.0276	313.6535	247.1843	122.6019	43.2006	0.0000	0.0000	0.0000	0.0000	117.3020	248.3647	392.0652	(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)	434.2846	346.5784	273.1318	135.4717	47.7355	0.0000	0.0000	0.0000	0.0000	129.6154	274.4362	433.2212	(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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396	(64)
Efficiency of water heater (217)m	89.5636	89.4998	89.3008	88.8497	88.1155	87.3000	87.3000	87.3000	87.3000	88.7848	89.3148	89.5812	(217)
Fuel for water heating, kWh/month	175.1157	153.7065	160.0315	141.7494	138.2849	122.1399	114.8619	129.4153	130.2530	147.2259	157.7986	170.0577	(219)
Water heating fuel used													1740.6402 (219)
Annual totals kWh/year													
Space heating fuel - main system													2074.4748 (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)													50.5975 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													125.5975 (231)
Electricity for lighting (calculated in Appendix L)													317.2942 (232)
Total delivered energy for all uses													4258.0067 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2074.4748	3.8700	80.2822 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1740.6402	3.8700	67.3628 (247)
Mechanical ventilation fans	50.5975	18.9000	9.5629 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	317.2942	18.9000	59.9686 (250)
Additional standing charges			93.0000 (251)
Total energy cost			324.3515 (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	2074.4748	0.2160	448.0866 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1740.6402	0.2160	375.9783 (264)
Space and water heating			824.0648 (265)
Pumps and fans	125.5975	0.5190	65.1851 (267)
Energy for lighting	317.2942	0.5190	164.6757 (268)
Total kg/year			1053.9256 (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	2074.4748	1.2200	2530.8593 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1740.6402	1.2200	2123.5810 (264)
Space and water heating			4654.4403 (265)
Pumps and fans	125.5975	3.0700	385.5844 (267)
Energy for lighting	317.2942	3.0700	974.0931 (268)
Primary energy kWh/year			6014.1178 (272)
Primary energy kWh/m2/year			86.6962 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 83
Current environmental impact rating: B 87

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

Potential energy efficiency rating: B 83
 Potential environmental impact rating: B 87

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	£84	£84	£0
Mains gas	£241	£241	£0
Space heating	£197	£197	£0
Water heating	£67	£67	£0
Lighting	£60	£60	£0
Total cost of fuels	£325	£325	£0
Total cost of uses	£324	£324	£0
Delivered energy	61 kWh/m ²	61 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m ²	15 kg/m ²	15 kg/m ²	0 kg/m ²
Primary energy	87 kWh/m ²	87 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	525 - PRJ009194 - TF	Issued on Date	26/02/2021
Assessment Reference	525 E	Prop Type Ref	Block B - TF
Property	525 - PRJ009194 - TF		

SAP Rating	83 B	DER	18.27	TER	19.58
Environmental	87 B	% DER<TER	6.68		
CO₂ Emissions (t/year)	1.05	DFEE	47.22	TFEE	54.24
General Requirements Compliance	Pass	% DFEE<TFEE	12.94		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
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Client	
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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)	19.58	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.27	kgCO ₂ /m ²	Pass
	-1.31 (-6.7%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	54.24	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	47.22	kWh/m ² /yr	
	-7.0 (-12.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.37 (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
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BASIC COMPLIANCE REPORT

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

7.06 m², No overhang

Windows facing North West

4.87 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

Party wall U-value

0.00

W/m²K

Roof U-value

0.11

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.