

PREDICTED ENERGY ASSESSMENT

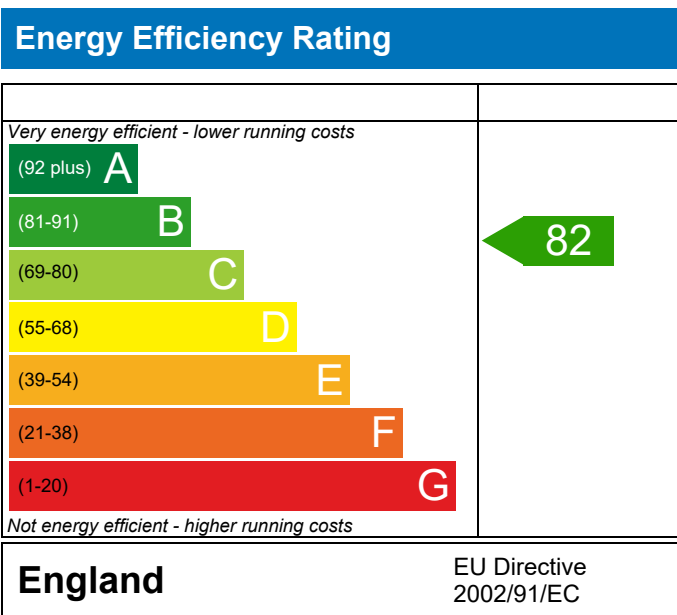


Plot 675

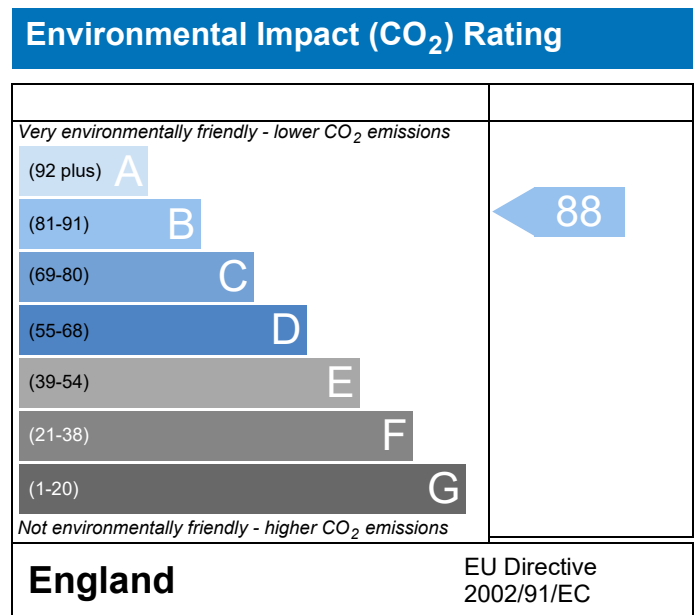
Dwelling type: Flat, End-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 44.01 m²

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	675 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	675	Prop Type Ref	Block B		
Property	Plot 675				
SAP Rating	82 B	DER	20.60	TER	22.33
Environmental	88 B	% DER<TER	7.73		
CO ₂ Emissions (t/year)	0.76	DFEE	50.54	TFEE	57.52
General Requirements Compliance	Pass	% DFEE<TFEE	12.14		
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)	22.33	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.60	kgCO ₂ /m ²	Pass
	-1.73 (-7.7%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	57.52	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	50.54	kWh/m ² /yr	
	-7.0 (-12.2%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (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	1.36 (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

4.71 m², No overhang

Windows facing North West

3.62 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	675 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	675	Prop Type Ref	Block B
Property	Plot 675		

SAP Rating	82 B	DER	20.60	TER	22.33
Environmental	88 B	% DER<TER	7.73		
CO ₂ Emissions (t/year)	0.76	DFEE	50.54	TTEE	57.52
General Requirements Compliance	Pass	% DFEE<TTEE	12.14		

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	44.0100 (1b)	x 2.4700 (2b)	= 108.7047 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	44.0100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 108.7047 (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)			8.3300	1.3258	11.0436		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Clad	35.1010	8.3290	26.7720	0.2500	6.6930	61.0100	1633.3597 (29a)
W1 - To Corridor	13.4100	2.1170	11.2930	0.2499	2.8222	106.6200	1204.0597 (29a)
RF - Ins Joist	44.0060		44.0060	0.1100	4.8407	5.8200	256.1149 (30)
Total net area of external elements Aum(A, m ²)			92.5210				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.9435		(33)
Party Wall			18.3430	0.0000	0.0000	54.0300	991.0723 (32)
Party Floor			44.0060			40.0000	1760.2400 (32d)
1st Floor Stud			88.4359			5.8200	514.6968 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		6359.5434 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							144.5022 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8095 (36)
Total fabric heat loss						(33) + (36) =	33.7529 (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	19.5661	18.7349	18.5271	17.9363	17.9363	17.9363	17.9363	17.9363	17.9363	18.3193	18.1115	18.7349 (38)
Average = Sum(39)m / 12 =	53.3190	52.4878	52.2800	51.6892	51.6892	51.6892	51.6892	51.6892	51.6892	52.0722	51.8644	52.4878 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2115	1.1926	1.1879	1.1745	1.1745	1.1745	1.1745	1.1745	1.1745	1.1832	1.1785	1.1926 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.5165 (42)
Average daily hot water use (litres/day)													70.2174 (43)
Daily hot water use													
Energy conte	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	77.2391	74.4304	71.6217	68.8130	66.0043	63.1956	63.1956	66.0043	68.8130	71.6217	74.4304	77.2391 (44)	
Distribution loss (46)m = 0.15 x (45)m	114.5434	100.1804	103.3772	90.1267	86.4787	74.6246	69.1506	79.3514	80.2991	93.5808	102.1508	110.9291 (45)	
Water storage loss:	Total = Sum(45)m = 1104.7928 (45)												
Total storage loss	17.1815	15.0271	15.5066	13.5190	12.9718	11.1937	10.3726	11.9027	12.0449	14.0371	15.3226	16.6394 (46)	
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 (56)	
Combi 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 (57)	
Total heat required for water heating calculated for each month	14.4823	13.0648	14.4390	13.9444	14.3881	13.8998	14.3480	14.3740	13.9241	14.4180	13.9864	14.4740 (61)	
Solar input	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (62)	
Output from w/h	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)	
RHI water heating demand	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (64)	
Heat gains from water heating, kWh/month	Total per year (kWh/year) = Sum(64)m = 1274.5357 (64)												
	41.7063	36.5762	37.9827	33.4532	32.3512	28.2876	26.5796	29.9778	30.1805	34.7201	37.4617	40.5024 (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	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	29.7653	26.4373	21.5002	16.2771	12.1673	10.2721	11.0994	14.4274	19.3645	24.5876	28.6974	30.5925 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	196.6178	198.6581	193.5166	182.5711	168.7544	155.7686	147.0933	145.0530	150.1945	161.1400	174.9567	187.9425 (68)
Pumps, fans	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609 (71)
Total internal gains	56.0568	54.4288	51.0520	46.4628	43.4828	39.2884	35.7253	40.2928	41.9173	46.6668	52.0302	54.4388 (72)
	361.3859	358.4702	345.0149	324.2571	303.3506	284.2752	272.8640	278.7193	290.4223	311.3405	334.6304	351.9198 (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	4.7080		15.0428		0.5000		0.0000		0.7700		27.2663 (75)	
Northwest	3.6210		15.0428		0.5000		0.0000		0.7700		20.9710 (81)	
Solar gains	48.2373	84.4862	151.9838	253.3451	323.3923	371.8790	340.0675	278.3759	196.2589	109.4452	60.2760	37.5246 (83)
Total gains	409.6233	442.9564	496.9987	577.6021	626.7429	656.1541	612.9316	557.0952	486.6812	420.7857	394.9063	389.4445 (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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
alpha	33.1315	33.6562	33.7900	34.1762	34.1762	34.1762	34.1762	34.1762	34.1762	33.9248	34.0608	33.6562	
util living area	3.2088	3.2437	3.2527	3.2784	3.2784	3.2784	3.2784	3.2784	3.2784	3.2617	3.2707	3.2437	
MIT	0.9449	0.9292	0.8818	0.7739	0.6121	0.4238	0.3073	0.3365	0.5755	0.8124	0.9138	0.9500 (86)	
Th 2	19.5995	19.7609	20.1189	20.5474	20.8392	20.9637	20.9907	20.9879	20.9044	20.5645	20.0701	19.5959 (87)	
util rest of house	19.9108	19.9259	19.9297	19.9405	19.9405	19.9405	19.9405	19.9405	19.9405	19.9335	19.9373	19.9259 (88)	
MIT 2	0.9343	0.9161	0.8600	0.7357	0.5532	0.3497	0.2214	0.2431	0.4926	0.7678	0.8948	0.9403 (89)	
	18.6795	18.8468	19.1917	19.5920	19.8364	19.9238	19.9380	19.9372	19.8907	19.6147	19.1588	18.6882 (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) =	0.4199 (91)		
MIT	19.0658	19.2307	19.5810	19.9932	20.2575	20.3605	20.3801	20.3784	20.3164	20.0135	19.5415	19.0694 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.9158	19.0807	19.4310	19.8432	20.1075	20.2105	20.2301	20.2284	20.1664	19.8635	19.3915	18.9194 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9224	0.9036	0.8483	0.7319	0.5630	0.3690	0.2452	0.2689	0.5112	0.7645	0.8832	0.9288 (94)
Useful gains	377.8175	400.2357	421.6115	422.7463	352.8294	242.1322	150.2836	149.8214	248.7998	321.7032	348.7638	361.7298 (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	720.6488	702.3209	634.2098	529.4636	388.0558	248.6487	151.4522	151.3656	267.0451	419.8863	570.0654	704.3528 (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	255.0665	203.0013	158.1731	76.8365	26.2084	0.0000	0.0000	0.0000	0.0000	73.0482	159.3372	254.9116 (98)
RHI space heating demand												1206.5827 (98)
												1207 (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	44.0100 (1b)	2.4700 (2b)	108.7047 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	44.0100		108.7047 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 108.7047 (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)
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	0.2505 (18)
Number of sides sheltered				1	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	0.2954	0.2896	0.2838	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 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)			8.3300	1.3258	11.0436		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	35.1010	8.3290	26.7720	0.2500	6.6930	61.0100	1633.3597 (29a)
Wl - To Corridor	13.4100	2.1170	11.2930	0.2499	2.8222	106.6200	1204.0597 (29a)
Rf - Ins Joist	44.0060		44.0060	0.1100	4.8407	5.8200	256.1149 (30)
Total net area of external elements Aum(A, m2)			92.5210				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.9435		(33)
Party Wall			18.3430	0.0000	0.0000	54.0300	991.0723 (32)
Party Floor			44.0060			40.0000	1760.2400 (32d)
1st Floor Stud			88.4359			5.8200	514.6968 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6359.5434 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							144.5022 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8095 (36)
Total fabric heat loss							(33) + (36) = 33.7529 (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	19.5661	19.3583	19.1505	18.1115	17.9363	17.9363	17.9363	17.9363	17.9363	17.9363	18.3193	18.7349 (38)
Heat transfer coeff	53.3190	53.1112	52.9034	51.8644	51.6892	51.6892	51.6892	51.6892	51.6892	51.6892	52.0722	52.4878 (39)
Average = Sum(39)m / 12 =												52.1578 (39)
HLP	1.2115	1.2068	1.2021	1.1785	1.1745	1.1745	1.1745	1.1745	1.1745	1.1745	1.1832	1.1926 (40)
HLP (average)												1.1851 (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												1.5165 (42)
Average daily hot water use (litres/day)												70.2174 (43)
Daily hot water use	77.2391	74.4304	71.6217	68.8130	66.0043	63.1956	63.1956	66.0043	68.8130	71.6217	74.4304	77.2391 (44)
Energy conte	114.5434	100.1804	103.3772	90.1267	86.4787	74.6246	69.1506	79.3514	80.2991	93.5808	102.1508	110.9291 (45)
Energy content (annual)												Total = Sum(45)m = 1104.7928 (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	17.1815	15.0271	15.5066	13.5190	12.9718	11.1937	10.3726	11.9027	12.0449	14.0371	15.3226	16.6394 (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	14.4823	13.0648	14.4390	13.9444	14.3881	13.8998	14.3480	14.3740	13.9241	14.4180	13.9864	14.4740 (61)	
Total heat required for water heating calculated for each month	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (64)	
Heat gains from water heating, kWh/month	41.7063	36.5762	37.9827	33.4532	32.3512	28.2876	26.5796	29.9778	30.1805	34.7201	37.4617	40.5024 (65)	
								Solar input (sum of months) = Sum(63)m =					0.0000 (63)
								Total per year (kWh/year) = Sum(64)m =					1274.5357 (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	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.7653	26.4373	21.5002	16.2771	12.1673	10.2721	11.0994	14.4274	19.3645	24.5876	28.6974	30.5925 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	196.6178	198.6581	193.5166	182.5711	168.7544	155.7686	147.0933	145.0530	150.1945	161.1400	174.9567	187.9425 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156 (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)	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609 (71)
Water heating gains (Table 5)	56.0568	54.4288	51.0520	46.4628	43.4828	39.2884	35.7253	40.2928	41.9173	46.6668	52.0302	54.4388 (72)
Total internal gains	361.3859	358.4702	345.0149	324.2571	303.3506	284.2752	272.8640	278.7193	290.4223	311.3405	334.6304	351.9198 (73)

6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.7080	11.2829	0.5000	0.0000	0.7700	20.4512 (75)						
Northwest	3.6210	11.2829	0.5000	0.0000	0.7700	15.7294 (81)						
Solar gains	36.1806	73.6467	132.6879	217.9117	292.9160	312.2795	292.1310	232.8903	161.6823	90.0021	45.5246	29.5469 (83)
Total gains	397.5665	432.1169	477.7028	542.1687	596.2666	596.5546	564.9951	511.6096	452.1046	401.3426	380.1549	381.4668 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	33.1315	33.2612	33.3918	34.0608	34.1762	34.1762	34.1762	34.1762	34.1762	34.1762	33.9248	33.6562
alpha	3.2088	3.2174	3.2261	3.2707	3.2784	3.2784	3.2784	3.2784	3.2784	3.2784	3.2617	3.2437
util living area	0.9569	0.9417	0.9054	0.8185	0.6782	0.5157	0.3901	0.4438	0.6688	0.8638	0.9379	0.9614 (86)
MIT	19.3939	19.5868	19.9435	20.4159	20.7571	20.9262	20.9777	20.9659	20.8273	20.3928	19.8345	19.3697 (87)
Th 2	19.9108	19.9146	19.9183	19.9373	19.9405	19.9405	19.9405	19.9405	19.9405	19.9405	19.9335	19.9259 (88)
util rest of house	0.9489	0.9310	0.8878	0.7862	0.6256	0.4421	0.3012	0.3497	0.5960	0.8315	0.9247	0.9543 (89)
MIT 2	18.4776	18.6686	19.0161	19.4728	19.7721	19.9013	19.9326	19.9275	19.8372	19.4663	18.9283	18.4654 (90)
Living area fraction	18.8624	19.0541	19.4056	19.8688	20.1857	20.3317	20.3714	20.3635	20.2530	19.8553	19.3089	18.8452 (92)
Temperature adjustment	18.7124	18.9041	19.2556	19.7188	20.0357	20.1817	20.2214	20.2135	20.1030	19.7053	19.1589	-0.1500
adjusted MIT												18.6952 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9379	0.9188	0.8752	0.7788	0.6306	0.4595	0.3253	0.3747	0.6080	0.8232	0.9130	0.9439 (94)
Ext temp.	372.8687	397.0094	418.0722	422.2529	376.0049	274.1017	183.8115	191.7110	274.8791	330.3977	347.0676	360.0625 (95)
Heat loss rate W	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)
Month fracti	768.4526	743.7761	674.8124	561.1105	430.8654	288.5125	187.1883	197.1164	310.2888	470.6457	627.9307	760.8188 (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 m ²	294.3144	233.0272	191.0147	99.9774	40.8162	0.0000	0.0000	0.0000	0.0000	104.3445	202.2214	298.1627 (98)
											1463.8785 (98)	
											(98) / (4) =	33.2624 (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													1617.5453 (211)
Space heating requirement	294.3144	233.0272	191.0147	99.9774	40.8162	0.0000	0.0000	0.0000	0.0000	104.3445	202.2214	298.1627	(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)	325.2093	257.4886	211.0659	110.4723	45.1008	0.0000	0.0000	0.0000	0.0000	115.2978	223.4491	329.4616	(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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031	(64)
Efficiency of water heater (217)m	89.5001	89.4280	89.2519	88.8391	88.1984	87.3000	87.3000	87.3000	87.3000	88.8437	89.3058	89.5284	(216)
Fuel for water heating, kWh/month	144.1626	126.6328	132.0041	117.1455	114.3636	101.4025	95.6456	107.3601	107.9303	121.5605	130.0444	140.0707	(219)
Water heating fuel used													1438.3228 (219)
Annual totals kWh/year													
Space heating fuel - main system													1617.5453 (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)													32.1003 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													107.1003 (231)
Electricity for lighting (calculated in Appendix L)													210.2656 (232)
Total delivered energy for all uses													3373.2341 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1617.5453	3.4800	56.2906	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1438.3228	3.4800	50.0536	(247)
Mechanical ventilation fans	32.1003	13.1900	4.2340	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	210.2656	13.1900	27.7340	(250)
Additional standing charges			120.0000	(251)
Total energy cost			268.2048	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2655 (257)
SAP value		82.3457
SAP rating (Section 12)		82 (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	1617.5453	0.2160	349.3898	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1438.3228	0.2160	310.6777	(264)
Space and water heating			660.0675	(265)
Pumps and fans	107.1003	0.5190	55.5851	(267)
Energy for lighting	210.2656	0.5190	109.1279	(268)
Total kg/year			824.7804	(272)
CO2 emissions per m2			18.7400	(273)
EI value			87.5834	
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	$3.48 / 0.8851 = 3.932$, stars = 4
Water heating environmental impact	$0.216 / 0.8851 = 0.2440$, stars = 4

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Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

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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	44.0100 (1b)	x 2.4700 (2b)	= 108.7047 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	44.0100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 108.7047 (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)			8.3300	1.3258	11.0436		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	35.1010	8.3290	26.7720	0.2500	6.6930	61.0100	1633.3597 (29a)
Wl - To Corridor	13.4100	2.1170	11.2930	0.2499	2.8222	106.6200	1204.0597 (29a)
Rf - Ins Joist	44.0060		44.0060	0.1100	4.8407	5.8200	256.1149 (30)
Total net area of external elements Aum(A, m2)			92.5210				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.9435		(33)
Party Wall			18.3430	0.0000	0.0000	54.0300	991.0723 (32)
Party Floor			44.0060			40.0000	1760.2400 (32d)
1st Floor Stud			88.4359			5.8200	514.6968 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	6359.5434 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							144.5022 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8095 (36)
Total fabric heat loss						(33) + (36) =	33.7529 (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	19.5661	18.7349	18.5271	17.9363	17.9363	17.9363	17.9363	17.9363	17.9363	18.3193	18.1115	18.7349 (38)
Heat transfer coeff	53.3190	52.4878	52.2800	51.6892	51.6892	51.6892	51.6892	51.6892	51.6892	52.0722	51.8644	52.4878 (39)
Average = Sum(39)m / 12 =												52.0539 (39)
HLP	1.2115	1.1926	1.1879	1.1745	1.1745	1.1745	1.1745	1.1745	1.1745	1.1832	1.1785	1.1926 (40)
HLP (average)												1.1828 (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												1.5165 (42)
Average daily hot water use (litres/day)												70.2174 (43)
Daily hot water use	77.2391	74.4304	71.6217	68.8130	66.0043	63.1956	63.1956	66.0043	68.8130	71.6217	74.4304	77.2391 (44)
Energy conte	114.5434	100.1804	103.3772	90.1267	86.4787	74.6246	69.1506	79.3514	80.2991	93.5808	102.1508	110.9291 (45)
Energy content (annual)										Total = Sum(45)m =		1104.7928 (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	17.1815	15.0271	15.5066	13.5190	12.9718	11.1937	10.3726	11.9027	12.0449	14.0371	15.3226	16.6394 (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	14.4823	13.0648	14.4390	13.9444	14.3881	13.8998	14.3480	14.3740	13.9241	14.4180	13.9864	14.4740 (61)
Total heat required for water heating calculated for each month	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (64)
Heat gains from water heating, kWh/month	41.7063	36.5762	37.9827	33.4532	32.3512	28.2876	26.5796	29.9778	30.1805	34.7201	37.4617	40.5024 (65)
												1274.5357 (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	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.7653	26.4373	21.5002	16.2771	12.1673	10.2721	11.0994	14.4274	19.3645	24.5876	28.6974	30.5925 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	196.6178	198.6581	193.5166	182.5711	168.7544	155.7686	147.0933	145.0530	150.1945	161.1400	174.9567	187.9425 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156 (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)	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609 (71)
Water heating gains (Table 5)	56.0568	54.4288	51.0520	46.4628	43.4828	39.2884	35.7253	40.2928	41.9173	46.6668	52.0302	54.4388 (72)
Total internal gains	361.3859	358.4702	345.0149	324.2571	303.3506	284.2752	272.8640	278.7193	290.4223	311.3405	334.6304	351.9198 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.7080	15.0428	0.5000	0.0000	0.7700	27.2663 (75)						
Northwest	3.6210	15.0428	0.5000	0.0000	0.7700	20.9710 (81)						
Solar gains	48.2373	84.4862	151.9838	253.3451	323.3923	371.8790	340.0675	278.3759	196.2589	109.4452	60.2760	37.5246 (83)
Total gains	409.6233	442.9564	496.9987	577.6021	626.7429	656.1541	612.9316	557.0952	486.6812	420.7857	394.9063	389.4445 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	33.1315	33.6562	33.7900	34.1762	34.1762	34.1762	34.1762	34.1762	34.1762	33.9248	34.0608	33.6562
alpha	3.2088	3.2437	3.2527	3.2784	3.2784	3.2784	3.2784	3.2784	3.2784	3.2617	3.2707	3.2437
util living area	0.9449	0.9292	0.8818	0.7739	0.6121	0.4238	0.3073	0.3365	0.5755	0.8124	0.9138	0.9500 (86)
MIT	19.5995	19.7609	20.1189	20.5474	20.8392	20.9637	20.9907	20.9879	20.9044	20.5645	20.0701	19.5959 (87)
Th 2	19.9108	19.9259	19.9297	19.9405	19.9405	19.9405	19.9405	19.9405	19.9405	19.9335	19.9373	19.9259 (88)
util rest of house	0.9343	0.9161	0.8600	0.7357	0.5532	0.3497	0.2214	0.2431	0.4926	0.7678	0.8948	0.9403 (89)
MIT 2	18.6795	18.8468	19.1917	19.5920	19.8364	19.9238	19.9380	19.9372	19.8907	19.6147	19.1588	18.6882 (90)
Living area fraction	19.0658	19.2307	19.5810	19.9932	20.2575	20.3605	20.3801	20.3784	20.3164	20.0135	19.5415	19.0694 (92)
Temperature adjustment	18.9158	19.0807	19.4310	19.8432	20.1075	20.2105	20.2301	20.2284	20.1664	19.8635	19.3915	-0.1500
adjusted MIT												18.9194 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9224	0.9036	0.8483	0.7319	0.5630	0.3690	0.2452	0.2689	0.5112	0.7645	0.8832	0.9288 (94)
Ext temp.	377.8175	400.2357	421.6115	422.7463	352.8294	242.1322	150.2836	149.8214	248.7998	321.7032	348.7638	361.7298 (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	720.6488	702.3209	634.2098	529.4636	388.0558	248.6487	151.4522	151.3656	267.0451	419.8863	570.0654	704.3528 (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 per m2	255.0665	203.0013	158.1731	76.8365	26.2084	0.0000	0.0000	0.0000	0.0000	73.0482	159.3372	254.9116 (98)
												1206.5827 (98)
												27.4161 (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													1333.2406 (211)
Space heating requirement	255.0665	203.0013	158.1731	76.8365	26.2084	0.0000	0.0000	0.0000	0.0000	73.0482	159.3372	254.9116	(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)	281.8414	224.3108	174.7769	84.9022	28.9596	0.0000	0.0000	0.0000	0.0000	80.7162	176.0632	281.6702	(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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031	(64)
Efficiency of water heater (217)m	89.3992	89.3275	89.1057	88.6311	87.9413	87.3000	87.3000	87.3000	87.3000	88.5635	89.1227	89.4192	(216)
Fuel for water heating, kWh/month	144.3254	126.7752	132.2207	117.4206	114.6979	101.4025	95.6456	107.3601	107.9303	121.9451	130.3115	140.2418	(219)
Water heating fuel used													1440.2767 (219)
Annual totals kWh/year													
Space heating fuel - main system													1333.2406 (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)													32.1003 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													107.1003 (231)
Electricity for lighting (calculated in Appendix L)													210.2656 (232)
Total delivered energy for all uses													3090.8832 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1333.2406	3.8700	51.5964 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1440.2767	3.8700	55.7387 (247)
Mechanical ventilation fans	32.1003	18.9000	6.0670 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	210.2656	18.9000	39.7402 (250)
Additional standing charges			93.0000 (251)
Total energy cost			260.3173 (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	1333.2406	0.2160	287.9800 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1440.2767	0.2160	311.0998 (264)
Space and water heating			599.0797 (265)
Pumps and fans	107.1003	0.5190	55.5851 (267)
Energy for lighting	210.2656	0.5190	109.1279 (268)
Total kg/year			763.7926 (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	1333.2406	1.2200	1626.5535 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1440.2767	1.2200	1757.1375 (264)
Space and water heating			3383.6910 (265)
Pumps and fans	107.1003	3.0700	328.7979 (267)
Energy for lighting	210.2656	3.0700	645.5155 (268)
Primary energy kWh/year			4358.0045 (272)
Primary energy kWh/m2/year			99.0231 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 82
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
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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 82
 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	£60	£60	£0
Mains gas	£200	£200	£0
Space heating	£165	£165	£0
Water heating	£56	£56	£0
Lighting	£40	£40	£0
Total cost of fuels	£260	£260	£0
Total cost of uses	£261	£261	£0
Delivered energy	70 kWh/m ²	70 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m ²	17 kg/m ²	17 kg/m ²	0 kg/m ²
Primary energy	99 kWh/m ²	99 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	675 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	675	Prop Type Ref	Block B
Property	Plot 675		

SAP Rating	82 B	DER	20.60	TER	22.33
Environmental	88 B	% DER<TER	7.73		
CO₂ Emissions (t/year)	0.76	DFEE	50.54	TFEE	57.52
General Requirements Compliance	Pass	% DFEE<TFEE	12.14		

Assessor Details	Mr. Michael Jukes, Michael Jukes, 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)	22.33	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.60	kgCO ₂ /m ²	Pass
	-1.73 (-7.7%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	57.52	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	50.54	kWh/m ² /yr	
	-7.0 (-12.2%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (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	1.36 (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

4.71 m², No overhang

Windows facing North West

3.62 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.