PREDICTED ENERGY ASSESSMENT

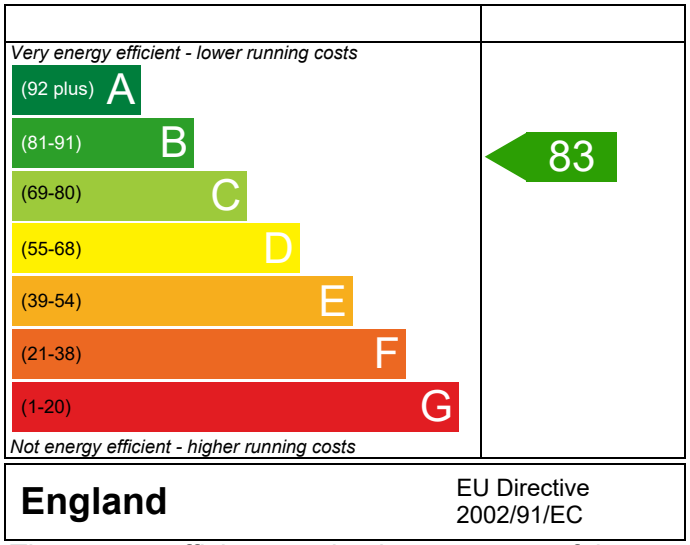
524 - PRJ009194 - TF

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	26/02/2021
Produced by:	Michael Juckes
Total floor area:	50.62 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO_2) emissions.

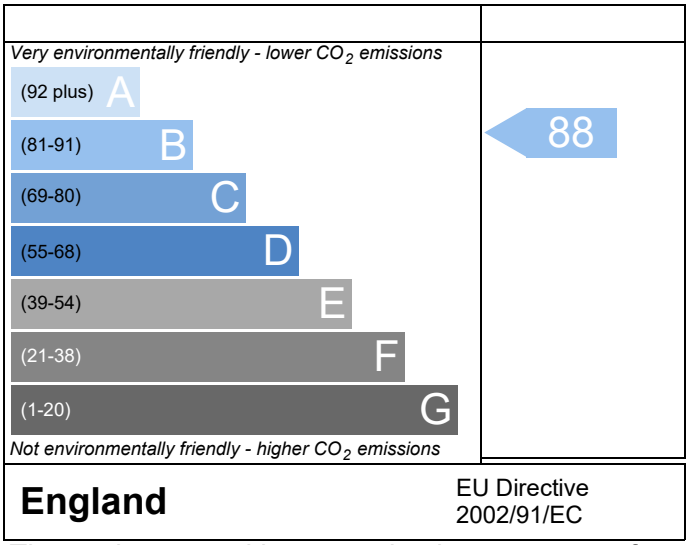
Energy Efficiency Rating



England EU Directive 2002/91/EC

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



England EU Directive 2002/91/EC

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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

Briary Energy

Property Reference	524 - PRJ009194 - TF	**Issued on Date**	26/02/2021
Assessment Reference	524 M	**Prop Type Ref**	Block B - TF
Property	524 - PRJ009194 - TF		

SAP Rating	83 B	**DER**	17.93	**TER**	19.72
Environmental	88 B	**% DER<TER**	9.08		
CO_2 Emissions (t/year)	0.77	**DFEE**	42.22	**TFEE**	48.37
General Requirements Compliance	Pass	**% DFEE<TFEE**	12.73		

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

SUMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	19.72	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	17.93	$kgCO_2/m^2$	Pass
	-1.79 (-9.1%)	$kgCO_2/m^2$	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	48.37	$kWh/m^2/yr$	
Dwelling Fabric Energy Efficiency (DFEE)	42.22	$kWh/m^2/yr$	
	-6.2 (-12.8%)	$kWh/m^2/yr$	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	1.37 (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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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)	Medium	Pass

Based on:

Overshading	Average
Windows facing South West	4.71 m², No overhang
Windows facing North West	5.48 m², No overhang
Air change rate	3.87 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	524 - PRJ009194 - TF	**Issued on Date**	26/02/2021
Assessment Reference	524 M	**Prop Type Ref**	Block B - TF
Property	524 - PRJ009194 - TF		

SAP Rating	83 B	**DER**	17.93	**TER**	19.72
Environmental	88 B	**% DER<TER**	9.08		
CO_2 Emissions (t/year)	0.77	**DFEE**	42.22	**TFEE**	48.37
General Requirements Compliance	Pass	**% DFEE<TFEE**	12.73		

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

CALCULATION OF HEAT DEMAND 09 Jan 2014

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

1. Overall dwelling dimensions

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		50.6200 (1b)	x	2.4700 (2b)	=	125.0314	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	125.0314	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000	(8)
Pressure test		Yes	
Measured/design AP50		5.0100	
Infiltration rate		0.2505	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2129	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	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	0.2715	0.2502	0.2449	0.2289	0.2289	0.2129	0.2129	0.2076	0.2129	0.2395	0.2342	0.2502	(22b)

Mechanical extract ventilation - decentralised
If mechanical ventilation: 0.5000 (23a)

Effective ac	0.5215	0.5002	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Windows (Uw = 1.40)			10.1800	1.3258	13.5095			(27)
Solid Door			2.1200	1.2000	2.5440			(26)
Wl - Clad	36.1340	10.1830	25.9510	0.2500	6.4878	61.0100	1583.2705	(29a)
Wl - To Corridor	3.9200	2.1170	1.8030	0.2499	0.4506	106.6200	192.2359	(29a)
Rf - Ins Joist	50.6170		50.6170	0.1100	5.5679	5.8200	294.5909	(30)
Total net area of external elements Aum(A, m2)			90.6810					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.5597			(33)
Party Wall			32.2120	0.0000	0.0000	54.0300	1740.4144	(32)
Party Floor			50.6170			40.0000	2024.6800	(32d)
1st Floor Stud			97.9750			5.8200	570.2146	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	6405.4063 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		126.5390 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)		6.4452 (36)
Total fabric heat loss	(33) + (36) =	35.0049 (37)

CALCULATION OF HEAT DEMAND 09 Jan 2014

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	21.5164	20.6379	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6379	(38)
Heat transfer coeff	56.5213	55.6428	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6428	(39)
Average = Sum(39)m / 12 =												55.7102	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1166	1.0992	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0992	(40)
HLP (average)												1.1006	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.7084 (42)

Average daily hot water use (litres/day) 74.7737 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511	(44)
Energy conte	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272	(45)
Energy content (annual)										Total = Sum(45)m =		1176.4816	(45)
Distribution loss (46)m = 0.15 x (45)m	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191	(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	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084	(61)
Total heat required for water heating calculated for each month	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
								Solar input (sum of months) = Sum(63)m =				0.0000	(63)
Output from w/h	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
								Total per year (kWh/year) = Sum(64)m =				1346.5393	(64)
RHI water heating demand												1347	(64)
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044	(65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	33.3877	29.6547	24.1168	18.2580	13.6480	11.5223	12.4502	16.1832	21.7211	27.5799	32.1899	34.3156	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	(71)
Water heating gains (Table 5)	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672	(72)
Total internal gains	399.0594	395.8976	380.9540	357.8404	334.4453	313.1798	300.5110	306.8033	319.8807	343.1651	369.0985	388.4620	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	4.7080	46.3896	0.5000	0.0000	0.7700	84.0849	(79)
Northwest	5.4750	15.0428	0.5000	0.0000	0.7700	31.7084	(81)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	115.7933	177.8656	266.6180	378.0546	440.3965	490.0320	454.3035	397.7274	320.7410	214.9509	139.3880	93.4020	(83)
Total gains	514.8527	573.7633	647.5720	735.8950	774.8418	803.2118	754.8146	704.5307	640.6217	558.1159	508.4865	481.8640	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	31.4798	31.9768	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9768	
alpha	3.0987	3.1318	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1318	
util living area	0.9117	0.8822	0.8158	0.6990	0.5471	0.3754	0.2693	0.2878	0.4863	0.7242	0.8632	0.9217	(86)
MIT	19.7324	19.9333	20.2771	20.6297	20.8657	20.9690	20.9921	20.9904	20.9312	20.6674	20.1901	19.7071	(87)
Th 2	19.9873	20.0015	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0015	(88)
util rest of house	0.8979	0.8649	0.7900	0.6607	0.4943	0.3126	0.1981	0.2120	0.4157	0.6771	0.8396	0.9090	(89)
MIT 2	18.8738	19.0757	19.3987	19.7157	19.9127	19.9864	19.9992	19.9987	19.9647	19.7593	19.3262	18.8615	(90)

CALCULATION OF HEAT DEMAND 09 Jan 2014

Living area fraction									fLA = Living area / (4) =			0.4417	(91)
MIT	19.2531	19.4545	19.7867	20.1194	20.3337	20.4205	20.4378	20.4367	20.3916	20.1604	19.7078	19.2350	(92)
Temperature adjustment												-0.1500	
adjusted MIT	19.1031	19.3045	19.6367	19.9694	20.1837	20.2705	20.2878	20.2867	20.2416	20.0104	19.5578	19.0850	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8836	0.8510	0.7796	0.6594	0.5043	0.3298	0.2187	0.2339	0.4333	0.6775	0.8276	0.8952	(94)
Useful gains	454.9110	488.2487	504.8215	485.2177	390.7578	264.9294	165.0894	164.7879	277.5686	378.1406	420.8057	431.3596	(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	774.5150	756.9941	686.3536	576.9030	421.9199	270.9694	166.2252	166.1680	291.6187	456.7863	620.7665	755.9097	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	237.7854	180.5969	135.0599	66.0135	23.1846	0.0000	0.0000	0.0000	0.0000	58.5124	143.9718	241.4653	(98)
Space heating												1086.5897	(98)
RHI space heating demand												1087	(98)

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	50.6200 (1b)	x	2.4700 (2b)	=	125.0314	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	125.0314	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000	(8)
Pressure test		Yes	
Measured/design AP50		5.0100	
Infiltration rate		0.2505	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2129	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.2715	0.2662	0.2608	0.2342	0.2289	0.2023	0.2023	0.1970	0.2129	0.2289	0.2395	0.2502	(22b)

Mechanical extract ventilation - decentralised
If mechanical ventilation: 0.5000 (23a)

Effective ac	0.5215	0.5162	0.5108	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Windows (Uw = 1.40)			10.1800	1.3258	13.5095			(27)
Solid Door			2.1200	1.2000	2.5440			(26)
Wl - Clad	36.1340	10.1830	25.9510	0.2500	6.4878	61.0100	1583.2705	(29a)
Wl - To Corridor	3.9200	2.1170	1.8030	0.2499	0.4506	106.6200	192.2359	(29a)
Rf - Ins Joist	50.6170		50.6170	0.1100	5.5679	5.8200	294.5909	(30)
Total net area of external elements Aum(A, m2)			90.6810					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.5597			(33)
Party Wall			32.2120	0.0000	0.0000	54.0300	1740.4144	(32)
Party Floor			50.6170			40.0000	2024.6800	(32d)
1st Floor Stud			97.9750			5.8200	570.2146	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		6405.4063	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							126.5390	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							6.4452	(36)
Total fabric heat loss					(33) + (36) =		35.0049	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	21.5164	21.2968	21.0772	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6379	(38)
Heat transfer coeff	56.5213	56.3017	56.0821	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6428	(39)

Average = Sum(39)m / 12 = 55.8024 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1166	1.1122	1.1079	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0992	(40)
HLP (average)												1.1024	(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 1.7084 (42)
Average daily hot water use (litres/day) 74.7737 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511	(44)
Energy conte	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272	(45)
Energy content (annual)										Total = Sum(45)m =		1176.4816	(45)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Distribution loss (46)m = 0.15 x (45)m	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191	(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	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084	(61)
Total heat required for water heating calculated for each month	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
Solar input (sum of months) = Sum(63)m =												0.0000	(63)
Output from w/h	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
Total per year (kWh/year) = Sum(64)m =												1346.5393	(64)
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts (66)m	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	33.3877	29.6547	24.1168	18.2580	13.6480	11.5223	12.4502	16.1832	21.7211	27.5799	32.1899	34.3156	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	(71)
Water heating gains (Table 5)	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672	(72)
Total internal gains	399.0594	395.8976	380.9540	357.8404	334.4453	313.1798	300.5110	306.8033	319.8807	343.1651	369.0985	388.4620	(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	
Southwest	4.7080	36.7938	0.5000	0.0000	0.7700	66.6918	(79)
Northwest	5.4750	11.2829	0.5000	0.0000	0.7700	23.7830	(81)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	90.4748	162.0118	242.6548	335.8321	408.2624	419.4309	398.4997	342.3046	274.5821	184.7152	109.8066	76.4967	(83)
Total gains	489.5342	557.9094	623.6088	693.6724	742.7077	732.6107	699.0107	649.1079	594.4628	527.8802	478.9051	464.9587	(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	31.4798	31.6026	31.7264	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9768	
alpha	3.0987	3.1068	3.1151	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1318	
util living area	0.9325	0.9014	0.8466	0.7465	0.6088	0.4586	0.3416	0.3810	0.5762	0.7916	0.9015	0.9403	(86)
MIT	19.5016	19.7578	20.1207	20.5199	20.7984	20.9378	20.9814	20.9735	20.8722	20.5032	19.9443	19.4622	(87)
Th 2	19.9873	19.9908	19.9944	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0015	(88)
util rest of house	0.9221	0.8870	0.8246	0.7123	0.5601	0.3950	0.2674	0.3033	0.5102	0.7545	0.8846	0.9310	(89)
MIT 2	18.6492	18.8987	19.2468	19.6199	19.8598	19.9671	19.9944	19.9907	19.9242	19.6160	19.0926	18.6220	(90)
Living area fraction									fLA = Living area / (4) =			0.4417	(91)
MIT	19.0257	19.2782	19.6328	20.0174	20.2744	20.3959	20.4304	20.4248	20.3429	20.0079	19.4688	18.9931	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8757	19.1282	19.4828	19.8674	20.1244	20.2459	20.2804	20.2748	20.1929	19.8579	19.3188	18.8431	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9083	0.8725	0.8121	0.7074	0.5663	0.4110	0.2885	0.3250	0.5234	0.7486	0.8710	0.9178	(94)
Useful gains	444.6237	486.7658	506.4313	490.6977	420.6250	301.0698	201.6450	210.9681	311.1698	395.1687	417.1335	426.7414	(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	823.8380	801.0722	728.1037	610.1743	468.6904	314.1097	204.7588	215.5762	338.9808	515.0627	679.7950	814.7838	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	282.1355	211.2139	164.9243	86.0231	35.7606	0.0000	0.0000	0.0000	0.0000	89.2011	189.1163	288.7035	(98)
Space heating												1347.0783	(98)
Space heating per m2											(98) / (4) =	26.6116	(99)

8c. Space cooling requirement

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	90.5000	(206)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)
Space heating requirement	1488.4843	(211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	282.1355	211.2139	164.9243	86.0231	35.7606	0.0000	0.0000	0.0000	0.0000	89.2011	189.1163	288.7035	(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)													
	311.7519	233.3856	182.2368	95.0532	39.5145	0.0000	0.0000	0.0000	0.0000	98.5648	208.9683	319.0094	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
Efficiency of water heater												87.3000	(216)
(217)m	89.4312	89.3153	89.0948	88.6764	88.0829	87.3000	87.3000	87.3000	87.3000	88.6758	89.2126	89.4676	(217)
Fuel for water heating, kWh/month													
	152.6245	134.1044	139.7994	123.9837	120.9103	106.9709	100.8056	113.2823	113.9243	128.6689	137.6445	148.2498	(219)
Water heating fuel used												1520.9685	(219)
Annual totals kWh/year													
Space heating fuel - main system												1488.4843	(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)	36.9215	(230a)
central heating pump	30.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	111.9215	(231)
Electricity for lighting (calculated in Appendix L)	235.8549	(232)
Total delivered energy for all uses	3357.2293	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1488.4843	3.4800	51.7993	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1520.9685	3.4800	52.9297	(247)
Mechanical ventilation fans	36.9215	13.1900	4.8700	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	235.8549	13.1900	31.1093	(250)
Additional standing charges			120.0000	(251)
Total energy cost			270.6007	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.1886	(257)
SAP value		83.4193	
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	1488.4843	0.2160	321.5126	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1520.9685	0.2160	328.5292	(264)
Space and water heating			650.0418	(265)
Pumps and fans	111.9215	0.5190	58.0873	(267)
Energy for lighting	235.8549	0.5190	122.4087	(268)
Total kg/year			830.5378	(272)
CO2 emissions per m2			16.4100	(273)
EI value			88.3610	
EI rating			88	(274)
EI band			B	

Calculation of stars for heating and DHW

Main heating energy efficiency	3.48 × (1 + 0.29 × 0.00) / 0.9050 = 3.845, stars = 4
Main heating environmental impact	0.216 × (1 + 0.29 × 0.00) / 0.9050 = 0.2387, stars = 4
Water heating energy efficiency	3.48 / 0.8843 = 3.935, stars = 4
Water heating environmental impact	0.216 / 0.8843 = 0.2443, stars = 4

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

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

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	50.6200 (1b)	x	2.4700 (2b)	=	125.0314	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	125.0314	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000	(8)
Pressure test		Yes	
Measured/design AP50		5.0100	
Infiltration rate		0.2505	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2129	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	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	0.2715	0.2502	0.2449	0.2289	0.2289	0.2129	0.2129	0.2076	0.2129	0.2395	0.2342	0.2502	(22b)
Mechanical extract ventilation - decentralised													
If mechanical ventilation:												0.5000	(23a)
Effective ac	0.5215	0.5002	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Windows (Uw = 1.40)			10.1800	1.3258	13.5095			(27)
Solid Door			2.1200	1.2000	2.5440			(26)
Wl - Clad	36.1340	10.1830	25.9510	0.2500	6.4878	61.0100	1583.2705	(29a)
Wl - To Corridor	3.9200	2.1170	1.8030	0.2499	0.4506	106.6200	192.2359	(29a)
Rf - Ins Joist	50.6170		50.6170	0.1100	5.5679	5.8200	294.5909	(30)
Total net area of external elements Aum(A, m2)			90.6810					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.5597			(33)
Party Wall			32.2120	0.0000	0.0000	54.0300	1740.4144	(32)
Party Floor			50.6170			40.0000	2024.6800	(32d)
1st Floor Stud			97.9750			5.8200	570.2146	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	6405.4063 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		126.5390 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)		6.4452 (36)
Total fabric heat loss	(33) + (36) =	35.0049 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	21.5164	20.6379	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6379	(38)
Heat transfer coeff	56.5213	55.6428	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6428	(39)
Average = Sum(39)m / 12 =												55.7102	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1166	1.0992	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0992	(40)
HLP (average)												1.1006	(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	1.7084 (42)
Average daily hot water use (litres/day)	74.7737 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511	(44)
Energy conte	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272	(45)
Energy content (annual)										Total = Sum(45)m =		1176.4816	(45)

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

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Distribution loss  (46)m = 0.15 x (45)m
                18.2964    16.0021    16.5128    14.3962    13.8135    11.9200    11.0457    12.6751    12.8264    14.9480    16.3169    17.7191 (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      14.5179    13.0947    14.4688    13.9693    14.4111    13.9187    14.3656    14.3951    13.9463    14.4449    14.0170    14.5084 (61)
Total heat required for water heating calculated for each month
               136.4939   119.7757   124.5540   109.9442   106.5013    93.3856    88.0033    98.8955    99.4559   114.0981   122.7962   132.6356 (62)
Solar input      0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (63)
                                                                                          Solar input (sum of months) = Sum(63)m =      0.0000 (63)
Output from w/h
               136.4939   119.7757   124.5540   109.9442   106.5013    93.3856    88.0033    98.8955    99.4559   114.0981   122.7962   132.6356 (64)
                                                                                            Total per year (kWh/year) = Sum(64)m =   1346.5393 (64)
Heat gains from water heating, kWh/month
                44.1865    38.7451    40.2205    35.4040    34.2228    29.9024    28.0759    31.6952    31.9185    36.7459    39.6733    42.9044 (65)


-----------------------------------------------------------------------------------------------------
5. Internal gains (see Table 5 and 5a)
-----------------------------------------------------------------------------------------------------
Metabolic gains (Table 5), Watts
                    Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
(66)m          102.5020   102.5020   102.5020   102.5020   102.5020   102.5020   102.5020   102.5020   102.5020   102.5020   102.5020   102.5020 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5
                33.3877    29.6547    24.1168    18.2580    13.6480    11.5223    12.4502    16.1832    21.7211    27.5799    32.1899    34.3156 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5
               222.1554   224.4607   218.6514   206.2843   190.6730   176.0005   166.1985   163.8932   169.7024   182.0696   197.6809   212.3533 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5
                46.9586    46.9586    46.9586    46.9586    46.9586    46.9586    46.9586    46.9586    46.9586    46.9586    46.9586    46.9586 (69)
Pumps, fans      3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)
               -68.3347   -68.3347   -68.3347   -68.3347   -68.3347   -68.3347   -68.3347   -68.3347   -68.3347   -68.3347   -68.3347   -68.3347 (71)
Water heating gains (Table 5)
                59.3904    57.6564    54.0598    49.1722    45.9984    41.5311    37.7365    42.6010    44.3313    49.3897    55.1019    57.6672 (72)
Total internal gains
               399.0594   395.8976   380.9540   357.8404   334.4453   313.1798   300.5110   306.8033   319.8807   343.1651   369.0985   388.4620 (73)


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6. Solar gains
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[Jan]                                       Area          Solar flux              g                 FF              Access                 Gains
                                              m2            Table 6a      Specific data      Specific data          factor                     W
                                                                W/m2        or Table 6b        or Table 6c        Table 6d
-----------------------------------------------------------------------------------------------------
Southwest                                 4.7080             46.3896             0.5000             0.0000          0.7700               84.0849 (79)
Northwest                                 5.4750             15.0428             0.5000             0.0000          0.7700               31.7084 (81)
-----------------------------------------------------------------------------------------------------

Solar gains    115.7933   177.8656   266.6180   378.0546   440.3965   490.0320   454.3035   397.7274   320.7410   214.9509   139.3880    93.4020 (83)
Total gains    514.8527   573.7633   647.5720   735.8950   774.8418   803.2118   754.8146   704.5307   640.6217   558.1159   508.4865   481.8640 (84)


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7. Mean internal temperature (heating season)
-----------------------------------------------------------------------------------------------------
Temperature during heating periods in the living area from Table 9, Th1 (C)                                                            21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)
                    Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
tau             31.4798    31.9768    31.9812    31.9812    31.9812    31.9812    31.9812    31.9812    31.9812    31.9812    31.9812    31.9768
alpha            3.0987     3.1318     3.1321     3.1321     3.1321     3.1321     3.1321     3.1321     3.1321     3.1321     3.1321     3.1318
util living area
                 0.9117     0.8822     0.8158     0.6990     0.5471     0.3754     0.2693     0.2878     0.4863     0.7242     0.8632     0.9217 (86)

MIT             19.7324    19.9333    20.2771    20.6297    20.8657    20.9690    20.9921    20.9904    20.9312    20.6674    20.1901    19.7071 (87)
Th 2            19.9873    20.0015    20.0016    20.0016    20.0016    20.0016    20.0016    20.0016    20.0016    20.0016    20.0016    20.0015 (88)
util rest of house
                 0.8979     0.8649     0.7900     0.6607     0.4943     0.3126     0.1981     0.2120     0.4157     0.6771     0.8396     0.9090 (89)
MIT 2           18.8738    19.0757    19.3987    19.7157    19.9127    19.9864    19.9992    19.9987    19.9647    19.7593    19.3262    18.8615 (90)
Living area fraction                                                                                fLA = Living area / (4) =      0.4417 (91)
MIT             19.2531    19.4545    19.7867    20.1194    20.3337    20.4205    20.4378    20.4367    20.3916    20.1604    19.7078    19.2350 (92)
Temperature adjustment                                                                                                            -0.1500
adjusted MIT    19.1031    19.3045    19.6367    19.9694    20.1837    20.2705    20.2878    20.2867    20.2416    20.0104    19.5578    19.0850 (93)


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8. Space heating requirement
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                    Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
Utilisation      0.8836     0.8510     0.7796     0.6594     0.5043     0.3298     0.2187     0.2339     0.4333     0.6775     0.8276     0.8952 (94)
Useful gains   454.9110   488.2487   504.8215   485.2177   390.7578   264.9294   165.0894   164.7879   277.5686   378.1406   420.8057   431.3596 (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
               774.5150   756.9941   686.3536   576.9030   421.9199   270.9694   166.2252   166.1680   291.6187   456.7863   620.7665   755.9097 (97)
Month fracti     1.0000     1.0000     1.0000     1.0000     1.0000     0.0000     0.0000     0.0000     0.0000     1.0000     1.0000     1.0000 (97a)
Space heating kWh
               237.7854   180.5969   135.0599    66.0135    23.1846     0.0000     0.0000     0.0000     0.0000    58.5124   143.9718   241.4653 (98)
Space heating                                                                                                                   1086.5897 (98)
Space heating per m2                                                                                         (98) / (4) =        21.4656 (99)


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8c. Space cooling requirement
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CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	90.5000	(206)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)
Space heating requirement	1200.6515	(211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	237.7854	180.5969	135.0599	66.0135	23.1846	0.0000	0.0000	0.0000	0.0000	58.5124	143.9718	241.4653	(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)													
	262.7463	199.5546	149.2374	72.9431	25.6183	0.0000	0.0000	0.0000	0.0000	64.6545	159.0848	266.8125	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
Efficiency of water heater												87.3000	(216)
(217)m	89.3062	89.1963	88.9360	88.4737	87.8554	87.3000	87.3000	87.3000	87.3000	88.3591	88.9983	89.3390	(217)
Fuel for water heating, kWh/month													
	152.8381	134.2833	140.0491	124.2678	121.2235	106.9709	100.8056	113.2823	113.9243	129.1300	137.9758	148.4633	(219)
Water heating fuel used												1523.2140	(219)
Annual totals kWh/year													
Space heating fuel - main system												1200.6515	(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)	36.9215	(230a)
central heating pump	30.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	111.9215	(231)
Electricity for lighting (calculated in Appendix L)	235.8549	(232)
Total delivered energy for all uses	3071.6420	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1200.6515	3.8700	46.4652	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1523.2140	3.8700	58.9484	(247)
Mechanical ventilation fans	36.9215	18.9000	6.9782	(249)
Pumps and fans for heating	75.0000	18.9000	14.1750	(249)
Energy for lighting	235.8549	18.9000	44.5766	(250)
Additional standing charges			93.0000	(251)
Total energy cost			264.1433	(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	1200.6515	0.2160	259.3407	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1523.2140	0.2160	329.0142	(264)
Space and water heating			588.3550	(265)
Pumps and fans	111.9215	0.5190	58.0873	(267)
Energy for lighting	235.8549	0.5190	122.4087	(268)
Total kg/year			768.8509	(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	1200.6515	1.2200	1464.7949	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1523.2140	1.2200	1858.3211	(264)
Space and water heating			3323.1160	(265)
Pumps and fans	111.9215	3.0700	343.5991	(267)
Energy for lighting	235.8549	3.0700	724.0745	(268)
Primary energy kWh/year			4390.7896	(272)
Primary energy kWh/m2/year			86.7402	(273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating:	B 83
Current environmental impact rating:	B 88

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:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: B 83
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	£66	£66	£0
Mains gas	£198	£198	£0
Space heating	£161	£161	£0
Water heating	£59	£59	£0
Lighting	£45	£45	£0
Total cost of fuels	£264	£264	£0
Total cost of uses	£265	£265	£0
Delivered energy	61 kWh/m²	61 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	15 kg/m²	15 kg/m²	0 kg/m²
Primary energy	87 kWh/m²	87 kWh/m²	0 kWh/m²

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

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

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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
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No improvements selected / applicable
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BASIC COMPLIANCE REPORT
Calculation Type: New Build (As Designed)

Briary Energy

Property Reference	524 - PRJ009194 - TF	**Issued on Date**	26/02/2021
Assessment Reference	524 M	**Prop Type Ref**	Block B - TF
Property	524 - PRJ009194 - TF		

SAP Rating	83 B	**DER**	17.93	**TER**	19.72
Environmental	88 B	**% DER<TER**	9.08		
CO_2 Emissions (t/year)	0.77	**DFEE**	42.22	**TFEE**	48.37
General Requirements Compliance	Pass	**% DFEE<TFEE**	12.73		

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

SUMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	19.72	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	17.93	$kgCO_2/m^2$	Pass
	-1.79 (-9.1%)	$kgCO_2/m^2$	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	48.37	$kWh/m^2/yr$	
Dwelling Fabric Energy Efficiency (DFEE)	42.22	$kWh/m^2/yr$	
	-6.2 (-12.8%)	$kWh/m^2/yr$	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	1.37 (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

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)	Medium	Pass

Based on:

Overshading	Average
Windows facing South West	4.71 m², No overhang
Windows facing North West	5.48 m², No overhang
Air change rate	3.87 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.