

PREDICTED ENERGY ASSESSMENT



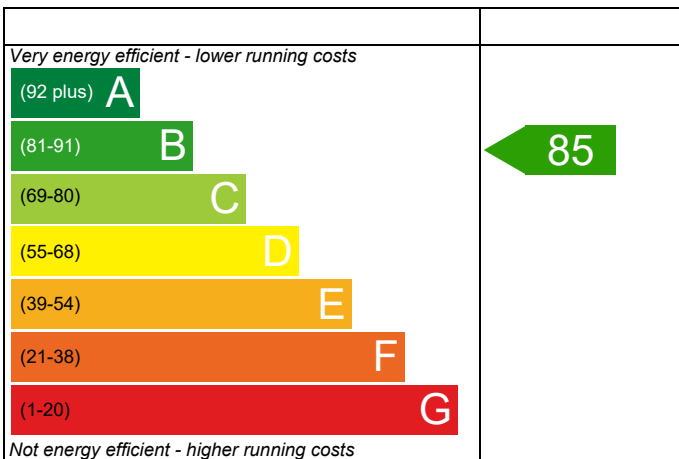
Plot 044 - PRJ010870 - EA159

Dwelling type: House, Mid-Terrace
 Date of assessment: 13/10/2020
 Produced by: Gary Nicholls
 Total floor area: 93.02 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.

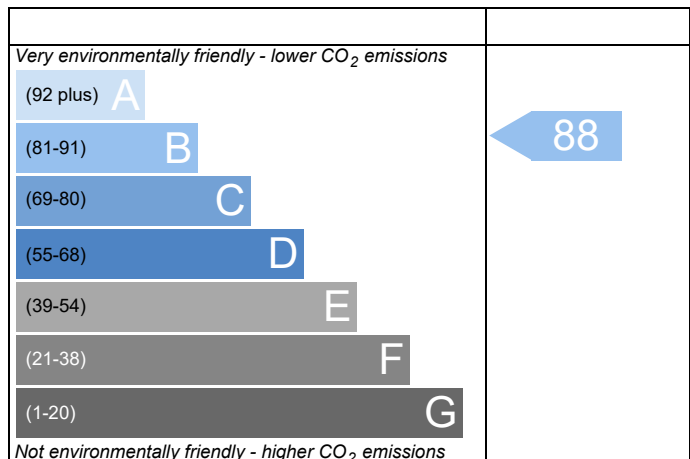
Energy Efficiency Rating



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 (CO₂) 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 (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	Plot 044 - PRJ010870 - EA159		Issued on Date	13/10/2020	
Assessment Reference	044 M	Prop Type Ref	NSS863 3B5P SAS BR-MT		
Property	Plot 044 - PRJ010870 - EA159				
SAP Rating	85 B	DER	15.46	TER	16.57
Environmental	88 B	% DER<TER	6.70		
CO ₂ Emissions (t/year)	1.22	DFEE	35.82	TFEE	43.61
General Requirements Compliance	Pass	% DFEE<TFEE	17.86		
Assessor Details	Mr. Gary Nicholls, Gary Nicholls, Tel: 02033971373, gary@briaryenergy.co.uk			Assessor ID	W947-0001
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)	16.57	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	15.46	kgCO ₂ /m ²	Pass
	-1.11 (-6.7%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	43.61	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	35.82	kWh/m ² /yr	
	-7.8 (-17.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.19 (max. 0.25)	0.19 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.30 (max. 2.00)	1.30 (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

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (East Anglia)

Slight

Pass

Based on:

Overshading

Average

Windows facing North

3.86 m², No overhang

Windows facing South

4.05 m², No overhang

Air change rate

0.00 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

0.10

W/m²K

Thermal bridging y-value

0.032

W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	Plot 044 - PRJ010870 - EA159	Issued on Date	13/10/2020
Assessment Reference	044 M	Prop Type Ref	NSS863 3B5P SAS BR-MT
Property	Plot 044 - PRJ010870 - EA159		

SAP Rating	85 B	DER	15.46	TER	16.57
Environmental	88 B	% DER<TER	6.70		
CO ₂ Emissions (t/year)	1.22	DFEE	35.82	TREE	43.61
General Requirements Compliance	Pass	% DFEE<TFEE	17.86		

Assessor Details	Mr. Gary Nicholls, Gary Nicholls, Tel: 02033971373, gary@briaryenergy.co.uk	Assessor ID	W947-0001
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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	46.5100 (1b)	x 2.3300 (2b)	= 108.3683 (1b) - (3b)
First floor	46.5100 (1c)	x 2.5300 (2c)	= 117.6703 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0200		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 226.0386 (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				4 * 10 =	40.0000 (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)				40.0000 / (5) =	0.1770 (8)							
Pressure test				Yes								
Measured/design AP50					5.0100							
Infiltration rate					0.4275 (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) =		0.3954 (21)							
Wind speed	Jan 4.9000	Feb 4.8000	Mar 4.7000	Apr 4.2000	May 4.2000	Jun 3.7000	Jul 3.8000	Aug 3.8000	Sep 4.0000	Oct 4.2000	Nov 4.3000	Dec 4.5000 (22)
Wind factor	1.2250	1.2000	1.1750	1.0500	1.0500	0.9250	0.9500	0.9500	1.0000	1.0500	1.0750	1.1250 (22a)
Adj infiltr rate	0.4844	0.4745	0.4646	0.4152	0.4152	0.3657	0.3756	0.3756	0.3954	0.4152	0.4251	0.4448 (22b)
Effective ac	0.6173	0.6126	0.6079	0.5862	0.5862	0.5669	0.5705	0.5705	0.5782	0.5862	0.5903	0.5989 (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
Half Glazed Door			2.1000	1.3000	2.7300		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			7.9100	1.2357	9.7747		(27)
Ground Floor			46.5100	0.1900	8.8369	75.6000	3516.1560 (28a)
Brick Wall	52.2400	12.1100	40.1300	0.2400	9.6312	39.3600	1579.5169 (29a)
Ins Joist	46.5100		46.5100	0.1000	4.6510	5.8200	270.6882 (30)
Total net area of external elements Aum(A, m ²)			145.2600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.3538		(33)
Party Wall			84.1300	0.0000	0.0000	54.0300	4545.5438 (32)
Ground Floor Stud			73.1800			5.8200	425.9076 (32c)
1st Floor Stud			107.9400			5.8200	628.2108 (32c)
Int Floors			46.5100			18.0000	837.1800 (32d)
Int Ceilings			46.5100			5.8200	270.6882 (32e)
Heat capacity Cm = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	12073.8914 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							129.7989 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.7180 (36)
Total fabric heat loss						(33) + (36) =	43.0718 (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 = $0.33 \times (25)m \times (5)$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	46.0465	45.6930	45.3468	43.7250	43.7250	42.2855	42.5588	42.5588	43.1274	43.7250	44.0348	44.6762 (38)
Heat transfer coeff	89.1183	88.7648	88.4186	86.7968	86.7968	85.3573	85.6306	85.6306	86.1991	86.7968	87.1066	87.7480 (39)
Average = Sum(39)m / 12 =												87.0304 (39)
HLP	0.9581	0.9543	0.9505	0.9331	0.9331	0.9176	0.9206	0.9206	0.9267	0.9331	0.9364	0.9433 (40)
HLP (average)												0.9356 (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 2.6648 (42)
 Average daily hot water use (litres/day) 97.4900 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	107.2390	103.3394	99.4398	95.5402	91.6406	87.7410	87.7410	91.6406	95.5402	99.4398	103.3394	107.2390 (44)
Energy conte	159.0323	139.0907	143.5291	125.1322	120.0673	103.6090	96.0089	110.1716	111.4874	129.9279	141.8264	154.0143 (45)
Energy content (annual)												Total = Sum(45)m = 1533.8973 (45)
Distribution loss (46)m = $0.15 \times (45)m$	23.8548	20.8636	21.5294	18.7698	18.0101	15.5413	14.4013	16.5257	16.7231	19.4892	21.2740	23.1021 (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	14.6940	13.2584	14.6451	14.1170	14.5470	14.0310	14.4696	14.5198	14.0778	14.6045	14.1838	14.6790 (61)
Total heat required for water heating calculated for each month	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933 (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	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933 (64)
Total per year (kWh/year) = Sum(64)m =												1705.7242 (64)
RHI water heating demand												1706 (64)
Heat gains from water heating, kWh/month	56.5518	49.5622	51.3847	45.1357	43.5591	37.9577	35.5404	40.2620	40.5890	46.8521	50.7032	54.8795 (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	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	65.0279	57.7572	46.9713	35.5603	26.5818	22.4414	24.2488	31.5195	42.3054	53.7164	62.6949	66.8352 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	364.9632	368.7504	359.2068	338.8897	313.2430	289.1387	273.0356	269.2484	278.7920	299.1091	324.7558	348.8601 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539 (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)	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937 (71)
Water heating gains (Table 5)	76.0104	73.7533	69.0655	62.6885	58.5472	52.7191	47.7693	54.1156	56.3737	62.9733	70.4212	73.7628 (72)
Total internal gains	615.9523	610.2117	585.1943	547.0892	508.3227	474.2500	455.0044	464.8342	487.4217	525.7495	567.8226	599.4088 (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						
North	3.8600	12.0539	0.4700	0.0000	0.7700	16.8385 (74)						
South	4.0500	51.7504	0.4700	0.0000	0.7700	75.8503 (78)						
Solar gains	92.6888	145.6806	195.0438	257.3983	284.5657	298.1954	283.0404	256.0158	224.5398	167.6995	113.3649	78.8306 (83)
Total gains	708.6411	755.8922	780.2381	804.4875	792.8884	772.4454	738.0448	720.8500	711.9615	693.4489	681.1875	678.2394 (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	37.6338	37.7837	37.9316	38.6403	38.6403	39.2920	39.1666	39.1666	38.9083	38.6403	38.5029	38.2215
alpha	3.5089	3.5189	3.5288	3.5760	3.5760	3.6195	3.6111	3.6111	3.5939	3.5760	3.5669	3.5481
util living area	0.9570	0.9442	0.9172	0.8570	0.7525	0.5722	0.3861	0.3946	0.6446	0.8470	0.9320	0.9615 (86)
MIT	19.6633	19.8098	20.0966	20.4630	20.7545	20.9371	20.9891	20.9883	20.8984	20.5722	20.0900	19.6506 (87)
Th 2	20.1184	20.1216	20.1248	20.1395	20.1395	20.1525	20.1501	20.1501	20.1449	20.1395	20.1366	20.1308 (88)
util rest of house	0.9501	0.9352	0.9032	0.8319	0.7070	0.4996	0.2933	0.3001	0.5745	0.8151	0.9194	0.9551 (89)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

MIT 2	18.9088	19.0544	19.3363	19.6972	19.9611	20.1181	20.1467	20.1465	20.0849	19.8032	19.3424	18.9063 (90)
Living area fraction									fLA = Living area / (4) =			0.1907 (91)
MIT	19.0527	19.1984	19.4813	19.8433	20.1124	20.2743	20.3074	20.3070	20.2400	19.9498	19.4850	19.0482 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.9027	19.0484	19.3313	19.6933	19.9624	20.1243	20.1574	20.1570	20.0900	19.7998	19.3350	18.8982 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9380	0.9217	0.8881	0.8170	0.6967	0.4971	0.2941	0.3009	0.5697	0.8006	0.9051	0.9438 (94)
Useful gains	664.6814	696.7326	692.9267	657.2792	552.3896	383.9600	217.0696	216.8892	405.6099	555.1832	616.5108	640.1157 (95)
Ext temp.	4.7000	5.2000	7.0000	9.5000	12.5000	15.4000	17.6000	17.6000	15.0000	11.4000	7.7000	4.7000 (96)
Heat loss rate W												
1265.7200	1229.2542	1090.3158	884.7433	647.7156	403.2498	218.9916	218.9605	438.7559	729.0783	1013.4841	1245.8648 (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												
447.1727	357.8545	295.6575	163.7742	70.9226	0.0000	0.0000	0.0000	0.0000	129.3779	285.8208	450.6773 (98)	
Space heating												2201.2575 (98)
RHI space heating demand												2201 (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	46.5100 (1b)	2.3300 (2b)	108.3683 (1b) - (3b)
First floor	46.5100 (1c)	2.5300 (2c)	117.6703 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0200		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 226.0386 (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				4 * 10 =	40.0000 (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) =				40.0000 / (5) =	0.1770 (8)							
Pressure test					Yes							
Measured/design AP50					5.0100							
Infiltration rate					0.4275 (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) =	0.3954 (21)							
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 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	0.5041	0.4943	0.4844	0.4349	0.4251	0.3756	0.3756	0.3657	0.3954	0.4251	0.4448	0.4646 (22b)
Effective ac	0.6271	0.6221	0.6173	0.5946	0.5903	0.5705	0.5705	0.5669	0.5782	0.5903	0.5989	0.6079 (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
Half Glazed Door			2.1000	1.3000	2.7300		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			7.9100	1.2357	9.7747		(27)
Ground Floor			46.5100	0.1900	8.8369	75.6000	3516.1560 (28a)
Brick Wall	52.2400	12.1100	40.1300	0.2400	9.6312	39.3600	1579.5169 (29a)
Ins Joist	46.5100		46.5100	0.1000	4.6510	5.8200	270.6882 (30)
Total net area of external elements Aum(A, m2)			145.2600				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	38.3538	(33)
Party Wall			84.1300	0.0000	0.0000	54.0300	4545.5438 (32)
Ground Floor Stud			73.1800			5.8200	425.9076 (32c)
1st Floor Stud			107.9400			5.8200	628.2108 (32c)
Int Floors			46.5100			18.0000	837.1800 (32d)
Int Ceilings			46.5100			5.8200	270.6882 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 12073.8914 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							129.7989 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.7180 (36)
Total fabric heat loss							(33) + (36) = 43.0718 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	46.7754	46.4073	46.0465	44.3519	44.0348	42.5588	42.5588	42.2855	43.1274	44.0348	44.6762	45.3468 (38)
Average = Sum(39)m / 12 =	89.8472	89.4791	89.1183	87.4237	87.1066	85.6306	85.6306	85.3573	86.1991	87.1066	87.7480	88.4186 (39)
HLP	0.9659	0.9619	0.9581	0.9398	0.9364	0.9206	0.9206	0.9176	0.9267	0.9364	0.9433	0.9505 (40)
HLP (average)												0.9398 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.6648 (42)
Average daily hot water use (litres/day)												97.4900 (43)
Daily hot water use	107.2390	103.3394	99.4398	95.5402	91.6406	87.7410	87.7410	91.6406	95.5402	99.4398	103.3394	107.2390 (44)
Energy conte	159.0323	139.0907	143.5291	125.1322	120.0673	103.6090	96.0089	110.1716	111.4874	129.9279	141.8264	154.0143 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Energy content (annual)												Total = Sum(45)m =	1533.8973 (45)
Distribution loss (46)m = 0.15 x (45)m													
	23.8548	20.8636	21.5294	18.7698	18.0101	15.5413	14.4013	16.5257	16.7231	19.4892	21.2740	23.1021	(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	14.6940	13.2584	14.6451	14.1170	14.5470	14.0310	14.4696	14.5198	14.0778	14.6045	14.1838	14.6790	(61)
Total heat required for water heating calculated for each month	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933	(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	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933	(64)
Total per year (kWh/year) = Sum(64)m =												1705.7242 (64)	
Heat gains from water heating, kWh/month	56.5518	49.5622	51.3847	45.1357	43.5591	37.9577	35.5404	40.2620	40.5890	46.8521	50.7032	54.8795	(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	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	65.0279	57.7572	46.9713	35.5603	26.5818	22.4414	24.2488	31.5195	42.3054	53.7164	62.6949	66.8352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	364.9632	368.7504	359.2068	338.8897	313.2430	289.1387	273.0356	269.2484	278.7920	299.1091	324.7558	348.8601	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	(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)	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	(71)
Water heating gains (Table 5)	76.0104	73.7533	69.0655	62.6885	58.5472	52.7191	47.7693	54.1156	56.3737	62.9733	70.4212	73.7628	(72)
Total internal gains	615.9523	610.2117	585.1943	547.0892	508.3227	474.2500	455.0044	464.8342	487.4217	525.7495	567.8226	599.4088	(73)

6. Solar gains

[Jan]		Area	Solar flux	Specific data	FF	Access	Gains						
		m ²	Table 6a	g	Specific data	factor	W						
			W/m ²	or Table 6b	or Table 6c	Table 6d							
North		3.8600	10.6334	0.4700	0.0000	0.7700	14.8541 (74)						
South		4.0500	46.7521	0.4700	0.0000	0.7700	68.5243 (78)						
Solar gains	83.3784	140.6121	191.1914	239.0502	272.7389	273.7637	262.6308	236.5066	207.3292	154.8364	99.5491	71.5944	(83)
Total gains	699.3307	750.8238	776.3857	786.1394	781.0616	748.0136	717.6352	701.3408	694.7509	680.5858	667.3717	671.0032	(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	37.3285	37.4820	37.6338	38.3633	38.5029	39.1666	39.1666	39.2920	38.9083	38.5029	38.2215	37.9316	
alpha	3.4886	3.4988	3.5089	3.5576	3.5669	3.6111	3.6111	3.6195	3.5939	3.5669	3.5481	3.5288	
util living area	0.9615	0.9483	0.9257	0.8795	0.7951	0.6490	0.4994	0.5274	0.7179	0.8770	0.9430	0.9659	(86)
MIT	19.5743	19.7439	20.0101	20.3640	20.6714	20.8908	20.9678	20.9603	20.8327	20.4630	19.9763	19.5513	(87)
Th 2	20.1119	20.1152	20.1184	20.1338	20.1366	20.1501	20.1501	20.1525	20.1449	20.1366	20.1308	20.1248	(88)
util rest of house	0.9553	0.9400	0.9133	0.8582	0.7566	0.5840	0.4124	0.4418	0.6591	0.8515	0.9325	0.9603	(89)
MIT 2	18.8160	18.9848	19.2475	19.6001	19.8866	20.0829	20.1360	20.1342	20.0348	19.7001	19.2273	18.8036	(90)
Living area fraction												fLA = Living area / (4) = 0.1907 (91)	
MIT	18.9606	19.1296	19.3929	19.7457	20.0363	20.2370	20.2947	20.2918	20.1869	19.8456	19.3701	18.9462	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8106	18.9796	19.2429	19.5957	19.8863	20.0870	20.1447	20.1418	20.0369	19.6956	19.2201	18.7962	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9438	0.9268	0.8984	0.8428	0.7442	0.5788	0.4118	0.4406	0.6509	0.8362	0.9190	0.9497	(94)
Useful gains	660.0209	695.8644	697.5189	662.5318	581.2478	432.9384	295.5477	309.0214	452.2085	569.0804	613.2970	637.2190	(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	1303.7406	1259.8263	1135.6298	935.0613	713.0765	469.8550	303.5320	319.3864	511.7595	792.2865	1063.5189	1290.5734	(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	478.9275	378.9824	325.9545	196.2212	98.0805	0.0000	0.0000	0.0000	0.0000	166.0654	324.1598	486.0956	(98)
Space heating												2454.4869 (98)	
Space heating per m ²												(98) / (4) = 26.3867 (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

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													2712.1402 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	478.9275	378.9824	325.9545	196.2212	98.0805	0.0000	0.0000	0.0000	0.0000	166.0654	324.1598	486.0956	(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)	529.2017	418.7651	360.1707	216.8190	108.3763	0.0000	0.0000	0.0000	0.0000	183.4977	358.1876	537.1222	(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	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933	(64)
Efficiency of water heater (217)m	89.6255	89.5587	89.4290	89.1437	88.6208	87.3000	87.3000	87.3000	87.3000	88.9822	89.4349	87.3000	(216)
Fuel for water heating, kWh/month	193.8358	170.1108	176.8713	156.2075	151.8992	134.7537	126.5505	142.8310	143.8320	162.4284	174.4400	188.1617	(219)
Water heating fuel used												1921.9218	(219)
Annual totals kWh/year													
Space heating fuel - main system													2712.1402 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													75.0000 (231)
Electricity for lighting (calculated in Appendix L)													459.3653 (232)
Total delivered energy for all uses													5168.4274 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2712.1402	3.4800	94.3825 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1921.9218	3.4800	66.8829 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	459.3653	13.1900	60.5903 (250)
Additional standing charges			120.0000 (251)
Total energy cost			351.7481 (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] =	1.0704 (257)
SAP value		85.0682
SAP rating (Section 12)		85 (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	2712.1402	0.2160	585.8223 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1921.9218	0.2160	415.1351 (264)
Space and water heating			1000.9574 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	459.3653	0.5190	238.4106 (268)
Total kg/year			1278.2930 (272)
CO2 emissions per m2			13.7400 (273)
EI value			87.5894
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	$3.48 / 0.8864 = 3.926$, stars = 4
Water heating environmental impact	$0.216 / 0.8864 = 0.2437$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

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Calculation Type: New Build (As Designed)



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

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

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	46.5100 (1b)	x 2.3300 (2b)	= 108.3683 (1b) - (3b)
First floor	46.5100 (1c)	x 2.5300 (2c)	= 117.6703 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0200		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 226.0386 (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				4 * 10 =	40.0000 (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) =				40.0000 / (5) =	0.1770 (8)
Pressure test					Yes
Measured/design AP50					5.0100
Infiltration rate					0.4275 (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) =		0.3954 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.8000	4.7000	4.2000	4.2000	3.7000	3.8000	3.8000	4.0000	4.2000	4.3000	4.5000 (22)
Wind factor	1.2250	1.2000	1.1750	1.0500	1.0500	0.9250	0.9500	0.9500	1.0000	1.0500	1.0750	1.1250 (22a)
Adj infilt rate												
Effective ac	0.4844	0.4745	0.4646	0.4152	0.4152	0.3657	0.3756	0.3756	0.3954	0.4152	0.4251	0.4448 (22b)
	0.6173	0.6126	0.6079	0.5862	0.5862	0.5669	0.5705	0.5705	0.5782	0.5862	0.5903	0.5989 (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
Half Glazed Door			2.1000	1.3000	2.7300		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			7.9100	1.2357	9.7747		(27)
Ground Floor			46.5100	0.1900	8.8369	75.6000	3516.1560 (28a)
Brick Wall	52.2400	12.1100	40.1300	0.2400	9.6312	39.3600	1579.5169 (29a)
Ins Joist	46.5100		46.5100	0.1000	4.6510	5.8200	270.6882 (30)
Total net area of external elements Aum(A, m2)			145.2600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.3538		(33)
Party Wall			84.1300	0.0000	0.0000	54.0300	4545.5438 (32)
Ground Floor Stud			73.1800			5.8200	425.9076 (32c)
1st Floor Stud			107.9400			5.8200	628.2108 (32c)
Int Floors			46.5100			18.0000	837.1800 (32d)
Int Ceilings			46.5100			5.8200	270.6882 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12073.8914 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							129.7989 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.7180 (36)
Total fabric heat loss						(33) + (36) =	43.0718 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	46.0465	45.6930	45.3468	43.7250	43.7250	42.2855	42.5588	42.5588	43.1274	43.7250	44.0348	44.6762 (38)
Average = Sum(39)m / 12 =	89.1183	88.7648	88.4186	86.7968	86.7968	85.3573	85.6306	85.6306	86.1991	86.7968	87.1066	87.7480 (39)
HLP	0.9581	0.9543	0.9505	0.9331	0.9331	0.9176	0.9206	0.9206	0.9267	0.9331	0.9364	0.9433 (40)
HLP (average)												0.9356 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.6648 (42)
Average daily hot water use (litres/day)												97.4900 (43)
Daily hot water use	107.2390	103.3394	99.4398	95.5402	91.6406	87.7410	87.7410	91.6406	95.5402	99.4398	103.3394	107.2390 (44)
Energy conte	159.0323	139.0907	143.5291	125.1322	120.0673	103.6090	96.0089	110.1716	111.4874	129.9279	141.8264	154.0143 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

Energy content (annual)												Total = Sum(45)m =	1533.8973 (45)
Distribution loss (46)m = 0.15 x (45)m													
	23.8548	20.8636	21.5294	18.7698	18.0101	15.5413	14.4013	16.5257	16.7231	19.4892	21.2740	23.1021	(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	14.6940	13.2584	14.6451	14.1170	14.5470	14.0310	14.4696	14.5198	14.0778	14.6045	14.1838	14.6790	(61)
Total heat required for water heating calculated for each month	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933	(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	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933	(64)
Total per year (kWh/year) = Sum(64)m =												1705.7242 (64)	
Heat gains from water heating, kWh/month	56.5518	49.5622	51.3847	45.1357	43.5591	37.9577	35.5404	40.2620	40.5890	46.8521	50.7032	54.8795	(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	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	65.0279	57.7572	46.9713	35.5603	26.5818	22.4414	24.2488	31.5195	42.3054	53.7164	62.6949	66.8352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	364.9632	368.7504	359.2068	338.8897	313.2430	289.1387	273.0356	269.2484	278.7920	299.1091	324.7558	348.8601	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	(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)	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	(71)
Water heating gains (Table 5)	76.0104	73.7533	69.0655	62.6885	58.5472	52.7191	47.7693	54.1156	56.3737	62.9733	70.4212	73.7628	(72)
Total internal gains	615.9523	610.2117	585.1943	547.0892	508.3227	474.2500	455.0044	464.8342	487.4217	525.7495	567.8226	599.4088	(73)

6. Solar gains

[Jan]			Area	Solar flux	Specific data	FF	Access	Gains					
			m ²	Table 6a	g		factor	W					
				W/m ²	or Table 6b	or Table 6c	Table 6d						
North			3.8600	12.0539	0.4700	0.0000	0.7700	16.8385 (74)					
South			4.0500	51.7504	0.4700	0.0000	0.7700	75.8503 (78)					
Solar gains	92.6888	145.6806	195.0438	257.3983	284.5657	298.1954	283.0404	256.0158	224.5398	167.6995	113.3649	78.8306	(83)
Total gains	708.6411	755.8922	780.2381	804.4875	792.8884	772.4454	738.0448	720.8500	711.9615	693.4489	681.1875	678.2394	(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	37.6338	37.7837	37.9316	38.6403	38.6403	39.2920	39.1666	39.1666	38.9083	38.6403	38.5029	38.2215	
alpha	3.5089	3.5189	3.5288	3.5760	3.5760	3.6195	3.6111	3.6111	3.5939	3.5760	3.5669	3.5481	
util living area	0.9570	0.9442	0.9172	0.8570	0.7525	0.5722	0.3861	0.3946	0.6446	0.8470	0.9320	0.9615	(86)
MIT	19.6633	19.8098	20.0966	20.4630	20.7545	20.9371	20.9891	20.9883	20.8984	20.5722	20.0900	19.6506	(87)
Th 2	20.1184	20.1216	20.1248	20.1395	20.1395	20.1525	20.1501	20.1501	20.1449	20.1395	20.1366	20.1308	(88)
util rest of house	0.9501	0.9352	0.9032	0.8319	0.7070	0.4996	0.2933	0.3001	0.5745	0.8151	0.9194	0.9551	(89)
MIT 2	18.9088	19.0544	19.3363	19.6972	19.9611	20.1181	20.1467	20.1465	20.0849	19.8032	19.3424	18.9063	(90)
Living area fraction													fLA = Living area / (4) = 0.1907 (91)
MIT	19.0527	19.1984	19.4813	19.8433	20.1124	20.2743	20.3074	20.3070	20.2400	19.9498	19.4850	19.0482	(92)
Temperature adjustment													-0.1500
adjusted MIT	18.9027	19.0484	19.3313	19.6933	19.9624	20.1243	20.1574	20.1570	20.0900	19.7998	19.3350	18.8982	(93)

8. Space heating requirement

Utilisation	0.9380	0.9217	0.8881	0.8170	0.6967	0.4971	0.2941	0.3009	0.5697	0.8006	0.9051	0.9438	(94)
Useful gains	664.6814	696.7326	692.9267	657.2792	552.3896	383.9600	217.0696	216.8892	405.6099	555.1832	616.5108	640.1157	(95)
Ext temp.	4.7000	5.2000	7.0000	9.5000	12.5000	15.4000	17.6000	17.6000	15.0000	11.4000	7.7000	4.7000	(96)
Heat loss rate W	1265.7200	1229.2542	1090.3158	884.7433	647.7156	403.2498	218.9916	218.9605	438.7559	729.0783	1013.4841	1245.8648	(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	447.1727	357.8545	295.6575	163.7742	70.9226	0.0000	0.0000	0.0000	0.0000	129.3779	285.8208	450.6773	(98)
Space heating													2201.2575 (98)
Space heating per m2													(98) / (4) = 23.6643 (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

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													2432.3287 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	447.1727	357.8545	295.6575	163.7742	70.9226	0.0000	0.0000	0.0000	0.0000	129.3779	285.8208	450.6773	(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)	494.1135	395.4194	326.6934	180.9660	78.3675	0.0000	0.0000	0.0000	0.0000	142.9590	315.8241	497.9859	(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	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933	(64)
Efficiency of water heater (217)m	89.5812	89.5202	89.3584	89.0008	88.3783	87.3000	87.3000	87.3000	87.3000	88.7828	89.3436	87.3000	(216)
Fuel for water heating, kWh/month	193.9316	170.1841	177.0110	156.4582	152.3160	134.7537	126.5505	142.8310	143.8320	162.7932	174.6182	188.2623	(219)
Water heating fuel used													1923.5417 (219)
Annual totals kWh/year													
Space heating fuel - main system													2432.3287 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													75.0000 (231)
Electricity for lighting (calculated in Appendix L)													459.3653 (232)
Total delivered energy for all uses													4890.2358 (238)

10a. Fuel costs - using BEDF prices (466)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2432.3287	3.9500	96.0770 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1923.5417	3.9500	75.9799 (247)
Pumps and fans for heating	75.0000	18.7000	14.0250 (249)
Energy for lighting	459.3653	18.7000	85.9013 (250)
Additional standing charges			91.0000 (251)
Total energy cost			362.9832 (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	2432.3287	0.2160	525.3830 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1923.5417	0.2160	415.4850 (264)
Space and water heating			940.8680 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	459.3653	0.5190	238.4106 (268)
Total kg/year			1218.2036 (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	2432.3287	1.2200	2967.4410 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1923.5417	1.2200	2346.7209 (264)
Space and water heating			5314.1619 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	459.3653	3.0700	1410.2516 (268)
Primary energy kWh/year			6954.6635 (272)
Primary energy kWh/m2/year			74.7652 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 85
 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	Recommended
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Recommended
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
N Solar water heating	+ 1.2	-£ 30	-190 kg (15.6%)
U Solar photovoltaic panels	+ 9.7	-£ 350	-970 kg (94.3%)

Recommended measures	Typical annual savings		Energy efficiency	Environmental impact
Solar water heating	£30	2.04 kg/m ²	B 86	B 89
Solar photovoltaic panels	£350	10.43 kg/m ²	A 96	A 98
Total Savings	£380	12.47 kg/m²		

Potential energy efficiency rating: A 96
 Potential environmental impact rating: A 98

Fuel prices for cost data on this page from database revision number 466 TEST (28 Sep 2020)
 Recommendation texts revision number 4.9c (22 Feb 2014)

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

	Current	Potential	Saving
Electricity	£100	£109	-£9
Mains gas	£263	£224	£39
Space heating	£201	£201	£0
Water heating	£76	£46	£30
Lighting	£86	£86	£0
Generated (PV)	-£0	-£350	£350
Total cost of fuels	£363	-£17	£380
Total cost of uses	£363	-£17	£380
Delivered energy	53 kWh/m ²	22 kWh/m ²	30 kWh/m ²
Carbon dioxide emissions	1.2 tonnes	0.1 tonnes	1.2 tonnes
CO2 emissions per m ²	13 kg/m ²	1 kg/m ²	12 kg/m ²
Primary energy	75 kWh/m ²	2 kWh/m ²	73 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

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	46.5100 (1b)	2.3300 (2b)	108.3683 (1b) - (3b)
First floor	46.5100 (1c)	2.5300 (2c)	117.6703 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0200		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 226.0386 (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				4 * 10 =	40.0000 (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) =				40.0000 / (5) =	0.1770 (8)							
Pressure test					Yes							
Measured/design AP50					5.0100							
Infiltration rate					0.4275 (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) =	0.3954 (21)							
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 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	0.5041	0.4943	0.4844	0.4349	0.4251	0.3756	0.3756	0.3657	0.3954	0.4251	0.4448	0.4646 (22b)
Effective ac	0.6271	0.6221	0.6173	0.5946	0.5903	0.5705	0.5705	0.5669	0.5782	0.5903	0.5989	0.6079 (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
Half Glazed Door			2.1000	1.3000	2.7300		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			7.9100	1.2357	9.7747		(27)
Ground Floor			46.5100	0.1900	8.8369	75.6000	3516.1560 (28a)
Brick Wall	52.2400	12.1100	40.1300	0.2400	9.6312	39.3600	1579.5169 (29a)
Ins Joist	46.5100		46.5100	0.1000	4.6510	5.8200	270.6882 (30)
Total net area of external elements Aum(A, m2)			145.2600				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	38.3538	(33)
Party Wall			84.1300	0.0000	0.0000	54.0300	4545.5438 (32)
Ground Floor Stud			73.1800			5.8200	425.9076 (32c)
1st Floor Stud			107.9400			5.8200	628.2108 (32c)
Int Floors			46.5100			18.0000	837.1800 (32d)
Int Ceilings			46.5100			5.8200	270.6882 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 12073.8914 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							129.7989 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.7180 (36)
Total fabric heat loss							(33) + (36) = 43.0718 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	46.7754	46.4073	46.0465	44.3519	44.0348	42.5588	42.5588	42.2855	43.1274	44.0348	44.6762	45.3468 (38)
Average = Sum(39)m / 12 =	89.8472	89.4791	89.1183	87.4237	87.1066	85.6306	85.6306	85.3573	86.1991	87.1066	87.7480	88.4186 (39)
HLP	0.9659	0.9619	0.9581	0.9398	0.9364	0.9206	0.9206	0.9176	0.9267	0.9364	0.9433	0.9505 (40)
HLP (average)												0.9398 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.6648 (42)
Average daily hot water use (litres/day)												97.4900 (43)
Daily hot water use	107.2390	103.3394	99.4398	95.5402	91.6406	87.7410	87.7410	91.6406	95.5402	99.4398	103.3394	107.2390 (44)
Energy conte	159.0323	139.0907	143.5291	125.1322	120.0673	103.6090	96.0089	110.1716	111.4874	129.9279	141.8264	154.0143 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

Energy content (annual)												Total = Sum(45)m =	1533.8973 (45)
Distribution loss (46)m = 0.15 x (45)m													
	23.8548	20.8636	21.5294	18.7698	18.0101	15.5413	14.4013	16.5257	16.7231	19.4892	21.2740	23.1021	(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	14.6940	13.2584	14.6451	14.1170	14.5470	14.0310	14.4696	14.5198	14.0778	14.6045	14.1838	14.6790	(61)
Total heat required for water heating calculated for each month	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933	(62)
Aperture area of solar collector												3.0000 (H1)	
Zero-loss collector efficiency												0.7000 (H2)	
Collector heat loss coefficient												1.8000 (H3)	
Collector 2nd order heat loss coefficient												0.0050 (H3a)	
Collector effective heat loss coefficient												1.8063 (H3b)	
Collector performance ratio												2.5804 (H4)	
Annual solar radiation per m2												1079.5246 (H5)	
Overshading factor												0.8000 (H6)	
Solar energy available												1813.6014 (H7)	
Adjustment factor for showers												1.0000 (H7a)	
Solar-to-load ratio												1.1823 (H8)	
Utilisation factor												0.5708 (H9)	
Collector performance factor												0.8793 (H10)	
Dedicated solar storage volume												75.0000 (H11)	
Effective solar volume												75.0000 (H13)	
Daily hot water demand												97.4900 (H14)	
Volume ratio Veff/V												0.7693 (H15)	
Solar storage volume factor												0.9475 (H16)	
Solar input	-25.0098	-41.7341	-71.0780	-95.2585	-117.6839	-115.7020	-114.1730	-99.7535	-78.1270	-53.3515	-29.6652	-20.9289	(63)
Solar input (sum of months) = Sum(63)m =												-862.4655 (63)	
Output from w/h	148.7166	110.6149	87.0962	43.9906	16.9304	1.9380	0.0000	24.9379	47.4383	91.1808	126.3450	147.7644	(64)
Total per year (kWh/year) = Sum(64)m =												846.9531 (64)	
Heat gains from water heating, kWh/month	56.5518	49.5622	51.3847	45.1357	43.5591	37.9577	35.5404	40.2620	40.5890	46.8521	50.7032	54.8795	(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	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	65.0279	57.7572	46.9713	35.5603	26.5818	22.4414	24.2488	31.5195	42.3054	53.7164	62.6949	66.8352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	364.9632	368.7504	359.2068	338.8897	313.2430	289.1387	273.0356	269.2484	278.7920	299.1091	324.7558	348.8601	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	(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)	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	(71)
Water heating gains (Table 5)	76.0104	73.7533	69.0655	62.6885	58.5472	52.7191	47.7693	54.1156	56.3737	62.9733	70.4212	73.7628	(72)
Total internal gains	615.9523	610.2117	585.1943	547.0892	508.3227	474.2500	455.0044	464.8342	487.4217	525.7495	567.8226	599.4088	(73)

6. Solar gains

[Jan]		Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W				
North		3.8600	10.6334	0.4700			0.0000	0.7700	14.8541 (74)				
South		4.0500	46.7521	0.4700			0.0000	0.7700	68.5243 (78)				
Solar gains	83.3784	140.6121	191.1914	239.0502	272.7389	273.7637	262.6308	236.5066	207.3292	154.8364	99.5491	71.5944	(83)
Total gains	699.3307	750.8238	776.3857	786.1394	781.0616	748.0136	717.6352	701.3408	694.7509	680.5858	667.3717	671.0032	(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	37.3285	37.4820	37.6338	38.3633	38.5029	39.1666	39.1666	39.2920	38.9083	38.5029	38.2215	37.9316	
alpha	3.4886	3.4988	3.5089	3.5576	3.5669	3.6111	3.6111	3.6195	3.5939	3.5669	3.5481	3.5288	
util living area	0.9615	0.9483	0.9257	0.8795	0.7951	0.6490	0.4994	0.5274	0.7179	0.8770	0.9430	0.9659	(86)
MIT	19.5743	19.7439	20.0101	20.3640	20.6714	20.8908	20.9678	20.9603	20.8327	20.4630	19.9763	19.5513	(87)
Th 2	20.1119	20.1152	20.1184	20.1338	20.1366	20.1501	20.1501	20.1525	20.1449	20.1366	20.1308	20.1248	(88)
util rest of house	0.9553	0.9400	0.9133	0.8582	0.7566	0.5840	0.4124	0.4418	0.6591	0.8515	0.9325	0.9603	(89)
MIT 2	18.8160	18.9848	19.2475	19.6001	19.8866	20.0829	20.1360	20.1342	20.0348	19.7001	19.2273	18.8036	(90)
Living area fraction												fLA = Living area / (4) =	
MIT	18.9606	19.1296	19.3929	19.7457	20.0363	20.2370	20.2947	20.2918	20.1869	19.8456	19.3701	18.9462	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8106	18.9796	19.2429	19.5957	19.8863	20.0870	20.1447	20.1418	20.0369	19.6956	19.2201	18.7962	(93)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9438	0.9268	0.8984	0.8428	0.7442	0.5788	0.4118	0.4406	0.6509	0.8362	0.9190	0.9497	(94)
Useful gains	660.0209	695.8644	697.5189	662.5318	581.2478	432.9384	295.5477	309.0214	452.2085	569.0804	613.2970	637.2190	(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													
	1303.7406	1259.8263	1135.6298	935.0613	713.0765	469.8550	303.5320	319.3864	511.7595	792.2865	1063.5189	1290.5734	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	478.9275	378.9824	325.9545	196.2212	98.0805	0.0000	0.0000	0.0000	0.0000	166.0654	324.1598	486.0956	(98)
Space heating												2454.4869	(98)
Space heating per m2												(98) / (4) =	26.3867 (99)

8c. Space cooling requirement

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													2712.1402 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	478.9275	378.9824	325.9545	196.2212	98.0805	0.0000	0.0000	0.0000	0.0000	166.0654	324.1598	486.0956	(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)	529.2017	418.7651	360.1707	216.8190	108.3763	0.0000	0.0000	0.0000	0.0000	183.4977	358.1876	537.1222	(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	148.7166	110.6149	87.0962	43.9906	16.9304	1.9380	0.0000	24.9379	47.4383	91.1808	126.3450	147.7644	(64)
Efficiency of water heater	89.7208	89.7567	89.8059	89.8965	90.0143	87.3000	87.3000	87.3000	87.3000	89.3393	89.5791	89.7332	(217)
(217)m	89.7208	89.7567	89.8059	89.8965	90.0143	87.3000	87.3000	87.3000	87.3000	89.3393	89.5791	89.7332	(217)
Fuel for water heating, kWh/month	165.7549	123.2386	96.9828	48.9347	18.8086	2.2199	0.0000	28.5658	54.3394	102.0613	141.0429	164.6707	(219)
Water heating fuel used												946.6196	(219)
Annual totals kWh/year													
Space heating fuel - main system													2712.1402 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
pump for solar water heating													50.0000 (230g)
Total electricity for the above, kWh/year													125.0000 (231)
Electricity for lighting (calculated in Appendix L)													459.3653 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 2.50 * 1080 * 0.80) =										-1727.2394			-1727.2394 (233)
Total delivered energy for all uses													2515.8858 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2712.1402	3.4800	94.3825	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	946.6196	3.4800	32.9424	(247)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Pump for solar water heating	50.0000	13.1900	6.5950	(249)
Energy for lighting	459.3653	13.1900	60.5903	(250)
Additional standing charges			120.0000	(251)
Energy saving/generation technologies				
PV Unit		-1727.2394	13.1900	-227.8229 (252)
Total energy cost			96.5798	(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] =	0.2939 (257)
SAP value			95.9002
SAP rating (Section 12)			96 (258)
SAP band			A

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

Energy Emission factor Emissions

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

	kWh/year	kg CO2/kWh	kg CO2/year
Space heating - main system 1	2712.1402	0.2160	585.8223 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	946.6196	0.2160	204.4698 (264)
Space and water heating			790.2921 (265)
Pumps and fans	125.0000	0.5190	64.8750 (267)
Energy for lighting	459.3653	0.5190	238.4106 (268)
Energy saving/generation technologies			
PV Unit	-1727.2394	0.5190	-896.4372 (269)
Total kg/year			197.1405 (272)
CO2 emissions per m2			2.1200 (273)
EI value			98.0860
EI rating			98 (274)
EI band			A

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

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	46.5100 (1b)	2.3300 (2b)	108.3683 (1b) - (3b)
First floor	46.5100 (1c)	2.5300 (2c)	117.6703 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0200		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 226.0386 (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				4 * 10 =	40.0000 (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) =				40.0000 / (5) =	0.1770 (8)
Pressure test					Yes
Measured/design AP50					5.0100
Infiltration rate					0.4275 (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) =	0.3954 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.8000	4.7000	4.2000	4.2000	3.7000	3.8000	3.8000	4.0000	4.2000	4.3000	4.5000 (22)
Wind factor	1.2250	1.2000	1.1750	1.0500	1.0500	0.9250	0.9500	0.9500	1.0000	1.0500	1.0750	1.1250 (22a)
Adj inflt rate												
Effective ac	0.4844	0.4745	0.4646	0.4152	0.4152	0.3657	0.3756	0.3756	0.3954	0.4152	0.4251	0.4448 (22b)
	0.6173	0.6126	0.6079	0.5862	0.5862	0.5669	0.5705	0.5705	0.5782	0.5862	0.5903	0.5989 (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
Half Glazed Door			2.1000	1.3000	2.7300		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			7.9100	1.2357	9.7747		(27)
Ground Floor			46.5100	0.1900	8.8369	75.6000	3516.1560 (28a)
Brick Wall	52.2400	12.1100	40.1300	0.2400	9.6312	39.3600	1579.5169 (29a)
Ins Joist	46.5100		46.5100	0.1000	4.6510	5.8200	270.6882 (30)
Total net area of external elements Aum(A, m2)			145.2600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.3538		(33)
Party Wall			84.1300	0.0000	0.0000	54.0300	4545.5438 (32)
Ground Floor Stud			73.1800			5.8200	425.9076 (32c)
1st Floor Stud			107.9400			5.8200	628.2108 (32c)
Int Floors			46.5100			18.0000	837.1800 (32d)
Int Ceilings			46.5100			5.8200	270.6882 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 12073.8914 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							129.7989 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.7180 (36)
Total fabric heat loss							(33) + (36) = 43.0718 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	46.0465	45.6930	45.3468	43.7250	43.7250	42.2855	42.5588	42.5588	43.1274	43.7250	44.0348	44.6762 (38)
Average = Sum(39)m / 12 =	89.1183	88.7648	88.4186	86.7968	86.7968	85.3573	85.6306	85.6306	86.1991	86.7968	87.1066	87.7480 (39)
HLP	0.9581	0.9543	0.9505	0.9331	0.9331	0.9176	0.9206	0.9206	0.9267	0.9331	0.9364	0.9433 (40)
HLP (average)												0.9356 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.6648 (42)
Average daily hot water use (litres/day)												97.4900 (43)
Daily hot water use	107.2390	103.3394	99.4398	95.5402	91.6406	87.7410	87.7410	91.6406	95.5402	99.4398	103.3394	107.2390 (44)
Energy conte	159.0323	139.0907	143.5291	125.1322	120.0673	103.6090	96.0089	110.1716	111.4874	129.9279	141.8264	154.0143 (45)



FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

Energy content (annual)												Total = Sum(45)m =	1533.8973 (45)
Distribution loss (46)m = 0.15 x (45)m													
	23.8548	20.8636	21.5294	18.7698	18.0101	15.5413	14.4013	16.5257	16.7231	19.4892	21.2740	23.1021	(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	14.6940	13.2584	14.6451	14.1170	14.5470	14.0310	14.4696	14.5198	14.0778	14.6045	14.1838	14.6790	(61)
Total heat required for water heating calculated for each month	173.7263	152.3490	158.1742	139.2491	134.6143	117.6400	110.4786	124.6914	125.5653	144.5324	156.0102	168.6933	(62)
Aperture area of solar collector												3.0000 (H1)	
Zero-loss collector efficiency												0.7000 (H2)	
Collector heat loss coefficient												1.8000 (H3)	
Collector 2nd order heat loss coefficient												0.0050 (H3a)	
Collector effective heat loss coefficient												1.8063 (H3b)	
Collector performance ratio												2.5804 (H4)	
Annual solar radiation per m2												1168.2835 (H5)	
Overshading factor												0.8000 (H6)	
Solar energy available												1962.7164 (H7)	
Adjustment factor for showers												1.0000 (H7a)	
Solar-to-load ratio												1.2796 (H8)	
Utilisation factor												0.5423 (H9)	
Collector performance factor												0.8793 (H10)	
Dedicated solar storage volume												75.0000 (H11)	
Effective solar volume												75.0000 (H13)	
Daily hot water demand												97.4900 (H14)	
Volume ratio Veff/V												0.7693 (H15)	
Solar storage volume factor												0.9475 (H16)	
Solar input	-26.8389	-41.7549	-69.8888	-98.3597	-117.1969	-120.0583	-117.3125	-103.3358	-81.4102	-55.7818	-32.6187	-886.7952	(H17)
Solar input												-22.2388 (63)	
Solar input (sum of months) = Sum(63)m =												-886.7952 (63)	
Output from w/h	146.8875	110.5942	88.2855	40.8894	17.4174	0.0000	0.0000	21.3557	44.1551	88.7506	123.3915	146.4545	(64)
Total per year (kWh/year) = Sum(64)m =												828.1813 (64)	
Heat gains from water heating, kWh/month	56.5518	49.5622	51.3847	45.1357	43.5591	37.9577	35.5404	40.2620	40.5890	46.8521	50.7032	54.8795	(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	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	159.8905	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	65.0279	57.7572	46.9713	35.5603	26.5818	22.4414	24.2488	31.5195	42.3054	53.7164	62.6949	66.8352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	364.9632	368.7504	359.2068	338.8897	313.2430	289.1387	273.0356	269.2484	278.7920	299.1091	324.7558	348.8601	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	53.6539	(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)	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	(71)
Water heating gains (Table 5)	76.0104	73.7533	69.0655	62.6885	58.5472	52.7191	47.7693	54.1156	56.3737	62.9733	70.4212	73.7628	(72)
Total internal gains	615.9523	610.2117	585.1943	547.0892	508.3227	474.2500	455.0044	464.8342	487.4217	525.7495	567.8226	599.4088	(73)

6. Solar gains

[Jan]		Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W				
North		3.8600	12.0539	0.4700		0.0000	0.7700	16.8385	(74)				
South		4.0500	51.7504	0.4700		0.0000	0.7700	75.8503	(78)				
Solar gains	92.6888	145.6806	195.0438	257.3983	284.5657	298.1954	283.0404	256.0158	224.5398	167.6995	113.3649	78.8306	(83)
Total gains	708.6411	755.8922	780.2381	804.4875	792.8884	772.4454	738.0448	720.8500	711.9615	693.4489	681.1875	678.2394	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, T _{hl} (C)												21.0000 (85)	
Utilisation factor for gains for living area, n _{l,m} (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6338	37.7837	37.9316	38.6403	38.6403	39.2920	39.1666	39.1666	38.9083	38.6403	38.5029	38.2215	
alpha	3.5089	3.5189	3.5288	3.5760	3.5760	3.6195	3.6111	3.6111	3.5939	3.5760	3.5669	3.5481	
util living area	0.9570	0.9442	0.9172	0.8570	0.7525	0.5722	0.3861	0.3946	0.6446	0.8470	0.9320	0.9615	(86)
MIT	19.6633	19.8098	20.0966	20.4630	20.7545	20.9371	20.9891	20.9883	20.8984	20.5722	20.0900	19.6506	(87)
Th 2	20.1184	20.1216	20.1248	20.1395	20.1395	20.1525	20.1501	20.1501	20.1449	20.1395	20.1366	20.1308	(88)
util rest of house	0.9501	0.9352	0.9032	0.8319	0.7070	0.4996	0.2933	0.3001	0.5745	0.8151	0.9194	0.9551	(89)
MIT 2	18.9088	19.0544	19.3363	19.6972	19.9611	20.1181	20.1467	20.1465	20.0849	19.8032	19.3424	18.9063	(90)
Living area fraction												f _{LA} = Living area / (4) =	
MIT	19.0527	19.1984	19.4813	19.8433	20.1124	20.2743	20.3074	20.3070	20.2400	19.9498	19.4850	19.0482	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.9027	19.0484	19.3313	19.6933	19.9624	20.1243	20.1574	20.1570	20.0900	19.7998	19.3350	18.8982	(93)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9380	0.9217	0.8881	0.8170	0.6967	0.4971	0.2941	0.3009	0.5697	0.8006	0.9051	0.9438	(94)
Useful gains	664.6814	696.7326	692.9267	657.2792	552.3896	383.9600	217.0696	216.8892	405.6099	555.1832	616.5108	640.1157	(95)
Ext temp.	4.7000	5.2000	7.0000	9.5000	12.5000	15.4000	17.6000	17.6000	15.0000	11.4000	7.7000	4.7000	(96)
Heat loss rate W													
	1265.7200	1229.2542	1090.3158	884.7433	647.7156	403.2498	218.9916	218.9605	438.7559	729.0783	1013.4841	1245.8648	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	447.1727	357.8545	295.6575	163.7742	70.9226	0.0000	0.0000	0.0000	0.0000	129.3779	285.8208	450.6773	(98)
Space heating												2201.2575	(98)
Space heating per m2												23.6643	(99)
												(98) / (4) =	

8c. Space cooling requirement

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													2432.3287	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Space heating requirement	447.1727	357.8545	295.6575	163.7742	70.9226	0.0000	0.0000	0.0000	0.0000	129.3779	285.8208	450.6773	(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)	494.1135	395.4194	326.6934	180.9660	78.3675	0.0000	0.0000	0.0000	0.0000	142.9590	315.8241	497.9859	(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	146.8875	110.5942	88.2855	40.8894	17.4174	0.0000	0.0000	21.3557	44.1551	88.7506	123.3915	146.4545	(64)	
Efficiency of water heater	89.6871	89.7236	89.7436	89.8421	89.8506	87.3000	87.3000	87.3000	87.3000	89.1701	89.5107	89.6936	(217)	
Fuel for water heating, kWh/month	163.7777	123.2610	98.3752	45.5126	19.3848	0.0000	0.0000	24.4624	50.5786	99.5295	137.8512	163.2830	(219)	
												926.0160	(219)	
Water heating fuel used														
Annual totals kWh/year													2432.3287	(211)
Space heating fuel - main system													0.0000	(215)
Space heating fuel - secondary														
Electricity for pumps and fans:														
central heating pump													30.0000	(230c)
main heating flue fan													45.0000	(230e)
pump for solar water heating													50.0000	(230g)
Total electricity for the above, kWh/year													125.0000	(231)
Electricity for lighting (calculated in Appendix L)													459.3653	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV Unit 0 (0.80 * 2.50 * 1168 * 0.80) =									-1869.2537				-1869.2537	(233)
Total delivered energy for all uses													2073.4564	(238)

10a. Fuel costs - using BEDF prices (466)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2432.3287	3.9500	96.0770	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	926.0160	3.9500	36.5776	(247)
Pumps and fans for heating	75.0000	18.7000	14.0250	(249)
Pump for solar water heating	50.0000	18.7000	9.3500	(249)
Energy for lighting	459.3653	18.7000	85.9013	(250)
Additional standing charges			91.0000	(251)
Energy saving/generation technologies				
PV Unit	-1869.2537	18.7000	-349.5504	(252)
Total energy cost			-16.6195	(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	2432.3287	0.2160	525.3830	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	926.0160	0.2160	200.0195	(264)
Space and water heating			725.4025	(265)
Pumps and fans	125.0000	0.5190	64.8750	(267)
Energy for lighting	459.3653	0.5190	238.4106	(268)
Energy saving/generation technologies				
PV Unit	-1869.2537	0.5190	-970.1427	(269)
Total kg/year			58.5454	(272)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

 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	2432.3287	1.2200	2967.4410 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	926.0160	1.2200	1129.7395 (264)
Space and water heating			4097.1806 (265)
Pumps and fans	125.0000	3.0700	383.7500 (267)
Energy for lighting	459.3653	3.0700	1410.2516 (268)
Energy saving/generation technologies			
PV Unit	-1869.2537	3.0700	-5738.6088 (269)
Primary energy kWh/year			152.5734 (272)
Primary energy kWh/m2/year			1.6402 (273)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Property Reference	Plot 044 - PRJ010870 - EA159	Issued on Date	13/10/2020
Assessment Reference	044 M	Prop Type Ref	NSS863 3B5P SAS BR-MT
Property	Plot 044 - PRJ010870 - EA159		

SAP Rating	85 B	DER	15.46	TER	16.57
Environmental	88 B	% DER<TER	6.70		
CO₂ Emissions (t/year)	1.22	DFEE	35.82	TFEE	43.61
General Requirements Compliance	Pass	% DFEE<TFEE	17.86		

Assessor Details	Mr. Gary Nicholls, Gary Nicholls, Tel: 02033971373, gary@briaryenergy.co.uk	Assessor ID	W947-0001
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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)	16.57	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	15.46	kgCO ₂ /m ²	Pass
	-1.11 (-6.7%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	43.61	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	35.82	kWh/m ² /yr	
	-7.8 (-17.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.19 (max. 0.25)	0.19 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.30 (max. 2.00)	1.30 (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

BASIC COMPLIANCE REPORT

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

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (East Anglia)

Slight

Pass

Based on:

Overshading

Average

Windows facing North

3.86 m², No overhang

Windows facing South

4.05 m², No overhang

Air change rate

0.00 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

0.10

W/m²K

Thermal bridging γ -value

0.032

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.