

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

Property Reference	058 - PRJ013014			Issued on Date	27/01/2025
Assessment Reference	058	Prop Type Ref	2B		
Property	19 Erwood Close, Netley Abbey, Southampton, SO31 5TJ				
SAP Rating	85 B	DER	14.86	TER	18.35
Environmental	88 B	% DER<TER	19.01		
CO ₂ Emissions (t/year)	1.02	DFEE	44.38	TFEE	50.80
General Requirements Compliance	Pass	% DFEE<TFEE	12.65		
Assessor Details	Mr. Christopher Nicholls, Briary Energy Limited, Tel: 0203 397 1373, chris@briaryenergy.co.uk			Assessor ID	U903-0001
Client					

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REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

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DWELLING AS BUILT

End-Terrace House, total floor area 82 m²

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating:Mains gas
Fuel factor:1.00 (mains gas)
Target Carbon Dioxide Emission Rate (TER) 18.35 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 14.86 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)50.8 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)44.4 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.30)	0.21 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.18 (max. 0.25)	0.18 (max. 0.70)	OK
Roof	0.08 (max. 0.20)	0.08 (max. 0.35)	OK
Openings	1.36 (max. 2.00)	1.40 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals: 3.32 (measured in this dwelling)
Maximum 10.0 OK

4 Heating efficiency

Main heating system: Boiler system with radiators or underfloor - Mains gas
Data from database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Combi boiler
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK

Secondary heating system: None

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

Space heating controls: Time and temperature zone control OK

Hot water controls: No cylinder

Boiler interlock Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:100%
Minimum 75% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Southern England): Slight OK
Based on:
Overshading: Average
Windows facing East: 6.36 m², No overhang
Windows facing West: 2.72 m², No overhang
Air change rate: 4.67 ach
Blinds/curtains: Dark-coloured curtain or roller blind, closed 100% of daylight hours

10 Key features

Party wall U-value 0.00 W/m²K
Roof U-value 0.08 W/m²K
Air permeability 3.3 m³/m²h

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CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (Version 9.92, January 2014)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.9100 (1b)	x 2.3700 (2b)	= 96.9567 (1b) - (3b)
First floor	40.9100 (1c)	x 2.6200 (2c)	= 107.1842 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.1409 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1470 (8)
Pressure test					Yes
Measured/design AP50					3.3200
Infiltration rate					0.3130 (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) =	0.2895 (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	0.3691	0.3619	0.3546	0.3184	0.3112	0.2750	0.2750	0.2678	0.2895	0.3112	0.3257	0.3401 (22b)
Effective ac	0.5681	0.5655	0.5629	0.5507	0.5484	0.5378	0.5378	0.5359	0.5419	0.5484	0.5530	0.5578 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			9.0800	1.3258	12.0379		(27)
Flr - Ground			40.9120	0.1800	7.3642	75.6000	3092.9472 (28a)
Wl - Brick (Timber Frame)	90.3710	11.1690	79.2020	0.2100	16.6324	7.4000	586.0948 (29a)
Rf - Ins Joist	40.9120		40.9120	0.0800	3.2730	7.4000	302.7488 (30)
Total net area of external elements Aum(A, m ²)			172.1960				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.8154		(33)
Party Wall			46.2040	0.0000	0.0000	7.4000	341.9096 (32)
Stud			70.7018			7.4000	523.1936 (32c)
Internal Floor			40.9120			7.4000	302.7488 (32d)
Internal Ceiling			40.9120			7.4000	302.7488 (32e)

Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss
(28)...(30) + (32) + (32a)...(32e) = 5452.3916 (34)
66.6389 (35)
15.2477 (36)
(33) + (36) = 57.0631 (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	38.2719	38.0937	37.9191	37.0987	36.9453	36.2308	36.2308	36.0984	36.5060	36.9453	37.2558	37.5804 (38)
Heat transfer coeff	95.3351	95.1569	94.9822	94.1619	94.0084	93.2939	93.2939	93.1616	93.5691	94.0084	94.3189	94.6435 (39)
Average = Sum(39)m / 12 =												94.1611 (39)
HLP	1.1652	1.1630	1.1609	1.1508	1.1490	1.1402	1.1402	1.1386	1.1436	1.1490	1.1528	1.1567 (40)
HLP (average)												1.1508 (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												2.4965 (42)
Average daily hot water use (litres/day)												93.4916 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	102.8407	99.1011	95.3614	91.6217	87.8821	84.1424	84.1424	87.8821	91.6217	95.3614	99.1011	102.8407 (44)
Energy content (annual)	152.5098	133.3861	137.6425	120.0000	115.1429	99.3596	92.0712	105.6531	106.9149	124.5990	136.0096	147.6976 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1470.9864 (45)

	22.8765	20.0079	20.6464	18.0000	17.2714	14.9039	13.8107	15.8480	16.0372	18.6899	20.4014	22.1546 (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	0.6702	0.5948	0.5907	0.4948	0.4554	0.3762	0.3486	0.4178	0.4408	0.5347	0.6065	0.6490 (61)
Total heat required for water heating calculated for each month	153.1800	133.9809	138.2331	120.4948	115.5983	99.7358	92.4199	106.0709	107.3557	125.1337	136.6161	148.3467 (62)
WWHRS	-49.4854	-43.5394	-44.4384	-36.5722	-33.9630	-28.0213	-23.7216	-28.7193	-29.5543	-36.5280	-42.3034	-47.8278 eq. (G10)
Total of WWHRS savings												-444.6741
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189 (64)
Heat gains from water heating, kWh/month	50.8771	44.4996	45.9138	40.0237	38.3989	33.1311	30.7008	35.2341	35.6594	41.5629	45.3748	49.2717 (65)

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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 %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													3265.6312 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	526.1070	432.7626	390.1741	262.8078	159.7568	0.0000	0.0000	0.0000	0.0000	247.2166	392.2352	534.5392	(98)
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)	583.2672	479.7812	432.5655	291.3612	177.1140	0.0000	0.0000	0.0000	0.0000	274.0761	434.8505	592.6156	(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	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189	(64)
Efficiency of water heater (217)m	87.5949	87.4689	87.1492	86.4217	85.0073	76.4000	76.4000	76.4000	76.4000	86.0968	87.1487	76.4000	(216)
Fuel for water heating, kWh/month	118.3796	103.3984	107.6254	97.1083	96.0333	93.8672	89.9191	101.2456	101.8344	102.9141	108.2205	114.6261	(219)
Water heating fuel used												1235.1721	(219)
Annual totals kWh/year													
Space heating fuel - main system												3265.6312	(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)												394.3960	(232)
Total delivered energy for all uses												4970.1993	(238)

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	3265.6312	0.2160	705.3763 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1235.1721	0.2160	266.7972 (264)
Space and water heating			972.1735 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	394.3960	0.5190	204.6915 (268)
Total CO2, kg/year			1215.7900 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			14.8600 (273)

16 CO2 EMISSIONS ASSOCIATED WITH APPLIANCES AND COOKING AND SITE-WIDE ELECTRICITY GENERATION TECHNOLOGIES

DER		14.8600	ZC1
Total Floor Area	TFA	81.8200	
Assumed number of occupants	N	2.4965	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		16.1654	ZC2
CO2 emissions from cooking, equation (L16)		2.1867	ZC3
Total CO2 emissions		33.2121	ZC4
Residual CO2 emissions offset from biofuel CHP		0.0000	ZC5
Additional allowable electricity generation, kWh/m²/year		0.0000	ZC6
Resulting CO2 emissions offset from additional allowable electricity generation		0.0000	ZC7
Net CO2 emissions		33.2121	ZC8

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CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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CALCULATION OF TARGET EMISSIONS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.9100 (1b)	x 2.3700 (2b)	= 96.9567 (1b) - (3b)
First floor	40.9100 (1c)	x 2.6200 (2c)	= 107.1842 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.1409 (5)

2. Ventilation rate

										main	secondary	other	total	m3 per hour
										heating	heating			
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											3 * 10 =	30.0000 (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) =										30.0000	/ (5) =	0.1470 (8)	
Pressure test												Yes		
Measured/design AP50												5.0000		
Infiltration rate												0.3970 (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) =	0.3672 (21)		
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Wind factor	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)		
Adj infilt rate	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)		
	0.4682	0.4590	0.4498	0.4039	0.3947	0.3488	0.3488	0.3396	0.3672	0.3947	0.4131	0.4314 (22b)		
Effective ac	0.6096	0.6053	0.6012	0.5816	0.5779	0.5608	0.5608	0.5577	0.5674	0.5779	0.5853	0.5931 (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					
TER Opaque door			2.0900	1.0000	2.0900		(26)					
TER Opening Type (Uw = 1.40)			9.0800	1.3258	12.0379		(27)					
Flr - Ground			40.9120	0.1300	5.3186		(28a)					
Wl - Brick (Timber Frame)	90.3710	11.1690	79.2020	0.1800	14.2564		(29a)					
Rf - Ins Joist	40.9120		40.9120	0.1300	5.3186		(30)					
Total net area of external elements Aum(A, m2)			172.1960				(31)					
Fabric heat loss, W/K = Sum (A x U)			(26) ... (30) + (32) =		39.0214		(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.8094 (36)					
Total fabric heat loss						(33) + (36) =	47.8308 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 41.0658	Feb 40.7791	Mar 40.4981	Apr 39.1783	May 38.9313	Jun 37.7818	Jul 37.7818	Aug 37.5689	Sep 38.2246	Oct 38.9313	Nov 39.4309	Dec 39.9532 (38)
Heat transfer coeff	88.8965	88.6099	88.3289	87.0090	86.7621	85.6126	85.6126	85.3997	86.0554	86.7621	87.2617	87.7839 (39)
Average = Sum(39)m / 12 =												87.0079 (39)
HLP	Jan 1.0865	Feb 1.0830	Mar 1.0796	Apr 1.0634	May 1.0604	Jun 1.0464	Jul 1.0464	Aug 1.0438	Sep 1.0518	Oct 1.0604	Nov 1.0665	Dec 1.0729 (40)
HLP (average)												1.0634 (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												2.4965 (42)
Average daily hot water use (litres/day)												93.4916 (43)
Daily hot water use	Jan 102.8407	Feb 99.1011	Mar 95.3614	Apr 91.6217	May 87.8821	Jun 84.1424	Jul 84.1424	Aug 87.8821	Sep 91.6217	Oct 95.3614	Nov 99.1011	Dec 102.8407 (44)
Energy conte	152.5098	133.3861	137.6425	120.0000	115.1429	99.3596	92.0712	105.6531	106.9149	124.5990	136.0096	147.6976 (45)
Energy content (annual)												1470.9864 (45)
Distribution loss (46)m = 0.15 x (45)m												
Water storage loss:	22.8765	20.0079	20.6464	18.0000	17.2714	14.9039	13.8107	15.8480	16.0372	18.6899	20.4014	22.1546 (46)
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												

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Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Total heat required for water heating calculated for each month	50.9589	45.6136	48.5951	45.1833	44.7837	41.4949	42.8781	44.7837	45.1833	48.5951	48.8718	50.9589 (61)
Solar input	203.4687	178.9997	186.2376	165.1834	159.9266	140.8545	134.9493	150.4368	152.0983	173.1942	184.8814	198.6565 (62)
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Heat gains from water heating, kWh/month	203.4687	178.9997	186.2376	165.1834	159.9266	140.8545	134.9493	150.4368	152.0983	173.1942	184.8814	198.6565 (64)
	63.4492	55.7543	57.9149	51.1958	49.4810	43.4108	41.3332	46.3256	46.8450	53.5780	57.4411	61.8492 (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)
(66)m	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.4705	19.9581	16.2310	12.2879	9.1854	7.7547	8.3792	10.8916	14.6187	18.5617	21.6643	23.0950	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	223.2022	225.5183	219.6817	207.2563	191.5714	176.8299	166.9816	164.6655	170.5021	182.9275	198.6124	213.3539	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	(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)	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	(71)
Water heating gains (Table 5)	85.2812	82.9677	77.8426	71.1053	66.5067	60.2927	55.5554	62.2656	65.0626	72.0134	79.7794	83.1306	(72)
Total internal gains	394.4012	391.8914	377.2027	354.0969	330.7108	308.3246	294.3635	301.2699	313.6306	336.9499	363.5033	383.0269	(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
East					6.3550	19.6403	0.6300	0.7000			0.7700	38.1447
West					2.7240	19.6403	0.6300	0.7000			0.7700	16.3503 (80)

Solar gains	54.4951	106.6039	175.5614	256.0459	313.7939	321.2239	305.8182	262.6933	204.1852	126.4945	67.9489	44.8141 (83)
Total gains	448.8963	498.4953	552.7641	610.1428	644.5046	629.5484	600.1817	563.9633	517.8158	463.4444	431.4523	427.8409 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	63.9164	64.1232	64.3271	65.3029	65.4888	66.3681	66.3681	66.5335	66.0266	65.4888	65.1139	64.7265	
alpha	5.2611	5.2749	5.2885	5.3535	5.3659	5.4245	5.4245	5.4356	5.4018	5.3659	5.3409	5.3151	
util living area	0.9987	0.9975	0.9933	0.9766	0.9208	0.7803	0.6080	0.6638	0.8954	0.9862	0.9974	0.9990	(86)
MIT	19.7966	19.9200	20.1492	20.4671	20.7509	20.9337	20.9862	20.9783	20.8479	20.4804	20.0878	19.7807	(87)
Th 2	20.0119	20.0148	20.0176	20.0308	20.0333	20.0449	20.0449	20.0470	20.0404	20.0333	20.0283	20.0230	(88)
util rest of house	0.9983	0.9966	0.9908	0.9671	0.8871	0.6964	0.4860	0.5422	0.8383	0.9789	0.9964	0.9987	(89)
MIT 2	18.3984	18.5808	18.9169	19.3844	19.7747	19.9974	20.0394	20.0373	19.9084	19.4099	18.8362	18.3832	(90)
Living area fraction	18.6331	18.8055	19.1237	19.5661	19.9385	20.1545	20.1983	20.1952	20.0661	19.5895	19.0463	18.6177	(91)
MIT	18.6331	18.8055	19.1237	19.5661	19.9385	20.1545	20.1983	20.1952	20.0661	19.5895	19.0463	18.6177	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6331	18.8055	19.1237	19.5661	19.9385	20.1545	20.1983	20.1952	20.0661	19.5895	19.0463	18.6177	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9973	0.9950	0.9875	0.9610	0.8831	0.7071	0.5065	0.5623	0.8402	0.9742	0.9947	0.9979	(94)
Ext temp.	447.6927	495.9782	545.8642	586.3515	569.1486	445.1257	303.9761	317.1256	435.0523	451.4953	429.1703	426.9517	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Month fracti	1274.1595	1232.1683	1115.0333	928.0466	714.7939	475.5349	308.0566	324.1128	513.4127	779.9498	1042.4513	1265.6399	(97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating	614.8913	494.7198	423.4618	246.0205	108.3601	0.0000	0.0000	0.0000	0.0000	244.3702	441.5623	623.9840	(98)
Space heating per m2												3197.3700	(98)
												39.0781	(99)

8c. Space cooling requirement

Not applicable

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

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Calculation Type: New Build (As Built)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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 %)													93.4000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													3423.3084 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	614.8913	494.7198	423.4618	246.0205	108.3601	0.0000	0.0000	0.0000	0.0000	244.3702	441.5623	623.9840	(98)
Space heating efficiency (main heating system 1)	93.4000	93.4000	93.4000	93.4000	93.4000	0.0000	0.0000	0.0000	0.0000	93.4000	93.4000	93.4000	(210)
Space heating fuel (main heating system)	658.3419	529.6786	453.3852	263.4052	116.0172	0.0000	0.0000	0.0000	0.0000	261.6383	472.7648	668.0771	(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	203.4687	178.9997	186.2376	165.1834	159.9266	140.8545	134.9493	150.4368	152.0983	173.1942	184.8814	198.6565	(64)
Efficiency of water heater	87.6587	87.4767	87.0553	86.0521	84.0948	80.3000	80.3000	80.3000	80.3000	85.9177	87.1644	87.7352	(217)
Fuel for water heating, kWh/month	232.1147	204.6256	213.9301	191.9573	190.1742	175.4103	168.0564	187.3435	189.4125	201.5814	212.1065	226.4275	(219)
Water heating fuel used												2393.1401	(219)
Annual totals kWh/year													
Space heating fuel - main system												3423.3084	(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)												396.8354	(232)
Total delivered energy for all uses												6288.2838	(238)

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	3423.3084	0.2160	739.4346 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2393.1401	0.2160	516.9183 (264)
Space and water heating			1256.3529 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	396.8354	0.5190	205.9576 (268)
Total CO2, kg/m2/year			1501.2354 (272)
Emissions per m2 for space and water heating			15.3551 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.5172 (272b)
Emissions per m2 for pumps and fans			0.4757 (272c)
Target Carbon Dioxide Emission Rate (TER) = (15.3551 * 1.00) + 2.5172 + 0.4757, rounded to 2 d.p.			18.3500 (273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (Version 9.92, January 2014)
CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.9100 (1b)	x 2.3700 (2b)	= 96.9567 (1b) - (3b)
First floor	40.9100 (1c)	x 2.6200 (2c)	= 107.1842 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.1409 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1470 (8)
Pressure test					Yes
Measured/design AP50					3.3200
Infiltration rate					0.3130 (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) =	0.2895 (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	0.3691	0.3619	0.3546	0.3184	0.3112	0.2750	0.2750	0.2678	0.2895	0.3112	0.3257	0.3401 (22b)
Effective ac	0.5681	0.5655	0.5629	0.5507	0.5484	0.5378	0.5378	0.5359	0.5419	0.5484	0.5530	0.5578 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			9.0800	1.3258	12.0379		(27)
Flr - Ground			40.9120	0.1800	7.3642	75.6000	3092.9472 (28a)
Wl - Brick (Timber Frame)	90.3710	11.1690	79.2020	0.2100	16.6324	7.4000	586.0948 (29a)
Rf - Ins Joist	40.9120		40.9120	0.0800	3.2730	7.4000	302.7488 (30)
Total net area of external elements Aum(A, m ²)			172.1960				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.8154		(33)
Party Wall			46.2040	0.0000	0.0000	7.4000	341.9096 (32)
Stud			70.7018			7.4000	523.1936 (32c)
Internal Floor			40.9120			7.4000	302.7488 (32d)
Internal Ceiling			40.9120			7.4000	302.7488 (32e)

Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss
(28)...(30) + (32) + (32a)...(32e) = 5452.3916 (34)
(33) + (36) = 57.0631 (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	38.2719	38.0937	37.9191	37.0987	36.9453	36.2308	36.2308	36.0984	36.5060	36.9453	37.2558	37.5804 (38)
Heat transfer coeff	95.3351	95.1569	94.9822	94.1619	94.0084	93.2939	93.2939	93.1616	93.5691	94.0084	94.3189	94.6435 (39)
Average = Sum(39)m / 12 =												94.1611 (39)
HLP	1.1652	1.1630	1.1609	1.1508	1.1490	1.1402	1.1402	1.1386	1.1436	1.1490	1.1528	1.1567 (40)
HLP (average)												1.1508 (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												2.4965 (42)
Average daily hot water use (litres/day)												93.4916 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	102.8407	99.1011	95.3614	91.6217	87.8821	84.1424	84.1424	87.8821	91.6217	95.3614	99.1011	102.8407 (44)
Energy content (annual)	152.5098	133.3861	137.6425	120.0000	115.1429	99.3596	92.0712	105.6531	106.9149	124.5990	136.0096	147.6976 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1470.9864 (45)

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0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(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)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Heat gains from water heating, kWh/month												
32.4083	28.3445	29.2490	25.5000	24.4679	21.1139	19.5651	22.4513	22.7194	26.4773	28.9020	31.3857	(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	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.3323	19.8354	16.1312	12.2124	9.1289	7.7070	8.3277	10.8246	14.5288	18.4476	21.5311	22.9530	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	223.2022	225.5183	219.6817	207.2563	191.5714	176.8299	166.9816	164.6655	170.5021	182.9275	198.6124	213.3539	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	(71)
Water heating gains (Table 5)													
	43.5596	42.1794	39.3132	35.4167	32.8869	29.3249	26.2972	30.1765	31.5548	35.5878	40.1417	42.1851	(72)
Total internal gains	349.5414	347.9804	335.5735	315.3327	294.0346	274.3090	262.0538	266.1139	277.0329	297.4102	320.7325	338.9394	(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	
East					6.3550	19.6403	0.7300	0.7200	0.7700		45.4623 (76)	
West					2.7240	19.6403	0.7300	0.7200	0.7700		19.4869 (80)	
Solar gains	64.9492	127.0544	209.2406	305.1649	373.9911	382.8464	364.4854	313.0875	243.3555	150.7608	80.9840	53.4111 (83)
Total gains	414.4907	475.0349	544.8141	620.4976	668.0256	657.1554	626.5392	579.2014	520.3884	448.1710	401.7166	392.3505 (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	15.8866	15.9164	15.9457	16.0846	16.1108	16.2342	16.2342	16.2573	16.1865	16.1108	16.0578	16.0027		
alpha	2.0591	2.0611	2.0630	2.0723	2.0741	2.0823	2.0823	2.0838	2.0791	2.0741	2.0705	2.0668		
util living area	0.9529	0.9365	0.9053	0.8471	0.7601	0.6427	0.5266	0.5701	0.7447	0.8818	0.9385	0.9577	(86)	
MIT	17.7512	18.0468	18.5963	19.3240	19.9983	20.5206	20.7790	20.7300	20.2929	19.4081	18.4515	17.6925	(87)	
Th 2	19.9480	19.9497	19.9514	19.9595	19.9610	19.9681	19.9681	19.9694	19.9654	19.9610	19.9580	19.9548	(88)	
util rest of house	0.9473	0.9288	0.8933	0.8264	0.7239	0.5805	0.4341	0.4802	0.6930	0.8615	0.9298	0.9525	(89)	
MIT 2	16.9650	17.2581	17.8009	18.5161	19.1603	19.6408	19.8522	19.8201	19.4499	18.6112	17.6681	16.9113	(90)	
Living area fraction	fLA = Living area / (4) =												0.1678	(91)
MIT	17.0969	17.3905	17.9344	18.6516	19.3009	19.7884	20.0077	19.9728	19.5914	18.7449	17.7996	17.0424	(92)	
Temperature adjustment													0.0000	
adjusted MIT	17.0969	17.3905	17.9344	18.6516	19.3009	19.7884	20.0077	19.9728	19.5914	18.7449	17.7996	17.0424	(93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation	0.9258	0.9035	0.8634	0.7944	0.6971	0.5684	0.4380	0.4806	0.6709	0.8309	0.9050	0.9325	(94)	
Useful gains	383.7222	429.1960	470.4038	492.9248	465.6926	373.5110	274.4109	278.3422	349.1452	372.3666	363.5548	365.8535	(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	1219.9929	1188.5540	1086.0613	918.2331	714.5496	484.0499	317.9178	332.8491	513.8208	765.6928	1009.1702	1215.4506	(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	622.1855	510.2886	458.0492	306.2220	185.1496	0.0000	0.0000	0.0000	0.0000	292.6347	464.8431	632.1003	(98)	
Space heating													3471.4729	(98)
Space heating per m2													42.4282	(99)
													(98) / (4) =	

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W												
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	876.9624	690.3746	708.0278	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.6699	0.7334	0.7042	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	587.4720	506.3256	498.5845	0.0000	0.0000	0.0000	0.0000 (102)
	0.0000	0.0000	0.0000	0.0000	0.0000	862.4055	824.7697	771.3590	0.0000	0.0000	0.0000	0.0000 (103)

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Month fraction	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000 (103a)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	197.9521	236.9224	202.9442	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												637.8187 (104)
Cooled fraction									fC = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.0000	0.0000	0.0000	0.0000	0.0000	0.2500	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	49.4880	59.2306	50.7361	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												159.4547 (107)
Space cooling per m2												1.9488 (108)
Energy for space heating												42.4282 (99)
Energy for space cooling												1.9488 (108)
Total												44.3770 (109)
Dwelling Fabric Energy Efficiency (DFEE)												44.4 (109)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (Version 9.92, January 2014)
CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.9100 (1b)	x 2.3700 (2b)	= 96.9567 (1b) - (3b)
First floor	40.9100 (1c)	x 2.6200 (2c)	= 107.1842 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.1409 (5)

2. Ventilation rate

										main	secondary	other	total	m3 per hour			
										heating	heating						
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																3 * 10 =	30.0000 (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) =					30.0000	/ (5) =	0.1470 (8)
Pressure test										Yes							
Measured/design AP50										5.0000							
Infiltration rate										0.3970 (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) =					0.3672 (21)		
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
Wind factor	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)				
Adj infilt rate	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)				
	0.4682	0.4590	0.4498	0.4039	0.3947	0.3488	0.3488	0.3396	0.3672	0.3947	0.4131	0.4314	(22b)				
Effective ac	0.6096	0.6053	0.6012	0.5816	0.5779	0.5608	0.5608	0.5577	0.5674	0.5779	0.5853	0.5931	(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					
TER Opaque door			2.0900	1.0000	2.0900		(26)					
TER Opening Type (Uw = 1.40)			9.0800	1.3258	12.0379		(27)					
Flr - Ground			40.9120	0.1300	5.3186		(28a)					
Wl - Brick (Timber Frame)	90.3710	11.1690	79.2020	0.1800	14.2564		(29a)					
Rf - Ins Joist	40.9120		40.9120	0.1300	5.3186		(30)					
Total net area of external elements Aum(A, m2)			172.1960				(31)					
Fabric heat loss, W/K = Sum (A x U)			(26) ... (30) + (32) =		39.0214		(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.8094 (36)					
Total fabric heat loss						(33) + (36) =	47.8308 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 41.0658	Feb 40.7791	Mar 40.4981	Apr 39.1783	May 38.9313	Jun 37.7818	Jul 37.7818	Aug 37.5689	Sep 38.2246	Oct 38.9313	Nov 39.4309	Dec 39.9532 (38)
Heat transfer coeff	88.8965	88.6099	88.3289	87.0090	86.7621	85.6126	85.6126	85.3997	86.0554	86.7621	87.2617	87.7839 (39)
Average = Sum(39)m / 12 =												87.0079 (39)
HLP	Jan 1.0865	Feb 1.0830	Mar 1.0796	Apr 1.0634	May 1.0604	Jun 1.0464	Jul 1.0464	Aug 1.0438	Sep 1.0518	Oct 1.0604	Nov 1.0665	Dec 1.0729 (40)
HLP (average)												1.0634 (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												2.4965 (42)
Average daily hot water use (litres/day)												93.4916 (43)
Daily hot water use	Jan 102.8407	Feb 99.1011	Mar 95.3614	Apr 91.6217	May 87.8821	Jun 84.1424	Jul 84.1424	Aug 87.8821	Sep 91.6217	Oct 95.3614	Nov 99.1011	Dec 102.8407 (44)
Energy conte	152.5098	133.3861	137.6425	120.0000	115.1429	99.3596	92.0712	105.6531	106.9149	124.5990	136.0096	147.6976 (45)
Energy content (annual)										Total = Sum(45)m =		1470.9864 (45)
Distribution loss (46)m = 0.15 x (45)m												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (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												

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Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Heat gains from water heating, kWh/month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
	32.4083	28.3445	29.2490	25.5000	24.4679	21.1139	19.5651	22.4513	22.7194	26.4773	28.9020	31.3857 (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	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	124.8244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.4705	19.9581	16.2310	12.2879	9.1854	7.7547	8.3792	10.8916	14.6187	18.5617	21.6643	23.0950	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	223.2022	225.5183	219.6817	207.2563	191.5714	176.8299	166.9816	164.6655	170.5021	182.9275	198.6124	213.3539	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	35.4824	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	(71)
Water heating gains (Table 5)	43.5596	42.1794	39.3132	35.4167	32.8869	29.3249	26.2972	30.1765	31.5548	35.5878	40.1417	42.1851	(72)
Total internal gains	349.6796	348.1031	335.6732	315.4082	294.0910	274.3567	262.1053	266.1808	277.1228	297.5243	320.8657	339.0814	(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			
East				6.3550	19.6403	0.6300	0.7000	0.7700	38.1447 (76)			
West				2.7240	19.6403	0.6300	0.7000	0.7700	16.3503 (80)			

Solar gains	54.4951	106.6039	175.5614	256.0459	313.7939	321.2239	305.8182	262.6933	204.1852	126.4945	67.9489	44.8141 (83)
Total gains	404.1746	454.7070	511.2347	571.4541	607.8849	595.5806	567.9235	528.8741	481.3080	424.0188	388.8146	383.8955 (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	63.9164	64.1232	64.3271	65.3029	65.4888	66.3681	66.3681	66.5335	66.0266	65.4888	65.1139	64.7265	
alpha	5.2611	5.2749	5.2885	5.3535	5.3659	5.4245	5.4245	5.4356	5.4018	5.3659	5.3409	5.3151	
util living area	0.9992	0.9984	0.9953	0.9823	0.9354	0.8071	0.6373	0.6983	0.9176	0.9907	0.9984	0.9994	(86)
MIT	19.7450	19.8698	20.1024	20.4268	20.7220	20.9213	20.9828	20.9724	20.8222	20.4373	20.0387	19.7298	(87)
Th 2	20.0119	20.0148	20.0176	20.0308	20.0333	20.0449	20.0449	20.0470	20.0404	20.0333	20.0283	20.0230	(88)
util rest of house	0.9990	0.9978	0.9935	0.9748	0.9061	0.7259	0.5121	0.5748	0.8681	0.9856	0.9978	0.9992	(89)
MIT 2	18.8588	18.9856	19.2198	19.5510	19.8323	20.0053	20.0401	20.0383	19.9313	19.5659	19.1655	18.8525	(90)
Living area fraction	19.0075	19.1340	19.3679	19.6980	19.9816	20.1590	20.1983	20.1951	fLA = Living area / (4) =			0.1678	(91)
MIT	19.0075	19.1340	19.3679	19.6980	19.9816	20.1590	20.1983	20.1951	20.0808	19.7122	19.3121	18.9997	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0075	19.1340	19.3679	19.6980	19.9816	20.1590	20.1983	20.1951	20.0808	19.7122	19.3121	18.9997	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9986	0.9971	0.9919	0.9714	0.9042	0.7368	0.5333	0.5955	0.8706	0.9833	0.9971	0.9989	(94)
Ext temp.	403.5941	453.3670	507.0951	555.1277	549.6341	438.8141	302.8490	314.9445	419.0421	416.9383	387.6804	383.4803	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Month fracti	1307.4443	1261.2735	1136.6111	939.5201	718.5312	475.9231	308.0564	324.0978	514.6766	790.5900	1065.6452	1299.1799	(97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating	672.4646	542.9132	468.3599	276.7626	125.6595	0.0000	0.0000	0.0000	0.0000	277.9968	488.1347	681.2805	(98)
Space heating per m2												3533.5717	(98)
												43.1871	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
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	
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	804.7582	633.5331	649.0377	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8367	0.9086	0.8812	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	673.3418	575.6410	571.9478	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	790.4983	756.3265	712.6241	0.0000	0.0000	0.0000	0.0000	(103)
Month fracti	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	(103a)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	84.3527	134.4300	104.6631	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												323.4458	(104)
Cooled fraction									fC = cooled area / (4) =			1.0000	(105)

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Intermittency factor (Table 10b)	0.0000	0.0000	0.0000	0.0000	0.2500	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	21.0882	33.6075	26.1658	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling											80.8615 (107)
Space cooling per m2											0.9883 (108)
Energy for space heating											43.1871 (99)
Energy for space cooling											0.9883 (108)
Total											44.1754 (109)
Target Fabric Energy Efficiency (TFEE)											50.8 (109)

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CALCULATION OF HEAT DEMAND 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (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	40.9100 (1b)	x 2.3700 (2b)	= 96.9567 (1b) - (3b)
First floor	40.9100 (1c)	x 2.6200 (2c)	= 107.1842 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.1409 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1470 (8)
Pressure test					Yes
Measured/design AP50					3.3200
Infiltration rate					0.3130 (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) =		0.2895 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	4.9000	4.6000	4.5000	4.2000	4.2000	4.1000	4.1000	4.0000	4.0000	4.3000	4.3000	4.4000 (22)
Wind factor	1.2250	1.1500	1.1250	1.0500	1.0500	1.0250	1.0250	1.0000	1.0000	1.0750	1.0750	1.1000 (22a)
Adj infilt rate	0.3546	0.3329	0.3257	0.3040	0.3040	0.2967	0.2967	0.2895	0.2895	0.3112	0.3112	0.3184 (22b)
Effective ac	0.5629	0.5554	0.5530	0.5462	0.5462	0.5440	0.5440	0.5419	0.5419	0.5484	0.5484	0.5507 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			9.0800	1.3258	12.0379		(27)
Flr - Ground			40.9120	0.1800	7.3642	75.6000	3092.9472 (28a)
Wl - Brick (Timber Frame)	90.3710	11.1690	79.2020	0.2100	16.6324	7.4000	586.0948 (29a)
Rf - Ins Joist	40.9120		40.9120	0.0800	3.2730	7.4000	302.7488 (30)
Total net area of external elements Aum(A, m ²)			172.1960				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.8154		(33)
Party Wall			46.2040	0.0000	0.0000	7.4000	341.9096 (32)
Stud			70.7018			7.4000	523.1936 (32c)
Internal Floor			40.9120			7.4000	302.7488 (32d)
Internal Ceiling			40.9120			7.4000	302.7488 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	5452.3916 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							66.6389 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							15.2477 (36)
Total fabric heat loss						(33) + (36) =	57.0631 (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	37.9191	37.4163	37.2558	36.7953	36.7953	36.6489	36.6489	36.5060	36.5060	36.9453	36.9453	37.0987 (38)
Heat transfer coeff	94.9822	94.4794	94.3189	93.8584	93.8584	93.7120	93.7120	93.5691	93.5691	94.0084	94.0084	94.1619 (39)
Average = Sum(39)m / 12 =												94.0198 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1609	1.1547	1.1528	1.1471	1.1471	1.1453	1.1453	1.1436	1.1436	1.1490	1.1490	1.1508 (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												2.4965 (42)
Average daily hot water use (litres/day)												93.4916 (43)

Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	102.8407	99.1011	95.3614	91.6217	87.8821	84.1424	84.1424	87.8821	91.6217	95.3614	99.1011	102.8407 (44)
Energy conte	152.5098	133.3861	137.6425	120.0000	115.1429	99.3596	92.0712	105.6531	106.9149	124.5990	136.0096	147.6976 (45)
Energy content (annual)												Total = Sum(45)m = 1470.9864 (45)
Distribution loss (46)m = 0.15 x (45)m												

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	22.8765	20.0079	20.6464	18.0000	17.2714	14.9039	13.8107	15.8480	16.0372	18.6899	20.4014	22.1546 (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	0.6702	0.5948	0.5907	0.4948	0.4554	0.3762	0.3486	0.4178	0.4408	0.5347	0.6065	0.6490 (61)
Total heat required for water heating calculated for each month	153.1800	133.9809	138.2331	120.4948	115.5983	99.7358	92.4199	106.0709	107.3557	125.1337	136.6161	148.3467 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	153.1800	133.9809	138.2331	120.4948	115.5983	99.7358	92.4199	106.0709	107.3557	125.1337	136.6161	148.3467 (64)
RHI water heating demand												
Heat gains from water heating, kWh/month	50.8771	44.4996	45.9138	40.0237	38.3989	33.1311	30.7008	35.2341	35.6594	41.5629	45.3748	49.2717 (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	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.8308	49.5885	40.3280	30.5309	22.8222	19.2675	20.8192	27.0616	36.3220	46.1191	53.8278	57.3825 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	333.1376	336.5945	327.8832	309.3378	285.9275	263.9252	249.2263	245.7693	254.4807	273.0261	296.4364	318.4387 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754 (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)	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595 (71)
Water heating gains (Table 5)	68.3832	66.2196	61.7121	55.5885	51.6114	46.0154	41.2646	47.3577	49.5270	55.8641	63.0206	66.2254 (72)
Total internal gains	562.7568	557.8078	535.3285	500.8623	465.7663	434.6133	416.7152	425.5938	445.7348	480.4144	518.6899	547.4518 (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	
East				6.3550	25.1733	0.7300	0.7200	0.7700			58.2698 (76)	
West				2.7240	25.1733	0.7300	0.7200	0.7700			24.9767 (80)	

Solar gains	83.2465	138.5284	231.5197	339.2055	391.1705	441.8227	406.6628	364.3931	283.3910	179.4571	103.4588	67.2903 (83)
Total gains	646.0033	696.3361	766.8482	840.0678	856.9367	876.4360	823.3780	789.9868	729.1258	659.8715	622.1487	614.7421 (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	15.9457	16.0305	16.0578	16.1366	16.1366	16.1618	16.1618	16.1865	16.1865	16.1108	16.1108	16.0846
alpha	2.0630	2.0687	2.0705	2.0758	2.0758	2.0775	2.0775	2.0791	2.0791	2.0741	2.0741	2.0723
util living area	0.8862	0.8668	0.8200	0.7386	0.6250	0.4621	0.3433	0.3460	0.5529	0.7438	0.8482	0.8930 (86)
MIT	18.6053	18.8078	19.2929	19.8989	20.4368	20.8003	20.9273	20.9286	20.6945	20.1061	19.3077	18.5907 (87)
Th 2	19.9514	19.9564	19.9580	19.9625	19.9625	19.9640	19.9640	19.9654	19.9654	19.9610	19.9610	19.9595 (88)
util rest of house	0.8732	0.8518	0.7992	0.7070	0.5750	0.3874	0.2461	0.2450	0.4793	0.7037	0.8278	0.8806 (89)
MIT 2	16.8296	17.1170	17.8013	18.6421	19.3602	19.7995	19.9259	19.9294	19.6928	18.9436	17.8365	16.8130 (90)
Living area fraction	17.1275	17.4007	18.0516	18.8530	19.5409	19.9674	20.0939	20.0970	19.8609	19.1387	18.0834	17.1113 (92)
Temperature adjustment	16.9775	17.2507	17.9016	18.7030	19.3909	19.8174	19.9439	19.9470	19.7109	18.9887	17.9334	-0.1500
adjusted MIT												16.9613 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.8224	0.7999	0.7471	0.6614	0.5440	0.3760	0.2441	0.2431	0.4591	0.6583	0.7754	0.8308 (94)
Ext temp.	531.3006	556.9777	572.9173	555.6454	466.1855	329.5370	200.9553	192.0734	334.7306	434.3858	482.3928	510.7386 (95)
Heat loss rate W	5.7000	6.1000	7.7000	10.1000	13.1000	15.9000	17.7000	17.8000	15.5000	12.3000	8.8000	5.8000 (96)
Month fracti	1071.1660	1053.5136	962.2005	807.4622	590.4494	367.1085	210.2833	200.8974	394.0100	628.7935	858.6168	1050.9702 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating	401.6598	333.6721	289.6267	181.3081	92.4523	0.0000	0.0000	0.0000	0.0000	144.6393	270.8813	401.9323 (98)
RHI space heating demand												2116.1720 (98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF HEAT DEMAND 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.9100 (1b)	x 2.3700 (2b)	= 96.9567 (1b) - (3b)
First floor	40.9100 (1c)	x 2.6200 (2c)	= 107.1842 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.1409 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1470 (8)
Pressure test					Yes
Measured/design AP50					3.3200
Infiltration rate					0.3130 (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) =	0.2895 (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	0.3691	0.3619	0.3546	0.3184	0.3112	0.2750	0.2750	0.2678	0.2895	0.3112	0.3257	0.3401 (22b)
Effective ac	0.5681	0.5655	0.5629	0.5507	0.5484	0.5378	0.5378	0.5359	0.5419	0.5484	0.5530	0.5578 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			9.0800	1.3258	12.0379		(27)
Flr - Ground			40.9120	0.1800	7.3642	75.6000	3092.9472 (28a)
Wl - Brick (Timber Frame)	90.3710	11.1690	79.2020	0.2100	16.6324	7.4000	586.0948 (29a)
Rf - Ins Joist	40.9120		40.9120	0.0800	3.2730	7.4000	302.7488 (30)
Total net area of external elements Aum(A, m ²)			172.1960				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.8154		(33)
Party Wall			46.2040	0.0000	0.0000	7.4000	341.9096 (32)
Stud			70.7018			7.4000	523.1936 (32c)
Internal Floor			40.9120			7.4000	302.7488 (32d)
Internal Ceiling			40.9120			7.4000	302.7488 (32e)

Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss

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	
38.2719	38.0937	37.9191	37.0987	36.9453	36.2308	36.2308	36.0984	36.5060	36.9453	37.2558	37.5804 (38)	
Heat transfer coeff	95.3351	95.1569	94.9822	94.1619	94.0084	93.2939	93.2939	93.1616	93.5691	94.0084	94.3189	94.6435 (39)
Average = Sum(39)m / 12 =												94.1611 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.1652	1.1630	1.1609	1.1508	1.1490	1.1402	1.1402	1.1386	1.1436	1.1490	1.1528	1.1567 (40)	
HLP (average)												1.1508 (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												2.4965 (42)
Average daily hot water use (litres/day)												93.4916 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	102.8407	99.1011	95.3614	91.6217	87.8821	84.1424	84.1424	87.8821	91.6217	95.3614	99.1011	102.8407 (44)
Energy conte	152.5098	133.3861	137.6425	120.0000	115.1429	99.3596	92.0712	105.6531	106.9149	124.5990	136.0096	147.6976 (45)
Energy content (annual)												Total = Sum(45)m = 1470.9864 (45)
Distribution loss (46)m = 0.15 x (45)m												

	22.8765	20.0079	20.6464	18.0000	17.2714	14.9039	13.8107	15.8480	16.0372	18.6899	20.4014	22.1546 (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	0.6702	0.5948	0.5907	0.4948	0.4554	0.3762	0.3486	0.4178	0.4408	0.5347	0.6065	0.6490 (61)
Total heat required for water heating calculated for each month	153.1800	133.9809	138.2331	120.4948	115.5983	99.7358	92.4199	106.0709	107.3557	125.1337	136.6161	148.3467 (62)
WWHRS	-49.4854	-43.5394	-44.4384	-36.5722	-33.9630	-28.0213	-23.7216	-28.7193	-29.5543	-36.5280	-42.3034	-47.8278 eq. (G10)
Total of WWHRS savings												-444.6741
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189 (64)
Heat gains from water heating, kWh/month	50.8771	44.4996	45.9138	40.0237	38.3989	33.1311	30.7008	35.2341	35.6594	41.5629	45.3748	49.2717 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.8308	49.5885	40.3280	30.5309	22.8222	19.2675	20.8192	27.0616	36.3220	46.1191	53.8278	57.3825 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	333.1376	336.5945	327.8832	309.3378	285.9275	263.9252	249.2263	245.7693	254.4807	273.0261	296.4364	318.4387 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754 (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)	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595 (71)
Water heating gains (Table 5)	68.3832	66.2196	61.7121	55.5885	51.6114	46.0154	41.2646	47.3577	49.5270	55.8641	63.0206	66.2254 (72)
Total internal gains	562.7568	557.8078	535.3285	500.8623	465.7663	434.6133	416.7152	425.5938	445.7348	480.4144	518.6899	547.4518 (73)

[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	
East					6.3550	19.6403	0.7300	0.7200			0.7700	45.4623
West					2.7240	19.6403	0.7300	0.7200			0.7700	76)
Solar gains	64.9492	127.0544	209.2406	305.1649	373.9911	382.8464	364.4854	313.0875	243.3555	150.7608	80.9840	53.4111
Total gains	627.7060	684.8622	744.5691	806.0272	839.7573	817.4596	781.2006	738.6813	689.0902	631.1752	599.6740	600.8629

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, n11,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	15.8866	15.9164	15.9457	16.0846	16.1108	16.2342	16.2342	16.2573	16.1865	16.1108	16.0578	16.0027
alpha	2.0591	2.0611	2.0630	2.0723	2.0741	2.0823	2.0823	2.0838	2.0791	2.0741	2.0705	2.0668
util living area	0.9054	0.8850	0.8477	0.7819	0.6882	0.5654	0.4497	0.4839	0.6530	0.8066	0.8819	0.9123 (86)
MIT	18.2216	18.4848	18.9715	19.6097	20.1900	20.6299	20.8377	20.8047	20.4640	19.7194	18.8658	18.1623 (87)
Th 2	19.9480	19.9497	19.9514	19.9595	19.9610	19.9681	19.9681	19.9694	19.9654	19.9610	19.9580	19.9548 (88)
util rest of house	0.8951	0.8726	0.8306	0.7561	0.6480	0.5028	0.3638	0.3989	0.5960	0.7782	0.8671	0.9028 (89)
MIT 2	16.2786	16.6536	17.3450	18.2432	19.0366	19.6097	19.8483	19.8180	19.4146	18.4149	17.2080	16.1963 (90)
Living area fraction	16.6047	16.9609	17.6179	18.4725	19.2302	19.7809	20.0143	19.9836	f1A = Living area / (4) =	19.5907	18.6338	17.4862
MIT	16.6047	16.9609	17.6179	18.4725	19.2302	19.7809	20.0143	19.9836	19.5907	18.6338	17.4862	16.5262 (91)
Temperature adjustment	16.4547	16.8109	17.4679	18.3225	19.0802	19.6309	19.8643	19.8336	19.4407	18.4838	17.3362	-0.1500
adjusted MIT	16.4547	16.8109	17.4679	18.3225	19.0802	19.6309	19.8643	19.8336	19.4407	18.4838	17.3362	16.3762 (93)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8468	0.8217	0.7780	0.7063	0.6085	0.4802	0.3544	0.3866	0.5625	0.7271	0.8160	0.8559 (94)
Useful gains	531.5539	562.7840	579.2414	569.2824	510.9988	392.5059	276.8913	285.5763	387.6417	458.9211	489.3525	514.2615 (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	1158.7667	1133.4001	1041.7600	887.2401	693.7974	469.3484	304.5405	319.8779	499.7245	741.1407	965.4664	1152.3998 (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	466.6463	383.4540	344.1138	228.9295	136.0021	0.0000	0.0000	0.0000	0.0000	209.9713	342.8020	474.7749 (98)
Space heating												2586.6940 (98)
Space heating per m2												31.6144 (99)
										(98) / (4) =		

Regs Region: England
Elmhurst Energy Systems
SAP2012 Calculator (Design
System) version 4.14r19

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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 %)												90.2000 (206)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement												2867.7317 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	466.6463	383.4540	344.1138	228.9295	136.0021	0.0000	0.0000	0.0000	0.0000	209.9713	342.8020	474.7749 (98)
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000 (210)
Space heating fuel (main heating system)	517.3462	425.1153	381.5009	253.8021	150.7784	0.0000	0.0000	0.0000	0.0000	232.7842	380.0465	526.3580 (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	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189 (64)
Efficiency of water heater (217)m	87.3320	87.1942	86.8403	86.0315	84.4764	76.4000	76.4000	76.4000	76.4000	85.6110	86.8165	76.4000 (216)
Fuel for water heating, kWh/month	118.7361	103.7242	108.0083	97.5488	96.6368	93.8672	89.9191	101.2456	101.8344	103.4980	108.6345	114.9571 (219)
Water heating fuel used												1238.6101 (219)
Annual totals kWh/year												
Space heating fuel - main system												2867.7317 (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)												394.3960 (232)
Total delivered energy for all uses												4575.7378 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2867.7317	3.4800	99.7971 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1238.6101	3.4800	43.1036 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	394.3960	13.1900	52.0208 (250)
Additional standing charges			120.0000 (251)
Total energy cost			324.8140 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.0757 (257)
SAP value		84.9938
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	2867.7317	0.2160	619.4301 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1238.6101	0.2160	267.5398 (264)
Space and water heating			886.9698 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	394.3960	0.5190	204.6915 (268)
Total kg/year			1130.5864 (272)
CO2 emissions per m2			13.8200 (273)
EI value			88.0540
EI rating			88 (274)
EI band			B

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9020 = 3.858$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9020 = 0.2395$, stars = 4
Water heating energy efficiency	$3.48 / 0.8311 = 4.187$, stars = 5
Water heating environmental impact	$0.216 / 0.8311 = 0.2599$, stars = 5

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.9100 (1b)	x 2.3700 (2b)	= 96.9567 (1b) - (3b)
First floor	40.9100 (1c)	x 2.6200 (2c)	= 107.1842 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.1409 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1470 (8)
Pressure test					Yes
Measured/design AP50					3.3200
Infiltration rate					0.3130 (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) =		0.2895 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.6000	4.5000	4.2000	4.2000	4.1000	4.1000	4.0000	4.0000	4.3000	4.3000	4.4000 (22)
Wind factor	1.2250	1.1500	1.1250	1.0500	1.0500	1.0250	1.0250	1.0000	1.0000	1.0750	1.0750	1.1000 (22a)
Adj infilt rate	0.3546	0.3329	0.3257	0.3040	0.3040	0.2967	0.2967	0.2895	0.2895	0.3112	0.3112	0.3184 (22b)
Effective ac	0.5629	0.5554	0.5530	0.5462	0.5462	0.5440	0.5440	0.5419	0.5419	0.5484	0.5484	0.5507 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			9.0800	1.3258	12.0379		(27)
Flr - Ground			40.9120	0.1800	7.3642	75.6000	3092.9472 (28a)
Wl - Brick (Timber Frame)	90.3710	11.1690	79.2020	0.2100	16.6324	7.4000	586.0948 (29a)
Rf - Ins Joist	40.9120		40.9120	0.0800	3.2730	7.4000	302.7488 (30)
Total net area of external elements Aum(A, m ²)			172.1960				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.8154		(33)
Party Wall			46.2040	0.0000	0.0000	7.4000	341.9096 (32)
Stud			70.7018			7.4000	523.1936 (32c)
Internal Floor			40.9120			7.4000	302.7488 (32d)
Internal Ceiling			40.9120			7.4000	302.7488 (32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 5452.3916 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K 66.6389 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K) 15.2477 (36)
Total fabric heat loss (33) + (36) = 57.0631 (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	37.9191	37.4163	37.2558	36.7953	36.7953	36.6489	36.6489	36.5060	36.5060	36.9453	36.9453	37.0987 (38)
Heat transfer coeff	94.9822	94.4794	94.3189	93.8584	93.8584	93.7120	93.7120	93.5691	93.5691	94.0084	94.0084	94.1619 (39)
Average = Sum(39)m / 12 =												94.0198 (39)
HLP	Jan 1.1609	Feb 1.1547	Mar 1.1528	Apr 1.1471	May 1.1471	Jun 1.1453	Jul 1.1453	Aug 1.1436	Sep 1.1436	Oct 1.1490	Nov 1.1490	Dec 1.1508 (40)
HLP (average)												1.1491 (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												2.4965 (42)
Average daily hot water use (litres/day)												93.4916 (43)
Daily hot water use	Jan 102.8407	Feb 99.1011	Mar 95.3614	Apr 91.6217	May 87.8821	Jun 84.1424	Jul 84.1424	Aug 87.8821	Sep 91.6217	Oct 95.3614	Nov 99.1011	Dec 102.8407 (44)
Energy conte	152.5098	133.3861	137.6425	120.0000	115.1429	99.3596	92.0712	105.6531	106.9149	124.5990	136.0096	147.6976 (45)
Energy content (annual)												Total = Sum(45)m = 1470.9864 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

Water storage loss:	22.8765	20.0079	20.6464	18.0000	17.2714	14.9039	13.8107	15.8480	16.0372	18.6899	20.4014	22.1546 (46)
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	0.6702	0.5948	0.5907	0.4948	0.4554	0.3762	0.3486	0.4178	0.4408	0.5347	0.6065	0.6490 (61)
Total heat required for water heating calculated for each month	153.1800	133.9809	138.2331	120.4948	115.5983	99.7358	92.4199	106.0709	107.3557	125.1337	136.6161	148.3467 (62)
WWHRS	-49.4854	-43.5394	-44.4384	-36.5722	-33.9630	-28.0213	-23.7216	-28.7193	-29.5543	-36.5280	-42.3034	-47.8278 eq. (G10)
Total of WWHRS savings												-444.6741
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189 (64)
Heat gains from water heating, kWh/month	50.8771	44.4996	45.9138	40.0237	38.3989	33.1311	30.7008	35.2341	35.6594	41.5629	45.3748	49.2717 (65)
												1032.4919 (64)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.8308	49.5885	40.3280	30.5309	22.8222	19.2675	20.8192	27.0616	36.3220	46.1191	53.8278	57.3825 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	333.1376	336.5945	327.8832	309.3378	285.9275	263.9252	249.2263	245.7693	254.4807	273.0261	296.4364	318.4387 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754 (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)	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595 (71)
Water heating gains (Table 5)	68.3832	66.2196	61.7121	55.5885	51.6114	46.0154	41.2646	47.3577	49.5270	55.8641	63.0206	66.2254 (72)
Total internal gains	562.7568	557.8078	535.3285	500.8623	465.7663	434.6133	416.7152	425.5938	445.7348	480.4144	518.6899	547.4518 (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
East					6.3550	25.1733	0.7300	0.7200			0.7700			58.2698 (76)
West					2.7240	25.1733	0.7300	0.7200			0.7700			24.9767 (80)

Solar gains	83.2465	138.5284	231.5197	339.2055	391.1705	441.8227	406.6628	364.3931	283.3910	179.4571	103.4588			67.2903 (83)
Total gains	646.0033	696.3361	766.8482	840.0678	856.9367	876.4360	823.3780	789.9868	729.1258	659.8715	622.1487			614.7421 (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	15.9457	16.0305	16.0578	16.1366	16.1366	16.1618	16.1618	16.1865	16.1865	16.1108	16.1108	16.0846
alpha	2.0630	2.0687	2.0705	2.0758	2.0758	2.0775	2.0775	2.0791	2.0791	2.0741	2.0741	2.0723
util living area	0.8862	0.8668	0.8200	0.7386	0.6250	0.4621	0.3433	0.3460	0.5529	0.7438	0.8482	0.8930 (86)
MIT	18.6053	18.8078	19.2929	19.8989	20.4368	20.8003	20.9273	20.9286	20.6945	20.1061	19.3077	18.5907 (87)
Th 2	19.9514	19.9564	19.9580	19.9625	19.9625	19.9640	19.9640	19.9654	19.9654	19.9610	19.9610	19.9595 (88)
util rest of house	0.8732	0.8518	0.7992	0.7070	0.5750	0.3874	0.2461	0.2450	0.4793	0.7037	0.8278	0.8806 (89)
MIT 2	16.8296	17.1170	17.8013	18.6421	19.3602	19.7995	19.9259	19.9294	19.6928	18.9436	17.8365	16.8130 (90)
Living area fraction	17.1275	17.4007	18.0516	18.8530	19.5409	19.9674	20.0939	20.0970	19.8609	19.1387	18.0834	17.1113 (91)
MIT	16.9775	17.2507	17.9016	18.7030	19.3909	19.8174	19.9439	19.9470	19.7109	18.9887	17.9334	16.9613 (93)
Temperature adjustment												-0.1500
adjusted MIT												16.9613 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	531.3006	556.9777	572.9173	555.6454	466.1855	329.5370	200.9553	192.0734	334.7306	434.3858	482.3928	510.7386 (95)
Ext temp.	5.7000	6.1000	7.7000	10.1000	13.1000	15.9000	17.7000	17.8000	15.5000	12.3000	8.8000	5.8000 (96)
Heat loss rate W	1071.1660	1053.5136	962.2005	807.4622	590.4494	367.1085	210.2833	200.8974	394.0100	628.7935	858.6168	1050.9702 (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	401.6598	333.6721	289.6267	181.3081	92.4523	0.0000	0.0000	0.0000	0.0000	144.6393	270.8813	401.9323 (98)
Space heating												2116.1720 (98)
Space heating per m2												25.8638 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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 %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2346.0887 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	401.6598	333.6721	289.6267	181.3081	92.4523	0.0000	0.0000	0.0000	0.0000	144.6393	270.8813	401.9323	(98)
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)	445.2992	369.9248	321.0939	201.0068	102.4970	0.0000	0.0000	0.0000	0.0000	160.3540	300.3118	445.6013	(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	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189	(64)
Efficiency of water heater (217)m	86.9764	86.8545	86.3831	85.3235	83.1564	76.4000	76.4000	76.4000	76.4000	84.4081	86.1799	76.4000	(216)
Fuel for water heating, kWh/month	119.2216	104.1299	108.5800	98.3582	98.1707	93.8672	89.9191	101.2456	101.8344	104.9729	109.4371	115.4670	(219)
Water heating fuel used												1245.2037	(219)
Annual totals kWh/year													
Space heating fuel - main system												2346.0887	(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)												394.3960	(232)
Total delivered energy for all uses												4060.6884	(238)

10a. Fuel costs - using BEDF prices (559)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2346.0887	5.7300	134.4309 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1245.2037	5.7300	71.3502 (247)
Pumps and fans for heating	75.0000	24.1800	18.1350 (249)
Energy for lighting	394.3960	24.1800	95.3650 (250)
Additional standing charges			114.0000 (251)
Total energy cost			433.2810 (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	2346.0887	0.2160	506.7552 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1245.2037	0.2160	268.9640 (264)
Space and water heating			775.7192 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	394.3960	0.5190	204.6915 (268)
Total kg/year			1019.3357 (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	2346.0887	1.2200	2862.2282 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1245.2037	1.2200	1519.1485 (264)
Space and water heating			4381.3768 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	394.3960	3.0700	1210.7958 (268)
Primary energy kWh/year			5822.4225 (272)
Primary energy kWh/m2/year			71.1614 (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 Built)

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	SAP increase too small
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
U Solar photovoltaic panels	+ 10.5	-£ 471	-1010 kg (99.1%)

Measures omitted - SAP change or cost saving too small:

N Solar water heating	+ 0.9	-£ 33	-143 kg (14.0%)
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Recommended measures	Typical annual savings		Energy efficiency	Environmental impact
Solar photovoltaic panels	£471	12.35 kg/m²	A 96	A 98
Total Savings	£471	12.35 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 559 TEST (13 Dec 2024)
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	£113	£113	£0
Mains gas	£320	£320	£0
Space heating	£267	£267	£0
Water heating	£71	£71	£0
Lighting	£95	£95	£0
Generated (PV)	-£0	-£471	£471
Total cost of fuels	£433	-£38	£471
Total cost of uses	£433	-£38	£471
Delivered energy	50 kWh/m²	26 kWh/m²	24 kWh/m²
Carbon dioxide emissions	1.0 tonnes	0.0 tonnes	1.0 tonnes
CO2 emissions per m²	12 kg/m²	0 kg/m²	12 kg/m²
Primary energy	71 kWh/m²	-2 kWh/m²	73 kWh/m²

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.9100 (1b)	x 2.3700 (2b)	= 96.9567 (1b) - (3b)
First floor	40.9100 (1c)	x 2.6200 (2c)	= 107.1842 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.1409 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1470 (8)
Pressure test					Yes
Measured/design AP50					3.3200
Infiltration rate					0.3130 (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) =	0.2895 (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	0.3691	0.3619	0.3546	0.3184	0.3112	0.2750	0.2750	0.2678	0.2895	0.3112	0.3257	0.3401 (22b)
Effective ac	0.5681	0.5655	0.5629	0.5507	0.5484	0.5378	0.5378	0.5359	0.5419	0.5484	0.5530	0.5578 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			9.0800	1.3258	12.0379		(27)
Flr - Ground			40.9120	0.1800	7.3642	75.6000	3092.9472 (28a)
Wl - Brick (Timber Frame)	90.3710	11.1690	79.2020	0.2100	16.6324	7.4000	586.0948 (29a)
Rf - Ins Joist	40.9120		40.9120	0.0800	3.2730	7.4000	302.7488 (30)
Total net area of external elements Aum(A, m ²)			172.1960				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.8154		(33)
Party Wall			46.2040	0.0000	0.0000	7.4000	341.9096 (32)
Stud			70.7018			7.4000	523.1936 (32c)
Internal Floor			40.9120			7.4000	302.7488 (32d)
Internal Ceiling			40.9120			7.4000	302.7488 (32e)

Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss

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	
38.2719	38.0937	37.9191	37.0987	36.9453	36.2308	36.2308	36.0984	36.5060	36.9453	37.2558	37.5804 (38)	
Heat transfer coeff												
95.3351	95.1569	94.9822	94.1619	94.0084	93.2939	93.2939	93.1616	93.5691	94.0084	94.3189	94.6435 (39)	
Average = Sum(39)m / 12 =												94.1611 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.1652	1.1630	1.1609	1.1508	1.1490	1.1402	1.1402	1.1386	1.1436	1.1490	1.1528	1.1567 (40)	
HLP (average)												1.1508 (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												2.4965 (42)
Average daily hot water use (litres/day)												93.4916 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
102.8407	99.1011	95.3614	91.6217	87.8821	84.1424	84.1424	87.8821	91.6217	95.3614	99.1011	102.8407 (44)	
Energy conte	152.5098	133.3861	137.6425	120.0000	115.1429	99.3596	92.0712	105.6531	106.9149	124.5990	136.0096	147.6976 (45)
Energy content (annual)												Total = Sum(45)m = 1470.9864 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

Water storage loss:	22.8765	20.0079	20.6464	18.0000	17.2714	14.9039	13.8107	15.8480	16.0372	18.6899	20.4014	22.1546 (46)
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	0.6702	0.5948	0.5907	0.4948	0.4554	0.3762	0.3486	0.4178	0.4408	0.5347	0.6065	0.6490 (61)
Total heat required for water heating calculated for each month	153.1800	133.9809	138.2331	120.4948	115.5983	99.7358	92.4199	106.0709	107.3557	125.1337	136.6161	148.3467 (62)
WWHRS	-49.4854	-43.5394	-44.4384	-36.5722	-33.9630	-28.0213	-23.7216	-28.7193	-29.5543	-36.5280	-42.3034	-47.8278 eq. (G10)
Total of WWHRS savings												-444.6741
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189 (64)
Heat gains from water heating, kWh/month	50.8771	44.4996	45.9138	40.0237	38.3989	33.1311	30.7008	35.2341	35.6594	41.5629	45.3748	49.2717 (65)
												1032.4919 (64)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.8308	49.5885	40.3280	30.5309	22.8222	19.2675	20.8192	27.0616	36.3220	46.1191	53.8278	57.3825 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	333.1376	336.5945	327.8832	309.3378	285.9275	263.9252	249.2263	245.7693	254.4807	273.0261	296.4364	318.4387 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754 (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)	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595 (71)
Water heating gains (Table 5)	68.3832	66.2196	61.7121	55.5885	51.6114	46.0154	41.2646	47.3577	49.5270	55.8641	63.0206	66.2254 (72)
Total internal gains	562.7568	557.8078	535.3285	500.8623	465.7663	434.6133	416.7152	425.5938	445.7348	480.4144	518.6899	547.4518 (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
East					6.3550	19.6403	0.7300	0.7200	0.7700			45.4623 (76)
West					2.7240	19.6403	0.7300	0.7200	0.7700			19.4869 (80)

Solar gains	64.9492	127.0544	209.2406	305.1649	373.9911	382.8464	364.4854	313.0875	243.3555	150.7608	80.9840	53.4111 (83)
Total gains	627.7060	684.8622	744.5691	806.0272	839.7573	817.4596	781.2006	738.6813	689.0902	631.1752	599.6740	600.8629 (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	15.8866	15.9164	15.9457	16.0846	16.1108	16.2342	16.2342	16.2573	16.1865	16.1108	16.0578	16.0027
alpha	2.0591	2.0611	2.0630	2.0723	2.0741	2.0823	2.0823	2.0838	2.0791	2.0741	2.0705	2.0668
util living area	0.9054	0.8850	0.8477	0.7819	0.6882	0.5654	0.4497	0.4839	0.6530	0.8066	0.8819	0.9123 (86)
MIT	18.2216	18.4848	18.9715	19.6097	20.1900	20.6299	20.8377	20.8047	20.4640	19.7194	18.8658	18.1623 (87)
Th 2	19.9480	19.9497	19.9514	19.9595	19.9610	19.9681	19.9681	19.9694	19.9654	19.9610	19.9580	19.9548 (88)
util rest of house	0.8951	0.8726	0.8306	0.7561	0.6480	0.5028	0.3638	0.3989	0.5960	0.7782	0.8671	0.9028 (89)
MIT 2	16.2786	16.6536	17.3450	18.2432	19.0366	19.6097	19.8483	19.8180	19.4146	18.4149	17.2080	16.1963 (90)
Living area fraction									fLA = Living area / (4) =			0.1678 (91)
MIT	16.6047	16.9609	17.6179	18.4725	19.2302	19.7809	20.0143	19.9836	19.5907	18.6338	17.4862	16.5262 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.4547	16.8109	17.4679	18.3225	19.0802	19.6309	19.8643	19.8336	19.4407	18.4838	17.3362	16.3762 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	531.5539	562.7840	579.2414	569.2824	510.9988	392.5059	276.8913	285.5763	387.6417	458.9211	489.3525	514.2615 (94)
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	1158.7667	1133.4001	1041.7600	887.2401	693.7974	469.3484	304.5405	319.8779	499.7245	741.1407	965.4664	1152.3998 (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	466.6463	383.4540	344.1138	228.9295	136.0021	0.0000	0.0000	0.0000	0.0000	209.9713	342.8020	474.7749 (98)
Space heating												2586.6940 (98)
Space heating per m2												(98) / (4) = 31.6144 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 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 %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2867.7317 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	466.6463	383.4540	344.1138	228.9295	136.0021	0.0000	0.0000	0.0000	0.0000	209.9713	342.8020	474.7749	(98)
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)	517.3462	425.1153	381.5009	253.8021	150.7784	0.0000	0.0000	0.0000	0.0000	232.7842	380.0465	526.3580	(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	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189	(64)
Efficiency of water heater (217)m	87.3320	87.1942	86.8403	86.0315	84.4764	76.4000	76.4000	76.4000	76.4000	85.6110	86.8165	76.4000	(216)
Fuel for water heating, kWh/month	118.7361	103.7242	108.0083	97.5488	96.6368	93.8672	89.9191	101.2456	101.8344	103.4980	108.6345	114.9571	(219)
Water heating fuel used												1238.6101	(219)
Annual totals kWh/year													
Space heating fuel - main system												2867.7317	(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)												394.3960	(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												2848.4984	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2867.7317	3.4800	99.7971 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1238.6101	3.4800	43.1036 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	394.3960	13.1900	52.0208 (250)
Additional standing charges			120.0000 (251)
Energy saving/generation technologies			
PV Unit	-1727.2394	13.1900	-227.8229 (252)
Total energy cost			96.9912 (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] =	0.3212 (257)
SAP value		95.5191
SAP rating (Section 12)		96 (258)
SAP band		A

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	2867.7317	0.2160	619.4301 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1238.6101	0.2160	267.5398 (264)
Space and water heating			886.9698 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	394.3960	0.5190	204.6915 (268)
Energy saving/generation technologies			
PV Unit	-1727.2394	0.5190	-896.4372 (269)
Total kg/year			234.1491 (272)
CO2 emissions per m2			2.8600 (273)
EI value			97.5259
EI rating			98 (274)
EI band			A

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.9100 (1b)	x 2.3700 (2b)	= 96.9567 (1b) - (3b)
First floor	40.9100 (1c)	x 2.6200 (2c)	= 107.1842 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.1409 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1470 (8)
Pressure test					Yes
Measured/design AP50					3.3200
Infiltration rate					0.3130 (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) =	0.2895 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.6000	4.5000	4.2000	4.2000	4.1000	4.1000	4.0000	4.0000	4.3000	4.3000	4.4000 (22)
Wind factor	1.2250	1.1500	1.1250	1.0500	1.0500	1.0250	1.0250	1.0000	1.0000	1.0750	1.0750	1.1000 (22a)
Adj infilt rate	0.3546	0.3329	0.3257	0.3040	0.3040	0.2967	0.2967	0.2895	0.2895	0.3112	0.3112	0.3184 (22b)
Effective ac	0.5629	0.5554	0.5530	0.5462	0.5462	0.5440	0.5440	0.5419	0.5419	0.5484	0.5484	0.5507 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			9.0800	1.3258	12.0379		(27)
Flr - Ground			40.9120	0.1800	7.3642	75.6000	3092.9472 (28a)
Wl - Brick (Timber Frame)	90.3710	11.1690	79.2020	0.2100	16.6324	7.4000	586.0948 (29a)
Rf - Ins Joist	40.9120		40.9120	0.0800	3.2730	7.4000	302.7488 (30)
Total net area of external elements Aum(A, m ²)			172.1960				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.8154		(33)
Party Wall			46.2040	0.0000	0.0000	7.4000	341.9096 (32)
Stud			70.7018			7.4000	523.1936 (32c)
Internal Floor			40.9120			7.4000	302.7488 (32d)
Internal Ceiling			40.9120			7.4000	302.7488 (32e)

Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss

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	37.9191	37.4163	37.2558	36.7953	36.7953	36.6489	36.6489	36.5060	36.5060	36.9453	36.9453	37.0987 (38)
Average = Sum(39)m / 12 =	94.9822	94.4794	94.3189	93.8584	93.8584	93.7120	93.7120	93.5691	93.5691	94.0084	94.0084	94.1619 (39)
	94.0198											94.0198 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1609	1.1547	1.1528	1.1471	1.1471	1.1453	1.1453	1.1436	1.1436	1.1490	1.1490	1.1508 (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												2.4965 (42)
Average daily hot water use (litres/day)												93.4916 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	102.8407	99.1011	95.3614	91.6217	87.8821	84.1424	84.1424	87.8821	91.6217	95.3614	99.1011	102.8407 (44)
Energy content (annual)	152.5098	133.3861	137.6425	120.0000	115.1429	99.3596	92.0712	105.6531	106.9149	124.5990	136.0096	147.6976 (45)
Distribution loss (46)m = 0.15 x (45)m												1470.9864 (45)

	22.8765	20.0079	20.6464	18.0000	17.2714	14.9039	13.8107	15.8480	16.0372	18.6899	20.4014	22.1546 (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	0.6702	0.5948	0.5907	0.4948	0.4554	0.3762	0.3486	0.4178	0.4408	0.5347	0.6065	0.6490 (61)
Total heat required for water heating calculated for each month	153.1800	133.9809	138.2331	120.4948	115.5983	99.7358	92.4199	106.0709	107.3557	125.1337	136.6161	148.3467 (62)
WWHRS	-49.4854	-43.5394	-44.4384	-36.5722	-33.9630	-28.0213	-23.7216	-28.7193	-29.5543	-36.5280	-42.3034	-47.8278 eq. (G10)
Total of WWHRS savings												-444.6741
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189 (64)
Heat gains from water heating, kWh/month	50.8771	44.4996	45.9138	40.0237	38.3989	33.1311	30.7008	35.2341	35.6594	41.5629	45.3748	49.2717 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892	149.7892 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.8308	49.5885	40.3280	30.5309	22.8222	19.2675	20.8192	27.0616	36.3220	46.1191	53.8278	57.3825 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	333.1376	336.5945	327.8832	309.3378	285.9275	263.9252	249.2263	245.7693	254.4807	273.0261	296.4364	318.4387 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754	52.4754 (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)	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595	-99.8595 (71)
Water heating gains (Table 5)	68.3832	66.2196	61.7121	55.5885	51.6114	46.0154	41.2646	47.3577	49.5270	55.8641	63.0206	66.2254 (72)
Total internal gains	562.7568	557.8078	535.3285	500.8623	465.7663	434.6133	416.7152	425.5938	445.7348	480.4144	518.6899	547.4518 (73)

[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	
East					6.3550	25.1733	0.7300	0.7200			0.7700	58.2698
West					2.7240	25.1733	0.7300	0.7200			0.7700	24.9767
Solar gains	83.2465	138.5284	231.5197	339.2055	391.1705	441.8227	406.6628	364.3931	283.3910	179.4571	103.4588	67.2903
Total gains	646.0033	696.3361	766.8482	840.0678	856.9367	876.4360	823.3780	789.9868	729.1258	659.8715	622.1487	614.7421

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, n _{li} (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	15.9457	16.0305	16.0578	16.1366	16.1366	16.1618	16.1618	16.1865	16.1865	16.1108	16.1108	16.0846
alpha	2.0630	2.0687	2.0705	2.0758	2.0758	2.0775	2.0775	2.0791	2.0791	2.0741	2.0741	2.0723
util living area	0.8862	0.8668	0.8200	0.7386	0.6250	0.4621	0.3433	0.3460	0.5529	0.7438	0.8482	0.8930 (86)
MIT	18.6053	18.8078	19.2929	19.8989	20.4368	20.8003	20.9273	20.9286	20.6945	20.1061	19.3077	18.5907 (87)
Th 2	19.9514	19.9564	19.9580	19.9625	19.9625	19.9640	19.9640	19.9654	19.9654	19.9610	19.9610	19.9595 (88)
util rest of house	0.8732	0.8518	0.7992	0.7070	0.5750	0.3874	0.2461	0.2450	0.4793	0.7037	0.8278	0.8806 (89)
MIT 2	16.8296	17.1170	17.8013	18.6421	19.3602	19.7995	19.9259	19.9294	19.6928	18.9436	17.8365	16.8130 (90)
Living area fraction												0.1678 (91)
MIT	17.1275	17.4007	18.0516	18.8530	19.5409	19.9674	20.0939	20.0970	19.8609	19.1387	18.0834	17.1113 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.9775	17.2507	17.9016	18.7030	19.3909	19.8174	19.9439	19.9470	19.7109	18.9887	17.9334	16.9613 (93)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8224	0.7999	0.7471	0.6614	0.5440	0.3760	0.2441	0.2431	0.4591	0.6583	0.7754	0.8308 (94)
Useful gains	531.3006	556.9777	572.9173	555.6454	466.1855	329.5370	200.9553	192.0734	334.7306	434.3858	482.3928	510.7386 (95)
Ext temp.	5.7000	6.1000	7.7000	10.1000	13.1000	15.9000	17.7000	17.8000	15.5000	12.3000	8.8000	5.8000 (96)
Heat loss rate W	1071.1660	1053.5136	962.2005	807.4622	590.4494	367.1085	210.2833	200.8974	394.0100	628.7935	858.6168	1050.9702 (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	401.6598	333.6721	289.6267	181.3081	92.4523	0.0000	0.0000	0.0000	0.0000	144.6393	270.8813	401.9323 (98)
Space heating												2116.1720 (98)
Space heating per m2												25.8638 (99)
										(98) / (4) =		

Regs Region: England
Elmhurst Energy Systems
SAP2012 Calculator (Design
System) version 4.14r19

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 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 %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2346.0887 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	401.6598	333.6721	289.6267	181.3081	92.4523	0.0000	0.0000	0.0000	0.0000	144.6393	270.8813	401.9323	(98)
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)	445.2992	369.9248	321.0939	201.0068	102.4970	0.0000	0.0000	0.0000	0.0000	160.3540	300.3118	445.6013	(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	103.6946	90.4415	93.7947	83.9226	81.6353	71.7145	68.6982	77.3516	77.8015	88.6057	94.3127	100.5189	(64)
Efficiency of water heater (217)m	86.9764	86.8545	86.3831	85.3235	83.1564	76.4000	76.4000	76.4000	76.4000	84.4081	86.1799	87.0542	(216)
Fuel for water heating, kWh/month	119.2216	104.1299	108.5800	98.3582	98.1707	93.8672	89.9191	101.2456	101.8344	104.9729	109.4371	115.4670	(219)
Water heating fuel used												1245.2037	(219)
Annual totals kWh/year													
Space heating fuel - main system												2346.0887	(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)												394.3960	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 2.50 * 1217 * 0.80) =										-1946.4459		-1946.4459	(233)
Total delivered energy for all uses												2114.2425	(238)

10a. Fuel costs - using BEDF prices (559)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2346.0887	5.7300	134.4309 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1245.2037	5.7300	71.3502 (247)
Pumps and fans for heating	75.0000	24.1800	18.1350 (249)
Energy for lighting	394.3960	24.1800	95.3650 (250)
Additional standing charges			114.0000 (251)
Energy saving/generation technologies			
PV Unit	-1946.4459	24.1800	-470.6506 (252)
Total energy cost			-37.3696 (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	2346.0887	0.2160	506.7552 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1245.2037	0.2160	268.9640 (264)
Space and water heating			775.7192 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	394.3960	0.5190	204.6915 (268)
Energy saving/generation technologies			
PV Unit	-1946.4459	0.5190	-1010.2054 (269)
Total kg/year			9.1303 (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	2346.0887	1.2200	2862.2282 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1245.2037	1.2200	1519.1485 (264)
Space and water heating			4381.3768 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	394.3960	3.0700	1210.7958 (268)
Energy saving/generation technologies			
PV Unit	-1946.4459	3.0700	-5975.5890 (269)
Primary energy kWh/year			-153.1665 (272)
Primary energy kWh/m2/year			-1.8720 (273)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Built)

Property Reference	058 - PRJ013014	Issued on Date	27/01/2025
Assessment Reference	058	Prop Type Ref	2B
Property	19 Erwood Close, Netley Abbey, Southampton, SO31 5TJ		
SAP Rating	85 B	DER	14.86
Environmental	88 B	TER	18.35
CO ₂ Emissions (t/year)	1.02	% DER<TER	19.01
General Requirements Compliance	Pass	DFEE	44.38
		TFEE	50.80
		% DFEE<TFEE	12.65
Assessor Details	Mr. Christopher Nicholls, Briary Energy Limited, Tel: 0203 397 1373, chris@briaryenergy.co.uk		Assessor ID
			U903-0001
Client			

SUMMARY FOR INPUT DATA FOR New Build (As Built)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.35	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	14.86	kgCO ₂ /m ²	Pass
	-3.49 (-19.0%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	50.80	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	44.38	kWh/m ² /yr	
	-6.4 (-12.6%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.30)	0.21 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.18 (max. 0.25)	0.18 (max. 0.70)	Pass
Roof	0.08 (max. 0.20)	0.08 (max. 0.35)	Pass
Openings	1.36 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	3.32 (measured in this dwelling)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Built)

Main heating system

Boiler system with radiators or underfloor - Mains gas
Data from database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Combi boiler
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0%

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Time and temperature zone control

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 (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing East

6.36 m², No overhang

Windows facing West

2.72 m², No overhang

Air change rate

4.67 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

3.32 (measured in this dwelling)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.08

W/m²K

Air permeability

3.3

m³/m²h

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