

Energy Performance Certificate



2 White Hart Apartments, 3, Brook Street, TAVISTOCK, PL19 0HD

Dwelling type: Mid-floor flat
Date of assessment: 29 January 2018
Date of certificate: 29 January 2018
Reference number: 0858-3861-7793-9028-2305
Type of assessment: SAP, new dwelling
Total floor area: 31 m²

Use this document to:

- Compare current ratings of properties to see which properties are more energy efficient

Estimated energy costs of dwelling for 3 years:

£ 1,386

Estimated energy costs of this home

	Current costs	Potential costs	Potential future savings
Lighting	£ 84 over 3 years	£ 84 over 3 years	Not applicable
Heating	£ 666 over 3 years	£ 666 over 3 years	
Hot Water	£ 636 over 3 years	£ 636 over 3 years	
Totals	£ 1,386	£ 1,386	

These figures show how much the average household would spend in this property for heating, lighting and hot water and is not based on energy used by individual households. This excludes energy use for running appliances like TVs, computers and cookers, and electricity generated by microgeneration.

Energy Efficiency Rating

Very energy efficient - lower running costs



Not energy efficient - higher running costs

Current	Potential
68	68

The graph shows the current energy efficiency of your home.

The higher the rating the lower your fuel bills are likely to be.

The average energy efficiency rating for a dwelling in England and Wales is band D (rating 60).

The EPC rating shown here is based on standard assumptions about occupancy and energy use and may not reflect how energy is consumed by individual occupants.

Summary of this home's energy performance related features

Element	Description	Energy Efficiency
Walls	Average thermal transmittance 0.47 W/m ² K	★★★★☆
Roof	(other premises above)	—
Floor	Average thermal transmittance 0.19 W/m ² K	★★★★★
Windows	Full secondary glazing	★★★★☆
Main heating	Room heaters, electric	—
Main heating controls	Programmer and appliance thermostats	★★★★☆
Secondary heating	None	—
Hot water	Electric immersion, standard tariff	—
Lighting	Low energy lighting in all fixed outlets	★★★★★
Air tightness	(not tested)	—

Thermal transmittance is a measure of the rate of heat loss through a building element; the lower the value the better the energy performance.

Current primary energy use per square metre of floor area: 282 kWh/m² per year

Low and zero carbon energy sources

Low and zero carbon energy sources are sources of energy that release either very little or no carbon dioxide into the atmosphere when they are used. Installing these sources may help reduce energy bills as well as cutting carbon. There are none provided for this home.

Your home's heat demand

This table shows the energy used for space and water heating by an average household in this property.

Heat demand

Space heating (kWh per year)	1,375
Water heating (kWh per year)	1,315

If you built your own home and, as part of its construction, you installed a renewable heating system, you could receive Renewable Heat Incentive (RHI) payments. The estimated energy required for space and water heating will form the basis of the payments. For more information, search for the domestic RHI on the www.gov.uk website.

Recommendations

None.

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by Elmhurst Energy Systems Ltd. You can obtain contact details of the Accreditation Scheme at www.elmhurstenergy.co.uk.

A copy of this certificate has been lodged on a national register as a requirement under the Energy Performance of Buildings Regulations 2012 as amended. It will be made available via the online search function at www.epcregister.com. The certificate (including the building address) and other data about the building collected during the energy assessment but not shown on the certificate, for instance heating system data, will be made publicly available at www.opendatacommunities.org.

This certificate and other data about the building may be shared with other bodies (including government departments and enforcement agencies) for research, statistical and enforcement purposes. For further information about how data about the property are used, please visit www.epcregister.com. To opt out of having information about your building made publicly available, please visit www.epcregister.com/optout.

Assessor's accreditation number: EES/004715
Assessor's name: Andrew Underwood
Phone number: 07870 638 476
E-mail address: info@sap-calculations.co.uk
Related party disclosure: No related party

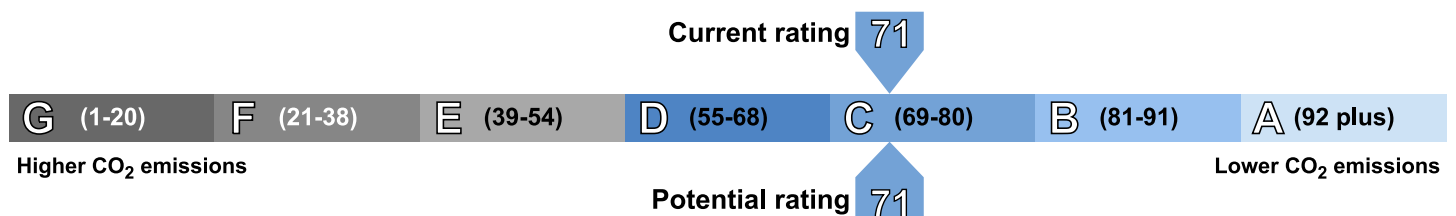
There is more information in the guidance document *Energy Performance Certificates for the marketing, sale and let of dwellings* available on the Government website at: www.gov.uk/government/collections/energy-performance-certificates. It explains the content and use of this document, advises on how to identify the authenticity of a certificate and how to make a complaint.

About the impact of buildings on the environment

One of the biggest contributors to global warming is carbon dioxide. The energy we use for heating, lighting and power in homes produces over a quarter of the UK's carbon dioxide emissions.

The average household causes about 6 tonnes of carbon dioxide every year. Based on this assessment, your home currently produces approximately 1.5 tonnes of carbon dioxide every year. You could reduce emissions by switching to renewable energy sources.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions based on standardised assumptions about occupancy and energy use. The higher the rating the less impact it has on the environment.



SUMMARY FOR INPUT DATA

Calculation Type: Conversion - new dwelling

Property Reference	A998-0001-16-83-2		Issued on Date	29/01/2018	
Survey Reference	16-83-2	Prop Type Ref	Conversion		
Property	2 White Hart Apartments, 3, Brook Street, TAVISTOCK, Devon, PL19 0HD				
SAP Rating	68 D	DER	N/A	TER	N/A
Environmental	71 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.49	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Surveyor	Andrew Underwood, Tel: 07870 638476			Surveyor ID	A998-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion - new dwelling

Orientation	South East
Property Tenure	Unknown
Transaction Type	New dwelling
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2016
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	7.70 m	31.24 m ²	2.31 m
7.0 Living Area	16.94	m ²	
8.0 Thermal Mass Parameter	Simple calculation - Medium		
Thermal Mass	250.00	kJ/m ² K	

9.0 External Walls

Description	Type	Construction	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall	Solid Wall	Other	0.47	17.79	14.11

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Masonry Party Wall	Solid Wall	Other	0.00	19.64
Timber Party Wall	Filled Cavity with Edge Sealing	Other	0.00	13.17
Stairwell	Filled Cavity with Edge Sealing	Other	0.00	10.16

10.1 Party Ceilings

Description	Construction	Area (m ²)
Party Ceilings	Other	31.24

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Heat Loss Floor 1	Exposed Floor - Timber	Timber exposed floor, insulation between joists	0.19	31.24

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion - new dwelling

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U Value (W/m ² K)
Windows	SAP table	Window	Secondary Glazing			0.76	Wood	0.70	2.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m ²)	Curtain Closed
Front Elevation	Window	[1] External Wall	South East	None	0.00					1.84	
Rear Elevation	Window	[1] External Wall	North West	None	0.00					1.84	

14.0 Conservatory	<input type="text" value="None"/>
15.0 Draught Proofing	<input type="text" value="100"/> %
16.0 Draught Lobby	<input type="text" value="Yes"/>
17.0 Thermal Bridging	<input type="text" value="Default"/>
Y-value	<input type="text" value="0.150"/> W/m ² K
18.0 Pressure Testing	<input type="text" value="No"/>

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	<input type="text" value="Windows fully open"/>
Cross ventilation possible	<input type="text" value="Yes"/>
Night Ventilation	<input type="text" value="No"/>
Air change rate	<input type="text" value="6.00"/>

Mechanical Ventilation

Mechanical Ventilation System Present	<input type="text" value="No"/>
---------------------------------------	---------------------------------

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				2
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System	<input type="text" value="No"/>
----------------------------------	---------------------------------

22.0 Lighting

Internal

Total number of light fittings	<input type="text" value="4"/>
Total number of L.E.L. fittings	<input type="text" value="4"/>
Percentage of L.E.L. fittings	<input type="text" value="100.00"/> %

External

External lights fitted	<input type="text" value="No"/>
------------------------	---------------------------------

23.0 Electricity Tariff	<input type="text" value="Standard"/>
--------------------------------	---------------------------------------

24.0 Main Heating 1	<input type="text" value="SAP table"/>
Description	<input type="text" value="Electric"/>
Percentage of Heat	<input type="text" value="100"/> %
Main Heating	<input type="text" value="REA"/>
SAP Code	<input type="text" value="691"/>
Efficiency (SAP Table)	<input type="text" value="100.0"/> %
Controls	<input type="text" value="CRC Programmer and appliance thermostats"/>
Sap Code	<input type="text" value="2603"/>

SUMMARY FOR INPUT DATA

Calculation Type: Conversion - new dwelling

25.0 Main Heating 2

Community Heating

28.0 Water Heating

Water Heating

Flue Gas Heat Recovery System

Waste Water Heat Recovery
Instantaneous System 1

Waste Water Heat Recovery
Instantaneous System 2

Waste Water Heat Recovery
Storage System

Solar Panel

Water use <= 125 litres/person/day

SAP Code

Immersion Heater

29.0 Hot Water Cylinder

Cylinder In Heated Space

Insulation Type

Insulation Thickness

Cylinder Volume

L

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

Property Reference	A998-0001-16-83-2		Issued on Date	29/01/2018	
Survey Reference	16-83-2	Prop Type Ref	Conversion		
Property	2 White Hart Apartments, 3, Brook Street, TAVISTOCK, Devon, PL19 0HD				
SAP Rating	68 D	DER	N/A	TER	N/A
Environmental	71 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.49	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Surveyor	Andrew Underwood, Tel: 07870 638476			Surveyor ID	A998-0001
Client					

SAP2012 - 9.92 input data (DesignData) -

SAP2012 Input Data (Flat) 29/01/2018

FullRefNo: 16-83-2

Regs Region: England
 SAP Region: South West England
 Postcode: PL19 0HD
 DwellingOrientation: South East
 Property Type: Flat, Mid-Terrace
 Storeys: 1
 Date Built: 2016
 Sheltered Sides: 2
 Sunlight Shade: Average or unknown
 Measurements
 1st Storey: 7.7, 31.24, 2.31
 Living Area: 16.94 m2, fraction: 54.2%
 Thermal Mass: Simple calculation
 Thermal Mass Simple: Medium
 Thermal MassValue: 250
 External Walls
 External Wall 14.11, 17.79, 0, Other, Solid, 0, 0.47, Calculate
 Party Walls
 Masonry Party Wall 19.64, 0, Other, Solid, 0, 0
 Timber Party Wall 13.17, 0, Other, FilledWithEdge, 0, 0
 Stairwell 10.16, 0, Other, FilledWithEdge, 0, 0
 External Roofs
 Party Ceilings
 Party Ceilings Area, Kappa, Construction, Element
 31.24, 0, Other
 Heat Loss Floors
 Heat Loss Floor 1 31.24, 20, Timber exposed floor, insulation between joists, Exposed Floor - Timber, 0, 0.19
 Description
 Windows
 SAP table, Window, Secondary Glazing, , , 0.76, Wood, 0.7, 2.40
 Opening Type, Location, Orientation, Pitch, Curtain Type, Overhang Ratio, Wide Overhang, Width, Height, Count, Area, Curtain Closed
 Front Elevation Window, External Wall, South East, , None, 0, , 0, 0, 1.84,
 Rear Elevation Window, External Wall, North West, , None, 0, , 0, 0, 1.84,
 Conservatory: None
 Draught Proofing: 100
 Draught Lobby: Yes
 Thermal Bridges
 Bridging: Default
 Y 0.15
 Pressure Test: False
 Designed q50: 15
 AsBuilt q50: 15
 Property Tested: False
 Mechanical Ventilation None
 Chimneys MHS: 0
 Chimneys SHS: 0
 Chimneys Other: 0
 Chimneys Total: 0
 Open Flues MHS: 0
 Open Flues SHS: 0
 Open Flues Other: 0
 Open Flues Total: 0
 Intermittent Fans: 2
 Passive Vents: 0
 Flueless Gas Fires: 0
 Cooling System None
 Light Fittings: 4
 LEL Fittings: 4
 Percentage of LEL Fittings: 100
 External Lights Fitted: No
 External LELs Fitted: No
 Electricity Tariff: Standard
 Main Heating 1
 Description Electric
 Percentage 100
 MHS Electricity REA Panel, convector or radiant heaters
 SAP Code 691
 Boiler Efficiency Type SAP Table
 Efficiency 100
 MHS Controls CRC Programmer and appliance thermostats
 Boiler Interlock No
 Ctrl SAP Code 2603
 Main Heating 2 None
 Heating Systems Interaction Each system heats separate parts of dwelling
 Smoke Control Area Unknown
 Community Heating None
 Secondary Heating None
 Water Heating

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

SAP2012 - 9.92 input data (DesignData) -

Type	Independent
WHS	HEI Immersion
Low Water Usage	Yes
SAP Code	903
Immersion Heater Type	Dual
Showers in Property	Non-electric only
Hot Water Cylinder	
Cylinder Type	HotWaterCylinder
Cylinder Insulation Type	Foam
Cylinder Volume	90.00
Cylinder in Heated Space	Yes
Flue Gas Heat Recovery System	None
Waste Water Heat Recovery	none
PV Unit	None
Wind Turbine	None
Terrain Type:	Urban
Small Scale Hydro	None
Special Features	None

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

CALCULATION OF HEAT DEMAND 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion - new dwelling (Version 9.92, January 2014)
 CALCULATION OF HEAT DEMAND 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	31.2400 (1b)	2.3100 (2b)	72.1644 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	31.2400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	72.1644 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				2 * 10 =	20.0000 (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) =				20.0000 / (5) =	0.2771 (8)
Pressure test				No	
Measured/design q50					15.0000
Infiltration rate					1.0271 (18)
Number of sides sheltered					2 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.8500 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.8731 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.6000	4.3000	4.3000	4.1000	4.0000	3.5000	3.6000	3.4000	3.5000	4.2000	4.2000	4.4000
Wind factor	1.1500	1.0750	1.0750	1.0250	1.0000	0.8750	0.9000	0.8500	0.8750	1.0500	1.0500	1.1000
Adj infilt rate												
Effective ac	1.0040	0.9386	0.9386	0.8949	0.8731	0.7639	0.7858	0.7421	0.7639	0.9167	0.9167	0.9604
	1.0040	0.9404	0.9404	0.9004	0.8811	0.7918	0.8087	0.7754	0.7918	0.9202	0.9202	0.9612

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Windows (Uw = 2.40)			3.6800	2.1898	8.0584		(27)
Heat Loss Floor 1			31.2400	0.1900	5.9356		(28b)
External Wall	17.7900	3.6800	14.1100	0.4700	6.6317		(29a)
Total net area of external elements Aum(A, m2)			49.0300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	20.6257		(33)
Masonry Party Wall			19.6400	0.0000	0.0000		(32)
Timber Party Wall			13.1700	0.0000	0.0000		(32)
Stairwell			10.1600	0.0000	0.0000		(32)
Party Ceilings			31.2400				(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)
Thermal bridges (Default value 0.150 * total exposed area)							7.3545 (36)
Total fabric heat loss						(33) + (36) =	27.9802 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Jan	23.9103	22.3959	22.3959	21.4429	20.9834	18.8562	19.2589	18.4647	18.8562	21.9137	21.9137	22.8894
Heat transfer coeff	51.8905	50.3761	50.3761	49.4231	48.9636	46.8364	47.2391	46.4449	46.8364	49.8939	49.8939	50.8696
Average = Sum(39)m / 12 =												
HLP	1.6610	1.6126	1.6126	1.5820	1.5673	1.4992	1.5121	1.4867	1.4992	1.5971	1.5971	1.6283
HLP (average)												1.5713
Days in month	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.1979 (42)
Average daily hot water use (litres/day)												62.6494 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	68.9143	66.4084	63.9024	61.3964	58.8904	56.3845	56.3845	58.8904	61.3964	63.9024	66.4084	68.9143
Energy conte	102.1980	89.3830	92.2352	80.4129	77.1581	66.5816	61.6976	70.7989	71.6445	83.4947	91.1410	98.9733
Energy content (annual)												
Distribution loss (46)m = 0.15 x (45)m	15.3297	13.4074	13.8353	12.0619	11.5737	9.9872	9.2546	10.6198	10.7467	12.5242	13.6712	14.8460
Water storage loss:												
Store volume												90.0000 (47)

b) If manufacturer declared loss factor is not known :

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

CALCULATION OF HEAT DEMAND 09 Jan 2014

Hot water storage loss factor from Table 2 (kWh/litre/day)														0.0152 (51)
Volume factor from Table 2a														1.1006 (52)
Temperature factor from Table 2b														0.6000 (53)
Enter (49) or (54) in (55)														0.9025 (55)
Total storage loss	27.9783	25.2707	27.9783	27.0758	27.9783	27.0758	27.9783	27.9783	27.0758	27.9783	27.0758	27.9783	27.9783	(56)
If cylinder contains dedicated solar storage	27.9783	25.2707	27.9783	27.0758	27.9783	27.0758	27.9783	27.9783	27.0758	27.9783	27.0758	27.9783	27.9783	(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	0.0000	0.0000	(59)
Total heat required for water heating calculated for each month	130.1763	114.6537	120.2136	107.4887	105.1364	93.6574	89.6760	98.7773	98.7203	111.4731	118.2168	126.9516	126.9516	(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	0.0000	(63)
Output from w/h	130.1763	114.6537	120.2136	107.4887	105.1364	93.6574	89.6760	98.7773	98.7203	111.4731	118.2168	126.9516	126.9516	(64)
RHI water heating demand														
Heat gains from water heating, kWh/month	56.3635	49.9364	53.0509	48.3979	48.0377	43.7990	42.8971	45.9233	45.4824	50.1447	51.9650	55.2913	55.2913	(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	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	24.9113	22.1260	17.9941	13.6227	10.1831	8.5970	9.2894	12.0747	16.2066	20.5780	24.0176	25.6037	25.6037	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.6820	151.2352	147.3212	138.9885	128.4701	118.5842	111.9798	110.4266	114.3407	122.6733	133.1918	143.0776	143.0776	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	(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	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	(71)
Water heating gains (Table 5)	75.7574	74.3102	71.3049	67.2194	64.5668	60.8320	57.6574	61.7249	63.1700	67.3987	72.1737	74.3162	74.3162	(72)
Total internal gains	317.6932	315.0139	303.9627	287.1730	270.5625	255.3556	246.2691	251.5686	261.0598	277.9926	296.7255	310.3401	310.3401	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	Specific data or Table 6c	Access factor Table 6d	Gains W								
Southeast	1.8400	46.0405	0.7600	0.7000	0.7700	31.2322 (77)								
Northwest	1.8400	15.0290	0.7600	0.7000	0.7700	10.1951 (81)								
Solar gains	41.4273	61.2792	91.5900	126.3082	145.4281	158.1291	137.7596	129.2565	106.3718	71.5396	48.6694	33.4593	33.4593	(83)
Total gains	359.1205	376.2931	395.5526	413.4812	415.9906	413.4847	384.0287	380.8251	367.4316	349.5321	345.3949	343.7994	343.7994	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)														21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	41.8081	43.0649	43.0649	43.8954	44.3073	46.3197	45.9247	46.7100	46.3197	43.4811	43.4811	42.6471	42.6471	
alpha	3.7872	3.8710	3.8710	3.9264	3.9538	4.0880	4.0616	4.1140	4.0880	3.8987	3.8987	3.8431	3.8431	
util living area	0.9744	0.9671	0.9492	0.9116	0.8286	0.6804	0.5791	0.5664	0.7488	0.9045	0.9560	0.9759	0.9759	(86)
MIT	19.7218	19.8720	20.0995	20.3976	20.7045	20.9082	20.9611	20.9664	20.8642	20.5196	20.1426	19.7614	19.7614	(87)
Th 2	19.5689	19.6041	19.6041	19.6265	19.6374	19.6881	19.6784	19.6975	19.6881	19.6154	19.6154	19.5926	19.5926	(88)
util rest of house	0.9657	0.9561	0.9315	0.8798	0.7647	0.5759	0.4424	0.4303	0.6500	0.8617	0.9387	0.9675	0.9675	(89)
MIT 2	17.9833	18.2207	18.5423	18.9677	19.3688	19.6292	19.6624	19.6842	19.5933	19.1322	18.6166	18.0569	18.0569	(90)
Living area fraction										fLA = Living area / (4) =		0.5423	0.5423	(91)
MIT	18.9260	19.1161	19.3867	19.7431	20.0931	20.3228	20.3666	20.3795	20.2825	19.8846	19.4441	18.9812	18.9812	(92)
Temperature adjustment												0.0000	0.0000	
adjusted MIT	18.9260	19.1161	19.3867	19.7431	20.0931	20.3228	20.3666	20.3795	20.2825	19.8846	19.4441	18.9812	18.9812	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Useful gains	344.9845	357.9499	367.1120	365.0938	327.9588	260.1790	198.2825	191.9677	256.5610	304.6078	323.3105	331.0063	331.0063	(95)
Ext temp.	5.3000	5.7000	7.1000	9.0000	11.8000	14.3000	16.0000	16.1000	14.1000	11.2000	8.2000	5.6000	5.6000	(96)
Heat loss rate W	707.0592	675.8517	618.9559	530.9552	406.0597	282.0839	206.2753	198.7588	289.5646	433.3065	561.0101	680.6955	680.6955	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	269.3836	213.6300	187.3719	119.4203	58.1071	0.0000	0.0000	0.0000	0.0000	95.7519	171.1437	260.1687	260.1687	(98)
Space heating														
RHI space heating demand													1375	(98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

CALCULATION OF HEAT DEMAND 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

CALCULATION OF ENERGY RATINGS 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion - new dwelling (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	31.2400 (1b)	x 2.3100 (2b)	= 72.1644 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	31.2400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 72.1644 (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					2 * 10 = 20.0000 (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) =					20.0000 / (5) = 0.2771 (8)
Pressure test					No
Measured/design q50					15.0000
Infiltration rate					1.0271 (18)
Number of sides sheltered					2 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.8731 (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												
Effective ac	1.1132	1.0913	1.0695	0.9604	0.9386	0.8294	0.8294	0.8076	0.8731	0.9386	0.9822	1.0259 (22b)
	1.1132	1.0913	1.0695	0.9612	0.9404	0.8440	0.8440	0.8261	0.8811	0.9404	0.9824	1.0259 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K					
Windows (Uw = 2.40)			3.6800	2.1898	8.0584		(27)					
Heat Loss Floor 1			31.2400	0.1900	5.9356		(28b)					
External Wall	17.7900	3.6800	14.1100	0.4700	6.6317		(29a)					
Total net area of external elements Aum(A, m ²)			49.0300				(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	20.6257		(33)					
Masonry Party Wall			19.6400	0.0000	0.0000		(32)					
Timber Party Wall			13.1700	0.0000	0.0000		(32)					
Stairwell			10.1600	0.0000	0.0000		(32)					
Party Ceilings			31.2400				(32b)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)					
Thermal bridges (Default value 0.150 * total exposed area)							7.3545 (36)					
Total fabric heat loss						(33) + (36) =	27.9802 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 26.5093	Feb 25.9895	Mar 25.4697	Apr 22.8894	May 22.3959	Jun 20.0985	Jul 20.0985	Aug 19.6730	Sep 20.9834	Oct 22.3959	Nov 23.3943	Dec 24.4301 (38)
Heat transfer coeff	54.4895	53.9697	53.4499	50.8696	50.3761	48.0787	48.0787	47.6532	48.9636	50.3761	51.3745	52.4103 (39)
Average = Sum(39)m / 12 =												50.8408 (39)
HLP	Jan 1.7442	Feb 1.7276	Mar 1.7109	Apr 1.6283	May 1.6126	Jun 1.5390	Jul 1.5390	Aug 1.5254	Sep 1.5673	Oct 1.6126	Nov 1.6445	Dec 1.6777 (40)
HLP (average)												1.6274 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												1.1979 (42)
Average daily hot water use (litres/day)												62.6494 (43)
Daily hot water use	68.9143	66.4084	63.9024	61.3964	58.8904	56.3845	56.3845	58.8904	61.3964	63.9024	66.4084	68.9143 (44)
Energy conte	102.1980	89.3830	92.2352	80.4129	77.1581	66.5816	61.6976	70.7989	71.6445	83.4947	91.1410	98.9733 (45)
Energy content (annual)												Total = Sum(45)m = 985.7189 (45)
Distribution loss (46)m = 0.15 x (45)m	15.3297	13.4074	13.8353	12.0619	11.5737	9.9872	9.2546	10.6198	10.7467	12.5242	13.6712	14.8460 (46)
Water storage loss:												90.0000 (47)
Store volume												
b) If manufacturer declared loss factor is not known :												

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

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 %)													100.0000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1669.4099 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	326.9501	263.2577	229.5551	133.2193	66.1960	0.0000	0.0000	0.0000	0.0000	115.2926	216.0187	318.9204	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	326.9501	263.2577	229.5551	133.2193	66.1960	0.0000	0.0000	0.0000	0.0000	115.2926	216.0187	318.9204	(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	130.1763	114.6537	120.2136	107.4887	105.1364	93.6574	89.6760	98.7773	98.7203	111.4731	118.2168	126.9516	(64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	130.1763	114.6537	120.2136	107.4887	105.1364	93.6574	89.6760	98.7773	98.7203	111.4731	118.2168	126.9516	(219)
Water heating fuel used													1315.1411 (219)
Annual totals kWh/year													
Space heating fuel - main system													1669.4099 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year													0.0000 (231)
Electricity for lighting (calculated in Appendix L)													175.9769 (232)
Total delivered energy for all uses													3160.5279 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1669.4099	13.1900	220.1952 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1315.1411	13.1900	173.4671 (247)
Pumps and fans for heating	0.0000	0.0000	0.0000 (249)
Energy for lighting	175.9769	13.1900	23.2113 (250)
Additional standing charges			0.0000 (251)
Total energy cost			416.8736 (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] =	2.2965 (257)
SAP value		67.9635
SAP rating (Section 12)		68 (258)
SAP band		D

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	1669.4099	0.5190	866.4237 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1315.1411	0.5190	682.5583 (264)
Space and water heating			1548.9820 (265)
Pumps and fans	0.0000	0.0000	0.0000 (267)
Energy for lighting	175.9769	0.5190	91.3320 (268)
Total kg/year			1640.3140 (272)
CO2 emissions per m2			52.5100 (273)
EI value			71.1697
EI rating			71 (274)
EI band			C

Calculation of stars for heating and DHW

Main heating energy efficiency	$13.19 \times (1 + 0.29 \times 0.00) / 1.0000 = 13.190$, stars = 1
Main heating environmental impact	$0.519 \times (1 + 0.29 \times 0.00) / 1.0000 = 0.5190$, stars = 2
Water heating energy efficiency	$13.19 / 1.0000 = 13.190$, stars = 1
Water heating environmental impact	$0.519 / 1.0000 = 0.5190$, stars = 2

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

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

SAP 2012 WORKSHEET FOR Conversion - new dwelling (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	31.2400 (1b)	x 2.3100 (2b)	= 72.1644 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	31.2400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 72.1644 (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					2 * 10 = 20.0000 (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) =					20.0000 / (5) = 0.2771 (8)
Pressure test					No
Measured/design q50					15.0000
Infiltration rate					1.0271 (18)
Number of sides sheltered					2 (19)
Shelter factor					(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor					(21) = (18) x (20) = 0.8731 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.6000	4.3000	4.3000	4.1000	4.0000	3.5000	3.6000	3.4000	3.5000	4.2000	4.2000	4.4000 (22)
Wind factor	1.1500	1.0750	1.0750	1.0250	1.0000	0.8750	0.9000	0.8500	0.8750	1.0500	1.0500	1.1000 (22a)
Adj infilt rate												
Effective ac	1.0040	0.9386	0.9386	0.8949	0.8731	0.7639	0.7858	0.7421	0.7639	0.9167	0.9167	0.9604 (22b)
	1.0040	0.9404	0.9404	0.9004	0.8811	0.7918	0.8087	0.7754	0.7918	0.9202	0.9202	0.9612 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K					
Windows (Uw = 2.40)			3.6800	2.1898	8.0584		(27)					
Heat Loss Floor 1			31.2400	0.1900	5.9356		(28b)					
External Wall	17.7900	3.6800	14.1100	0.4700	6.6317		(29a)					
Total net area of external elements Aum(A, m2)							(31)					
Fabric heat loss, W/K = Sum (A x U)					20.6257		(33)					
Masonry Party Wall			19.6400	0.0000	0.0000		(32)					
Timber Party Wall			13.1700	0.0000	0.0000		(32)					
Stairwell			10.1600	0.0000	0.0000		(32)					
Party Ceilings			31.2400				(32b)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								250.0000 (35)				
Thermal bridges (Default value 0.150 * total exposed area)								7.3545 (36)				
Total fabric heat loss								(33) + (36) = 27.9802 (37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	23.9103	22.3959	22.3959	21.4429	20.9834	18.8562	19.2589	18.4647	18.8562	21.9137	21.9137	22.8894 (38)
Average = Sum(39)m / 12 =	51.8905	50.3761	50.3761	49.4231	48.9636	46.8364	47.2391	46.4449	46.8364	49.8939	49.8939	50.8696 (39)
	51.8905	50.3761	50.3761	49.4231	48.9636	46.8364	47.2391	46.4449	46.8364	49.8939	49.8939	49.0870 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.6610	1.6126	1.6126	1.5820	1.5673	1.4992	1.5121	1.4867	1.4992	1.5971	1.5971	1.6283 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Assumed occupancy													1.1979 (42)
Average daily hot water use (litres/day)													62.6494 (43)
Daily hot water use	68.9143	66.4084	63.9024	61.3964	58.8904	56.3845	56.3845	58.8904	61.3964	63.9024	66.4084	68.9143 (44)	
Energy conte	102.1980	89.3830	92.2352	80.4129	77.1581	66.5816	61.6976	70.7989	71.6445	83.4947	91.1410	98.9733 (45)	
Energy content (annual)													Total = Sum(45)m = 985.7189 (45)
Distribution loss (46)m = 0.15 x (45)m	15.3297	13.4074	13.8353	12.0619	11.5737	9.9872	9.2546	10.6198	10.7467	12.5242	13.6712	14.8460 (46)	
Water storage loss:													90.0000 (47)
Store volume													90.0000 (47)
b) If manufacturer declared loss factor is not known :													

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

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

Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0152 (51)
Volume factor from Table 2a												1.1006 (52)
Temperature factor from Table 2b												0.6000 (53)
Enter (49) or (54) in (55)												0.9025 (55)
Total storage loss	27.9783	25.2707	27.9783	27.0758	27.9783	27.0758	27.9783	27.9783	27.0758	27.9783	27.0758	27.9783 (56)
If cylinder contains dedicated solar storage	27.9783	25.2707	27.9783	27.0758	27.9783	27.0758	27.9783	27.9783	27.0758	27.9783	27.0758	27.9783 (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	0.0000 (59)
Total heat required for water heating calculated for each month	130.1763	114.6537	120.2136	107.4887	105.1364	93.6574	89.6760	98.7773	98.7203	111.4731	118.2168	126.9516 (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	130.1763	114.6537	120.2136	107.4887	105.1364	93.6574	89.6760	98.7773	98.7203	111.4731	118.2168	126.9516 (64)
Heat gains from water heating, kWh/month	56.3635	49.9364	53.0509	48.3979	48.0377	43.7990	42.8971	45.9233	45.4824	50.1447	51.9650	55.2913 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721	71.8721 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	24.9113	22.1260	17.9941	13.6227	10.1831	8.5970	9.2894	12.0747	16.2066	20.5780	24.0176	25.6037 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.6820	151.2352	147.3212	138.9885	128.4701	118.5842	111.9798	110.4266	114.3407	122.6733	133.1918	143.0776 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851	43.3851 (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)	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148	-47.9148 (71)
Water heating gains (Table 5)	75.7574	74.3102	71.3049	67.2194	64.5668	60.8320	57.6574	61.7249	63.1700	67.3987	72.1737	74.3162 (72)
Total internal gains	317.6932	315.0139	303.9627	287.1730	270.5625	255.3556	246.2691	251.5686	261.0598	277.9926	296.7255	310.3401 (73)

6. Solar gains

[Jan]		Area	Solar flux	Specific data	g	Specific data	FF	Access	Gains			
		m ²	Table 6a	or Table 6b	W/m ²	or Table 6c		factor	W			
								Table 6d				
Southeast		1.8400	46.0405	0.7600	0.7000	0.7700		31.2322 (77)				
Northwest		1.8400	15.0290	0.7600	0.7000	0.7700		10.1951 (81)				
Solar gains	41.4273	61.2792	91.5900	126.3082	145.4281	158.1291	137.7596	129.2565	106.3718	71.5396	48.6694	33.4593 (83)
Total gains	359.1205	376.2931	395.5526	413.4812	415.9906	413.4847	384.0287	380.8251	367.4316	349.5321	345.3949	343.7994 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)												
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	41.8081	43.0649	43.0649	43.8954	44.3073	46.3197	45.9247	46.7100	46.3197	43.4811	43.4811	42.6471
alpha	3.7872	3.8710	3.8710	3.9264	3.9538	4.0880	4.0616	4.1140	4.0880	3.8987	3.8987	3.8431
util living area	0.9744	0.9671	0.9492	0.9116	0.8286	0.6804	0.5791	0.5664	0.7488	0.9045	0.9560	0.9759 (86)
MIT	19.7218	19.8720	20.0995	20.3976	20.7045	20.9082	20.9611	20.9664	20.8642	20.5196	20.1426	19.7614 (87)
Th 2	19.5689	19.6041	19.6041	19.6265	19.6374	19.6881	19.6784	19.6975	19.6881	19.6154	19.6154	19.5926 (88)
util rest of house	0.9657	0.9561	0.9315	0.8798	0.7647	0.5759	0.4424	0.4303	0.6500	0.8617	0.9387	0.9675 (89)
MIT 2	17.9833	18.2207	18.5423	18.9677	19.3688	19.6292	19.6624	19.6842	19.5933	19.1322	18.6166	18.0569 (90)
Living area fraction										fLA = Living area / (4) = 0.5423 (91)		
MIT	18.9260	19.1161	19.3867	19.7431	20.0931	20.3228	20.3666	20.3795	20.2825	19.8846	19.4441	18.9812 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9260	19.1161	19.3867	19.7431	20.0931	20.3228	20.3666	20.3795	20.2825	19.8846	19.4441	18.9812 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9606	0.9513	0.9281	0.8830	0.7884	0.6292	0.5163	0.5041	0.6983	0.8715	0.9361	0.9628 (94)
Useful gains	344.9845	357.9499	367.1120	365.0938	327.9588	260.1790	198.2825	191.9677	256.5610	304.6078	323.3105	331.0063 (95)
Ext temp.	5.3000	5.7000	7.1000	9.0000	11.8000	14.3000	16.0000	16.1000	14.1000	11.2000	8.2000	5.6000 (96)
Heat loss rate W	707.0592	675.8517	618.9559	530.9552	406.0597	282.0839	206.2753	198.7588	289.5646	433.3065	561.0101	680.6955 (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	269.3836	213.6300	187.3719	119.4203	58.1071	0.0000	0.0000	0.0000	0.0000	95.7519	171.1437	260.1687 (98)
Space heating												1374.9771 (98)
Space heating per m ²												(98) / (4) = 44.0134 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

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 %)													100.0000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1374.9771 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	269.3836	213.6300	187.3719	119.4203	58.1071	0.0000	0.0000	0.0000	0.0000	95.7519	171.1437	260.1687	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	269.3836	213.6300	187.3719	119.4203	58.1071	0.0000	0.0000	0.0000	0.0000	95.7519	171.1437	260.1687	(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	130.1763	114.6537	120.2136	107.4887	105.1364	93.6574	89.6760	98.7773	98.7203	111.4731	118.2168	126.9516	(64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	130.1763	114.6537	120.2136	107.4887	105.1364	93.6574	89.6760	98.7773	98.7203	111.4731	118.2168	126.9516	(219)
Water heating fuel used													1315.1411 (219)
Annual totals kWh/year													
Space heating fuel - main system													1374.9771 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year													0.0000 (231)
Electricity for lighting (calculated in Appendix L)													175.9769 (232)
Total delivered energy for all uses													2866.0951 (238)

10a. Fuel costs - using BEDF prices (422)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1374.9771	16.1200	221.6463	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1315.1411	16.1200	212.0008	(247)
Pumps and fans for heating	0.0000	0.0000	0.0000	(249)
Energy for lighting	175.9769	16.1200	28.3675	(250)
Additional standing charges			0.0000	(251)
Total energy cost			462.0145	(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	1374.9771	0.5190	713.6131	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1315.1411	0.5190	682.5583	(264)
Space and water heating			1396.1714	(265)
Pumps and fans	0.0000	0.0000	0.0000	(267)
Energy for lighting	175.9769	0.5190	91.3320	(268)
Total kg/year			1487.5034	(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	1374.9771	3.0700	4221.1798	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1315.1411	3.0700	4037.4833	(264)
Space and water heating			8258.6631	(265)
Pumps and fans	0.0000	0.0000	0.0000	(267)
Energy for lighting	175.9769	3.0700	540.2490	(268)
Primary energy kWh/year			8798.9121	(272)
Primary energy kWh/m2/year			281.6553	(273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: D 68
 Current environmental impact rating: C 71

(For testing purposes):

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

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

A		Not considered
B		Not considered
C		Not considered
D		Not considered
E	Low energy lighting	Already installed
F		Not considered
G		Not considered
H		Not considered
I		Not considered
J		Not considered
K		Not considered
M		Not considered
N	Solar water heating	Not applicable
O		Not considered
P		Not considered
R		Not considered
S		Not considered
T		Not considered
U	Solar photovoltaic panels	Not applicable
A2		Not considered
A3		Not considered
T2		Not considered
W		Not considered
X		Not considered
Y		Not considered
J2		Not considered
Q2		Not considered
Z1		Not considered
Z2		Not considered
Z3		Not considered
Z4		Not considered
Z5		Not considered
V2	Wind turbine	Not applicable
L2		Not considered
Q3		Not considered
O3		Not considered

Recommended measures: (none)	SAP change	Cost change	CO2 change
---------------------------------	------------	-------------	------------

Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0		0.00 kg/m ²
Potential energy efficiency rating:		D 68	
Potential environmental impact rating:			C 71

Fuel prices for cost data on this page from database revision number 422 TEST (19 Dec 2017)
 Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, South West England):

	Current	Potential	Saving
Electricity	£462	£462	£0
Space heating	£222	£222	£0
Water heating	£212	£212	£0
Lighting	£28	£28	£0
Total cost of fuels	£462	£462	£0
Total cost of uses	£462	£462	£0
Delivered energy	92 kWh/m ²	92 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.5 tonnes	1.5 tonnes	0.0 tonnes
CO2 emissions per m ²	48 kg/m ²	48 kg/m ²	0 kg/m ²
Primary energy	282 kWh/m ²	282 kWh/m ²	0 kWh/m ²

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion - new dwelling (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion - new dwelling

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

SAP 2012 WORKSHEET FOR Conversion - new dwelling (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable