ASSESSMENT NOTES
Calculation Type: New Build (As Designed)

SAINT-GOBAIN
SAINT-GOBAIN INSULATION UK

Property Reference	Plot 064 AS	**Issued on Date**	27/04/2021
Assessment Reference	Plot 06 AS	**Prop Type Ref**	Coleford V5 0F
Property	2 bed, 1 bath		

SAP Rating	84 B	**DER**	18.18	**TER**	19.43
Environmental	87 B	**% DER<TER**	6.44		
CO_2 Emissions (t/year)	1.12	**DFEE**	47.58	**TFEE**	52.59
General Requirements Compliance	Pass	**% DFEE<TFEE**	9.54		

Assessor Details	Mr. Michael Brogden, Michael Brogden, Tel: 0333 5777 577, michael@darren-evans.co.uk	**Assessor ID**	R034-0001
Client			

ASSESSMENT NOTES - Last time updated on: 27.04.2021

PREDICTED ENERGY ASSESSMENT

SAINT-GOBAIN
SAINT-GOBAIN INSULATION UK

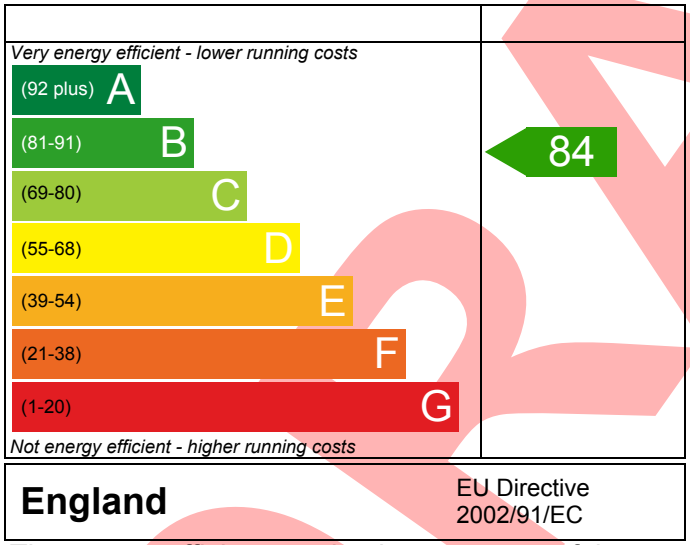
2 bed,
1 bath

Dwelling type:	Flat, End-Terrace
Date of assessment:	27/04/2021
Produced by:	Michael Brogden
Total floor area:	73 m²

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

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

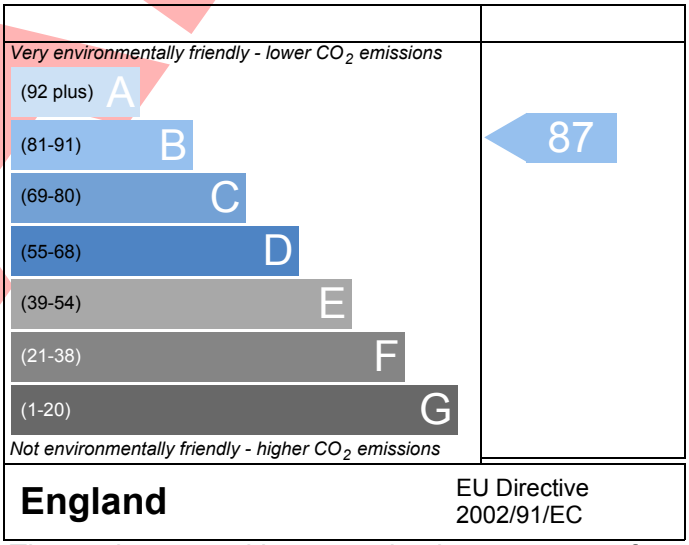
Energy Efficiency Rating



England EU Directive 2002/91/EC

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

Environmental Impact (CO_2) Rating



England EU Directive 2002/91/EC

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

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

SUMMARY FOR INPUT DATA
Calculation Type: New Build (As Designed)

SAINT-GOBAIN
SAINT-GOBAIN INSULATION UK

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Property	2 bed, 1 bath		

SAP Rating	84 B	**DER**	18.18	**TER**	19.43
Environmental	87 B	**% DER<TER**	6.44		
CO_2 Emissions (t/year)	1.12	**DFEE**	47.58	**TFEE**	52.59
General Requirements Compliance	Pass	**% DFEE<TFEE**	9.54		

Assessor Details	Mr. Michael Brogden, Michael Brogden, Tel: 0333 5777 577, michael@darren-evans.co.uk	**Assessor ID**	R034-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, End-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2017
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	36.04 m	73.00 m²	2.31 m

7.0 Living Area	28.73	m²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	230.66	kJ/m²K

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.27	60.00	60.85	51.72
Wall to Corridor	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.27	60.00	22.38	22.38

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	119.66

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceilings 1	Concrete floor slab, carpeted	100.00	73.00

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Heat Loss Floor 1	Ground Floor - Solid	Suspended concrete floor, carpeted	0.15	75.00	73.00

12.0 Opening Types

SUMMARY FOR INPUT DATA
Calculation Type: New Build (As Designed)

SAINT-GOBAIN INSULATION UK

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
French Door	Manufacturer	Window	Double glazed			0.71		0.70	1.41
Window	Manufacturer	Window	Double glazed			0.71		0.70	1.41
Solid door tall window	Manufacturer	Solid Door							1.20
solid Door	Manufacturer	Solid Door							1.10

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
front door	Solid Door	[1] External Wall 1	West							2.02	
front windows	Window	[1] External Wall 1	West	Dark-coloured curtain or roller blind	0.00					2.17	100
rear windows	Window	[1] External Wall 1	East	Dark-coloured curtain or roller blind	0.00					4.94	100

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Calculate Bridges	

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported	Reference:
Independently assessed	E2 Other lintels (including other steel lintels)	6.50	0.211	No	CATNIC
Table K1 - Approved	E3 Sill	5.49	0.040	No	
Table K1 - Approved	E4 Jamb	17.03	0.050	No	
Independently assessed	E5 Ground floor (normal)	36.04	0.038	No	E05-CXBR-CW4040_100mm-01-150B&
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	36.04	0.070	No	
Independently assessed	E16 Corner (normal)	13.86	0.042	No	E16-CXBR-CW4040_100mm-01
Independently assessed	E17 Corner (inverted – internal area greater than external area)	4.62	-0.091	No	E17-CXBR-CW4040_100mm-01

Y-value	0.042	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	5.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP_{50}		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Windows half open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	4.00

Mechanical Ventilation

Mechanical Ventilation System Present	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	No	
22.0 Lighting		
Internal		
Total number of light fittings	15	
Total number of L.E.L. fittings	15	
Percentage of L.E.L. fittings	100.00	%
External		
External lights fitted	No	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	Database	
Percentage of Heat	100	%
Database Ref. No.	17929	
Fuel Type	Mains gas	
Main Heating	BGW	
SAP Code	104	
In Winter	90.5	
In Summer	87.3	
Controls	CBI Time and temperature zone control	
PCDF Controls	0	
Delayed Start Stat	Yes	
Sap Code	2110	
Flue Type	Balanced	
Fan Assisted Flue	Yes	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	Normal (> 45°C)	
Combi boiler type	Standard Combi	
Combi keep hot type	None	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HWP From main heating 1	
Water Heating	Main Heating 1	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	

Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	901

29.0 Hot Water Cylinder	None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

BASIC COMPLIANCE REPORT
Calculation Type: New Build (As Designed)

SAINT-GOBAIN
SAINT-GOBAIN INSULATION UK

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General Requirements Compliance	Pass	**% DFEE<TFEE**	9.54		

Assessor Details	Mr. Michael Brogden, Michael Brogden, Tel: 0333 5777 577, michael@darren-evans.co.uk	**Assessor ID**	R034-0001
Client			

SUMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	19.43	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	18.18	$kgCO_2/m^2$	Pass
	-1.25 (-6.4%)	$kgCO_2/m^2$	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	52.59	$kWh/m^2/yr$	
Dwelling Fabric Energy Efficiency (DFEE)	47.58	$kWh/m^2/yr$	
	-5.0 (-9.5%)	$kWh/m^2/yr$	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.27 (max. 0.70)	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Openings	1.34 (max. 2.00)	1.41 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP1 35 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

5 Cylinder insulation

Hot water storage	No cylinder	

6 Controls

Space heating controls	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 (Severn Valley)	Not significant	Pass

Based on:

Overshading	Average
Windows facing East	4.94 m², No overhang
Windows facing West	2.17 m², No overhang
Air change rate	4.00 ach
Blinds/curtains	Dark-coloured curtain or roller blind, closed 100% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

10 Key features

Door U-value	1.10	W/m²K

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

FULL SAP CALCULATION PRINTOUT
Calculation Type: New Build (As Designed)

SAINT-GOBAIN
SAINT-GOBAIN INSULATION UK

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CO_2 Emissions (t/year)	1.12	**DFEE**	47.58	**TFEE**	52.59
General Requirements Compliance	Pass	**% DFEE<TFEE**	9.54		

Assessor Details	Mr. Michael Brogden, Michael Brogden, Tel: 0333 5777 577, michael@darren-evans.co.uk	**Assessor ID**	R034-0001
Client			

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

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REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England
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DWELLING AS DESIGNED

Ground-floor flat, total floor area 73 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) 19.43 kgCO□/m²
Dwelling Carbon Dioxide Emission Rate (DER) 18.18 kgCO□/m²OK

1b TFEE and DFEE
Target Fabric Energy Efficiency (TFEE)52.6 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)47.6 kWh/m²/yrOK

---
2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.27 (max. 0.70)	OK
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	OK
Roof	(no roof)		
Openings	1.34 (max. 2.00)	1.41 (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: 5.00 (design value)
Maximum 10.0 OK

---
4 Heating efficiency
Main heating system: Boiler system with radiators or underfloor - Mains gas
Data from database
Ideal LOGIC COMBI ESP1 35
Combi boiler
Efficiency: 89.6% 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 (Severn Valley): Not significant OK
Based on:
Overshading: Average
Windows facing East: 4.94 m², No overhang
Windows facing West: 2.17 m², No overhang
Air change rate: 4.00 ach
Blinds/curtains: Dark-coloured curtain or roller blind, closed 100% of daylight hours

---
10 Key features
Door U-value 1.10 W/m²K

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	73.0000 (1b)	x	2.3100 (2b)	=	168.6300	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	168.6300	(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) =	0.1186	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.3686	(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) =	0.3410	(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	0.4347	0.4262	0.4177	0.3751	0.3665	0.3239	0.3239	0.3154	0.3410	0.3665	0.3836	0.4006	(22b)
Effective ac	0.5945	0.5908	0.5872	0.5703	0.5672	0.5525	0.5525	0.5497	0.5581	0.5672	0.5736	0.5803	(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	
Window (Uw = 1.41)			7.1100	1.3347	9.4899			(27)
solid Door			2.0200	1.1000	2.2220			(26)
Heat Loss Floor 1			73.0000	0.1500	10.9500	75.0000	5475.0000	(28a)
External Wall 1	60.8500	9.1300	51.7200	0.2700	13.9644	60.0000	3103.2000	(29a)
Wall to Corridor	22.3800		22.3800	0.2172	4.8613	60.0000	1342.8000	(29a)
Total net area of external elements Aum(A, m2)			156.2300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.4876			(33)
Party Ceilings 1			73.0000			80.0000	5840.0000	(32b)
Internal Wall 1			119.6600			9.0000	1076.9400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	16837.9400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		230.6567 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)		6.4966 (36)
Total fabric heat loss	(33) + (36) =	47.9842 (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	33.0822	32.8780	32.6779	31.7378	31.5619	30.7432	30.7432	30.5915	31.0585	31.5619	31.9177	32.2897	(38)
Heat transfer coeff	81.0664	80.8622	80.6621	79.7220	79.5461	78.7274	78.7274	78.5757	79.0427	79.5461	79.9019	80.2739	(39)
Average = Sum(39)m / 12 =												79.7212	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1105	1.1077	1.1050	1.0921	1.0897	1.0785	1.0785	1.0764	1.0828	1.0897	1.0945	1.0996	(40)
HLP (average)												1.0921	(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	2.3167 (42)
Average daily hot water use (litres/day)	89.2216 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	98.1438	94.5749	91.0061	87.4372	83.8683	80.2995	80.2995	83.8683	87.4372	91.0061	94.5749	98.1438	(44)
Energy conte	145.5444	127.2941	131.3561	114.5194	109.8841	94.8216	87.8662	100.8277	102.0319	118.9084	129.7978	140.9520	(45)
Energy content (annual)										Total = Sum(45)m =		1403.8037	(45)
Distribution loss (46)m = 0.15 x (45)m	21.8317	19.0941	19.7034	17.1779	16.4826	14.2232	13.1799	15.1242	15.3048	17.8363	19.4697	21.1428	(46)
Water storage loss:													
Total storage loss													

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	14.0994	12.7142	14.0435	13.5531	13.9777	13.4955	13.9259	13.9595	13.5269	14.0163	13.6074	14.0886	(61)
Total heat required for water heating calculated for each month													
	159.6438	140.0083	145.3995	128.0725	123.8618	108.3172	101.7921	114.7872	115.5588	132.9246	143.4052	155.0406	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
								Solar input (sum of months) = Sum(63)m =				0.0000	(63)
Output from w/h													
	159.6438	140.0083	145.3995	128.0725	123.8618	108.3172	101.7921	114.7872	115.5588	132.9246	143.4052	155.0406	(64)
								Total per year (kWh/year) = Sum(64)m =				1568.8117	(64)
Heat gains from water heating, kWh/month													
	51.9184	45.5038	47.1868	41.4660	40.0309	34.9021	32.6970	37.0151	37.3073	43.0411	46.5596	50.3887	(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	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.1370	18.7737	15.2678	11.5587	8.6403	7.2945	7.8819	10.2452	13.7511	17.4602	20.3787	21.7245	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	204.1952	206.3141	200.9745	189.6072	175.2580	161.7717	152.7621	150.6432	155.9828	167.3501	181.6993	195.1856	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	(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)													
	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	(71)
Water heating gains (Table 5)													
	69.7827	67.7140	63.4231	57.5916	53.8050	48.4751	43.9475	49.7515	51.8158	57.8509	64.6661	67.7267	(72)
Total internal gains													
	355.8654	353.5523	340.4159	319.5080	298.4537	278.2918	265.3421	271.3904	282.3002	303.4118	327.4946	345.3872	(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	4.9400	19.6403	0.7100	0.7000	0.7700	33.4167	(76)
West	2.1700	19.6403	0.7100	0.7000	0.7700	14.6790	(80)

Solar gains	48.0957	94.0855	154.9453	225.9785	276.9452	283.5027	269.9061	231.8454	180.2078	111.6403	59.9697	39.5516	(83)
Total gains	403.9612	447.6378	495.3612	545.4866	575.3989	561.7945	535.2482	503.2358	462.5080	415.0521	387.4644	384.9388	(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	57.6960	57.8417	57.9852	58.6689	58.7987	59.4102	59.4102	59.5248	59.1731	58.7987	58.5368	58.2656	
alpha	4.8464	4.8561	4.8657	4.9113	4.9199	4.9607	4.9607	4.9683	4.9449	4.9199	4.9025	4.8844	
util living area													
	0.9980	0.9963	0.9911	0.9726	0.9166	0.7839	0.6187	0.6729	0.8923	0.9830	0.9963	0.9984	(86)
MIT	19.6872	19.8174	20.0618	20.3984	20.7056	20.9118	20.9788	20.9682	20.8158	20.4186	19.9962	19.6656	(87)
Th 2	19.9923	19.9945	19.9968	20.0073	20.0093	20.0185	20.0185	20.0202	20.0149	20.0093	20.0053	20.0011	(88)
util rest of house													
	0.9974	0.9951	0.9881	0.9623	0.8831	0.7015	0.4944	0.5503	0.8362	0.9747	0.9948	0.9979	(89)
MIT 2	18.2342	18.4260	18.7835	19.2754	19.6989	19.9523	20.0093	20.0049	19.8507	19.3109	18.6952	18.2088	(90)
Living area fraction									fLA = Living area / (4) =			0.3936	(91)
MIT	18.8061	18.9736	19.2866	19.7174	20.0951	20.3300	20.3909	20.3840	20.2305	19.7468	19.2073	18.7822	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.6561	18.8236	19.1366	19.5674	19.9451	20.1800	20.2409	20.2340	20.0805	19.5968	19.0573	18.6322	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9961	0.9931	0.9844	0.9563	0.8805	0.7165	0.5240	0.5789	0.8407	0.9700	0.9928	0.9969	(94)
Useful gains	402.3945	444.5647	487.6442	521.6701	506.6419	402.5348	280.4778	291.3480	388.8467	402.6089	384.6916	383.7547	(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													
	1163.7943	1125.8922	1019.2944	850.4228	655.8643	439.2952	286.6362	301.2606	472.7159	715.6634	955.4084	1158.5252	(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													
	566.4814	457.8521	395.5478	236.7019	111.0214	0.0000	0.0000	0.0000	0.0000	232.9126	410.9161	576.4293	(98)
Space heating												2987.8627	(98)
Space heating per m2											(98) / (4) =	40.9296	(99)

8c. Space cooling requirement

Not applicable

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												90.5000	(206)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement												3301.5057	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	566.4814	457.8521	395.5478	236.7019	111.0214	0.0000	0.0000	0.0000	0.0000	232.9126	410.9161	576.4293	(98)
Space heating efficiency (main heating system 1)													
	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)													
	625.9463	505.9139	437.0694	261.5491	122.6756	0.0000	0.0000	0.0000	0.0000	257.3620	454.0509	636.9385	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	159.6438	140.0083	145.3995	128.0725	123.8618	108.3172	101.7921	114.7872	115.5588	132.9246	143.4052	155.0406	(64)
Efficiency of water heater												87.3000	(216)
(217)m	89.7765	89.7298	89.6171	89.3501	88.7839	87.3000	87.3000	87.3000	87.3000	89.3105	89.6499	89.8023	(217)
Fuel for water heating, kWh/month													
	177.8236	156.0333	162.2454	143.3379	139.5094	124.0746	116.6003	131.4859	132.3698	148.8342	159.9614	172.6465	(219)
Water heating fuel used												1764.9225	(219)
Annual totals kWh/year													
Space heating fuel - main system												3301.5057	(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)												373.2862	(232)
Total delivered energy for all uses												5514.7143	(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	3301.5057	0.2160	713.1252	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1764.9225	0.2160	381.2233	(264)
Space and water heating			1094.3485	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	373.2862	0.5190	193.7355	(268)
Total CO2, kg/year			1327.0090	(272)
Dwelling Carbon Dioxide Emission Rate (DER)			18.1800	(273)

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

DER		18.1800	ZC1
Total Floor Area	TFA	73.0000	
Assumed number of occupants	N	2.3167	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		16.5756	ZC2
CO2 emissions from cooking, equation (L16)		2.3918	ZC3
Total CO2 emissions		37.1474	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		37.1474	ZC8

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	73.0000 (1b)	x	2.3100 (2b)	=	168.6300	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	168.6300	(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							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) =	0.1779	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.4279	(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) =	0.3958	(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	0.5047	0.4948	0.4849	0.4354	0.4255	0.3760	0.3760	0.3661	0.3958	0.4255	0.4453	0.4651	(22b)
Effective ac	0.6273	0.6224	0.6175	0.5948	0.5905	0.5707	0.5707	0.5670	0.5783	0.5905	0.5991	0.6081	(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			2.0200	1.0000	2.0200			(26)
TER Opening Type (Uw = 1.40)			7.1100	1.3258	9.4261			(27)
Heat Loss Floor 1			73.0000	0.1300	9.4900			(28a)
External Wall 1	60.8500	9.1300	51.7200	0.1800	9.3096			(29a)
Wall to Corridor	22.3800		22.3800	0.1800	4.0284			(29a)
Total net area of external elements Aum(A, m2)			156.2300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.2741			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.5718	(36)
Total fabric heat loss					(33) + (36) =		44.8459	(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	34.9102	34.6350	34.3653	33.0984	32.8614	31.7580	31.7580	31.5537	32.1830	32.8614	33.3409	33.8422	(38)
Heat transfer coeff	79.7561	79.4810	79.2112	77.9444	77.7074	76.6040	76.6040	76.3996	77.0290	77.7074	78.1869	78.6882	(39)
Average = Sum(39)m / 12 =												77.9432	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0925	1.0888	1.0851	1.0677	1.0645	1.0494	1.0494	1.0466	1.0552	1.0645	1.0711	1.0779	(40)
HLP (average)												1.0677	(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	2.3167	(42)
Average daily hot water use (litres/day)	89.2216	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	98.1438	94.5749	91.0061	87.4372	83.8683	80.2995	80.2995	83.8683	87.4372	91.0061	94.5749	98.1438	(44)
Energy conte	145.5444	127.2941	131.3561	114.5194	109.8841	94.8216	87.8662	100.8277	102.0319	118.9084	129.7978	140.9520	(45)
Energy content (annual)										Total = Sum(45)m =		1403.8037	(45)
Distribution loss (46)m = 0.15 x (45)m	21.8317	19.0941	19.7034	17.1779	16.4826	14.2232	13.1799	15.1242	15.3048	17.8363	19.4697	21.1428	(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)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Combi loss	50.0130	43.5304	46.3757	43.1197	42.7384	39.5997	40.9197	42.7384	43.1197	46.3757	46.6397	50.0130	(61)
Total heat required for water heating calculated for each month													
	195.5574	170.8244	177.7318	157.6391	152.6225	134.4214	128.7859	143.5661	145.1516	165.2841	176.4375	190.9650	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
								Solar input (sum of months) = Sum(63)m =				0.0000	(63)
Output from w/h													
	195.5574	170.8244	177.7318	157.6391	152.6225	134.4214	128.7859	143.5661	145.1516	165.2841	176.4375	190.9650	(64)
									Total per year (kWh/year) = Sum(64)m =			1938.9868	(64)
Heat gains from water heating, kWh/month													
	60.8968	53.2079	55.2698	48.8576	47.2211	41.4281	39.4454	44.2098	44.7055	51.1310	54.8177	59.3698	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.1370	18.7737	15.2678	11.5587	8.6403	7.2945	7.8819	10.2452	13.7511	17.4602	20.3787	21.7245	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	204.1952	206.3141	200.9745	189.6072	175.2580	161.7717	152.7621	150.6432	155.9828	167.3501	181.6993	195.1856	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	(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)													
	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	(71)
Water heating gains (Table 5)													
	81.8505	79.1784	74.2874	67.8578	63.4692	57.5391	53.0181	59.4218	62.0910	68.7244	76.1357	79.7981	(72)
Total internal gains													
	367.9332	365.0167	351.2802	329.7742	308.1179	287.3558	274.4126	281.0607	292.5755	314.2853	338.9642	357.4586	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
East	4.9400	19.6403	0.6300	0.7000	0.7700	29.6515	(76)
West	2.1700	19.6403	0.6300	0.7000	0.7700	13.0250	(80)

Solar gains	42.6765	83.4843	137.4867	200.5162	245.7401	251.5587	239.4942	205.7219	159.9027	99.0611	53.2126	35.0951	(83)
Total gains	410.6097	448.5010	488.7669	530.2904	553.8580	538.9145	513.9068	486.7827	452.4782	413.3464	392.1768	392.5537	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	63.5618	63.7819	63.9991	65.0393	65.2376	66.1773	66.1773	66.3543	65.8122	65.2376	64.8376	64.4245	
alpha	5.2375	5.2521	5.2666	5.3360	5.3492	5.4118	5.4118	5.4236	5.3875	5.3492	5.3225	5.2950	
util living area													
	0.9985	0.9974	0.9936	0.9792	0.9310	0.8015	0.6312	0.6828	0.9028	0.9863	0.9972	0.9989	(86)
MIT	19.8014	19.9171	20.1369	20.4464	20.7294	20.9236	20.9834	20.9750	20.8389	20.4766	20.0919	19.7878	(87)
Th 2	20.0069	20.0100	20.0130	20.0273	20.0299	20.0424	20.0424	20.0447	20.0376	20.0299	20.0245	20.0189	(88)
util rest of house													
	0.9980	0.9964	0.9912	0.9706	0.9002	0.7195	0.5063	0.5599	0.8479	0.9791	0.9960	0.9985	(89)
MIT 2	18.4018	18.5731	18.8958	19.3527	19.7453	19.9864	20.0356	20.0333	19.8963	19.4020	18.8394	18.3906	(90)
Living area fraction									fLA = Living area / (4) =			0.3936	(91)
MIT	18.9526	19.1021	19.3842	19.7831	20.1326	20.3553	20.4086	20.4039	20.2673	19.8249	19.3323	18.9405	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.9526	19.1021	19.3842	19.7831	20.1326	20.3553	20.4086	20.4039	20.2673	19.8249	19.3323	18.9405	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9973	0.9953	0.9891	0.9678	0.9040	0.7487	0.5559	0.6086	0.8632	0.9770	0.9949	0.9979	(94)
Useful gains	409.4955	446.3734	483.4412	513.2123	500.7149	403.5070	285.7047	296.2630	390.5929	403.8539	390.1575	391.7151	(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													
	1168.6378	1128.7941	1020.5762	848.2787	655.2758	440.8758	291.7565	305.8999	475.0598	716.8426	956.4071	1159.9014	(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													
	564.8019	458.5867	399.6284	241.2478	114.9932	0.0000	0.0000	0.0000	0.0000	232.8636	407.6997	571.5306	(98)
Space heating												2991.3519	(98)
Space heating per m2											(98) / (4) =	40.9774	(99)

8c. Space cooling requirement

Not applicable

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

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	3202.7323	(211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	564.8019	458.5867	399.6284	241.2478	114.9932	0.0000	0.0000	0.0000	0.0000	232.8636	407.6997	571.5306	(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)													
	604.7129	490.9922	427.8677	258.2953	123.1191	0.0000	0.0000	0.0000	0.0000	249.3186	436.5093	611.9171	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	195.5574	170.8244	177.7318	157.6391	152.6225	134.4214	128.7859	143.5661	145.1516	165.2841	176.4375	190.9650	(64)
Efficiency of water heater												80.3000	(216)
(217)m	87.5673	87.4159	87.0303	86.1192	84.3494	80.3000	80.3000	80.3000	80.3000	85.9140	87.0913	87.6393	(217)
Fuel for water heating, kWh/month													
	223.3225	195.4157	204.2183	183.0475	180.9407	167.3990	160.3810	178.7872	180.7617	192.3831	202.5891	217.8988	(219)
Water heating fuel used												2287.1445	(219)
Annual totals kWh/year													
Space heating fuel - main system												3202.7323	(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)												373.2862	(232)
Total delivered energy for all uses												5938.1629	(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	3202.7323	0.2160	691.7902	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	2287.1445	0.2160	494.0232	(264)
Space and water heating			1185.8134	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	373.2862	0.5190	193.7355	(268)
Total CO2, kg/m2/year			1418.4739	(272)
Emissions per m2 for space and water heating			16.2440	(272a)
Fuel factor (mains gas)			1.0000	
Emissions per m2 for lighting			2.6539	(272b)
Emissions per m2 for pumps and fans			0.5332	(272c)
Target Carbon Dioxide Emission Rate (TER) = (16.2440 * 1.00) + 2.6539 + 0.5332, rounded to 2 d.p.			19.4300	(273)

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1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	73.0000 (1b)	x	2.3100 (2b)	=	168.6300	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.0000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	168.6300	(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							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) =	0.1779	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.4279	(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) =	0.3958	(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	0.5047	0.4948	0.4849	0.4354	0.4255	0.3760	0.3760	0.3661	0.3958	0.4255	0.4453	0.4651	(22b)
Effective ac	0.6273	0.6224	0.6175	0.5948	0.5905	0.5707	0.5707	0.5670	0.5783	0.5905	0.5991	0.6081	(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	
Window (Uw = 1.41)			7.1100	1.3347	9.4899			(27)
solid Door			2.0200	1.1000	2.2220			(26)
Heat Loss Floor 1			73.0000	0.1500	10.9500	75.0000	5475.0000	(28a)
External Wall 1	60.8500	9.1300	51.7200	0.2700	13.9644	60.0000	3103.2000	(29a)
Wall to Corridor	22.3800		22.3800	0.2172	4.8613	60.0000	1342.8000	(29a)
Total net area of external elements Aum(A, m2)			156.2300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.4876			(33)
Party Ceilings 1			73.0000			100.0000	7300.0000	(32b)
Internal Wall 1			119.6600			9.0000	1076.9400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	18297.9400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.6567 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)		6.4966 (36)
Total fabric heat loss	(33) + (36) =	47.9842 (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	34.9102	34.6350	34.3653	33.0984	32.8614	31.7580	31.7580	31.5537	32.1830	32.8614	33.3409	33.8422	(38)
Heat transfer coeff	82.8944	82.6192	82.3495	81.0826	80.8456	79.7422	79.7422	79.5379	80.1672	80.8456	81.3251	81.8264	(39)
Average = Sum(39)m / 12 =												81.0815	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1355	1.1318	1.1281	1.1107	1.1075	1.0924	1.0924	1.0896	1.0982	1.1075	1.1140	1.1209	(40)
HLP (average)												1.1107	(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	2.3167 (42)
Average daily hot water use (litres/day)	89.2216 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	98.1438	94.5749	91.0061	87.4372	83.8683	80.2995	80.2995	83.8683	87.4372	91.0061	94.5749	98.1438	(44)
Energy conte	145.5444	127.2941	131.3561	114.5194	109.8841	94.8216	87.8662	100.8277	102.0319	118.9084	129.7978	140.9520	(45)
Energy content (annual)										Total = Sum(45)m =		1403.8037	(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	(46)
Water storage loss:													
Total storage loss													

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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	(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	0.0000	(59)
Heat gains from water heating, kWh/month													
	30.9282	27.0500	27.9132	24.3354	23.3504	20.1496	18.6716	21.4259	21.6818	25.2680	27.5820	29.9523	(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	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.1370	18.7737	15.2678	11.5587	8.6403	7.2945	7.8819	10.2452	13.7511	17.4602	20.3787	21.7245	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	204.1952	206.3141	200.9745	189.6072	175.2580	161.7717	152.7621	150.6432	155.9828	167.3501	181.6993	195.1856	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	(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)													
	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	(71)
Water heating gains (Table 5)													
	41.5701	40.2530	37.5177	33.7991	31.3849	27.9855	25.0962	28.7982	30.1136	33.9624	38.3084	40.2585	(72)
Total internal gains													
	324.6528	323.0913	311.5105	292.7155	273.0337	254.8023	243.4907	247.4372	257.5980	276.5233	298.1369	314.9190	(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	4.9400	19.6403	0.7100	0.7000	0.7700	33.4167	(76)
West	2.1700	19.6403	0.7100	0.7000	0.7700	14.6790	(80)

Solar gains	48.0957	94.0855	154.9453	225.9785	276.9452	283.5027	269.9061	231.8454	180.2078	111.6403	59.9697	39.5516	(83)
Total gains	372.7486	417.1767	466.4559	518.6941	549.9789	538.3050	513.3969	479.2826	437.8059	388.1636	358.1066	354.4706	(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	61.3161	61.5203	61.7218	62.6862	62.8700	63.7399	63.7399	63.9036	63.4020	62.8700	62.4993	62.1164	
alpha	5.0877	5.1014	5.1148	5.1791	5.1913	5.2493	5.2493	5.2602	5.2268	5.1913	5.1666	5.1411	
util living area													
	0.9991	0.9981	0.9950	0.9823	0.9381	0.8168	0.6511	0.7099	0.9199	0.9902	0.9982	0.9993	(86)
MIT	19.6974	19.8230	20.0591	20.3902	20.6947	20.9083	20.9785	20.9667	20.8051	20.4094	20.0011	19.6829	(87)
Th 2	19.9719	19.9750	19.9780	19.9921	19.9947	20.0071	20.0071	20.0094	20.0023	19.9947	19.9894	19.9838	(88)
util rest of house													
	0.9988	0.9975	0.9931	0.9747	0.9091	0.7347	0.5202	0.5821	0.8701	0.9848	0.9974	0.9991	(89)
MIT 2	18.7789	18.9067	19.1444	19.4829	19.7740	19.9608	20.0011	19.9989	19.8828	19.5066	19.0963	18.7739	(90)
Living area fraction										fLA = Living area / (4) =		0.3936	(91)
MIT	19.1404	19.2673	19.5044	19.8399	20.1364	20.3337	20.3857	20.3798	20.2458	19.8619	19.4524	19.1317	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1404	19.2673	19.5044	19.8399	20.1364	20.3337	20.3857	20.3798	20.2458	19.8619	19.4524	19.1317	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9984	0.9969	0.9919	0.9732	0.9139	0.7645	0.5725	0.6331	0.8846	0.9838	0.9969	0.9988	(94)
Useful gains	372.1506	415.8697	462.6802	504.8138	502.6499	411.5092	293.9373	303.4420	387.2837	381.8845	356.9875	354.0360	(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													
	1230.1831	1187.0135	1070.9062	887.0397	682.0437	457.2168	301.8838	316.5421	492.6890	748.7855	1004.5624	1221.8044	(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													
	638.3762	518.2087	452.5201	275.2026	133.4690	0.0000	0.0000	0.0000	0.0000	272.9744	466.2539	645.6197	(98)
Space heating												3402.6246	(98)
Space heating per m2											(98) / (4) =	46.6113	(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	749.5769	590.0924	604.4880	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8205	0.8959	0.8678	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	615.0250	528.6801	524.6028	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	716.5898	685.8298	647.7910	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	73.1266	116.9194	91.6520	0.0000	0.0000	0.0000	0.0000	(104)

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Space cooling												281.6980 (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	18.2817	29.2298	22.9130	0.0000	0.0000	0.0000		0.0000 (107)
Space cooling												70.4245 (107)
Space cooling per m2												0.9647 (108)
Energy for space heating												46.6113 (99)
Energy for space cooling												0.9647 (108)
Total												47.5760 (109)
Dwelling Fabric Energy Efficiency (DFEE)												47.6 (109)

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1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	73.0000 (1b)	x	2.3100 (2b)	=	168.6300	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	168.6300	(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							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) =	0.1779	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.4279	(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) =	0.3958	(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	0.5047	0.4948	0.4849	0.4354	0.4255	0.3760	0.3760	0.3661	0.3958	0.4255	0.4453	0.4651	(22b)
Effective ac	0.6273	0.6224	0.6175	0.5948	0.5905	0.5707	0.5707	0.5670	0.5783	0.5905	0.5991	0.6081	(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			2.0200	1.0000	2.0200			(26)
TER Opening Type (Uw = 1.40)			7.1100	1.3258	9.4261			(27)
Heat Loss Floor 1			73.0000	0.1300	9.4900			(28a)
External Wall 1	60.8500	9.1300	51.7200	0.1800	9.3096			(29a)
Wall to Corridor	22.3800		22.3800	0.1800	4.0284			(29a)
Total net area of external elements Aum(A, m2)			156.2300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.2741			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.5718	(36)
Total fabric heat loss					(33) + (36) =		44.8459	(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	34.9102	34.6350	34.3653	33.0984	32.8614	31.7580	31.7580	31.5537	32.1830	32.8614	33.3409	33.8422	(38)
Heat transfer coeff	79.7561	79.4810	79.2112	77.9444	77.7074	76.6040	76.6040	76.3996	77.0290	77.7074	78.1869	78.6882	(39)
Average = Sum(39)m / 12 =												77.9432	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0925	1.0888	1.0851	1.0677	1.0645	1.0494	1.0494	1.0466	1.0552	1.0645	1.0711	1.0779	(40)
HLP (average)												1.0677	(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		2.3167 (42)
Average daily hot water use (litres/day)		89.2216 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	98.1438	94.5749	91.0061	87.4372	83.8683	80.2995	80.2995	83.8683	87.4372	91.0061	94.5749	98.1438	(44)
Energy conte	145.5444	127.2941	131.3561	114.5194	109.8841	94.8216	87.8662	100.8277	102.0319	118.9084	129.7978	140.9520	(45)
Energy content (annual)										Total = Sum(45)m =		1403.8037	(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	(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)

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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	(59)
Heat gains from water heating, kWh/month													
	30.9282	27.0500	27.9132	24.3354	23.3504	20.1496	18.6716	21.4259	21.6818	25.2680	27.5820	29.9523	(65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.1370	18.7737	15.2678	11.5587	8.6403	7.2945	7.8819	10.2452	13.7511	17.4602	20.3787	21.7245	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	204.1952	206.3141	200.9745	189.6072	175.2580	161.7717	152.7621	150.6432	155.9828	167.3501	181.6993	195.1856	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	(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)													
	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	(71)
Water heating gains (Table 5)													
	41.5701	40.2530	37.5177	33.7991	31.3849	27.9855	25.0962	28.7982	30.1136	33.9624	38.3084	40.2585	(72)
Total internal gains													
	324.6528	323.0913	311.5105	292.7155	273.0337	254.8023	243.4907	247.4372	257.5980	276.5233	298.1369	314.9190	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
East	4.9400	19.6403	0.6300	0.7000	0.7700	29.6515	(76)
West	2.1700	19.6403	0.6300	0.7000	0.7700	13.0250	(80)

Solar gains	42.6765	83.4843	137.4867	200.5162	245.7401	251.5587	239.4942	205.7219	159.9027	99.0611	53.2126	35.0951	(83)
Total gains	367.3293	406.5755	448.9972	493.2317	518.7738	506.3610	482.9849	453.1591	417.5008	375.5844	351.3495	350.0141	(84)

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7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	63.5618	63.7819	63.9991	65.0393	65.2376	66.1773	66.1773	66.3543	65.8122	65.2376	64.8376	64.4245	
alpha	5.2375	5.2521	5.2666	5.3360	5.3492	5.4118	5.4118	5.4236	5.3875	5.3492	5.3225	5.2950	
util living area													
	0.9991	0.9983	0.9957	0.9847	0.9454	0.8301	0.6644	0.7210	0.9257	0.9911	0.9983	0.9994	(86)
MIT	19.7455	19.8632	20.0867	20.4026	20.6965	20.9083	20.9788	20.9676	20.8101	20.4303	20.0393	19.7326	(87)
Th 2	20.0069	20.0100	20.0130	20.0273	20.0299	20.0424	20.0424	20.0447	20.0376	20.0299	20.0245	20.0189	(88)
util rest of house													
	0.9989	0.9978	0.9940	0.9782	0.9195	0.7520	0.5364	0.5968	0.8792	0.9861	0.9976	0.9991	(89)
MIT 2	18.8553	18.9753	19.2005	19.5246	19.8074	19.9951	20.0363	20.0342	19.9194	19.5563	19.1630	18.8521	(90)
Living area fraction										fLA = Living area / (4) =		0.3936	(91)
MIT	19.2056	19.3248	19.5493	19.8702	20.1573	20.3545	20.4073	20.4016	20.2700	19.9003	19.5079	19.1986	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.2056	19.3248	19.5493	19.8702	20.1573	20.3545	20.4073	20.4016	20.2700	19.9003	19.5079	19.1986	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9985	0.9972	0.9930	0.9768	0.9235	0.7802	0.5876	0.6464	0.8926	0.9853	0.9971	0.9989	(94)
Useful gains	366.7881	405.4407	445.8356	481.8014	479.1020	395.0537	283.8067	292.9317	372.6569	370.0563	350.3415	349.6192	(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													
	1188.8143	1146.4940	1033.6502	855.0616	657.1961	440.8178	291.6521	305.7181	475.2653	722.7011	970.1338	1180.2151	(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													
	611.5876	497.9879	437.3341	268.7473	132.5020	0.0000	0.0000	0.0000	0.0000	262.3677	446.2504	617.9633	(98)
Space heating												3274.7404	(98)
Space heating per m2											(98) / (4) =	44.8595	(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	720.0772	566.8693	580.6372	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8184	0.8957	0.8689	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	589.3047	507.7695	504.5390	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	679.2527	650.2833	617.2571	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	64.7626	106.0303	83.8623	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												254.6552	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

	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	16.1906	26.5076	20.9656	0.0000	0.0000	0.0000	0.0000	(107)

Space cooling	63.6638 (107)
Space cooling per m2	0.8721 (108)
Energy for space heating	44.8595 (99)
Energy for space cooling	0.8721 (108)
Total	45.7316 (109)
Target Fabric Energy Efficiency (TFEE)	52.6 (109)

SAP 2012 OVERHEATING ASSESSMENT FOR New Build (As Designed) 9.92

Overheating Calculation Input Data

Dwelling type	EndTerrace Flat
Number of storeys	1
Cross ventilation possible	Yes
SAP Region	Severn Valley
Front of dwelling faces	West
Overshading	Average or unknown
Thermal mass parameter	230.7 (calculated from construction elements)
Night ventilation	No
Ventilation rate during hot weather (ach)	3.00 (Windows half open)

Overheating Calculation

Summer ventilation heat loss coefficient	166.94 (P1)
Transmission heat loss coefficient	47.98 (37)
Summer heat loss coefficient	214.93 (P2)

Overhangs

Orientation	Ratio	Z_overhangs	Overhang type
East	0.000	1.000	None
West	0.000	1.000	None

Solar shading

Orientation	Z blinds	Solar access	Z overhangs	Z summer
East	0.850	0.90	1.000	0.765 (P8)
West	0.850	0.90	1.000	0.765 (P8)

[Jul]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Shading	Gains W
East	4.9400	119.1985	0.7100	0.7000	0.7650	201.4921
West	2.1700	119.1985	0.7100	0.7000	0.7650	88.5097
total:						290.0018

	Jun	Jul	Aug	
Solar gains	316	290	254	(P3)
Internal gains	406	389	398	
Total summer gains	722	679	652	(P5)
Summer gain/loss ratio	3.36	3.16	3.03	(P6)
Summer external temperature	15.00	16.70	16.70	
Thermal mass temperature increment (TMP = 230.7)	0.39	0.39	0.39	
Threshold temperature	18.74	20.25	20.12	(P7)
Likelihood of high internal temperature	Not significant	Not significant	Not significant	

Assessment of likelihood of high internal temperature: Not significant

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