

ASSESSMENT NOTES

Calculation Type: New Build (As Designed)



Property Reference	Plot 065 AS	Issued on Date	27/04/2021
Assessment Reference	Plot 065 AS	Prop Type Ref	Loughton V5 0F
Property	2 bed, 1 bath		

SAP Rating	83 B	DER	19.69	TER	20.79
Environmental	88 B	% DER<TER	5.31		
CO ₂ Emissions (t/year)	0.84	DFEE	46.43	TFEE	51.10
General Requirements Compliance	Pass	% DFEE<TFEE	9.14		

Assessor Details	Mr. Michael Brogden, Michael Brogden, Tel: 0333 5777 577, michael@darren-evans.co.uk	Assessor ID	R034-0001
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Client	
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ASSESSMENT NOTES - Last time updated on: 27.04.2021

PREDICTED ENERGY ASSESSMENT



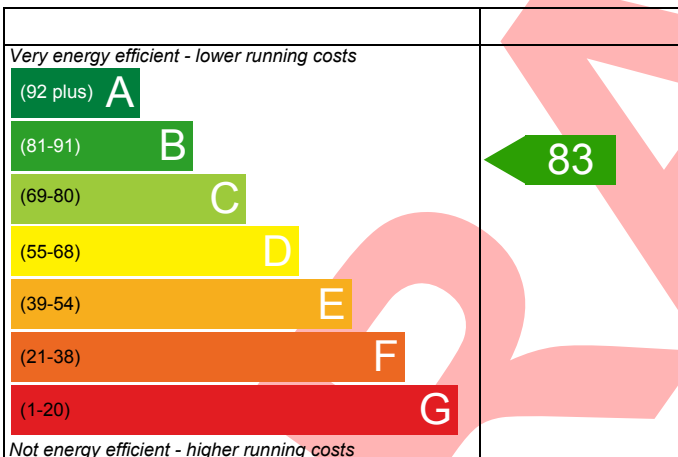
2 bed,
1 bath

Dwelling type: Flat, End-Terrace
Date of assessment: 27/04/2021
Produced by: Michael Brogden
Total floor area: 50.54 m²

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

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating

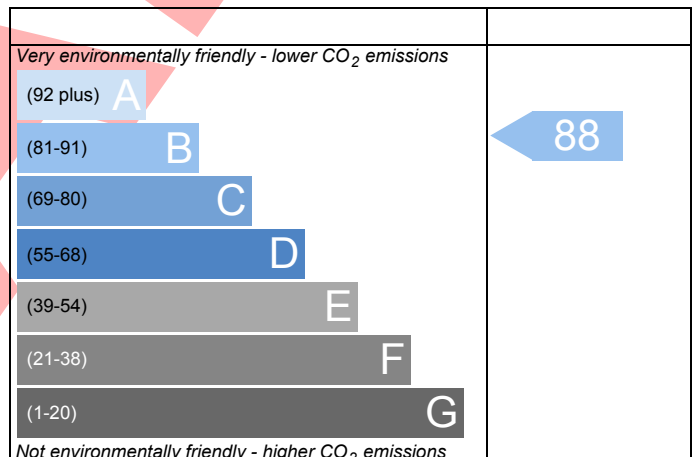


England

EU Directive
2002/91/EC

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

Environmental Impact (CO₂) Rating



England

EU Directive
2002/91/EC

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

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

SUMMARY FOR INPUT DATA

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

Orientation	North
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	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 23.14 m	Internal Floor Area 50.54 m ²	Average Storey Height 2.31 m

7.0 Living Area	21.14	m ²
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8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	260.15	kJ/m ² K

9.0 External Walls						
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.27	60.00	47.21	39.96
Wall to Corridor	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.27	60.00	6.24	6.24

9.1 Party Walls					
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	16.36

9.2 Internal Walls				
Description	Construction		Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame		9.00	82.52

10.1 Party Ceilings				
Description	Construction		Kappa (kJ/m ² K)	Area (m ²)
Party Ceilings 1	Concrete floor slab, carpeted		100.00	50.54

SUMMARY FOR INPUT DATA

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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	50.54

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
French Door	Manufacture	Window	Double glazed			0.71		0.70	1.41
Window	Manufacture	Window	Double glazed			0.71		0.70	1.41
Solid door tall window	Manufacture	Solid Door							1.20
Half Glazed Door	Manufacture	Half Glazed Door	Double Low-E Soft 0.05			0.63		0.70	1.50
solid door	Manufacture	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	North							2.02	
rear Windows	Window	[1] External Wall 1	West	Dark-coloured curtain or roller blind	0.00					0.76	100
front windows	Window	[1] External Wall 1	North	Dark-coloured curtain or roller blind	0.00					1.24	100
RHS Window	Window	[1] External Wall 1	West	Dark-coloured curtain or roller blind	0.00					3.23	100

14.0 Conservatory

15.0 Draught Proofing

%

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported	Reference:
Independently assessed	E2 Other lintels (including other steel lintels)	5.01	0.211	No	CATNIC
Table K1 - Approved	E3 Sill	4.00	0.040	No	
Table K1 - Approved	E4 Jamb	17.10	0.050	No	
Independently assessed	E5 Ground floor (normal)	23.14	0.038	No	E05-CXBR-CW4040_100mm-01-150B&cd09
Independently assessed	E7 Party floor between dwellings (in blocks of flats)	23.14	0.058	No	
Independently assessed	E16 Corner (normal)	6.93	0.042	No	E16-CXBR-CW4040_100mm-01
Independently assessed	E18 Party wall between dwellings	2.31	0.052	No	E18-CXBR-CW4040_100mm-01-RD22
Table K1 - Default	E25 Staggered party wall between dwellings	2.31	0.120	No	
Independently assessed	P1 Party wall - Ground floor	7.08	0.010	No	P01-CXBR-EWM22-150B&Bperp
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.08	0.000	No	

Y-value W/m²K

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

SUMMARY FOR INPUT DATA

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Property Tested ?
 As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather
 Cross ventilation possible
 Night Ventilation
 Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

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

22.0 Lighting

Internal

Total number of light fittings
 Total number of L.E.L. fittings
 Percentage of L.E.L. fittings %

External

External lights fitted

23.0 Electricity Tariff

24.0 Main Heating 1

Percentage of Heat %
 Database Ref. No.
 Fuel Type
 Main Heating
 SAP Code
 In Winter
 In Summer
 Controls
 PCDF Controls
 Delayed Start Stat
 Sap Code
 Flue Type
 Fan Assisted Flue
 Is MHS Pumped
 Heat Emitter
 Flow Temperature
 Combi boiler type
 Combi keep hot type

25.0 Main Heating 2

SUMMARY FOR INPUT DATA

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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

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		TFEE	51.10
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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)

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)	20.79	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	19.69	kgCO ₂ /m ²	Pass
	-1.10 (-5.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.10	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	46.43	kWh/m ² /yr	
	-4.7 (-9.2%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.27 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Openings	1.32 (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
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



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 North

1.24 m², No overhang

Windows facing West

3.99 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

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Door U-value

1.10

W/m²K

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FULL SAP CALCULATION PRINTOUT

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FULL SAP CALCULATION PRINTOUT

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

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

DWELLING AS DESIGNED

Ground-floor flat, total floor area 51 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) 20.79 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 19.69 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)51.1 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)46.4 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.27 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	OK
Roof	(no roof)		
Openings	1.32 (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 North: 1.24 m², No overhang
Windows facing West: 3.99 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

Party wall U-value 0.00 W/m²K
Door U-value 1.10 W/m²K

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	50.5400 (1b)	x 2.3100 (2b)	= 116.7474 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.5400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 116.7474 (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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				20.0000 / (5) =	0.1713 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.4213 (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) =		0.3581 (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												
	0.4566	0.4476	0.4387	0.3939	0.3850	0.3402	0.3402	0.3313	0.3581	0.3850	0.4029	0.4208 (22b)
Effective ac	0.6042	0.6002	0.5962	0.5776	0.5741	0.5579	0.5579	0.5549	0.5641	0.5741	0.5812	0.5885 (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
Window (Uw = 1.41)			5.2300	1.3347	6.9806		(27)
solid door			2.0200	1.1000	2.2220		(26)
Heat Loss Floor 1			50.5400	0.1500	7.5810	75.0000	3790.5000 (28a)
External Wall 1	47.2100	7.2500	39.9600	0.2700	10.7892	60.0000	2397.6000 (29a)
Wall to Corridor	6.2400		6.2400	0.2172	1.3554	60.0000	374.4000 (29a)
Total net area of external elements Aum(A, m ²)			103.9900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	28.9282		(33)
Party Wall 1			16.3600	0.0000	0.0000	110.0000	1799.6000 (32)
Party Ceilings 1			50.5400			80.0000	4043.2000 (32b)
Internal Wall 1			82.5200			9.0000	742.6800 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13147.9800 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							260.1500 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.0527 (36)
Total fabric heat loss						(33) + (36) =	33.9810 (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	23.2793	23.1234	22.9705	22.2525	22.1182	21.4929	21.4929	21.3771	21.7338	22.1182	22.3900	22.6741 (38)
Heat transfer coeff	57.2603	57.1043	56.9515	56.2335	56.0992	55.4738	55.4738	55.3580	55.7147	56.0992	56.3709	56.6550 (39)
Average = Sum(39)m / 12 =												56.2329 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1330	1.1299	1.1269	1.1127	1.1100	1.0976	1.0976	1.0953	1.1024	1.1100	1.1154	1.1210 (40)
HLP (average)												1.1126 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7060 (42)
Average daily hot water use (litres/day)												74.7177 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	82.1895	79.2008	76.2121	73.2233	70.2346	67.2459	67.2459	70.2346	73.2233	76.2121	79.2008	82.1895 (44)
Energy conte	121.8846	106.6011	110.0027	95.9031	92.0213	79.4074	73.5826	84.4371	85.4455	99.5785	108.6978	118.0387 (45)
Energy content (annual)										Total = Sum(45)m =		1175.6004 (45)
Distribution loss (46)m = 0.15 x (45)m												
	18.2827	15.9902	16.5004	14.3855	13.8032	11.9111	11.0374	12.6656	12.8168	14.9368	16.3047	17.7058 (46)
Water storage loss:												

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CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	13.9970	12.6279	13.9578	13.4813	13.9117	13.4410	13.8753	13.8989	13.4630	13.9387	13.5194	13.9894 (61)
Total heat required for water heating calculated for each month	135.8816	119.2290	123.9605	109.3844	105.9329	92.8483	87.4579	98.3360	98.9085	113.5172	122.2172	132.0281 (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	135.8816	119.2290	123.9605	109.3844	105.9329	92.8483	87.4579	98.3360	98.9085	113.5172	122.2172	132.0281 (64)
Heat gains from water heating, kWh/month	44.0259	38.6018	40.0654	35.2581	34.0750	29.7632	27.9350	31.5501	31.7764	36.5945	39.5219	42.7452 (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	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	15.1908	13.4923	10.9727	8.3070	6.2096	5.2424	5.6646	7.3631	9.8827	12.5484	14.6458	15.6130	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	148.6364	150.1787	146.2920	138.0176	127.5726	117.7558	111.1975	109.6552	113.5419	121.8163	132.2613	142.0781	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	(71)
Water heating gains (Table 5)	59.1746	57.4432	53.8513	48.9696	45.7997	41.3378	37.5471	42.4060	44.1339	49.1862	54.8915	57.4533	(72)
Total internal gains	274.5918	272.7044	262.7061	246.8843	231.1720	215.9261	205.9994	211.0144	219.1486	235.1410	253.3887	266.7345	(73)

6. Solar gains

[Jan]					Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W		
North					1.2400	10.6334	0.7100	0.7000	0.7700	4.5413 (74)		
West					3.9900	19.6403	0.7100	0.7000	0.7700	26.9904 (80)		

Solar gains	31.5318	61.4777	101.6997	150.5028	187.3262	193.2568	183.3593	155.4104	118.8603	72.9814	39.2562	25.9815 (83)
Total gains	306.1236	334.1821	364.4058	397.3872	418.4983	409.1828	389.3587	366.4247	338.0089	308.1224	292.6449	292.7160 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	63.7827	63.9569	64.1286	64.9474	65.1029	65.8367	65.8367	65.9745	65.5521	65.1029	64.7890	64.4641	
alpha	5.2522	5.2638	5.2752	5.3298	5.3402	5.3891	5.3891	5.3983	5.3701	5.3402	5.3193	5.2976	
util living area	0.9983	0.9969	0.9925	0.9755	0.9190	0.7780	0.6070	0.6620	0.8919	0.9841	0.9967	0.9987	(86)
MIT	19.8250	19.9407	20.1609	20.4694	20.7514	20.9334	20.9859	20.9781	20.8493	20.4919	20.1089	19.8065	(87)
Th 2	19.9740	19.9765	19.9790	19.9905	19.9927	20.0028	20.0028	20.0046	19.9989	19.9927	19.9883	19.9837	(88)
util rest of house	0.9977	0.9958	0.9896	0.9651	0.8832	0.6901	0.4797	0.5351	0.8310	0.9755	0.9952	0.9982	(89)
MIT 2	18.4079	18.5788	18.9012	19.3531	19.7388	19.9566	19.9975	19.9954	19.8718	19.3916	18.8334	18.3879	(90)
Living area fraction									fLA = Living area / (4) =			0.4183	(91)
MIT	19.0007	19.1485	19.4281	19.8200	20.1624	20.3652	20.4109	20.4064	20.2807	19.8518	19.3669	18.9813	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8507	18.9985	19.2781	19.6700	20.0124	20.2152	20.2609	20.2564	20.1307	19.7018	19.2169	18.8313	(93)

8. Space heating requirement

Utilisation	0.9967	0.9943	0.9868	0.9609	0.8841	0.7106	0.5140	0.5690	0.8405	0.9721	0.9937	0.9974	(94)
Useful gains	305.1144	332.2642	359.6085	381.8455	369.9851	290.7691	200.1284	208.5026	284.0937	299.5397	290.7940	291.9522	(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	833.1753	805.0829	727.7325	605.6360	466.3173	311.4945	203.0863	213.4831	335.9981	510.6049	683.0430	828.9370	(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	392.8774	317.7341	273.8842	161.1292	71.6711	0.0000	0.0000	0.0000	0.0000	157.0325	282.4193	399.5167	(98)
Space heating												2056.2646	(98)
Space heating per m2										(98) / (4) =		40.6859	(99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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													2272.1156 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	392.8774	317.7341	273.8842	161.1292	71.6711	0.0000	0.0000	0.0000	0.0000	157.0325	282.4193	399.5167	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	434.1186	351.0874	302.6345	178.0433	79.1946	0.0000	0.0000	0.0000	0.0000	173.5166	312.0655	441.4549	(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	135.8816	119.2290	123.9605	109.3844	105.9329	92.8483	87.4579	98.3360	98.9085	113.5172	122.2172	132.0281	(64)
Efficiency of water heater (217)m	89.6555	89.6038	89.4781	89.1782	88.5637	87.3000	87.3000	87.3000	87.3000	89.1292	89.5090	87.3000	(216)
Fuel for water heating, kWh/month	151.5597	133.0624	138.5373	122.6582	119.6121	106.3555	100.1809	112.6415	113.2973	127.3626	136.5418	147.2157	(219)
Water heating fuel used												1509.0249	(219)
Annual totals kWh/year													
Space heating fuel - main system												2272.1156	(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)												268.2738	(232)
Total delivered energy for all uses												4124.4142	(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	2272.1156	0.2160	490.7770 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1509.0249	0.2160	325.9494 (264)
Space and water heating			816.7263 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	268.2738	0.5190	139.2341 (268)
Total CO2, kg/year			994.8854 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			19.6900 (273)

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

DER		19.6900	ZC1
Total Floor Area	TFA	50.5400	
Assumed number of occupants	N	1.7060	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		17.4275	ZC2
CO2 emissions from cooking, equation (L16)		3.1647	ZC3
Total CO2 emissions		40.2822	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		40.2822	ZC8

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	50.5400 (1b)	x 2.3100 (2b)	= 116.7474 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.5400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 116.7474 (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)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =				20.0000 / (5) = 0.1713 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.4213 (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) =				0.3581 (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	0.4566	0.4476	0.4387	0.3939	0.3850	0.3402	0.3402	0.3313	0.3581	0.3850	0.4029	0.4208 (22b)
Effective ac	0.6042	0.6002	0.5962	0.5776	0.5741	0.5579	0.5579	0.5549	0.5641	0.5741	0.5812	0.5885 (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
TER Opaque door			2.0200	1.0000	2.0200		(26)
TER Opening Type (Uw = 1.40)			5.2300	1.3258	6.9337		(27)
Heat Loss Floor 1			50.5400	0.1300	6.5702		(28a)
External Wall 1	47.2100	7.2500	39.9600	0.1800	7.1928		(29a)
Wall to Corridor	6.2400		6.2400	0.1800	1.1232		(29a)
Total net area of external elements Aum(A, m ²)			103.9900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.8399		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.0950 (36)
Total fabric heat loss						(33) + (36) =	31.9349 (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	23.2793	23.1234	22.9705	22.2525	22.1182	21.4929	21.4929	21.3771	21.7338	22.1182	22.3900	22.6741 (38)
Heat transfer coeff	55.2142	55.0583	54.9054	54.1875	54.0531	53.4278	53.4278	53.3120	53.6687	54.0531	54.3249	54.6090 (39)
Average = Sum(39)m / 12 =												54.1868 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0925	1.0894	1.0864	1.0722	1.0695	1.0571	1.0571	1.0548	1.0619	1.0695	1.0749	1.0805 (40)
HLP (average)												1.0722 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7060 (42)
Average daily hot water use (litres/day)												74.7177 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	82.1895	79.2008	76.2121	73.2233	70.2346	67.2459	67.2459	70.2346	73.2233	76.2121	79.2008	82.1895 (44)
Energy conte	121.8846	106.6011	110.0027	95.9031	92.0213	79.4074	73.5826	84.4371	85.4455	99.5785	108.6978	118.0387 (45)
Energy content (annual)												Total = Sum(45)m = 1175.6004 (45)
Distribution loss (46)m = 0.15 x (45)m	18.2827	15.9902	16.5004	14.3855	13.8032	11.9111	11.0374	12.6656	12.8168	14.9368	16.3047	17.7058 (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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Combi loss	41.8829	36.4541	38.8368	36.1101	35.7908	33.1624	34.2678	35.7908	36.1101	38.8368	39.0579	41.8829 (61)
Total heat required for water heating calculated for each month	163.7675	143.0551	148.8396	132.0132	127.8121	112.5697	107.8504	120.2279	121.5557	138.4154	147.7557	159.9216 (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	163.7675	143.0551	148.8396	132.0132	127.8121	112.5697	107.8504	120.2279	121.5557	138.4154	147.7557	159.9216 (64)
Heat gains from water heating, kWh/month	50.9973	44.5584	46.2851	40.9153	39.5448	34.6935	33.0332	37.0230	37.4382	42.8191	45.9065	49.7186 (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	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	15.1908	13.4923	10.9727	8.3070	6.2096	5.2424	5.6646	7.3631	9.8827	12.5484	14.6458	15.6130	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	148.6364	150.1787	146.2920	138.0176	127.5726	117.7558	111.1975	109.6552	113.5419	121.8163	132.2613	142.0781	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	(71)
Water heating gains (Table 5)	68.5448	66.3071	62.2112	56.8268	53.1516	48.1855	44.3994	49.7621	51.9975	57.5525	63.7590	66.8261	(72)
Total internal gains	283.9621	281.5683	271.0660	254.7415	238.5239	222.7738	212.8517	218.3705	227.0122	243.5073	262.2562	276.1073	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g	Specific data or Table 6b	FF	Specific data or Table 6c	Access factor Table 6d	Gains W	
North				1.2400	10.6334		0.6300		0.7000	0.7700	4.0296 (74)	
West				3.9900	19.6403		0.6300		0.7000	0.7700	23.9493 (80)	
Solar gains	27.9789	54.5507	90.2406	133.5448	166.2191	171.4814	162.6991	137.8993	105.4676	64.7581	34.8330	23.0540 (83)
Total gains	311.9410	336.1189	361.3066	388.2863	404.7430	394.2551	375.5508	356.2698	332.4798	308.2654	297.0892	299.1613 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	63.5655	63.7456	63.9231	64.7700	64.9310	65.6909	65.6909	65.8336	65.3961	64.9310	64.6062	64.2701	
alpha	5.2377	5.2497	5.2615	5.3180	5.3287	5.3794	5.3794	5.3889	5.3597	5.3287	5.3071	5.2847	
util living area	0.9977	0.9962	0.9914	0.9739	0.9177	0.7776	0.6061	0.6568	0.8844	0.9812	0.9957	0.9982 (86)	
MIT	19.8529	19.9635	20.1767	20.4769	20.7525	20.9332	20.9859	20.9787	20.8560	20.5103	20.1347	19.8354 (87)	
Th 2	20.0070	20.0095	20.0120	20.0236	20.0258	20.0360	20.0360	20.0379	20.0321	20.0258	20.0214	20.0168 (88)	
util rest of house	0.9970	0.9949	0.9882	0.9634	0.8830	0.6930	0.4835	0.5348	0.8239	0.9717	0.9940	0.9976 (89)	
MIT 2	18.4770	18.6403	18.9523	19.3923	19.7699	19.9883	20.0304	20.0284	19.9092	19.4459	18.8992	18.4585 (90)	
Living area fraction									fLA = Living area / (4) =			0.4183 (91)	
MIT	19.0525	19.1938	19.4644	19.8460	20.1809	20.3835	20.4301	20.4259	20.3052	19.8911	19.4160	19.0344 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.0525	19.1938	19.4644	19.8460	20.1809	20.3835	20.4301	20.4259	20.3052	19.8911	19.4160	19.0344 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9959	0.9934	0.9859	0.9610	0.8894	0.7258	0.5352	0.5862	0.8435	0.9700	0.9925	0.9967 (94)
Useful gains	310.6757	333.8953	356.2134	373.1554	359.9862	286.1573	201.0044	208.8435	280.4303	299.0082	294.8538	298.1835 (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	814.5485	786.9921	711.8181	593.1332	458.4205	309.0009	204.6327	214.6306	333.0251	502.2120	669.0649	810.0920 (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	374.8813	304.4810	264.5699	158.3840	73.2351	0.0000	0.0000	0.0000	0.0000	151.1836	269.4320	380.8599 (98)
Space heating												1977.0269 (98)
Space heating per m2										(98) / (4) =		39.1181 (99)

8c. Space cooling requirement

Not applicable

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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													2116.7312 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	374.8813	304.4810	264.5699	158.3840	73.2351	0.0000	0.0000	0.0000	0.0000	151.1836	269.4320	380.8599	(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)	401.3718	325.9968	283.2654	169.5761	78.4102	0.0000	0.0000	0.0000	0.0000	161.8668	288.4711	407.7729	(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	163.7675	143.0551	148.8396	132.0132	127.8121	112.5697	107.8504	120.2279	121.5557	138.4154	147.7557	159.9216	(64)
Efficiency of water heater	87.0704	86.9059	86.4837	85.5107	83.7067	80.3000	80.3000	80.3000	80.3000	85.2737	86.5447	80.3000	(216)
(217)m	87.0704	86.9059	86.4837	85.5107	83.7067	80.3000	80.3000	80.3000	80.3000	85.2737	86.5447	87.1581	(217)
Fuel for water heating, kWh/month	188.0864	164.6091	172.1013	154.3822	152.6904	140.1865	134.3093	149.7234	151.3770	162.3190	170.7276	183.4845	(219)
Water heating fuel used												1923.9967	(219)
Annual totals kWh/year													
Space heating fuel - main system												2116.7312	(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)												268.2738	(232)
Total delivered energy for all uses												4384.0017	(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	2116.7312	0.2160	457.2139 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1923.9967	0.2160	415.5833 (264)
Space and water heating			872.7972 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	268.2738	0.5190	139.2341 (268)
Total CO2, kg/m2/year			1050.9563 (272)
Emissions per m2 for space and water heating			17.2694 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.7549 (272b)
Emissions per m2 for pumps and fans			0.7702 (272c)
Target Carbon Dioxide Emission Rate (TER) = (17.2694 * 1.00) + 2.7549 + 0.7702, rounded to 2 d.p.			20.7900 (273)

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1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	50.5400 (1b)	x 2.3100 (2b)	= 116.7474 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.5400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 116.7474 (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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					Air changes per hour
Pressure test					20.0000 / (5) = 0.1713 (8)
Measured/design AP50					Yes
Infiltration rate					5.0000
Number of sides sheltered					0.4213 (18)
					2 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.3581 (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												
	0.4566	0.4476	0.4387	0.3939	0.3850	0.3402	0.3402	0.3313	0.3581	0.3850	0.4029	0.4208 (22b)
Effective ac	0.6042	0.6002	0.5962	0.5776	0.5741	0.5579	0.5579	0.5549	0.5641	0.5741	0.5812	0.5885 (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
Window (Uw = 1.41)			5.2300	1.3347	6.9806		(27)
solid door			2.0200	1.1000	2.2220		(26)
Heat Loss Floor 1			50.5400	0.1500	7.5810	75.0000	3790.5000 (28a)
External Wall 1	47.2100	7.2500	39.9600	0.2700	10.7892	60.0000	2397.6000 (29a)
Wall to Corridor	6.2400		6.2400	0.2172	1.3554	60.0000	374.4000 (29a)
Total net area of external elements Aum(A, m ²)			103.9900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	28.9282		(33)
Party Wall 1			16.3600	0.0000	0.0000	110.0000	1799.6000 (32)
Party Ceilings 1			50.5400			100.0000	5054.0000 (32b)
Internal Wall 1			82.5200			9.0000	742.6800 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	14158.7800 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							280.1500 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.0527 (36)
Total fabric heat loss						(33) + (36) =	33.9810 (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	23.2793	23.1234	22.9705	22.2525	22.1182	21.4929	21.4929	21.3771	21.7338	22.1182	22.3900	22.6741 (38)
Heat transfer coeff	57.2603	57.1043	56.9515	56.2335	56.0992	55.4738	55.4738	55.3580	55.7147	56.0992	56.3709	56.6550 (39)
Average = Sum(39)m / 12 =												56.2329 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1330	1.1299	1.1269	1.1127	1.1100	1.0976	1.0976	1.0953	1.1024	1.1100	1.1154	1.1210 (40)
HLP (average)												1.1126 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7060 (42)
Average daily hot water use (litres/day)												74.7177 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	82.1895	79.2008	76.2121	73.2233	70.2346	67.2459	67.2459	70.2346	73.2233	76.2121	79.2008	82.1895 (44)
Energy conte	121.8846	106.6011	110.0027	95.9031	92.0213	79.4074	73.5826	84.4371	85.4455	99.5785	108.6978	118.0387 (45)
Energy content (annual)												Total = Sum(45)m = 1175.6004 (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:												

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Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Heat gains from water heating, kWh/month	25.9005	22.6527	23.3756	20.3794	19.5545	16.8741	15.6363	17.9429	18.1572	21.1604	23.0983	25.0832 (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	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	15.1908	13.4923	10.9727	8.3070	6.2096	5.2424	5.6646	7.3631	9.8827	12.5484	14.6458	15.6130	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	148.6364	150.1787	146.2920	138.0176	127.5726	117.7558	111.1975	109.6552	113.5419	121.8163	132.2613	142.0781	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	(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)	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	(71)
Water heating gains (Table 5)	34.8125	33.7094	31.4188	28.3047	26.2830	23.4362	21.0165	24.1168	25.2183	28.4415	32.0809	33.7140	(72)
Total internal gains	247.2297	245.9706	237.2736	223.2194	208.6553	195.0245	186.4688	189.7251	197.2330	211.3963	227.5782	239.9953	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W		
North					1.2400	10.6334	0.7100	0.7000	0.7700	4.5413 (74)		
West					3.9900	19.6403	0.7100	0.7000	0.7700	26.9904 (80)		

Solar gains	31.5318	61.4777	101.6997	150.5028	187.3262	193.2568	183.3593	155.4104	118.8603	72.9814	39.2562	25.9815 (83)
Total gains	278.7615	307.4483	338.9733	373.7223	395.9815	388.2813	369.8281	345.1355	316.0933	284.3776	266.8344	265.9768 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	68.6863	68.8738	69.0587	69.9404	70.1079	70.8982	70.8982	71.0465	70.5917	70.1079	69.7699	69.4201	
alpha	5.5791	5.5916	5.6039	5.6627	5.6739	5.7265	5.7265	5.7364	5.7061	5.6739	5.6513	5.6280	
util living area	0.9993	0.9985	0.9960	0.9846	0.9401	0.8107	0.6379	0.6990	0.9204	0.9912	0.9985	0.9994	(86)
MIT	19.8470	19.9576	20.1686	20.4666	20.7447	20.9311	20.9860	20.9771	20.8401	20.4850	20.1176	19.8306	(87)
Th 2	19.9740	19.9765	19.9790	19.9905	19.9927	20.0028	20.0028	20.0046	19.9989	19.9927	19.9883	19.9837	(88)
util rest of house	0.9990	0.9980	0.9943	0.9772	0.9095	0.7234	0.5050	0.5674	0.8669	0.9859	0.9978	0.9992	(89)
MIT 2	18.9208	19.0333	19.2456	19.5493	19.8132	19.9706	19.9994	19.9983	19.9055	19.5716	19.2029	18.9124	(90)
Living area fraction									fLA = Living area / (4) =			0.4183	(91)
MIT	19.3083	19.4199	19.6317	19.9330	20.2028	20.3723	20.4121	20.4077	20.2964	19.9536	19.5855	19.2965	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3083	19.4199	19.6317	19.9330	20.2028	20.3723	20.4121	20.4077	20.2964	19.9536	19.5855	19.2965	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9987	0.9975	0.9935	0.9767	0.9170	0.7587	0.5616	0.6236	0.8857	0.9856	0.9974	0.9990	(94)
Ext temp.	278.4089	306.6932	336.7630	365.0018	363.0970	294.5903	207.6940	215.2387	279.9592	280.2787	266.1434	265.7207	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Month fracti	859.3766	829.1501	747.8673	620.4230	477.0026	320.2143	211.4697	221.8574	345.2317	524.7318	703.8200	855.2899	(97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating per m2	432.2400	351.0910	305.8616	183.9032	84.7458	0.0000	0.0000	0.0000	0.0000	181.8731	315.1272	438.6395	(98)
												2293.4814	(98)
										(98) / (4) =		45.3795	(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	521.4541	410.5064	420.7211	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8495	0.9193	0.8936	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	442.9863	377.3640	375.9379	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	519.2439	496.5229	468.8996	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													

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	0.0000	0.0000	0.0000	0.0000	0.0000	54.9055	88.6542	69.1635	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												212.7232 (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	13.7264	22.1635	17.2909	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												53.1808 (107)
Space cooling per m2												1.0523 (108)
Energy for space heating												45.3795 (99)
Energy for space cooling												1.0523 (108)
Total												46.4318 (109)
Dwelling Fabric Energy Efficiency (DFEE)												46.4 (109)

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1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	50.5400 (1b)	x 2.3100 (2b)	= 116.7474 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.5400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 116.7474 (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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					20.0000 / (5) = 0.1713 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.4213 (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) = 0.3581 (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	0.4566	0.4476	0.4387	0.3939	0.3850	0.3402	0.3402	0.3313	0.3581	0.3850	0.4029	0.4208 (22b)
Effective ac	0.6042	0.6002	0.5962	0.5776	0.5741	0.5579	0.5579	0.5549	0.5641	0.5741	0.5812	0.5885 (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
TER Opaque door			2.0200	1.0000	2.0200		(26)
TER Opening Type (Uw = 1.40)			5.2300	1.3258	6.9337		(27)
Heat Loss Floor 1			50.5400	0.1300	6.5702		(28a)
External Wall 1	47.2100	7.2500	39.9600	0.1800	7.1928		(29a)
Wall to Corridor	6.2400		6.2400	0.1800	1.1232		(29a)
Total net area of external elements Aum(A, m ²)			103.9900				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 23.8399		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.0950 (36)
Total fabric heat loss							(33) + (36) = 31.9349 (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	23.2793	23.1234	22.9705	22.2525	22.1182	21.4929	21.4929	21.3771	21.7338	22.1182	22.3900	22.6741 (38)
Heat transfer coeff	55.2142	55.0583	54.9054	54.1875	54.0531	53.4278	53.4278	53.3120	53.6687	54.0531	54.3249	54.6090 (39)
Average = Sum(39)m / 12 =												54.1868 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0925	1.0894	1.0864	1.0722	1.0695	1.0571	1.0571	1.0548	1.0619	1.0695	1.0749	1.0805 (40)
HLP (average)												1.0722 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7060 (42)
Average daily hot water use (litres/day)												74.7177 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	82.1895	79.2008	76.2121	73.2233	70.2346	67.2459	67.2459	70.2346	73.2233	76.2121	79.2008	82.1895 (44)
Energy conte	121.8846	106.6011	110.0027	95.9031	92.0213	79.4074	73.5826	84.4371	85.4455	99.5785	108.6978	118.0387 (45)
Energy content (annual)												
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	25.9005	22.6527	23.3756	20.3794	19.5545	16.8741	15.6363	17.9429	18.1572	21.1604	23.0983	25.0832 (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	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	85.3004	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	15.1908	13.4923	10.9727	8.3070	6.2096	5.2424	5.6646	7.3631	9.8827	12.5484	14.6458	15.6130	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	148.6364	150.1787	146.2920	138.0176	127.5726	117.7558	111.1975	109.6552	113.5419	121.8163	132.2613	142.0781	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	31.5300	(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)	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	-68.2403	(71)
Water heating gains (Table 5)	34.8125	33.7094	31.4188	28.3047	26.2830	23.4362	21.0165	24.1168	25.2183	28.4415	32.0809	33.7140	(72)
Total internal gains	247.2297	245.9706	237.2736	223.2194	208.6553	195.0245	186.4688	189.7251	197.2330	211.3963	227.5782	239.9953	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
North				1.2400	10.6334		0.6300		0.7000		0.7700		4.0296 (74)
West				3.9900	19.6403		0.6300		0.7000		0.7700		23.9493 (80)

Solar gains	27.9789	54.5507	90.2406	133.5448	166.2191	171.4814	162.6991	137.8993	105.4676	64.7581	34.8330	23.0540	(83)
Total gains	275.2086	300.5213	327.5142	356.7642	374.8743	366.5059	349.1679	327.6245	302.7006	276.1544	262.4111	263.0493	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	63.5655	63.7456	63.9231	64.7700	64.9310	65.6909	65.6909	65.8336	65.3961	64.9310	64.6062	64.2701	
alpha	5.2377	5.2497	5.2615	5.3180	5.3287	5.3794	5.3794	5.3889	5.3597	5.3287	5.3071	5.2847	
util living area	0.9988	0.9977	0.9945	0.9817	0.9369	0.8126	0.6448	0.7016	0.9142	0.9883	0.9976	0.9990	(86)
MIT	19.7846	19.8978	20.1156	20.4243	20.7143	20.9166	20.9812	20.9710	20.8233	20.4546	20.0705	19.7679	(87)
Th 2	20.0070	20.0095	20.0120	20.0236	20.0258	20.0360	20.0360	20.0379	20.0321	20.0258	20.0214	20.0168	(88)
util rest of house	0.9983	0.9969	0.9924	0.9740	0.9080	0.7316	0.5178	0.5771	0.8632	0.9821	0.9966	0.9987	(89)
MIT 2	18.8943	19.0093	19.2283	19.5424	19.8190	19.9938	20.0307	20.0287	19.9243	19.5764	19.1916	18.8856	(90)
Living area fraction									fLA = Living area / (4) =			0.4183	(91)
MIT	19.2667	19.3809	19.5994	19.9113	20.1935	20.3798	20.4283	20.4228	20.3003	19.9437	19.5593	19.2547	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.2667	19.3809	19.5994	19.9113	20.1935	20.3798	20.4283	20.4228	20.3003	19.9437	19.5593	19.2547	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9979	0.9963	0.9913	0.9729	0.9138	0.7632	0.5717	0.6299	0.8798	0.9814	0.9960	0.9983	(94)
Ext temp.	274.6290	299.4022	324.6503	347.0798	342.5586	279.7009	199.6040	206.3736	266.3097	271.0264	261.3564	262.6152	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Month fracti	826.3744	797.2961	719.2291	596.6731	459.1004	308.8025	204.5373	214.4644	332.7629	505.0586	676.8474	822.1195	(97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating	410.4986	334.5847	293.5666	179.7072	86.7071	0.0000	0.0000	0.0000	0.0000	174.1199	299.1535	416.2712	(98)
Space heating per m2												2194.6089	(98)
												43.4232	(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	502.2213	395.3657	405.1712	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8360	0.9078	0.8829	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	419.8679	358.9042	357.7350	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	493.7921	472.3746	448.4322	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	53.2255	84.4220	67.4787	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												205.1261	(104)
Cooled fraction												1.0000	(105)
Intermittency factor (Table 10b)													

fC = cooled area / (4) =

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Space cooling kWh	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	0.0000	0.0000	0.0000	0.0000	0.0000	13.3064	21.1055	16.8697	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling per m2												51.2815 (107)
Energy for space heating												1.0147 (108)
Energy for space cooling												43.4232 (99)
Total												1.0147 (108)
Target Fabric Energy Efficiency (TFEE)												44.4379 (109)
												51.1 (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	North
Overshading	Average or unknown
Thermal mass parameter	260.1 (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	115.58 (P1)
Transmission heat loss coefficient	33.98 (37)
Summer heat loss coefficient	149.56 (P2)

Overhangs	Ratio	Z_overhangs	Overhang type
Orientation			
North	0.000	1.000	None
West	0.000	1.000	None

Solar shading	Z blinds	Solar access	Z overhangs	Z summer
Orientation				
North	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	Specific data or Table 6b	FF Specific data or Table 6c	Shading	Gains W
North	1.2400	82.4373	0.7100	0.7000	0.7650	34.9789
West	3.9900	119.1985	0.7100	0.7000	0.7650	162.7436
total:						197.7225

	Jun	Jul	Aug	
Solar gains	216	198	171	(P3)
Internal gains	311	299	306	
Total summer gains	527	496	477	(P5)
Summer gain/loss ratio	3.53	3.32	3.19	(P6)
Summer external temperature	15.00	16.70	16.70	
Thermal mass temperature increment (TMP = 260.1)	0.18	0.18	0.18	
Threshold temperature	18.71	20.20	20.07	(P7)
Likelihood of high internal temperature	Not significant	Not significant	Not significant	
Assessment of likelihood of high internal temperature:	Not significant			