

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Property Reference	01			Issued on Date	12/04/2021
Assessment Reference	Notional	Prop Type Ref	Ground floor studio		
Property	3-7, Henry Road, Barnet, London, EN4 8BL				
SAP Rating	74 C	DER	40.88	TER	27.28
Environmental	77 C	% DER<TER	-49.86		
CO ₂ Emissions (t/year)	1.28	DFEE	102.61	TFEE	65.31
General Requirements Compliance	Fail	% DFEE<TFEE	-57.13		
Assessor Details	Mr. Malcolm Maclean, SRE Limited, Tel: 01730 710044, malcolm@sre.co.uk			Assessor ID	V497-0002
Client	Daniel Rose Planning, DRPL				

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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 37 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) 27.28 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 40.88 kgCO₂/m²Fail
Excess emissions =13.60 kgCO₂/m² (49.9%)

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 65.3 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE) 102.6 kWh/m²/yrFail
Excess energy =37.3 kWh/m²/yr (57.1%)

2 Fabric U-values

Element	Average	Highest	
External wall	0.23 (max. 0.30)	0.28 (max. 0.70)	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	(no roof)		
Openings	1.63 (max. 2.00)	1.80 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated using default γ -value of 0.15

3 Air permeability

Air permeability at 50 pascals: 15.00 (assumed) OK

4 Heating efficiency

Main heating system: Boiler system with radiators or underfloor - Mains gas
Post 98 Combi condens. with auto ign.

SAP default data

Fail

Secondary heating system:

None

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

Space heating controls: Programmer, room thermostat and TRVs OK

Hot water controls:

No cylinder

Boiler interlock

No

Fail

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 (Thames Valley): Slight OK

Based on:

Overshading: Average
Windows facing North: 3.91 m², Overhang width less than twice window, ratio 0.06
Windows facing West: 3.44 m², Overhang width less than twice window, ratio 0.05
Air change rate: 3.00 ach
Blinds/curtains: Light-coloured curtain or roller blind, closed 0% of daylight hours

10 Key features

None

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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	37.1700 (1b)	2.4900 (2b)	92.5533 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	37.1700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	92.5533 (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) =	0.2161 (8)
Pressure test				No	
Measured/design AP50					15.0000
Infiltration rate					0.9661 (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) =		0.8212 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												
Effective ac	1.0470	1.0265	1.0059	0.9033	0.8828	0.7801	0.7801	0.7596	0.8212	0.8828	0.9238	0.9649 (22b)
	1.0470	1.0265	1.0059	0.9080	0.8896	0.8043	0.8043	0.7885	0.8372	0.8896	0.9267	0.9655 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Windows (Uw = 1.60)			7.3500	1.5038	11.0526		(27)
Front door			1.4900	1.8000	2.6820		(26)
Heat Loss Floor 1			37.1700	0.1600	5.9472	110.0000	4088.7000 (28a)
Ext Wall Outside Existing	28.5400	7.3500	21.1900	0.1800	3.8142	150.0000	3178.5000 (29a)
Ext Wall Sheltered Existing	13.0900	1.4900	11.6000	0.2735	3.1730	124.1000	1439.5600 (29a)
Ext Wall Outside New	4.1600		4.1600	0.2800	1.1648	150.0000	624.0000 (29a)
Ext Wall Sheltered New	16.3600		16.3600	0.2499	4.0885	124.1000	2030.2760 (29a)
Total net area of external elements Aum(A, m2)			99.3200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	31.9224		(33)
Party Ceilings 1			37.1700			30.0000	1115.1000 (32b)
Internal Wall 1			8.6600			9.0000	77.9400 (32c)
Internal Wall 2			4.2100			9.0000	37.8900 (32c)
Internal Wall 3			5.2000			9.0000	46.8000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12638.7660 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							340.0260 (35)
Thermal bridges (Default value 0.150 * total exposed area)							14.8980 (36)
Total fabric heat loss						(33) + (36) =	46.8204 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	31.9781	31.3511	30.7241	27.7318	27.1719	24.5652	24.5652	24.0825	25.5692	27.1719	28.3046	29.4889 (38)
Heat transfer coeff	78.7986	78.1715	77.5445	74.5522	73.9923	71.3856	71.3856	70.9029	72.3896	73.9923	75.1250	76.3093 (39)
Average = Sum(39)m / 12 =												74.5458 (39)
HLP	2.1200	2.1031	2.0862	2.0057	1.9906	1.9205	1.9205	1.9075	1.9475	1.9906	2.0211	2.0530 (40)
HLP (average)												2.0055 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												1.3333 (42)
Average daily hot water use (litres/day)												65.8663 (43)
Daily hot water use	72.4530	69.8183	67.1837	64.5490	61.9143	59.2797	59.2797	61.9143	64.5490	67.1837	69.8183	72.4530 (44)
Energy conte	107.4456	93.9727	96.9714	84.5420	81.1200	70.0004	64.8657	74.4343	75.3233	87.7821	95.8210	104.0554 (45)
Energy content (annual)										Total = Sum(45)m =		1036.3338 (45)

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Distribution loss (46)m = 0.15 x (45)m	16.1168	14.0959	14.5457	12.6813	12.1680	10.5001	9.7299	11.1651	11.2985	13.1673	14.3731	15.6083 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	36.9212	32.1356	34.2361	31.8324	31.5509	29.2338	30.2083	31.5509	31.8324	34.2361	34.4309	36.9212 (61)
Total heat required for water heating calculated for each month	144.3669	126.1082	131.2074	116.3744	112.6709	99.2343	95.0740	105.9852	107.1557	122.0181	130.2519	140.9766 (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	144.3669	126.1082	131.2074	116.3744	112.6709	99.2343	95.0740	105.9852	107.1557	122.0181	130.2519	140.9766 (64)
Heat gains from water heating, kWh/month	44.9560	39.2798	40.8020	36.0683	34.8601	30.5836	29.1199	32.6371	33.0031	37.7465	40.4682	43.8287 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1431.4235 (64)												

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	66.6660	66.6660	66.6660	66.6660	66.6660	66.6660	66.6660	66.6660	66.6660	66.6660	66.6660	66.6660 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	10.2912	9.1405	7.4336	5.6277	4.2068	3.5515	3.8375	4.9882	6.6951	8.5010	9.9219	10.5772 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	114.4875	115.6756	112.6818	106.3084	98.2631	90.7017	85.6502	84.4622	87.4559	93.8293	101.8746	109.4360 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	29.6666	29.6666	29.6666	29.6666	29.6666	29.6666	29.6666	29.6666	29.6666	29.6666	29.6666	29.6666 (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)	-53.3328	-53.3328	-53.3328	-53.3328	-53.3328	-53.3328	-53.3328	-53.3328	-53.3328	-53.3328	-53.3328	-53.3328 (71)
Water heating gains (Table 5)	60.4247	58.4521	54.8414	50.0949	46.8550	42.4772	39.1397	43.8671	45.8376	50.7346	56.2058	58.9096 (72)
Total internal gains	231.2032	229.2679	220.9565	208.0307	195.3247	182.7302	174.6272	179.3173	185.9885	199.0648	214.0022	224.9226 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
North	3.9100	10.6334	0.6300	0.7000	0.7700	12.7063 (74)						
West	3.4400	19.6403	0.6300	0.7000	0.7700	20.6480 (80)						
Solar gains	33.3543	64.6743	107.7814	163.2920	208.1767	217.2888	205.1080	170.3298	126.9751	76.8334	41.4205	27.5725 (83)
Total gains	264.5575	293.9422	328.7379	371.3227	403.5013	400.0191	379.7351	349.6470	312.9636	275.8982	255.4227	252.4951 (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	44.5537	44.9111	45.2742	47.0914	47.4478	49.1803	49.1803	49.5152	48.4982	47.4478	46.7323	46.0071
alpha	3.9702	3.9941	4.0183	4.1394	4.1632	4.2787	4.2787	4.3010	4.2332	4.1632	4.1155	4.0671
util living area	0.9986	0.9977	0.9949	0.9849	0.9521	0.8602	0.7268	0.7821	0.9435	0.9910	0.9977	0.9989 (86)
MIT	19.1815	19.3275	19.6156	20.0592	20.4659	20.8001	20.9325	20.9064	20.6392	20.1282	19.6181	19.2045 (87)
Th 2	19.2546	19.2655	19.2765	19.3295	19.3396	19.3868	19.3868	19.3957	19.3685	19.3396	19.3193	19.2982 (88)
util rest of house	0.9979	0.9965	0.9920	0.9749	0.9147	0.7419	0.5077	0.5774	0.8795	0.9833	0.9963	0.9984 (89)
MIT 2	17.6736	17.8273	18.1225	18.6007	18.9948	19.3071	19.3759	19.3770	19.1810	18.6799	18.1578	17.7290 (90)
Living area fraction	fLA = Living area / (4) = 0.8184 (91)											
MIT	18.9077	19.0551	19.3445	19.7944	20.1987	20.5289	20.6498	20.6287	20.3744	19.8652	19.3529	18.9366 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.9077	19.0551	19.3445	19.7944	20.1987	20.5289	20.6498	20.6287	20.3744	19.8652	19.3529	18.9366 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9978	0.9963	0.9922	0.9783	0.9371	0.8327	0.6872	0.7443	0.9251	0.9864	0.9963	0.9982 (94)
Ext temp.	263.9631	292.8574	326.1670	363.2834	378.1361	333.0957	260.9383	260.2510	289.5119	272.1361	254.4778	252.0447 (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	1151.0657	1106.5224	996.0173	812.1994	628.8410	423.2414	289.0969	299.8257	454.1994	685.5514	920.5002	1124.5374 (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	660.0043	546.7829	498.3686	323.2195	186.5244	0.0000	0.0000	0.0000	0.0000	307.5810	479.5361	649.1346 (98)
(98) / (4) = 98.2284 (99)												

8c. Space cooling requirement

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Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													79.0000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													4621.7106 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	660.0043	546.7829	498.3686	323.2195	186.5244	0.0000	0.0000	0.0000	0.0000	307.5810	479.5361	649.1346	(98)
Space heating efficiency (main heating system 1)	79.0000	79.0000	79.0000	79.0000	79.0000	0.0000	0.0000	0.0000	0.0000	79.0000	79.0000	79.0000	(210)
Space heating fuel (main heating system)	835.4485	692.1303	630.8463	409.1386	236.1069	0.0000	0.0000	0.0000	0.0000	389.3430	607.0077	821.6893	(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	144.3669	126.1082	131.2074	116.3744	112.6709	99.2343	95.0740	105.9852	107.1557	122.0181	130.2519	140.9766	(64)
Efficiency of water heater (217)m	82.2290	82.1524	81.9505	81.4137	80.3682	75.0000	75.0000	75.0000	75.0000	81.2314	81.9007	82.2392	(216)
Fuel for water heating, kWh/month	175.5669	153.5051	160.1056	142.9420	140.1934	132.3123	126.7653	141.3136	142.8743	150.2106	159.0364	171.4227	(219)
Water heating fuel used													(219)
Annual totals kWh/year													
Space heating fuel - main system													4621.7106 (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)													181.7450 (232)
Total delivered energy for all uses													6674.7039 (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	4621.7106	0.2160	998.2895 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1796.2483	0.2160	387.9896 (264)
Space and water heating			1386.2791 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	181.7450	0.5190	94.3257 (268)
Total CO2, kg/year			1519.5298 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			40.8800 (273)

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

DER			40.8800 ZC1
Total Floor Area		TFA	37.1700
Assumed number of occupants		N	1.3333
CO2 emission factor in Table 12 for electricity displaced from grid		EF	0.5190
CO2 emissions from appliances, equation (L14)			18.2521 ZC2
CO2 emissions from cooking, equation (L16)			4.0624 ZC3
Total CO2 emissions			63.1945 ZC4
Residual CO2 emissions offset from biofuel CHP			0.0000 ZC5
Additional allowable electricity generation, kWh/m ² /year			0.0000 ZC6
Resulting CO2 emissions offset from additional allowable electricity generation			0.0000 ZC7
Net CO2 emissions			63.1945 ZC8

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CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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CALCULATION OF TARGET EMISSIONS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	37.1700 (1b)	2.4900 (2b)	92.5533 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	37.1700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	92.5533 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				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) =	0.2161 (8)
Pressure test				Yes	
Measured/design AP50					5.0000
Infiltration rate					0.4661 (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) =	0.3962 (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	0.5051	0.4952	0.4853	0.4358	0.4259	0.3764	0.3764	0.3665	0.3962	0.4259	0.4457	0.4655 (22b)
	0.6276	0.6226	0.6178	0.5950	0.5907	0.5708	0.5708	0.5671	0.5785	0.5907	0.5993	0.6083 (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			1.4900	1.0000	1.4900		(26)
TER Opening Type (Uw = 1.40)			7.3500	1.3258	9.7443		(27)
Heat Loss Floor 1			37.1700	0.1300	4.8321		(28a)
Ext Wall Outside Existing	28.5400	7.3500	21.1900	0.1800	3.8142		(29a)
Ext Wall Sheltered Existing	13.0900	1.4900	11.6000	0.1800	2.0880		(29a)
Ext Wall Outside New	4.1600		4.1600	0.1800	0.7488		(29a)
Ext Wall Sheltered New	16.3600		16.3600	0.1800	2.9448		(29a)
Total net area of external elements Aum(A, m ²)			99.3200				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	25.6622	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							4.9660 (36)
Total fabric heat loss							(33) + (36) = 30.6282 (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	19.1678	19.0165	18.8682	18.1716	18.0413	17.4345	17.4345	17.3222	17.6682	18.0413	18.3049	18.5806 (38)
Heat transfer coeff	49.7960	49.6447	49.4964	48.7998	48.6695	48.0627	48.0627	47.9504	48.2964	48.6695	48.9331	49.2088 (39)
Average = Sum(39)m / 12 =												48.7992 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.3397	1.3356	1.3316	1.3129	1.3094	1.2931	1.2931	1.2900	1.2993	1.3094	1.3165	1.3239 (40)
HLP (average)												1.3129 (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												1.3333 (42)
Average daily hot water use (litres/day)												65.8663 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	72.4530	69.8183	67.1837	64.5490	61.9143	59.2797	59.2797	61.9143	64.5490	67.1837	69.8183	72.4530 (44)
Energy conte	107.4456	93.9727	96.9714	84.5420	81.1200	70.0004	64.8657	74.4343	75.3233	87.7821	95.8210	104.0554 (45)
Energy content (annual)												Total = Sum(45)m = 1036.3338 (45)
Distribution loss (46)m = 0.15 x (45)m	16.1168	14.0959	14.5457	12.6813	12.1680	10.5001	9.7299	11.1651	11.2985	13.1673	14.3731	15.6083 (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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
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 %)													88.4000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2365.8786 (211)
Space heating requirement	389.7536	316.3962	276.6324	168.1521	83.5905	0.0000	0.0000	0.0000	0.0000	174.3730	288.0026	394.5363	(98)
Space heating efficiency (main heating system 1)	88.4000	88.4000	88.4000	88.4000	88.4000	0.0000	0.0000	0.0000	0.0000	88.4000	88.4000	88.4000	(210)
Space heating fuel (main heating system)	440.8977	357.9143	312.9326	190.2173	94.5594	0.0000	0.0000	0.0000	0.0000	197.2546	325.7948	446.3080	(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	144.3669	126.1082	131.2074	116.3744	112.6709	99.2343	95.0740	105.9852	107.1557	122.0181	130.2519	140.9766	(64)
Efficiency of water heater (217)m	87.4278	87.2717	86.8843	85.9769	84.3120	80.3000	80.3000	80.3000	80.3000	85.9495	86.9925	87.5026	(217)
Fuel for water heating, kWh/month	165.1270	144.5006	151.0140	135.3553	133.6356	123.5794	118.3985	131.9865	133.4442	141.9649	149.7277	161.1113	(219)
Water heating fuel used													1689.8451 (219)
Annual totals kWh/year													
Space heating fuel - main system													2365.8786 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
central heating pump													39.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													84.0000 (231)
Electricity for lighting (calculated in Appendix L)													181.7450 (232)
Total delivered energy for all uses													4321.4687 (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	2365.8786	0.2160	511.0298 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1689.8451	0.2160	365.0065 (264)
Space and water heating			876.0363 (265)
Pumps and fans	84.0000	0.5190	43.5960 (267)
Energy for lighting	181.7450	0.5190	94.3257 (268)
Total CO2, kg/m2/year			1013.9580 (272)
Emissions per m2 for space and water heating			23.5684 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.5377 (272b)
Emissions per m2 for pumps and fans			1.1729 (272c)
Target Carbon Dioxide Emission Rate (TER) = (23.5684 * 1.00) + 2.5377 + 1.1729, rounded to 2 d.p.			27.2800 (273)