

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Energy Calculations Ltd
SAP • CODE • SBEM • DESIGN

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	98.5000 (1b)	x 2.5000 (2b)	= 246.2500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	98.5000		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 246.2500 (5)
Dwelling volume			

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					30.0000 / (5) = 0.1218 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3718 (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) =	0.3161 (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	0.4030	0.3951	0.3872	0.3477	0.3398	0.3003	0.3003	0.2923	0.3161	0.3398	0.3556	0.3714 (22b)
Effective ac	0.5812	0.5780	0.5749	0.5604	0.5577	0.5451	0.5451	0.5427	0.5499	0.5577	0.5632	0.5690 (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			1.8000	1.0000	1.8000		(26)					
TER Opening Type (Uw = 1.40)			20.8400	1.3258	27.6288		(27)					
Floor			98.5000	0.1300	12.8050		(28a)					
Main Wall	94.6000	20.8400	73.7600	0.1800	13.2768		(29a)					
Wall to Stairs	44.4000	1.8000	42.6000	0.1800	7.6680		(29a)					
Total net area of external elements Sum(A, m2)			237.5000				(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	63.1786		(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							11.7115 (36)					
Total fabric heat loss						(33) + (36) =	74.8901 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	47.2291	46.9729	46.7218	45.5422	45.3215	44.2942	44.2942	44.1039	44.6899	45.3215	45.7680	46.2347 (38)
Average = Sum(39)m / 12 =	122.1192	121.8630	121.6118	120.4323	120.2116	119.1843	119.1843	118.9940	119.5800	120.2116	120.6581	121.1248 (39)
												120.4312 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2398	1.2372	1.2346	1.2227	1.2204	1.2100	1.2100	1.2081	1.2140	1.2204	1.2250	1.2297 (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												2.7252 (42)
Average daily hot water use (litres/day)												98.9235 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	108.8158	104.8589	100.9020	96.9450	92.9881	89.0311	89.0311	92.9881	96.9450	100.9020	104.8589	108.8158 (44)
Energy content (annual)	161.3707	141.1359	145.6396	126.9721	121.8328	105.1324	97.4206	111.7916	113.1268	131.8383	143.9118	156.2789 (45)
Distribution loss (46)m = 0.15 x (45)m	Total = Sum(45)m =											1556.4516 (45)
	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)

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

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	34.2913	29.9914	30.9484	26.9816	25.8895	22.3406	20.7019	23.7557	24.0394	28.0156	30.5813	33.2093 (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	136.2600	136.2600	136.2600	136.2600	136.2600	136.2600	136.2600	136.2600	136.2600	136.2600	136.2600	136.2600 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.6842	20.1479	16.3854	12.4048	9.2727	7.8284	8.4589	10.9952	14.7577	18.7383	21.8704	23.3147 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	253.8797	256.5142	249.8754	235.7422	217.9016	201.1339	189.9320	187.2975	193.9363	208.0696	225.9102	242.6779 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.6260	36.6260	36.6260	36.6260	36.6260	36.6260	36.6260	36.6260	36.6260	36.6260	36.6260	36.6260 (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)	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080 (71)
Water heating gains (Table 5)	46.0904	44.6300	41.5973	37.4744	34.7977	31.0287	27.8251	31.9297	33.3881	37.6554	42.4740	44.6361 (72)
Total internal gains	386.5324	385.1702	371.7362	349.4994	325.8500	303.8690	290.0940	294.1005	305.9602	328.3413	354.1326	374.5067 (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			10.2900		10.6334		0.6300		0.7000		0.7700		33.4394 (74)
South			8.3200		46.7521		0.6300		0.7000		0.7700		118.8765 (78)
West			2.2300		19.6403		0.6300		0.7000		0.7700		13.3852 (80)
Solar gains	165.7011	284.7778	399.7104	517.6058	604.1201	611.5241	584.5973	517.5539	439.7765	317.1302	198.8508	141.6043	(83)
Total gains	552.2335	669.9480	771.4465	867.1052	929.9701	915.3931	874.6913	811.6544	745.7367	645.4715	552.9834	516.1110	(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	56.0131	56.1309	56.2468	56.7977	56.9020	57.3925	57.3925	57.4842	57.2025	56.9020	56.6914	56.4730
alpha	4.7342	4.7421	4.7498	4.7865	4.7935	4.8262	4.8262	4.8323	4.8135	4.7935	4.7794	4.7649
util living area	0.9985	0.9960	0.9888	0.9645	0.8939	0.7453	0.5781	0.6380	0.8670	0.9792	0.9967	0.9989 (86)
MIT	19.6041	19.7848	20.0605	20.4157	20.7302	20.9240	20.9823	20.9721	20.8317	20.4181	19.9409	19.5721 (87)
Th 2	19.8883	19.8904	19.8924	19.9019	19.9037	19.9120	19.9120	19.9136	19.9088	19.9037	19.9001	19.8963 (88)
util rest of house	0.9980	0.9945	0.9847	0.9503	0.8507	0.6509	0.4459	0.5048	0.7973	0.9684	0.9952	0.9985 (89)
MIT 2	18.6195	18.8012	19.0764	19.4305	19.7201	19.8768	19.9076	19.9056	19.8145	19.4393	18.9650	18.5939 (90)
Living area fraction	18.9663	19.1477	19.4231	19.7776	20.0759	20.2457	20.2862	20.2814	20.1729	19.7841	19.3088	18.9385 (92)
Temperature adjustment	18.9663	19.1477	19.4231	19.7776	20.0759	20.2457	20.2862	20.2814	20.1729	19.7841	19.3088	18.9385 (93)
adjusted MIT	18.9663	19.1477	19.4231	19.7776	20.0759	20.2457	20.2862	20.2814	20.1729	19.7841	19.3088	18.9385 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9974	0.9933	0.9824	0.9483	0.8585	0.6822	0.4931	0.5523	0.8168	0.9668	0.9942	0.9981 (94)
Ext temp.	550.7766	665.4299	757.8444	822.3146	798.4161	624.4642	431.3124	448.2987	609.1261	624.0556	549.7763	515.1181 (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	1791.0414	1736.2669	1571.5961	1310.0117	1006.8842	672.8831	439.3369	461.8575	726.1951	1104.0327	1473.0903	1785.1951 (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	922.7570	719.6024	605.4312	351.1419	155.1002	0.0000	0.0000	0.0000	0.0000	357.1029	664.7861	944.9373 (98)
Space heating per m2												4720.8591 (98)
												47.9275 (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	1120.3321	881.9635	904.3545	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8472	0.9118	0.8848	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	949.1402	804.1474	800.1990	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1174.1484	1124.3289	1052.4799	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	162.0059	238.2150	187.6970	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												587.9179 (104)
Cooled fraction												1.0000 (105)

FC = cooled area / (4) =

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SAP • CODE • SBEM • DESIGN

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Intermittency factor (Table 10b)	0.0000	0.0000	0.0000	0.0000	0.2500	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	40.5015	59.5538	46.9242	0.0000	0.0000	0.0000 (107)
Space cooling	0.0000	0.0000	0.0000	0.0000	0.0000	40.5015	59.5538	46.9242	0.0000	0.0000	146.9795 (107)
Space cooling per m2											1.4922 (108)
Energy for space heating											47.9275 (99)
Energy for space cooling											1.4922 (108)
Total											49.4197 (109)
Target Fabric Energy Efficiency (TFEE)											56.8 (109)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Energy Calculations Ltd
SAP • CODE • DESIGN • BUILD

CALCULATION OF HEAT DEMAND 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	98.5000	x 2.5000 (2b)	= 246.2500 (1b) - (3b)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 246.2500 (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				0 * 10 =	0.0000 (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) =	0.0000 / (5) =	Air changes per hour
Pressure test		Yes
Measured/design AP50		3.0000
Infiltration rate		0.1500 (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) =	0.1275 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000 (22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500 (22a)
Adj infilt rate	0.1339	0.1275	0.1275	0.1179	0.1179	0.1052	0.1084	0.1020	0.1052	0.1116	0.1116	0.1211 (22b)
Balanced mechanical ventilation with heat recovery												0.5000 (23a)
If mechanical ventilation:												75.6500 (23c)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												
Effective ac	0.2556	0.2493	0.2493	0.2397	0.2397	0.2269	0.2301	0.2238	0.2269	0.2333	0.2333	0.2429 (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
Door			1.8000	1.0000	1.8000		(26)
Windows (Uw = 1.00)			20.8400	0.9615	20.0385		(27)
Floor			98.5000	0.1000	9.8500	110.0000	10835.0000 (28a)
Main Wall	94.6000	20.8400	73.7600	0.1600	11.8016	60.0000	4425.6000 (29a)
Wall to Stairs	44.4000	1.8000	42.6000	0.2041	8.6939	190.0000	8094.0000 (29a)
Total net area of external elements Aum (A, m ²)			237.5000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	52.1839	(33)
Party Ceilings 1			98.5000			40.0000	3940.0000 (32b)
Internal Wall 1			103.8000			9.0000	934.2000 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		28228.8000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							286.5868 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.7991 (36)
Total fabric heat loss					(33) + (36) =		56.9830 (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	20.7727	20.2547	20.2547	19.4776	19.4776	18.4415	18.7005	18.1825	18.4415	18.9596	18.9596	19.7366 (38)
Heat transfer coeff	77.7558	77.2377	77.2377	76.4606	76.4606	75.4245	75.6936	75.1655	75.4245	75.9426	75.9426	76.7197 (39)
Average = Sum(39)m / 12 =												76.2880 (39)
HLP	0.7894	0.7841	0.7841	0.7763	0.7763	0.7657	0.7684	0.7631	0.7657	0.7710	0.7710	0.7789 (40)
HLP (average)												0.7745 (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												2.7252 (42)
Average daily hot water use (litres/day)												98.9235 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	108.8158	104.8589	100.9020	96.9450	92.9881	89.0311	89.0311	92.9881	96.9450	100.9020	104.8589	108.8158 (44)
Energy conte	161.3707	141.1359	145.6396	126.9721	121.8328	105.1324	97.4206	111.7916	113.1268	131.8383	143.9118	156.2789 (45)
Energy content (annual)										Total = Sum(45)m =		1556.4516 (45)

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CALCULATION OF HEAT DEMAND 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	24.2056	21.1704	21.8459	19.0458	18.2749	15.7699	14.6131	16.7687	16.9690	19.7757	21.5868	23.4418 (46)
Water storage loss:												
Store volume												210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.5000 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8100 (55)
Total storage loss	25.1100	22.6800	25.1100	24.3000	25.1100	24.3000	25.1100	25.1100	24.3000	25.1100	24.3000	25.1100 (56)
If cylinder contains dedicated solar storage	25.1100	22.6800	25.1100	24.3000	25.1100	24.3000	25.1100	25.1100	24.3000	25.1100	24.3000	25.1100 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	209.7431	184.8271	194.0120	173.7841	170.2052	151.9444	145.7930	160.1640	159.9388	180.2107	190.7238	204.6513 (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	209.7431	184.8271	194.0120	173.7841	170.2052	151.9444	145.7930	160.1640	159.9388	180.2107	190.7238	204.6513 (64)
Total per year (kWh/year) = Sum(64)m =												2125.9976 (64)
RHI water heating demand												2126 (64)
Heat gains from water heating, kWh/month	92.3537	81.8806	87.1231	79.6678	79.2073	72.4061	71.0903	75.8686	75.0642	82.5342	85.3003	90.6607 (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	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	56.7106	50.3699	40.9635	31.0120	23.1819	19.5711	21.1473	27.4880	36.8943	46.8458	54.6760	58.2868 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	378.9250	382.8570	372.9484	351.8540	325.2262	300.1998	283.4806	279.5486	289.4572	310.5516	337.1794	362.2058 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764 (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)	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080 (71)
Water heating gains (Table 5)	124.1313	121.8462	117.1009	110.6498	106.4614	100.5641	95.5515	101.9740	104.2559	110.9330	118.4726	121.8557 (72)
Total internal gains	668.3473	663.6535	639.5932	602.0962	563.4499	528.9154	508.7597	517.5909	539.1879	576.9108	618.9084	650.9287 (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				10.2900	11.9814	0.2500	0.7000	0.7700	14.9519 (74)				
South				8.3200	50.9848	0.2500	0.7000	0.7700	51.4441 (78)				
West				2.2300	22.3313	0.2500	0.7000	0.7700	6.0394 (80)				
Solar gains	72.4353	112.1788		156.2335	210.0144	240.1445	260.7000	246.3083	222.0370	186.8363	133.5568	89.0782	61.2936 (83)
Total gains	740.7826	775.8323		795.8267	812.1106	803.5944	789.6154	755.0681	739.6279	726.0241	710.4677	707.9866	712.2223 (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	100.8457	101.5221	101.5221	102.5538	102.5538	103.9626	103.6068	104.3209	103.9626	103.2534	103.2534	102.2076
alpha	7.7230	7.7681	7.7681	7.8369	7.8369	7.9308	7.9071	7.9547	7.9308	7.8836	7.8836	7.8138
util living area	0.9922	0.9871	0.9692	0.9054	0.7377	0.4769	0.3107	0.3252	0.5982	0.8895	0.9783	0.9937 (86)
Tweekday	19.6695	19.7740	19.9597	20.1651	20.2607	20.2829	20.2808	20.2854	20.2816	20.2063	19.9506	19.6617
Tweekend	20.7057	20.7511	20.8360	20.9333	20.9889	20.9997	21.0000	21.0000	20.9981	20.9518	20.8265	20.6988
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	0	0	0	0	0	0	0	0	0	0	0	0
16 / 9	0	0	0	0	0	0	0	0	0	0	0	0
MIT	20.5458	20.6150	20.7469	20.8958	20.9828	20.9995	21.0000	21.0000	20.9971	20.9256	20.7291	20.5352 (87)
Th 2	20.2625	20.2671	20.2671	20.2740	20.2740	20.2831	20.2808	20.2854	20.2831	20.2785	20.2785	20.2717 (88)
util rest of house	0.9895	0.9827	0.9586	0.8761	0.6797	0.4089	0.2386	0.2526	0.5265	0.8514	0.9699	0.9915 (89)
Tweekday	19.6695	19.7740	19.9597	20.1651	20.2607	20.2829	20.2808	20.2854	20.2816	20.2063	19.9506	19.6617
Tweekend	19.6695	19.7740	19.9597	20.1651	20.2607	20.2829	20.2808	20.2854	20.2816	20.2063	19.9506	19.6617
MIT 2	19.6695	19.7740	19.9597	20.1651	20.2607	20.2829	20.2808	20.2854	20.2816	20.2063	19.9506	19.6617 (90)
Living area fraction									fLA = Living area / (4) =			0.3523 (91)
MIT	19.9782	20.0703	20.2370	20.4225	20.5151	20.5354	20.5342	20.5371	20.5337	20.4597	20.2249	19.9694 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9782	20.0703	20.2370	20.4225	20.5151	20.5354	20.5342	20.5371	20.5337	20.4597	20.2249	19.9694 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9883	0.9813	0.9581	0.8827	0.6995	0.4329	0.2640	0.2782	0.5518	0.8618	0.9692	0.9904 (94)
Ext temp.	732.0839	761.3189	762.5085	716.8096	562.1463	341.8221	199.3603	205.7337	400.6196	612.2979	686.1820	705.3721 (95)
	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000 (96)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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CALCULATION OF HEAT DEMAND 09 Jan 2014

Heat loss rate W	1156.8653	1117.6501	991.5033	804.5557	574.6085	342.0771	199.3642	205.7393	402.2885	672.8256	928.3888	1140.7792 (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	316.0373	239.4546	170.3722	63.1772	9.2719	0.0000	0.0000	0.0000	0.0000	45.0327	174.3888	323.9429 (98)
Space heating												1341.6775 (98)
RHI space heating demand												1342 (98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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CALCULATION OF ENERGY RATINGS 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)	
Ground floor	98.5000 (1b)	x 2.5000 (2b)	= 246.2500 (1b) - (3b)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	98.5000		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	246.2500 (5)
Dwelling volume				

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				0 * 10 =	0.0000 (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) =	0.0000 / (5) =	Air changes per hour	0.0000 (8)
Pressure test			Yes	
Measured/design AP50			3.0000	
Infiltration rate			0.1500 (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) =	0.1275 (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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												0.5000 (23a)
If mechanical ventilation:												75.6500 (23c)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												
Effective ac	0.2843	0.2811	0.2779	0.2620	0.2588	0.2429	0.2429	0.2397	0.2493	0.2588	0.2652	0.2716 (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
Door			1.8000	1.0000	1.8000		(26)
Windows (Uw = 1.00)			20.8400	0.9615	20.0385		(27)
Floor			98.5000	0.1000	9.8500	110.0000	10835.0000 (28a)
Main Wall	94.6000	20.8400	73.7600	0.1600	11.8016	60.0000	4425.6000 (29a)
Wall to Stairs	44.4000	1.8000	42.6000	0.2041	8.6939	190.0000	8094.0000 (29a)
Total net area of external elements Aum (A, m ²)			237.5000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	52.1839		(33)
Party Ceilings 1			98.5000			40.0000	3940.0000 (32b)
Internal Wall 1			103.8000			9.0000	934.2000 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		28228.8000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							286.5868 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.7991 (36)
Total fabric heat loss						(33) + (36) =	56.9830 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	23.1039	22.8449	22.5859	21.2908	21.0318	19.7366	19.7366	19.4776	20.2547	21.0318	21.5498	22.0678 (38)
Average = Sum(39)m / 12 =	80.0870	79.8280	79.5689	78.2738	78.0148	76.7197	76.7197	76.4606	77.2377	78.0148	78.5328	79.0509 (39)
												78.2091 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.8131	0.8104	0.8078	0.7947	0.7920	0.7789	0.7789	0.7763	0.7841	0.7920	0.7973	0.8025 (40)
Days in month												0.7940 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.7252 (42)
Average daily hot water use (litres/day)												98.9235 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	108.8158	104.8589	100.9020	96.9450	92.9881	89.0311	89.0311	92.9881	96.9450	100.9020	104.8589	108.8158 (44)
Energy content (annual)	161.3707	141.1359	145.6396	126.9721	121.8328	105.1324	97.4206	111.7916	113.1268	131.8383	143.9118	156.2789 (45)
										Total = Sum(45)m =		1556.4516 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	24.2056	21.1704	21.8459	19.0458	18.2749	15.7699	14.6131	16.7687	16.9690	19.7757	21.5868	23.4418 (46)
Water storage loss:												
Store volume												210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.5000 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8100 (55)
Total storage loss	25.1100	22.6800	25.1100	24.3000	25.1100	24.3000	25.1100	25.1100	24.3000	25.1100	24.3000	25.1100 (56)
If cylinder contains dedicated solar storage	25.1100	22.6800	25.1100	24.3000	25.1100	24.3000	25.1100	25.1100	24.3000	25.1100	24.3000	25.1100 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	209.7431	184.8271	194.0120	173.7841	170.2052	151.9444	145.7930	160.1640	159.9388	180.2107	190.7238	204.6513 (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	209.7431	184.8271	194.0120	173.7841	170.2052	151.9444	145.7930	160.1640	159.9388	180.2107	190.7238	204.6513 (64)
Total per year (kWh/year) = Sum(64)m =												2125.9976 (64)
Heat gains from water heating, kWh/month	92.3537	81.8806	87.1231	79.6678	79.2073	72.4061	71.0903	75.8686	75.0642	82.5342	85.3003	90.6607 (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	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	56.7106	50.3699	40.9635	31.0120	23.1819	19.5711	21.1473	27.4880	36.8943	46.8458	54.6760	58.2868 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	378.9250	382.8570	372.9484	351.8540	325.2262	300.1998	283.4806	279.5486	289.4572	310.5516	337.1794	362.2058 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764 (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)	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080 (71)
Water heating gains (Table 5)	124.1313	121.8462	117.1009	110.6498	106.4614	100.5641	95.5515	101.9740	104.2559	110.9330	118.4726	121.8557 (72)
Total internal gains	668.3473	663.6535	639.5932	602.0962	563.4499	528.9154	508.7597	517.5909	539.1879	576.9108	618.9084	650.9287 (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			10.2900	10.6334	0.2500	0.7000	0.7700	13.2696 (74)				
South			8.3200	46.7521	0.2500	0.7000	0.7700	47.1732 (78)				
West			2.2300	19.6403	0.2500	0.7000	0.7700	5.3116 (80)				
Solar gains	65.7544	113.0071	158.6152	205.3991	239.7302	231.9830	205.3785	174.5145	125.8453	78.9090	56.1922 (83)	
Total gains	734.1017	776.6605	798.2084	807.4954	803.1801	771.5837	740.7428	722.9695	713.7023	702.7561	697.8175	707.1209 (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	97.9102	98.2279	98.5477	100.1782	100.5109	102.2076	102.2076	102.5538	101.5221	100.5109	99.8478	99.1935
alpha	7.5273	7.5485	7.5698	7.6785	7.7007	7.8138	7.8138	7.8369	7.7681	7.7007	7.6565	7.6129
util living area	0.9950	0.9910	0.9802	0.9422	0.8353	0.6295	0.4552	0.4856	0.7255	0.9380	0.9880	0.9961 (86)
Tweekday	19.5168	19.6380	19.8265	20.0666	20.2151	20.2688	20.2716	20.2737	20.2577	20.1118	19.7949	19.5009
Tweekend	20.6451	20.6985	20.7827	20.8907	20.9680	20.9969	20.9998	20.9996	20.9911	20.9107	20.7643	20.6347
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	0	0	0	0	0	0	0	0	0	0	0	0
16 / 9	0	0	0	0	0	0	0	0	0	0	0	0
MIT	20.4523	20.5336	20.6646	20.8294	20.9506	20.9952	20.9996	20.9994	20.9861	20.8622	20.6319	20.4363 (87)
Th 2	20.2420	20.2443	20.2466	20.2580	20.2602	20.2717	20.2717	20.2740	20.2671	20.2602	20.2557	20.2511 (88)
util rest of house	0.9933	0.9880	0.9733	0.9226	0.7892	0.5611	0.3802	0.4095	0.6575	0.9135	0.9834	0.9948 (89)
Tweekday	19.5168	19.6380	19.8265	20.0666	20.2151	20.2688	20.2716	20.2737	20.2577	20.1118	19.7949	19.5009
Tweekend	19.5168	19.6380	19.8265	20.0666	20.2151	20.2688	20.2716	20.2737	20.2577	20.1118	19.7949	19.5009
MIT 2	19.5168	19.6380	19.8265	20.0666	20.2151	20.2688	20.2716	20.2737	20.2577	20.1118	19.7949	19.5009 (90)
Living area fraction								fLA = Living area / (4) =				0.3523 (91)
MIT	19.8464	19.9535	20.1217	20.3353	20.4742	20.5247	20.5280	20.5294	20.5143	20.3761	20.0897	19.8304 (92)
Temperature adjustment												0.0000
adjusted MIT	19.8464	19.9535	20.1217	20.3353	20.4742	20.5247	20.5280	20.5294	20.5143	20.3761	20.0897	19.8304 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9922	0.9866	0.9720	0.9249	0.8033	0.5852	0.4066	0.4363	0.6812	0.9179	0.9821	0.9938 (94)
Ext temp.	728.3903	766.2257	775.8197	746.8471	645.2051	451.5217	301.1998	315.4664	486.1592	645.0273	685.3075	702.7661 (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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Month fracti	1245.0620	1201.6890	1083.8672	895.0845	684.5142	454.5397	301.3584	315.7360	495.4272	762.6842	1020.1217	1235.5957 (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	384.4038	292.6314	229.1874	106.7309	29.2460	0.0000	0.0000	0.0000	0.0000	87.5367	241.0662	396.4252 (98)
Space heating per m2										(98) / (4) =		17.9414 (99)

8c. Space cooling requirement

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 %)												210.8659 (206)
Efficiency of secondary/supplementary heating system, %												100.0000 (208)
Space heating requirement												838.0814 (211)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	384.4038	292.6314	229.1874	106.7309	29.2460	0.0000	0.0000	0.0000	0.0000	87.5367	241.0662	396.4252 (98)
Space heating efficiency (main heating system 1)	210.8659	210.8659	210.8659	210.8659	210.8659	0.0000	0.0000	0.0000	0.0000	210.8659	210.8659	210.8659 (210)
Space heating fuel (main heating system)	182.2978	138.7761	108.6887	50.6156	13.8695	0.0000	0.0000	0.0000	0.0000	41.5130	114.3221	187.9988 (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	209.7431	184.8271	194.0120	173.7841	170.2052	151.9444	145.7930	160.1640	159.9388	180.2107	190.7238	204.6513 (64)
Efficiency of water heater (217)m	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800 (216)
Fuel for water heating, kWh/month	77.6309	68.4089	71.8084	64.3216	62.9970	56.2382	53.9614	59.2805	59.1971	66.7002	70.5914	75.7463 (219)
Water heating fuel used												786.8819 (219)
Annual totals kWh/year												838.0814 (211)
Space heating fuel - main system												0.0000 (215)
Space heating fuel - secondary												
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.5875)												176.4997 (230a)
mechanical ventilation fans (SFP = 0.5875)												176.4997 (231)
Total electricity for the above, kWh/year												400.6109 (232)
Electricity for lighting (calculated in Appendix L)												
Energy saving/generation technologies (Appendices M ,N and Q)												2202.0739 (238)
Total delivered energy for all uses												

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	838.0814	13.1900	110.5429 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	786.8819	13.1900	103.7897 (247)
Mechanical ventilation fans	176.4997	13.1900	23.2803 (249)
Pumps and fans for heating	0.0000	0.0000	0.0000 (249)
Energy for lighting	400.6109	13.1900	52.8406 (250)
Additional standing charges			0.0000 (251)
Energy saving/generation technologies			
PV Unit	0.0000	13.1900	0.0000 (252)
Total energy cost			290.4535 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):			0.4200 (256)
Energy cost factor (ECF)		[(255) x (256)] / [(4) + 45.0] =	0.8501 (257)
SAP value			88.1410
SAP rating (Section 12)			88 (258)
SAP band			B

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	838.0814	0.5190	434.9643 (261)
Space heating - secondary	0.0000	0.5190	0.0000 (263)
Water heating (other fuel)	786.8819	0.5190	408.3917 (264)
Space and water heating			843.3560 (265)
Pumps and fans	176.4997	0.5190	91.6033 (267)
Energy for lighting	400.6109	0.5190	207.9170 (268)
Energy saving/generation technologies			
PV Unit	-1761.0000	0.5190	-913.9590 (269)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Energy Calculations Ltd
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CALCULATION OF ENERGY RATINGS 09 Jan 2014

Total kg/year	228.9173 (272)
CO2 emissions per m2	2.3200 (273)
EI value	97.8624
EI rating	98 (274)
EI band	A

----- Calculation of stars for heating and DHW

Main heating energy efficiency	$13.19 \times (1 + 0.29 \times 0.00) / 2.1087 = 6.255$, stars = 3
Main heating environmental impact	$0.519 \times (1 + 0.29 \times 0.00) / 2.1087 = 0.2461$, stars = 4
Water heating energy efficiency	$13.19 / 2.7018 = 4.882$, stars = 4
Water heating environmental impact	$0.519 / 2.7018 = 0.1921$, stars = 5

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	98.5000 (1b)	x 2.5000 (2b)	= 246.2500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	98.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 246.2500 (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				0 * 10 =	0.0000 (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) =	0.0000 / (5) =	0.0000 (8)
Pressure test			Yes
Measured/design AP50			3.0000
Infiltration rate			0.1500 (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) =		0.1275 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000 (22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500 (22a)
Adj infilt rate	0.1339	0.1275	0.1275	0.1179	0.1179	0.1052	0.1084	0.1020	0.1052	0.1116	0.1116	0.1211 (22b)
Balanced mechanical ventilation with heat recovery												0.5000 (23a)
If mechanical ventilation:												75.6500 (23c)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												
Effective ac	0.2556	0.2493	0.2493	0.2397	0.2397	0.2269	0.2301	0.2238	0.2269	0.2333	0.2333	0.2429 (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
Door			1.8000	1.0000	1.8000		(26)
Windows (Uw = 1.00)			20.8400	0.9615	20.0385		(27)
Floor			98.5000	0.1000	9.8500	110.0000	10835.0000 (28a)
Main Wall	94.6000	20.8400	73.7600	0.1600	11.8016	60.0000	4425.6000 (29a)
Wall to Stairs	44.4000	1.8000	42.6000	0.2041	8.6939	190.0000	8094.0000 (29a)
Total net area of external elements Aum (A, m ²)			237.5000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	52.1839		(33)
Party Ceilings 1			98.5000			40.0000	3940.0000 (32b)
Internal Wall 1			103.8000			9.0000	934.2000 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		28228.8000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							286.5868 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.7991 (36)
Total fabric heat loss					(33) + (36) =		56.9830 (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	20.7727	20.2547	20.2547	19.4776	19.4776	18.4415	18.7005	18.1825	18.4415	18.9596	18.9596	19.7366 (38)
Heat transfer coeff	77.7558	77.2377	77.2377	76.4606	76.4606	75.4245	75.6936	75.1655	75.4245	75.9426	75.9426	76.7197 (39)
Average = Sum(39)m / 12 =												76.2880 (39)
HLP	0.7894	0.7841	0.7841	0.7763	0.7763	0.7657	0.7684	0.7631	0.7657	0.7710	0.7710	0.7789 (40)
HLP (average)												0.7745 (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												2.7252 (42)
Average daily hot water use (litres/day)												98.9235 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	108.8158	104.8589	100.9020	96.9450	92.9881	89.0311	89.0311	92.9881	96.9450	100.9020	104.8589	108.8158 (44)
Energy conte	161.3707	141.1359	145.6396	126.9721	121.8328	105.1324	97.4206	111.7916	113.1268	131.8383	143.9118	156.2789 (45)
Energy content (annual)										Total = Sum(45)m =		1556.4516 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

Distribution loss (46)m = 0.15 x (45)m	24.2056	21.1704	21.8459	19.0458	18.2749	15.7699	14.6131	16.7687	16.9690	19.7757	21.5868	23.4418 (46)
Water storage loss:												
Store volume												210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.5000 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8100 (55)
Total storage loss	25.1100	22.6800	25.1100	24.3000	25.1100	24.3000	25.1100	25.1100	24.3000	25.1100	24.3000	25.1100 (56)
If cylinder contains dedicated solar storage	25.1100	22.6800	25.1100	24.3000	25.1100	24.3000	25.1100	25.1100	24.3000	25.1100	24.3000	25.1100 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	209.7431	184.8271	194.0120	173.7841	170.2052	151.9444	145.7930	160.1640	159.9388	180.2107	190.7238	204.6513 (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	209.7431	184.8271	194.0120	173.7841	170.2052	151.9444	145.7930	160.1640	159.9388	180.2107	190.7238	204.6513 (64)
Heat gains from water heating, kWh/month	92.3537	81.8806	87.1231	79.6678	79.2073	72.4061	71.0903	75.8686	75.0642	82.5342	85.3003	90.6607 (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	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120	163.5120 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	56.7106	50.3699	40.9635	31.0120	23.1819	19.5711	21.1473	27.4880	36.8943	46.8458	54.6760	58.2868 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	378.9250	382.8570	372.9484	351.8540	325.2262	300.1998	283.4806	279.5486	289.4572	310.5516	337.1794	362.2058 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764	54.0764 (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)	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080	-109.0080 (71)
Water heating gains (Table 5)	124.1313	121.8462	117.1009	110.6498	106.4614	100.5641	95.5515	101.9740	104.2559	110.9330	118.4726	121.8557 (72)
Total internal gains	668.3473	663.6535	639.5932	602.0962	563.4499	528.9154	508.7597	517.5909	539.1879	576.9108	618.9084	650.9287 (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				10.2900	11.9814	0.2500	0.7000	0.7700	14.9519 (74)				
South				8.3200	50.9848	0.2500	0.7000	0.7700	51.4441 (78)				
West				2.2300	22.3313	0.2500	0.7000	0.7700	6.0394 (80)				
Solar gains	72.4353	112.1788		156.2335	210.0144	240.1445	260.7000	246.3083	222.0370	186.8363	133.5568	89.0782	61.2936 (83)
Total gains	740.7826	775.8323		795.8267	812.1106	803.5944	789.6154	755.0681	739.6279	726.0241	710.4677	707.9866	712.2223 (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	100.8457	101.5221	101.5221	102.5538	102.5538	103.9626	103.6068	104.3209	103.9626	103.2534	103.2534	102.2076
alpha	7.7230	7.7681	7.7681	7.8369	7.8369	7.9308	7.9071	7.9547	7.9308	7.8836	7.8836	7.8138
util living area	0.9922	0.9871	0.9692	0.9054	0.7377	0.4769	0.3107	0.3252	0.5982	0.8895	0.9783	0.9937 (86)
Weekday	19.6695	19.7740	19.9597	20.1651	20.2607	20.2829	20.2808	20.2854	20.2816	20.2063	19.9506	19.6617
Weekend	20.7057	20.7511	20.8360	20.9333	20.9889	20.9997	21.0000	21.0000	20.9981	20.9518	20.8265	20.6988
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	0	0	0	0	0	0	0	0	0	0	0	0
16 / 9	0	0	0	0	0	0	0	0	0	0	0	0
MIT	20.5458	20.6150	20.7469	20.8958	20.9828	20.9995	21.0000	21.0000	20.9971	20.9256	20.7291	20.5352 (87)
Th 2	20.2625	20.2671	20.2671	20.2740	20.2740	20.2831	20.2808	20.2854	20.2831	20.2785	20.2785	20.2717 (88)
util rest of house	0.9895	0.9827	0.9586	0.8761	0.6797	0.4089	0.2386	0.2526	0.5265	0.8514	0.9699	0.9915 (89)
Weekday	19.6695	19.7740	19.9597	20.1651	20.2607	20.2829	20.2808	20.2854	20.2816	20.2063	19.9506	19.6617
Weekend	19.6695	19.7740	19.9597	20.1651	20.2607	20.2829	20.2808	20.2854	20.2816	20.2063	19.9506	19.6617
MIT 2	19.6695	19.7740	19.9597	20.1651	20.2607	20.2829	20.2808	20.2854	20.2816	20.2063	19.9506	19.6617 (90)
Living area fraction									fLA = Living area / (4) =			0.3523 (91)
MIT	19.9782	20.0703	20.2370	20.4225	20.5151	20.5354	20.5342	20.5371	20.5337	20.4597	20.2249	19.9694 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9782	20.0703	20.2370	20.4225	20.5151	20.5354	20.5342	20.5371	20.5337	20.4597	20.2249	19.9694 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9883	0.9813	0.9581	0.8827	0.6995	0.4329	0.2640	0.2782	0.5518	0.8618	0.9692	0.9904 (94)
Ext temp.	732.0839	761.3189	762.5085	716.8096	562.1463	341.8221	199.3603	205.7337	400.6196	612.2979	686.1820	705.3721 (95)
Heat loss rate W	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000 (96)

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Month fracti	1156.8653	1117.6501	991.5033	804.5557	574.6085	342.0771	199.3642	205.7393	402.2885	672.8256	926.3888	1140.7792 (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	316.0373	239.4546	170.3722	63.1772	9.2719	0.0000	0.0000	0.0000	0.0000	45.0327	174.3888	323.9429 (98)
Space heating per m2												1341.6775 (98)
										(98) / (4) =		13.6211 (99)

8c. Space cooling requirement

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 %)												207.3458 (206)
Efficiency of secondary/supplementary heating system, %												100.0000 (208)
Space heating requirement												647.0724 (211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	316.0373	239.4546	170.3722	63.1772	9.2719	0.0000	0.0000	0.0000	0.0000	45.0327	174.3888	323.9429 (98)
Space heating efficiency (main heating system 1)	207.3458	207.3458	207.3458	207.3458	207.3458	0.0000	0.0000	0.0000	0.0000	207.3458	207.3458	207.3458 (210)
Space heating fuel (main heating system)	152.4204	115.4856	82.1681	30.4695	4.4717	0.0000	0.0000	0.0000	0.0000	21.7186	84.1053	156.2331 (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	209.7431	184.8271	194.0120	173.7841	170.2052	151.9444	145.7930	160.1640	159.9388	180.2107	190.7238	204.6513 (64)
Efficiency of water heater (217)m	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800	270.1800 (216)
Fuel for water heating, kWh/month	77.6309	68.4089	71.8084	64.3216	62.9970	56.2382	53.9614	59.2805	59.1971	66.7002	70.5914	75.7463 (219)
Water heating fuel used												786.8819 (219)
Annual totals kWh/year												647.0724 (211)
Space heating fuel - main system												0.0000 (215)
Space heating fuel - secondary												

Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.5875)												
mechanical ventilation fans (SFP = 0.5875)												176.4997 (230a)
Total electricity for the above, kWh/year												176.4997 (231)
Electricity for lighting (calculated in Appendix L)												400.6109 (232)

Energy saving/generation technologies (Appendices M ,N and Q)												
Total delivered energy for all uses												2011.0648 (238)

10a. Fuel costs - using BEDF prices (589)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	647.0724	26.0600	168.6271 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	786.8819	26.0600	205.0614 (247)
Mechanical ventilation fans	176.4997	26.0600	45.9958 (249)
Pumps and fans for heating	0.0000	0.0000	0.0000 (249)
Energy for lighting	400.6109	26.0600	104.3992 (250)
Additional standing charges			0.0000 (251)
Energy saving/generation technologies			
PV Unit	0.0000	26.0600	0.0000 (252)
Total energy cost			524.0835 (255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	647.0724	0.5190	335.8306 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	786.8819	0.5190	408.3917 (264)
Space and water heating			744.2223 (265)
Pumps and fans	176.4997	0.5190	91.6033 (267)
Energy for lighting	400.6109	0.5190	207.9170 (268)
Energy saving/generation technologies			
PV Unit	-1761.0000	0.5190	-913.9590 (269)
Total kg/year			129.7836 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	647.0724	3.0700	1986.5122 (261)
Space heating - secondary	0.0000	3.0700	0.0000 (263)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

Water heating (other fuel)	786.8819	3.0700	2415.7275 (264)
Space and water heating			4402.2397 (265)
Pumps and fans	176.4997	3.0700	541.8540 (267)
Energy for lighting	400.6109	3.0700	1229.8753 (268)
Energy saving/generation technologies			
FV Unit	-1761.0000	3.0700	-5406.2700 (269)
Primary energy kWh/year			767.6990 (272)
Primary energy kWh/m ² /year			7.7939 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 88
Current environmental impact rating: A 98

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

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

Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
Total Savings	£0	0.00 kg/m ²	

Potential energy efficiency rating: B 88
Potential environmental impact rating: A 98

Fuel prices for cost data on this page from database revision number 589 TEST (12 Dec 2025)
Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current £524	Potential £524	Saving £0
Electricity			
Space heating	£215	£215	£0
Water heating	£205	£205	£0
Lighting	£104	£104	£0
Total cost of fuels	£524	£524	£0
Total cost of uses	£524	£524	£0
Delivered energy	20 kWh/m ²	20 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.1 tonnes	0.1 tonnes	0.0 tonnes
CO2 emissions per m ²	1 kg/m ²	1 kg/m ²	0 kg/m ²
Primary energy	8 kWh/m ²	8 kWh/m ²	0 kWh/m ²

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Energy Calculations Ltd
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CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

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

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

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

No improvements selected / applicable

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

Overheating Calculation Input Data

Dwelling type	Detached Flat
Number of storeys	1
Cross ventilation possible	Yes
SAP Region	Thames Valley
Front of dwelling faces	West
Overshading	Average or unknown
Thermal mass parameter	286.6 (calculated from construction elements)
Night ventilation	No
Ventilation rate during hot weather (ach)	6.00 (Windows fully open)

Overheating Calculation

Summer ventilation heat loss coefficient	487.58 (P1)
Transmission heat loss coefficient	56.98 (37)
Summer heat loss coefficient	544.56 (P2)

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

Solar shading	Z blinds	Solar access	Z overhangs	Z summer
Orientation				
North	1.000	0.90	1.000	0.900 (P8)
South	1.000	0.90	1.000	0.900 (P8)
West	1.000	0.90	1.000	0.900 (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
North	10.2900	81.1852	0.2500	0.7000	0.9000	118.4173
South	6.3200	112.2060	0.2500	0.7000	0.9000	132.3313
West	2.2300	117.5071	0.2500	0.7000	0.9000	37.1443
total:						287.8928

	Jun	Jul	Aug	
Solar gains	305	288	260	(P3)
Internal gains	529	509	518	
Total summer gains	834	797	777	(P5)

Summer gain/loss ratio	1.53	1.46	1.43	(P6)
Summer external temperature	16.00	17.90	17.80	
Thermal mass temperature increment (TMP = 286.6)	0.00	0.00	0.00	
Threshold temperature	17.53	19.36	19.23	(P7)
Likelihood of high internal temperature	Not significant	Not significant	Not significant	

Assessment of likelihood of high internal temperature: Not significant

BASIC COMPLIANCE REPORT

Energy Calculations Ltd
SAP • CODE • SBEM • DESIGN

Calculation Type: New Build (As Designed)

Property Reference	024691	Issued on Date	05/02/2026
Assessment Reference	001	Prop Type Ref	
Property	Unit 01, Jansons Road , London		

SAP Rating	88 B	DER	4.40	TER	26.48
Environmental	98 A	% DER<TER	83.38		
CO ₂ Emissions (t/year)	0.13	DFEE	45.18	TFEE	56.83
General Requirements Compliance	Pass	% DFEE<TFEE	20.51		

Assessor Details	Mr. Matthew Carter, Energy Calculations Limited, Tel: 01754 761 035, mcarter@energycalculations.co.uk	Assessor ID	7869-0001
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	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	26.48	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	4.40	kgCO ₂ /m ²	Pass
	-22.08 (-83.4%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	56.83	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	45.18	kWh/m ² /yr	
	-11.6 (-20.4%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.20 (max. 0.70)	Pass
Floor	0.10 (max. 0.25)	0.10 (max. 0.70)	Pass
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Vaillant aroTHERM plus 7kW & AI VIH RW VWL75/6A230VS2+VWZAIMB2	
Secondary heating system	None	

5 Cylinder insulation

BASIC COMPLIANCE REPORT

Energy Calculations Ltd
SAP • CODE • SBEM • DESIGN

Calculation Type: New Build (As Designed)

Hot water storage	Measured cylinder loss: 1.50 kWh/day Permitted by DBSCG 2.30	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Time and temperature zone control	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

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

8 Mechanical ventilation

Continuous supply and extract system			
Specific fan power	0.47		
Maximum	1.5		Pass
MVHR efficiency	89	%	
Minimum	70	%	Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing North	10.29 m ² , No overhang	
Windows facing South	8.32 m ² , No overhang	
Windows facing West	2.23 m ² , No overhang	
Air change rate	6.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	Pass

10 Key features

Floor U-value	0.10	W/m ² K
Door U-value	1.00	W/m ² K
Window U-value	1.00	W/m ² K
Thermal bridging ψ -value	0.020	W/m ² K
Air permeability	3.0	m ³ /m ² h
Photovoltaic array	1761.00	kWh/Year

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

Energy Calculations Ltd
SAP • CODE • SBEM • DESIGN

Calculation Type: New Build (As Designed)

Property Reference	024691	Issued on Date	05/02/2026
Assessment Reference	001	Prop Type Ref	
Property	Unit 01, Jansons Road , London		

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Environmental	98 A	% DER<TER	83.38		
CO ₂ Emissions (t/year)	0.13	DFEE	45.18	TFEE	56.83
General Requirements Compliance	Pass	% DFEE<TFEE	20.51		

Assessor Details	Mr. Matthew Carter, Energy Calculations Limited, Tel: 01754 761 035, mcarter@energycalculations.co.uk	Assessor ID	7869-0001
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Client	
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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, Detached
2.0 Number of Storeys	1
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	55.60 m	98.50 m ²	2.50 m

7.0 Living Area	34.70	m ²
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8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	286.59	kJ/m²K

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)
Main Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.16	60.00	94.60	73.76
Wall to Stairs	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.25	190.00	44.40	42.60

9.2 Internal Walls

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	103.80

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceilings 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	98.50

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)
Floor	Ground Floor - Solid	Slab on ground, screed over insulation	0.10	110.00	98.50

12.0 Opening Types



SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door							1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05			0.25		0.70	1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Opening 1	Solid Door	[2] Wall to Stairs	West							1.80	
Opening 2	Window	[1] Main Wall	West	None	0.00					2.23	
Opening 3	Window	[1] Main Wall	North	None	0.00					10.29	
Opening 4	Window	[1] Main Wall	South	None	0.00					8.32	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

Yes

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E2 Other lintels (including other steel lintels)	8.51	0.060	No
Independently assessed	E4 Jamb	34.30	0.025	No
Independently assessed	E5 Ground floor (normal)	55.60	0.060	No
Independently assessed	E16 Corner (normal)	12.50	0.050	No
Independently assessed	E17 Corner (inverted – internal area greater than external area)	10.00	-0.077	No
Independently assessed	E18 Party wall between dwellings	7.50	0.032	No

Y-value

0.020

W/m²K

18.0 Pressure Testing

Yes

Designed AP₅₀

3.00

m³/(h.m²) @ 50 Pa

Property Tested ?

As Built AP₅₀

m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Windows fully open

Cross ventilation possible

Yes

Night Ventilation

No

Air change rate

6.00

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

Yes

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500530

Configuration

2

MVHR Duct Insulated

Yes

Manufacturer SFP

0.47

Duct Type

Rigid

MVHR Efficiency

89.00

Wet Rooms

2

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

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				0
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	24
Total number of L.E.L. fittings	24
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.	110263
Fuel Type	Electricity
Main Heating	PET
SAP Code	224
In Winter	0.0
In Summer	0.0
Controls	CHD Time and temperature zone control
PCDF Controls	0
Sap Code	2207
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Flow Temperature	Normal (> 45°C)

25.0 Main Heating 2

None

Community Heating	None
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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
Immersion Only Heating Hot Water	Yes

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	210.00	L
Loss	1.50	kWh/day
Pipes insulation	Fully insulated primary pipework	

31.0 Thermal Store	None	
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32.0 Photovoltaic Unit	More Dwellings, One Block	
Apportioned	1761.00	kWh/Year

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

BLOCK COMPLIANCE

Energy Calculations Ltd
SAP • CODE • SBEM • DESIGN

Calculation Type: New Build (As Designed)

Block Reference	000702 - Be Green	Issued on Date	05/02/2026
Block Name	Jansons - Green		
Assessor Details	Mr. Matthew Carter, Energy Calculations Limited, Tel: 01754 761 035, mcarter@energycalculations.co.uk	Assessor ID	7869-0001
Client			

Block Compliance Report - DER

Block Reference: 000702 - Be Green		Block Name: Jansons - Green			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DER (kgCO ₂ /m ²)	TER (kgCO ₂ /m ²)	% DER/TER
024691-001	1	98.5	4.40	26.48	83.38 %
024692-001	1	88.5	3.33	22.93	85.48 %
024693-001	1	51.5	6.35	27.79	77.15 %
024694-001	1	88.5	3.89	24.48	84.11 %
024695-001	1	51.5	5.37	25.74	79.14 %
024696-001	1	70.9	9.14	33.99	73.11 %
024697-001	1	51.5	9.12	33.14	72.48 %
Totals:	7	500.9	41.60	194.54	
Average DER = 5.58 kgCO ₂ /m ²		% DER/TER	PASS		
Average TER = 27.31 kgCO ₂ /m ²		79.57 %			

Block Compliance Report - DFEE

Block Reference: 000702 - Be Green		Block Name: Jansons - Green			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DFEE (kWh/m ² /yr)	TFEE (kWh/m ² /yr)	% DFEE/TFEE
024691-001	1	98.5	45.18	56.83	20.51 %
024692-001	1	88.5	35.17	42.44	17.13 %
024693-001	1	51.5	38.75	47.30	18.07 %
024694-001	1	88.5	37.97	47.59	20.21 %
024695-001	1	51.5	33.87	40.43	16.23 %
024696-001	1	70.9	59.73	74.81	20.16 %
024697-001	1	51.5	53.59	65.17	17.76 %
Totals:	7	500.9	304.26	374.57	
Average DFEE = 43.24 kWh/m ² /yr		% DFEE/TFEE	PASS		
Average TFEE = 53.39 kWh/m ² /yr		19.01 %			