

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Property Reference	P1 Riley	Issued on Date	12/09/2022
Assessment Reference	P1 Riley	Prop Type Ref	
Property	Plot 1, Riley Road, Reading		

SAP Rating	88 B	DER	13.27	TER	16.58
Environmental	89 B	% DER<TER	19.95		
CO ₂ Emissions (t/year)	1.00	DFEE	45.30	TFEE	50.13
General Requirements Compliance	Pass	% DFEE<TFEE	9.63		

Assessor Details	Mr. Alan Ironmonger, Forum Energy Consultants, Tel: 01303 260656, forumenergy@btinternet.com	Assessor ID	L609-0001
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Client	
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CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	49.7000 (1b)	x 2.3800 (2b)	= 118.2860 (1b) - (3b)
First floor	49.7000 (1c)	x 2.5900 (2c)	= 128.7230 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	99.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 247.0090 (5)

2. Ventilation rate

	main heating		+	secondary heating	+	other	=	total	m3 per hour			
Number of chimneys		0	+	0	+	0	=	0 * 40 =	0.0000 (6a)			
Number of open flues		0	+	0	+	0	=	0 * 20 =	0.0000 (6b)			
Number of intermittent fans								3 * 10 =	30.0000 (7a)			
Number of passive vents								0 * 10 =	0.0000 (7b)			
Number of flueless gas fires								0 * 40 =	0.0000 (7c)			
									Air changes per hour			
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =							30.0000 / (5) =	0.1215 (8)			
Pressure test								Yes				
Measured/design AP50									5.0000			
Infiltration rate									0.3715 (18)			
Number of sides sheltered									1 (19)			
Shelter factor								(20) = 1 - [0.075 x (19)] =	0.9250 (20)			
Infiltration rate adjusted to include shelter factor								(21) = (18) x (20) =	0.3436 (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	0.4381	0.4295	0.4209	0.3780	0.3694	0.3264	0.3264	0.3178	0.3436	0.3694	0.3865	0.4037 (22b)
Effective ac	0.5960	0.5922	0.5886	0.5714	0.5682	0.5533	0.5533	0.5505	0.5590	0.5682	0.5747	0.5815 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
windows (Uw = 1.30)			20.7400	1.2357	25.6293		(27)
pers door			2.0000	1.0000	2.0000		(26a)
Heat Loss Floor 1			49.7000	0.1100	5.4670	75.0000	3727.5000 (28a)
render	105.1600	22.7400	82.4200	0.2000	16.4840	70.0000	5769.4000 (29a)
External Roof 1	49.7000		49.7000	0.1000	4.9700	9.0000	447.3000 (30)
Total net area of external elements Aum(A, m ²)			204.5600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	54.5503		(33)
Party Wall 1			46.6100	0.0000	0.0000	180.0000	8389.8000 (32)
Internal Wall 1			35.0000			9.0000	315.0000 (32c)
Internal Wall 2			35.0000			100.0000	3500.0000 (32c)
Internal Floor 1			49.7000			18.0000	894.6000 (32d)
Internal Ceiling 1			49.7000			9.0000	447.3000 (32e)
Heat capacity Cm = Sum (A x k)					(28)...(30) + (32) + (32a)...(32e) =		23490.9000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							236.3270 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							20.3203 (36)
Total fabric heat loss						(33) + (36) =	74.8706 (37)

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CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

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	48.5783	48.2746	47.9769	46.5785	46.3169	45.0989	45.0989	44.8734	45.5681	46.3169	46.8461	47.3995 (38)
Average = Sum(39)m / 12 =	123.4489	123.1452	122.8474	121.4491	121.1874	119.9695	119.9695	119.7440	120.4386	121.1874	121.7167	122.2701 (39)
												121.4478 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2419	1.2389	1.2359	1.2218	1.2192	1.2069	1.2069	1.2047	1.2117	1.2192	1.2245	1.2301 (40)
Days in month												1.2218 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.7339 (42)
Average daily hot water use (litres/day)												99.1302 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	109.0432	105.0780	101.1128	97.1476	93.1824	89.2171	89.2171	93.1824	97.1476	101.1128	105.0780	109.0432 (44)
Energy conte	161.7079	141.4308	145.9439	127.2374	122.0873	105.3521	97.6242	112.0252	113.3631	132.1138	144.2125	156.6055 (45)
Energy content (annual)												Total = Sum(45)m = 1559.7035 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
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	34.3629	30.0540	31.0131	27.0379	25.9436	22.3873	20.7451	23.8053	24.0897	28.0742	30.6452	33.2787 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	22.8381	20.2846	16.4966	12.4890	9.3356	7.8815	8.5163	11.0698	14.8578	18.8654	22.0188	23.4729 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	255.3541	258.0039	251.3265	237.1113	219.1670	202.3019	191.0350	188.3853	195.0626	209.2779	227.2222	244.0872 (68)
Pumps, fans	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561 (71)
Total internal gains	46.1867	44.7233	41.6842	37.5527	34.8704	31.0935	27.8833	31.9964	33.4579	37.7341	42.5627	44.7294 (72)
	388.3875	387.0203	373.5159	351.1614	327.3815	305.2855	291.4431	295.4600	307.3868	329.8860	355.8122	376.2980 (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			
Southeast				5.9000	36.7938	0.7200	0.7000	0.7700	75.8212 (77)			
Southwest				9.6300	36.7938	0.7200	0.7000	0.7700	123.7557 (79)			
Northwest				5.2100	11.2829	0.7200	0.7000	0.7700	20.5316 (81)			
Solar gains	220.1085	381.7461	540.4362	699.9894	811.7602	818.0803	783.6437	698.3940	595.3980	426.7949	264.8812	187.5634 (83)
Total gains	608.4960	768.7664	913.9520	1051.1508	1139.1417	1123.3658	1075.0868	993.8540	902.7848	756.6809	620.6934	563.8614 (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	52.8579	52.9883	53.1167	53.7283	53.8443	54.3909	54.3909	54.4933	54.1790	53.8443	53.6101	53.3675
alpha	4.5239	4.5326	4.5411	4.5819	4.5896	4.6261	4.6261	4.6329	4.6119	4.5896	4.5740	4.5578
util living area	0.9972	0.9916	0.9759	0.9275	0.8167	0.6413	0.4815	0.5376	0.7862	0.9592	0.9935	0.9980 (86)
MIT	19.5880	19.8149	20.1358	20.5182	20.8083	20.9537	20.9900	20.9838	20.8816	20.4790	19.9531	19.5493 (87)
Th 2	19.8866	19.8890	19.8914	19.9026	19.9047	19.9145	19.9145	19.9163	19.9107	19.9047	19.9004	19.8960 (88)
util rest of house	0.9963	0.9889	0.9680	0.9037	0.7612	0.5489	0.3675	0.4191	0.7044	0.9409	0.9910	0.9973 (89)
MIT 2	18.6075	18.8348	19.1525	19.5262	19.7807	19.8940	19.9120	19.9118	19.8483	19.4996	18.9823	18.5763 (90)
Living area fraction									fLA = Living area / (4) =			0.2225 (91)
MIT	18.8257	19.0529	19.3714	19.7470	20.0094	20.1298	20.1519	20.1504	20.0782	19.7175	19.1983	18.7928 (92)
Temperature adjustment												0.0000
adjusted MIT	18.8257	19.0529	19.3714	19.7470	20.0094	20.1298	20.1519	20.1504	20.0782	19.7175	19.1983	18.7928 (93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9950	0.9862	0.9632	0.8997	0.7671	0.5683	0.3930	0.4455	0.7184	0.9370	0.9888	0.9964	(94)
Useful gains	605.4621	758.1331	880.3409	945.7497	873.8026	638.3587	422.5427	442.8045	648.5913	708.9727	613.7344	561.8350	(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	1793.1812	1742.8639	1581.2132	1317.3565	1006.9896	663.4113	426.1189	449.0832	720.0114	1104.9297	1472.5704	1784.2627	(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	883.6630	661.7391	521.4490	267.5569	99.0911	0.0000	0.0000	0.0000	0.0000	294.5920	618.3619	909.4862	(98)
Space heating												4255.9390	(98)
Space heating per m2											(98) / (4) =	42.8163	(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	1127.7135	887.7744	910.0542	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9020	0.9468	0.9278	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1017.1987	840.5349	844.3813	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1417.7537	1359.0634	1265.9629	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	288.3996	385.7852	313.6567	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												987.8415	(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	72.0999	96.4463	78.4142	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling												246.9604	(107)
Space cooling per m2												2.4845	(108)
Energy for space heating												42.8163	(99)
Energy for space cooling												2.4845	(108)
Total												45.3008	(109)
Dwelling Fabric Energy Efficiency (DFEE)												45.3	(109)

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CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	49.7000 (1b)	x 2.3800 (2b)	= 118.2860 (1b) - (3b)
First floor	49.7000 (1c)	x 2.5900 (2c)	= 128.7230 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	99.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 247.0090 (5)

2. Ventilation rate

										main heating	secondary heating	other	total	m3 per hour			
Number of chimneys										0	+	0	+	0	=	0 * 40 =	0.0000 (6a)
Number of open flues										0	+	0	+	0	=	0 * 20 =	0.0000 (6b)
Number of intermittent fans																3 * 10 =	30.0000 (7a)
Number of passive vents																0 * 10 =	0.0000 (7b)
Number of flueless gas fires																0 * 40 =	0.0000 (7c)
										Air changes per hour							
Infiltration due to chimneys, flues and fans										= (6a)+(6b)+(7a)+(7b)+(7c) =					30.0000	/ (5) =	0.1215 (8)
Pressure test										Yes							
Measured/design AP50										5.0000							
Infiltration rate										0.3715 (18)							
Number of sides sheltered										1 (19)							
Shelter factor										(20) = 1 - [0.075 x (19)] =					0.9250 (20)		
Infiltration rate adjusted to include shelter factor										(21) = (18) x (20) =					0.3436 (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	0.4381	0.4295	0.4209	0.3780	0.3694	0.3264	0.3264	0.3178	0.3436	0.3694	0.3865	0.4037	(22b)				
Effective ac	0.5960	0.5922	0.5886	0.5714	0.5682	0.5533	0.5533	0.5505	0.5590	0.5682	0.5747	0.5815	(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 Semi-glazed door			2.0000	1.2000	2.4000			(26a)				
TER Opening Type (Uw = 1.40)			20.7400	1.3258	27.4962			(27)				
Heat Loss Floor 1			49.7000	0.1300	6.4610			(28a)				
render	105.1600	22.7400	82.4200	0.1800	14.8356			(29a)				
External Roof 1	49.7000		49.7000	0.1300	6.4610			(30)				
Total net area of external elements Aum(A, m2)			204.5600					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26) ... (30) + (32) =	57.6538			(33)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								250.0000 (35)				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								11.1164 (36)				
Total fabric heat loss						(33) + (36) =		68.7702 (37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 48.5783	Feb 48.2746	Mar 47.9769	Apr 46.5785	May 46.3169	Jun 45.0989	Jul 45.0989	Aug 44.8734	Sep 45.5681	Oct 46.3169	Nov 46.8461	Dec 47.3995 (38)
Heat transfer coeff	117.3485	117.0448	116.7471	115.3487	115.0871	113.8692	113.8692	113.6436	114.3383	115.0871	115.6164	116.1697 (39)
Average = Sum(39)m / 12 =												115.3475 (39)
HLP	Jan 1.1806	Feb 1.1775	Mar 1.1745	Apr 1.1604	May 1.1578	Jun 1.1456	Jul 1.1456	Aug 1.1433	Sep 1.1503	Oct 1.1578	Nov 1.1631	Dec 1.1687 (40)
HLP (average)												1.1604 (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												2.7339 (42)
Average daily hot water use (litres/day)												99.1302 (43)
Daily hot water use	Jan 109.0432	Feb 105.0780	Mar 101.1128	Apr 97.1476	May 93.1824	Jun 89.2171	Jul 89.2171	Aug 93.1824	Sep 97.1476	Oct 101.1128	Nov 105.0780	Dec 109.0432 (44)
Energy conte	161.7079	141.4308	145.9439	127.2374	122.0873	105.3521	97.6242	112.0252	113.3631	132.1138	144.2125	156.6055 (45)
Energy content (annual)										Total = Sum(45)m =		1559.7035 (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	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												

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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 (57)
Heat gains from water heating, kWh/month	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)
	34.3629	30.0540	31.0131	27.0379	25.9436	22.3873	20.7451	23.8053	24.0897	28.0742	30.6452	33.2787 (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	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951	136.6951 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.8381	20.2846	16.4966	12.4890	9.3356	7.8815	8.5163	11.0698	14.8578	18.8654	22.0188	23.4729 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	255.3541	258.0039	251.3265	237.1113	219.1670	202.3019	191.0350	188.3853	195.0626	209.2779	227.2222	244.0872 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695	36.6695 (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)	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561	-109.3561 (71)
Water heating gains (Table 5)	46.1867	44.7233	41.6842	37.5527	34.8704	31.0935	27.8833	31.9964	33.4579	37.7341	42.5627	44.7294 (72)
Total internal gains	388.3875	387.0203	373.5159	351.1614	327.3815	305.2855	291.4431	295.4600	307.3868	329.8860	355.8122	376.2980 (73)

6. Solar gains												

[Jan]				Area	Solar flux		g		FF		Access	Gains
				m2	Table 6a		Specific data		Specific data		factor	W
					W/m2		or Table 6b		or Table 6c		Table 6d	
Southeast				5.9000	36.7938		0.6300		0.7000		0.7700	66.3436 (77)
Southwest				9.6300	36.7938		0.6300		0.7000		0.7700	108.2862 (79)
Northwest				5.2100	11.2829		0.6300		0.7000		0.7700	17.9652 (81)

Solar gains	192.5950	334.0278	472.8817	612.4907	710.2902	715.8203	685.6882	611.0947	520.9732	373.4455	231.7711	164.1180 (83)
Total gains	580.9825	721.0481	846.3975	963.6522	1037.6717	1021.1058	977.1313	906.5547	828.3601	703.3315	587.5833	540.4160 (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	58.8229	58.9755	59.1259	59.8427	59.9787	60.6203	60.6203	60.7406	60.3715	59.9787	59.7042	59.4198
alpha	4.9215	4.9317	4.9417	4.9895	4.9986	5.0414	5.0414	5.0494	5.0248	4.9986	4.9803	4.9613
util living area	0.9982	0.9946	0.9835	0.9453	0.8459	0.6708	0.5040	0.5609	0.8130	0.9698	0.9958	0.9988 (86)
MIT	19.7036	19.9026	20.1907	20.5428	20.8184	20.9586	20.9919	20.9865	20.8909	20.5143	20.0367	19.6705 (87)
Th 2	19.9356	19.9380	19.9404	19.9518	19.9539	19.9638	19.9638	19.9656	19.9600	19.9539	19.9496	19.9451 (88)
util rest of house	0.9976	0.9927	0.9776	0.9257	0.7944	0.5793	0.3899	0.4427	0.7350	0.9552	0.9940	0.9983 (89)
MIT 2	18.7562	18.9562	19.2428	19.5908	19.8354	19.9456	19.9618	19.9620	19.9022	19.5721	19.0998	18.7308 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	18.9670	19.1668	19.4537	19.8027	20.0542	20.1710	20.1911	20.1900	20.1222	19.7818	19.3083	18.9399 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.9670	19.1668	19.4537	19.8027	20.0542	20.1710	20.1911	20.1900	20.1222	19.7818	19.3083	18.9399 (93)

8. Space heating requirement												

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9968	0.9909	0.9742	0.9223	0.8000	0.5986	0.4155	0.4692	0.7487	0.9521	0.9925	0.9978 (94)
Ext temp.	579.1428	714.4899	824.5331	888.7872	830.1160	611.2621	405.9511	425.3715	620.2208	669.6608	583.1974	539.2038 (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	1721.1519	1669.8602	1512.3104	1257.6072	961.4581	634.3660	408.9103	430.7057	688.5724	1056.7028	1411.4804	1712.3332 (97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating kWh	849.6548	642.0088	511.7063	265.5504	97.7185	0.0000	0.0000	0.0000	0.0000	287.9592	596.3637	872.8082 (98)
Space heating												4123.7700 (98)
Space heating per m2	(98) / (4) =											41.4866 (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	1070.3700	842.6317	863.6914	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9036	0.9501	0.9316	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	967.2199	800.5483	804.5726	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1298.2289	1244.5700	1163.9248	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	238.3265	330.3521	267.3580	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												836.0367 (104)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

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	59.5816	82.5880	66.8395	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												209.0092 (107)
Space cooling per m2												2.1027 (108)
Energy for space heating												41.4866 (99)
Energy for space cooling												2.1027 (108)
Total												43.5893 (109)
Target Fabric Energy Efficiency (TFEE)												50.1 (109)