

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Property Reference	P2 Riley	Issued on Date	12/09/2022
Assessment Reference	P2 Riley	Prop Type Ref	
Property	Plot 2, Riley Road, Reading		

SAP Rating	88 B	DER	13.39	TER	16.93
Environmental	90 B	% DER<TER	20.90		
CO ₂ Emissions (t/year)	0.93	DFEE	44.48	TFEE	49.08
General Requirements Compliance	Pass	% DFEE<TFEE	9.38		

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	46.3300 (1b)	x 2.3800 (2b)	= 110.2654 (1b) - (3b)
First floor	46.3300 (1c)	x 2.5900 (2c)	= 119.9947 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	92.6600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 230.2601 (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) =	0.1303 (8)			
Pressure test								Yes				
Measured/design AP50									5.0000			
Infiltration rate									0.3803 (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) =	0.3232 (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	0.4121	0.4041	0.3960	0.3556	0.3475	0.3071	0.3071	0.2990	0.3232	0.3475	0.3636	0.3798 (22b)
Effective ac	0.5849	0.5816	0.5784	0.5632	0.5604	0.5471	0.5471	0.5447	0.5522	0.5604	0.5661	0.5721 (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)			12.4700	1.2357	15.4097		(27)
patio doors (Uw = 1.30)			3.7800	1.2357	4.6711		(27)
pers door			2.0000	1.0000	2.0000		(26a)
Heat Loss Floor 1			46.3300	0.1100	5.0963	75.0000	3474.7500 (28a)
render	95.9100	18.2500	77.6600	0.2000	15.5320	70.0000	5436.2000 (29a)
External Roof 1	46.3300		46.3300	0.1000	4.6330	9.0000	416.9700 (30)
Total net area of external elements Aum(A, m ²)			188.5700				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	47.3421			(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			46.3300			18.0000	833.9400 (32d)
Internal Ceiling 1			46.3300			9.0000	416.9700 (32e)
Heat capacity Cm = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	22783.6300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							245.8842 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							18.6086 (36)
Total fabric heat loss						(33) + (36) =	65.9507 (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)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.4463	44.1957	43.9500	42.7963	42.5805	41.5756	41.5756	41.3895	41.9627	42.5805	43.0171	43.4737	(38)
Heat transfer coeff	110.3970	110.1464	109.9007	108.7470	108.5312	107.5263	107.5263	107.3402	107.9134	108.5312	108.9678	109.4244	(39)
Average = Sum(39)m / 12 =												108.7460	(39)
HLP	1.1914	1.1887	1.1861	1.1736	1.1713	1.1604	1.1604	1.1584	1.1646	1.1713	1.1760	1.1809	(40)
HLP (average)												1.1736	(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												2.6604	(42)	
Average daily hot water use (litres/day)												97.3847	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
	107.1231	103.2277	99.3324	95.4370	91.5416	87.6462	87.6462	91.5416	95.4370	99.3324	103.2277	107.1231	(44)	
Energy conte	158.8605	138.9404	143.3741	124.9970	119.9376	103.4970	95.9052	110.0526	111.3670	129.7875	141.6732	153.8479	(45)	
Energy content (annual)												Total = Sum(45)m =	1532.2400	(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														
	33.7579	29.5248	30.4670	26.5619	25.4867	21.9931	20.3799	23.3862	23.6655	27.5798	30.1056	32.6927	(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	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.3026	19.8090	16.1098	12.1961	9.1167	7.6967	8.3166	10.8102	14.5095	18.4231	21.5025	22.9225	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	243.8872	246.4180	240.0405	226.4636	209.3251	193.2174	182.4564	179.9256	186.3031	199.8801	217.0185	233.1263	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	(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)	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	(71)
Water heating gains (Table 5)	45.3735	43.9358	40.9503	36.8915	34.2564	30.5460	27.3923	31.4330	32.8687	37.0697	41.8133	43.9418	(72)
Total internal gains	374.4694	373.0689	360.0066	338.4573	315.6043	294.3662	281.0714	285.0750	296.5875	318.2790	343.2404	362.8966	(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				5.3500	10.6334	0.7200	0.7000	0.7700	19.8696 (74)				
South				5.0400	46.7521	0.7200	0.7000	0.7700	82.2991 (78)				
West				2.0800	19.6403	0.7200	0.7000	0.7700	14.2684 (80)				
South				3.7800	46.7521	0.7200	0.7000	0.7700	61.7243 (78)				
Solar gains	178.1614	301.7571	410.9512	510.2672	575.6439	574.1179	552.3523	502.6246	444.9063	332.7319	213.0196	152.7474	(83)
Total gains	552.6308	674.8259	770.9578	848.7244	891.2482	868.4841	833.4237	787.6996	741.4938	651.0108	556.2600	515.6440	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	57.3275	57.4580	57.5864	58.1973	58.3131	58.8580	58.8580	58.9601	58.6469	58.3131	58.0794	57.8371	
alpha	4.8218	4.8305	4.8391	4.8798	4.8875	4.9239	4.9239	4.9307	4.9098	4.8875	4.8720	4.8558	
util living area	0.9979	0.9942	0.9844	0.9548	0.8774	0.7225	0.5520	0.6019	0.8325	0.9701	0.9952	0.9985 (86)	
MIT	19.6831	19.8759	20.1486	20.4832	20.7674	20.9378	20.9866	20.9799	20.8696	20.4914	20.0178	19.6486 (87)	
Th 2	19.9269	19.9290	19.9312	19.9412	19.9430	19.9518	19.9518	19.9534	19.9484	19.9430	19.9393	19.9353 (88)	
util rest of house	0.9972	0.9922	0.9789	0.9380	0.8317	0.6303	0.4285	0.4771	0.7577	0.9557	0.9932	0.9980 (89)	
MIT 2	18.7303	18.9238	19.1952	19.5275	19.7862	19.9230	19.9484	19.9477	19.8774	19.5422	19.0740	18.7026 (90)	
Living area fraction										fLA = Living area / (4) =		0.2671 (91)	
MIT	18.9848	19.1781	19.4499	19.7828	20.0483	20.1941	20.2257	20.2234	20.1424	19.7958	19.3261	18.9553 (92)	
Temperature adjustment												0.0000	
adjusted MIT	18.9848	19.1781	19.4499	19.7828	20.0483	20.1941	20.2257	20.2234	20.1424	19.7958	19.3261	18.9553 (93)	

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9963	0.9903	0.9757	0.9349	0.8369	0.6532	0.4618	0.5108	0.7733	0.9531	0.9917	0.9973	(94)
Useful gains	550.5959	668.3109	752.2459	793.5130	745.8958	567.3264	384.8788	402.3372	573.4295	620.4971	551.6346	514.2677	(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	1621.1599	1572.6852	1423.2019	1183.4674	906.0465	601.5108	389.8581	410.4020	652.0600	998.0269	1332.2536	1614.5890	(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	796.4996	607.7395	499.1912	280.7671	119.1522	0.0000	0.0000	0.0000	0.0000	280.8821	562.0457	818.6390	(98)
Space heating												3964.9165	(98)
Space heating per m2												(98) / (4) =	42.7899 (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	1010.7475	795.6948	815.7858	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8696	0.9285	0.9097	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	878.9121	738.8376	742.1425	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1116.0499	1072.9444	1021.3186	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	170.7392	248.5754	207.7070	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												627.0216	(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	42.6848	62.1439	51.9267	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling												156.7554	(107)
Space cooling per m2												1.6917	(108)
Energy for space heating												42.7899	(99)
Energy for space cooling												1.6917	(108)
Total												44.4817	(109)
Dwelling Fabric Energy Efficiency (DFEE)												44.5	(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	46.3300 (1b)	x 2.3800 (2b)	= 110.2654 (1b) - (3b)
First floor	46.3300 (1c)	x 2.5900 (2c)	= 119.9947 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	92.6600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 230.2601 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					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) = 0.1303 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3803 (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) =	0.3232 (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	0.4121	0.4041	0.3960	0.3556	0.3475	0.3071	0.3071	0.2990	0.3232	0.3475	0.3636	0.3798 (22b)
Effective ac	0.5849	0.5816	0.5784	0.5632	0.5604	0.5471	0.5471	0.5447	0.5522	0.5604	0.5661	0.5721 (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 Semi-glazed door			2.0000	1.2000	2.4000		(26a)
TER Opening Type (Uw = 1.40)			16.2500	1.3258	21.5436		(27)
Heat Loss Floor 1			46.3300	0.1300	6.0229		(28a)
render	95.9100	18.2500	77.6600	0.1800	13.9788		(29a)
External Roof 1	46.3300		46.3300	0.1300	6.0229		(30)
Total net area of external elements Aum(A, m ²)			188.5700				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		49.9682		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.5237 (36)
Total fabric heat loss						(33) + (36) =	60.4919 (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	44.4463	44.1957	43.9500	42.7963	42.5805	41.5756	41.5756	41.3895	41.9627	42.5805	43.0171	43.4737 (38)
Heat transfer coeff	104.9381	104.6875	104.4419	103.2882	103.0723	102.0675	102.0675	101.8814	102.4545	103.0723	103.5090	103.9655 (39)
Average = Sum(39)m / 12 =												103.2872 (39)
HLP	1.1325	1.1298	1.1272	1.1147	1.1124	1.1015	1.1015	1.0995	1.1057	1.1124	1.1171	1.1220 (40)
HLP (average)												1.1147 (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												2.6604 (42)
Average daily hot water use (litres/day)												97.3847 (43)
Daily hot water use	107.1231	103.2277	99.3324	95.4370	91.5416	87.6462	87.6462	91.5416	95.4370	99.3324	103.2277	107.1231 (44)
Energy conte	158.8605	138.9404	143.3741	124.9970	119.9376	103.4970	95.9052	110.0526	111.3670	129.7875	141.6732	153.8479 (45)
Energy content (annual)										Total = Sum(45)m =		1532.2400 (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												

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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)
	33.7579	29.5248	30.4670	26.5619	25.4867	21.9931	20.3799	23.3862	23.6655	27.5798	30.1056	32.6927 (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	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	133.0203	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.3026	19.8090	16.1098	12.1961	9.1167	7.6967	8.3166	10.8102	14.5095	18.4231	21.5025	22.9225	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	243.8872	246.4180	240.0405	226.4636	209.3251	193.2174	182.4564	179.9256	186.3031	199.8801	217.0185	233.1263	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	36.3020	(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)	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	-106.4163	(71)
Water heating gains (Table 5)	45.3735	43.9358	40.9503	36.8915	34.2564	30.5460	27.3923	31.4330	32.8687	37.0697	41.8133	43.9418	(72)
Total internal gains	374.4694	373.0689	360.0066	338.4573	315.6043	294.3662	281.0714	285.0750	296.5875	318.2790	343.2404	362.8966	(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					5.3500	10.6334	0.6300	0.7000			0.7700			17.3859 (74)
South					8.8200	46.7521	0.6300	0.7000			0.7700			126.0205 (78)
West					2.0800	19.6403	0.6300	0.7000			0.7700			12.4848 (80)
Solar gains	155.8912	264.0374	359.5823	446.4838	503.6884	502.3532	483.3082	439.7965	389.2930	291.1404	186.3921	133.6540	(83)	
Total gains	530.3607	637.1063	719.5889	784.9410	819.2927	796.7194	764.3797	724.8715	685.8805	609.4194	529.6325	496.5506	(84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil _m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
tau	61.3192	61.4660	61.6105	62.2987	62.4292	63.0438	63.0438	63.1589	62.8056	62.4292	62.1658	61.8928		
alpha	5.0879	5.0977	5.1074	5.1532	5.1619	5.2029	5.2029	5.2106	5.1870	5.1619	5.1444	5.1262		
util living area	0.9984	0.9956	0.9881	0.9641	0.8958	0.7457	0.5717	0.6213	0.8508	0.9759	0.9963	0.9989	(86)	
MIT	19.7565	19.9307	20.1824	20.4971	20.7707	20.9395	20.9876	20.9813	20.8739	20.5130	20.0710	19.7259	(87)	
Th 2	19.9744	19.9766	19.9787	19.9888	19.9907	19.9996	19.9996	20.0012	19.9962	19.9907	19.9869	19.9829	(88)	
util rest of house	0.9979	0.9941	0.9839	0.9502	0.8548	0.6569	0.4498	0.4989	0.7809	0.9639	0.9948	0.9985	(89)	
MIT 2	18.8400	19.0153	19.2665	19.5813	19.8334	19.9712	19.9964	19.9958	19.9262	19.6024	19.1640	18.8163	(90)	
Living area fraction									fLA = Living area / (4) =			0.2671	(91)	
MIT	19.0848	19.2598	19.5111	19.8259	20.0838	20.2298	20.2612	20.2590	20.1793	19.8456	19.4062	19.0593	(92)	
Temperature adjustment												0.0000		
adjusted MIT	19.0848	19.2598	19.5111	19.8259	20.0838	20.2298	20.2612	20.2590	20.1793	19.8456	19.4062	19.0593	(93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9972	0.9927	0.9813	0.9475	0.8592	0.6789	0.4828	0.5319	0.7954	0.9617	0.9936	0.9980	(94)
Useful gains	528.8759	632.4664	706.1465	743.7286	703.9219	540.9284	369.0168	385.5696	545.5708	586.0785	526.2296	495.5479	(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	1551.4915	1503.2888	1358.9072	1128.5203	864.1329	574.6220	373.6845	393.1643	622.8535	952.9690	1273.8076	1544.8548	(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	760.8259	585.1927	485.6540	277.0500	119.1970	0.0000	0.0000	0.0000	0.0000	272.9665	538.2561	780.6843	(98)
Space heating												3819.8266	(98)
Space heating per m2										(98) / (4) =		41.2241	(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	959.4344	755.2994	774.2987	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8678	0.9292	0.9108	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	832.5975	701.8495	705.2018	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1032.1691	992.2435	947.8832	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	143.6915	216.0532	180.5550	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												540.2996	(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	35.9229	54.0133	45.1387	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												135.0749 (107)
Space cooling per m2												1.4577 (108)
Energy for space heating												41.2241 (99)
Energy for space cooling												1.4577 (108)
Total												42.6819 (109)
Target Fabric Energy Efficiency (TFEE)												49.1 (109)