

Calculated by Lambda Calculation Engine SAP Engine version v94.0.1.1

RRN: 5450-4820-7042-2402-8992
Address: CS2 Baseline;

1. Overall dwelling dimensions

Ground floor(main)	38.38	2.07	79.4466	(1b)–	(3b)
First floor(main)	37.73	2.66	100.3618	(1c)–	(3c)
Total floor area	76.1100				(4)
Dwelling volume (m³)			179.8084		(5)

2. Ventilation rate

Number of chimneys	0	(6a)
Number of open flues	0	(6b)
Number of intermittent fans	0	(7a)
Number of passive vents	0	(7b)
Number of flueless gas fires	0	(7c)
	ach	
Infiltration due to chimneys, flues and fans	0.0000	(8)
Number of storeys	2	(9)
Additional infiltration	0.1000	(10)
Structural infiltration	0.3500	(11)
Floor infiltration	0.0000	(12)
0.05 if no draught lobby	0.0500	(13)
% of windows and doors draught proofed	100	(14)
Window infiltration	0.0500	(15)
Infiltration rate	0.5500	(18)
Number of sides sheltered	2	(19)
Shelter factor	0.8500	(20)
Infiltration rate incorporating shelter factor	0.4675	(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	0.5961	0.5844	0.5727	0.5143	0.5026	0.4441	0.4441	0.4324	0.4675	0.5026	0.5259	0.5493	(22b)
Effective ach	0.6776	0.6707	0.6640	0.6322	0.6263	0.5986	0.5986	0.5935	0.6093	0.6263	0.6383	0.6509	(25)

3. Heat losses and heat loss parameter

Element					Net	U-value		A x U	K-value	A x K			
Element													(Main)
Doors					3.7000	3.0000		11.1000				(26)	
Windows (1)					16.1600	4.0268		65.0738				(27)	
Windows (2)					0.0000	0.0000		0.0000				(27)	
Ground Floor					38.3800	0.6700		25.7146				(28a)	
Walls					96.4300	1.9500		188.0385				(29a)	
Roof					38.3800	0.3000		11.5140				(30)	
Total area of elements (whole dwelling)					193.0500							(31)	
Party wall (main)					0.0000	0.0000		0.0000				(32)	
Fabric heat loss								301.4409				(33)	
Thermal mass parameter								250.0000				(35)	
Thermal bridges (0.15 × total area) (36)								28.9575					
Total fabric heat loss								330.3984				(37)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Vent loss	40.2093	39.8000	39.3988	37.5143	37.1617	35.5204	35.5204	35.2164	36.1526	37.1617	37.8750	38.6207	(38)
Heat transfer coeff	370.6077	370.1984	369.7972	367.9127	367.5601	365.9188	365.9188	365.6149	366.5510	367.5601	368.2734	369.0191	(39)
Heat transfer coeff (average)										367.9110			(39)
HLP	4.8694	4.8640	4.8587	4.8340	4.8293	4.8078	4.8078	4.8038	4.8161	4.8293	4.8387	4.8485	(40)
HLP (average)										4.8339			(40)
Days in month	31.0000	28.0000	31.0000	30.0000	31.0000	30.0000	31.0000	31.0000	30.0000	31.0000	30.0000	31.0000	(41)

4. Water heating energy requirements

[illegible]

Fghrs PV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Output from w/h	186.5696	164.0503	171.3634	152.3322	148.3509	131.2212	124.7533	138.6448	138.9488	158.0226	168.7067	181.6477	(64)
Output from water heater(annual)										1864.6117			(64)
Heat gains (kWh)	76.3321	67.4607	71.2760	64.4869	63.6244	57.4675	55.7782	60.3971	60.0369	66.8402	69.9314	74.6955	(65)
5. Internal gains													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic	143.0947	143.0947	143.0947	143.0947	143.0947	143.0947	143.0947	143.0947	143.0947	143.0947	143.0947	143.0947	(66)
Lighting	47.0535	41.7925	33.9880	25.7311	19.2343	16.2384	17.5462	22.8072	30.6117	38.8686	45.3654	48.3613	(67)
Appliances	315.1031	318.3729	310.1331	292.5917	270.4487	249.6375	235.7343	232.4645	240.7043	258.2457	280.3887	301.1999	(68)
Cooking	51.6944	51.6944	51.6944	51.6944	51.6944	51.6944	51.6944	51.6944	51.6944	51.6944	51.6944	51.6944	(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	-95.3964	-95.3964	-95.3964	-95.3964	-95.3964	-95.3964	-95.3964	-95.3964	-95.3964	-95.3964	-95.3964	-95.3964	(71)
Water heating	102.5969	100.3880	95.8011	89.5652	85.5166	79.8160	74.9706	81.1789	83.3846	89.8390	97.1270	100.3972	(72)
Total internal	564.1461	559.9460	539.3148	507.2805	474.5922	445.0845	427.6437	435.8431	454.0933	486.3459	522.2737	549.3511	(73)
6. Solar gains													
(calculation for January)													
Orientation			Area				Gains[W]						(76)
East/West(1)(main)			16.1600				130.8696						(76)
East/West(2)(main)			0.0000				0.0000						(76)
					total:		130.8696						(83-1)
Solar gains	130.8696	256.0088	421.6100	614.8930	753.5744	771.4175	734.4209	630.8567	490.3498	303.7760	163.1790	107.6208	(83)
Total gains	695.0157	815.9548	960.9247	1122.1735	1228.1667	1216.5020	1162.0647	1066.6999	944.4431	790.1219	685.4527	656.9719	(84)
7. Mean internal temperature													
Living room temperature during heating periods Th1										21.0000			(85)
Heating system responsiveness										0.0000			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	14.2615	14.2773	14.2927	14.3660	14.3797	14.4442	14.4442	14.4562	14.4193	14.3797	14.3519	14.3229	
alpha	1.9508	1.9518	1.9528	1.9577	1.9586	1.9629	1.9629	1.9637	1.9613	1.9586	1.9568	1.9549	
external 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	
util living area	0.9875	0.9821	0.9712	0.9488	0.9093	0.8449	0.7632	0.7980	0.9040	0.9635	0.9830	0.9889	(86)
MIT 1	17.6590	17.8592	18.2868	18.8939	19.5335	20.1144	20.4640	20.4003	19.9016	19.0851	18.2713	17.6237	(87)
th2													(88)
util rest	0.9824	0.9746	0.9578	0.9201	0.8437	0.6811	0.4121	0.4810	0.7948	0.9369	0.9742	0.9843	(89)
MIT 2	14.1867	14.4738	15.0857	15.9472	16.8304	17.5695	17.8963	17.8640	17.3436	16.2331	15.0694	14.1361	(90)
Living area fraction =											0.2500		(91)
MIT	15.0549	15.3202	15.8861	16.6840	17.5063	18.2058	18.5383	18.4982	17.9832	16.9462	15.8700	15.0082	(92)
Temperature adjustment											0.0000		
adjusted MIT	15.0549	15.3202	15.8861	16.6840	17.5063	18.2058	18.5383	18.4982	17.9832	16.9462	15.8700	15.0082	(93)
8. Space heating requirement													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9725	0.9616	0.9398	0.8964	0.8213	0.6890	0.4929	0.5496	0.7860	0.9173	0.9617	0.9753	(94)
Useful gains W	675.8912	784.6130	903.0350	1005.8755	1008.7156	838.1976	572.8145	586.2913	742.3010	724.7732	659.1779	640.7411	(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	3985.8352	3857.5523	3470.9539	2863.8310	2134.1616	1319.4273	709.2679	767.1157	1423.3872	2332.6186	3229.7614	3988.4145	(97)
Month fraction	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	2462.5984	2065.0152	1910.5317	1337.7279	837.3318	0.0000	0.0000	0.0000	0.0000	1196.2369	1850.8201	2490.6690	(98)
Space heating										14150.9310			(98)
Space heating per m2										185.9274			(99)
8c. Space cooling requirement													
- not applicable													
9. Energy requirements													
Fraction of space heat from secondary											0.1000		(201)
Fraction of space heat from main system											0.9000		(202)
Fraction of total space heat from main system 1											0.9000		(204)
Efficiency of main heating system 1											100.0000		(206)
Efficiency of secondary heating system											100.0000		(208)
Space heating requirement											12735.8379		(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	2462.5984	2065.0152	1910.5317	1337.7279	837.3318	0.0000	0.0000	0.0000	0.0000	1196.2369	1850.8201	2490.6690	(98)
Space heating efficiency (main heating system)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	2216.3385	1858.5137	1719.4785	1203.9551	753.5986	0.0000	0.0000	0.0000	0.0000	1076.6132	1665.7381	2241.6021	(211)
Space heating fuel (secondary)	246.2598	206.5015	191.0532	133.7728	83.7332	0.0000	0.0000	0.0000	0.0000	119.6237	185.0820	249.0669	(215)
Water heating requirement	186.5696	164.0503	171.3634	152.3322	148.3509	131.2212	124.7533	138.6448	138.9488	158.0226	168.7067	181.6477	(64)
Efficiency of water heater	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Water heating fuel	186.5696	164.0503	171.3634	152.3322	148.3509	131.2212	124.7533	138.6448	138.9488	158.0226	168.7067	181.6477	(219)
Space cooling fuel	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Annual totals:											kWh/year		
Space heating fuel - main system											12735.8379		(211)
Space heating fuel - secondary											1415.0931		(215)
Water heating fuel											1864.6117		(219)
Electricity for pumps and fans											0.0000		(231)
Electricity for lighting											332.3921		(232)
Total delivered energy for all uses											16347.9349		(238)

10. Fuel costs

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating – main system	12735.8379	5.5000	700.4711	(240)
Space heating – secondary	1415.0931	15.2900	216.3677	(242)
Water heating	1864.6117	0.0000	0.0000	(247)
Water heating:				
High-rate fraction			0.0350	(243)
Low-rate fraction			0.9650	(244)
High-rate cost	65.2137	15.2900	9.9712	(245)
Low-rate cost	1799.3980	5.5000	98.9669	(246)
Pumps and fans for heating	0.0000	0.0000	0.0000	(249)
Electricity for lighting	332.3921	14.3110	47.5686	(250)
Additional standing charges			24.0000	(251)
Total energy cost			1097.3455	(255)

11. SAP rating

Energy cost deflator			0.4200	(256)
Energy cost factor (ECF)			3.8055	(257)
SAP value			46.7701	
SAP rating			47	(258)
SAP BAND			E	

12. Carbon dioxide emissions

	Energy kWh/year	Emission factor	Emissions kg/year	
Space heating – main system	12735.8379	0.5190	6609.8999	(261)
Space heating – secondary	1415.0931	0.5190	734.4333	(263)
Water heating	1864.6117	0.5190	967.7335	(264)
Space and water heating			8312.0667	(265)
Energy for lighting	332.3921	0.5190	172.5115	(268)
Total kg/year			8484.5782	(272)
			kg/m2/year	
CO2 emissions per m2			111.48	(273)
EI value			24.6822	
EI rating			25	(274)
EI band			F	

SAP 2012 WORKSHEET (Version 9.94, September 2019)
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 15 Mar 2021

Calculated by Lambda Calculation Engine SAP Engine version v94.0.1.1

RRN: 5450-4820-7042-2402-8992
Address: CS2 Baseline;

1. Overall dwelling dimensions

Ground floor(main)	38.38	2.07	79.4466	(1b)–	(3b)
First floor(main)	37.73	2.66	100.3618	(1c)–	(3c)
Total floor area	76.1100				(4)
Dwelling volume (m³)			179.8084		(5)

2. Ventilation rate

Number of chimneys	0	(6a)
Number of open flues	0	(6b)
Number of intermittent fans	0	(7a)
Number of passive vents	0	(7b)
Number of flueless gas fires	0	(7c)
	ach	
Infiltration due to chimneys, flues and fans	0.0000	(8)
Number of storeys	2	(9)
Additional infiltration	0.1000	(10)
Structural infiltration	0.3500	(11)
Floor infiltration	0.0000	(12)
0.05 if no draught lobby	0.0500	(13)
% of windows and doors draught proofed	100	(14)
Window infiltration	0.0500	(15)
Infiltration rate	0.5500	(18)
Number of sides sheltered	2	(19)
Shelter factor	0.8500	(20)
Infiltration rate incorporating shelter factor	0.4675	(21)

3. Heat losses and heat loss parameter

Element	Net	U-value	A x U	K-value	A x K
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Element													(Main)
Doors					3. 7000	3. 0000		11. 1000					(26)
Windows(1)					0. 0000	4. 0268		0. 0000					(27)
Windows(2)					16. 1600	1. 5038		24. 3008					(27)
Ground Floor					38. 3800	0. 2500		9. 5950					(28a)
Walls					96. 4300	0. 3000		28. 9290					(29a)
Roof					38. 3800	0. 3000		11. 5140					(30)
Total area of elements (whole dwelling)					193. 0500								(31)
Party wall (main)					0. 0000	0. 0000		0. 0000					(32)
Fabric heat loss								85. 4388					(33)
Thermal mass parameter								250. 0000					(35)
Thermal bridges (0.15 × total area)								28. 9575					(36)
Total fabric heat loss								114. 3963					(37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Vent loss	40. 2093	39. 8000	39. 3988	37. 5143	37. 1617	35. 5204	35. 5204	35. 2164	36. 1526	37. 1617	37. 8750	38. 6207	(38)
Heat transfer coeff	154. 6055	154. 1962	153. 7950	151. 9105	151. 5580	149. 9166	149. 9166	149. 6127	150. 5488	151. 5580	152. 2712	153. 0169	(39)
Heat transfer coeff (average)										151. 9088			(39)
HLP	2. 0313	2. 0260	2. 0207	1. 9959	1. 9913	1. 9697	1. 9697	1. 9657	1. 9780	1. 9913	2. 0007	2. 0105	(40)
HLP (average)										1. 9959			(40)
Days in month	31. 0000	28. 0000	31. 0000	30. 0000	31. 0000	30. 0000	31. 0000	31. 0000	30. 0000	31. 0000	30. 0000	31. 0000	(41)

4. Water heating energy requirements

Assumed occupancy													2. 3849	(42)
Average daily hot water use (litres/day)													95. 6228	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	105. 1850	101. 3601	97. 5352	93. 7103	89. 8854	86. 0605	86. 0605	89. 8854	93. 7103	97. 5352	101. 3601	105. 1850		(44)
Energy content	155. 9864	136. 4267	140. 7801	122. 7355	117. 7677	101. 6245	94. 1701	108. 0615	109. 3521	127. 4394	139. 1100	151. 0645		(45)
Energy content (annual)											1504. 5185			(45)
Distribution loss	23. 3980	20. 4640	21. 1170	18. 4103	17. 6651	15. 2437	14. 1255	16. 2092	16. 4028	19. 1159	20. 8665	22. 6597		(46)
Cylinder volume											210. 0000			(47)
Cylinder loss factor (kWh/litre/day)											0. 0094			(51)
Volume factor											0. 8298			(52)
Temperature factor											0. 6000			(53)
Energy lost from cylinder in kWh/day											0. 9866			(55)
Total storage loss	30. 5833	27. 6236	30. 5833	29. 5967	30. 5833	29. 5967	30. 5833	30. 5833	29. 5967	30. 5833	29. 5967	30. 5833		(56)
Net storage loss	20. 3888	18. 4157	20. 3888	19. 7311	20. 3888	19. 7311	20. 3888	20. 3888	19. 7311	20. 3888	19. 7311	20. 3888		(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)
Combi 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		(61)
Total	176. 3752	154. 8424	161. 1690	142. 4667	138. 1565	121. 3557	114. 5589	128. 4504	129. 0833	147. 8282	158. 8412	171. 4533		(62)
WW heat rec.	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000		(G10)
Solar input	24. 8987	41. 5487	70. 7622	94. 8353	117. 1611	115. 1880	113. 6657	99. 3103	77. 7799	53. 1145	29. 5334	20. 8359		(63)
Solar input(sum of months)											858. 6337			(63)
Flue gas heat rec.	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000		(66)
Fghrs PV	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000	0. 0000		
Output from w/h	151. 4766	113. 2937	90. 4067	47. 6313	20. 9954	6. 1677	0. 8932	29. 1401	51. 3034	94. 7137	129. 3078	150. 6174		(64)
Output from water heater(annual)											885. 9469			(64)
Heat gains (kWh)	68. 1765	60. 0945	63. 1205	56. 5945	55. 4688	49. 5751	47. 6226	52. 2415	52. 1445	58. 6847	62. 0390	66. 5400		(65)

5. Internal gains

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic	143. 0947	143. 0947	143. 0947	143. 0947	143. 0947	143. 0947	143. 0947	143. 0947	143. 0947	143. 0947	143. 0947	143. 0947	(66)
Lighting	47. 1484	41. 8768	34. 0565	25. 7830	19. 2731	16. 2711	17. 5815	22. 8531	30. 6734	38. 9470	45. 4569	48. 4588	(67)
Appliances	315. 1031	318. 3729	310. 1331	292. 5917	270. 4487	249. 6375	235. 7343	232. 4645	240. 7043	258. 2457	280. 3887	301. 1999	(68)
Cooking	51. 6944	51. 6944	51. 6944	51. 6944	51. 6944	51. 6944	51. 6944	51. 6944	51. 6944	51. 6944	51. 6944	51. 6944	(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	-95. 3964	-95. 3964	-95. 3964	-95. 3964	-95. 3964	-95. 3964	-95. 3964	-95. 3964	-95. 3964	-95. 3964	-95. 3964	-95. 3964	(71)
Water heating	91. 6351	89. 4263	84. 8393	78. 6034	74. 5549	68. 8543	64. 0089	70. 2171	72. 4229	78. 8772	86. 1653	89. 4355	(72)
Total internal	553. 2792	549. 0685	528. 4215	496. 3707	463. 6693	434. 1555	416. 7173	424. 9274	443. 1932	475. 4625	511. 4034	538. 4868	(73)

6. Solar gains

(calculation for January)													
Orientation			Area					Gains[W]					
East/West(1) (main)			0. 0000					0. 0000					(76)
East/West(2) (main)			16. 1600					96. 9975					(76)
					total:			96. 9975					(83-1)
Solar gains	96. 9975	189. 7477	312. 4874	455. 7442	558. 5316	571. 7565	544. 3355	467. 5762	363. 4358	225. 1516	120. 9445	79. 7660	(83)
Total gains	650. 2767	738. 8162	840. 9089	952. 1149	1022. 2009	1005. 9120	961. 0529	892. 5035	806. 6290	700. 6141	632. 3479	618. 2528	(84)

7. Mean internal temperature

Living room temperature during heating periods Th1													21. 0000	(85)
Heating system responsiveness													0. 0000	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
tau	34. 1865	34. 2772	34. 3666	34. 7930	34. 8739	35. 2557	35. 2557	35. 3273	35. 1077	34. 8739	34. 7105	34. 5414		
alpha	3. 2791	3. 2851	3. 2911	3. 3195	3. 3249	3. 3504	3. 3504	3. 3552	3. 3405	3. 3249	3. 3140	3. 3028		
external 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		
util living area	0. 9918	0. 9868	0. 9745	0. 9423	0. 8742	0. 7516	0. 6106	0. 6622	0. 8559	0. 9614	0. 9871	0. 9931		(86)
MIT 1	19. 2867	19. 4416	19. 7326	20. 1302	20. 4936	20. 7609	20. 8731	20. 8522	20. 6366	20. 1625	19. 6594	19. 2649		(87)
th2														(88)
util rest	0. 9889	0. 9819	0. 9644	0. 9173	0. 8142	0. 6247	0. 4147	0. 4707	0. 7616	0. 9395	0. 9814	0. 9906		(89)
MIT 2	17. 1257	17. 3528	17. 7752	18. 3490	18. 8360	19. 1532	19. 2414	19. 2342	19. 0326	18. 4088	17. 6826	17. 1031		(90)
Living area fraction =											0. 2500			(91)
MIT	17. 6660	17. 8751	18. 2646	18. 7943	19. 2504	19. 5552	19. 6494	19. 6387	19. 4337	18. 8473	18. 1769	17. 6436		(92)
Temperature adjustment											0. 0000			
adjusted MIT	17. 6660	17. 8751	18. 2646	18. 7943	19. 2504	19. 5552	19. 6494	19. 6387	19. 4337	18. 8473	18. 1769	17. 6436		(93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Utilisation	0.9844	0.9758	0.9553	0.9065	0.8101	0.6430	0.4541	0.5085	0.7679	0.9302	0.9754	0.9867	(94)
Useful gains W	640.1479	720.9024	803.3569	863.0557	828.1125	646.8214	436.4473	453.8755	619.3803	651.6864	616.8163	610.0482	(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	2066.4582	2000.7044	1809.3388	1503.0559	1144.3299	742.8688	457.1493	484.5521	802.9761	1249.9386	1686.6859	2057.1047	(97)
Month fraction	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	1061.1748	860.0270	748.4506	460.8002	235.2657	0.0000	0.0000	0.0000	0.0000	445.0997	770.3061	1076.6100	(98)
Space heating										5657.7341			(98)
Space heating per m2										74.3363			(99)

8c. Space cooling requirement

- not applicable

9. Energy requirements

Fraction of space heat from secondary											0.1000		(201)
Fraction of space heat from main system											0.9000		(202)
Fraction of total space heat from main system 1											0.9000		(204)
Efficiency of main heating system 1											100.0000		(206)
Efficiency of secondary heating system											100.0000		(208)
Space heating requirement											5091.9607		(211)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Space heating requirement	1061.1748	860.0270	748.4506	460.8002	235.2657	0.0000	0.0000	0.0000	0.0000	445.0997	770.3061	1076.6100	(98)
Space heating efficiency (main heating system)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	955.0573	774.0243	673.6055	414.7201	211.7391	0.0000	0.0000	0.0000	0.0000	400.5897	693.2755	968.9490	(211)
Space heating fuel (secondary)	106.1175	86.0027	74.8451	46.0800	23.5266	0.0000	0.0000	0.0000	0.0000	44.5100	77.0306	107.6610	(215)
Water heating requirement	151.4766	113.2937	90.4067	47.6313	20.9954	6.1677	0.8932	29.1401	51.3034	94.7137	129.3078	150.6174	(64)
Efficiency of water heater	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Water heating fuel	151.4766	113.2937	90.4067	47.6313	20.9954	6.1677	0.8932	29.1401	51.3034	94.7137	129.3078	150.6174	(219)
Space cooling fuel	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Annual totals:											kWh/year		
Space heating fuel - main system											5091.9607		(211)
Space heating fuel - secondary											565.7734		(215)
Water heating fuel											885.9469		(219)
pump for solar water heating											50.0000		(230g)
Electricity for pumps and fans											50.0000		(231)
Electricity for lighting											333.0621		(232)
PV generation											-1727.2394		(233)
Wind generation											-3575.5408		(234)
Total delivered energy for all uses											1623.9630		(238)

10. Fuel costs

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system	5091.9607	5.5000	280.0578	(240)
Space heating - secondary	565.7734	15.2900	86.5068	(242)
Water heating	885.9469	0.0000	0.0000	(247)
Water heating:				
High-rate fraction			0.1240	(243)
Low-rate fraction			0.8760	(244)
High-rate cost	109.8937	15.2900	16.8027	(245)
Low-rate cost	776.0532	5.5000	42.6829	(246)
Pumps and fans for heating	0.0000	50.0000	7.1555	(249)
Electricity for lighting	333.0621	14.3110	47.6645	(250)
Additional standing charges			24.0000	(251)
Electricity generated - PVs	-1727.2394	13.7505	-237.5041	(252)
Electricity generated - wind	-3575.5408	13.9747	-499.6711	(252)
Total energy cost			-232.3049	(255)

11. SAP rating

Energy cost deflator	0.4200	(256)
Energy cost factor (ECF)	-0.8056	(257)
SAP value	111.2383	
SAP rating	111	(258)
SAP BAND	A	

12. Carbon dioxide emissions

	Energy kWh/year	Emission factor	Emissions kg/year	
Space heating - main system	5091.9607	0.5190	2642.7276	(261)
Space heating - secondary	565.7734	0.5190	293.6364	(263)
Water heating	885.9469	0.5190	459.8065	(264)
Space and water heating			3396.1704	(265)
Pumps and fans	0.5190	50.0000	25.9500	(267)
Energy for lighting	333.0621	0.5190	172.8592	(268)
Electricity generated - PVs	-1727.2394	0.5190	-896.4372	(269)
Electricity generated - wind	-3575.5408	0.5190	-1855.7056	(269)
Total kg/year			842.8367	(272)
			kg/m2/year	
CO2 emissions per m2			11.07	(273)
EI value			90.6746	
EI rating			91	(274)
EI band			B	