

Full SAP Calculation Printout



Property Reference	UNIT 41			Issued on Date	02/07/2025
Assessment Reference	UNIT 41	Prop Type Ref			
Property	Flat 42, Alexander House, 205 Kings Road, READING, RG1 4FW				
SAP Rating	85 B	DER	4.67	TER	12.97
Environmental	97 A	% DER < TER			63.99
CO ₂ Emissions (t/year)	0.18	DFEE	41.99	TFEE	42.44
Compliance Check	See BREL	% DFEE < TFEE			1.06
% DPER < TPER	28.94	DPER	49.18	TPER	69.21
Assessor Details	Mr. Ondrej Gajdos			Assessor ID	W452-0001
Client					

SAP 10 WORKSHEET FOR New Build (As Built) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	43.2000 (1b)	2.5000 (2b)	108.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	43.2000		108.0000 (4)
Dwelling volume			108.0000 (5)

2. Ventilation rate

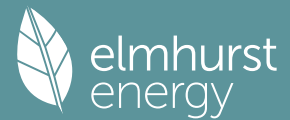
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1852 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.8400 (17)
Infiltration rate	0.3772 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2923 (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	0.3727	0.3654	0.3581	0.3216	0.3142	0.2777	0.2777	0.2704	0.2923	0.3142	0.3289	0.3435 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.5695	0.5668	0.5641	0.5517	0.5494	0.5386	0.5386	0.5366	0.5427	0.5494	0.5541	0.5590 (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
Main dwelling							
1			6.5000	1.1450	7.4427		(27)
2			6.5000	1.1450	7.4427		(27)
1			2.1000	1.0000	2.1000		(26)
top floor exposed new	25.2500	13.0000	12.2500	0.2000	2.4500	18.0000	220.5000 (29a)
corridor new	25.2500	2.1000	23.1500	0.2300	5.3245	14.0000	324.1000 (29a)
flat roof new	20.8000		20.8000	0.1300	2.7040	9.0000	187.2000 (30)
roof terrace new	22.4000		22.4000	0.1300	2.9120	9.0000	201.6000 (30)
Total net area of external elements Aum(A, m ²)			93.7000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 30.3760		(33)
Main dwelling							
pw			21.5000	0.0000	0.0000	20.0000	430.0000 (32)
pf			43.2000			30.0000	1296.0000 (32d)
iw			56.0000			9.0000	504.0000 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 3163.4000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							73.2269 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

Full SAP Calculation Printout



E2 Other lintels (including other steel lintels)	6.2000	0.0470	0.2914	
E3 Sill	5.2000	0.0150	0.0780	
E4 Jamb	14.2000	0.0470	0.6674	
E15 Flat roof with parapet	10.0000	0.1970	1.9700	
E18 Party wall between dwellings	5.0000	0.2400	1.2000	
E24 Eaves (insulation at ceiling level - inverted)	10.0000	0.0500	0.5000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				4.7068 (36)
Point Thermal bridges				0.0000
Total fabric heat loss		(33) + (36) + (36a) =		35.0828 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 20.2954	Feb 20.1993	Mar 20.1050	Apr 19.6625	May 19.5797	Jun 19.1943	Jul 19.1943	Aug 19.1229	Sep 19.3427	Oct 19.5797	Nov 19.7472	Dec 19.9223 (38)
Heat transfer coeff	55.3782	55.2820	55.1878	54.7453	54.6625	54.2771	54.2771	54.2057	54.4255	54.6625	54.8300	55.0051 (39)
Average = Sum(39)m / 12 =												54.7449
HLP	Jan 1.2819	Feb 1.2797	Mar 1.2775	Apr 1.2673	May 1.2653	Jun 1.2564	Jul 1.2564	Aug 1.2548	Sep 1.2598	Oct 1.2653	Nov 1.2692	Dec 1.2733 (40)
HLP (average)												1.2672
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

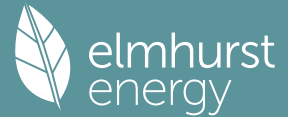
4. Water heating energy requirements (kWh/year)												
Assumed occupancy												1.4937 (42)
Hot water usage for mixer showers												0.0000 (42a)
Hot water usage for baths	21.3086	20.9922	20.5465	19.7248	19.1096	18.4273	18.0588	18.5013	18.9832	19.7132	20.5518	21.2366 (42b)
Hot water usage for other uses	29.9274	28.8392	27.7509	26.6626	25.5744	24.4861	24.4861	25.5744	26.6626	27.7509	28.8392	29.9274 (42c)
Average daily hot water use (litres/day)												46.9632 (43)
Daily hot water use	51.2361	49.8313	48.2974	46.3875	44.6839	42.9134	42.5449	44.0757	45.6458	47.4641	49.3910	51.1640 (44)
Energy conte	81.1454	70.9592	74.2313	63.5021	60.1531	52.7670	51.4544	54.5749	56.2858	64.4083	70.3665	80.1105 (45)
Energy content (annual)										Total = Sum(45)m =		779.9587
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)
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 heat required for water heating calculated for each month	68.9736	60.3153	63.0966	53.9768	51.1302	44.8520	43.7362	46.3887	47.8430	54.7471	59.8115	68.0939 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
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 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	68.9736	60.3153	63.0966	53.9768	51.1302	44.8520	43.7362	46.3887	47.8430	54.7471	59.8115	68.0939 (64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				662.9649 (64)
Electric shower(s)	39.4528	35.1527	38.3854	36.6307	37.3181	35.5979	36.7845	37.3181	36.6307	38.3854	37.6636	39.4528 (64a)
												448.7728 (64a)
Heat gains from water heating, kWh/month	27.1066	23.8670	25.3705	22.6519	22.1121	20.1125	20.1302	20.9267	21.1184	23.2831	24.3688	26.8867 (65)

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	65.3971	72.4040	65.3971	67.5770	65.3971	67.5770	65.3971	65.3971	67.5770	65.3971	67.5770	65.3971 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	129.6572	131.0026	127.6121	120.3943	111.2830	102.7197	96.9989	95.6534	99.0439	106.2618	115.3730	123.9363 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687 (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)	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498 (71)
Water heating gains (Table 5)	36.4336	35.5164	34.1002	31.4610	29.7205	27.9340	27.0567	28.1273	29.3311	31.2945	33.8455	36.1380 (72)
Total internal gains	276.8941	284.3291	272.5156	264.8384	251.8068	243.6369	234.8589	234.5840	241.3583	248.3596	262.2018	270.8777 (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	
West	6.5000		19.6403		0.6300		0.8000		0.7700		44.5887 (80)	
West	6.5000		19.6403		0.6300		0.8000		0.7700		44.5887 (80)	
Solar gains	89.1773	174.4498	287.2939	419.0010	513.5015	525.6602	500.4499	429.8791	334.1347	206.9993	111.1936	73.3351 (83)
Total gains	366.0714	458.7789	559.8095	683.8395	765.3083	769.2970	735.3088	664.4631	575.4930	455.3589	373.3954	344.2128 (84)

7. Mean internal temperature (heating season)												
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)

Full SAP Calculation Printout



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	15.8677	15.8953	15.9224	16.0511	16.0754	16.1896	16.1896	16.2109	16.1454	16.0754	16.0263	15.9753
alpha	2.0578	2.0597	2.0615	2.0701	2.0717	2.0793	2.0793	2.0807	2.0764	2.0717	2.0684	2.0650
util living area	0.9047	0.8575	0.7837	0.6635	0.5307	0.3997	0.3029	0.3432	0.5247	0.7457	0.8687	0.9142 (86)
MIT	17.8324	18.3477	19.0678	19.8800	20.4509	20.7848	20.9134	20.8851	20.6040	19.7705	18.6524	17.7372 (87)
Th 2	19.8550	19.8568	19.8585	19.8666	19.8681	19.8751	19.8751	19.8764	19.8724	19.8681	19.8650	19.8618 (88)
util rest of house	0.8934	0.8416	0.7604	0.6295	0.4850	0.3408	0.2321	0.2685	0.4624	0.7097	0.8512	0.9039 (89)
MIT 2	17.0037	17.5029	18.1934	18.9548	19.4637	19.7448	19.8367	19.8224	19.6137	18.8827	17.8161	16.9153 (90)
Living area fraction									FLA = Living area / (4) =			0.5463 (91)
MIT	17.4564	17.9644	18.6711	19.4602	20.0030	20.3130	20.4249	20.4030	20.1547	19.3677	18.2730	17.3643 (92)
Temperature adjustment												0.0000
adjusted MIT	17.4564	17.9644	18.6711	19.4602	20.0030	20.3130	20.4249	20.4030	20.1547	19.3677	18.2730	17.3643 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8625	0.8091	0.7324	0.6162	0.4907	0.3643	0.2674	0.3044	0.4788	0.6915	0.8205	0.8742 (94)
Useful gains	315.7507	371.2086	410.0046	421.4142	375.5601	280.2864	196.6387	202.2786	275.5695	314.8976	306.3576	300.8986 (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	728.5794	722.2273	671.6954	578.1225	453.8642	310.0838	207.6053	216.9828	329.5323	479.2662	612.6139	724.1040 (97)
Space heating kWh	307.1445	235.8846	194.6980	112.8300	58.2582	0.0000	0.0000	0.0000	0.0000	122.2902	220.5045	314.8648 (98a)
Space heating requirement - total per year (kWh/year)												1566.4749
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	307.1445	235.8846	194.6980	112.8300	58.2582	0.0000	0.0000	0.0000	0.0000	122.2902	220.5045	314.8648 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1566.4749
Space heating per m2										(98c) / (4) =		36.2610 (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	510.2043	401.6502	411.9631	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8328	0.8741	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	424.8988	351.1003	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	876.7080	838.2865	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	325.3027	362.4665	303.0531	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	81.3257	90.6166	75.7633	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												247.7056 (107)
Energy for space heating												36.2610 (99)
Energy for space cooling												5.7339 (108)
Total												41.9949 (109)
Fabric Energy Efficiency (DFEE)												42.0 (109)

SAP 10 WORKSHEET FOR New Build (As Built) (Version 10.2, February 2022)
CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

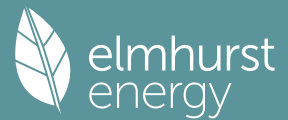
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	43.2000	2.5000	108.0000
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	43.2000		108.0000 (1b) - (3b)
Dwelling volume			108.0000 (4)
		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	108.0000 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1852 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)

Full SAP Calculation Printout



Infiltration rate												0.4352 (18)
Number of sides sheltered												3 (19)
Shelter factor												(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor												(21) = (18) x (20) = 0.3373 (21)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	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)
Adj infilt rate	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)
	0.4300	0.4216	0.4132	0.3710	0.3626	0.3204	0.3204	0.3120	0.3373	0.3626	0.3794	0.3963 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.5925	0.5889	0.5853	0.5688	0.5657	0.5513	0.5513	0.5487	0.5569	0.5657	0.5720	0.5785 (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					
Main dwelling												
TER Opaque door			2.1000	1.0000	2.1000		(26)					
TER Opening Type			8.7000	1.1450	9.9618		(27)					
top floor exposed new	25.2500	8.7000	16.5500	0.1800	2.9790		(29a)					
corridor new	25.2500	2.1000	23.1500	0.1800	4.1670		(29a)					
flat roof new	20.8000		20.8000	0.1100	2.2880		(30)					
roof terrace new	22.4000		22.4000	0.1100	2.4640		(30)					
Total net area of external elements Aum(A, m2)			93.7000				(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)... (30) + (32) =	23.9598		(33)					
Main dwelling												
pw			21.5000	0.0000	0.0000		(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							73.2269 (35)					
List of Thermal Bridges												
K1 Element				Length	Psi-value		Total					
E2 Other lintels (including other steel lintels)				6.2000	0.0500		0.3100					
E3 Sill				5.2000	0.0500		0.2600					
E4 Jamb				14.2000	0.0500		0.7100					
E15 Flat roof with parapet				10.0000	0.5600		5.6000					
E18 Party wall between dwellings				5.0000	0.0600		0.3000					
E24 Eaves (insulation at ceiling level - inverted)				10.0000	0.2400		2.4000					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							9.5800 (36)					
Point Thermal bridges						(36a) =	0.0000					
Total fabric heat loss						(33) + (36) + (36a) =	33.5398 (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	21.1152	20.9872	20.8618	20.2727	20.1625	19.6494	19.6494	19.5544	19.8470	20.1625	20.3855	20.6186 (38)
Average = Sum(39)m / 12 =	54.6550	54.5271	54.4016	53.8125	53.7023	53.1892	53.1892	53.0942	53.3869	53.7023	53.9253	54.1584 (39)
												53.8120
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2652	1.2622	1.2593	1.2457	1.2431	1.2312	1.2312	1.2290	1.2358	1.2431	1.2483	1.2537 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

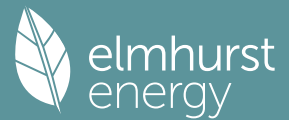
4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.4937 (42)
Hot water usage for mixer showers													
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	(42a)
Hot water usage for baths													
21.3086	20.9922	20.5465	19.7248	19.1096	18.4273	18.0588	18.5013	18.9832	19.7132	20.5518	21.2366		(42b)
Hot water usage for other uses													
29.9274	28.8392	27.7509	26.6626	25.5744	24.4861	24.4861	25.5744	26.6626	27.7509	28.8392	29.9274		(42c)
Average daily hot water use (litres/day)													46.9632 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
51.2361	49.8313	48.2974	46.3875	44.6839	42.9134	42.5449	44.0757	45.6458	47.4641	49.3910	51.1640		(44)
Energy content (annual)	81.1454	70.9592	74.2313	63.5021	60.1531	52.7670	51.4544	54.5749	56.2858	64.4083	70.3665	80.1105	(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		779.9587	
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													
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	(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 heat required for water heating calculated for each month													
68.9736	60.3153	63.0966	53.9768	51.1302	44.8520	43.7362	46.3887	47.8430	54.7471	59.8115	68.0939		(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
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	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	68.9736	60.3153	63.0966	53.9768	51.1302	44.8520	43.7362	46.3887	47.8430	54.7471	59.8115	68.0939	(64)
12Total per year (kWh/year)													662.9649 (64)
Electric shower(s)	39.4528	35.1527	38.3854	36.6307	37.3181	35.5979	36.7845	37.3181	36.6307	38.3854	37.6636	39.4528	(64a)
													448.7728 (64a)
Heat gains from water heating, kWh/month													
27.1066	23.8670	25.3705	22.6519	22.1121	20.1125	20.1302	20.9267	21.1184	23.2831	24.3688	26.8867		(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
----------------------------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Full SAP Calculation Printout



(66)m	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	74.6873	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	65.8113	72.8625	65.8113	68.0050	65.8113	68.0050	65.8113	65.8113	68.0050	65.8113	68.0050	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	129.6572	131.0026	127.6121	120.3943	111.2830	102.7197	96.9989	95.6534	99.0439	106.2618	115.3730	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	30.4687	(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	(70)
Losses e.g. evaporation (negative values) (Table 5)	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	-59.7498	(71)
Water heating gains (Table 5)	36.4336	35.5164	34.1002	31.4610	29.7205	27.9340	27.0567	28.1273	29.3311	31.2945	33.8455	(72)
Total internal gains	277.3082	284.7877	272.9298	265.2664	252.2210	244.0648	235.2730	234.9982	241.7862	248.7738	262.6298	(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		
-----				-----				-----				-----	
West				8.7000	19.6403	0.6300		0.7000		0.7700	52.2202 (80)		
-----				-----				-----				-----	
Solar gains	52.2202	102.1538	168.2327	245.3573	300.6946	307.8145	293.0519	251.7273	195.6616	121.2140	65.1124	42.9433 (83)	
Total gains	329.5284	386.9414	441.1625	510.6237	552.9156	551.8793	528.3249	486.7255	437.4478	369.9878	327.7422	314.2352 (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)												
tau	16.0776	16.1153	16.1525	16.3293	16.3628	16.5207	16.5207	16.5502	16.4595	16.3628	16.2952	16.2250
alpha	2.0718	2.0744	2.0768	2.0886	2.0909	2.1014	2.1014	2.1033	2.0973	2.0909	2.0863	2.0817
util living area	0.9191	0.8888	0.8417	0.7540	0.6415	0.5066	0.3945	0.4354	0.6174	0.8018	0.8914	0.9256 (86)
MIT	17.7242	18.1287	18.7523	19.5596	20.2157	20.6687	20.8606	20.8238	20.4660	19.5813	18.5267	17.6601 (87)
Th 2	19.8682	19.8706	19.8729	19.8836	19.8857	19.8951	19.8951	19.8968	19.8915	19.8857	19.8816	19.8773 (88)
util rest of house	0.9092	0.8757	0.8227	0.7242	0.5964	0.4409	0.3092	0.3487	0.5548	0.7705	0.8763	0.9165 (89)
MIT 2	16.9073	17.3030	17.9101	18.6860	19.2906	19.6866	19.8302	19.8101	19.5302	18.7285	17.7077	16.8501 (90)
Living area fraction									fLA = Living area / (4) =			0.5463 (91)
MIT	17.3536	17.7541	18.3702	19.1632	19.7960	20.2231	20.3931	20.3639	20.0414	19.1943	18.1551	17.2926 (92)
Temperature adjustment												0.0000
adjusted MIT	17.3536	17.7541	18.3702	19.1632	19.7960	20.2231	20.3931	20.3639	20.0414	19.1943	18.1551	17.2926 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.8802	0.8443	0.7920	0.7023	0.5925	0.4614	0.3490	0.3869	0.5640	0.7476	0.8466	0.8886 (94)
Ext temp.	290.0617	326.7007	349.3929	358.6358	327.5850	254.6228	184.3812	188.3381	246.7204	276.6204	277.4529	279.2298 (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)
Space heating kWh	713.4444	700.8943	645.7599	552.2913	434.7732	299.0888	201.7538	210.4588	317.1936	461.5359	596.1483	709.0755 (97)
Space heating requirement - total per year (kWh/year)	314.9967	251.4581	220.4970	139.4320	79.7480	0.0000	0.0000	0.0000	0.0000	137.5772	229.4607	319.8052 (98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	314.9967	251.4581	220.4970	139.4320	79.7480	0.0000	0.0000	0.0000	0.0000	137.5772	229.4607	319.8052 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1692.9748
Space heating per m2										(98c) / (4) =		39.1892 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
Ext. temp.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	499.9787	393.6003	403.5160	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.7481	0.8038	0.7744	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	374.0155	316.3656	312.4848	0.0000	0.0000	0.0000	0.0000 (102)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	622.1194	595.9124	548.5389	0.0000	0.0000	0.0000	0.0000 (103)
Cooled fraction	0.0000	0.0000	0.0000	0.0000	0.0000	178.6349	207.9828	175.6243	0.0000	0.0000	0.0000	0.0000 (104)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	1.0000 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	44.6587	51.9957	43.9061	0.0000	0.0000	0.0000	0.0000 (107)
Energy for space heating												140.5605 (107)
Energy for space cooling												39.1892 (99)
Total												3.2537 (108)
Fabric Energy Efficiency (TFEE)												42.4429 (109)