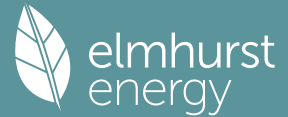


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Property Reference	UNIT 37				Issued on Date	02/07/2025	
Assessment Reference	UNIT 37			Prop Type Ref			
Property	Flat 38, Alexander House, 205 Kings Road, READING, RG1 4FW						
SAP Rating	82 B	DER	5.07	TER	10.85		
Environmental	96 A	% DER < TER				53.27	
CO ₂ Emissions (t/year)	0.25	DFEE	47.90	TFEE	40.00		
Compliance Check	See BREL	% DFEE < TFEE				-19.76	
% DPER < TPER	8.46	DPER	53.06	TPER	57.96		
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	56.5000 (1b)	2.5000 (2b)	141.2500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.5000		141.2500 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	141.2500 (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) = 0.1416 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8916 (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) = 0.6910 (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	0.8810	0.8637	0.8465	0.7601	0.7428	0.6564	0.6564	0.6392	0.6910	0.7428	0.7774	0.8119 (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	0.8881	0.8730	0.8582	0.7889	0.7759	0.7155	0.7155	0.7043	0.7387	0.7759	0.8021	0.8296 (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			4.1000	1.1450	4.6947		(27)
1			2.1000	1.0000	2.1000		(26)
top floor exposed new	32.2500	6.5000	25.7500	0.2000	5.1500	18.0000	463.5000 (29a)
corridor new	25.5000	2.1000	23.4000	0.2300	5.3820	14.0000	327.6000 (29a)
exposed new	11.2500	4.1000	7.1500	0.2500	1.7875	60.0000	429.0000 (29a)
flat roof new	22.7000		22.7000	0.1300	2.9510	9.0000	204.3000 (30)
roof terrace new	21.4000		21.4000	0.1300	2.7820	9.0000	192.6000 (30)
pitched new	12.4000		12.4000	0.1100	1.3640	9.0000	111.6000 (30)
Total net area of external elements Aum (A, m ²)			125.5000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.6539		(33)
Main dwelling							
pw			26.2500	0.0000	0.0000	20.0000	525.0000 (32)
pf			55.2000			30.0000	1656.0000 (32d)
iw			49.5000			9.0000	445.5000 (32c)
Heat capacity Cm = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	4355.1000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							77.0814 (35)

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List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	6.3000	0.0470	0.2961
E2 Other lintels (including other steel lintels)	5.3000	0.0150	0.0795
E3 Sill	12.2400	0.0470	0.5753
E4 Jamb	0.0000	0.3200	0.0000
E20 Exposed floor (normal)	10.0000	0.2800	2.8000
E7 Party floor between dwellings (in blocks of flats)	18.0000	0.1970	3.5460
E15 Flat roof with parapet	5.0000	0.1800	0.9000
E16 Corner (normal)	5.0000	0.0000	0.0000
E17 Corner (inverted - internal area greater than external area)	5.0000	0.2400	1.2000
E18 Party wall between dwellings	7.0000	0.0500	0.3500
E24 Eaves (insulation at ceiling level - inverted)			
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			9.7469 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	43.4008 (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	41.3959	40.6934	40.0049	36.7709	36.1658	33.3491	33.3491	32.8275	34.4340	36.1658	37.3899	38.6696 (38)
Heat transfer coeff	84.7967	84.0942	83.4057	80.1717	79.5666	76.7499	76.7499	76.2283	77.8348	79.5666	80.7906	82.0703 (39)
Average = Sum(39)m / 12 =												80.1688
HLP	1.5008	1.4884	1.4762	1.4190	1.4083	1.3584	1.3584	1.3492	1.3776	1.4083	1.4299	1.4526 (40)
HLP (average)												1.4189
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8812 (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 (42a)
Hot water usage for baths	24.1020	23.7440	23.2400	22.3106	21.6146	20.8430	20.4261	20.9267	21.4717	22.2974	23.2459	24.0205 (42b)
Hot water usage for other uses	33.8949	32.6624	31.4298	30.1973	28.9647	27.7322	27.7322	28.9647	30.1973	31.4298	32.6624	33.8949 (42c)
Average daily hot water use (litres/day)												53.1599 (43)
Daily hot water use	57.9969	56.4064	54.6698	52.5078	50.5794	48.5752	48.1583	49.8914	51.6690	53.7272	55.9083	57.9154 (44)
Energy conte	91.8529	90.3220	84.0254	71.8806	68.0896	59.7288	58.2433	61.7760	63.7130	72.9073	79.6516	90.6815 (45)
Energy content (annual)										Total = Sum(45)m =		882.8721
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	78.0750	68.2737	71.4216	61.0985	57.8761	50.7695	49.5068	52.5096	54.1560	61.9712	67.7039	77.0793 (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	78.0750	68.2737	71.4216	61.0985	57.8761	50.7695	49.5068	52.5096	54.1560	61.9712	67.7039	77.0793 (64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				750.4413 (64)
Electric shower(s)	44.6547	39.7877	43.4467	41.4606	42.2386	40.2915	41.6346	42.2386	41.4606	43.4467	42.6297	44.6547 (64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				507.9448 (64a)
Heat gains from water heating, kWh/month	30.6824	27.0153	28.7171	25.6398	25.0287	22.7653	22.7854	23.6871	23.9042	26.3545	27.5834	30.4335 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	82.8603	91.7382	82.8603	85.6223	82.8603	85.6223	82.8603	82.8603	85.6223	82.8603	85.6223	82.8603 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	164.0419	165.7441	161.4546	152.3225	140.7950	129.9607	122.7227	121.0205	125.3101	134.4421	145.9697	156.8039 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058 (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)	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462 (71)
Water heating gains (Table 5)	41.2398	40.2014	38.5982	35.6108	33.6407	31.6184	30.6255	31.8374	33.2002	35.4227	38.3103	40.9053 (72)
Total internal gains	339.3593	348.9010	334.1304	324.7729	308.5133	298.4187	287.4258	286.9355	295.3499	303.9424	321.1195	331.7868 (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			
South				6.5000	46.7521	0.6300	0.8000	0.7700	106.1397 (78)			
South				4.1000	46.7521	0.6300	0.8000	0.7700	66.9497 (78)			
Solar gains	173.0894	283.4758	361.0979	408.1190	425.2853	409.2792	399.8907	388.3493	377.2094	305.7553	205.1699	149.5652 (83)
Total gains	512.4487	632.3768	695.2283	732.8919	733.7985	707.6979	687.3165	675.2848	672.5593	609.6976	526.2895	481.3519 (84)

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7. Mean internal temperature (heating season)											
Temperature during heating periods in the living area from Table 9, Th1 (C)											
Utilisation factor for gains for living area, nil,m (see Table 9a)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
tau	14.2665	14.3857	14.5044	15.0895	15.2042	15.7622	15.7622	15.8701	15.5425	15.2042	14.9739
alpha	1.9511	1.9590	1.9670	2.0060	2.0136	2.0508	2.0508	2.0580	2.0362	2.0136	1.9983
util living area	0.9076	0.8660	0.8226	0.7554	0.6710	0.5446	0.4256	0.4444	0.5929	0.7635	0.8697
MIT	17.5164	18.0329	18.6434	19.4273	20.0612	20.5914	20.8255	20.8040	20.4697	19.6276	18.4980
Th 2	19.6869	19.6962	19.7054	19.7488	19.7570	19.7954	19.7954	19.8025	19.7805	19.7570	19.7405
util rest of house	0.8953	0.8490	0.7997	0.7226	0.6222	0.4716	0.3278	0.3492	0.5243	0.7256	0.8507
MIT 2	16.5882	17.0932	17.6890	18.4641	19.0574	19.5444	19.7184	19.7112	19.4372	18.6719	17.5835
Living area fraction	fLA = Living area / (4) =										
MIT	17.1353	17.6470	18.2515	19.0318	19.6490	20.1615	20.3709	20.3553	20.0457	19.2352	18.1225
Temperature adjustment	0.0000										
adjusted MIT	17.1353	17.6470	18.2515	19.0318	19.6490	20.1615	20.3709	20.3553	20.0457	19.2352	18.1225
											17.1297 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8635	0.8155	0.7685	0.7010	0.6175	0.4952	0.3765	0.3951	0.5404	0.7072	0.8198	0.8741
Useful gains	442.5046	515.6741	534.3052	513.7527	453.1009	350.4466	258.8003	266.8077	363.4218	431.1716	431.4409	420.7550
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	1088.3882	1071.9512	980.1453	812.2798	632.4746	426.8444	289.4194	301.5027	462.7852	687.0702	890.5149	1061.1434
Space heating kWh	480.5374	373.8183	331.7051	214.9395	133.4541	0.0000	0.0000	0.0000	0.0000	190.3886	330.5333	476.4490
Space heating requirement - total per year (kWh/year)												2531.8252
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
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	480.5374	373.8183	331.7051	214.9395	133.4541	0.0000	0.0000	0.0000	0.0000	190.3886	330.5333	476.4490
Space heating requirement after solar contribution - total per year (kWh/year)												2531.8252
Space heating per m2												(98c) / (4) = 44.8111 (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	721.4488	567.9490	579.3347	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7051	0.7694	0.7598	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	508.6630	436.9741	440.1826	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	797.0090	774.8234	762.3536	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	207.6091	251.3599	239.6952	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	51.9023	62.8400	59.9238	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												174.6660 (107)
Energy for space heating												44.8111 (99)
Energy for space cooling												3.0914 (108)
Total												47.9025 (109)
Fabric Energy Efficiency (DFEE)												47.9 (109)

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

1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	56.5000 (1b)	x 2.5000 (2b)	= 141.2500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 141.2500 (5)

2. Ventilation rate

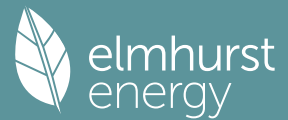
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number 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)

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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			10.6000	1.1450	12.1374					(27)		
top floor exposed new	32.2500	6.5000	25.7500	0.1800	4.6350					(29a)		
corridor new	25.5000	2.1000	23.4000	0.1800	4.2120					(29a)		
exposed new	11.2500	4.1000	7.1500	0.1800	1.2870					(29a)		
flat roof new	22.7000		22.7000	0.1100	2.4970					(30)		
roof terrace new	21.4000		21.4000	0.1100	2.3540					(30)		
pitched new	12.4000		12.4000	0.1100	1.3640					(30)		
Total net area of external elements Aum(A, m2)			125.5000							(31)		
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	30.5864					(33)		
Main dwelling												
pw			26.2500	0.0000	0.0000					(32)		
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K										77.0814 (35)		
List of Thermal Bridges												
K1 Element				Length	Psi-value		Total					
E2 Other lintels (including other steel lintels)				6.3000	0.0500		0.3150					
E3 Sill				5.3000	0.0500		0.2650					
E4 Jamb				12.2400	0.0500		0.6120					
E20 Exposed floor (normal)				0.0000	0.3200		0.0000					
E7 Party floor between dwellings (in blocks of flats)				10.0000	0.0700		0.7000					
E15 Flat roof with parapet				18.0000	0.5600		10.0800					
E16 Corner (normal)				5.0000	0.0900		0.4500					
E17 Corner (inverted - internal area greater than external area)				5.0000	-0.0900		-0.4500					
E18 Party wall between dwellings				5.0000	0.0600		0.3000					
E24 Eaves (insulation at ceiling level - inverted)				7.0000	0.2400		1.6800					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)										13.9520 (36)		
Point Thermal bridges										0.0000		
Total fabric heat loss										(33) + (36) + (36a) = 44.5384 (37)		
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 26.7958	Feb 26.6603	Mar 26.5274	Apr 25.9036	May 25.7869	Jun 25.2435	Jul 25.2435	Aug 25.1429	Sep 25.4528	Oct 25.7869	Nov 26.0230	Dec 26.2699 (38)
Heat transfer coeff	71.3342	71.1987	71.0659	70.4420	70.3253	69.7819	69.7819	69.6813	69.9912	70.3253	70.5614	70.8083 (39)
Average = Sum(39)m / 12 =												70.4414
HLP	Jan 1.2626	Feb 1.2602	Mar 1.2578	Apr 1.2468	May 1.2447	Jun 1.2351	Jul 1.2351	Aug 1.2333	Sep 1.2388	Oct 1.2447	Nov 1.2489	Dec 1.2532 (40)
HLP (average)												1.2468
Days in month	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy								1.8812 (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 (42a)	
Hot water usage for baths	24.1020	23.7440	23.2400	22.3106	21.6146	20.8430	20.4261	20.9267	21.4717	22.2974	23.2459	24.0205 (42b)	
Hot water usage for other uses	33.8949	32.6624	31.4298	30.1973	28.9647	27.7322	27.7322	28.9647	30.1973	31.4298	32.6624	33.8949 (42c)	
Average daily hot water use (litres/day)												53.1599 (43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	57.9969	56.4064	54.6698	52.5078	50.5794	48.5752	48.1583	49.8914	51.6690	53.7272	55.9083	57.9154 (44)	
Distribution loss (46)m = 0.15 x (45)m	91.8529	80.3220	84.0254	71.8806	68.0896	59.7288	58.2433	61.7760	63.7130	72.9073	79.6516	90.6815 (45)	
Total storage loss:	Total = Sum(45)m = 882.8721												
Water 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 (46)	
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	78.0750	68.2737	71.4216	61.0985	57.8761	50.7695	49.5068	52.5096	54.1560	61.9712	67.7039	77.0793 (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)	
FGRHS	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	78.0750	68.2737	71.4216	61.0985	57.8761	50.7695	49.5068	52.5096	54.1560	61.9712	67.7039	77.0793 (64)	
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m = 750.4413 (64)												
Electric shower(s)	750 (64)												

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	44.6547	39.7877	43.4467	41.4606	42.2386	40.2915	41.6346	42.2386	41.4606	43.4467	42.6297	44.6547 (64a)
	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =											507.9448 (64a)
Heat gains from water heating, kWh/month	30.6824	27.0153	28.7171	25.6398	25.0287	22.7653	22.7854	23.6871	23.9042	26.3545	27.5834	30.4335 (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	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577	94.0577 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	83.9825	92.9806	83.9825	86.7819	83.9825	86.7819	83.9825	83.9825	86.7819	83.9825	86.7819	83.9825 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	164.0419	165.7441	161.4546	152.3225	140.7950	129.9607	122.7227	121.0205	125.3101	134.4421	145.9697	156.8039 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058	32.4058 (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)	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462	-75.2462 (71)
Water heating gains (Table 5)	41.2398	40.2014	38.5982	35.6108	33.6407	31.6184	30.6255	31.8374	33.2002	35.4227	38.3103	40.9053 (72)
Total internal gains	340.4815	350.1434	335.2525	325.9325	309.6354	299.5783	288.5480	288.0577	296.5095	305.0646	322.2791	332.9090 (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			
South	10.6000		46.7521		0.6300		0.7000		0.7700		151.4532 (78)	
Solar gains	151.4532	248.0413	315.9607	357.1041	372.1246	358.1193	349.9043	339.8056	330.0582	267.5359	179.5237	130.8695 (83)
Total gains	491.9347	598.1848	651.2132	683.0367	681.7600	657.6976	638.4523	627.8633	626.5677	572.6004	501.8028	463.7785 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)

Utilisation factor for gains for living area, nil,m (see Table 9a)												21.0000 (85)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	16.9589	16.9912	17.0229	17.1737	17.2022	17.3361	17.3361	17.3612	17.2843	17.2022	17.1446	17.0849
alpha	2.1306	2.1327	2.1349	2.1449	2.1468	2.1557	2.1557	2.1574	2.1523	2.1468	2.1430	2.1390
util living area	0.9048	0.8627	0.8189	0.7537	0.6679	0.5449	0.4237	0.4440	0.5906	0.7610	0.8678	0.9142 (86)
MIT	18.0115	18.4733	19.0050	19.6399	20.1989	20.6428	20.8522	20.8307	20.5436	19.8077	18.8041	17.9226 (87)
Th 2	19.8703	19.8722	19.8740	19.8828	19.8844	19.8920	19.8920	19.8935	19.8891	19.8844	19.8811	19.8776 (88)
util rest of house	0.8934	0.8470	0.7977	0.7234	0.6229	0.4768	0.3333	0.3553	0.5270	0.7257	0.8499	0.9038 (89)
MIT 2	17.1820	17.6298	18.1448	18.7563	19.2758	19.6667	19.8236	19.8111	19.5859	18.9271	17.9671	17.1003 (90)
Living area fraction	17.6709	18.1269	18.6518	19.2771	19.8199	20.2420	20.4298	20.4121	20.1504	19.4461	18.4605	17.5849 (91)
MIT	17.6709	18.1269	18.6518	19.2771	19.8199	20.2420	20.4298	20.4121	20.1504	19.4461	18.4605	17.5849 (92)
Temperature adjustment												0.0000
adjusted MIT	17.6709	18.1269	18.6518	19.2771	19.8199	20.2420	20.4298	20.4121	20.1504	19.4461	18.4605	17.5849 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8649	0.8173	0.7708	0.7048	0.6201	0.4995	0.3788	0.3985	0.5429	0.7100	0.8221	0.8761 (94)
Useful gains	425.4504	488.9217	501.9243	481.4332	422.7381	328.5208	241.8531	250.2143	340.1782	406.5584	412.5450	406.3363 (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	953.8009	941.7396	863.5752	730.9817	571.0312	393.7090	267.2530	279.5662	423.4739	622.1053	801.6100	947.7633 (97)
Space heating kWh	393.0928	304.2937	269.0683	179.6749	110.3301	0.0000	0.0000	0.0000	0.0000	160.3669	280.1268	402.8216 (98a)
Space heating requirement - total per year (kWh/year)												2099.7750
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	393.0928	304.2937	269.0683	179.6749	110.3301	0.0000	0.0000	0.0000	0.0000	160.3669	280.1268	402.8216 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2099.7750
Space heating per m2	(98c) / (4) =											37.1642 (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	655.9502	516.3863	529.5780	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7221	0.7860	0.7747	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	473.6353	405.8947	410.2414	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	737.3099	716.5039	705.7522	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	189.8457	231.0932	219.8600	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	47.4614	57.7733	54.9650	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												160.1997 (107)
Energy for space heating												37.1642 (99)
Energy for space cooling												2.8354 (108)

Total
Fabric Energy Efficiency (TFEE)

39.9996 (109)
40.0 (109)