

Full SAP Calculation Printout



Plot Reference	UNIT 11			Issued on Date	08/07/2026
Assessment Reference	001	Plot Type Ref	UNIT 11		
Plot Address	UNIT 11, Stoney Wood Quarter, 34 The Fairway, LONDON, NW7 3HS			SAP Version	10.2
SAP Rating	82 B	DER	3.90	TER	15.00
Environmental	97 A	% DER < TER			74.00
CO ₂ Emissions (t/year)	0.19	DFEE	28.08	TFEE	31.29
Compliance Check	See BREL	% DFEE < TFEE			10.26
% DPER < TPER	47.89	DPER	42.05	TPER	80.71
Assessor Details	Mr. Ondrej Gajdos			Assessor ID	W452-0001
Client					

SAP 10 WORKSHEET FOR New Build (As Designed) (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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.6000		141.9000 (1b) - (3b)
Dwelling volume			141.9000 (4)

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) = 0.1409 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2909 (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) = 0.2255 (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	0.2875	0.2819	0.2762	0.2480	0.2424	0.2142	0.2142	0.2086	0.2255	0.2424	0.2537	0.2649 (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	0.5413	0.5397	0.5381	0.5308	0.5294	0.5229	0.5229	0.5218	0.5254	0.5294	0.5322	0.5351 (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							
dl			2.1000	1.0000	2.1000		(26)
1			11.6500	0.7940	9.2496		(27)
exposed wall	41.2500	11.6500	29.6000	0.1500	4.4400	60.0000	1776.0000 (29a)
corridor wall	18.7000	2.1000	16.6000	0.2500	4.1500	9.0000	149.4000 (29a)
terraces	4.0000		4.0000	0.1000	0.4000	9.0000	36.0000 (30)
Total net area of external elements Aum(A, m ²)			63.9500				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	20.3396	(33)
Main dwelling							
pw			21.4500	0.0000	0.0000	110.0000	2359.5001 (32)
pf			51.6000			40.0000	2063.9999 (32d)
pc			47.6000			30.0000	1428.0000 (32b)
iw			144.1000			9.0000	1296.9001 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9109.8000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							176.5465 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				7.4000	0.0500	0.3700	

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E3 Sill	6.4000	0.0500	0.3200
E4 Jamb	16.9000	0.0500	0.8450
E7 Party floor between dwellings (in blocks of flats)	33.6000	0.0700	2.3520
E9 Balcony between dwellings, wall insulation continuous	3.0000	0.0200	0.0600
E23 Balcony within or between dwellings, balcony support penetrates wall insulation	3.4000	0.0200	0.0680
E24 Eaves (insulation at ceiling level - inverted)	5.3000	0.2400	1.2720
E14 Flat roof	4.7000	0.1600	0.7520
E16 Corner (normal)	11.0000	0.0900	0.9900
E17 Corner (inverted - internal area greater than external area)	5.5000	-0.0900	-0.4950
E18 Party wall between dwellings	2.7500	0.0600	0.1650
E25 Staggered party wall between dwellings	2.7500	0.0600	0.1650
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			6.8640 (36)
Point Thermal Bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	27.2036 (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	25.3486	25.2735	25.1998	24.8539	24.7891	24.4878	24.4878	24.4320	24.6039	24.7891	24.9201	25.0570	(38)
Average = Sum(39)m / 12 =	52.5522	52.4771	52.4034	52.0575	51.9928	51.6914	51.6914	51.6356	51.8075	51.9928	52.1237	52.2606	(39)
												52.0572	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0185	1.0170	1.0156	1.0089	1.0076	1.0018	1.0018	1.0007	1.0040	1.0076	1.0101	1.0128	(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													1.7373 (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	23.0645	22.7220	22.2396	21.3502	20.6842	19.9458	19.5469	20.0259	20.5474	21.3376	22.2453	22.9866	(42b)
Hot water usage for other uses	32.4214	31.2424	30.0635	28.8845	27.7055	26.5266	26.5266	27.7055	28.8845	30.0635	31.2424	32.4214	(42c)
Average daily hot water use (litres/day)												50.8584	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	55.4859	53.9644	52.3031	50.2347	48.3898	46.4724	46.0735	47.7314	49.4319	51.4011	53.4878	55.4079	(44)
Energy content (annual)	87.8761	76.8446	80.3879	68.7688	65.1420	57.1432	55.7219	59.1015	60.9545	69.7508	76.2031	86.7554	(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 (or HIU 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													
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)
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	(59)
Total heat required for water heating calculated for each month													
WWHRS	74.6947	65.3179	68.3297	58.4535	55.3707	48.5717	47.3636	50.2363	51.8113	59.2882	64.7726	73.7421	(62)
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	(63a)
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	(63b)
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	(63c)
Output from w/h	74.6947	65.3179	68.3297	58.4535	55.3707	48.5717	47.3636	50.2363	51.8113	59.2882	64.7726	73.7421	(64)
12Total per year (kWh/year)												717.9524	(64)
Electric shower(s)	42.7227	38.0663	41.5669	39.6668	40.4111	38.5483	39.8332	40.4111	39.6668	41.5669	40.7853	42.7227	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												485.9682	(64a)
Heat gains from water heating, kWh/month	29.3544	25.8460	27.4742	24.5301	23.9454	21.7800	21.7992	22.6619	22.8695	25.2138	26.3895	29.1162	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	76.3447	84.5245	76.3447	78.8895	76.3447	78.8895	76.3447	76.3447	78.8895	76.3447	78.8895	76.3447	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	151.3882	152.9591	149.0004	140.5728	129.9344	119.9359	113.2562	111.6853	115.6440	124.0716	134.7100	144.7085	(68)
Pumps, fans	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	(69)
Losses e.g. evaporation (negative values) (Table 5)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Water heating gains (Table 5)	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	(71)
Total internal gains	39.4548	38.4614	36.9276	34.0695	32.1847	30.2500	29.3000	30.4595	31.7632	33.8895	36.6521	39.1347	(72)
	316.2467	325.0040	311.3318	302.5909	287.5229	278.1344	267.9600	267.5485	275.3558	283.3648	299.3106	309.2470	(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			
Northeast				1.0800	11.2829	0.5300	0.7000	0.7700	3.1329 (75)			
East				1.4400	19.6403	0.5300	0.7000	0.7700	7.2714 (76)			
Southeast				9.1300	36.7938	0.5300	0.7000	0.7700	86.3680 (77)			
Solar gains	96.7723	167.7182	236.2067	302.4439	346.5941	347.2420	333.4871	300.2591	259.2013	187.2671	116.4576	82.4512 (83)
Total gains	413.0190	492.7223	547.5384	605.0348	634.1170	625.3765	601.4471	567.8076	534.5571	470.6320	415.7682	391.6981 (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	Dec	
tau	48.1521	48.2210	48.2888	48.6097	48.6702	48.9539	48.9539	49.0068	48.8443	48.6702	48.5480	48.4208	21.0000 (85)
alpha	4.2101	4.2147	4.2193	4.2406	4.2447	4.2636	4.2636	4.2671	4.2563	4.2447	4.2365	4.2281	
util living area	0.9774	0.9543	0.9144	0.8251	0.6870	0.5119	0.3744	0.4124	0.6233	0.8610	0.9571	0.9815	(86)
MIT	19.6762	19.9531	20.2756	20.6341	20.8659	20.9700	20.9937	20.9905	20.9319	20.6204	20.0860	19.6196	(87)
Th 2	20.0680	20.0692	20.0704	20.0760	20.0770	20.0819	20.0819	20.0828	20.0800	20.0770	20.0749	20.0727	(88)
util rest of house	0.9725	0.9450	0.8975	0.7930	0.6361	0.4445	0.2980	0.3328	0.5542	0.8274	0.9468	0.9774	(89)
MIT 2	18.8754	19.1460	19.4562	19.7904	19.9869	20.0668	20.0798	20.0794	20.0420	19.7876	19.2838	18.8234	(90)
Living area fraction	19.1423	19.4151	19.7293	20.0716	20.2799	20.3678	20.3844	20.3831	20.3386	20.0652	19.5512	19.0888	(91)
MIT	19.1423	19.4151	19.7293	20.0716	20.2799	20.3678	20.3844	20.3831	20.3386	20.0652	19.5512	19.0888	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1423	19.4151	19.7293	20.0716	20.2799	20.3678	20.3844	20.3831	20.3386	20.0652	19.5512	19.0888	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9664	0.9372	0.8903	0.7928	0.6478	0.4659	0.3234	0.3592	0.5744	0.8270	0.9397	0.9720	(94)
Useful gains	399.1478	461.7873	487.4896	479.6995	410.7860	291.3810	194.5205	203.9407	307.0484	389.1901	390.6816	380.7126	(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	779.9976	761.7080	693.2609	581.5678	446.0922	298.1480	195.6222	205.6704	323.2083	492.1240	649.0014	778.0961	(97)
Space heating kWh	283.3522	201.5467	153.0939	73.3452	26.2678	0.0000	0.0000	0.0000	0.0000	76.5828	185.9903	295.6533	(98a)
Space heating requirement - total per year (kWh/year)												1295.8322	
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	283.3522	201.5467	153.0939	73.3452	26.2678	0.0000	0.0000	0.0000	0.0000	76.5828	185.9903	295.6533	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1295.8322	
Space heating per m2												25.1130	(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	485.8995	382.5167	392.4309	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9256	0.9599	0.9479	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	449.7477	367.1863	371.9895	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	703.7123	677.2534	639.3944	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	182.8545	230.6900	198.9492	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	45.7136	57.6725	49.7373	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												153.1234	(107)
Energy for space heating												25.1130	(99)
Energy for space cooling												2.9675	(108)
Total												28.0805	(109)
Fabric Energy Efficiency (DFEE)												28.1	(109)

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

1. Overall dwelling characteristics

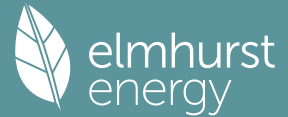
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling	51.6000 (1b)	x 2.7500 (2b)	= 141.9000 (1b) - (3b)	
Ground floor				(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.6000			
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 141.9000 (5)	

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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Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											
Pressure test	20.0000 / (5) =											
Pressure Test Method	Yes											
Measured/design AP50	Blower Door											
Infiltration rate	5.0000 (17)											
Number of sides sheltered	0.3909 (18)											
	3 (19)											
Shelter factor	(20) = 1 - [0.075 x (19)] =											
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =											
	0.7750 (20)											
	0.3030 (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)
	0.3863	0.3787	0.3712	0.3333	0.3257	0.2878	0.2878	0.2803	0.3030	0.3257	0.3409	0.3560 (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	0.5746	0.5717	0.5689	0.5555	0.5530	0.5414	0.5414	0.5393	0.5459	0.5530	0.5581	0.5634 (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			10.8000	1.1450	12.3664		(27)
exposed wall	41.2500	10.8000	30.4500	0.1800	5.4810		(29a)
corridor wall	18.7000	2.1000	16.6000	0.1800	2.9880		(29a)
terraces	4.0000		4.0000	0.1100	0.4400		(30)
Total net area of external elements Aum(A, m2)			63.9500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.3754		(33)
Main dwelling							
pw			21.4500	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							176.5465 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				7.4000	0.0500	0.3700	
E3 Sill				6.4000	0.0500	0.3200	
E4 Jamb				16.9000	0.0500	0.8450	
E7 Party floor between dwellings (in blocks of flats)				33.6000	0.0700	2.3520	
E9 Balcony between dwellings, wall insulation continuous				3.0000	0.0200	0.0600	
E23 Balcony within or between dwellings, balcony support penetrates wall insulation				3.4000	0.0200	0.0680	
E24 Eaves (insulation at ceiling level - inverted)				5.3000	0.2400	1.2720	
E14 Flat roof				4.7000	0.0800	0.3760	
E16 Corner (normal)				11.0000	0.0900	0.9900	
E17 Corner (inverted - internal area greater than external area)				5.5000	-0.0900	-0.4950	
E18 Party wall between dwellings				2.7500	0.0600	0.1650	
E25 Staggered party wall between dwellings				2.7500	0.0600	0.1650	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							6.4880 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	29.8634 (37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.7373 (42)											
Hot water usage for mixer showers	0.0000 (42a)											
Hot water usage for baths	23.0645 (42b)											
Hot water usage for other uses	32.4214 (42c)											
Average daily hot water use (litres/day)	50.8584 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	55.4859	53.9644	52.3031	50.2347	48.3898	46.4724	46.0735	47.7314	49.4319	51.4011	53.4878	55.4079 (44)
Energy content (annual)	87.8761	76.8446	80.3879	68.7688	65.1420	57.1432	55.7219	59.1015	60.9545	69.7508	76.2031	86.7554 (45)
Distribution loss (46)m = 0.15 x (45)m	Total = Sum(45)m =											
Water storage loss (or HIU loss):	844.6499											
Total storage loss	0.0000 (46)											
If cylinder contains dedicated solar storage	0.0000 (56)											
Primary loss	0.0000 (57)											
Combi loss	0.0000 (59)											
Total heat required for water heating calculated for each month	0.0000 (61)											
WWHRS	74.6947	65.3179	68.3297	58.4535	55.3707	48.5717	47.3636	50.2363	51.8113	59.2882	64.7726	73.7421 (62)
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 (63a)
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 (63b)
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 (63c)
Output from w/h	74.6947	65.3179	68.3297	58.4535	55.3707	48.5717	47.3636	50.2363	51.8113	59.2882	64.7726	73.7421 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											
Electric shower(s)	42.7227	38.0663	41.5669	39.6668	40.4111	38.5483	39.8332	40.4111	39.6668	41.5669	40.7853	42.7227 (64a)

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Heat gains from water heating, kWh/month
29.3544 25.8460 27.4742 24.5301 23.9454 21.7800 21.7992 22.6619 22.8695 25.2138 26.3895 29.1162 (65)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 485.9682 (64a)

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	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635	86.8635 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.5856	84.7912	76.5856	79.1384	76.5856	79.1384	76.5856	76.5856	79.1384	76.5856	79.1384	76.5856 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	151.3882	152.9591	149.0004	140.5728	129.9344	119.9359	113.2562	111.6853	115.6440	124.0716	134.7100	144.7085 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863	31.6863 (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)	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908	-69.4908 (71)
Water heating gains (Table 5)	39.4548	38.4614	36.9276	34.0695	32.1847	30.2500	29.3000	30.4595	31.7632	33.8895	36.6521	39.1347 (72)
Total internal gains	316.4876	325.2707	311.5727	302.8398	287.7638	278.3834	268.2009	267.7894	275.6047	283.6057	299.5595	309.4878 (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	
Northeast				1.0000	11.2829	0.6300	0.7000			0.7700	3.4482 (75)	
East				1.3300	19.6403	0.6300	0.7000			0.7700	7.9831 (76)	
Southeast				8.4700	36.7938	0.6300	0.7000			0.7700	95.2424 (77)	
Solar gains	106.6737	184.8686	260.3385	333.3137	381.9490	382.6552	367.5006	330.8973	285.6719	206.4102	128.3711	90.8885 (83)
Total gains	423.1613	510.1393	571.9112	636.1536	669.7129	661.0385	635.7015	598.6867	561.2766	490.0159	427.9307	400.3764 (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	44.5739	44.6807	44.7858	45.2865	45.3814	45.8286	45.8286	45.9123	45.6553	45.3814	45.1898	44.9912
alpha	3.9716	3.9787	3.9857	4.0191	4.0254	4.0552	4.0552	4.0608	4.0437	4.0254	4.0127	3.9994
util living area	0.9771	0.9537	0.9135	0.8244	0.6881	0.5141	0.3774	0.4159	0.6276	0.8622	0.9570	0.9812 (86)
MIT	19.5361	19.8347	20.1862	20.5829	20.8410	20.9626	20.9916	20.9875	20.9168	20.5669	19.9864	19.4845 (87)
Th 2	20.0007	20.0028	20.0049	20.0148	20.0167	20.0253	20.0253	20.0269	20.0220	20.0167	20.0129	20.0090 (88)
util rest of house	0.9721	0.9441	0.8959	0.7910	0.6349	0.4430	0.2960	0.3313	0.5551	0.8277	0.9464	0.9770 (89)
MIT 2	18.6863	18.9788	19.3176	19.6908	19.9106	20.0068	20.0226	20.0226	19.9760	19.6879	19.1387	18.6419 (90)
Living area fraction									FLA = Living area / (4) =			0.3333 (91)
MIT	18.9695	19.2641	19.6071	19.9881	20.2207	20.3254	20.3456	20.3443	20.2896	19.9809	19.4213	18.9228 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9695	19.2641	19.6071	19.9881	20.2207	20.3254	20.3456	20.3443	20.2896	19.9809	19.4213	18.9228 (93)

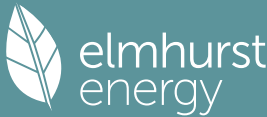
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9654	0.9354	0.8878	0.7901	0.6465	0.4654	0.3230	0.3593	0.5758	0.8263	0.9385	0.9710 (94)
Useful gains	408.5113	477.2029	507.7194	502.5951	432.9402	307.6485	205.3460	215.1156	323.1874	404.8863	401.6266	388.7631 (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	832.8023	813.5127	740.5821	619.5788	475.1217	316.1363	206.8204	217.3923	343.0672	523.0859	689.9568	828.0735 (97)
Space heating kWh	315.6725	226.0002	173.2498	84.2283	31.3830	0.0000	0.0000	0.0000	0.0000	87.9405	207.5978	326.8469 (98a)
Space heating requirement - total per year (kWh/year)												1452.9190
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	315.6725	226.0002	173.2498	84.2283	31.3830	0.0000	0.0000	0.0000	0.0000	87.9405	207.5978	326.8469 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1452.9190
Space heating per m ²										(98c) / (4) =		28.1573 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
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	519.0367	408.6033	418.8810	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9166	0.9533	0.9400	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	475.7294	389.5247	393.7619	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	745.1253	717.0322	675.2349	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	193.9650	243.6656	209.4159	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	48.4913	60.9164	52.3540	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												161.7616 (107)
Energy for space heating												28.1573 (99)

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Energy for space cooling	3.1349	(108)
Total	31.2923	(109)
Fabric Energy Efficiency (TFEE)	31.3	(109)