

Full SAP Calculation Printout



Plot Reference	UNIT 02			Issued on Date	08/07/2026
Assessment Reference	001	Plot Type Ref	UNIT 02		
Plot Address	UNIT 02, Stoney Wood Quarter, 34 The Fairway, LONDON, NW7 3HS			SAP Version	10.2
SAP Rating	82 B	DER	3.45	TER	14.31
Environmental	97 A	% DER < TER			75.89
CO ₂ Emissions (t/year)	0.26	DFEE	34.22	TFEE	37.79
Compliance Check	See BREL	% DFEE < TFEE			9.44
% DPER < TPER	52.29	DPER	36.92	TPER	77.38
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			
Basement floor	49.2000 (1a)	x 2.6500 (2a)	= 130.3800 (1a) - (3a)
Ground floor	33.2000 (1b)	x 2.8000 (2b)	= 92.9600 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	82.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 223.3400 (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	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	Air changes per hour 30.0000 / (5) = 0.1343 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2843 (18)
Number of sides sheltered	4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1990 (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	0.2538	0.2488	0.2438	0.2189	0.2140	0.1891	0.1891	0.1841	0.1990	0.2140	0.2239	0.2339 (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	0.5322	0.5309	0.5297	0.5240	0.5229	0.5179	0.5179	0.5169	0.5198	0.5229	0.5251	0.5273 (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			27.6700	0.7940	21.9688		(27)
1r1			0.4400	0.7940	0.3493		(27a)
parking below			49.2000	0.1000	4.9200	75.0000	3690.0001 (28b)
exposed wall	32.9200	27.6700	5.2500	0.1500	0.7875	60.0000	314.9999 (29a)
basement wall	14.0450		14.0450	0.1500	2.1068	9.0000	126.4050 (29a)
garage wall	11.0000		11.0000	0.3000	3.3000	9.0000	99.0000 (29a)
terrace above LGF	13.8000	0.4400	13.3600	0.1000	1.3360	9.0000	120.2400 (30)
terrace above GF	1.5000		1.5000	0.1000	0.1500	9.0000	13.5000 (30)
Total net area of external elements Aum(A, m ²)			122.4650				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	34.9184	(33)
Main dwelling							
pw			97.2300	0.0000	0.0000	110.0000	10695.3004 (32)
pc			31.7000			30.0000	951.0000 (32b)
iw			162.2900			9.0000	1460.6099 (32c)
if			33.2000			18.0000	597.6000 (32d)
ic			33.2000			9.0000	298.8000 (32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$
Thermal mass parameter (TMP = C_m / TFA) in $\text{kJ/m}^2\text{K}$
List of Thermal Bridges

(28)...(30) + (32) + (32a)...(32e) = 18367.4553 (34)
222.9060 (35)

	Length	Psi-value	Total
K1 Element			
E2 Other lintels (including other steel lintels)	10.4200	0.0500	0.5210
E3 Sill	10.4200	0.0500	0.5210
E4 Jamb	31.8000	0.0500	1.5900
E20 Exposed floor (normal)	16.6000	0.3200	5.3120
E6 Intermediate floor within a dwelling	1.3000	0.0000	0.0000
E7 Party floor between dwellings (in blocks of flats)	0.9000	0.0700	0.0630
E24 Eaves (insulation at ceiling level - inverted)	2.6000	0.1600	0.4160
E24 Eaves (insulation at ceiling level - inverted)	3.0000	0.2400	0.7200
E14 Flat roof	11.0000	0.1600	1.7600
E16 Corner (normal)	8.1000	0.0900	0.7290
E17 Corner (inverted - internal area greater than external area)	10.7500	-0.0900	-0.9675
E18 Party wall between dwellings	5.4500	0.0600	0.3270
E25 Staggered party wall between dwellings	7.6500	0.0600	0.4590
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			11.4505 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	46.3689 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.2241	39.1319	39.0416	38.6174	38.5380	38.1685	38.1685	38.1001	38.3108	38.5380	38.6986	38.8665	(38)
Heat transfer coeff	85.5930	85.5009	85.4105	84.9863	84.9069	84.5374	84.5374	84.4690	84.6798	84.9069	85.0675	85.2354	(39)
Average = Sum(39)m / 12 =												84.9859	
HLP	1.0387	1.0376	1.0365	1.0314	1.0304	1.0259	1.0259	1.0251	1.0277	1.0304	1.0324	1.0344	(40)
HLP (average)												1.0314	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.5068 (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													
28.6133	28.1883	27.5899	26.4865	25.6604	24.7442	24.2494	24.8436	25.4906	26.4709	27.5970	28.5165	28.5165	(42b)
Hot water usage for other uses													
40.3024	38.8368	37.3713	35.9058	34.4402	32.9747	32.9747	34.4402	35.9058	37.3713	38.8368	40.3024	40.3024	(42c)
Average daily hot water use (litres/day)												63.1675	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
68.9157	67.0252	64.9612	62.3923	60.1006	57.7189	57.2241	59.2838	61.3964	63.8422	66.4338	68.8189	68.8189	(44)
Energy conte	109.1456	95.4429	99.8430	85.4119	80.9069	70.9721	69.2076	73.4058	75.7079	86.6333	94.6472	107.7538	(45)
Energy content (annual)										Total = Sum(45)m =		1049.0780	
Distribution loss (46)m = $0.15 \times (45)\text{m}$													
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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													
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													
92.7737	81.1265	84.8665	72.6002	68.7709	60.3263	58.8264	62.3949	64.3517	73.6383	80.4501	91.5907	91.5907	(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	92.7737	81.1265	84.8665	72.6002	68.7709	60.3263	58.8264	62.3949	64.3517	73.6383	80.4501	91.5907	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		891.7163	(64)
Electric shower(s)	53.0559	47.2733	51.6206	49.2609	50.1853	47.8719	49.4676	50.1853	49.2609	51.6206	50.6499	53.0559	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												603.5081	(64a)
Heat gains from water heating, kWh/month	36.4574	32.0999	34.1218	30.4653	29.7390	27.0495	27.0735	28.1450	28.4032	31.3147	32.7750	36.1617	(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	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	113.1756	125.3015	113.1756	116.9481	113.1756	116.9481	113.1756	113.1756	116.9481	113.1756	116.9481	113.1756	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	224.3833	226.7117	220.8442	208.3530	192.5851	177.7656	167.8652	165.5368	171.4043	183.8954	199.6633	214.4829	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	(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)	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	(71)
Water heating gains (Table 5)	49.0019	47.7678	45.8626	42.3129	39.9718	37.5688	36.3891	37.8294	39.4488	42.0897	45.5208	48.6044	(72)
Total internal gains	447.1631	460.3833	440.4847	428.2163	406.3349	392.8848	378.0322	377.1441	388.4036	399.7631	422.7346	436.8652	(73)

6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	7.3800	10.6334	0.5300	0.7000	0.7700	20.1760 (74)
Northeast	14.9600	11.2829	0.5300	0.7000	0.7700	43.3971 (75)

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Northwest	5.3300	11.2829	0.5300	0.7000	0.7700	15.4617 (81)
Horizontal	0.4400	26.0000	0.5300	0.7000	1.0000	3.8198 (82)

Solar gains	82.8546	166.2997	295.4797	481.7766	646.4923	689.1670	644.7003	514.3481	358.6953	202.0099	103.7976	67.9720 (83)
Total gains	530.0177	626.6830	735.9645	909.9930	1052.8272	1082.0518	1022.7325	891.4922	747.0989	601.7729	526.5322	504.8372 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	59.6085	59.6727	59.7359	60.0340	60.0902	60.3528	60.3528	60.4017	60.2514	60.0902	59.9767	59.8586
alpha	4.9739	4.9782	4.9824	5.0023	5.0060	5.0235	5.0235	5.0268	5.0168	5.0060	4.9984	4.9906
util living area	0.9955	0.9891	0.9682	0.8799	0.6960	0.4922	0.3623	0.4320	0.7178	0.9481	0.9902	0.9964 (86)
MIT	19.6878	19.8986	20.2345	20.6683	20.9171	20.9877	20.9978	20.9950	20.9299	20.5445	20.0368	19.6471 (87)
Th 2	20.0512	20.0521	20.0530	20.0573	20.0581	20.0618	20.0618	20.0625	20.0603	20.0581	20.0564	20.0548 (88)
util rest of house	0.9941	0.9859	0.9591	0.8501	0.6404	0.4233	0.2858	0.3459	0.6417	0.9282	0.9868	0.9954 (89)
MIT 2	18.8561	19.0658	19.3955	19.8027	20.0064	20.0564	20.0612	20.0610	20.0235	19.7017	19.2076	18.8185 (90)
Living area fraction	19.1115	19.3215	19.6531	20.0685	20.2860	20.3423	20.3488	20.3478	20.3018	19.9605	19.4622	19.0729 (91)
MIT	19.1115	19.3215	19.6531	20.0685	20.2860	20.3423	20.3488	20.3478	20.3018	19.9605	19.4622	19.0729 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1115	19.3215	19.6531	20.0685	20.2860	20.3423	20.3488	20.3478	20.3018	19.9605	19.4622	19.0729 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9924	0.9828	0.9544	0.8505	0.6544	0.4442	0.3093	0.3724	0.6625	0.9257	0.9840	0.9939 (94)
Useful gains	525.9656	615.8883	702.4372	773.9072	689.0005	480.6297	316.3048	331.9740	494.9211	557.0553	518.1184	501.7556 (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	1267.7603	1233.0530	1123.4118	949.1688	729.0142	485.4417	316.9132	333.4668	525.1660	794.7689	1051.6250	1267.6979 (97)
Space heating kWh	551.8953	414.7347	313.2051	126.1884	29.7702	0.0000	0.0000	0.0000	0.0000	176.8589	384.1247	569.8611 (98a)
Space heating requirement - total per year (kWh/year)												2566.6384
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	551.8953	414.7347	313.2051	126.1884	29.7702	0.0000	0.0000	0.0000	0.0000	176.8589	384.1247	569.8611 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2566.6384
Space heating per m2												(98c) / (4) = 31.1485 (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	794.6518	625.5770	641.9644	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9557	0.9780	0.9584	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	759.4505	611.7910	615.2398	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1216.0362	1149.1762	998.7834	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	328.7417	399.8146	285.3565	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	82.1854	99.9536	71.3391	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												253.4782 (107)
Energy for space heating												31.1485 (99)
Energy for space cooling												3.0762 (108)
Total												34.2247 (109)
Fabric Energy Efficiency (DFEE)												34.2 (109)

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

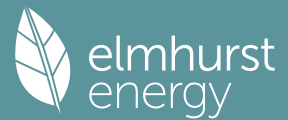
1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Basement floor	49.2000 (1a)	x 2.6500 (2a)	= 130.3800 (1a) - (3a)
Ground floor	33.2000 (1b)	x 2.8000 (2b)	= 92.9600 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	82.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	223.3400 (5)

2. Ventilation rate

Number of open chimneys	m3 per hour
0 * 80 =	0.0000 (6a)

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Number of open flues
Number of chimneys / flues attached to closed fire
Number of flues attached to solid fuel boiler
Number of flues attached to other heater
Number of blocked chimneys
Number of intermittent extract fans
Number of passive vents
Number of flueless gas fires

0 * 20 = 0.0000 (6b)
0 * 10 = 0.0000 (6c)
0 * 20 = 0.0000 (6d)
0 * 35 = 0.0000 (6e)
0 * 20 = 0.0000 (6f)
3 * 10 = 30.0000 (7a)
0 * 10 = 0.0000 (7b)
0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 30.0000 / (5) = 0.1343 (8)
Pressure test
Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered
Blower Door
Yes
5.0000 (17)
0.3843 (18)
4 (19)
Shelter factor (20) = 1 - [0.075 x (19)] = 0.7000 (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.2690 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000
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
Adj infilt rate												
	0.3430	0.3363	0.3296	0.2959	0.2892	0.2556	0.2556	0.2489	0.2690	0.2892	0.3027	0.3161
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												
Effective ac	0.5588	0.5565	0.5543	0.5438	0.5418	0.5327	0.5327	0.5310	0.5362	0.5418	0.5458	0.5500

(22b) 0.3161 (22b)
(23b) 0.0000 (23b)
(23c) 0.0000 (23c)
(25) 0.5500 (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 Opening Type			20.2900	1.1450	23.2328		(27)
TER Roof Window			0.3200	1.1450	0.5094		(27a)
parking below			49.2000	0.1300	6.3960		(28b)
exposed wall	32.9200	20.2900	12.6300	0.1800	2.2734		(29a)
basement wall	14.0450		14.0450	0.1800	2.5281		(29a)
garage wall	11.0000		11.0000	0.1800	1.9800		(29a)
terrace above LGF	13.8000	0.3200	13.4800	0.1100	1.4828		(30)
terrace above GF	1.5000		1.5000	0.1100	0.1650		(30)
Total net area of external elements Aum(A, m2)			122.4650				(31)
Fabric heat loss, W/K = Sum (A x U)					38.5675		(33)
Main dwelling							
pw			97.2300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							222.9060 (35)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	10.4200	0.0500	0.5210
E2 Other lintels (including other steel lintels)	10.4200	0.0500	0.5210
E3 Sill	31.8000	0.0500	1.5900
E4 Jamb	16.6000	0.3200	5.3120
E20 Exposed floor (normal)	1.3000	0.0000	0.0000
E6 Intermediate floor within a dwelling	0.9000	0.0700	0.0630
E7 Party floor between dwellings (in blocks of flats)	2.6000	0.2400	0.6240
E24 Eaves (insulation at ceiling level - inverted)	3.0000	0.2400	0.7200
E24 Eaves (insulation at ceiling level - inverted)	11.0000	0.0800	0.8800
E14 Flat roof	8.1000	0.0900	0.7290
E16 Corner (normal)	10.7500	-0.0900	-0.9675
E17 Corner (inverted - internal area greater than external area)	5.4500	0.0600	0.3270
E18 Party wall between dwellings	7.6500	0.0600	0.4590
E25 Staggered party wall between dwellings			

Thermal bridges (Sum(L x Psi) calculated using Appendix K)

Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 49.3460 (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
	41.1868	41.0185	40.8534	40.0783	39.9333	39.2582	39.2582	39.1332	39.5182	39.9333	40.2267	40.5334
Heat transfer coeff	90.5328	90.3645	90.1994	89.4243	89.2793	88.6042	88.6042	88.4791	88.8642	89.2793	89.5727	89.8794
Average = Sum(39)m / 12 =												89.4236

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.0987	1.0967	1.0947	1.0852	1.0835	1.0753	1.0753	1.0738	1.0784	1.0835	1.0870	1.0908
HLP (average)												1.0852
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.5068 (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 28.6133 28.1883 27.5899 26.4865 25.6604 24.7442 24.2494 24.8436 25.4906 26.4709 27.5970 28.5165 (42b)
Hot water usage for other uses 40.3024 38.8368 37.3713 35.9058 34.4402 32.9747 32.9747 34.4402 35.9058 37.3713 38.8368 40.3024 (42c)
Average daily hot water use (litres/day) 63.1675 (43)
Daily hot water use
Jan 68.9157 Feb 67.0252 Mar 64.9612 Apr 62.3923 May 60.1006 Jun 57.7189 Jul 57.2241 Aug 59.2838 Sep 61.3964 Oct 63.8422 Nov 66.4338 Dec 68.8189 (44)
Energy conte 109.1456 95.4429 99.8430 85.4119 80.9069 70.9721 69.2076 73.4058 75.7079 86.6333 94.6472 107.7538 (45)
Energy content (annual)
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
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)

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Total heat required for water heating calculated for each month												
	92.7737	81.1265	84.8665	72.6002	68.7709	60.3263	58.8264	62.3949	64.3517	73.6383	80.4501	91.5907 (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	92.7737	81.1265	84.8665	72.6002	68.7709	60.3263	58.8264	62.3949	64.3517	73.6383	80.4501	91.5907 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											891.7163 (64a)
Electric shower(s)	53.0559	47.2733	51.6206	49.2609	50.1853	47.8719	49.4676	50.1853	49.2609	51.6206	50.6499	53.0559 (64a)
	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =											603.5081 (64a)
Heat gains from water heating, kWh/month	36.4574	32.0999	34.1218	30.4653	29.7390	27.0495	27.0735	28.1450	28.4032	31.3147	32.7750	36.1617 (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	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412	125.3412 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	113.1756	125.3015	113.1756	116.9481	113.1756	116.9481	113.1756	113.1756	116.9481	113.1756	116.9481	113.1756 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	224.3833	226.7117	220.8442	208.3530	192.5851	177.7656	167.8652	165.5368	171.4043	183.8954	199.6633	214.4829 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341	35.5341 (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)	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729	-100.2729 (71)
Water heating gains (Table 5)	49.0019	47.7678	45.8626	42.3129	39.9718	37.5688	36.3891	37.8294	39.4488	42.0897	45.5208	48.6044 (72)
Total internal gains	447.1631	460.3833	440.4847	428.2163	406.3349	392.8848	378.0322	377.1441	388.4036	399.7631	422.7346	436.8652 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
North				5.4100	10.6334		0.6300		0.7000		0.7700		17.5809 (74)
Northeast				10.9700	11.2829		0.6300		0.7000		0.7700		37.8269 (75)
Northwest				3.9100	11.2829		0.6300		0.7000		0.7700		13.4825 (81)
Horizontal				0.3200	26.0000		0.6300		0.7000		1.0000		3.3022 (82)
Solar gains	72.1925	144.8982	257.4549	419.7850	563.3159	600.5049	561.7569	448.1687	312.5372	176.0127	90.4401		59.2253 (83)
Total gains	519.3556	605.2816	697.9396	848.0013	969.6508	993.3897	939.7892	825.3128	700.9408	575.7758	513.1747		496.0905 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	56.3560	56.4610	56.5643	57.0546	57.1473	57.5827	57.5827	57.6641	57.4142	57.1473	56.9601	56.7658
alpha	4.7571	4.7641	4.7710	4.8036	4.8098	4.8388	4.8388	4.8443	4.8276	4.8098	4.7973	4.7844
util living area	0.9959	0.9910	0.9761	0.9114	0.7581	0.5539	0.4114	0.4849	0.7687	0.9593	0.9916	0.9967 (86)
MIT	19.5701	19.7704	20.0984	20.5543	20.8627	20.9758	20.9953	20.9901	20.8927	20.4576	19.9392	19.5378 (87)
Th 2	20.0019	20.0036	20.0052	20.0129	20.0143	20.0211	20.0211	20.0223	20.0185	20.0143	20.0114	20.0084 (88)
util rest of house	0.9947	0.9883	0.9688	0.8862	0.7025	0.4760	0.3216	0.3859	0.6927	0.9426	0.9886	0.9958 (89)
MIT 2	18.7010	18.9011	19.2254	19.6637	19.9263	20.0103	20.0198	20.0194	19.9602	19.5849	19.0760	18.6739 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	18.9679	19.1680	19.4935	19.9372	20.2138	20.3067	20.3193	20.3175	20.2465	19.8529	19.3410	18.9391 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9679	19.1680	19.4935	19.9372	20.2138	20.3067	20.3193	20.3175	20.2465	19.8529	19.3410	18.9391 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9930	0.9854	0.9641	0.8840	0.7145	0.4993	0.3492	0.4163	0.7119	0.9391	0.9859	0.9943 (94)
Useful gains	515.7042	596.4154	672.8722	749.6362	692.8284	495.9933	328.2019	343.5871	499.0053	540.7366	505.9355	493.2565 (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	1327.9250	1289.3189	1172.0033	986.9911	760.1039	505.6379	329.5482	346.6128	546.2035	826.0902	1096.4633	1324.7443 (97)
Space heating kWh	604.2923	465.6311	371.3536	170.8956	50.0530	0.0000	0.0000	0.0000	0.0000	212.3031	425.1800	618.6269 (98a)
Space heating requirement - total per year (kWh/year)												2918.3356
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)												
Space heating kWh	604.2923	465.6311	371.3536	170.8956	50.0530	0.0000	0.0000	0.0000	0.0000	212.3031	425.1800	618.6269 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2918.3356
Space heating per m2												35.4167 (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												

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Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	832.8791	655.6708	672.4415	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.9242	0.9593	0.9303	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	769.7297	628.9858	625.5758	0.0000	0.0000	0.0000	0.0000 (102)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	1113.0774	1052.8646	921.9586	0.0000	0.0000	0.0000	0.0000 (103)
Cooled fraction	0.0000	0.0000	0.0000	0.0000	0.0000	247.2104	315.3659	220.5088	0.0000	0.0000	0.0000	0.0000 (104)
Intermittency factor (Table 10b)									FC = cooled area / (4) =			1.0000 (105)
Space cooling kWh	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 requirement	0.0000	0.0000	0.0000	0.0000	0.0000	61.8026	78.8415	55.1272	0.0000	0.0000	0.0000	0.0000 (107)
Energy for space heating												195.7713 (107)
Energy for space cooling												35.4167 (99)
Total												2.3759 (108)
Fabric Energy Efficiency (TFEE)												37.7926 (109)
												37.8 (109)