

Full SAP Calculation Printout



Plot Reference	UNIT 06				Issued on Date	08/07/2026	
Assessment Reference	001			Plot Type Ref	UNIT 06		
Plot Address	UNIT 06, Stoney Wood Quarter, 34 The Fairway, LONDON, NW7 3HS				SAP Version	10.2	
SAP Rating	85 B	DER	12.46	TER	13.67		
Environmental	91 B	% DER < TER				8.85	
CO ₂ Emissions (t/year)	0.74	DFEE	26.30	TFEE	29.15		
Compliance Check	See BREL	% DFEE < TFEE				9.78	
% DPER < TPER	3.26	DPER	71.22	TPER	73.62		
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 DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	62.2000 (1b)	x 2.8000 (2b)	= 174.1600 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 174.1600 (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	0 * 10 = 0.0000 (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) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.1500	(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) =	0.1050 (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	0.1339	0.1313	0.1286	0.1155	0.1129	0.0997	0.0997	0.0971	0.1050	0.1129	0.1181	0.1234 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												81.0000 (23c)
Effective ac	0.2289	0.2262	0.2236	0.2105	0.2079	0.1947	0.1947	0.1921	0.2000	0.2079	0.2131	0.2184 (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)
l			12.9200	0.7940	10.2579		(27)
exposed floor			8.2000	0.0900	0.7380	75.0000	615.0000 (28b)
exposed wall	40.0400	12.9200	27.1200	0.1500	4.0680	60.0000	1627.2001 (29a)
corridor wall	17.9200	2.1000	15.8200	0.3100	4.9042	14.0000	221.4800 (29a)
corridor above	4.9000		4.9000	0.0900	0.4410	9.0000	44.1000 (30)
Total net area of external elements Aum(A, m ²)			71.0600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	22.5091		(33)
Main dwelling							
pw			45.6400	0.0000	0.0000	110.0000	5020.3999 (32)
pf			54.0000			40.0000	2160.0000 (32d)
pc			57.3000			30.0000	1719.0000 (32b)
iw			98.5600			9.0000	887.0400 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 12294.2199 (34)

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

197.6563 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	5.7000	0.0500	0.2850
E3 Sill	4.7000	0.0500	0.2350
E4 Jamb	26.2000	0.0500	1.3100
E20 Exposed floor (normal)	4.0000	0.3200	1.2800
E21 Exposed floor (inverted)	10.4000	0.3200	3.3280
E7 Party floor between dwellings (in blocks of flats)	10.8000	0.0700	0.7560
E23 Balcony within or between dwellings, balcony support penetrates wall insulation	1.9000	0.0200	0.0380
E16 Corner (normal)	11.2000	0.0900	1.0080
E17 Corner (inverted - internal area greater than external area)	11.2000	-0.0900	-1.0080
E18 Party wall between dwellings	5.6000	0.0600	0.3360
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.5680 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	30.0771 (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	13.1541	13.0032	12.8524	12.0980	11.9472	11.1928	11.1928	11.0420	11.4946	11.9472	12.2489	12.5506 (38)
Heat transfer coeff	43.2312	43.0804	42.9295	42.1752	42.0243	41.2700	41.2700	41.1191	41.5717	42.0243	42.3260	42.6278 (39)
Average = Sum(39)m / 12 =												42.1374
HLP	0.6950	0.6926	0.6902	0.6781	0.6756	0.6635	0.6635	0.6611	0.6684	0.6756	0.6805	0.6853 (40)
HLP (average)												0.6775
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0431 (42)
Hot water usage for mixer showers	58.4757	57.5970	56.3164	53.8663	52.0582	50.0418	48.8957	50.1665	51.5596	53.7246	56.2274	58.2517 (42a)
Hot water usage for baths	25.2697	24.8944	24.3659	23.3915	22.6618	21.8528	21.4158	21.9406	22.5120	23.3777	24.3722	25.1843 (42b)
Hot water usage for other uses	35.5534	34.2606	32.9677	31.6749	30.3820	29.0892	29.0892	30.3820	31.6749	32.9677	34.2606	35.5534 (42c)
Average daily hot water use (litres/day)												109.6630 (43)
Daily hot water use	119.2989	116.7520	113.6501	108.9327	105.1021	100.9838	99.4006	102.4891	105.7465	110.0700	114.8601	118.9894 (44)
Energy conte	188.9403	166.2532	174.6759	149.1234	141.4876	124.1713	120.2164	126.9030	130.3960	149.3640	163.6393	186.3087 (45)
Energy content (annual)										Total = Sum(45)m =		1821.4791
Distribution loss (46)m = 0.15 x (45)m	28.3410	24.9380	26.2014	22.3685	21.2231	18.6257	18.0325	19.0354	19.5594	22.4046	24.5459	27.9463 (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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.6535	50.9589	49.3151	50.9589	49.3151	50.9589 (61)
Total heat required for water heating calculated for each month	239.8992	212.2806	225.6348	198.4385	192.4465	173.4864	170.8699	177.8619	179.7111	200.3229	212.9544	237.2676 (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	239.8992	212.2806	225.6348	198.4385	192.4465	173.4864	170.8699	177.8619	179.7111	200.3229	212.9544	237.2676 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2421.1736 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	75.5624	66.7860	70.8195	61.9123	59.7843	53.6157	52.6353	54.9350	55.6854	62.4033	66.7388	74.6874 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	90.3324	100.0109	90.3324	93.3435	90.3324	93.3435	90.3324	90.3324	93.3435	90.3324	93.3435	90.3324 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	178.4593	180.3112	175.6446	165.7099	153.1692	141.3827	133.5086	131.6568	136.3234	146.2580	158.7987	170.5852 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242 (71)
Water heating gains (Table 5)	101.5623	99.3840	95.1875	85.9893	80.3553	74.4663	70.7464	73.8373	77.3409	83.8754	92.6928	100.3862 (72)
Total internal gains	427.0006	436.3526	417.8110	401.6893	380.5035	362.8391	348.2341	349.4731	360.6544	377.1124	401.4816	417.9504 (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		
Southeast					7.5600	36.7938	0.5300	0.7000	0.7700	71.5161 (77)		
Southwest					5.3600	36.7938	0.5300	0.7000	0.7700	50.7045 (79)		
Solar gains	122.2207	208.1870	284.8506	352.9436	395.3263	392.4675	378.3806	346.7612	308.4329	230.0910	146.3922	104.5954 (83)
Total gains	549.2213	644.5397	702.6616	754.6330	775.8298	755.3066	726.6146	696.2343	669.0873	607.2034	547.8738	522.5459 (84)

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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	78.9952	79.2719	79.5505	80.9733	81.2640	82.7493	82.7493	83.0529	82.1487	81.2640	80.6847	80.1135
alpha	6.2663	6.2848	6.3034	6.3982	6.4176	6.5166	6.5166	6.5369	6.4766	6.4176	6.3790	6.3409
util living area	0.9500	0.8922	0.8057	0.6573	0.5007	0.3495	0.2499	0.2716	0.4277	0.6930	0.8932	0.9593 (86)
MIT	20.5410	20.7281	20.8706	20.9670	20.9945	20.9996	21.0000	20.9999	20.9984	20.9625	20.7723	20.5062 (87)
Th 2	20.3452	20.3474	20.3495	20.3603	20.3624	20.3732	20.3732	20.3753	20.3689	20.3624	20.3581	20.3538 (88)
util rest of house	0.9410	0.8761	0.7817	0.6267	0.4673	0.3153	0.2143	0.2348	0.3890	0.6569	0.8746	0.9517 (89)
MIT 2	19.8249	20.0507	20.2161	20.3294	20.3579	20.3729	20.3732	20.3753	20.3678	20.3288	20.1160	19.7897 (90)
Living area fraction									FLA = Living area / (4) =			0.4743 (91)
MIT	20.1645	20.3720	20.5265	20.6318	20.6598	20.6701	20.6704	20.6716	20.6669	20.6294	20.4273	20.1295 (92)
Temperature adjustment												-0.1500
adjusted MIT	20.0145	20.2220	20.3765	20.4818	20.5098	20.5201	20.5204	20.5216	20.5169	20.4794	20.2773	19.9795 (93)
8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9358	0.8728	0.7827	0.6326	0.4750	0.3233	0.2227	0.2434	0.3981	0.6637	0.8721	0.9466 (94)
Useful gains	513.9418	562.5436	550.0042	477.3648	368.5422	244.2178	161.7894	169.4622	266.3455	403.0008	477.7851	494.6611 (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	679.3572	660.0756	595.7130	488.4659	370.2274	244.3235	161.7965	169.4747	266.7615	415.1734	557.7422	672.6447 (97)
Space heating kWh	123.0691	65.5415	34.0074	7.9928	1.2538	0.0000	0.0000	0.0000	0.0000	9.0564	57.5691	132.4198 (98a)
Space heating requirement - total per year (kWh/year)												430.9097
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	123.0691	65.5415	34.0074	7.9928	1.2538	0.0000	0.0000	0.0000	0.0000	9.0564	57.5691	132.4198 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												430.9097
Space heating per m2										(98c) / (4) =		6.9278 (99)
9a. Energy requirements - Individual heating systems, including micro-CHP												
Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												88.9000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	123.0691	65.5415	34.0074	7.9928	1.2538	0.0000	0.0000	0.0000	0.0000	9.0564	57.5691	132.4198 (98)
Space heating efficiency (main heating system 1)	88.9000	88.9000	88.9000	88.9000	88.9000	0.0000	0.0000	0.0000	0.0000	88.9000	88.9000	88.9000 (210)
Space heating fuel (main heating system)	138.4354	73.7250	38.2535	8.9907	1.4103	0.0000	0.0000	0.0000	0.0000	10.1871	64.7571	148.9536 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	239.8992	212.2806	225.6348	198.4385	192.4465	173.4864	170.8699	177.8619	179.7111	200.3229	212.9544	237.2676 (64)
Efficiency of water heater	83.0232	82.1754	81.3305	80.6019	80.3503	80.3000	80.3000	80.3000	80.3000	80.6374	81.9878	80.3000 (216)
Fuel for water heating, kWh/month	288.9544	258.3263	277.4295	246.1958	239.5093	216.0478	212.7894	221.4967	223.7996	248.4243	259.7390	83.1823 (217)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	285.2379 (219)
(221)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 (221)
Pumps and Fa	15.9880	14.4407	15.9880	15.4722	15.9880	15.4722	15.9880	15.9880	15.4722	15.9880	15.4722	15.9880 (231)
Lighting	18.7693	15.0574	13.5575	9.9328	7.6724	6.2684	6.9990	9.0976	11.8169	15.5044	17.5122	19.2909 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)
Annual totals kWh/year												
Space heating fuel - main system 1												484.7128 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												80.3000
Water heating fuel used												2977.9501 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.1000, SFP = 0.6930)												
mechanical ventilation fans (SFP = 0.6930)												147.2453 (230a)
central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												188.2453 (231)

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Electricity for lighting (calculated in Appendix L)	151.4789 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3802.3872 (238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	484.7128	0.2100	101.7897 (261)
Total CO2 associated with community systems			0.0000 (273)
Water heating (other fuel)	2977.9501	0.2100	625.3695 (264)
Space and water heating			727.1592 (265)
Pumps, fans and electric keep-hot	188.2453	0.1387	26.1119 (267)
Energy for lighting	151.4789	0.1443	21.8631 (268)
Total CO2, kg/year			775.1342 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			12.4600 (273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	484.7128	1.1300	547.7255 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2977.9501	1.1300	3365.0836 (278)
Space and water heating			3912.8091 (279)
Pumps, fans and electric keep-hot	188.2453	1.5128	284.7775 (281)
Energy for lighting	151.4789	1.5338	232.3435 (282)
Total Primary energy kWh/year			4429.9301 (286)
Dwelling Primary energy Rate (DPER)			71.2200 (287)

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	62.2000 (1b)	x 2.8000 (2b)	= 174.1600 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.2000		(5)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 174.1600 (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)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1148 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3648 (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) = 0.2554 (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	0.3256	0.3192	0.3128	0.2809	0.2745	0.2426	0.2426	0.2362	0.2554	0.2745	0.2873	0.3001 (22b)
Effective ac	0.5530	0.5510	0.5489	0.5395	0.5377	0.5294	0.5294	0.5279	0.5326	0.5377	0.5413	0.5450 (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							

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TER Opaque door			2.1000	1.0000	2.1000	(26)
TER Opening Type			12.9200	1.1450	14.7939	(27)
exposed floor			8.2000	0.1300	1.0660	(28b)
exposed wall	40.0400	12.9200	27.1200	0.1800	4.8816	(29a)
corridor wall	17.9200	2.1000	15.8200	0.1800	2.8476	(29a)
corridor above	4.9000		4.9000	0.1100	0.5390	(30)
Total net area of external elements Aum(A, m2)			71.0600			(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		26.2281	(33)
Main dwelling						
pw			45.6400	0.0000	0.0000	(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 197.6563 (35)

List of Thermal Bridges						
K1 Element			Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)			5.7000	0.0500	0.2850	
E3 Sill			4.7000	0.0500	0.2350	
E4 Jamb			26.2000	0.0500	1.3100	
E20 Exposed floor (normal)			4.0000	0.3200	1.2800	
E21 Exposed floor (inverted)			10.4000	0.3200	3.3280	
E7 Party floor between dwellings (in blocks of flats)			10.8000	0.0700	0.7560	
E23 Balcony within or between dwellings, balcony support penetrates wall insulation			1.9000	0.0200	0.0380	
E16 Corner (normal)			11.2000	0.0900	1.0080	
E17 Corner (inverted - internal area greater than external area)			11.2000	-0.0900	-1.0080	
E18 Party wall between dwellings			5.6000	0.0600	0.3360	

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 7.5680 (36)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 33.7961 (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	31.7832	31.6649	31.5489	31.0042	30.9023	30.4279	30.4279	30.3400	30.6106	30.9023	31.1085	31.3240
Average = Sum(39)m / 12 =	65.5793	65.4610	65.3450	64.8003	64.6984	64.2240	64.2240	64.1361	64.4067	64.6984	64.9046	65.1201
												64.7998

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0543	1.0524	1.0506	1.0418	1.0402	1.0325	1.0325	1.0311	1.0355	1.0402	1.0435	1.0469
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.0431 (42)
Hot water usage for mixer showers													
Hot water usage for baths	58.4757	57.5970	56.3164	53.8663	52.0582	50.0418	48.8957	50.1665	51.5596	53.7246	56.2274	58.2517	(42a)
Hot water usage for other uses	25.2697	24.8944	24.3659	23.3915	22.6618	21.8528	21.4158	21.9406	22.5120	23.3777	24.3722	25.1843	(42b)
Average daily hot water use (litres/day)	35.5534	34.2606	32.9677	31.6749	30.3820	29.0892	29.0892	30.3820	31.6749	32.9677	34.2606	35.5534	(42c)
													109.6630 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	119.2989	116.7520	113.6501	108.9327	105.1021	100.9838	99.4006	102.4891	105.7465	110.0700	114.8601	118.9894	(44)
Energy conte	188.9403	166.2532	174.6759	149.1234	141.4876	124.1713	120.2164	126.9030	130.3960	149.3640	163.6393	186.3087	(45)
Energy content (annual)										Total = Sum(45)m =		1821.4791	
Distribution loss (46)m = 0.15 x (45)m	28.3410	24.9380	26.2014	22.3685	21.2231	18.6257	18.0325	19.0354	19.5594	22.4046	24.5459	27.9463	(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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.6535	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	239.8992	212.2806	225.6348	198.4385	192.4465	173.4864	170.8699	177.8619	179.7111	200.3229	212.9544	237.2676	(62)
WWHRS	-26.7327	-23.6426	-24.7572	-20.4999	-19.1052	-16.3484	-15.3240	-16.2956	-16.9147	-19.9406	-22.5903	-26.2376	(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	213.1665	188.6380	200.8777	177.9386	173.3413	157.1380	155.5459	161.5663	162.7963	180.3823	190.3641	211.0299	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2172.7849	(64)
												2173	(64)

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	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552	102.1552 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	90.3324	100.0109	90.3324	93.3435	90.3324	93.3435	90.3324	90.3324	93.3435	90.3324	93.3435	90.3324 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	178.4593	180.3112	175.6446	165.7099	153.1692	141.3827	133.5086	131.6568	136.3234	146.2580	158.7987	170.5852 (68)
Pumps, fans	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155	33.2155 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242	-81.7242 (71)
Total internal gains	101.5623	99.3840	95.1875	85.9893	80.3553	74.4663	70.7464	73.8373	77.3409	83.8754	92.6928	100.3862 (72)
	427.0006	436.3526	417.8110	401.6893	380.5035	362.8391	348.2341	349.4731	360.6544	377.1124	401.4816	417.9504 (73)

6. Solar gains

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[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

Southeast	7.5600	36.7938	0.6300	0.7000	0.7700	85.0097 (77)
Southwest	5.3600	36.7938	0.6300	0.7000	0.7700	60.2715 (79)

Solar gains	145.2812	247.4676	338.5960	419.5368	469.9162	466.5180	449.7731	412.1879	366.6278	273.5044	174.0134	124.3304 (83)
Total gains	572.2818	683.8202	756.4070	821.2261	850.4197	829.3571	798.0072	761.6610	727.2822	650.6168	575.4950	542.2809 (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	52.0753	52.1694	52.2620	52.7013	52.7843	53.1742	53.1742	53.2471	53.0234	52.7843	52.6166	52.4425
alpha	4.4717	4.4780	4.4841	4.5134	4.5190	4.5449	4.5449	4.5498	4.5349	4.5190	4.5078	4.4962
util living area	0.9730	0.9442	0.8964	0.7992	0.6567	0.4851	0.3521	0.3842	0.5838	0.8323	0.9479	0.9780 (86)
MIT	19.8645	20.1384	20.4312	20.7297	20.9085	20.9815	20.9965	20.9949	20.9580	20.7220	20.2459	19.8091 (87)
Th 2	20.0383	20.0399	20.0414	20.0486	20.0500	20.0563	20.0563	20.0575	20.0539	20.0500	20.0473	20.0444 (88)
util rest of house	0.9668	0.9323	0.8755	0.7626	0.6028	0.4176	0.2776	0.3070	0.5132	0.7925	0.9347	0.9729 (89)
MIT 2	18.7423	19.0825	19.4383	19.7876	19.9750	20.0452	20.0550	20.0554	20.0260	19.7899	19.2267	18.6774 (90)
Living area fraction	19.2745	19.5833	19.9092	20.2344	20.4177	20.4893	20.5015	20.5010	FLA = Living area / (4) =	20.2320	19.7101	0.4743 (91)
MIT	19.2745	19.5833	19.9092	20.2344	20.4177	20.4893	20.5015	20.5010	20.4681	20.2320	19.7101	19.2142 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2745	19.5833	19.9092	20.2344	20.4177	20.4893	20.5015	20.5010	20.4681	20.2320	19.7101	19.2142 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	549.7613	632.9884	659.7668	632.4917	530.8884	372.3572	249.6828	261.6510	396.2464	520.9680	534.7099	524.5263 (94)
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	982.0187	961.1848	876.2236	734.4749	564.0231	378.2347	250.5731	263.0195	410.1456	623.1732	818.4510	977.7255 (97)
Space heating kWh	321.5995	220.5479	161.0439	73.4279	24.6522	0.0000	0.0000	0.0000	0.0000	76.0407	204.2936	337.1802 (98a)
Space heating requirement - total per year (kWh/year)												1418.7859
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	321.5995	220.5479	161.0439	73.4279	24.6522	0.0000	0.0000	0.0000	0.0000	76.0407	204.2936	337.1802 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1418.7859
Space heating per m2										(98c) / (4) =		22.8101 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
 Fraction of space heat from main system(s) 1.0000 (202)
 Efficiency of main space heating system 1 (in %) 92.4000 (206)
 Efficiency of main space heating system 2 (in %) 0.0000 (207)
 Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	321.5995	220.5479	161.0439	73.4279	24.6522	0.0000	0.0000	0.0000	0.0000	76.0407	204.2936	337.1802 (98)
Space heating efficiency (main heating system 1)	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000 (210)
Space heating fuel (main heating system)	348.0514	238.6883	174.2899	79.4674	26.6799	0.0000	0.0000	0.0000	0.0000	82.2951	221.0969	364.9137 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)

Water heating												
Water heating requirement	213.1665	188.6380	200.8777	177.9386	173.3413	157.1380	155.5459	161.5663	162.7963	180.3823	190.3641	211.0299 (64)
Efficiency of water heater (217)m	85.2601	84.7172	83.9120	82.6352	81.2790	80.3000	80.3000	80.3000	80.3000	82.6716	84.5331	80.3000 (216)
Fuel for water heating, kWh/month	250.0189	222.6678	239.3908	215.3303	213.2671	195.6886	193.7059	201.2033	202.7352	218.1914	225.1948	85.3801 (217)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	247.1654 (219)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	0.0000 (221)
Lighting	18.7693	15.0574	13.5575	9.9328	7.6724	6.2684	6.9990	9.0976	11.8169	15.5044	17.5122	7.3041 (231)
Electricity generated by PVs (Appendix M) (negative quantity)	-10.3247	-15.7550	-24.4898	-29.8531	-34.2851	-32.7847	-32.3920	-29.5263	-24.8704	-18.9959	-11.7698	19.2909 (232)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-8.7925 (233a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity generated by PVs (Appendix M) (negative quantity)	-2.6857	-5.8466	-11.9984	-18.5921	-25.1545	-25.4819	-25.1775	-21.0492	-15.0850	-8.5381	-3.6412	0.0000 (235b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.1092 (233b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Annual totals kWh/year												0.0000 (235d)
Space heating fuel - main system 1												1535.4825 (211)

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Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	80.3000	
Water heating fuel used	2624.5596	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	151.4789	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-439.1987	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	3958.3224	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1535.4825	0.2100	322.4513 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2624.5596	0.2100	551.1575 (264)
Space and water heating			873.6088 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	151.4789	0.1443	21.8631 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-273.8393	0.1330	-36.4100
PV Unit electricity exported	-165.3594	0.1250	-20.6700
Total			-57.0799 (269)
Total CO2, kg/year			850.3213 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.6700 (273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1535.4825	1.1300	1735.0953 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2624.5596	1.1300	2965.7523 (278)
Space and water heating			4700.8476 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	151.4789	1.5338	232.3435 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-273.8393	1.4913	-408.3788
PV Unit electricity exported	-165.3594	0.4588	-75.8658
Total			-484.2446 (283)
Total Primary energy kWh/year			4579.0473 (286)
Target Primary Energy Rate (TPER)			73.6200 (287)