

Full SAP Calculation Printout



Plot Reference	UNIT 07			Issued on Date	08/07/2026
Assessment Reference	001	Plot Type Ref	UNIT 07		
Plot Address	UNIT 07, Stoney Wood Quarter, 34 The Fairway, LONDON, NW7 3HS			SAP Version	10.2
SAP Rating	84 B	DER	13.57	TER	16.34
Environmental	89 B	% DER < TER			16.95
CO ₂ Emissions (t/year)	0.92	DFEE	37.79	TFEE	43.85
Compliance Check	See BREL	% DFEE < TFEE			13.81
% DPER < TPER	12.63	DPER	77.11	TPER	88.26
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			
Basement floor	39.1000 (1a)	x 2.9000 (2a)	= 113.3900 (1a) - (3a)
Ground floor	32.6000 (1b)	x 2.8000 (2b)	= 91.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.7000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 204.6700 (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)											
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)
Balanced mechanical ventilation with heat recovery	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)
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			1.8900	1.0000	1.8900		(26)
1			30.1500	0.7940	23.9378		(27)
basement floor			39.1000	0.1000	3.9100	110.0000	4300.9998 (28)
exposed wall	79.3500	32.0400	47.3100	0.1500	7.0965	60.0000	2838.5999 (29a)
basement wall	62.0600		62.0600	0.1500	9.3090	9.0000	558.5400 (29a)
Total net area of external elements Aum(A, m ²)			180.5100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		46.1433		(33)
Main dwelling							
pw			28.5000	0.0000	0.0000	110.0000	3135.0000 (32)
pc			35.9000			30.0000	1077.0000 (32b)
iw			89.9600			9.0000	809.6400 (32c)
if			32.6000			18.0000	586.8000 (32d)
ic			32.6000			9.0000	293.4000 (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) = 13599.9797 (34)
189.6789 (35)

	Length	Psi-value	Total
K1 Element	12.3500	0.0500	0.6175
E2 Other lintels (including other steel lintels)	11.4500	0.0500	0.5725
E3 Sill	35.2000	0.0500	1.7600
E4 Jamb	6.7000	0.1600	1.0720
E5 Ground floor (normal)	21.3000	0.0700	1.4910
E22 Basement floor	6.1000	0.0000	0.0000
E6 Intermediate floor within a dwelling	21.5000	0.0700	1.5050
E7 Party floor between dwellings (in blocks of flats)	11.5000	0.0900	1.0350
E16 Corner (normal)	5.7000	-0.0900	-0.5130
E17 Corner (inverted - internal area greater than external area)	11.3000	0.0600	0.6780
E18 Party wall between dwellings	5.7000	0.0600	0.3420
E25 Staggered party wall between dwellings			
Thermal bridges (Sum($L \times \text{Psi}$) calculated using Appendix K)			8.5600 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	54.7033 (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	15.4585	15.2812	15.1039	14.2174	14.0401	13.1536	13.1536	12.9763	13.5082	14.0401	14.3947	14.7493 (38)
Heat transfer coeff	70.1618	69.9845	69.8072	68.9207	68.7434	67.8570	67.8570	67.6797	68.2116	68.7434	69.0980	69.4526 (39)
Average = Sum(39)m / 12 =												68.8764
HLP	0.9785	0.9761	0.9736	0.9612	0.9588	0.9464	0.9464	0.9439	0.9513	0.9588	0.9637	Dec 0.9687 (40)
HLP (average)												0.9606
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2867 (42)
Hot water usage for mixer showers	62.5597	61.6196	60.2496	57.6284	55.6940	53.5368	52.3106	53.6702	55.1606	57.4768	60.1543	62.3201 (42a)
Hot water usage for baths	27.0260	26.6246	26.0594	25.0172	24.2369	23.3716	22.9042	23.4654	24.0766	25.0024	26.0661	26.9346 (42b)
Hot water usage for other uses	38.0479	36.6643	35.2808	33.8972	32.5136	31.1301	31.1301	32.5136	33.8972	35.2808	36.6643	38.0479 (42c)
Average daily hot water use (litres/day)												117.3243 (43)
Daily hot water use	127.6336	124.9085	121.5897	116.5428	112.4445	108.0384	106.3449	109.6493	113.1344	117.7600	122.8847	127.3025 (44)
Energy conte	202.1404	177.8681	186.8789	159.5413	151.3719	132.8459	128.6149	135.7688	139.5060	159.7992	175.0718	199.3250 (45)
Energy content (annual)												Total = Sum(45)m = 1948.7322
Distribution loss (46)m = $0.15 \times (45)\text{m}$	30.3211	26.6802	28.0318	23.9312	22.7058	19.9269	19.2922	20.3653	20.9259	23.9699	26.2608	29.8988 (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	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589 (59)
Total heat required for water heating calculated for each month	253.0993	223.8954	237.8378	208.8563	202.3308	182.1609	179.5738	186.7277	188.8211	210.7582	224.3869	250.2839 (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	253.0993	223.8954	237.8378	208.8563	202.3308	182.1609	179.5738	186.7277	188.8211	210.7582	224.3869	250.2839 (64)
12Total per year (kWh/year)												2548.7322 (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	79.9514	70.6480	74.8770	65.3762	63.0709	56.5000	55.5042	57.8828	58.7145	65.8730	70.5402	79.0153 (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	114.3340	114.3340	114.3340	114.3340	114.3340	114.3340	114.3340	114.3340	114.3340	114.3340	114.3340	114.3340 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.4983	112.3731	101.4983	104.8816	101.4983	104.8816	101.4983	101.4983	104.8816	101.4983	104.8816	101.4983 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	201.2318	203.3199	198.0578	186.8555	172.7145	159.4240	150.5451	148.4570	153.7190	164.9214	179.0624	192.3529 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334 (69)
Pumps, fans	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)
Losses e.g. evaporation (negative values) (Table 5)	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672 (71)
Water heating gains (Table 5)	107.4616	105.1309	100.6411	90.8003	84.7727	78.4722	74.6024	77.7995	81.5479	88.5389	97.9724	106.2033 (72)
Total internal gains	470.4918	481.1242	460.4974	442.8376	419.2857	400.0780	383.9460	385.0550	397.4488	415.2589	442.2166	460.3547 (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
Southwest	20.9600	36.7938	0.5300	0.7000	0.7700	198.2775 (79)
Northwest	9.1900	11.2829	0.5300	0.7000	0.7700	26.6591 (81)

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Solar gains	224.9366	392.0052	559.8793	733.1418	857.1645	866.7943	829.0952	734.1488	619.5008	439.5911	271.0347	191.4554 (83)
Total gains	695.4284	873.1294	1020.3767	1175.9794	1276.4502	1266.8723	1213.0412	1119.2038	1016.9495	854.8499	713.2513	651.8101 (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	53.8437	53.9801	54.1172	54.8133	54.9547	55.6726	55.6726	55.8184	55.3832	54.9547	54.6726	54.3935	
alpha	4.5896	4.5987	4.6078	4.6542	4.6636	4.7115	4.7115	4.7212	4.6922	4.6636	4.6448	4.6262	
util living area	0.9608	0.9083	0.8184	0.6605	0.4907	0.3413	0.2459	0.2777	0.4560	0.7429	0.9206	0.9690 (86)	
MIT	20.0324	20.3585	20.6591	20.8897	20.9750	20.9964	20.9994	20.9990	20.9867	20.8458	20.4141	19.9691 (87)	
Th 2	20.1012	20.1033	20.1054	20.1158	20.1178	20.1282	20.1282	20.1303	20.1241	20.1178	20.1137	20.1095 (88)	
util rest of house	0.9527	0.8920	0.7910	0.6221	0.4471	0.2954	0.1973	0.2254	0.4006	0.6992	0.9034	0.9624 (89)	
MIT 2	19.0012	19.3998	19.7533	20.0131	20.0980	20.1261	20.1280	20.1299	20.1154	19.9777	19.4830	18.9290 (90)	
Living area fraction									FLA = Living area / (4) =				0.4086 (91)
MIT	19.4226	19.7916	20.1235	20.3713	20.4564	20.4818	20.4841	20.4850	20.4714	20.3325	19.8635	19.3540 (92)	
Temperature adjustment												-0.1500	
adjusted MIT	19.2726	19.6416	19.9735	20.2213	20.3064	20.3318	20.3341	20.3350	20.3214	20.1825	19.7135	19.2040 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9435	0.8825	0.7867	0.6268	0.4565	0.3062	0.2088	0.2378	0.4132	0.7026	0.8943	0.9540 (94)
Useful gains	656.1112	770.5193	802.6902	737.1218	582.7252	387.9056	253.2598	266.0908	420.2498	600.6301	637.8802	621.8170 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	14.0000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1050.5034	1031.6828	940.5446	780.2750	591.6338	388.9403	253.3850	266.3219	424.3733	658.7324	871.5662	1042.0693 (97)
Space heating kWh	293.4278	175.5019	102.5637	31.0703	6.6280	0.0000	0.0000	0.0000	0.0000	43.2281	168.2539	312.6677 (98a)
Space heating requirement - total per year (kWh/year)												1133.3414
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	293.4278	175.5019	102.5637	31.0703	6.6280	0.0000	0.0000	0.0000	0.0000	43.2281	168.2539	312.6677 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1133.3414
Space heating per m2										(98c) / (4) =		15.8067 (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	293.4278	175.5019	102.5637	31.0703	6.6280	0.0000	0.0000	0.0000	0.0000	43.2281	168.2539	312.6677 (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)	330.0650	197.4149	115.3697	34.9497	7.4556	0.0000	0.0000	0.0000	0.0000	48.6256	189.2620	351.7072 (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	253.0993	223.8954	237.8378	208.8563	202.3308	182.1609	179.5738	186.7277	188.8211	210.7582	224.3869	250.2839 (64)
Efficiency of water heater	84.6991	83.8650	82.7108	81.3187	80.5472	80.3000	80.3000	80.3000	80.3000	81.6442	83.7727	80.3000 (216)
Fuel for water heating, kWh/month	298.8217	266.9714	287.5535	256.8367	251.1955	226.8505	223.6287	232.5376	235.1446	258.1421	267.8520	294.9395 (219)
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	0.0000 (221)
Pumps and Fa	18.1788	16.4195	18.1788	17.5924	18.1788	17.5924	18.1788	18.1788	17.5924	18.1788	17.5924	18.1788 (231)
Lighting	21.0893	16.9187	15.2334	11.1606	8.6208	7.0433	7.8642	10.2221	13.2776	17.4209	19.6768	21.6755 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)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 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)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 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)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 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)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 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)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 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)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 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)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 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)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 (235d)
Annual totals kWh/year												
Space heating fuel - main system 1												1274.8498 (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												3100.4736 (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)												173.0403 (230a)

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central heating pump	41.0000 (230c)
Total electricity for the above, kWh/year	214.0403 (231)
Electricity for lighting (calculated in Appendix L)	170.2031 (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	4759.5668 (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	1274.8498	0.2100	267.7185 (261)
Total CO2 associated with community systems			0.0000 (273)
Water heating (other fuel)	3100.4736	0.2100	651.0995 (264)
Space and water heating			918.8179 (265)
Pumps, fans and electric keep-hot	214.0403	0.1387	29.6900 (267)
Energy for lighting	170.2031	0.1443	24.5656 (268)
Total CO2, kg/year			973.0735 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			13.5700 (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	1274.8498	1.1300	1440.5802 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3100.4736	1.1300	3503.5352 (278)
Space and water heating			4944.1155 (279)
Pumps, fans and electric keep-hot	214.0403	1.5128	323.8002 (281)
Energy for lighting	170.2031	1.5338	261.0632 (282)
Total Primary energy kWh/year			5528.9788 (286)
Dwelling Primary energy Rate (DPER)			77.1100 (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			
Basement floor	39.1000 (1a)	x 2.9000 (2a)	= 113.3900 (1a) - (3a)
Ground floor	32.6000 (1b)	x 2.8000 (2b)	= 91.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.7000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	204.6700 (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	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) =	30.0000 / (5) = 0.1466 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3966 (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) = 0.2776 (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	0.3539	0.3470	0.3401	0.3054	0.2984	0.2637	0.2637	0.2568	0.2776	0.2984	0.3123	0.3262 (22b)
Effective ac	0.5626	0.5602	0.5578	0.5466	0.5445	0.5348	0.5348	0.5330	0.5385	0.5445	0.5488	0.5532 (25)

3. Heat losses and heat loss parameter

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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			1.8900	1.0000	1.8900			(26)					
TER Opening Type			16.0300	1.1450	18.3550			(27)					
basement floor			39.1000	0.1300	5.0830			(28)					
exposed wall	79.3500	17.9200	61.4300	0.1800	11.0574			(29a)					
basement wall	62.0600		62.0600	0.1800	11.1708			(29a)					
Total net area of external elements Aum(A, m2)			180.5100					(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	47.5562			(33)					
Main dwelling													
pw			28.5000	0.0000	0.0000			(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								189.6789 (35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value	Total							
E2 Other lintels (including other steel lintels)				12.3500	0.0500	0.6175							
E3 Sill				11.4500	0.0500	0.5725							
E4 Jamb				35.2000	0.0500	1.7600							
E5 Ground floor (normal)				6.7000	0.1600	1.0720							
E22 Basement floor				21.3000	0.0700	1.4910							
E6 Intermediate floor within a dwelling				6.1000	0.0000	0.0000							
E7 Party floor between dwellings (in blocks of flats)				21.5000	0.0700	1.5050							
E16 Corner (normal)				11.5000	0.0900	1.0350							
E17 Corner (inverted - internal area greater than external area)				5.7000	-0.0900	-0.5130							
E18 Party wall between dwellings				11.3000	0.0600	0.6780							
E25 Staggered party wall between dwellings				5.7000	0.0600	0.3420							
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								8.5600 (36)					
Point Thermal bridges						(36a) =		0.0000					
Total fabric heat loss						(33) + (36) + (36a) =		56.1162 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 38.0012	Feb 37.8369	Mar 37.6759	Apr 36.9196	May 36.7781	Jun 36.1193	Jul 36.1193	Aug 35.9973	Sep 36.3730	Oct 36.7781	Nov 37.0643	Dec 37.3636	(38)
Heat transfer coeff	94.1174	93.9531	93.7921	93.0357	92.8942	92.2355	92.2355	92.1135	92.4892	92.8942	93.1805	93.4798	(39)
Average = Sum(39)m / 12 =												93.0351	
HLP	Jan 1.3127	Feb 1.3104	Mar 1.3081	Apr 1.2976	May 1.2956	Jun 1.2864	Jul 1.2864	Aug 1.2847	Sep 1.2899	Oct 1.2956	Nov 1.2996	Dec 1.3038	(40)
HLP (average)												1.2976	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)													

Assumed occupancy													2.2867 (42)
Hot water usage for mixer showers													
62.5597	61.6196	60.2496	57.6284	55.6940	53.5368	52.3106	53.6702	55.1606	57.4768	60.1543	62.3201	62.3201	(42a)
Hot water usage for baths													
27.0260	26.6246	26.0594	25.0172	24.2369	23.3716	22.9042	23.4654	24.0766	25.0024	26.0661	26.9346	26.9346	(42b)
Hot water usage for other uses													
38.0479	36.6643	35.2808	33.8972	32.5136	31.1301	31.1301	32.5136	33.8972	35.2808	36.6643	38.0479	38.0479	(42c)
Average daily hot water use (litres/day)												117.3243	(43)
Daily hot water use	Jan 127.6336	Feb 124.9085	Mar 121.5897	Apr 116.5428	May 112.4445	Jun 108.0384	Jul 106.3449	Aug 109.6493	Sep 113.1344	Oct 117.7600	Nov 122.8847	Dec 127.3025	(44)
Energy conte	202.1404	177.8681	186.8789	159.5413	151.3719	132.8459	128.6149	135.7688	139.5060	159.7992	175.0718	199.3250	(45)
Energy content (annual)										Total = Sum(45)m =		1948.7322	
Distribution loss (46)m = 0.15 x (45)m													
30.3211	26.6802	28.0318	23.9312	22.7058	19.9269	19.2922	20.3653	20.9259	23.9699	26.2608	29.8988	29.8988	(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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
253.0993	223.8954	237.8378	208.8563	202.3308	182.1609	179.5738	186.7277	188.8211	210.7582	224.3869	250.2839	250.2839	(62)
WWHRS	-28.5997	-25.2938	-26.4862	-21.9316	-20.4395	-17.4902	-16.3943	-17.4337	-18.0961	-21.3333	-24.1680	-28.0701	(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	224.4996	198.6016	211.3516	186.9247	181.8913	164.6707	163.1795	169.2940	170.7250	189.4249	200.2189	222.2138	(64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				2282.9957	(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)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	79.9514	70.6480	74.8770	65.3762	63.0709	56.5000	55.5042	57.8828	58.7145	65.8730	70.5402	79.0153	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 114.3340	Feb 114.3340	Mar 114.3340	Apr 114.3340	May 114.3340	Jun 114.3340	Jul 114.3340	Aug 114.3340	Sep 114.3340	Oct 114.3340	Nov 114.3340	Dec 114.3340	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
101.4932	112.3674	101.4932	104.8763	101.4932	104.8763	101.4932	101.4932	101.4932	104.8763	101.4932	104.8763	101.4932	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
201.2318	203.3199	198.0578	186.8555	172.7145	159.4240	150.5451	148.4570	153.7190	164.9214	179.0624	192.3529	192.3529	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	34.4334	(69)
Pumps, fans	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)
Losses e.g. evaporation (negative values) (Table 5)													
-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	-91.4672	(71)
Water heating gains (Table 5)													
107.4616	105.1309	100.6411	90.8003	84.7727	78.4722	74.6024	77.7995	81.5479	88.5389	97.9724	106.2033	106.2033	(72)
Total internal gains	470.4867	481.1184	460.4923	442.8323	419.2805	400.0727	383.9409	385.0498	397.4434	415.2537	442.2112	460.3496	(73)

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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
Southwest			11.1500	36.7938	0.6300	0.7000	0.7700	125.3781 (79)
Northwest			4.8800	11.2829	0.6300	0.7000	0.7700	16.8273 (81)
Solar gains	142.2054	247.8177	353.9213	463.4103	541.7718	547.8449	277.8943	121.0395 (83)
Total gains	612.6921	728.9362	814.4136	906.2426	961.0523	947.9176	693.1480	581.3891 (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	40.1389	40.2091	40.2782	40.6056	40.6675	40.9579	40.9579	41.0122	40.8455	40.6675	40.5425	40.4127
alpha	3.6759	3.6806	3.6852	3.7070	3.7112	3.7305	3.7305	3.7341	3.7230	3.7112	3.7028	3.6942
util living area	0.9806	0.9635	0.9333	0.8636	0.7439	0.5778	0.4344	0.4797	0.6979	0.8958	0.9659	0.9838 (86)
MIT	19.2696	19.5551	19.9299	20.3865	20.7335	20.9237	20.9796	20.9705	20.8433	20.3825	19.7443	19.2170 (87)
Th 2	19.8309	19.8327	19.8345	19.8427	19.8443	19.8515	19.8515	19.8528	19.8487	19.8443	19.8412	19.8379 (88)
util rest of house	0.9758	0.9547	0.9171	0.8308	0.6853	0.4897	0.3267	0.3685	0.6140	0.8630	0.9561	0.9798 (89)
MIT 2	17.8554	18.2150	18.6813	19.2343	19.6193	19.8050	19.8440	19.8410	19.7402	19.2462	18.4637	17.7935 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	18.4333	18.7626	19.1915	19.7052	20.0746	20.2622	20.3081	20.3026	20.1910	19.7105	18.9870	18.3752 (92)
Temperature adjustment												
adjusted MIT	18.4333	18.7626	19.1915	19.7052	20.0746	20.2622	20.3081	20.3026	20.1910	19.7105	18.9870	18.3752 (93)

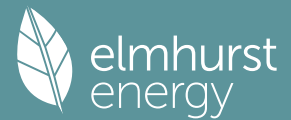
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9679	0.9443	0.9062	0.8264	0.6979	0.5225	0.3705	0.4133	0.6408	0.8585	0.9466	0.9727 (94)
Useful gains	593.0447	688.3477	737.9929	748.8762	670.6778	495.2709	336.3776	350.9652	505.6297	595.0557	580.8096	565.5002 (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	1330.1875	1302.4378	1190.3620	1005.2660	777.9559	522.2529	342.0170	359.4803	563.3519	846.3160	1107.6372	1325.0984 (97)
Space heating kWh	548.4342	412.6685	336.5626	184.6007	79.8149	0.0000	0.0000	0.0000	0.0000	186.9377	379.3159	565.1410 (98a)
Space heating requirement - total per year (kWh/year)	2693.4755											
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	548.4342	412.6685	336.5626	184.6007	79.8149	0.0000	0.0000	0.0000	0.0000	186.9377	379.3159	565.1410 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2693.4755											
Space heating per m2	(98c) / (4) = 37.5659 (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	548.4342	412.6685	336.5626	184.6007	79.8149	0.0000	0.0000	0.0000	0.0000	186.9377	379.3159	565.1410 (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)	593.5435	446.6110	364.2452	199.7843	86.3798	0.0000	0.0000	0.0000	0.0000	202.3135	410.5150	611.6245 (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	224.4996	198.6016	211.3516	186.9247	181.8913	164.6707	163.1795	169.2940	170.7250	189.4249	200.2189	222.2138 (64)
Efficiency of water heater (217)m	86.2180	85.9106	85.3731	84.3546	82.7411	80.3000	80.3000	80.3000	80.3000	84.3531	85.7280	80.3000 (216)
Fuel for water heating, kWh/month	260.3859	231.1724	247.5624	221.5939	219.8318	205.0694	203.2124	210.8269	212.6090	224.5618	233.5513	257.5146 (219)
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	0.0000 (221)
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	7.3041 (231)
Lighting	21.0883	16.9178	15.2326	11.1601	8.6203	7.0429	7.8638	10.2216	13.2769	17.4200	19.6758	21.6744 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-9.3307	-14.3766	-22.5603	-27.7679	-32.1259	-30.8004	-30.4271	-27.6192	-23.0981	-17.4396	-10.6822	-7.9310 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity) (234a)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 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity) (235a)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 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation) (235c)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 (235c)
Electricity generated by PVs (Appendix M) (negative quantity) (233b)m	-2.1194	-4.6341	-9.5517	-14.8669	-20.1848	-20.4779	-20.2378	-16.8905	-12.0652	-6.7920	-2.8805	-1.6632 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity) (234b)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 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity) (235b)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 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												

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(235d)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	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2915.0167	(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												2727.8917	(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)												170.1944	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-386.5231	(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												5512.5798	(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	2915.0167	0.2100	612.1535	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2727.8917	0.2100	572.8573	(264)
Space and water heating			1185.0108	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	170.1944	0.1443	24.5643	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-254.1591	0.1328	-33.7466	
PV Unit electricity exported	-132.3640	0.1249	-16.5282	
Total			-50.2748	(269)
Total CO2, kg/year			1171.2295	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			16.3400	(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	2915.0167	1.1300	3293.9689	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2727.8917	1.1300	3082.5177	(278)
Space and water heating			6376.4866	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	170.1944	1.5338	261.0499	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-254.1591	1.4906	-378.8545	
PV Unit electricity exported	-132.3640	0.4583	-60.6631	
Total			-439.5175	(283)
Total Primary energy kWh/year			6328.1198	(286)
Target Primary Energy Rate (TPER)			88.2600	(287)