

Full SAP Calculation Printout



Plot Reference	UNIT 05			Issued on Date	08/07/2026
Assessment Reference	001	Plot Type Ref	UNIT 05		
Plot Address	UNIT 05, Stoney Wood Quarter, 34 The Fairway, LONDON, NW7 3HS			SAP Version	10.2
SAP Rating	85 B	DER	12.92	TER	15.33
Environmental	90 B	% DER < TER			15.72
CO ₂ Emissions (t/year)	0.89	DFEE	35.32	TFEE	41.11
Compliance Check	See BREL	% DFEE < TFEE			14.09
% DPER < TPER	10.44	DPER	73.54	TPER	82.11
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	73.5000 (1b)	2.7500 (2b)	202.1250 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	202.1250 (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			17.4700	0.7940	13.8704		(27)
exposed floor			55.0000	0.1000	5.5000	75.0000	4125.0000 (28b)
exposed wall	36.3000	17.4700	18.8300	0.1500	2.8245	60.0000	1129.8000 (29a)
stair wall	8.2500		8.2500	0.2000	1.6500	9.0000	74.2500 (29a)
corridor wall	5.5000	2.1000	3.4000	0.3100	1.0540	14.0000	47.6000 (29a)
terrace above 1F	6.3000		6.3000	0.1000	0.6300	9.0000	56.7000 (30)
Total net area of external elements A _{um} (A, m ²)			111.3500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.6289		(33)
Main dwelling							
pw			67.9250	0.0000	0.0000	110.0000	7471.7503 (32)
pf			18.5000			40.0000	740.0000 (32d)
pc			67.2000			30.0000	2015.9999 (32b)
iw			129.2500			9.0000	1163.2500 (32c)

Full SAP Calculation Printout



Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K
List of Thermal Bridges

(28)...(30) + (32) + (32a)...(32e) = 16824.3502 (34)
228.9027 (35)

	Length	Psi-value	Total
K1 Element			
E2 Other lintels (including other steel lintels)	7.9000	0.0500	0.3950
E3 Sill	6.9000	0.0500	0.3450
E4 Jamb	27.7000	0.0500	1.3850
E20 Exposed floor (normal)	11.3000	0.3200	3.6160
E21 Exposed floor (inverted)	7.6000	0.3200	2.4320
E7 Party floor between dwellings (in blocks of flats)	9.1000	0.0700	0.6370
E24 Eaves (insulation at ceiling level - inverted)	7.3000	0.1600	1.1680
E14 Flat roof	7.2000	0.1600	1.1520
E16 Corner (normal)	5.5000	0.0900	0.4950
E17 Corner (inverted - internal area greater than external area)	2.7500	-0.0900	-0.2475
E18 Party wall between dwellings	8.2500	0.0600	0.4950
E25 Staggered party wall between dwellings	2.7500	0.0600	0.1650
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			12.0375 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	39.6664 (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	15.2662	15.0912	14.9161	14.0406	13.8655	12.9901	12.9901	12.8150	13.3402	13.8655	14.2157	14.5659	(38)
Average = Sum(39)m / 12 =	54.9327	54.7576	54.5825	53.7071	53.5320	52.6565	52.6565	52.4814	53.0067	53.5320	53.8822	54.2323	(39)
												53.6633	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.7474	0.7450	0.7426	0.7307	0.7283	0.7164	0.7164	0.7140	0.7212	0.7283	0.7331	0.7379	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3280 (42)
Hot water usage for mixer showers	63.2528	62.3022	60.9171	58.2668	56.3110	54.1299	52.8901	54.2648	55.7717	58.1136	60.8207	63.0104	(42a)
Hot water usage for baths	27.3240	26.9182	26.3467	25.2931	24.5041	23.6293	23.1568	23.7242	24.3421	25.2782	26.3535	27.2316	(42b)
Hot water usage for other uses	38.4712	37.0722	35.6733	34.2743	32.8754	31.4764	31.4764	32.8754	34.2743	35.6733	37.0722	38.4712	(42c)
Average daily hot water use (litres/day)												118.6244	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	129.0480	126.2927	122.9371	117.8342	113.6905	109.2356	107.5233	110.8644	114.3881	119.0650	124.2465	128.7132	(44)
Energy content (annual)	204.3804	179.8391	188.9497	161.3092	153.0492	134.3179	130.0401	137.2733	141.0519	161.5701	177.0119	201.5338	(45)
Distribution loss (46)m = 0.15 x (45)m	30.6571	26.9759	28.3425	24.1964	22.9574	20.1477	19.5060	20.5910	21.1578	24.2355	26.5518	30.2301	(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	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	255.3393	225.8664	239.9086	210.6242	204.0081	183.6330	180.9990	188.2322	190.3670	212.5290	226.3270	252.4927	(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	255.3393	225.8664	239.9086	210.6242	204.0081	183.6330	180.9990	188.2322	190.3670	212.5290	226.3270	252.4927	(64)
12Total per year (kWh/year)												2570.3266	(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)
												0.0000	(64a)
Heat gains from water heating, kWh/month	80.6962	71.3033	75.5655	65.9641	63.6286	56.9895	55.9781	58.3831	59.2285	66.4618	71.1852	79.7497	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	116.4006	116.4006	116.4006	116.4006	116.4006	116.4006	116.4006	116.4006	116.4006	116.4006	116.4006	116.4006	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	103.5625	114.6585	103.5625	107.0146	103.5625	107.0146	103.5625	103.5625	107.0146	103.5625	107.0146	103.5625	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	205.3242	207.4549	202.0858	190.6556	176.2270	162.6662	153.6068	151.4762	156.8453	168.2754	182.7040	196.2648	(68)
Pumps, fans	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	(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)	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	(71)
Total internal gains	108.4627	106.1062	101.5665	91.6168	85.5223	79.1520	75.2393	78.4719	82.2619	89.3303	98.8684	107.1905	(72)
	478.2696	489.1397	468.1350	450.2071	426.2320	406.7530	390.3288	391.4307	404.0419	422.0885	449.5071	467.9380	(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	6.6000	10.6334	0.5300	0.7000	0.7700	18.0436 (74)
Northeast	10.8700	11.2829	0.5300	0.7000	0.7700	31.5325 (75)

Full SAP Calculation Printout



Solar gains	49.5761	98.6676	174.2354	284.0334	382.0691	407.8870	381.3186	303.5051	211.3598	119.4862	61.9352	40.7931 (83)
Total gains	527.8457	587.8073	642.3704	734.2405	808.3011	814.6400	771.6474	694.9358	615.4017	541.5747	511.4423	508.7311 (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	85.0756	85.3476	85.6214	87.0171	87.3017	88.7531	88.7531	89.0492	88.1668	87.3017	86.7343	86.1742
alpha	6.6717	6.6898	6.7081	6.8011	6.8201	6.9169	6.9169	6.9366	6.8778	6.8201	6.7823	6.7449
util living area	0.9892	0.9768	0.9419	0.8129	0.6070	0.4131	0.3002	0.3472	0.5875	0.8838	0.9748	0.9912 (86)
MIT	20.3297	20.4784	20.6836	20.9098	20.9878	20.9992	20.9999	20.9998	20.9928	20.8671	20.5741	20.3086 (87)
Th 2	20.2992	20.3013	20.3033	20.3138	20.3159	20.3264	20.3264	20.3285	20.3222	20.3159	20.3117	20.3075 (88)
util rest of house	0.9864	0.9711	0.9285	0.7814	0.5652	0.3699	0.2543	0.2966	0.5325	0.8538	0.9676	0.9889 (89)
MIT 2	19.5196	19.7079	19.9614	20.2280	20.3063	20.3259	20.3263	20.3284	20.3175	20.1898	19.8380	19.4997 (90)
Living area fraction	19.9131	20.0821	20.3122	20.5592	20.6373	20.6530	20.6535	20.6545	20.6455	20.5187	20.1955	19.8926 (91)
MIT	19.9131	20.0821	20.3122	20.5592	20.6373	20.6530	20.6535	20.6545	20.6455	20.5187	20.1955	19.8926 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.7631	19.9321	20.1622	20.4092	20.4873	20.5030	20.5035	20.5045	20.4955	20.3687	20.0455	19.7426 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9837	0.9675	0.9254	0.7860	0.5758	0.3813	0.2664	0.3099	0.5467	0.8563	0.9643	0.9866 (94)
Useful gains	519.2635	568.7061	594.4773	577.0975	465.4298	310.5844	205.5292	215.3666	336.4618	463.7772	493.1791	501.9022 (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	849.4297	823.1240	745.7153	618.1233	470.4026	310.8297	205.5452	215.4107	339.0060	522.9404	697.5337	842.9120 (97)
Space heating kWh	245.6437	170.9688	112.5210	29.5385	3.6997	0.0000	0.0000	0.0000	0.0000	44.0174	147.1353	253.7113 (98a)
Space heating requirement - total per year (kWh/year)												1007.2358
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	245.6437	170.9688	112.5210	29.5385	3.6997	0.0000	0.0000	0.0000	0.0000	44.0174	147.1353	253.7113 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1007.2358
Space heating per m2										(98c) / (4) =		13.7039 (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	245.6437	170.9688	112.5210	29.5385	3.6997	0.0000	0.0000	0.0000	0.0000	44.0174	147.1353	253.7113 (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)	276.3146	192.3159	126.5703	33.2267	4.1617	0.0000	0.0000	0.0000	0.0000	49.5134	165.5065	285.3895 (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	255.3393	225.8664	239.9086	210.6242	204.0081	183.6330	180.9990	188.2322	190.3670	212.5290	226.3270	252.4927 (64)
Efficiency of water heater (217)m	84.2985	83.7923	82.8592	81.2669	80.4386	80.3000	80.3000	80.3000	80.3000	81.6553	83.4817	80.3000 (216)
Fuel for water heating, kWh/month	302.8990	269.5552	289.5378	259.1758	253.6197	228.6836	225.4035	234.4112	237.0698	260.2758	271.1097	84.3918 (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	0.0000 (221)
Pumps and Fa	17.9960	16.2545	17.9960	17.4155	17.9960	17.4155	17.9960	17.9960	17.4155	17.9960	17.4155	17.9960 (231)
Lighting	21.5182	17.2627	15.5432	11.3876	8.7961	7.1865	8.0241	10.4300	13.5476	17.7752	20.0770	22.1163 (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												1132.9986 (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												3130.9323 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans:
(BalancedWithHeatRecovery, Database: in-use factor = 1.1000, SFP = 0.6930)

Full SAP Calculation Printout



mechanical ventilation fans (SFP = 0.6930)	170.8886 (230a)
central heating pump	41.0000 (230c)
Total electricity for the above, kWh/year	211.8886 (231)
Electricity for lighting (calculated in Appendix L)	173.6645 (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	4649.4840 (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	1132.9986	0.2100	237.9297 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3130.9323	0.2100	657.4958 (264)
Space and water heating			895.4255 (265)
Pumps, fans and electric keep-hot	211.8886	0.1387	29.3916 (267)
Energy for lighting	173.6645	0.1443	25.0652 (268)
Total CO2, kg/year			949.8822 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			12.9200 (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	1132.9986	1.1300	1280.2884 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3130.9323	1.1300	3537.9535 (278)
Space and water heating			4818.2419 (279)
Pumps, fans and electric keep-hot	211.8886	1.5128	320.5451 (281)
Energy for lighting	173.6645	1.5338	266.3725 (282)
Total Primary energy kWh/year			5405.1594 (286)
Dwelling Primary energy Rate (DPER)			73.5400 (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	73.5000	2.7500	202.1250
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.5000		202.1250
Dwelling volume			202.1250

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) = 0.1484 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3984 (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) = 0.2789 (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	0.3556	0.3486	0.3416	0.3068	0.2998	0.2650	0.2650	0.2580	0.2789	0.2998	0.3138	0.3277 (22b)
Effective ac	0.5632	0.5608	0.5584	0.5471	0.5449	0.5351	0.5351	0.5333	0.5389	0.5449	0.5492	0.5537 (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			2.1000	1.0000	2.1000			(26)					
TER Opening Type			16.2800	1.1450	18.6412			(27)					
exposed floor			55.0000	0.1300	7.1500			(28b)					
exposed wall	36.3000	16.2800	20.0200	0.1800	3.6036			(29a)					
stair wall	8.2500		8.2500	0.1800	1.4850			(29a)					
corridor wall	5.5000	2.1000	3.4000	0.1800	0.6120			(29a)					
terrace above 1F	6.3000		6.3000	0.1100	0.6930			(30)					
Total net area of external elements Aum(A, m2)			111.3500					(31)					
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		34.2848			(33)					
Main dwelling													
pw			67.9250	0.0000	0.0000			(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							228.9027	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value	Total							
E2 Other lintels (including other steel lintels)				7.9000	0.0500	0.3950							
E3 Sill				6.9000	0.0500	0.3450							
E4 Jamb				27.7000	0.0500	1.3850							
E20 Exposed floor (normal)				11.3000	0.3200	3.6160							
E21 Exposed floor (inverted)				7.6000	0.3200	2.4320							
E7 Party floor between dwellings (in blocks of flats)				9.1000	0.0700	0.6370							
E24 Eaves (insulation at ceiling level - inverted)				7.3000	0.2400	1.7520							
E14 Flat roof				7.2000	0.0800	0.5760							
E16 Corner (normal)				5.5000	0.0900	0.4950							
E17 Corner (inverted - internal area greater than external area)				2.7500	-0.0900	-0.2475							
E18 Party wall between dwellings				8.2500	0.0600	0.4950							
E25 Staggered party wall between dwellings				2.7500	0.0600	0.1650							
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							12.0455	(36)					
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	46.3303	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 37.5677	Feb 37.4039	Mar 37.2434	Apr 36.4895	May 36.3484	Jun 35.6918	Jul 35.6918	Aug 35.5702	Sep 35.9447	Oct 36.3484	Nov 36.6338	Dec 36.9321	(38)
Heat transfer coeff	83.8980	83.7342	83.5737	82.8198	82.6788	82.0221	82.0221	81.9005	82.2751	82.6788	82.9641	83.2624	(39)
Average = Sum(39)m / 12 =												82.8191	
HLP	Jan 1.1415	Feb 1.1392	Mar 1.1371	Apr 1.1268	May 1.1249	Jun 1.1159	Jul 1.1159	Aug 1.1143	Sep 1.1194	Oct 1.1249	Nov 1.1288	Dec 1.1328	(40)
HLP (average)												1.1268	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)													

Assumed occupancy													2.3280 (42)
Hot water usage for mixer showers													
63.2528	62.3022	60.9171	58.2668	56.3110	54.1299	52.8901	54.2648	55.7717	58.1136	60.8207	63.0104	63.0104	(42a)
Hot water usage for baths													
27.3240	26.9182	26.3467	25.2931	24.5041	23.6293	23.1568	23.7242	24.3421	25.2782	26.3535	27.2316	27.2316	(42b)
Hot water usage for other uses													
38.4712	37.0722	35.6733	34.2743	32.8754	31.4764	31.4764	32.8754	34.2743	35.6733	37.0722	38.4712	38.4712	(42c)
Average daily hot water use (litres/day)													118.6244 (43)
Daily hot water use	Jan 129.0480	Feb 126.2927	Mar 122.9371	Apr 117.8342	May 113.6905	Jun 109.2356	Jul 107.5233	Aug 110.8644	Sep 114.3881	Oct 119.0650	Nov 124.2465	Dec 128.7132	(44)
Energy conte	204.3804	179.8391	188.9497	161.3092	153.0492	134.3179	130.0401	137.2733	141.0519	161.5701	177.0119	201.5338	(45)
Energy content (annual)										Total = Sum(45)m =		1970.3266	
Distribution loss (46)m = 0.15 x (45)m													
30.6571	26.9759	28.3425	24.1964	22.9574	20.1477	19.5060	20.5910	21.1578	24.2355	26.5518	30.2301	30.2301	(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													
255.3393	225.8664	239.9086	210.6242	204.0081	183.6330	180.9990	188.2322	190.3670	212.5290	226.3270	252.4927	252.4927	(62)
WWHRS	-28.9165	-25.5740	-26.7796	-22.1746	-20.6659	-17.6840	-16.5759	-17.6268	-18.2965	-21.5696	-24.4357	-28.3810	(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	226.4228	200.2924	213.1290	188.4496	183.3422	165.9490	164.4231	170.6053	172.0705	190.9594	201.8912	224.1117	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2301.6463	(64)
Electric shower(s)												2302	(64)
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	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	80.6962	71.3033	75.5655	65.9641	63.6286	56.9895	55.9781	58.3831	59.2285	66.4618	71.1852	79.7497	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 116.4006	Feb 116.4006	Mar 116.4006	Apr 116.4006	May 116.4006	Jun 116.4006	Jul 116.4006	Aug 116.4006	Sep 116.4006	Oct 116.4006	Nov 116.4006	Dec 116.4006	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
103.5780	114.6756	103.5780	107.0306	103.5780	107.0306	103.5780	107.0306	103.5780	107.0306	103.5780	107.0306	103.5780	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
205.3242	207.4549	202.0858	190.6556	176.2270	162.6662	153.6068	151.4762	156.8453	168.2754	182.7040	196.2648	196.2648	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	34.6401	(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)													
-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	-93.1205	(71)
Water heating gains (Table 5)													
108.4627	106.1062	101.5665	91.6168	85.5223	79.1520	75.2393	78.4719	82.2619	89.3303	98.8684	107.1905	107.1905	(72)
Total internal gains	478.2851	489.1568	468.1505	450.2231	426.2475	406.7690	390.3443	391.4462	404.0579	422.1039	449.5231	467.9534	(73)

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6. Solar gains

[Jan]				Area m ²	Solar flux Table 6a W/m ²	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W
North				6.1500	10.6334		0.6300		0.7000		19.9857 (74)
Northeast				10.1300	11.2829		0.6300		0.7000		34.9304 (75)
Solar gains	54.9161	109.2955	193.0032	314.6284	423.2241	451.8229	422.3927	336.1975	234.1266	132.3566	45.1870 (83)
Total gains	533.2011	598.4523	661.1537	764.8515	849.4716	858.5919	812.7369	727.6437	638.1845	554.4606	513.1404 (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	55.7037	55.8127	55.9198	56.4289	56.5252	56.9777	56.9777	57.0623	56.8025	56.5252	56.3307	56.1289
alpha	4.7136	4.7208	4.7280	4.7619	4.7683	4.7985	4.7985	4.8042	4.7868	4.7683	4.7554	4.7419
util living area	0.9935	0.9879	0.9733	0.9171	0.7831	0.5876	0.4390	0.5070	0.7755	0.9524	0.9876	0.9945 (86)
MIT	19.6360	19.8146	20.1096	20.5280	20.8371	20.9679	20.9935	20.9876	20.8856	20.4789	19.9934	19.6069 (87)
Th 2	19.9671	19.9689	19.9707	19.9790	19.9806	19.9878	19.9878	19.9892	19.9850	19.9806	19.9774	19.9741 (88)
util rest of house	0.9915	0.9842	0.9650	0.8923	0.7274	0.5042	0.3406	0.4009	0.6975	0.9328	0.9832	0.9929 (89)
MIT 2	18.3888	18.6170	18.9901	19.5055	19.8461	19.9696	19.9857	19.9846	19.9062	19.4599	18.8520	18.3567 (90)
Living area fraction									fLA =	Living area /	(4) =	0.4857 (91)
MIT	18.9946	19.1987	19.5339	20.0022	20.3275	20.4545	20.4752	20.4718	20.3819	19.9548	19.4064	18.9639 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9946	19.1987	19.5339	20.0022	20.3275	20.4545	20.4752	20.4718	20.3819	19.9548	19.4064	18.9639 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9890	0.9807	0.9607	0.8930	0.7476	0.5436	0.3884	0.4524	0.7303	0.9322	0.9800	0.9907 (94)
Useful gains	527.3308	586.9003	635.1441	682.9957	635.0260	466.7120	315.7039	329.1797	466.0415	516.8427	507.7814	508.3617 (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	1232.8465	1197.2922	1089.2881	919.4796	713.3083	480.1951	317.8527	333.4817	516.8459	773.4463	1020.9869	1229.2808 (97)
Space heating kWh	524.9037	410.1834	337.8831	170.2684	58.2421	0.0000	0.0000	0.0000	0.0000	190.9131	369.5079	536.3638 (98a)
Space heating requirement - total per year (kWh/year)												2598.2655
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	524.9037	410.1834	337.8831	170.2684	58.2421	0.0000	0.0000	0.0000	0.0000	190.9131	369.5079	536.3638 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2598.2655
Space heating per m ²										(98c) / (4) =		35.3506 (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	524.9037	410.1834	337.8831	170.2684	58.2421	0.0000	0.0000	0.0000	0.0000	190.9131	369.5079	536.3638	(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)	568.0775	443.9214	365.6744	184.2732	63.0326	0.0000	0.0000	0.0000	0.0000	206.6159	399.9003	580.4803	(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	226.4228	200.2924	213.1290	188.4496	183.3422	165.9490	164.4231	170.6053	172.0705	190.9594	201.8912	224.1117	(64)
Efficiency of water heater	86.1204	85.8823	85.3638	84.1646	82.2175	80.3000	80.3000	80.3000	80.3000	84.3809	85.6586	86.1800	(216)
Fuel for water heating, kWh/month	262.9142	233.2175	249.6714	223.9060	222.9967	206.6612	204.7610	212.4599	214.2845	226.3064	235.6929	260.0507	(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	0.0000	(219)
(221)m	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(221)
Pumps and Fa	21.5215	17.2653	15.5455	11.3893	8.7974	7.1876	8.0253	10.4316	13.5496	17.7778	20.0800	22.1196	(231)
Lighting	-13.8992	-21.0260	-32.4023	-39.1448	-44.6369	-42.5602	-42.0415	-38.4703	-32.6278	-25.1955	-15.7794	-11.8557	(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)
(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	(234a)
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	(235a)
(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	(235a)
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	(235c)
(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	(235c)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	-4.0373	-8.7543	-17.9009	-27.6425	-37.3076	-37.7672	-37.3249	-31.2540	-22.4553	-12.7632	-5.4665	-3.1736	(233b)
(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	(234b)
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	(234b)
(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	(234b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m													

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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	(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	(235d)
Annual totals kWh/year												
Space heating fuel - main system 1											2811.9756	(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											2752.9224	(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)											173.6905	(232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation											-605.4869	(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											5219.1016	(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	2811.9756	0.2100	590.5149 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2752.9224	0.2100	578.1137 (264)
Space and water heating			1168.6286 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	173.6905	0.1443	25.0689 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-359.6396	0.1331	-47.8819
PV Unit electricity exported	-245.8473	0.1251	-30.7535
Total			-78.6355 (269)
Total CO2, kg/year			1126.9913 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.3300 (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	2811.9756	1.1300	3177.5325 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2752.9224	1.1300	3110.8023 (278)
Space and water heating			6288.3348 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	173.6905	1.5338	266.4122 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-359.6396	1.4920	-536.5733
PV Unit electricity exported	-245.8473	0.4591	-112.8770
Total			-649.4503 (283)
Total Primary energy kWh/year			6035.3975 (286)
Target Primary Energy Rate (TPER)			82.1100 (287)