

Full SAP Calculation Printout



Property Reference	LEAN PLANNING		Issued on Date	12/09/2023	
Assessment Reference	L01to5 - 09 x5_Copy_Copy	Prop Type Ref			
Property					
SAP Rating	87 B	DER	10.58	TER	11.66
Environmental	91 B	% DER < TER	9.26		
CO ₂ Emissions (t/year)	0.75	DFEE	22.43	TFEE	22.07
Compliance Check	See BREL	% DFEE < TFEE	-1.66		
% DPER < TPER	3.02	DPER	55.78	TPER	57.52
Assessor Details	Mr. Richard Denteh		Assessor ID	U148-0001	
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)
Ground floor	76.3000 (1b)	2.7400 (2b)	209.0620 (1b) - (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	76.3000		209.0620 (5)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)

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)

	Air changes per hour
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	2 (19)

Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1275 (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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (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) =	72.8000 (23c)											
Effective ac	0.2986	0.2954	0.2922	0.2762	0.2731	0.2571	0.2571	0.2539	0.2635	0.2731	0.2794	0.2858 (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
glazing (Uw = 1.30)			12.7700	1.2357	15.7804		(27)
External Wall 1	47.8404	12.7700	35.0704	0.1400	4.9099	190.0000	6663.3760 (29a)
Total net area of external elements Aum(A, m ²)			47.8404				(31)

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Fabric heat loss, W/K = Sum (A x U)	(26)...(30) + (32) =	20.6903	(33)
Party Wall 1	17.4400	0.0000	0.0000
Party Floor 1	76.3000		180.0000
Party Ceiling 1	76.3000		40.0000
Internal Wall 1	155.5200		30.0000
			9.0000
			1399.6800 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	16543.2560 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		216.8186 (35)

List of Thermal Bridges	Length	Psi-value	Total
K1 Element	7.0000	0.0300	0.2100
E2 Other lintels (including other steel lintels)	4.7400	0.0300	0.1422
E3 Sill	13.9400	0.0300	0.4182
E4 Jamb	34.9200	0.0700	2.4444
E7 Party floor between dwellings (in blocks of flats)	5.1400	0.0000	0.0000
E8 Balcony within a dwelling, wall insulation continuous	2.7400	0.0900	0.2466
E16 Corner (normal)	5.4800	0.0600	0.3288
E18 Party wall between dwellings			

Thermal bridges (Sum(L x Psi) calculated using Appendix K)		3.7902 (36)
Point Thermal bridges		0.0000
Total fabric heat loss	(33) + (36) + (36a) =	24.4805 (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	20.5980	20.3781	20.1582	19.0586	18.8387	17.7392	17.7392	15.9193	18.1790	18.8387	19.2785	19.7183 (38)
Heat transfer coeff	45.0784	44.8585	44.6386	43.5391	43.3192	42.2196	42.2196	41.9997	42.6595	43.3192	43.7590	44.1988 (39)
Average = Sum(39)m / 12 =												43.4841

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.5908	0.5879	0.5850	0.5706	0.5677	0.5533	0.5533	0.5505	0.5591	0.5677	0.5735	0.5793 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy	2.3889 (42)											
Hot water usage for mixer showers	88.3765	87.0484	85.1131	81.4101	78.6775	75.6300	73.8979	75.8186	77.9240	81.1960	84.9785	88.0379 (42a)
Hot water usage for baths	27.7631	27.3508	26.7701	25.6995	24.8979	24.0090	23.5289	24.1054	24.7332	25.6844	26.7770	27.6692 (42b)
Hot water usage for other uses	39.0948	37.6732	36.2516	34.8299	33.4083	31.9867	31.9867	33.4083	34.8299	36.2516	37.6732	39.0948 (42c)
Average daily hot water use (litres/day)												142.7617 (43)

Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	155.2345	152.0724	148.1348	141.9396	136.9837	131.6257	129.4134	133.3323	137.4872	143.1320	149.4287	154.8020 (44)
Energy content (annual)	245.8534	216.5490	227.6776	194.3083	184.4064	161.8492	156.5143	165.0933	169.5354	194.2287	212.8886	242.3825 (45)
Distribution loss (46)m = 0.15 x (45)m	Total = Sum(45)m = 2371.2867											
Water storage loss:	36.8780	32.4824	34.1516	29.1462	27.6610	24.2774	23.4771	24.7640	25.4303	29.1343	31.9333	36.3574 (46)
Store volume	110.0000 (47)											

	Hot water storage loss factor from Table 2 (kWh/litre/day)	Volume factor from Table 2a	Temperature factor from Table 2b									
b) If manufacturer declared loss factor is not known :												
Hot water storage loss factor from Table 2 (kWh/litre/day)			0.0152 (51)									
Volume factor from Table 2a			1.0294 (52)									
Temperature factor from Table 2b			0.6000 (53)									
Enter (49) or (54) in (55)			1.0327 (55)									
Total storage loss	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144 (56)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
If cylinder contains dedicated solar storage	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)

Total heat required for water heating calculated for each month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
301.1302	266.4765	282.9544	247.8019	239.6832	215.3429	211.7911	220.3701	223.0291	249.5055	266.3823	297.6593 (62)	
WWHRS	-67.0388	-59.2897	-62.0847	-51.4086	-47.9110	-40.9978	-38.4289	-40.8652	-42.4179	-50.0060	-56.6507	-65.7973 (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	234.0914	207.1868	220.8697	196.3933	191.7722	174.3451	173.3623	179.5048	180.6112	199.4996	209.7316	231.8620 (64)
12Total per year (kWh/year)												2399.2300 (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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
125.9677	111.9445	119.9243	107.4024	105.5366	96.6098	96.2625	99.1149	99.1655	108.8025	113.5804	124.8136 (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	119.4455	119.4455	119.4455	119.4455	119.4455	119.4455	119.4455	119.4455	119.4455	119.4455	119.4455	119.4455 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	108.0126	119.5854	108.0126	111.6131	108.0126	111.6131	108.0126	108.0126	111.6131	108.0126	111.6131	108.0126 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												

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211.5344	213.7294	208.1979	196.4220	181.5571	167.5861	158.2527	156.0576	161.5891	173.3650	188.2299	202.2009 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5											
34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445 (69)
Pumps, fans 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (70)											
Losses e.g. evaporation (negative values) (Table 5)											
-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564 (71)
Water heating gains (Table 5)											
169.3114	166.5841	161.1885	149.1701	141.8502	134.1803	129.3850	133.2190	137.7298	146.2399	157.7506	167.7603 (72)
Total internal gains											
547.6921	558.7326	536.2327	516.0388	490.2536	472.2131	454.4840	456.1229	469.7656	486.4512	516.4272	536.8074 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g Specific data or Table 6c	FF Specific data or Table 6c	Access factor Table 6d	Gains W					
South	5.0000	46.7521	0.3300	0.8000	0.7700	42.7669 (78)						
West	7.7700	19.6403	0.3300	0.8000	0.7700	27.9194 (80)						
Solar gains	70.6863	124.6574	179.1652	232.0176	265.8449	265.6968	255.4843	230.5385	197.8107	140.3527	85.5055	59.9141 (83)
Total gains	618.3784	683.3900	715.3979	748.0564	756.0985	737.9099	709.9683	686.6615	667.5764	626.8039	601.9327	596.7215 (84)

7. Mean internal temperature (heating season)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
101.9412	102.4409	102.9456	105.5454	106.0812	108.8439	108.8439	109.4137	107.7217	106.0812	105.0150	103.9700
7.7961	7.8294	7.8630	8.0364	8.0721	8.2563	8.2563	8.2942	8.1814	8.0721	8.0010	7.9313
0.9532	0.9097	0.8381	0.6913	0.5313	0.3661	0.2617	0.2814	0.4406	0.7040	0.8935	0.9596 (86)
20.7106	20.8218	20.9154	20.9827	20.9979	20.9999	21.0000	21.0000	20.9996	20.9835	20.8748	20.6982 (87)
20.4383	20.4409	20.4435	20.4565	20.4591	20.4722	20.4722	20.4748	20.4669	20.4591	20.4539	20.4487 (88)
0.9444	0.8954	0.8167	0.6633	0.5009	0.3360	0.2303	0.2492	0.4067	0.6713	0.8753	0.9519 (89)
20.1842	20.2898	20.3758	20.4441	20.4578	20.4721	20.4722	20.4748	20.4668	20.4478	20.3517	20.1820 (90)
20.3770	20.4846	20.5734	20.6413	20.6556	20.6654	20.6655	20.6671	20.6619	20.6440	20.5432	20.3711 (92)
20.3770	20.4846	20.5734	20.6413	20.6556	20.6654	20.6655	20.6671	20.6619	20.6440	20.5432	20.3711 (93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.9434	0.8966	0.8218	0.6729	0.5119	0.3470	0.2418	0.2610	0.4191	0.6826	0.8784	0.9507 (94)
583.3780	612.6974	587.9257	503.3611	387.0823	256.0526	171.6411	179.2157	279.7942	427.8451	528.7500	567.3049 (95)
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)
724.7238	699.1016	628.2154	511.2056	387.9491	256.0794	171.6421	179.2177	279.9269	435.0965	588.2614	714.7412 (97)
105.1613	58.0636	29.9755	5.6480	0.6449	0.0000	0.0000	0.0000	0.0000	5.3950	42.8482	109.6926 (98a)
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)
105.1613	58.0636	29.9755	5.6480	0.6449	0.0000	0.0000	0.0000	0.0000	5.3950	42.8482	109.6926 (98c)
357.4292	357.4292	357.4292	357.4292	357.4292	357.4292	357.4292	357.4292	357.4292	357.4292	357.4292	357.4292 (99)

9b. Energy requirements

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (301)
Fraction of space heat from community system	1.0000 (302)
Fraction of heat from community Combined Heat and Power-Space and Water	0.5580 (303a)
Fraction of heat from community Boilers-Space and Water	0.4420 (303b)
Factor for control and charging method (Table 4c(3)) for space heating	1.0500 (305)
Factor for charging method (Table 4c(3)) for water heating	1.0500 (305a)
Distribution loss factor (Table 12c) for community heating system	1.2500 (306)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)
Space heating requirement	105.1613 58.0636 29.9755 5.6480 0.6449 0.0000 0.0000 0.0000 0.0000 5.3950 42.8482 109.6926 (98)
Space heat from Combined Heat and Power = (98) x 0.56 x 1.05 x 1.25	77.0175 42.5244 21.9533 4.1365 0.4723 0.0000 0.0000 0.0000 0.0000 3.9512 31.3810 80.3361
Space heat from Boilers = (98) x 0.44 x 1.05 x 1.25	61.0067 33.6842 17.3895 3.2766 0.3741 0.0000 0.0000 0.0000 0.0000 3.1298 24.8573 63.6354
Space heating requirement	

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138.0242	76.2085	39.3429	7.4131	0.8464	0.0000	0.0000	0.0000	0.0000	0.0000	7.0810	56.2383	143.9715 (307)
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)												
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 (308)
Space heating fuel for secondary/supplementary system												
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (309)												

Water heating

234.0914	207.1868	220.8697	196.3933	191.7722	174.3451	173.3623	179.5048	180.6112	199.4996	209.7316	231.8620 (64)
Annual water heating requirement											
Water heat from Combined Heat and Power = (64) x 0.56 x 1.05 x 1.25											
171.4427	151.7384	161.7595	143.8336	140.4492	127.6860	126.9662	131.4648	132.2752	146.1085	153.6021	169.8099
Water heat from Boilers = (64) x 0.44 x 1.05 x 1.25											
135.8023	120.1942	128.1320	113.9327	111.2519	101.1420	100.5718	104.1352	104.7771	115.7347	121.6705	134.5089
Water heating fuel											
307.2450	271.9327	289.8915	257.7663	251.7010	228.8279	227.5380	235.6001	237.0523	261.8432	275.2727	304.3188 (310)

Cooling System Energy Efficiency Ratio

Space coolin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (314)
Pumps and Fa	13.5389	12.2287	13.5389	13.1022	13.5389	13.1022	13.5389	13.1022	13.5389	13.1022	13.5389	0.0000 (315)
Lighting	19.8435	15.9192	14.3334	10.5013	8.1115	6.6272	7.3996	9.6183	12.4932	16.3917	18.5144	0.0000 (316)
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 (317)
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 (318)
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 (319)
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 (320)
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 (321)
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 (322)

Annual totals kWh/year

Space heating fuel - community heating	469.1258 (307)
Space heating fuel - secondary	0.0000 (309)
Water heating fuel - community heating	3148.9894 (310)
Efficiency of water heater	0.0000 (311)
Electricity used for heat distribution	4.6913 (313)
Space cooling fuel	0.0000 (321)

Electricity for pumps and fans:

(Balanced with Heat Recovery, Database: in-use factor = 1.2500, SFP = 0.6250)	159.4098 (330a)
mechanical ventilation fans (SFP = 0.6250)	159.4098 (331)
Total electricity for the above, kWh/year	160.1482 (332)
Electricity for lighting (calculated in Appendix L)	

Energy saving/generation technologies (Appendices M, N and Q)

PV generation	0.0000 (333)
Wind generation	0.0000 (334)
Hydro-electric generation (Appendix N)	0.0000 (335a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (335)
Appendix Q - special features	
Energy saved or generated	-0.0000 (336)
Energy used	0.0000 (337)
Total delivered energy for all uses	3937.6732 (338)

12b. Carbon dioxide emissions - Community heating scheme

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Electrical efficiency of CHP unit	32.0000		361 (361)
Heat efficiency of CHP unit	49.9000		362 (362)
Space heating from Combined Heat and Power	524.5936	0.2100	110.1647 (363)
less credit emissions for electricity	-167.8700	0.3480	-58.4187 (364)
Water heating from Combined Heat and Power	3521.3148	0.2100	739.4761 (365)
less credit emissions for electricity	-1126.8207	0.3480	-392.1336 (366)
Efficiency of heat source Boilers	93.9000		367 (367)
Space and Water heating from Boilers	1703.0958	0.2100	46.3730 (368)
Electrical energy for heat distribution (space & water)	4.6913	0.0000	5.1764 (372)
Overall CO2 factor for heat network		0.2106	386 (386)
Total CO2 associated with community systems			761.9149 (373)
Space and water heating			761.9149 (376)
Pumps, fans and electric keep-hot	159.4098	0.1387	22.1121 (378)
Energy for lighting	160.1482	0.1443	23.1143 (379)
Total CO2, kg/year			807.1413 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			10.5800 (384)

13b. Primary energy - Community heating scheme

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Electrical efficiency of CHP unit	32.0000		461 (461)
Heat efficiency of CHP unit	49.9000		462 (462)
Space heating from Combined Heat and Power	524.5936	1.1300	592.7908 (463)
less credit emissions for electricity	-167.8700	2.1490	-360.7525 (464)
Water heating from Combined Heat and Power	3521.3148	1.1300	3979.0857 (465)
less credit emissions for electricity	-1126.8207	2.1490	-2421.5377 (466)
Efficiency of heat source Boilers	93.9000		467b (467b)
Space and Water heating from Boilers	1703.0958	1.1300	249.5310 (468)
Electrical energy for heat distribution (space & water)	4.6913	0.0000	55.3239 (472)
Overall CO2 factor for heat network			1.0418 (486)

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Total CO2 associated with community systems			3769.4083 (473)
Space and water heating			3769.4083 (476)
Pumps, fans and electric keep-hot	159.4098	1.5128	241.1551 (478)
Energy for lighting	160.1482	1.5338	245.6406 (479)
Total Primary energy kWh/year			4256.2040 (483)
Dwelling Primary energy Rate (DPER)			55.7800 (484)

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)
Ground floor	76.3000 (1b)	x 2.7400 (2b)	= 209.0620 (1b) - (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	76.3000		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 209.0620 (5)
Dwelling volume			

2. Ventilation rate

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)
Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1435 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3935 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3345 (21)

Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 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	0.4265	0.4181	0.4097	0.3679	0.3596	0.3177	0.3177	0.3094	0.3345	0.3596	0.3763	0.3930 (22b)
Effective ac	0.5909	0.5874	0.5839	0.5677	0.5646	0.5505	0.5505	0.5479	0.5559	0.5646	0.5708	0.5772 (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
TER Opening Type (Uw = 1.20)			12.7700	1.1450	14.6221		(27)
External Wall 1	47.8404	12.7700	35.0704	0.1800	6.3127		(29a)
Total net area of external elements Aum(A, m2)	47.8404		47.8404				(31)
Fabric heat loss, W/K = Sum (A x U)					20.9348		(33)
Party Wall 1			17.4400	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K						226.8186	(35)
List of Thermal Bridges							
K1 Element		Length		Psi-value		Total	
E2 Other lintels (including other steel lintels)		7.0000		0.0500		0.3500	
E3 Sill		4.7400		0.0500		0.2370	
E4 Jamb		13.9400		0.0500		0.6970	
E7 Party floor between dwellings (in blocks of flats)		34.9200		0.0700		2.4444	
E8 Balcony within a dwelling, wall insulation continuous		5.1400		0.0000		0.0000	
E16 Corner (normal)		2.7400		0.0900		0.2466	
E18 Party wall between dwellings		5.4800		0.0600		0.3288	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)						4.3038	(36)
Point Thermal bridges						0.0000	(36a)
Total fabric heat loss						25.2386	(37)

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Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan 40.7686	Feb 40.5250	Mar 40.2862	Apr 39.1647	May 38.9549	Jun 37.9780	Jul 37.9780	Aug 37.7971	Sep 38.3543	Oct 38.9549	Nov 39.3794	Dec 39.8232 (38)
Heat transfer coeff	66.0072	65.7636	65.5248	64.4033	64.1935	63.2166	63.2166	63.0358	63.5929	64.1935	64.6180	65.0618 (39)
Average = Sum(39)m / 12 =												64.4023

HLP	Jan 0.8651	Feb 0.8619	Mar 0.8588	Apr 0.8441	May 0.8413	Jun 0.8285	Jul 0.8285	Aug 0.8262	Sep 0.8335	Oct 0.8413	Nov 0.8469	Dec 0.8527 (40)
HLP (average)												0.8441
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.3889 (42)

Hot water usage for mixer showers 64.2739 63.3079 61.9004 59.2074 57.2200 55.0037 53.7439 55.1408 56.6720 59.0517 61.8025 64.0276 (42a)

Hot water usage for baths 27.7631 27.3508 26.7701 25.6995 24.8979 24.0090 23.5289 24.1054 24.7332 25.6844 26.7770 27.6692 (42b)

Hot water usage for other uses 39.0948 37.6732 36.2516 34.8299 33.4083 31.9867 31.9867 33.4083 34.8299 36.2516 37.6732 39.0948 (42c)

Average daily hot water use (litres/day) 120.5398 (43)

Daily hot water use	Jan 131.1318	Feb 128.3319	Mar 124.9221	Apr 119.7369	May 115.5262	Jun 110.9993	Jul 109.2595	Aug 112.6545	Sep 116.2352	Oct 120.9876	Nov 126.2527	Dec 130.7916 (44)
Energy conte	207.6807	182.7429	192.0006	163.9138	155.5205	136.4866	132.1398	139.4898	143.3296	164.1790	179.8702	204.7881 (45)
Energy content (annual)												Total = Sum(45)m = 2002.1417
Distribution loss (46)m = 0.15 x (45)m	31.1521	27.4114	28.8001	24.5871	23.3281	20.4730	19.8210	20.9235	21.4994	24.6269	26.9805	30.7182 (46)
Water storage loss:												0.0000 (47)
Store volume												0.0000 (47)
b) If manufacturer declared loss factor is not known :												1.4400 (51)
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0000 (52)
Volume factor from Table 2a												1.0000 (53)
Temperature factor from Table 2b												1.4400 (55)
Enter (49) or (54) in (55)												1.4400 (55)
Total storage loss	44.6400	40.3200	44.6400	43.2000	44.6400	43.2000	44.6400	44.6400	43.2000	44.6400	43.2000	44.6400 (56)
If cylinder contains dedicated solar storage	44.6400	40.3200	44.6400	43.2000	44.6400	43.2000	44.6400	44.6400	43.2000	44.6400	43.2000	44.6400 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	252.3207	223.0629	236.6406	207.1138	200.1605	179.6866	176.7798	184.1298	186.5296	208.8190	223.0702	249.4281 (62)
WVHRS	-29.3833	-25.9869	-27.2119	-22.5326	-20.9995	-17.9694	-16.8435	-17.9114	-18.5919	-21.9178	-24.8302	-28.8392 (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	222.9373	197.0761	209.4287	184.5812	179.1609	161.7172	159.9363	166.2185	167.9377	186.9013	198.2400	220.5889 (64)
12Total per year (kWh/year)												2254.7241 (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	104.7658	93.0180	99.5522	89.0613	87.4226	79.9418	79.6485	82.0924	82.2171	90.3015	94.3668	103.8040 (65)

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

Metabolic gains (Table 5), Watts

(66)m	Jan 119.4455	Feb 119.4455	Mar 119.4455	Apr 119.4455	May 119.4455	Jun 119.4455	Jul 119.4455	Aug 119.4455	Sep 119.4455	Oct 119.4455	Nov 119.4455	Dec 119.4455 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	110.3566	122.1805	110.3566	114.0351	110.3566	114.0351	110.3566	114.0351	110.3566	114.0351	110.3566	110.3566 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	211.5344	213.7294	208.1979	196.4220	181.5571	167.5861	158.2527	156.0576	161.5891	173.3650	188.2299	202.2009 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445	34.9445 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564	-95.5564 (71)
Water heating gains (Table 5)	140.8143	138.4197	133.8067	123.6963	117.5034	111.0303	107.0544	110.3392	114.1904	121.3730	131.0650	139.5216 (72)
Total internal gains	521.5389	533.1632	511.1949	492.9871	468.2507	451.4852	434.4973	435.5870	448.6483	463.9282	492.1638	510.9127 (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
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Property Reference	LEAN PLANNING		Issued on Date	12/09/2023	
Assessment Reference	L011 - 01.2 x2_Copy_Copy	Prop Type Ref			
Property					
SAP Rating	86 B	DER	12.15	TER	13.34
Environmental	91 B	% DER < TER			8.92
CO ₂ Emissions (t/year)	0.62	DFEE	16.92	TFEE	21.17
Compliance Check	See BREL	% DFEE < TFEE			20.07
% DPER < TPER	3.64	DPER	63.57	TPER	65.97
Assessor Details	Mr. Richard Denteh		Assessor ID	U148-0001	
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)
Ground floor	51.9000 (1b)	2.7400 (2b)	142.2060 (1b) - (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9000		142.2060 (5)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)

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)
Air changes per hour	0.0000 / (5) = 0.0000 (8)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	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	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1162 (21)
Wind speed	Jan: 5.1000, Feb: 5.0000, Mar: 4.9000, Apr: 4.4000, May: 4.3000, Jun: 3.8000, Jul: 3.8000, Aug: 3.7000, Sep: 4.0000, Oct: 4.3000, Nov: 4.5000, Dec: 4.7000 (22)
Wind factor	Jan: 1.2750, Feb: 1.2500, Mar: 1.2250, Apr: 1.1000, May: 1.0750, Jun: 0.9500, Jul: 0.9500, Aug: 0.9250, Sep: 1.0000, Oct: 1.0750, Nov: 1.1250, Dec: 1.1750 (22a)
Adj infilt rate	0.1482, 0.1453, 0.1424, 0.1279, 0.1250, 0.1104, 0.1104, 0.1075, 0.1162, 0.1250, 0.1308, 0.1366 (22b)
Balanced mechanical ventilation with heat recovery	
If mechanical ventilation	0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x F _{mv} (equation (N5)), otherwise (23b) = (23a)	0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =	72.8000 (23c)
Effective ac	0.2842, 0.2813, 0.2784, 0.2639, 0.2610, 0.2464, 0.2464, 0.2435, 0.2522, 0.2610, 0.2668, 0.2726 (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
glazing (U _w = 1.30)			7.7700	1.2357	9.6017		(27)
External Wall 1	19.2348	7.7700	11.4648	0.1400	1.6051	190.0000	2178.3120 (29a)
External Roof 1	51.9000		51.9000	0.1000	5.1900	9.0000	467.1000 (30)

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Total net area of external elements A _{um} (A, m ²)	71.1348	(31)
Fabric heat loss, W/K = Sum (A x U)	(26)...(30) + (32) = 16.3968	(33)
Party Wall 1	58.5300	0.0000
Party Floor 1	51.9000	180.0000
Internal Wall 1	70.2000	75.0000
		10535.4000 (32)
		40.0000 (32d)
		5265.0000 (32c)

Heat capacity C _m = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 20521.8120	(34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K		395.4106 (35)

List of Thermal Bridges	Length	Psi-value	Total
K1 Element	3.8400	0.0300	0.1152
E2 Other lintels (including other steel lintels)	1.5600	0.0300	0.0468
E3 Sill	7.7400	0.0300	0.2322
E4 Jamb	7.0100	0.0700	0.4907
E7 Party floor between dwellings (in blocks of flats)	7.0100	0.0200	0.1402
E9 Balcony between dwellings, wall insulation continuous	5.4800	0.0600	0.3288
E18 Party wall between dwellings	7.0100	0.0800	0.5608
E14 Flat roof	21.3500	0.1200	2.5620
P4 Party wall - Roof (insulation at ceiling level)			

Thermal bridges (Sum(L x Psi) calculated using Appendix K)	(36a) = 0.0000	(36)
Point Thermal bridges	(33) + (36) + (36a) = 20.8735	(37)
Total fabric heat loss		

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	13.3378	13.2014	13.0650	12.3831	12.2467	11.5648	11.5648	11.4284	11.8376	12.2467	12.5195	12.7923 (38)
Heat transfer coeff	34.2113	34.0749	33.9385	33.2566	33.1202	32.4383	32.4383	32.3019	32.7111	33.1202	33.3930	33.6658 (39)
Average = Sum(39)m / 12 =												33.2225

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.6592	0.6565	0.6539	0.6408	0.6382	0.6250	0.6250	0.6224	0.6303	0.6382	0.6434	0.6487 (40)
HLP (average)												0.6401
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot water usage for mixer showers	73.5573	72.4519	70.8410	67.7590	65.4846	62.9481	61.5064	63.1051	64.8575	67.5808	70.7290	73.2755 (42a)
Hot water usage for baths	23.1283	22.7849	22.3012	21.4093	20.7415	20.0010	19.6010	20.0813	20.6043	21.3967	22.3069	23.0502 (42b)
Hot water usage for other uses	32.5120	31.3298	30.1475	28.9653	27.7830	26.6007	26.6007	27.7830	28.9653	30.1475	31.3298	32.5120 (42c)
Average daily hot water use (litres/day)												118.8174 (43)
Daily hot water use	129.1977	126.5665	123.2897	118.1336	114.0091	109.5499	107.7082	110.9694	114.4270	119.1250	124.3657	128.8376 (44)
Energy conte	204.6175	180.2290	189.4917	161.7190	153.4781	134.7043	130.2637	137.4033	141.0999	161.6515	177.1817	201.7286 (45)
Energy content (annual)												Total = Sum(45)m = 1973.5683
Distribution loss (46)m = 0.15 x (45)m	30.6926	27.0343	28.4238	24.2578	23.0217	20.2057	19.5396	20.6105	21.1650	24.2477	26.5773	30.2593 (46)
Water storage loss:												
Store volume												110.0000 (47)
b) If manufacturer declared loss factor is not known :												
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0152 (51)
Volume factor from Table 2a												1.0294 (52)
Temperature factor from Table 2b												0.6000 (53)
Enter (49) or (54) in (55)												1.0327 (55)
Total storage loss	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144 (56)
If cylinder contains dedicated solar storage	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	259.8943	230.1564	244.7685	215.2126	208.7549	188.1980	185.5405	192.6801	194.5936	216.9283	230.6754	257.0054 (62)
W _{MHRS}	-55.7975	-49.3478	-51.6742	-42.7882	-39.8771	-34.1231	-31.9850	-34.0128	-35.3051	-41.6208	-47.1513	-54.7642 (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	204.0968	180.8086	193.0943	172.4244	168.8778	154.0749	153.5555	158.6672	159.2885	175.3075	183.5241	202.2412 (64)
12Total per year (kWh/year)												2105.9609 (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	112.2568	99.8681	107.2274	96.5665	95.2529	87.5841	87.5341	89.9080	89.7107	97.9706	101.7079	111.2962 (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	87.3060	87.3060	87.3060	87.3060	87.3060	87.3060	87.3060	87.3060	87.3060	87.3060	87.3060	87.3060 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	79.0664	87.5378	79.0664	81.7020	79.0664	81.7020	79.0664	79.0664	81.7020	79.0664	81.7020	79.0664 (67)

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Total CO2 associated with community systems			2965.1296 (473)
Space and water heating			2965.1296 (476)
Pumps, fans and electric keep-hot	101.9262	1.5128	154.1939 (478)
Energy for lighting	117.2302	1.5338	179.8116 (479)
Total Primary energy kWh/year			3299.1350 (483)
Dwelling Primary energy Rate (DPER)			63.5700 (484)

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)
Ground floor	51.9000 (1b)	x 2.7400 (2b)	= 142.2060 (1b) - (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9000		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 142.2060 (5)

2. Ventilation rate

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)
Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1406 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3906 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3027 (21)

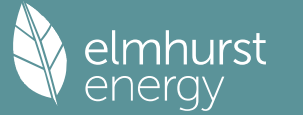
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.3860	0.3784	0.3709	0.3330	0.3255	0.2876	0.2876	0.2800	0.3027	0.3255	0.3406	0.3557 (22b)
Effective ac	0.5745	0.5716	0.5688	0.5555	0.5530	0.5414	0.5414	0.5392	0.5458	0.5530	0.5580	0.5633 (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
TER Opening Type (Uw = 1.20)			7.7700	1.1450	8.8969		(27)
External Wall 1	19.2348	7.7700	11.4648	0.1800	2.0637		(29a)
External Roof 1	51.9000		51.9000	0.1100	5.7090		(30)
Total net area of external elements Aum(A, m2)			71.1348				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		16.6696		(33)
Party Wall 1			58.5300	0.0000	0.0000		(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	395.4106 (35)		
List of Thermal Bridges			
K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	3.8400	0.0500	0.1920
E3 Sill	1.5600	0.0500	0.0780
E4 Jamb	7.7400	0.0500	0.3870
E7 Party floor between dwellings (in blocks of flats)	7.0100	0.0700	0.4907
E9 Balcony between dwellings, wall insulation continuous	7.0100	0.0200	0.1402
E18 Party wall between dwellings	5.4800	0.0600	0.3288
E14 Flat roof	7.0100	0.0800	0.5608
P4 Party wall - Roof (insulation at ceiling level)	21.3500	0.1200	2.5620
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.7395 (36)
Point Thermal bridges			(36a) = 0.0000

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Total fabric heat loss	(33) + (36) + (36a) =												21.4091 (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)
(38)m	26.9601	26.8243	26.6912	26.0662	25.9493	25.4049	25.4049	25.3041	25.6146	25.9493	26.1859	26.4332	
Heat transfer coeff	48.3692	48.2334	48.1004	47.4753	47.3584	46.8140	46.8140	46.7132	47.0237	47.3584	47.5950	47.8423	(39)
Average = Sum(39)m / 12 =													47.4748

HLP	Jan 0.9320	Feb 0.9294	Mar 0.9268	Apr 0.9147	May 0.9125	Jun 0.9020	Jul 0.9020	Aug 0.9001	Sep 0.9000	Oct 0.9125	Nov 0.9171	Dec 0.9218	(40)
HLP (average)													0.9147
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7461 (42)
Hot water usage for mixer showers	53.4962	52.6923	51.5208	49.2793	47.6252	45.7805	44.7320	45.8946	47.1691	49.1497	51.4393	53.2912	(42a)
Hot water usage for baths	23.1283	22.7849	22.3012	21.4093	20.7415	20.0010	19.6010	20.0813	20.6043	21.3967	22.3069	23.0502	(42b)
Hot water usage for other uses	32.5120	31.3298	30.1475	28.9653	27.7830	26.6007	26.6007	27.7830	28.9653	30.1475	31.3298	32.5120	(42c)
Average daily hot water use (litres/day)													100.3217 (43)
Daily hot water use	Jan 109.1366	Feb 106.8069	Mar 103.9694	Apr 99.6538	May 96.1496	Jun 92.3822	Jul 90.9337	Aug 93.7589	Sep 96.7386	Oct 100.6939	Nov 105.0759	Dec 108.8534	(44)
Energy conte	172.8457	152.0916	159.7971	136.4211	129.4359	113.5947	109.9764	116.0931	119.2884	136.6406	149.6999	170.4382	(45)
Energy content (annual)													Total = Sum(45)m = 1666.3227
Distribution loss (46)m = 0.15 x (45)m	25.9268	22.8137	23.9696	20.4632	19.4154	17.0392	16.4965	17.4140	17.8933	20.4961	22.4550	25.5657	(46)
Water storage loss:													0.0000 (47)
Store volume													0.0000 (47)
b) If manufacturer declared loss factor is not known :													1.4400 (51)
Hot water storage loss factor from Table 2 (kWh/litre/day)													0.0000 (52)
Volume factor from Table 2a													1.0000 (53)
Temperature factor from Table 2b													1.4400 (55)
Enter (49) or (54) in (55)													1.4400 (55)
Total storage loss	44.6400	40.3200	44.6400	43.2000	44.6400	43.2000	44.6400	44.6400	43.2000	44.6400	43.2000	44.6400	(56)
If cylinder contains dedicated solar storage	44.6400	40.3200	44.6400	43.2000	44.6400	43.2000	44.6400	44.6400	43.2000	44.6400	43.2000	44.6400	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	217.4857	192.4116	204.4371	179.6211	174.0759	156.7947	154.6164	160.7331	162.4884	181.2806	192.8999	215.0782	(62)
WMHRS	-24.4562	-21.6293	-22.6489	-18.7542	-17.4783	-14.9563	-14.0191	-14.9079	-15.4743	-18.2425	-20.6666	-24.0033	(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	193.0294	170.7823	181.7882	160.8669	156.5976	141.8384	140.5973	145.8252	147.0140	163.0381	172.2334	191.0748	(64)
12Total per year (kWh/year)													Total per year (kWh/year) = Sum(64)m = 1964.6856 (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	93.1832	82.8265	88.8445	79.9200	78.7494	72.3302	72.2792	74.3130	74.2234	81.1450	84.3352	92.3827	(65)

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

Metabolic gains (Table 5), Watts	Jan 87.3060	Feb 87.3060	Mar 87.3060	Apr 87.3060	May 87.3060	Jun 87.3060	Jul 87.3060	Aug 87.3060	Sep 87.3060	Oct 87.3060	Nov 87.3060	Dec 87.3060	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	81.1655	89.8619	81.1655	83.8711	81.1655	83.8711	81.1655	81.1655	83.8711	81.1655	83.8711	81.1655	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	152.1665	153.7456	149.7665	141.2955	130.6025	120.5525	113.8385	112.2595	116.2386	124.7095	135.4026	145.4526	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.7306	31.7306	31.7306	31.7306	31.7306	31.7306	31.7306	31.7306	31.7306	31.7306	31.7306	31.7306	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-69.8448	-69.8448	-69.8448	-69.8448	-69.8448	-69.8448	-69.8448	-69.8448	-69.8448	-69.8448	-69.8448	-69.8448	(71)
Water heating gains (Table 5)	125.2462	123.2536	119.4147	111.0000	105.8460	100.4587	97.1494	99.8830	103.0880	109.0659	117.1323	124.1703	(72)
Total internal gains	407.7701	416.0529	399.5386	385.3585	366.8059	354.0741	341.3453	342.4999	352.3895	364.1328	385.5977	399.9802	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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