

Summary for Input Data



Plot Reference	A 106		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	82 B	DER	5.48	TER	16.74
Environmental	96 A	% DER < TER			67.26
CO ₂ Emissions (t/year)	0.25	DFEE	33.84	TFEE	39.41
Compliance Check	See BREL	% DFEE < TFEE			14.12
% DPER < TPER	35.95	DPER	58.18	TPER	90.84

Assessor Details	Mr. Robert Tanner	Assessor ID	W344-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	254.92	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
		9.18 m	51.08 m ²	2.80 m

8.0 Living Area	25.52	m ²
-----------------	-------	----------------

9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.15	70.00	17.22	7.45	0.00	None	9.77	Enter Gross Area
	Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	8.48	6.06	0.70	Stairwell Access Corridor 3	2.42	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00	70.00	55.24	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	117.49

10.1 Party Ceilings	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	51.08

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Heatloss Floor 1	Exposed Floor - Solid	Lowest occupied	Other	0.10	None	0.00	110.00	51.08

Summary for Input Data

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Door to Corridor				0.00			1.00
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.35		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South West	2.42	
Window	Window	External Wall 1	North East	9.77	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	5.08	0.05	0.05	No
E4 Jamb	Independently assessed	14.40	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	2.79	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	3.03	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.36	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	5.60	0.05	0.05	No
E20 Exposed floor (normal)	Independently assessed	6.15	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	3.03	0.10	0.10	No
E25 Staggered party wall between dwellings	Independently assessed	5.60	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	19.73	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	19.73	0.08	0.08	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	1
Manufacturer SFP	0.63
Duct Type	Rigid
MVHR Efficiency	90.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

22.0 Pressure Testing

Summary for Input Data

Designed AP₅₀ m²/(h.m²) @ 50 Pa
 Test Method

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	15.00	1125.00	5

24.0 Main Heating 1

25.0 Main Heating 2

26.0 Heat Networks

Space Community Heating

Distribution Loss
 Distribution Loss Value
 SAP Code

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	Heat pump	Electricity	Space and Water	232.00	100.00					
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating

28.0 Water Heating

Water Heating
 SAP Code
 Flue Gas Heat Recovery System
 Waste Water Heat Recovery Instantaneous System 1
 Waste Water Heat Recovery Instantaneous System 2
 Waste Water Heat Recovery Storage System
 Solar Panel
 Water use <= 125 litres/person/day
 Cold Water Source
 Bath Count

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type
 Cylinder Volume L
 Loss kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?
 Connected To Dwelling
 Diverter
 Battery Capacity [kWh]

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.24	North East	Horizontal	Modest		No	0.80		

34.0 Small-scale Hydro

Summary for Input Data



Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	A 106				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.48	TER	16.74		
Environmental	96 A	% DER < TER				67.26	
CO ₂ Emissions (t/year)	0.25	DFEE	33.84	TFEE	39.41		
Compliance Check	See BREL	% DFEE < TFEE				14.12	
% DPER < TPER	35.95	DPER	58.18	TPER	90.84		
Assessor Details	Mr. Robert Tanner				Assessor ID	W344-0001	
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	51.0800 (1b)	2.8000 (2b)	143.0240 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.0800		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	143.0240 (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	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)

	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	0.1482	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 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	0.2432	0.2403	0.2374	0.2229	0.2200	0.2054	0.2054	0.2025	0.2112	0.2200	0.2258	0.2316 (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							
Door			2.4200	1.0000	2.4200		(26)
Window			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			51.0800	0.1000	5.1080	110.0000	5618.8000 (28b)
External Wall 1	17.2200	9.7700	7.4500	0.1500	1.1175	70.0000	521.5000 (29a)
Corridor wall	8.4800	2.4200	6.0600	0.1900	1.1514	70.0000	424.2000 (29a)
Total net area of external elements Aum(A, m ²)			76.7800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	20.9839		(33)
Main dwelling							
Party Wall 1			55.2400	0.0000	0.0000	70.0000	3866.8001 (32)
Party Ceiling 1			51.0800			30.0000	1532.4000 (32b)
Internal Wall 1			117.4900			9.0000	1057.4100 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		13021.1100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							254.9160 (35)
List of Thermal Bridges							

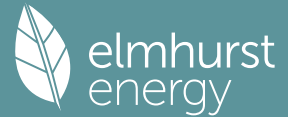
Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)m \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	11.4794	11.3423	11.2051	10.5192	10.3821	9.6962	9.6962	9.5591	9.9706	10.3821	10.6564	10.9307 (38)
Heat transfer coeff												
	36.7138	36.5766	36.4395	35.7536	35.6165	34.9306	34.9306	34.7934	35.2050	35.6165	35.8908	36.1651 (39)
Average = Sum(39)m / 12 =												35.7193
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.7188	0.7161	0.7134	0.7000	0.6973	0.6838	0.6838	0.6812	0.6892	0.6973	0.7026	0.7080 (40)
HLP (average)												0.6993
Days in month	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy												1.7219 (42)
Hot water usage for mixer showers	51.7493	50.9570	49.7894	47.9932	46.3839	44.1325	42.3517	44.4335	45.4806	47.7105	50.0328	51.7026 (42a)
Hot water usage for baths	22.4422	22.1035	21.6215	20.8998	20.2493	19.3539	18.6745	19.5052	19.9412	20.8284	21.7509	22.4244 (42b)
Hot water usage for other uses	32.2643	31.0910	29.9178	28.7445	27.5713	26.3981	26.3981	27.5713	28.7445	29.9178	31.0910	32.2643 (42c)
Average daily hot water use (litres/day)												97.8493 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	106.4558	104.1515	101.3287	97.6375	94.2045	89.8844	87.4243	91.5101	94.1663	98.4568	102.8747	106.3913 (44)
Distribution loss (46)m = 0.15 x (45)m	156.7213	137.8135	144.7966	127.5390	121.3920	103.9483	96.6065	107.7090	109.2282	126.8715	139.0386	156.2435 (45)
Water storage loss (or HIU loss):												Total = Sum(45)m = 1527.9081
Store volume	23.5082	20.6720	21.7195	19.1309	18.2088	15.5922	14.4910	16.1564	16.3842	19.0307	20.8558	23.4365 (46)
b) If manufacturer declared loss factor is not known :												110.0000 (47)
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	211.9981	187.7409	200.0734	181.0327	176.6688	157.4420	151.8833	162.9858	162.7219	182.1483	192.5323	211.5203 (62)
PVHRS	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	211.9981	187.7409	200.0734	181.0327	176.6688	157.4420	151.8833	162.9858	162.7219	182.1483	192.5323	211.5203 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 2178.7479 (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	96.3313	85.7649	92.3663	85.2017	84.5843	77.3578	76.3431	80.0347	79.1133	86.4062	89.0253	96.1724 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.6123	84.8207	76.6123	79.1660	76.6123	79.1660	76.6123	76.6123	79.1660	76.6123	79.1660	76.6123 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	150.0385	151.5954	147.6720	139.3195	128.7760	118.8666	112.2465	110.6896	114.6130	122.9655	133.5090	143.4184 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097 (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)	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772 (71)
Water heating gains (Table 5)	129.4775	127.6264	124.1483	118.3356	113.6886	107.4413	102.6117	107.5735	109.8796	116.1374	123.6462	129.2640 (72)
Total internal gains	404.9572	412.8715	397.2615	385.6501	367.9058	354.3029	340.2994	343.7043	352.4876	364.5441	385.1502	398.1236 (73)

[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
Northeast	9.7700	11.2829	0.3500	0.7000	0.7700	18.7161 (75)

Full SAP Calculation Printout



Solar gains	18.7161	38.0972	68.6391	112.7251	151.5247	161.5414	151.1186	120.4735	83.6378	46.5578	23.5497	15.2845 (83)
Total gains	423.6734	450.9687	465.9006	498.3753	519.4305	515.8443	491.4180	464.1778	436.1254	411.1019	408.6999	413.4081 (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	98.5181	98.8876	99.2598	101.1639	101.5535	103.5474	103.5474	103.9556	102.7405	101.5535	100.7772	100.0128
alpha	7.5679	7.5925	7.6173	7.7443	7.7702	7.9032	7.9304	7.8494	7.8494	7.7702	7.7185	7.6675
util living area	0.9803	0.9656	0.9315	0.8141	0.6305	0.4330	0.3127	0.3448	0.5545	0.8348	0.9529	0.9827 (86)
MIT	20.5570	20.6562	20.7884	20.9396	20.9917	20.9996	21.0000	20.9999	20.9975	20.9388	20.7542	20.5482 (87)
Th 2	20.3243	20.3267	20.3290	20.3409	20.3432	20.3551	20.3551	20.3575	20.3504	20.3432	20.3385	20.3338 (88)
util rest of house	0.9752	0.9571	0.9155	0.7820	0.5885	0.3896	0.2669	0.2966	0.5034	0.7985	0.9402	0.9781 (89)
MIT 2	19.8209	19.9453	20.1064	20.2852	20.3370	20.3549	20.3551	20.3575	20.3489	20.2892	20.0765	19.8179 (90)
Living area fraction									fLA = Living area / (4) =			0.4996 (91)
MIT	20.1887	20.3005	20.4471	20.6121	20.6641	20.6770	20.6773	20.6785	20.6730	20.6137	20.4151	20.1828 (92)
Temperature adjustment												0.0000
adjusted MIT	20.1887	20.3005	20.4471	20.6121	20.6641	20.6770	20.6773	20.6785	20.6730	20.6137	20.4151	20.1828 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9740	0.9568	0.9186	0.7956	0.6092	0.4113	0.2898	0.3207	0.5289	0.8141	0.9418	0.9769 (94)
Useful gains	412.6522	431.4682	427.9589	396.5226	316.4253	212.1619	142.4168	148.8504	230.6475	334.6677	384.9237	403.8749 (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	583.3339	563.2984	508.2259	418.7504	319.2680	212.2739	142.4224	148.8627	231.4009	356.6531	477.8881	578.0186 (97)
Space heating kWh	126.9872	88.5899	59.7186	16.0040	2.1149	0.0000	0.0000	0.0000	0.0000	16.3571	66.9344	129.5629 (98a)
Space heating requirement - total per year (kWh/year)												506.2691
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	126.9872	88.5899	59.7186	16.0040	2.1149	0.0000	0.0000	0.0000	0.0000	16.3571	66.9344	129.5629 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												506.2691
Space heating per m2										(98c) / (4) =		9.9113 (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 Heat pump-Space and Water

1.0000 (303a)

Factor for control and charging method (Table 4c(3)) for space heating

1.0000 (305)

Factor for charging method (Table 4c(3)) for water heating

1.0000 (305a)

Distribution loss factor (Table 12c) for community heating system

1.5000 (306)

Efficiency of secondary/supplementary heating system, %

0.0000 (208)

Space heating:

Space heating requirement

126.9872 88.5899 59.7186 16.0040 2.1149 0.0000 0.0000 0.0000 0.0000 16.3571 66.9344 129.5629 (98)

Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50

307a 190.4808 132.8849 89.5780 24.0060 3.1724 0.0000 0.0000 0.0000 0.0000 24.5357 100.4016 194.3444

Space heating requirement

190.4808 132.8849 89.5780 24.0060 3.1724 0.0000 0.0000 0.0000 0.0000 24.5357 100.4016 194.3444 (307)

Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)

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

Annual water heating requirement

211.9981 187.7409 200.0734 181.0327 176.6688 157.4420 151.8833 162.9858 162.7219 182.1483 192.5323 211.5203 (64)

Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50

310a 317.9972 281.6114 300.1102 271.5490 265.0033 236.1630 227.8249 244.4787 244.0829 273.2224 288.7985 317.2804

Water heating fuel

317.9972 281.6114 300.1102 271.5490 265.0033 236.1630 227.8249 244.4787 244.0829 273.2224 288.7985 317.2804 (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

11.6705 10.5411 11.6705 11.2940 11.6705 11.2940 11.6705 11.6705 11.2940 11.6705 11.2940 11.6705 (315)

Lighting

16.2873 13.0662 11.7647 8.6193 6.6578 5.4395 6.0735 7.8945 10.2542 13.4541 15.1964 16.7399 (332)

Electricity generated by PVs (Appendix M) (negative quantity)

(333a)m -2.6445 -4.7059 -8.7069 -12.2943 -15.4110 -15.2176 -14.8993 -12.8006 -9.5965 -6.1473 -3.1789 -2.1580 (333a)

Electricity generated by wind turbines (Appendix M) (negative quantity)

(334a)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 (334a)

Electricity generated by hydro-electric generators (Appendix M) (negative quantity)

(335a)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 (335a)

Electricity generated by PVs (Appendix M) (negative quantity)

(333b)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 (333b)

Electricity generated by wind turbines (Appendix M) (negative quantity)

(334b)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 (334b)

Electricity generated by hydro-electric generators (Appendix M) (negative quantity)

(335b)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 (335b)

Annual totals kWh/year

Space heating fuel - community heating 759.4036 (307)

Space heating fuel - secondary

0.0000 (309)

Water heating fuel - community heating

3268.1218 (310)

Efficiency of water heater

0.0000 (311)

Electricity used for heat distribution

7.5940 (313)

Space cooling fuel

0.0000 (321)

Electricity for pumps and fans:

(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)

mechanical ventilation fans (SFP = 0.7875)

137.4103 (330a)

Total electricity for the above, kWh/year

137.4103 (331)

Electricity for lighting (calculated in Appendix L)

131.4475 (332)

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

Full SAP Calculation Printout



PV generation	-107.7609 (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	4188.6224 (338)

12b. Carbon dioxide emissions - Community heating scheme

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Efficiency of heat source Heat pump			232.0000 (367)
Space and Water heating from Heat pump	1736.0024	0.1581	51.7425 (367)
Electrical energy for heat distribution (space & water)	7.5940	0.0000	5.7993 (372)
Overall CO2 factor for heat network			0.0635 (386)
Total CO2 associated with community systems			255.7710 (373)
Space and water heating			255.7710 (376)
Pumps, fans and electric keep-hot	137.4103	0.1387	19.0605 (378)
Energy for lighting	131.4475	0.1443	18.9719 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.7609	0.1305	-14.0607
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.0607 (380)
Total CO2, kg/year			279.7427 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.4800 (384)

13b. Primary energy - Community heating scheme

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Efficiency of heat source Heat pump			232.0000 (467a)
Space and Water heating from Heat pump	1736.0024	1.5852	518.8777 (467)
Electrical energy for heat distribution (space & water)	7.5940	0.0000	61.7240 (472)
Overall CO2 factor for heat network			0.6759 (486)
Total CO2 associated with community systems			2722.2404 (473)
Space and water heating			2722.2404 (476)
Pumps, fans and electric keep-hot	137.4103	1.5128	207.8743 (478)
Energy for lighting	131.4475	1.5338	201.6186 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.7609	1.4820	-159.7008
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-159.7008 (480)
Total Primary energy kWh/year			2972.0325 (483)
Dwelling Primary energy Rate (DPER)			58.1800 (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)
Main dwelling	51.0800 (1b)	x 2.8000 (2b)	= 143.0240 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.0800		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 143.0240 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1398 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3898	(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) =		0.3021 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (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												

Full SAP Calculation Printout



Effective ac	0.3852	0.3777	0.3701	0.3323	0.3248	0.2870	0.2870	0.2795	0.3021	0.3248	0.3399	0.3550 (22b)
	0.5742	0.5713	0.5685	0.5552	0.5527	0.5412	0.5412	0.5391	0.5456	0.5527	0.5578	0.5630 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Main dwelling							
TER Opaque door			2.4200	1.0000	2.4200		(26)
TER Opening Type			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			51.0800	0.1300	6.6404		(28b)
External Wall 1	17.2200	9.7700	7.4500	0.1800	1.3410		(29a)
Corridor wall	8.4800	2.4200	6.0600	0.1800	1.0908		(29a)
Total net area of external elements Aum(A, m2)			76.7800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	22.6792		(33)
Main dwelling							
Party Wall 1			55.2400	0.0000	0.0000		(32)

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

254.9160 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.0800	0.0500	0.2540
E4 Jamb	14.4000	0.0500	0.7200
E7 Party floor between dwellings (in blocks of flats)	2.7900	0.0700	0.1953
E7 Party floor between dwellings (in blocks of flats)	3.0300	0.0700	0.2121
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E20 Exposed floor (normal)	6.1500	0.3200	1.9680
E21 Exposed floor (inverted)	3.0300	0.3200	0.9696
E25 Staggered party wall between dwellings	5.6000	0.0600	0.3360
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	19.7300	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	19.7300	0.1600	3.1568

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

8.2150 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 30.8942 (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	27.1007	26.9647	26.8314	26.2054	26.0883	25.5430	25.5430	25.4420	25.7530	26.0883	26.3252	26.5729 (38)
Heat transfer coeff	57.9949	57.8589	57.7256	57.0996	56.9825	56.4372	56.4372	56.3363	56.6473	56.9825	57.2194	57.4672 (39)
Average = Sum(39)m / 12 =												57.0991

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1354	1.1327	1.1301	1.1178	1.1156	1.1049	1.1049	1.1029	1.1090	1.1156	1.1202	1.1250 (40)
HLP (average)												1.1178
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7219 (42)
Hot water usage for mixer showers												
53.0906	52.2928	51.1301	48.9057	47.2641	45.4334	44.3928	45.5466	46.8114	48.7770	51.0493	52.8872 (42a)	
Hot water usage for baths												
22.9539	22.6130	22.1330	21.2478	20.5851	19.8501	19.4532	19.9299	20.4489	21.2353	22.1387	22.8763 (42b)	
Hot water usage for other uses												
32.2643	31.0910	29.9178	28.7445	27.5713	26.3981	26.3981	27.5713	28.7445	29.9178	31.0910	32.2643 (42c)	
Average daily hot water use (litres/day)												99.5608 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
108.3088	105.9968	103.1809	98.8981	95.4204	91.6816	90.2440	93.0478	96.0049	99.9301	104.2790	108.0278 (44)	
Energy content (annual)	171.5347	150.9381	158.5852	135.3865	128.4542	112.7332	109.1423	115.2126	118.3836	135.6042	148.5645	169.1454 (45)
Distribution loss (46)m = 0.15 x (45)m												
25.7302	22.6407	23.7878	20.3080	19.2681	16.9100	16.3714	17.2819	17.7575	20.3406	22.2847	25.3718 (46)	
Water storage loss (or HIU loss):												
Store volume												180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.5520 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8381 (55)
Total storage loss												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (56)	
If cylinder contains dedicated solar storage												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	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 (61)	
Total heat required for water heating calculated for each month												
220.7774	195.4153	207.8279	183.0407	177.6969	160.3874	158.3850	164.4553	166.0378	184.8469	196.2187	218.3881 (62)	
WWHRS	-24.2708	-21.4653	-22.4772	-18.6120	-17.3457	-14.8429	-13.9128	-14.7949	-15.3570	-18.1042	-20.5099	-23.8213 (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												
196.5066	173.9500	185.3507	164.4287	160.3512	145.5445	144.4722	149.6604	150.6808	166.7427	175.7088	194.5668 (64)	
12Total per year (kWh/year)												
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												
96.4294	85.7687	92.1237	83.1394	82.1052	75.6071	75.6840	77.7023	77.4859	84.4825	87.5211	95.6350 (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	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	76.6123	84.8207	76.6123	79.1660	76.6123	79.1660	76.6123	76.6123	79.1660	76.6123	79.1660	76.6123 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	150.0385	151.5954	147.6720	139.3195	128.7760	118.8666	112.2465	110.6896	114.6130	122.9655	133.5090	143.4184 (68)

Full SAP Calculation Printout



Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097 (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 (70)
Losses e.g. evaporation (negative values) (Table 5)	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772 (71)
Water heating gains (Table 5)	129.6094	127.6320	123.8222	115.4713	110.3564	105.0099	101.7258	104.4386	107.6193	113.5518	121.5570 (72)
Total internal gains	408.0892	415.8771	399.9354	385.7858	367.5736	351.8715	339.4135	340.5694	350.2273	364.9585	400.4013 (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

Northeast						9.7700	11.2829	0.6300	0.7000			0.7700	33.6890 (75)

Solar gains	33.6890	68.5750	123.5504	202.9052	272.7444	290.7744	272.0135	216.8523	150.5481	83.8041	42.3895	27.5122	(83)
Total gains	441.7782	484.4521	523.4858	588.6911	640.3181	642.6459	611.4270	557.4218	500.7754	448.7626	428.4505	427.9134	(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	62.3671	62.5137	62.6580	63.3450	63.4752	64.0884	64.0884	64.2033	63.8508	63.4752	63.2123	62.9399
alpha	5.1578	5.1676	5.1772	5.2230	5.2317	5.2726	5.2726	5.2802	5.2567	5.2317	5.2142	5.1960
util living area	0.9904	0.9833	0.9651	0.8984	0.7510	0.5499	0.4040	0.4605	0.7214	0.9312	0.9813	0.9918 (86)
MIT	19.8999	20.0565	20.3119	20.6632	20.8981	20.9838	20.9973	20.9949	20.9384	20.6366	20.2211	19.8769 (87)
Th 2	19.9720	19.9742	19.9763	19.9863	19.9882	19.9969	19.9969	19.9985	19.9935	19.9882	19.9844	19.9804 (88)
util rest of house	0.9874	0.9781	0.9539	0.8682	0.6912	0.4690	0.3131	0.3626	0.6380	0.9034	0.9744	0.9892 (89)
MIT 2	18.7153	18.9147	19.2350	19.6610	19.9090	19.9884	19.9961	19.9968	19.9552	19.6425	19.1319	18.6924 (90)
Living area fraction	19.3072	19.4852	19.7730	20.1617	20.4031	20.4857	20.4963	20.4955	20.4464	20.1392	19.6761	19.2842 (92)
MIT	19.3072	19.4852	19.7730	20.1617	20.4031	20.4857	20.4963	20.4955	20.4464	20.1392	19.6761	19.2842 (93)
Temperature adjustment												0.0000
adjusted MIT	19.3072	19.4852	19.7730	20.1617	20.4031	20.4857	20.4963	20.4955	20.4464	20.1392	19.6761	19.2842 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9849	0.9750	0.9513	0.8740	0.7169	0.5091	0.3586	0.4116	0.6773	0.9082	0.9718	0.9869 (94)
Useful gains	435.0892	472.3339	497.9850	514.4874	459.0513	327.1466	219.2549	229.4348	339.1906	407.5690	416.3605	422.3120 (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	870.3384	843.8815	766.1944	643.0400	495.9268	332.1727	219.8971	230.7229	359.5062	543.5668	719.5956	866.8477 (97)
Space heating kWh	323.8254	249.6800	199.5478	92.5579	27.4354	0.0000	0.0000	0.0000	0.0000	101.1824	218.3293	330.7345 (98a)
Space heating requirement - total per year (kWh/year)												1543.2927
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	323.8254	249.6800	199.5478	92.5579	27.4354	0.0000	0.0000	0.0000	0.0000	101.1824	218.3293	330.7345 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1543.2927
Space heating per m2										(98c) / (4) =		30.2132 (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 %)												92.3000 (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	323.8254	249.6800	199.5478	92.5579	27.4354	0.0000	0.0000	0.0000	0.0000	101.1824	218.3293	330.7345 (98)
Space heating efficiency (main heating system 1)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating fuel (main heating system)	350.8401	270.5092	216.1948	100.2794	29.7241	0.0000	0.0000	0.0000	0.0000	109.6234	236.5431	358.3256 (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	196.5066	173.9500	185.3507	164.4287	160.3512	145.5445	144.4722	149.6604	150.6808	166.7427	175.7088	194.5668 (64)
Efficiency of water heater (217)m	85.1723	84.8697	84.2256	82.8233	80.9994	79.8000	79.8000	79.8000	79.8000	82.9759	84.5480	79.8000 (216)
Fuel for water heating, kWh/month	230.7166	204.9614	220.0644	198.5294	197.9659	182.3866	181.0428	187.5443	188.8231	200.9530	207.8215	228.2596 (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	15.9185	12.7704	11.4984	8.4242	6.5071	5.3163	5.9360	7.7158	10.0221	13.1495	14.8523	16.3609 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-6.8084	-10.5107	-16.5276	-20.3900	-23.6397	-22.6908	-22.4242	-20.3355	-16.9731	-12.7764	-7.8038	-5.7854 (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)

Full SAP Calculation Printout



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	(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	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	-1.5018	-3.2868	-6.7785	-10.5533	-14.3261	-14.5257	-11.9685	-8.5475	-4.8103	-2.0396	-1.1779	(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	(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	(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											1672.0397	(211)
Space heating fuel - main system 2											0.0000	(213)
Space heating fuel - secondary											0.0000	(215)
Efficiency of water heater											79.8000	
Water heating fuel used											2429.0687	(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)											128.4715	(232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation											-280.5286	(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											4035.0514	(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	1672.0397	0.2100	351.1283 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2429.0687	0.2100	510.1044 (264)
Space and water heating			861.2328 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	128.4715	0.1443	18.5424 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-186.6655	0.1327	-24.7757
PV Unit electricity exported	-93.8631	0.1249	-11.7213
Total			-36.4970 (269)
Total CO2, kg/year			855.2075 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			16.7400 (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	1672.0397	1.1300	1889.4049 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2429.0687	1.1300	2744.8476 (278)
Space and water heating			4634.2525 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	128.4715	1.5338	197.0539 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-186.6655	1.4904	-278.2121
PV Unit electricity exported	-93.8631	0.4583	-43.0207
Total			-321.2328 (283)
Total Primary energy kWh/year			4640.1744 (286)
Target Primary Energy Rate (TPER)			90.8400 (287)

Full SAP Calculation Printout



Plot Reference	A 106			Issued on Date	19/03/2026	
Assessment Reference	Be Green		Plot Type Ref			
Plot Address				SAP Version	10.2	
SAP Rating	82 B		DER	5.48	TER	16.74
Environmental	96 A		% DER < TER			67.26
CO ₂ Emissions (t/year)	0.25		DFEE	33.84	TFEE	39.41
Compliance Check	See BREL		% DFEE < TFEE			14.12
% DPER < TPER	35.95		DPER	58.18	TPER	90.84
Assessor Details	Mr. Robert Tanner				Assessor ID	W344-0001
Client						

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	51.0800 (1b)	2.8000 (2b)	143.0240 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.0800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	143.0240 (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	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1398 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2898 (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) = 0.2246 (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	0.2864	0.2808	0.2752	0.2471	0.2415	0.2134	0.2134	0.2078	0.2246	0.2415	0.2527	0.2639 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.5410	0.5394	0.5379	0.5305	0.5292	0.5228	0.5228	0.5216	0.5252	0.5292	0.5319	0.5348 (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							
Door			2.4200	1.0000	2.4200		(26)
Window			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			51.0800	0.1000	5.1080	110.0000	5618.8000 (28b)
External Wall 1	17.2200	9.7700	7.4500	0.1500	1.1175	70.0000	521.5000 (29a)
Corridor wall	8.4800	2.4200	6.0600	0.1900	1.1514	70.0000	424.2000 (29a)
Total net area of external elements Aum(A, m ²)			76.7800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	20.9839		(33)
Main dwelling							
Party Wall 1			55.2400	0.0000	0.0000	70.0000	3866.8001 (32)
Party Ceiling 1			51.0800			30.0000	1532.4000 (32b)
Internal Wall 1			117.4900			9.0000	1057.4100 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13021.1100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							254.9160 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				5.0800	0.0500	0.2540	
E4 Jamb				14.4000	0.0400	0.5760	

Full SAP Calculation Printout



E7 Party floor between dwellings (in blocks of flats)	2.7900	0.0500	0.1395
E7 Party floor between dwellings (in blocks of flats)	3.0300	0.0390	0.1182
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0500	0.1680
E18 Party wall between dwellings	5.6000	0.0500	0.2800
E20 Exposed floor (normal)	6.1500	0.1000	0.6150
E21 Exposed floor (inverted)	3.0300	0.1000	0.3030
E25 Staggered party wall between dwellings	5.6000	0.0390	0.2184
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	19.7300	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	19.7300	0.0800	1.5784

Thermal bridges (Sum(L x Psi) calculated using Appendix K)
 Point Thermal Bridges (36a) = 4.2505 (36)
 Total fabric heat loss (33) + (36) + (36a) = 25.2344 (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	25.5346	25.4594	25.3858	25.0397	24.9750	24.6736	24.6736	24.6178	24.7897	24.9750	25.1059	25.2429 (38)
Heat transfer coeff	50.7690	50.6938	50.6201	50.2741	50.2094	49.9080	49.9080	49.8521	50.0241	50.2094	50.3403	50.4773 (39)
Average = Sum(39)m / 12 =												50.2738

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9939	0.9924	0.9910	0.9842	0.9830	0.9771	0.9771	0.9760	0.9793	0.9830	0.9855	0.9882 (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												1.7219 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	22.4422	22.1035	21.6215	20.8998	20.2493	19.3539	18.6745	19.5052	19.9412	20.8284	21.7509	22.4244 (42b)
Hot water usage for other uses	32.2643	31.0910	29.9178	28.7445	27.5713	26.3981	26.3981	27.5713	28.7445	29.9178	31.0910	32.2643 (42c)
Average daily hot water use (litres/day)												50.1404 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
54.7065	53.1945	51.5393	49.6443	47.8206	45.7519	45.0726	47.0765	48.6858	50.7462	52.8419	54.6887	(44)
Energy conte	80.5374	70.3871	73.6486	64.8479	61.6217	52.9106	49.8065	55.4099	56.4730	65.3916	71.4176	80.3144 (45)
Energy content (annual)										Total = Sum(45)m =		782.7664
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
68.4568	59.8290	62.6013	55.1207	52.3784	44.9740	42.3356	47.0985	48.0021	55.5829	60.7050	68.2672	(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	68.4568	59.8290	62.6013	55.1207	52.3784	44.9740	42.3356	47.0985	48.0021	55.5829	60.7050	68.2672 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		665.3514 (64)
Electric shower(s)	42.5167	37.8828	41.3665	39.4756	40.2163	38.3625	39.6412	40.2163	39.4756	41.3665	40.5887	42.5167 (64a)
Heat gains from water heating, kWh/month	27.7434	24.4279	25.9920	23.6491	23.1487	20.8341	20.4942	21.8287	21.8694	24.2374	25.3234	27.6960 (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	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.6123	84.8207	76.6123	79.1660	76.6123	79.1660	76.6123	76.6123	79.1660	76.6123	79.1660	76.6123 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	150.0385	151.5954	147.6720	139.3195	128.7760	118.8666	112.2465	110.6896	114.6130	122.9655	133.5090	143.4184 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097 (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)	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772 (71)
Water heating gains (Table 5)	37.2895	36.3511	34.9354	32.8459	31.1138	28.9363	27.5460	29.3396	30.3742	32.5771	35.1714	37.2258 (72)
Total internal gains	312.7692	321.5962	308.0487	300.1604	285.3311	275.7978	265.2337	265.4704	272.9821	280.9838	296.6754	306.0854 (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	
-----									-----			
Northeast					9.7700	11.2829	0.3500	0.7000	0.7700		18.7161 (75)	
-----									-----			
Solar gains	18.7161	38.0972	68.6391	112.7251	151.5247	161.5414	151.1186	120.4735	83.6378	46.5578	23.5497	15.2845 (83)
Total gains	331.4853	359.6934	376.6878	412.8855	436.8557	437.3392	416.3523	385.9440	356.6200	327.5416	320.2251	321.3699 (84)

7. Mean internal temperature (heating season)

Full SAP Calculation Printout



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	71.2438	71.3494	71.4533	71.9451	72.0379	72.4729	72.4729	72.5540	72.3047	72.0379	71.8504	71.6555
alpha	5.7496	5.7566	5.7636	5.7963	5.8025	5.8315	5.8315	5.8369	5.8203	5.8025	5.7900	5.7770
util living area	0.9972	0.9950	0.9895	0.9634	0.8798	0.6947	0.5214	0.5823	0.8391	0.9740	0.9941	0.9977 (86)
MIT	19.9003	20.0254	20.2315	20.5516	20.8241	20.9667	20.9946	20.9902	20.9021	20.5672	20.1879	19.8776 (87)
Th 2	20.0884	20.0896	20.0908	20.0965	20.0976	20.1025	20.1025	20.1034	20.1006	20.0976	20.0954	20.0932 (88)
util rest of house	0.9963	0.9933	0.9857	0.9497	0.8375	0.6118	0.4183	0.4750	0.7710	0.9616	0.9918	0.9970 (89)
MIT 2	19.0864	19.2119	19.4172	19.7327	19.9787	20.0874	20.1011	20.1006	20.0468	19.7527	19.3787	19.0677 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.4930	19.6184	19.8241	20.1418	20.4011	20.5267	20.5475	20.5451	20.4741	20.1596	19.7830	19.4723 (92)
Temperature adjustment												
adjusted MIT	19.4930	19.6184	19.8241	20.1418	20.4011	20.5267	20.5475	20.5451	20.4741	20.1596	19.7830	19.4723 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9955	0.9922	0.9843	0.9505	0.8530	0.6523	0.4700	0.5288	0.8017	0.9626	0.9907	0.9963 (94)
Useful gains	330.0091	356.8804	370.7804	392.4355	372.6441	285.2760	195.6833	204.1008	285.8930	315.3040	317.2607	320.1713 (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	771.3353	746.1295	674.4660	565.1733	436.8746	295.7908	197.0129	206.6405	318.8601	479.9829	638.4653	770.9050 (97)
Space heating kWh	328.3467	261.5754	225.9421	124.3712	47.7875	0.0000	0.0000	0.0000	0.0000	122.5211	231.2673	335.3458 (98a)
Space heating requirement - total per year (kWh/year)	1677.1570											
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	328.3467	261.5754	225.9421	124.3712	47.7875	0.0000	0.0000	0.0000	0.0000	122.5211	231.2673	335.3458 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1677.1570											
Space heating per m2	(98c) / (4) = 32.8339 (99)											

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	469.1348	369.3189	378.8763	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8661	0.9297	0.8990	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	406.2973	343.3665	340.6099	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	483.3591	460.4455	426.2682	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	55.4845	87.1068	63.7297	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	13.8711	21.7767	15.9324	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	51.5802 (107)											
Energy for space heating	32.8339 (99)											
Energy for space cooling	1.0098 (108)											
Total	33.8437 (109)											
Fabric Energy Efficiency (DFEE)	33.8 (109)											

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	51.0800 (1b)	x 2.8000 (2b)	= 143.0240 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.0800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	143.0240 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(7a)+(7b)+(7c) =
Pressure test	20.0000 / (5) = 0.1398 (8)
	Yes

Full SAP Calculation Printout



Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Blower Door
5.0000 (17)
0.3898 (18)
3 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3021 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(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	0.3852	0.3777	0.3701	0.3323	0.3248	0.2870	0.2870	0.2795	0.3021	0.3248	0.3399	0.3550	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)													(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =													(23c)
Effective ac	0.5742	0.5713	0.5685	0.5552	0.5527	0.5412	0.5412	0.5391	0.5456	0.5527	0.5578	0.5630	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			9.7700	1.1450	11.1870			(27)
Heatloss Floor 1			51.0800	0.1300	6.6404			(28b)
External Wall 1	17.2200	9.7700	7.4500	0.1800	1.3410			(29a)
Corridor wall	8.4800	2.4200	6.0600	0.1800	1.0908			(29a)
Total net area of external elements Aum (A, m2)			76.7800					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 22.6792			(33)
Main dwelling								
Party Wall 1			55.2400	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 254.9160 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	5.0800	0.0500	0.2540	
E4 Jamb	14.4000	0.0500	0.7200	
E7 Party floor between dwellings (in blocks of flats)	2.7900	0.0700	0.1953	
E7 Party floor between dwellings (in blocks of flats)	3.0300	0.0700	0.2121	
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672	
E18 Party wall between dwellings	5.6000	0.0600	0.3360	
E20 Exposed floor (normal)	6.1500	0.3200	1.9680	
E21 Exposed floor (inverted)	3.0300	0.3200	0.9696	
E25 Staggered party wall between dwellings	5.6000	0.0600	0.3360	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	19.7300	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	19.7300	0.1600	3.1568	

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 8.2150 (36)

Point Thermal bridges

Total fabric heat loss (33) + (36) + (36a) = 30.8942 (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	
	27.1007	26.9647	26.8314	26.2054	26.0883	25.5430	25.5430	25.4420	25.7530	26.0883	26.3252	26.5729	(38)
Heat transfer coeff	57.9949	57.8589	57.7256	57.0996	56.9825	56.4372	56.4372	56.3363	56.6473	56.9825	57.2194	57.4672	(39)
Average = Sum(39)m / 12 =												57.0991	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	1.1354	1.1327	1.1301	1.1178	1.1156	1.1049	1.1049	1.1029	1.1090	1.1156	1.1202	1.1250	(40)
HLP (average)												1.1178	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7219 (42)
Hot water usage for mixer showers													(42a)
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	
Hot water usage for baths													(42b)
22.9539	22.6130	22.1330	21.2478	20.5851	19.8501	19.4532	19.9299	20.4489	21.2353	22.1387	22.8763		
Hot water usage for other uses													(42c)
32.2643	31.0910	29.9178	28.7445	27.5713	26.3981	26.3981	27.5713	28.7445	29.9178	31.0910	32.2643		
Average daily hot water use (litres/day)												50.6131	(43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	55.2182	53.7041	52.0508	49.9924	48.1564	46.2482	45.8512	47.5012	49.1935	51.1531	53.2297	55.1406	(44)
Energy conte	87.4522	76.4739	80.0001	68.4371	64.8277	56.8676	55.4531	58.8164	60.6605	69.4143	75.8355	86.3369	(45)
Energy content (annual)										Total = Sum(45)m =		840.5750	
Distribution loss (46)m = 0.15 x (45)m													(46)
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	
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													(57)
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	
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													
74.3343	65.0028	68.0001	58.1715	55.1036	48.3374	47.1351	49.9939	51.5614	59.0021	64.4602	73.3863		(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	74.3343	65.0028	68.0001	58.1715	55.1036	48.3374	47.1351	49.9939	51.5614	59.0021	64.4602	73.3863	(64)
Total per year (kWh/year)												714.4888	(64)
Electric shower(s)	42.5167	37.8828	41.3665	39.4756	40.2163	38.3625	39.6412	40.2163	39.4756	41.3665	40.5887	42.5167	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												483.6253	(64a)
Heat gains from water heating, kWh/month	29.2128	25.7214	27.3416	24.4118	23.8300	21.6750	21.6941	22.5526	22.7592	25.0922	26.2622	28.9758	(65)

Full SAP Calculation Printout



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	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965	86.0965 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.6123	84.8207	76.6123	79.1660	76.6123	79.1660	76.6123	76.6123	79.1660	76.6123	79.1660	76.6123 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	150.0385	151.5954	147.6720	139.3195	128.7760	118.8666	112.2465	110.6896	114.6130	122.9655	133.5090	143.4184 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097	31.6097 (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)	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772	-68.8772 (71)
Water heating gains (Table 5)	39.2645	38.2759	36.7495	33.9052	32.0295	30.1041	29.1587	30.3126	31.6100	33.7260	36.4753	38.9459 (72)
Total internal gains	314.7442	323.5210	309.8628	301.2197	286.2468	276.9657	266.8464	266.4434	274.2180	282.1327	297.9792	307.8055 (73)

6. Solar gains

[Jan]	Area m ²		Solar flux Table 6a W/m ²		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast	9.7700		11.2829		0.6300		0.7000		0.7700		33.6890 (75)	
Solar gains	33.6890	68.5750	123.5504	202.9052	272.7444	290.7744	272.0135	216.8523	150.5481	83.8041	42.3895	27.5122 (83)
Total gains	348.4332	392.0960	433.4131	504.1250	558.9912	567.7401	538.8600	483.2957	424.7661	365.9368	340.3688	335.3177 (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	62.3671	62.5137	62.6580	63.3450	63.4752	64.0884	64.0884	64.2033	63.8508	63.4752	63.2123	62.9399
alpha	5.1578	5.1676	5.1772	5.2230	5.2317	5.2726	5.2726	5.2802	5.2567	5.2317	5.2142	5.1960
util living area	0.9967	0.9933	0.9837	0.9394	0.8163	0.6136	0.4566	0.5268	0.8033	0.9677	0.9931	0.9973 (86)
MIT	19.7129	19.8764	20.1484	20.5482	20.8469	20.9732	20.9953	20.9905	20.8966	20.5041	20.0499	19.6901 (87)
Th 2	19.9720	19.9742	19.9763	19.9863	19.9882	19.9969	19.9969	19.9985	19.9935	19.9882	19.9844	19.9804 (88)
util rest of house	0.9956	0.9911	0.9780	0.9182	0.7614	0.5270	0.3548	0.4170	0.7250	0.9522	0.9904	0.9964 (89)
MIT 2	18.8076	18.9718	19.2420	19.6326	19.8912	19.9856	19.9957	19.9960	19.9396	19.6003	19.1530	18.7915 (90)
Living area fraction	19.2599	19.4237	19.6948	20.0901	20.3687	20.4790	20.4951	20.4928	20.4177	20.0518	19.6011	19.2405 (91)
MIT	19.2599	19.4237	19.6948	20.0901	20.3687	20.4790	20.4951	20.4928	20.4177	20.0518	19.6011	19.2405 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2599	19.4237	19.6948	20.0901	20.3687	20.4790	20.4951	20.4928	20.4177	20.0518	19.6011	19.2405 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9946	0.9895	0.9760	0.9206	0.7835	0.5696	0.4058	0.4720	0.7606	0.9534	0.9890	0.9955 (94)
Useful gains	346.5401	387.9878	423.0101	464.1225	437.9643	323.3859	218.6736	228.1294	323.0691	348.8716	336.6194	333.8154 (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	867.5976	840.3284	761.6807	638.9486	493.9617	331.7952	219.8295	230.5749	357.8830	538.5890	715.3056	864.3337 (97)
Space heating kWh	387.6667	303.9728	251.9709	125.8748	41.6620	0.0000	0.0000	0.0000	0.0000	141.1497	272.6540	394.7056 (98a)
Space heating requirement - total per year (kWh/year)												1919.6568
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	387.6667	303.9728	251.9709	125.8748	41.6620	0.0000	0.0000	0.0000	0.0000	141.1497	272.6540	394.7056 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1919.6568
Space heating per m ²										(98c) / (4) =		37.5814 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	530.5101	417.6356	428.1556	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9060	0.9509	0.9207	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	480.6271	397.1171	394.1925	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	635.5786	603.3640	539.8917	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	111.5651	153.4477	108.4002	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	27.8913	38.3619	27.1000	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												93.3532 (107)
Energy for space heating												37.5814 (99)
Energy for space cooling												1.8276 (108)
Total												39.4090 (109)
Fabric Energy Efficiency (TFEE)												39.4 (109)

