

Summary for Input Data

Plot Reference	B 104	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	6.02	TER	18.50
Environmental	96 A	% DER < TER			67.46
CO ₂ Emissions (t/year)	0.27	DFEE	39.72	TFEE	45.73
Compliance Check	See BREL	% DFEE < TFEE			13.15
% DPER < TPER	36.95	DPER	63.74	TPER	101.09

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	252.42	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	18.65 m	50.71 m ²	2.80 m

8.0 Living Area	28.50	m ²
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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	29.05	20.00	0.00	None	9.05	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	23.17	20.75	0.70	Stairwell Access Corridor 3	2.42	Enter Gross Area

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	30.86	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	76.44

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	50.71

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	50.71

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12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South West	2.42	
SE windows	Windows	External Wall 1	South East	1.03	
NE windows	Windows	External Wall 1	North East	8.02	

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	5.55	0.05	0.05	No
E3 Sill	Independently assessed	2.06	0.04	0.04	No
E4 Jamb	Independently assessed	18.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	6.98	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	8.28	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.40	0.10	0.10	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.40	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	2.80	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	5.60	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
E20 Exposed floor (normal)	Independently assessed	6.98	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	8.28	0.10	0.10	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	11.02	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	11.02	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

Summary for Input Data

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

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

Summary for Input Data



Battery Capacity [kWh]

0.00

PV Cells kWp

Orientation

Elevation

Overshading

FGHRS

MCS Certificate

**Overshading
Factor**

**MCS
Certificate
Reference**

**Panel
Manufacturer**

0.24

South West

Horizontal

Modest

No

0.80

34.0 Small-scale Hydro

None

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



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Compliance Check	See BREL	DFEE	39.72
% DPER < TPER	36.95	TFEE	45.73
		% DFEE < TFEE	13.15
		TPER	101.09
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	50.7100 (1b)	2.8000 (2b)	141.9880 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		141.9880 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	141.9880 (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

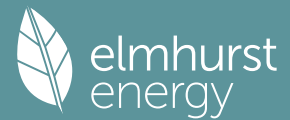
Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Windows			9.0500	1.1450	10.3626		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			50.7100	0.1000	5.0710	110.0000	5578.1000 (28b)
External Wall 1	29.0500	9.0500	20.0000	0.1500	3.0000	70.0000	1399.9999 (29a)
Corridor wall	23.1700	2.4200	20.7500	0.1900	3.9425	70.0000	1452.5000 (29a)
Total net area of external elements Aum(A, m ²)			102.9300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	24.7961		(33)
Main dwelling							
Party Wall 1			30.8600	0.0000	0.0000	70.0000	2160.2000 (32)
Party Ceiling 1			50.7100			30.0000	1521.3000 (32b)
Internal Wall 1			76.4400			9.0000	687.9600 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		12800.0600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							252.4169 (35)
List of Thermal Bridges							

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												
Hot water usage for mixer showers												1.7110 (42)
Hot water usage for baths	51.5710	50.7814	49.6178	47.8279	46.2241	43.9804	42.2058	44.2804	45.3239	47.5461	49.8604	51.5245 (42a)
Hot water usage for other uses	22.3653	22.0277	21.5474	20.8281	20.1799	19.2875	18.6105	19.4384	19.8729	20.7570	21.6763	22.3476 (42b)
Average daily hot water use (litres/day)	32.1526	30.9834	29.8142	28.6450	27.4758	26.3066	26.3066	27.4758	28.6450	29.8142	30.9834	32.1526 (42c)
												97.5120 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	106.0888	103.7925	100.9794	97.3010	93.8798	89.5746	87.1230	91.1946	93.8417	98.1174	102.5201	106.0246 (44)
Distribution loss (46)m = 0.15 x (45)m	156.1811	137.3384	144.2975	127.0994	120.9736	103.5900	96.2734	107.3377	108.8517	126.4341	138.5594	155.7049 (45)
Water storage loss (or HIU loss):	23.4272	20.6008	21.6446	19.0649	18.1460	15.5385	14.4410	16.1007	16.3278	18.9651	20.7839	23.3557 (46)
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	211.4579	187.2659	199.5743	180.5931	176.2504	157.0837	151.5502	162.6145	162.3454	181.7109	192.0530	210.9817 (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	211.4579	187.2659	199.5743	180.5931	176.2504	157.0837	151.5502	162.6145	162.3454	181.7109	192.0530	210.9817 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											2173.4811 (64)
Electric shower(s)												2173 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =											0.0000 (64a)
Heat gains from water heating, kWh/month	96.1517	85.6070	92.2004	85.0555	84.4452	77.2386	76.2324	79.9112	78.9881	86.2608	88.8659	95.9933 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.9046	85.1444	76.9046	79.4681	76.9046	79.4681	76.9046	76.9046	79.4681	76.9046	79.4681	76.9046 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.0778	150.6248	146.7265	138.4275	127.9515	118.1055	111.5278	109.9808	113.8791	122.1781	132.6541	142.5001 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551 (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)	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408 (71)
Water heating gains (Table 5)	129.2361	127.3913	123.9252	118.1326	113.5016	107.2759	102.4629	107.4076	109.7057	115.9419	123.4249	129.0233 (72)
Total internal gains	403.8838	411.8258	396.2216	384.6935	367.0230	353.5148	339.5606	342.9584	351.7183	363.6900	384.2125	397.0933 (73)

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[Jan]	Area m2				Solar flux Table 6a W/m2	Specific data or Table 6b		g	Specific data or Table 6c	FF	Access factor Table 6d		Gains W
Northeast	8.0200				11.2829	0.3500			0.7000		0.7700		15.3637 (75)
Southeast	1.0300				36.7938	0.3500			0.7000		0.7700		6.4345 (77)
Solar gains	21.7982	42.2335	71.3408	111.1150	145.1960	153.2680	143.9706	117.1500	84.8945	50.3318	27.0385	18.0533	(83)
Total gains	425.6820	454.0593	467.5624	495.8085	512.2190	506.7828	483.5312	460.1083	436.6128	414.0218	411.2510	415.1466	(84)
7. Mean internal temperature (heating season)													
Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	85.6265	85.9083	86.1919	87.6384	87.9335	89.4396	89.4396	89.7470	88.8310	87.9335	87.3452	86.7647	
alpha	6.7084	6.7272	6.7461	6.8426	6.8622	6.9626	6.9626	6.9831	6.9221	6.8622	6.8230	6.7843	
util living area	0.9850	0.9746	0.9513	0.8681	0.7085	0.5000	0.3616	0.3957	0.6225	0.8795	0.9662	0.9869	(86)
MIT	20.3883	20.5003	20.6575	20.8645	20.9705	20.9976	20.9998	20.9996	20.9902	20.8737	20.6229	20.3767	(87)
Th 2	20.2370	20.2393	20.2417	20.2533	20.2556	20.2673	20.2673	20.2696	20.2626	20.2556	20.2510	20.2463	(88)
util rest of house	0.9809	0.9677	0.9384	0.8382	0.6598	0.4437	0.3015	0.3331	0.5602	0.8458	0.9561	0.9833	(89)
MIT 2	19.5377	19.6794	19.8744	20.1239	20.2327	20.2660	20.2672	20.2695	20.2566	20.1399	19.8427	19.5308	(90)
Living area fraction	fLA = Living area / (4) =												0.5620 (91)
MIT	20.0157	20.1407	20.3145	20.5401	20.6474	20.6772	20.6789	20.6798	20.6689	20.5523	20.2812	20.0062	(92)
Temperature adjustment													0.0000
adjusted MIT	20.0157	20.1407	20.3145	20.5401	20.6474	20.6772	20.6789	20.6798	20.6689	20.5523	20.2812	20.0062	(93)
8. Space heating requirement													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9794	0.9667	0.9397	0.8503	0.6859	0.4753	0.3352	0.3683	0.5949	0.8601	0.9565	0.9819	(94)
Useful gains	416.9329	438.9317	439.3868	421.5761	351.3314	240.8629	162.0998	169.4564	259.7456	356.0859	393.3771	407.6211	(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	652.5828	630.7827	569.8734	472.2513	361.7856	241.5921	162.1533	169.5569	262.9278	402.4181	536.5681	647.7302	(97)
Space heating kWh	175.3235	128.9239	97.0820	36.4861	7.7779	0.0000	0.0000	0.0000	0.0000	34.4711	103.0975	178.6412	(98a)
Space heating requirement - total per year (kWh/year)													761.8033
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	175.3235	128.9239	97.0820	36.4861	7.7779	0.0000	0.0000	0.0000	0.0000	34.4711	103.0975	178.6412	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)													761.8033
Space heating per m2	(98c) / (4) =												15.0227 (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													
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50	175.3235	128.9239	97.0820	36.4861	7.7779	0.0000	0.0000	0.0000	0.0000	34.4711	103.0975	178.6412	(98)
307a	262.9853	193.3858	145.6230	54.7292	11.6669	0.0000	0.0000	0.0000	0.0000	51.7067	154.6462	267.9617	
Space heating requirement	262.9853	193.3858	145.6230	54.7292	11.6669	0.0000	0.0000	0.0000	0.0000	51.7067	154.6462	267.9617	(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													
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50	211.4579	187.2659	199.5743	180.5931	176.2504	157.0837	151.5502	162.6145	162.3454	181.7109	192.0530	210.9817	(64)
310a	317.1868	280.8988	299.3615	270.8896	264.3756	235.6255	227.3254	243.9218	243.5181	272.5664	288.0795	316.4725	
Water heating fuel	317.1868	280.8988	299.3615	270.8896	264.3756	235.6255	227.3254	243.9218	243.5181	272.5664	288.0795	316.4725	(310)
Cooling System Energy Efficiency Ratio	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)
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	(315)
Pumps and Fa	11.5859	10.4647	11.5859	11.2122	11.5859	11.2122	11.5859	11.5859	11.2122	11.5859	11.2122	11.5859	(331)
Lighting	16.3494	13.1161	11.8096	8.6522	6.6832	5.4603	6.0967	7.9247	10.2934	13.5055	15.2544	16.8038	(332)
Electricity generated by PVs (Appendix M) (negative quantity)													
(333a)m	-2.6437	-4.7037	-8.7013	-12.2838	-15.3952	-15.2011	-14.8834	-12.7885	-9.5891	-6.1439	-3.1777	-2.1574	(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													1142.7049 (307)
Space heating fuel - secondary													0.0000 (309)
Water heating fuel - community heating													3260.2216 (310)
Efficiency of water heater													0.0000 (311)
Electricity used for heat distribution													11.4270 (313)
Space cooling fuel													0.0000 (321)
Electricity for pumps and fans:													

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(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)			
mechanical ventilation fans (SFP = 0.7875)			136.4150 (330a)
Total electricity for the above, kWh/year			136.4150 (331)
Electricity for lighting (calculated in Appendix L)			131.9492 (332)
Energy saving/generation technologies (Appendices M ,N and Q)			
PV generation			-107.6687 (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			4563.6220 (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	1897.8132	0.1571	77.3778 (367)
Electrical energy for heat distribution (space & water)	11.4270	0.0000	6.3829 (372)
Overall CO2 factor for heat network			0.0639 (386)
Total CO2 associated with community systems			281.5077 (373)
Space and water heating			281.5077 (376)
Pumps, fans and electric keep-hot	136.4150	0.1387	18.9224 (378)
Energy for lighting	131.9492	0.1443	19.0443 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.6687	0.1305	-14.0490
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.0490 (380)
Total CO2, kg/year			305.4255 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.0200 (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	1897.8132	1.5816	779.0102 (467)
Electrical energy for heat distribution (space & water)	11.4270	0.0000	67.6387 (472)
Overall CO2 factor for heat network			0.6775 (486)
Total CO2 associated with community systems			2983.0996 (473)
Space and water heating			2983.0996 (476)
Pumps, fans and electric keep-hot	136.4150	1.5128	206.3686 (478)
Energy for lighting	131.9492	1.5338	202.3881 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.6687	1.4820	-159.5655
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-159.5655 (480)
Total Primary energy kWh/year			3232.2908 (483)
Dwelling Primary energy Rate (DPER)			63.7400 (484)

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

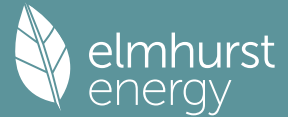
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	50.7100 (1b)	2.8000 (2b)	141.9880 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	141.9880 (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)
Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1409 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3909 (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) = 0.3029 (21)

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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													
Effective ac	0.3862	0.3786	0.3711	0.3332	0.3256	0.2878	0.2878	0.2802	0.3029	0.3256	0.3408	0.3559	(22b)
	0.5746	0.5717	0.5688	0.5555	0.5530	0.5414	0.5414	0.5393	0.5459	0.5530	0.5581	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	
Main dwelling								
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			9.0500	1.1450	10.3626			(27)
Heatloss Floor 1			50.7100	0.1300	6.5923			(28b)
External Wall 1	29.0500	9.0500	20.0000	0.1800	3.6000			(29a)
Corridor wall	23.1700	2.4200	20.7500	0.1800	3.7350			(29a)
Total net area of external elements Aum(A, m2)			102.9300					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	26.7099		(33)
Main dwelling								
Party Wall 1			30.8600	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							252.4169	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	5.5500	0.0500	0.2775	
E3 Sill	2.0600	0.0500	0.1030	
E4 Jamb	18.6000	0.0500	0.9300	
E7 Party floor between dwellings (in blocks of flats)	6.9800	0.0700	0.4886	
E7 Party floor between dwellings (in blocks of flats)	8.2800	0.0700	0.5796	
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680	
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520	
E18 Party wall between dwellings	5.6000	0.0600	0.3360	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E20 Exposed floor (normal)	6.9800	0.3200	2.2336	
E21 Exposed floor (inverted)	8.2800	0.3200	2.6496	
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	11.0200	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	11.0200	0.1600	1.7632	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				9.8331 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	36.5430 (37)

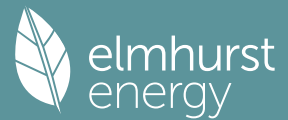
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	26.9226	26.7869	26.6539	26.0291	25.9122	25.3681	25.3681	25.2673	25.5777	25.9122	26.1487	26.3959	(38)
Heat transfer coeff	63.4656	63.3299	63.1969	62.5721	62.4552	61.9111	61.9111	61.8103	62.1207	62.4552	62.6917	62.9389	(39)
Average = Sum(39)m / 12 =												62.5716	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.2515	1.2489	1.2462	1.2339	1.2316	1.2209	1.2209	1.2189	1.2250	1.2316	1.2363	1.2412	(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													1.7110 (42)
Hot water usage for mixer showers													
52.9077	52.1126	50.9540	48.7372	47.1012	45.2768	44.2398	45.3897	46.6501	48.6090	50.8734	52.7050	52.7050	(42a)
Hot water usage for baths													
22.8753	22.5355	22.0571	21.1750	20.5145	19.7821	19.3865	19.8616	20.3788	21.1625	22.0628	22.7979	22.7979	(42b)
Hot water usage for other uses													
32.1526	30.9834	29.8142	28.6450	27.4758	26.3066	26.3066	27.4758	28.6450	29.8142	30.9834	32.1526	32.1526	(42c)
Average daily hot water use (litres/day)												99.2177	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	107.9355	105.6315	102.8253	98.5572	95.0915	91.3656	89.9330	92.7271	95.6740	99.5857	103.9195	107.6554	(44)
Energy conte	170.9434	150.4178	158.0386	134.9198	128.0115	112.3446	108.7661	114.8155	117.9755	135.1368	148.0524	168.5624	(45)
Energy content (annual)										Total =	Sum(45)m =	1647.9845	
Distribution loss (46)m = 0.15 x (45)m													
25.6415	22.5627	23.7058	20.2380	19.2017	16.8517	16.3149	17.2223	17.6963	20.2705	22.2079	25.2844	25.2844	(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	25.9803	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	25.9803	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	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													
220.1861	194.8951	207.2813	182.5740	177.2541	159.9988	158.0088	164.0581	165.6297	184.3795	195.7066	217.8051	217.8051	(62)
WWHRS	-24.1872	-21.3913	-22.3998	-18.5479	-17.2860	-14.7917	-13.8649	-14.7439	-15.3041	-18.0418	-20.4392	-23.7393	(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	195.9989	173.5037	184.8815	164.0261	159.9682	145.2071	144.1439	149.3142	150.3257	166.3376	175.2674	194.0658	(64)
12Total per year (kWh/year)										Total per year (kWh/year) =	Sum(64)m =	2003.0401	(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	96.2328	85.5957	91.9420	82.9842	81.9580	75.4779	75.5589	77.5703	77.3502	84.3271	87.3508	95.4411	(65)

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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	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.9046	85.1444	76.9046	79.4681	76.9046	79.4681	76.9046	76.9046	79.4681	76.9046	79.4681	76.9046 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.0778	150.6248	146.7265	138.4275	127.9515	118.1055	111.5278	109.9808	113.8791	122.1781	132.6541	142.5001 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408 (71)
Water heating gains (Table 5)	129.3452	127.3746	123.5779	115.2558	110.1585	104.8305	101.5576	104.2611	107.4309	113.3429	121.3205	128.2811 (72)
Total internal gains	406.9929	414.8091	398.8743	384.8167	366.6799	351.0694	338.6554	339.8119	349.4434	364.0910	385.1081	399.3511 (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	8.0200		11.2829		0.6300		0.7000		0.7700		27.6547 (75)	
Southeast	1.0300		36.7938		0.6300		0.7000		0.7700		11.5820 (77)	
Solar gains	39.2367	76.0203	128.4134	200.0069	261.3529	275.8824	259.1471	210.8700	152.8100	90.5973	48.6693	32.4960 (83)
Total gains	446.2296	490.8294	527.2877	584.8237	628.0328	626.9519	597.8024	550.6819	502.2534	454.6883	433.7774	431.8471 (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	56.0236	56.1437	56.2618	56.8236	56.9299	57.4303	57.4303	57.5239	57.2365	56.9299	56.7152	56.4924
alpha	4.7349	4.7429	4.7508	4.7882	4.7953	4.8287	4.8287	4.8349	4.8158	4.7953	4.7810	4.7662
util living area	0.9903	0.9836	0.9679	0.9148	0.7936	0.6048	0.4501	0.5059	0.7566	0.9379	0.9818	0.9917 (86)
MIT	19.7269	19.8935	20.1629	20.5410	20.8296	20.9646	20.9930	20.9881	20.8993	20.5388	20.0797	19.7016 (87)
Th 2	19.8790	19.8811	19.8832	19.8930	19.8948	19.9033	19.9033	19.9049	19.9000	19.8948	19.8911	19.8872 (88)
util rest of house	0.9872	0.9783	0.9573	0.8869	0.7336	0.5125	0.3408	0.3908	0.6695	0.9113	0.9750	0.9890 (89)
MIT 2	18.4298	18.6419	18.9809	19.4444	19.7592	19.8846	19.9013	19.9011	19.8362	19.4540	18.8865	18.4035 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.1588	19.3453	19.6452	20.0607	20.3608	20.4916	20.5149	20.5120	20.4337	20.0637	19.5571	19.1330 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.1588	19.3453	19.6452	20.0607	20.3608	20.4916	20.5149	20.5120	20.4337	20.0637	19.5571	19.1330 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9845	0.9751	0.9545	0.8917	0.7605	0.5632	0.4023	0.4556	0.7143	0.9161	0.9723	0.9866 (94)
Useful gains	439.3348	478.6178	503.3092	521.4845	477.6007	353.1027	240.5217	250.8706	358.7659	416.5192	421.7806	426.0480 (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	943.0228	914.8216	830.7342	698.3477	540.9116	364.7550	242.3742	254.1633	393.4531	591.0566	780.9571	939.8685 (97)
Space heating kWh	374.7439	293.1290	243.6042	127.3415	47.1033	0.0000	0.0000	0.0000	0.0000	129.8559	258.6071	382.2825 (98a)
Space heating requirement - total per year (kWh/year)	1856.6674											
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	374.7439	293.1290	243.6042	127.3415	47.1033	0.0000	0.0000	0.0000	0.0000	129.8559	258.6071	382.2825 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1856.6674											
Space heating per m ²	(98c) / (4) = 36.6134 (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	374.7439	293.1290	243.6042	127.3415	47.1033	0.0000	0.0000	0.0000	0.0000	129.8559	258.6071	382.2825 (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)	406.0063	317.5828	263.9266	137.9648	51.0328	0.0000	0.0000	0.0000	0.0000	140.6889	280.1811	414.1739 (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	195.9989	173.5037	184.8815	164.0261	159.9682	145.2071	144.1439	149.3142	150.3257	166.3376	175.2674	194.0658 (64)

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Efficiency of water heater (217)m	85.4890	85.2261	84.6793	83.4986	81.6832	79.8000	79.8000	79.8000	79.8000	83.5107	84.9306	79.8000 (216)
Fuel for water heating, kWh/month	229.2681	203.5806	218.3314	196.4418	195.8398	181.9638	180.6315	187.1106	188.3780	199.1812	206.3654	85.5512 (217)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	226.8418 (219)
Pumps and Fa (233a)m	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	0.0000 (221)
Lighting (234a)m	15.9793	12.8192	11.5422	8.4563	6.5319	5.3366	5.9586	7.7453	10.0603	13.1997	14.9090	0.0000 (231)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-4.2462	-6.6661	-10.6565	-13.3712	-15.7059	-15.1488	-14.9703	-13.4772	-11.1073	-8.1924	-4.9041	16.4234 (232)
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	-3.5966 (233a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity) (235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation) (235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity generated by PVs (Appendix M) (negative quantity) (233b)m	-0.7038	-1.5524	-3.2258	-5.0603	-6.9086	-7.0194	-6.9327	-5.7648	-4.0942	-2.2832	-0.9591	0.0000 (235c)
Electricity generated by wind turbines (Appendix M) (negative quantity) (234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.5511 (233b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity) (235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation) (235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Annual totals kWh/year												2413.9338 (219)
Space heating fuel - main system 1												0.0000 (221)
Space heating fuel - main system 2												2011.5573 (211)
Space heating fuel - secondary												0.0000 (213)
Efficiency of water heater												0.0000 (215)
Water heating fuel used												79.8000
Space cooling fuel												2413.9338 (219)
Electricity for pumps and fans:												0.0000 (221)
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												128.9618 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-167.0979 (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												4473.3550 (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	2011.5573	0.2100	422.4270	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2413.9338	0.2100	506.9261	(264)
Space and water heating			929.3531	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	128.9618	0.1443	18.6132	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-122.0426	0.1324	-16.1594	
PV Unit electricity exported	-45.0553	0.1247	-5.6169	
Total			-21.7764	(269)
Total CO2, kg/year			938.1192	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			18.5000	(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	2011.5573	1.1300	2273.0598	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2413.9338	1.1300	2727.7452	(278)
Space and water heating			5000.8050	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	128.9618	1.5338	197.8059	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-122.0426	1.4892	-181.7498	
PV Unit electricity exported	-45.0553	0.4576	-20.6153	
Total			-202.3651	(283)
Total Primary energy kWh/year			5126.3466	(286)
Target Primary Energy Rate (TPER)			101.0900	(287)

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Plot Reference	B 104	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	81 B	DER	6.02
Environmental	96 A	TER	18.50
CO ₂ Emissions (t/year)	0.27	% DER < TER	67.46
Compliance Check	See BREL	DFEE	39.72
% DPER < TPER	36.95	TFEE	45.73
		% DFEE < TFEE	13.15
		TPER	101.09
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	50.7100	2.8000	141.9880
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		
Dwelling volume			

2. Ventilation rate

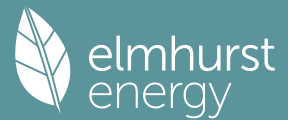
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1409 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2909 (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) = 0.2254 (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	0.2874	0.2818	0.2761	0.2480	0.2423	0.2141	0.2141	0.2085	0.2254	0.2423	0.2536	0.2649 (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	0.5413	0.5397	0.5381	0.5307	0.5294	0.5229	0.5229	0.5217	0.5254	0.5294	0.5322	0.5351 (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							
Windows			9.0500	1.1450	10.3626		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			50.7100	0.1000	5.0710	110.0000	5578.1000 (28b)
External Wall 1	29.0500	9.0500	20.0000	0.1500	3.0000	70.0000	1399.9999 (29a)
Corridor wall	23.1700	2.4200	20.7500	0.1900	3.9425	70.0000	1452.5000 (29a)
Total net area of external elements Aum(A, m ²)			102.9300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 24.7961		(33)
Main dwelling							
Party Wall 1			30.8600	0.0000	0.0000	70.0000	2160.2000 (32)
Party Ceiling 1			50.7100			30.0000	1521.3000 (32b)
Internal Wall 1			76.4400			9.0000	687.9600 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 12800.0600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							252.4169 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					5.5500	0.0500	0.2775
E3 Sill					2.0600	0.0400	0.0824

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E4 Jamb	18.6000	0.0400	0.7440
E7 Party floor between dwellings (in blocks of flats)	6.9800	0.0500	0.3490
E7 Party floor between dwellings (in blocks of flats)	8.2800	0.0390	0.3229
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.1000	0.3400
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0500	0.1700
E16 Corner (normal)	2.8000	0.0500	0.1400
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	5.6000	0.0500	0.2800
E18 Party wall between dwellings	2.8000	0.0390	0.1092
E20 Exposed floor (normal)	6.9800	0.1000	0.6980
E21 Exposed floor (inverted)	8.2800	0.1000	0.8280
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	11.0200	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	11.0200	0.0800	0.8816
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			5.3318 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	30.1279 (37)

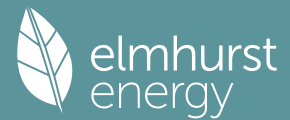
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	25.3632	25.2880	25.2144	24.8684	24.8037	24.5024	24.5024	24.4466	24.6184	24.8037	24.9346	25.0715 (38)
Average = Sum(39)m / 12 =	55.4911	55.4160	55.3423	54.9963	54.9316	54.6303	54.6303	54.5745	54.7463	54.9316	55.0626	55.1994 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0943	1.0928	1.0913	1.0845	1.0832	1.0773	1.0773	1.0762	1.0796	1.0832	1.0858	1.0885 (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												1.7110 (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	22.3653	22.0277	21.5474	20.8281	20.1799	19.2875	18.6105	19.4384	19.8729	20.7570	21.6763	22.3476 (42b)
Hot water usage for other uses	32.1526	30.9834	29.8142	28.6450	27.4758	26.3066	26.3066	27.4758	28.6450	29.8142	30.9834	32.1526 (42c)
Average daily hot water use (litres/day)												49.9675 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	54.5179	53.0111	51.3616	49.4731	47.6557	45.5942	44.9172	46.9142	48.5179	50.5712	52.6597	54.5001 (44)
Energy content (annual)	80.2597	70.1444	73.3946	64.6243	61.4092	52.7281	49.6348	55.2189	56.2783	65.1661	71.1714	80.0374 (45)
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 (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	68.2208	59.6227	62.3854	54.9306	52.1978	44.8189	42.1896	46.9360	47.8365	55.3912	60.4956	68.0318 (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)
FV 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	68.2208	59.6227	62.3854	54.9306	52.1978	44.8189	42.1896	46.9360	47.8365	55.3912	60.4956	68.0318 (64)
12Total per year (kWh/year)												663 (64)
Electric shower(s)	42.3702	37.7522	41.2240	39.3395	40.0777	38.2303	39.5046	40.0777	39.3395	41.2240	40.4488	42.3702 (64a)
Heat gains from water heating, kWh/month	27.6477	24.3437	25.9024	23.5675	23.0689	20.7623	20.4235	21.7534	21.7940	24.1538	25.2361	27.6005 (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	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.9046	85.1444	76.9046	79.4681	76.9046	79.4681	76.9046	76.9046	79.4681	76.9046	79.4681	76.9046 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.0778	150.6248	146.7265	138.4275	127.9515	118.1055	111.5278	109.9808	113.8791	122.1781	132.6541	142.5001 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551 (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)	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408 (71)
Water heating gains (Table 5)	37.1609	36.2258	34.8150	32.7327	31.0066	28.8365	27.4510	29.2385	30.2695	32.4648	35.0502	37.0975 (72)
Total internal gains	311.8087	320.6603	307.1114	299.2936	284.5280	275.0755	264.5487	264.7893	272.2820	280.2129	295.8377	305.1675 (73)

6. Solar gains												
[Jan]	Area	Solar flux	g	FF	Access	Gains						
	m2	Table 6a	Specific data	Specific data	factor	W						
		W/m2	or Table 6b	or Table 6c	Table 6d							
Northeast	8.0200	11.2829	0.3500	0.7000	0.7700	15.3637 (75)						
Southeast	1.0300	36.7938	0.3500	0.7000	0.7700	6.4345 (77)						
Solar gains	21.7982	42.2335	71.3408	111.1150	145.1960	153.2680	143.9706	117.1500	84.8945	50.3318	27.0385	18.0533 (83)

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Total gains 333.6069 362.8938 378.4522 410.4086 429.7240 428.3435 408.5193 381.9393 357.1765 330.5447 322.8762 323.2208 (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	64.0746	64.1615	64.2469	64.6511	64.7273	65.0843	65.0843	65.1508	64.9463	64.7273	64.5733	64.4132
alpha	5.2716	5.2774	5.2831	5.3101	5.3152	5.3390	5.3390	5.3434	5.3298	5.3152	5.3049	5.2942
util living area	0.9971	0.9948	0.9899	0.9691	0.9047	0.7462	0.5736	0.6316	0.8646	0.9763	0.9940	0.9975 (86)
MIT	19.7410	19.8740	20.0929	20.4316	20.7407	20.9362	20.9872	20.9791	20.8535	20.4721	20.0567	19.7167 (87)
Th 2	20.0055	20.0067	20.0079	20.0135	20.0145	20.0194	20.0194	20.0203	20.0175	20.0145	20.0124	20.0102 (88)
util rest of house	0.9961	0.9931	0.9863	0.9569	0.8661	0.6583	0.4534	0.5098	0.7982	0.9645	0.9917	0.9967 (89)
MIT 2	18.8628	18.9961	19.2142	19.5496	19.8350	19.9895	20.0161	20.0142	19.9350	19.5933	19.1829	18.8422 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.3564	19.4895	19.7080	20.0453	20.3440	20.5215	20.5618	20.5565	20.4512	20.0872	19.6740	19.3337 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.3564	19.4895	19.7080	20.0453	20.3440	20.5215	20.5618	20.5565	20.4512	20.0872	19.6740	19.3337 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9952	0.9919	0.9849	0.9573	0.8805	0.7055	0.5213	0.5784	0.8305	0.9655	0.9906	0.9960 (94)
Useful gains	332.0168	359.9568	372.7253	392.9001	378.3653	302.2174	212.9494	220.9307	296.6302	319.1516	319.8397	321.9180 (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	835.4944	808.4902	730.9638	612.9515	474.8315	323.4957	216.4368	226.8394	347.7058	521.1482	692.3573	835.3710 (97)
Space heating kWh	374.5873	301.4144	266.5295	158.4370	71.7708	0.0000	0.0000	0.0000	0.0000	150.2855	268.2126	382.0091 (98a)
Space heating requirement - total per year (kWh/year)	1973.2463											
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	374.5873	301.4144	266.5295	158.4370	71.7708	0.0000	0.0000	0.0000	0.0000	150.2855	268.2126	382.0091 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1973.2463											
Space heating per m2	(98c) / (4) = 38.9124 (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	513.5247	404.2641	414.7661	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8049	0.8842	0.8485	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	413.3257	357.4510	351.9443	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	472.1842	450.6560	420.9659	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	42.3782	69.3446	51.3521	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
Intermittency factor (Table 10b)												1.0000 (105)
	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	10.5945	17.3361	12.8380	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	40.7687 (107)											
Energy for space heating	38.9124 (99)											
Energy for space cooling	0.8040 (108)											
Total	39.7163 (109)											
Fabric Energy Efficiency (DFEE)	39.7 (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	50.7100 (1b)	x 2.8000 (2b)	= 141.9880 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 141.9880 (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)

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Number of passive vents
Number of flueless gas fires

0 * 10 = 0.0000 (7b)
0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =
Pressure test
Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Air changes per hour
20.0000 / (5) = 0.1409 (8)
Yes
Blower Door
5.0000 (17)
0.3909 (18)
3 (19)

Shelter factor
Infiltration rate adjusted to include shelter factor (20) = 1 - [0.075 x (19)] = 0.7750 (20)
(21) = (18) x (20) = 0.3029 (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	0.3862	0.3786	0.3711	0.3332	0.3256	0.2878	0.2878	0.2802	0.3029	0.3256	0.3408	0.3559 (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	0.5746	0.5717	0.5688	0.5555	0.5530	0.5414	0.5414	0.5393	0.5459	0.5530	0.5581	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
Main dwelling							
TER Opaque door			2.4200	1.0000	2.4200		(26)
TER Opening Type			9.0500	1.1450	10.3626		(27)
Heatloss Floor 1			50.7100	0.1300	6.5923		(28b)
External Wall 1	29.0500	9.0500	20.0000	0.1800	3.6000		(29a)
Corridor wall	23.1700	2.4200	20.7500	0.1800	3.7350		(29a)
Total net area of external elements Aum(A, m2)			102.9300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.7099		(33)
Main dwelling							
Party Wall 1			30.8600	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							252.4169 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.5500	0.0500	0.2775
E3 Sill	2.0600	0.0500	0.1030
E4 Jamb	18.6000	0.0500	0.9300
E7 Party floor between dwellings (in blocks of flats)	6.9800	0.0700	0.4886
E7 Party floor between dwellings (in blocks of flats)	8.2800	0.0700	0.5796
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680
E16 Corner (normal)	2.8000	0.0900	0.2520
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	6.9800	0.3200	2.2336
E21 Exposed floor (inverted)	8.2800	0.3200	2.6496
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	11.0200	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	11.0200	0.1600	1.7632

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 9.8331 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 36.5430 (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
	26.9226	26.7869	26.6539	26.0291	25.9122	25.3681	25.3681	25.2673	25.5777	25.9122	26.1487	26.3959 (38)
Heat transfer coeff	63.4656	63.3299	63.1969	62.5721	62.4552	61.9111	61.9111	61.8103	62.1207	62.4552	62.6917	62.9389 (39)
Average = Sum(39)m / 12 =												62.5716

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.2515	1.2489	1.2462	1.2339	1.2316	1.2209	1.2209	1.2189	1.2250	1.2316	1.2363	1.2412 (40)
HLP (average)												1.2339
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7110 (42)
Hot water usage for mixer showers												0.0000 (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	
Hot water usage for baths												22.7979 (42b)
22.8753	22.5355	22.0571	21.1750	20.5145	19.7821	19.3865	19.8616	20.3788	21.1625	22.0628	22.7979	
Hot water usage for other uses												32.1526 (42c)
32.1526	30.9834	29.8142	28.6450	27.4758	26.3066	26.3066	27.4758	28.6450	29.8142	30.9834	32.1526	
Average daily hot water use (litres/day)												50.4386 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	55.0278	53.5189	51.8713	49.8200	47.9903	46.0887	45.6931	47.3374	49.0238	50.9767	53.0462	54.9505 (44)
Energy conte	87.1506	76.2102	79.7243	68.2011	64.6042	56.6715	55.2619	58.6136	60.4513	69.1749	75.5740	86.0392 (45)
Energy content (annual)										Total = Sum(45)m =		837.6766
Distribution loss (46)m = 0.15 x (45)m												0.0000 (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	
Water storage loss (or HIU loss):												0.0000 (56)
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	
If cylinder contains dedicated solar storage												0.0000 (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	
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												
74.0780	64.7787	67.7656	57.9709	54.9136	48.1708	46.9726	49.8215	51.3836	58.7987	64.2379	73.1333 (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)

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Output from w/h	74.0780	64.7787	67.7656	57.9709	54.9136	48.1708	46.9726	49.8215	51.3836	58.7987	64.2379	73.1333 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											712.0251 (64)
Electric shower(s)	42.3702	37.7522	41.2240	39.3395	40.0777	38.2303	39.5046	40.0777	39.3395	41.2240	40.4488	42.3702 (64a)
Heat gains from water heating, kWh/month	29.1121	25.6327	27.2474	24.3276	23.7478	21.6003	21.6193	22.4748	22.6808	25.0057	26.1717	481.9588 (64a)

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	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.9046	85.1444	76.9046	79.4681	76.9046	79.4681	76.9046	76.9046	79.4681	76.9046	79.4681	76.9046 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.0778	150.6248	146.7265	138.4275	127.9515	118.1055	111.5278	109.9808	113.8791	122.1781	132.6541	142.5001 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551 (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)	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408 (71)
Water heating gains (Table 5)	39.1291	38.1439	36.6228	33.7884	31.9191	30.0004	29.0582	30.2081	31.5011	33.6098	36.3495	38.8117 (72)
Total internal gains	313.7769	322.5784	308.9193	300.3493	285.4405	276.2393	266.1559	265.7589	273.5136	281.3578	297.1371	306.8817 (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					8.0200	11.2829	0.6300	0.7000	0.7700			27.6547 (75)
Southeast					1.0300	36.7938	0.6300	0.7000	0.7700			11.5820 (77)
Solar gains	39.2367	76.0203	128.4134	200.0069	261.3529	275.8824	259.1471	210.8700	152.8100	90.5973	48.6693	32.4960 (83)
Total gains	353.0135	398.5988	437.3327	500.3562	546.7934	552.1217	525.3030	476.6288	426.3237	371.9551	345.8064	339.3777 (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	56.0236	56.1437	56.2618	56.8236	56.9299	57.4303	57.4303	57.5239	57.2365	56.9299	56.7152	56.4924
alpha	4.7349	4.7429	4.7508	4.7882	4.7953	4.8287	4.8287	4.8349	4.8158	4.7953	4.7810	4.7662
util living area	0.9963	0.9929	0.9842	0.9487	0.8514	0.6699	0.5079	0.5757	0.8303	0.9693	0.9927	0.9970 (86)
MIT	19.5411	19.7142	19.9980	20.4163	20.7617	20.9454	20.9883	20.9794	20.8455	20.4025	19.9090	19.5160 (87)
Th 2	19.8790	19.8811	19.8832	19.8930	19.8948	19.9033	19.9033	19.9049	19.9000	19.8948	19.8911	19.8872 (88)
util rest of house	0.9951	0.9904	0.9785	0.9294	0.7990	0.5741	0.3868	0.4490	0.7519	0.9540	0.9897	0.9959 (89)
MIT 2	18.5658	18.7394	19.0216	19.4325	19.7399	19.8798	19.9006	19.8994	19.8177	19.4283	18.9416	18.5471 (90)
Living area fraction	FLA = Living area / (4) =											0.5620 (91)
MIT	19.1140	19.2872	19.5703	19.9854	20.3142	20.4787	20.5119	20.5064	20.3953	19.9758	19.4853	19.0916 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1140	19.2872	19.5703	19.9854	20.3142	20.4787	20.5119	20.5064	20.3953	19.9758	19.4853	19.0916 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9939	0.9888	0.9765	0.9313	0.8207	0.6263	0.4551	0.5204	0.7905	0.9554	0.9883	0.9950 (94)
Ext temp.	350.8726	394.1163	427.0350	465.9854	448.7378	345.7718	239.0527	248.0343	336.9984	355.3618	341.7568	337.6639 (95)
Heat loss rate W	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)
Space heating kWh	940.1766	911.1429	826.0050	693.6385	538.0000	363.9560	242.1921	253.8193	391.0709	585.5689	776.4576	937.2638 (97)
Space heating requirement - total per year (kWh/year)	438.4422	347.4419	296.8337	163.9102	66.4110	0.0000	0.0000	0.0000	0.0000	171.2740	312.9845	446.1023 (98a)
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)
Space heating contribution - total per year (kWh/year)	438.4422	347.4419	296.8337	163.9102	66.4110	0.0000	0.0000	0.0000	0.0000	171.2740	312.9845	446.1023 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2243.3998
Space heating per m2												(98c) / (4) = 44.2398 (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	581.9644	458.1422	469.7586	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8515	0.9131	0.8755	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	495.5470	418.3499	411.2574	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	616.6636	586.8851	531.4784	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	87.2040	125.3902	89.4444	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	FC = cooled area / (4) =											1.0000 (105)
Intermittency factor (Table 10b)												

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Space cooling kWh	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 requirement	0.0000	0.0000	0.0000	0.0000	0.0000	21.8010	31.3476	22.3611	0.0000	0.0000	0.0000	0.0000 (107)
Energy for space heating												75.5096 (107)
Energy for space cooling												44.2398 (99)
Total												1.4890 (108)
Fabric Energy Efficiency (TFEE)												45.7288 (109)
												45.7 (109)