

Summary for Input Data

Plot Reference	A 116		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	82 B	DER	5.89	TER	17.02
Environmental	96 A	% DER < TER			65.39
CO ₂ Emissions (t/year)	0.27	DFEE	37.43	TFEE	41.87
Compliance Check	See BREL	% DFEE < TFEE			10.62
% DPER < TPER	31.89	DPER	62.40	TPER	91.61

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

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

Orientation	Northeast
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	251.61 kJ/m ² K
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:	20.72 m	50.71 m ²	2.80 m

8.0 Living Area	25.44 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	17.92	8.15	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	40.10	37.68	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	22.19	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	99.82

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

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	North East	2.42	
Window	Window	External Wall 1	South West	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	3.04	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	14.32	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.36	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	2.80	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	6.40	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	14.32	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	7.93	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	7.93	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

Summary for Input Data

22.0 Pressure Testing

Designed AP₅₀

Test Method

Yes

3.00

Blower Door

m³/(h.m²) @ 50 Pa

22.0 Lighting

No Fixed Lighting

No

Name
Lighting 1

Efficacy
75.00

Power
15.00

Capacity
1125.00

Count
5

24.0 Main Heating 1

None

25.0 Main Heating 2

None

26.0 Heat Networks

Space Community Heating

Distribution Loss

Distribution Loss Value

SAP Code

Space and Water Combined

Calculated

1.50

2306

	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

None

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

Community Heating

901

No

No

No

No

No

Yes

From header tank

1

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

Loss

Internal Store

Measured Loss

180.00

1.20

L

kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Diverter

Battery Capacity [kWh]

Multiple Dwellings – Not Connected

No

Yes

No

0.00

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		

Summary for Input Data



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 < TFEE			10.62
% DPER < TPER	31.89		DPER	62.40	TPER	91.61
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							
Door			2.4200	1.0000	2.4200		(26)
Window			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			50.7100	0.1000	5.0710	110.0000	5578.1000 (28b)
External Wall 1	17.9200	9.7700	8.1500	0.1500	1.2225	70.0000	570.5000 (29a)
Corridor wall	40.1000	2.4200	37.6800	0.1900	7.1592	70.0000	2637.5999 (29a)
Total net area of external elements A _{um} (A, m ²)			108.7300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.0597		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000	70.0000	1553.3000 (32)
Party Ceiling 1			50.7100			30.0000	1521.3000 (32b)
Internal Wall 1			99.8200			9.0000	898.3800 (32c)
Heat capacity C _m = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		12759.1799 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							251.6107 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



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
E7 Party floor between dwellings (in blocks of flats)	3.0400	0.0500	0.1520
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0390	0.5585
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0500	0.1680
E16 Corner (normal)	2.8000	0.0500	0.1400
E16 Corner (normal)	2.8000	0.0390	0.1092
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E18 Party wall between dwellings	2.8000	0.0390	0.1092
E20 Exposed floor (normal)	6.4000	0.1000	0.6400
E21 Exposed floor (inverted)	14.3200	0.1000	1.4320
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	7.9300	0.0800	0.6344
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.9133 (36)
Point Thermal bridges			0.0000 (36a) =
Total fabric heat loss		(33) + (36) + (36a) =	31.9730 (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	11.3963	11.2601	11.1239	10.4430	10.3069	9.6260	9.6260	9.4898	9.8983	10.3069	10.5792	10.8516	(38)
Average = Sum(39)m / 12 =	43.3693	43.2331	43.0969	42.4160	42.2799	41.5990	41.5990	41.4628	41.8713	42.2799	42.5522	42.8246	(39)
	42.3820												
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.8552	0.8526	0.8499	0.8364	0.8338	0.8203	0.8203	0.8176	0.8257	0.8338	0.8391	0.8445	(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													
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 conte	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)
Energy content (annual)	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)
Distribution loss (46)m = 0.15 x (45)m	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)
Water storage loss (or HIU loss):													
Store volume													110.0000 (47)
b) If manufacturer declared loss factor is not known :													
Hot water storage loss factor from Table 2 (kWh/litre/day)													0.0152 (51)
Volume factor from Table 2a													1.0294 (52)
Temperature factor from Table 2b													0.6000 (53)
Enter (49) or (54) in (55)													1.0327 (55)
Total storage loss	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	(56)
If cylinder contains dedicated solar storage	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	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)													2173.4811 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
													0.0000 (64a)
Heat gains from water heating, kWh/month	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)

5. Internal gains (see Table 5 and 5a)													
Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	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)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	76.0506	84.1988	76.0506	78.5856	76.0506	78.5856	76.0506	76.0506	78.5856	76.0506	78.5856	76.0506	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), 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)
Pumps, fans	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)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (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)
Total internal gains	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)
	403.0298	410.8802	395.3676	383.8110	366.1689	352.6322	338.7065	342.1043	350.8357	362.8359	383.3299	396.2392	(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								

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Southwest	9.7700		36.7938		0.3500		0.7000		0.7700		61.0336 (79)	
Solar gains	61.0336	103.9628	142.2464	176.2502	197.4149	195.9873	188.9527	173.1629	154.0228	114.9010	73.1042	52.2320 (83)
Total gains	464.0633	514.8430	537.6140	560.0612	563.5838	548.6196	527.6592	515.2671	504.8585	477.7369	456.4341	448.4713 (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	81.7218	81.9792	82.2383	83.5584	83.8275	85.1996	85.1996	85.4794	84.6454	83.8275	83.2910	82.7613
alpha	6.4481	6.4653	6.4826	6.5706	6.5885	6.6800	6.6800	6.6986	6.6430	6.5885	6.5527	6.5174
util living area	0.9789	0.9586	0.9220	0.8271	0.6766	0.4833	0.3467	0.3699	0.5662	0.8296	0.9514	0.9822 (86)
MIT	20.4001	20.5498	20.7126	20.8885	20.9735	20.9975	20.9998	20.9997	20.9931	20.9032	20.6495	20.3789 (87)
Th 2	20.2057	20.2080	20.2103	20.2219	20.2242	20.2357	20.2357	20.2381	20.2311	20.2242	20.2195	20.2149 (88)
util rest of house	0.9732	0.9483	0.9036	0.7928	0.6269	0.4265	0.2866	0.3088	0.5057	0.7894	0.9376	0.9774 (89)
MIT 2	19.5266	19.7128	19.9104	20.1182	20.2039	20.2344	20.2357	20.2379	20.2270	20.1390	19.8469	19.5078 (90)
Living area fraction									fLA = Living area / (4) =			0.5017 (91)
MIT	19.9648	20.1327	20.3129	20.5047	20.5900	20.6173	20.6190	20.6201	20.6114	20.5224	20.2496	19.9448 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9648	20.1327	20.3129	20.5047	20.5900	20.6173	20.6190	20.6201	20.6114	20.5224	20.2496	19.9448 (93)
8. Space heating requirement												
Utilisation	0.9712	0.9472	0.9062	0.8058	0.6508	0.4549	0.3167	0.3394	0.5358	0.8056	0.9382	0.9754 (94)
Useful gains	450.6866	487.6406	487.1848	451.3005	366.7683	249.5903	167.1336	174.8929	270.5277	384.8815	428.2370	437.4266 (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	679.3709	658.5564	595.2913	492.2234	375.8690	250.3121	167.1865	174.9763	272.6398	419.5162	559.5430	674.2638 (97)
Space heating kWh	170.1411	114.8554	80.4312	29.4645	6.7709	0.0000	0.0000	0.0000	0.0000	25.7682	94.5404	176.2068 (98a)
Space heating requirement - total per year (kWh/year)												698.1786
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	170.1411	114.8554	80.4312	29.4645	6.7709	0.0000	0.0000	0.0000	0.0000	25.7682	94.5404	176.2068 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												698.1786
Space heating per m2										(98c) / (4) =		13.7681 (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												
	170.1411	114.8554	80.4312	29.4645	6.7709	0.0000	0.0000	0.0000	0.0000	25.7682	94.5404	176.2068 (98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												
307a	255.2117	172.2831	120.6468	44.1967	10.1564	0.0000	0.0000	0.0000	0.0000	38.6524	141.8105	264.3103
Space heating requirement	255.2117	172.2831	120.6468	44.1967	10.1564	0.0000	0.0000	0.0000	0.0000	38.6524	141.8105	264.3103 (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												
	211.4579	187.2659	199.5743	180.5931	176.2504	157.0837	151.5502	162.6145	162.3454	181.7109	192.0530	210.9817 (64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												
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 (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	16.1678	12.9704	11.6785	8.5561	6.6090	5.3996	6.0290	7.8367	10.1790	13.3555	15.0850	16.6172 (332)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333a)m	-2.6436	-4.7034	-8.7006	-12.2828	-15.3940	-15.2000	-14.8822	-12.7873	-9.5881	-6.1434	-3.1775	-2.1573 (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												1047.2679 (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												10.4727 (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)												136.4150 (330a)
Total electricity for the above, kWh/year												136.4150 (331)
Electricity for lighting (calculated in Appendix L)												130.4838 (332)

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Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-107.6600 (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	4466.7283 (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	1856.6765	0.1576	71.1367 (367)
Electrical energy for heat distribution (space & water)	10.4727	0.0000	6.2381 (372)
Overall CO2 factor for heat network			0.0639 (386)
Total CO2 associated with community systems			275.1218 (373)
Space and water heating			275.1218 (376)
Pumps, fans and electric keep-hot	136.4150	0.1387	18.9224 (378)
Energy for lighting	130.4838	0.1443	18.8328 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.6600	0.1305	-14.0479
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.0479 (380)
Total CO2, kg/year			298.8293 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.8900 (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	1856.6765	1.5834	714.7506 (467)
Electrical energy for heat distribution (space & water)	10.4727	0.0000	66.1479 (472)
Overall CO2 factor for heat network			0.6773 (486)
Total CO2 associated with community systems			2917.3492 (473)
Space and water heating			2917.3492 (476)
Pumps, fans and electric keep-hot	136.4150	1.5128	206.3686 (478)
Energy for lighting	130.4838	1.5338	200.1404 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.6600	1.4820	-159.5526
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-159.5526 (480)
Total Primary energy kWh/year			3164.3056 (483)
Dwelling Primary energy Rate (DPER)			62.4000 (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)	x 2.8000 (2b)	= 141.9880 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		
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)
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)

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)

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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 infiltr 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)
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			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			50.7100	0.1300	6.5923		(28b)
External Wall 1	17.9200	9.7700	8.1500	0.1800	1.4670		(29a)
Corridor wall	40.1000	2.4200	37.6800	0.1800	6.7824		(29a)
Total net area of external elements Aum(A, m2)			108.7300				(31)
Fabric heat loss, W/K = Sum (A x U)					28.4487		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							251.6107 (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)	3.0400	0.0700	0.2128
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0700	1.0024
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672
E16 Corner (normal)	2.8000	0.0900	0.2520
E16 Corner (normal)	2.8000	0.0900	0.2520
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	6.4000	0.3200	2.0480
E21 Exposed floor (inverted)	14.3200	0.3200	4.5824
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	7.9300	0.1600	1.2688
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			10.9956 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 39.4443 (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	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	66.3669	66.2312	66.0982	65.4735	65.3566	64.8124	64.8124	64.7117	65.0220	65.3566	65.5930	65.8402 (39)
Average = Sum(39)m / 12 =												65.4729
HLP	1.3088	1.3061	1.3035	1.2911	1.2888	1.2781	1.2781	1.2761	1.2822	1.2888	1.2935	1.2984 (40)
HLP (average)												1.2911
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

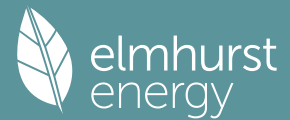
4. Water heating energy requirements (kWh/year)

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	(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	(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)												99.2177 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
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 content (annual)	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)	
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1647.9845	
25.6415	22.5627	23.7058	20.2380	19.2017	16.8517	16.3149	17.2223	17.6963	20.2705	22.2079	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	25.1422	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													
220.1861	194.8951	207.2813	182.5740	177.2541	159.9988	158.0088	164.0581	165.6297	184.3795	195.7066	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)												2003 (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													
96.2328	85.5957	91.9420	82.9842	81.9580	75.4779	75.5589	77.5703	77.3502	84.3271	87.3508	95.4411	(65)	

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

Metabolic gains (Table 5), Watts												
(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)

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Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.0506	84.1988	76.0506	78.5856	76.0506	78.5856	76.0506	78.5856	76.0506	78.5856	76.0506	(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	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	(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	406.1389	413.8635	398.0202	383.9342	365.8259	350.1869	337.8013	338.9578	348.5609	363.2369	384.2256	398.4970 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g Specific data or Table 6b	FF Specific data or Table 6c				Access factor Table 6d	Gains W

Southwest				9.7700	36.7938	0.6300		0.7000				0.7700	109.8605 (79)

Solar gains	109.8605	187.1330	256.0435	317.2504	355.3468	352.7772	340.1148	311.6931	277.2410	206.8218	131.5875	94.0177	(83)
Total gains	515.9993	600.9965	654.0638	701.1845	721.1727	702.9640	677.9161	650.6510	625.8019	570.0587	515.8131	492.5147	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	53.4034	53.5128	53.6205	54.1321	54.2289	54.6842	54.6842	54.7694	54.5079	54.2289	54.0334	53.8305
alpha	4.5602	4.5675	4.5747	4.6088	4.6153	4.6456	4.6456	4.6513	4.6339	4.6153	4.6022	4.5887
util living area	0.9834	0.9668	0.9372	0.8679	0.7453	0.5681	0.4163	0.4509	0.6656	0.8859	0.9671	0.9863 (86)
MIT	19.7715	20.0075	20.2932	20.6234	20.8558	20.9682	20.9939	20.9912	20.9341	20.6416	20.1536	19.7294 (87)
Th 2	19.8340	19.8361	19.8381	19.8478	19.8496	19.8580	19.8580	19.8596	19.8548	19.8496	19.8459	19.8421 (88)
util rest of house	0.9783	0.9570	0.9188	0.8306	0.6802	0.4760	0.3105	0.3425	0.5745	0.8452	0.9555	0.9820 (89)
MIT 2	18.4537	18.7493	19.1011	19.4942	19.7389	19.8417	19.8563	19.8569	19.8161	19.5265	18.9433	18.4066 (90)
Living area fraction									FLA = Living area / (4) =			0.5017 (91)
MIT	19.1148	19.3805	19.6991	20.0607	20.2992	20.4069	20.4270	20.4259	20.3769	20.0859	19.5504	19.0702 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1148	19.3805	19.6991	20.0607	20.2992	20.4069	20.4270	20.4259	20.3769	20.0859	19.5504	19.0702 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9742	0.9523	0.9162	0.8382	0.7071	0.5213	0.3637	0.3970	0.6178	0.8546	0.9519	0.9783	(94)
Useful gains	502.6678	572.3321	599.2349	587.7568	509.9317	366.4688	246.5598	258.2989	386.6150	487.1583	490.9900	481.8254	(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	983.2142	959.0617	872.4387	730.7291	562.0138	376.3576	248.0376	260.5237	408.1395	619.9659	816.6625	979.0596	(97)
Space heating kWh	357.5265	259.8823	203.2637	102.9400	38.7491	0.0000	0.0000	0.0000	0.0000	98.8088	234.4842	369.9422	(98a)
Space heating requirement - total per year (kWh/year)												1665.5967	
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	357.5265	259.8823	203.2637	102.9400	38.7491	0.0000	0.0000	0.0000	0.0000	98.8088	234.4842	369.9422	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1665.5967	
Space heating per m2												(98c) / (4) =	32.8455 (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	357.5265	259.8823	203.2637	102.9400	38.7491	0.0000	0.0000	0.0000	0.0000	98.8088	234.4842	369.9422 (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)	387.3526	281.5626	220.2206	111.5276	41.9817	0.0000	0.0000	0.0000	0.0000	107.0518	254.0457	400.8041 (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)
Efficiency of water heater (217)m	85.3899	84.9637	84.2728	83.0454	81.4089	79.8000	79.8000	79.8000	79.8000	82.9323	84.7133	79.8000 (216)
Fuel for water heating, kWh/month	229.5340	204.2091	219.3844	197.5137	196.4996	181.9638	180.6315	187.1106	188.3780	200.5704	206.8948	227.0234 (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	15.8018	12.6768	11.4140	8.3624	6.4594	5.2774	5.8925	7.6592	9.9486	13.0531	14.7434	16.2410 (232)

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Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-9.6855	-14.7049	-22.7464	-27.5940	-31.5794	-30.1666	-29.8139	-27.2343	-23.0191	-17.6816	-11.0184	-8.2567 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	-2.6894	-5.8415	-11.9594	-18.4847	-24.9567	-25.2538	-24.9435	-20.8707	-14.9845	-8.5074	-3.6398	-2.1125 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)
Annual totals kWh/year												
Space heating fuel - main system 1												1804.5468 (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												2419.7132 (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)												127.5296 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-417.7448 (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												4020.0449 (238)

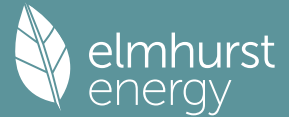
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1804.5468	0.2100	378.9548 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2419.7132	0.2100	508.1398 (264)
Space and water heating			887.0946 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	127.5296	0.1443	18.4065 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-253.5009	0.1331	-33.7284
PV Unit electricity exported	-164.2439	0.1251	-20.5438
Total			-54.2721 (269)
Total CO2, kg/year			863.1582 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			17.0200 (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	1804.5468	1.1300	2039.1379 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2419.7132	1.1300	2734.2760 (278)
Space and water heating			4773.4139 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	127.5296	1.5338	195.6092 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-253.5009	1.4916	-378.1329
PV Unit electricity exported	-164.2439	0.4591	-75.4034
Total			-453.5363 (283)
Total Primary energy kWh/year			4645.5876 (286)
Target Primary Energy Rate (TPER)			91.6100 (287)

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Plot Reference	A 116				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.89	TER	17.02		
Environmental	96 A	% DER < TER				65.39	
CO ₂ Emissions (t/year)	0.27	DFEE	37.43	TFEE	41.87		
Compliance Check	See BREL	% DFEE < TFEE				10.62	
% DPER < TPER	31.89	DPER	62.40	TPER	91.61		
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 (1b)	2.8000 (2b)	141.9880 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		141.9880 (4)
Dwelling volume			141.9880 (5)

2. Ventilation rate

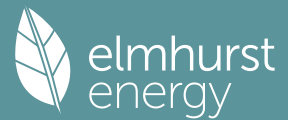
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	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							
Door			2.4200	1.0000	2.4200		(26)
Window			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			50.7100	0.1000	5.0710	110.0000	5578.1000 (28b)
External Wall 1	17.9200	9.7700	8.1500	0.1500	1.2225	70.0000	570.5000 (29a)
Corridor wall	40.1000	2.4200	37.6800	0.1900	7.1592	70.0000	2637.5999 (29a)
Total net area of external elements Aum(A, m ²)			108.7300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 27.0597		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000	70.0000	1553.3000 (32)
Party Ceiling 1			50.7100			30.0000	1521.3000 (32b)
Internal Wall 1			99.8200			9.0000	898.3800 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12759.1799 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							251.6107 (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

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E7 Party floor between dwellings (in blocks of flats)	3.0400	0.0500	0.1520
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0390	0.5585
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0500	0.1680
E16 Corner (normal)	2.8000	0.0500	0.1400
E16 Corner (normal)	2.8000	0.0390	0.1092
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E18 Party wall between dwellings	2.8000	0.0390	0.1092
E20 Exposed floor (normal)	6.4000	0.1000	0.6400
E21 Exposed floor (inverted)	14.3200	0.1000	1.4320
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	7.9300	0.0800	0.6344
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.9133 (36)
Point Thermal Bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	31.9730 (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	25.3632	25.2880	25.2144	24.8684	24.8037	24.5024	24.5024	24.4466	24.6184	24.8037	24.9346	25.0715	(38)
Heat transfer coeff	57.3362	57.2610	57.1874	56.8414	56.7767	56.4754	56.4754	56.4196	56.5914	56.7767	56.9076	57.0445	(39)
Average = Sum(39)m / 12 =												56.8411	
HLP	1.1307	1.1292	1.1277	1.1209	1.1196	1.1137	1.1137	1.1126	1.1160	1.1196	1.1222	1.1249	(40)
HLP (average)												1.1209	
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	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													
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	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)
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)
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	68.2208	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)												663.0571	(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)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												481.9588	(64a)

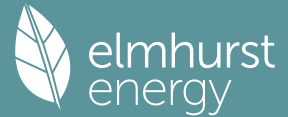
5. Internal gains (see Table 5 and 5a)

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	76.0506	84.1988	76.0506	78.5856	76.0506	78.5856	76.0506	76.0506	78.5856	76.0506	78.5856	76.0506	(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	310.9546	319.7147	306.2573	298.4110	283.6739	274.1929	263.6947	263.9352	271.3995	279.3588	294.9552	304.3134	(73)

6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	Specific data or Table 6b	g Specific data or Table 6c	FF Access factor Table 6d	Gains W	
Southwest	9.7700	36.7938	0.3500	0.7000	0.7700	61.0336	(79)
Solar gains	61.0336	103.9628	142.2464	176.2502	197.4149	195.9873	188.9527
Total gains	371.9882	423.6775	448.5037	474.6612	481.0888	470.1802	452.6473
						437.0981	425.4223
						394.2598	368.0593
						52.2320	356.5454
							(84)

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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	61.8147	61.8958	61.9755	62.3527	62.4238	62.7569	62.7569	62.8189	62.6281	62.4238	62.2802	62.1307	
alpha	5.1210	5.1264	5.1317	5.1568	5.1616	5.1838	5.1838	5.1879	5.1752	5.1616	5.1520	5.1420	
util living area	0.9952	0.9899	0.9799	0.9490	0.8741	0.7121	0.5376	0.5769	0.8001	0.9549	0.9895	0.9961 (86)	
MIT	19.7604	19.9391	20.1770	20.4982	20.7726	20.9437	20.9891	20.9844	20.8940	20.5475	20.0978	19.7256 (87)	
Th 2	19.9759	19.9771	19.9782	19.9838	19.9848	19.9897	19.9897	19.9906	19.9878	19.9848	19.9827	19.9805 (88)	
util rest of house	0.9936	0.9866	0.9731	0.9306	0.8281	0.6217	0.4201	0.4588	0.7217	0.9349	0.9855	0.9948 (89)	
MIT 2	18.8589	19.0369	19.2722	19.5857	19.8326	19.9641	19.9870	19.9863	19.9324	19.6375	19.1997	18.8280 (90)	
Living area fraction	fLA = Living area / (4) =												0.5017 (91)
MIT	19.3112	19.4895	19.7261	20.0435	20.3042	20.4555	20.4897	20.4870	20.4148	20.0940	19.6503	19.2783 (92)	
Temperature adjustment													0.0000
adjusted MIT	19.3112	19.4895	19.7261	20.0435	20.3042	20.4555	20.4897	20.4870	20.4148	20.0940	19.6503	19.2783 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9922	0.9846	0.9710	0.9319	0.8441	0.6654	0.4794	0.5183	0.7573	0.9374	0.9838	0.9936 (94)
Useful gains	369.0932	417.1462	435.4823	442.3183	406.0644	312.8390	216.9777	226.5642	322.1811	369.5965	362.0961	354.2808 (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	860.6835	835.4103	756.3667	633.4113	488.5167	330.6918	219.6736	230.5884	357.3639	539.0372	714.2061	860.1341 (97)
Space heating kWh	365.7431	281.0735	238.7380	137.5869	61.3445	0.0000	0.0000	0.0000	0.0000	126.0639	253.5191	376.3548 (98a)
Space heating requirement - total per year (kWh/year)												1840.4239
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	365.7431	281.0735	238.7380	137.5869	61.3445	0.0000	0.0000	0.0000	0.0000	126.0639	253.5191	376.3548 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1840.4239
Space heating per m2	(98c) / (4) =											36.2931 (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												
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	530.8685	417.9177	428.7887	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.8312	0.9052	0.8863	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	441.2459	378.2945	380.0141	0.0000	0.0000	0.0000	0.0000 (102)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	522.0411	503.1517	486.3306	0.0000	0.0000	0.0000	0.0000 (103)
Cooled fraction	0.0000	0.0000	0.0000	0.0000	0.0000	58.1726	92.8938	79.0994	0.0000	0.0000	0.0000	0.0000 (104)
Intermittency factor (Table 10b)	fc = cooled area / (4) =											1.0000 (105)
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	14.5431	23.2234	19.7749	0.0000	0.0000	0.0000	0.0000 (107)
Energy for space heating												57.5414 (107)
Energy for space cooling												36.2931 (99)
Total												1.1347 (108)
Fabric Energy Efficiency (DFEE)												37.4278 (109)
												37.4 (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)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Air changes per hour	

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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)

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			9.7700	1.1450	11.1870			(27)
Heatloss Floor 1			50.7100	0.1300	6.5923			(28b)
External Wall 1	17.9200	9.7700	8.1500	0.1800	1.4670			(29a)
Corridor wall	40.1000	2.4200	37.6800	0.1800	6.7824			(29a)
Total net area of external elements Aum(A, m2)			108.7300					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 28.4487			(33)
Main dwelling								
Party Wall 1			22.1900	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							251.6107	(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)	3.0400	0.0700	0.2128	
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0700	1.0024	
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E20 Exposed floor (normal)	6.4000	0.3200	2.0480	
E21 Exposed floor (inverted)	14.3200	0.3200	4.5824	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	7.9300	0.1600	1.2688	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				10.9956 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	39.4443 (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	66.3669	66.2312	66.0982	65.4735	65.3566	64.8124	64.8124	64.7117	65.0220	65.3566	65.5930	65.8402	(39)
Average = Sum(39)m / 12 =												65.4729	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.3088	1.3061	1.3035	1.2911	1.2888	1.2781	1.2781	1.2761	1.2822	1.2888	1.2935	1.2984	(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	22.8753	22.5355	22.0571	21.1750	20.5145	19.7821	19.3865	19.8616	20.3788	21.1625	22.0628	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	(42c)
Average daily hot water use (litres/day)												50.4386	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	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	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	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)
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)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												481.9588	(64a)

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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 28.8759 (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	76.0506	84.1988	76.0506	78.5856	76.0506	78.5856	76.0506	76.0506	78.5856	76.0506	78.5856	76.0506 (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	312.9228	321.6328	308.0652	299.4667	284.5864	275.3567	265.3019	264.9048	272.6311	280.5037	296.2546	306.0276 (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	
Southwest	9.7700		36.7938		0.6300		0.7000		0.7700		109.8605 (79)	
Solar gains	109.8605	187.1330	256.0435	317.2504	355.3468	352.7772	340.1148	311.6931	277.2410	206.8218	131.5875	94.0177 (83)
Total gains	422.7832	508.7658	564.1087	616.7171	639.9333	628.1339	605.4167	576.5979	549.8721	487.3256	427.8421	400.0453 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	53.4034	53.5128	53.6205	54.1321	54.2289	54.6842	54.6842	54.7694	54.5079	54.2289	54.0334	53.8305
alpha	4.5602	4.5675	4.5747	4.6088	4.6153	4.6456	4.6456	4.6513	4.6339	4.6153	4.6022	4.5887
util living area	0.9923	0.9819	0.9616	0.9074	0.8001	0.6243	0.4634	0.5044	0.7301	0.9279	0.9834	0.9940 (86)
MIT	19.5918	19.8408	20.1488	20.5230	20.8035	20.9534	20.9905	20.9860	20.9031	20.5333	19.9935	19.5489 (87)
Th 2	19.8340	19.8361	19.8381	19.8478	19.8496	19.8580	19.8580	19.8596	19.8548	19.8496	19.8459	19.8421 (88)
util rest of house	0.9898	0.9761	0.9491	0.8775	0.7393	0.5276	0.3471	0.3853	0.6393	0.8978	0.9771	0.9920 (89)
MIT 2	18.5818	18.8285	19.1296	19.4876	19.7275	19.8387	19.8559	19.8561	19.8082	19.5070	18.9891	18.5455 (90)
Living area fraction	fLA = Living area / (4) =											0.5017 (91)
MIT	19.0885	19.3363	19.6409	20.0070	20.2673	20.3979	20.4251	20.4230	20.3575	20.0219	19.4930	19.0489 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0885	19.3363	19.6409	20.0070	20.2673	20.3979	20.4251	20.4230	20.3575	20.0219	19.4930	19.0489 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9877	0.9730	0.9465	0.8822	0.7630	0.5749	0.4056	0.4453	0.6816	0.9031	0.9746	0.9901 (94)
Useful gains	417.5653	495.0157	533.9365	544.0378	488.2961	361.0907	245.5855	256.7567	374.7875	440.1002	416.9783	396.1031 (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	981.4700	956.1351	868.5896	727.2152	559.9280	375.7774	247.9135	260.3318	406.8749	615.7799	812.8933	977.6567 (97)
Space heating kWh	419.5451	309.8722	248.9819	131.8877	53.2941	0.0000	0.0000	0.0000	0.0000	130.7057	285.0588	432.6759 (98a)
Space heating requirement - total per year (kWh/year)												2012.0215
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	419.5451	309.8722	248.9819	131.8877	53.2941	0.0000	0.0000	0.0000	0.0000	130.7057	285.0588	432.6759 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2012.0215
Space heating per m2												(98c) / (4) = 39.6770 (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	609.2369	479.6120	491.8087	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8779	0.9328	0.9158	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	534.8440	447.3913	450.4181	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	706.4658	681.4420	649.2187	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	123.5678	174.1337	147.9076	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											1.0000 (105)
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	30.8919	43.5334	36.9769	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												111.4023 (107)
Energy for space heating												39.6770 (99)
Energy for space cooling												2.1968 (108)
Total												41.8739 (109)
Fabric Energy Efficiency (TFEE)												41.9 (109)

