

Summary for Input Data



Plot Reference	A 104	Issued on Date	15/05/2026
Assessment Reference	Be Green 260515	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	83 B	DER	4.86	TER	13.84
Environmental	96 A	% DER < TER			64.88
CO ₂ Emissions (t/year)	0.31	DFEE	33.19	TFEE	36.37
Compliance Check	See BREL	% DFEE < TFEE			8.74
% DPER < TPER	30.33	DPER	51.41	TPER	73.79

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, End-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	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	240.18	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:	19.60 m	71.15 m ²	2.80 m

8.0 Living Area	29.68	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	42.84	29.74	0.00	None	13.10	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	12.04	9.62	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	40.54	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	170.46

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	71.15

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	71.15

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	
SW windows	Window	External Wall 1	South West	7.13	
SE windows	Window	External Wall 1	South East	5.96	

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	8.25	0.05	0.05	No
E3 Sill	Independently assessed	4.76	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	10.94	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	4.30	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	0.10	0.10	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	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	10.94	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	4.30	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	14.48	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	14.48	0.08	0.08	No
E16 Corner (normal)	Independently assessed	2.80	0.04	0.04	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	2
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	89.00
Wet Rooms	2
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

Summary for Input Data

Number of flueless gas fires

0

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀

3.00

m³/(h.m²) @ 50 Pa

Test Method

Blower Door

22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	15.00	1125.00	7

24.0 Main Heating 1

None

25.0 Main Heating 2

None

26.0 Heat Networks

Space Community Heating

Space and Water Combined

Distribution Loss

Calculated

Distribution Loss Value

1.50

SAP Code

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

Community Heating

SAP Code

901

Flue Gas Heat Recovery System

No

Waste Water Heat Recovery Instantaneous System 1

No

Waste Water Heat Recovery Instantaneous System 2

No

Waste Water Heat Recovery Storage System

No

Solar Panel

No

Water use <= 125 litres/person/day

Yes

Cold Water Source

From header tank

Bath Count

1

28.1 Showers

Description

Shower Type

Flow Rate
[l/min]

Rated Power
[kW]

Connected

Connected To

Shower 1

Combi boiler or unvented hot water system

8.00

No

Shower 2

Combi boiler or unvented hot water system

8.00

No

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Internal Store

Insulation Type

Measured Loss

Cylinder Volume

180.00

L

Loss

1.20

kWh/day

32.0 Photovoltaic Unit

Multiple Dwellings – Not Connected

Export Capable Meter?

No

Connected To Dwelling

Yes

Diverter

No

Battery Capacity [kWh]

0.00

Summary for Input Data



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

34.0 Small-scale Hydro

None

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

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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% DPER < TPER	30.33	DPER	51.41	TPER	73.79		
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	71.1500 (1b)	2.8000 (2b)	199.2200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.1500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	199.2200 (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	2	(19)

Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (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			13.0900	1.1450	14.9885		(27)
Heatloss Floor 1			71.1500	0.1000	7.1150	110.0000	7826.5000 (28b)
External Wall 1	42.8400	13.0900	29.7500	0.1500	4.4625	70.0000	2082.5000 (29a)
Corridor wall	12.0400	2.4200	9.6200	0.1900	1.8278	70.0000	673.4000 (29a)
Total net area of external elements Aum(A, m ²)			126.0300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	30.8138		(33)
Main dwelling							
Party Wall 1			40.5400	0.0000	0.0000	70.0000	2837.8000 (32)
Party Ceiling 1			71.1500			30.0000	2134.5000 (32b)
Internal Wall 1			170.4600			9.0000	1534.1400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	17088.8400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		240.1805 (35)
List of Thermal Bridges		

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.2500	0.0500	0.4125
E3 Sill	4.7600	0.0400	0.1904
E4 Jamb	18.6000	0.0400	0.7440
E7 Party floor between dwellings (in blocks of flats)	10.9400	0.0500	0.5470
E7 Party floor between dwellings (in blocks of flats)	4.3000	0.0390	0.1677
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.1000	0.4360
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0500	0.2180
E16 Corner (normal)	2.8000	0.0500	0.1400
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)	10.9400	0.1000	1.0940
E21 Exposed floor (inverted)	4.3000	0.1000	0.4300
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	14.4800	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	14.4800	0.0800	1.1584
E16 Corner (normal)	2.8000	0.0390	0.1092
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			6.1456 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	36.9594 (37)

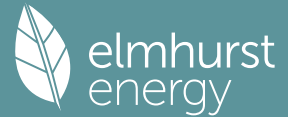
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	17.2287	17.0191	16.8096	15.7618	15.5522	14.5045	14.5045	14.2949	14.9236	15.5522	15.9713	16.3905	(38)
Heat transfer coeff	54.1881	53.9786	53.7690	52.7212	52.5117	51.4639	51.4639	51.2544	51.8830	52.5117	52.9308	53.3499	(39)
Average = Sum(39)m / 12 =												52.6688	
HLP	0.7616	0.7587	0.7557	0.7410	0.7380	0.7233	0.7233	0.7204	0.7292	0.7380	0.7439	0.7498	(40)
HLP (average)												0.7403	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.2737 (42)
Hot water usage for mixer showers	60.7673	59.8370	58.4659	56.3567	54.4670	51.8232	49.7321	52.1767	53.4062	56.0248	58.7518	60.7126 (42a)
Hot water usage for baths	26.3321	25.9346	25.3691	24.5223	23.7591	22.7084	21.9114	22.8861	23.3976	24.4386	25.5209	26.3112 (42b)
Hot water usage for other uses	37.9151	36.5364	35.1577	33.7789	32.4002	31.0215	31.0215	32.4002	33.7789	35.1577	36.5364	37.9151 (42c)
Average daily hot water use (litres/day)												114.9072 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	125.0146	122.3080	118.9927	114.6580	110.6263	105.5531	102.6650	107.4630	110.5828	115.6211	120.8091	124.9389 (44)
Energy content (annual)	184.0431	161.8383	170.0382	149.7720	142.5531	122.0687	113.4478	126.4859	128.2705	148.9894	163.2775	183.4820 (45)
Distribution loss (46)m = 0.15 x (45)m												1794.2664
	27.6065	24.2757	25.5057	22.4658	21.3830	18.3103	17.0172	18.9729	19.2406	22.3484	24.4916	27.5223 (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												
	239.3199	211.7657	225.3150	203.2656	197.8299	175.5623	168.7246	181.7627	181.7642	204.2662	216.7712	238.7588 (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												
	239.3199	211.7657	225.3150	203.2656	197.8299	175.5623	168.7246	181.7627	181.7642	204.2662	216.7712	238.7588 (64)
12Total per year (kWh/year)												2445.1062 (64)
Electric shower(s)												2445 (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												
	105.4158	93.7532	100.7591	92.5941	91.6204	83.3828	81.9428	86.2780	85.4449	93.7604	97.0847	105.2292 (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	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.6656	113.6655	102.6656	106.0878	102.6656	106.0878	102.6656	102.6656	106.0878	102.6656	106.0878	102.6656 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.9661	202.0411	196.8121	185.6802	171.6282	158.4213	149.5982	147.5232	152.7522	163.8841	177.9361	191.1430 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686 (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)	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487 (71)
Water heating gains (Table 5)	141.6879	139.5136	135.4289	128.6029	123.1456	115.8094	110.1382	115.9651	118.6734	126.0221	134.8399	141.4371 (72)
Total internal gains	501.4253	512.3260	492.0124	477.4767	454.5452	437.4242	419.5079	423.2597	434.6192	449.6776	475.9696	492.3515 (73)

6. Solar gains

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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
Southeast	5.9600				36.7938	0.3500		0.7000		0.7700	37.2324 (77)
Southwest	7.1300				36.7938	0.3500		0.7000		0.7700	44.5414 (79)
Solar gains	81.7738	139.2910	190.5840	236.1428	264.4996	262.5869	253.1618	232.0063	206.3622	153.9462	69.9813 (83)
Total gains	583.1991	651.6170	682.5964	713.6195	719.0448	700.0111	672.6696	655.2660	640.9814	603.6238	562.3328 (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
tau	87.6004	87.9405	88.2832	90.0377	90.3970	92.2375	92.2375	92.6146	91.4924	90.3970	89.6813
alpha	6.8400	6.8627	6.8855	7.0025	7.0265	7.1492	7.1492	7.1743	7.0995	7.0265	6.9788
util living area	0.9818	0.9613	0.9233	0.8209	0.6641	0.4694	0.3365	0.3597	0.5545	0.8275	0.9549
MIT	20.4425	20.5927	20.7490	20.9122	20.9818	20.9987	20.9999	20.9998	20.9957	20.9214	20.6840
Th 2	20.2867	20.2893	20.2919	20.3048	20.3074	20.3203	20.3203	20.3229	20.3151	20.3074	20.3022
util rest of house	0.9772	0.9522	0.9063	0.7890	0.6194	0.4200	0.2846	0.3068	0.5012	0.7905	0.9429
MIT 2	19.6487	19.8365	20.0270	20.2221	20.2931	20.3195	20.3202	20.3228	20.3125	20.2369	19.9616
Living area fraction	19.9799	20.1520	20.3282	20.5100	20.5804	20.6028	20.6038	20.6052	20.5975	20.5225	20.2630
MIT	19.9799	20.1520	20.3282	20.5100	20.5804	20.6028	20.6038	20.6052	20.5975	20.5225	20.2630
Temperature adjustment	19.9799	20.1520	20.3282	20.5100	20.5804	20.6028	20.6038	20.6052	20.5975	20.5225	20.2630
adjusted MIT	19.9799	20.1520	20.3282	20.5100	20.5804	20.6028	20.6038	20.6052	20.5975	20.5225	20.2630
8. Space heating requirement											
Utilisation	0.9748	0.9502	0.9073	0.7988	0.6373	0.4406	0.3063	0.3289	0.5233	0.8026	0.9421
Useful gains	568.4866	619.1528	619.2927	570.0499	458.2554	308.4299	206.0188	215.4866	335.4303	484.4578	540.7068
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000
Heat loss rate W	849.6620	823.2796	743.5275	612.0943	466.3233	308.9287	206.0491	215.5363	337.1080	521.0456	696.7270
Space heating kWh	209.1945	137.1732	92.4306	30.2719	6.0025	0.0000	0.0000	0.0000	0.0000	27.2213	112.3345
Space heating requirement - total per year (kWh/year)	209.1945	137.1732	92.4306	30.2719	6.0025	0.0000	0.0000	0.0000	0.0000	27.2213	112.3345
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
Solar heating contribution - total per year (kWh/year)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Space heating kWh	209.1945	137.1732	92.4306	30.2719	6.0025	0.0000	0.0000	0.0000	0.0000	27.2213	112.3345
Space heating requirement after solar contribution - total per year (kWh/year)	209.1945	137.1732	92.4306	30.2719	6.0025	0.0000	0.0000	0.0000	0.0000	27.2213	112.3345
Space heating per m2										(98c) / (4) =	11.6773 (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	209.1945	137.1732	92.4306	30.2719	6.0025	0.0000	0.0000	0.0000	0.0000	27.2213	112.3345
307a	313.7918	205.7598	138.6460	45.4079	9.0038	0.0000	0.0000	0.0000	0.0000	40.8320	168.5018
Space heating requirement	313.7918	205.7598	138.6460	45.4079	9.0038	0.0000	0.0000	0.0000	0.0000	40.8320	168.5018
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)	313.7918	205.7598	138.6460	45.4079	9.0038	0.0000	0.0000	0.0000	0.0000	40.8320	168.5018
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
Water heating											
Annual water heating requirement											
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50	239.3199	211.7657	225.3150	203.2656	197.8299	175.5623	168.7246	181.7627	181.7642	204.2662	216.7712
310a	358.9798	317.6485	337.9725	304.8985	296.7449	263.3435	253.0870	272.6440	272.6462	306.3993	325.1568
Water heating fuel	358.9798	317.6485	337.9725	304.8985	296.7449	263.3435	253.0870	272.6440	272.6462	306.3993	325.1568
Cooling System Energy Efficiency Ratio	358.9798	317.6485	337.9725	304.8985	296.7449	263.3435	253.0870	272.6440	272.6462	306.3993	325.1568
Space coolin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pumps and Fa	15.7399	14.2167	15.7399	15.2321	15.7399	15.2321	15.7399	15.7399	15.2321	15.7399	15.2321
Lighting	21.8260	17.5097	15.7655	11.5505	8.9219	7.2893	8.1389	10.5792	13.7414	18.0294	22.4327
Electricity generated by PVs (Appendix M) (negative quantity)	-3.7296	-6.6233	-12.2243	-17.2124	-21.5252	-21.2324	-20.7876	-17.8845	-13.4404	-8.6379	-4.4790
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity generated by PVs (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Annual totals kWh/year	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Space heating fuel - community heating											1246.2554 (307)
Space heating fuel - secondary											0.0000 (309)
Water heating fuel - community heating											3667.6592 (310)
Efficiency of water heater											0.0000 (311)
Electricity used for heat distribution											12.4626 (313)
Space cooling fuel											0.0000 (321)
Electricity for pumps and fans:											

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(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)	
mechanical ventilation fans (SFP = 0.7625)	185.3244 (330a)
Total electricity for the above, kWh/year	185.3244 (331)
Electricity for lighting (calculated in Appendix L)	176.1486 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-150.8211 (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	5124.5666 (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	2118.0666	0.1579	84.8380 (367)
Electrical energy for heat distribution (space & water)	12.4626	0.0000	7.1328 (372)
Overall CO2 factor for heat network			0.0640 (386)
Total CO2 associated with community systems			314.5813 (373)
Space and water heating			314.5813 (376)
Pumps, fans and electric keep-hot	185.3244	0.1387	25.7068 (378)
Energy for lighting	176.1486	0.1443	25.4237 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-150.8211	0.1305	-19.6861
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-19.6861 (380)
Total CO2, kg/year			346.0257 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.8600 (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	2118.0666	1.5846	851.2343 (467)
Electrical energy for heat distribution (space & water)	12.4626	0.0000	75.5217 (472)
Overall CO2 factor for heat network			0.6778 (486)
Total CO2 associated with community systems			3330.7683 (473)
Space and water heating			3330.7683 (476)
Pumps, fans and electric keep-hot	185.3244	1.5128	280.3588 (478)
Energy for lighting	176.1486	1.5338	270.1827 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-150.8211	1.4822	-223.5417
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-223.5417 (480)
Total Primary energy kWh/year			3657.7679 (483)
Dwelling Primary energy Rate (DPER)			51.4100 (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			
Ground floor	71.1500 (1b)	x 2.8000 (2b)	= 199.2200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.1500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 199.2200 (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	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 30.0000 / (5) = 0.1506 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4006 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3405 (21)

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Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate													
Effective ac	0.4341	0.4256	0.4171	0.3745	0.3660	0.3235	0.3235	0.3150	0.3405	0.3660	0.3831	0.4001	(22b)
	0.5942	0.5906	0.5870	0.5701	0.5670	0.5523	0.5523	0.5496	0.5580	0.5670	0.5734	0.5800	(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			13.0900	1.1450	14.9885		(27)
Heatloss Floor 1			71.1500	0.1300	9.2495		(28b)
External Wall 1	42.8400	13.0900	29.7500	0.1800	5.3550		(29a)
Corridor wall	12.0400	2.4200	9.6200	0.1800	1.7316		(29a)
Total net area of external elements Aum(A, m2)			126.0300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	33.7446	(33)
Main dwelling							
Party Wall 1			40.5400	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							240.1805 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.2500	0.0500	0.4125
E3 Sill	4.7600	0.0500	0.2380
E4 Jamb	18.6000	0.0500	0.9300
E7 Party floor between dwellings (in blocks of flats)	10.9400	0.0700	0.7658
E7 Party floor between dwellings (in blocks of flats)	4.3000	0.0700	0.3010
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
E16 Corner (normal)	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)	10.9400	0.3200	3.5008
E21 Exposed floor (inverted)	4.3000	0.3200	1.3760
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	14.4800	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	14.4800	0.1600	2.3168
E16 Corner (normal)	2.8000	0.0900	0.2520

Thermal bridges (Sum(L x Psi) calculated using Appendix K)			11.1913 (36)
Point Thermal bridges		(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =		44.9359 (37)

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

(38)m	Jan 39.0667	Feb 38.8261	Mar 38.5903	Apr 37.4827	May 37.2755	Jun 36.3108	Jul 36.3108	Aug 36.1322	Sep 36.6824	Oct 37.2755	Nov 37.6947	Dec 38.1330	(38)
Heat transfer coeff	84.0027	83.7621	83.5263	82.4187	82.2114	81.2468	81.2468	81.0681	81.6183	82.2114	82.6307	83.0689	(39)
Average = Sum(39)m / 12 =												82.4177	

HLP	Jan 1.1806	Feb 1.1773	Mar 1.1739	Apr 1.1584	May 1.1555	Jun 1.1419	Jul 1.1419	Aug 1.1394	Sep 1.1471	Oct 1.1555	Nov 1.1614	Dec 1.1675	(40)
HLP (average)												1.1584	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2737 (42)
Hot water usage for mixer showers												
62.3424	61.4055	60.0403	57.4282	55.5005	53.3508	52.1289	53.4838	54.9690	57.2772	59.9454	62.1036	(42a)
Hot water usage for baths												
26.9325	26.5325	25.9693	24.9307	24.1530	23.2907	22.8250	23.3843	23.9933	24.9160	25.9759	26.8415	(42b)
Hot water usage for other uses												
37.9151	36.5364	35.1577	33.7789	32.4002	31.0215	31.0215	32.4002	33.7789	35.1577	36.5364	37.9151	(42c)
Average daily hot water use (litres/day)												116.9166 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	127.1901	124.4745	121.1672	116.1378	112.0538	107.6630	105.9753	109.2683	112.7412	117.3508	122.4577	126.8602	(44)
Energy conte	201.4380	177.2500	186.2295	158.9869	150.8459	132.3842	128.1680	135.2970	139.0212	159.2439	174.4635	198.6323	(45)
Energy content (annual)										Total = Sum(45)m =		1941.9604	
Distribution loss (46)m = 0.15 x (45)m													
	30.2157	26.5875	27.9344	23.8480	22.6269	19.8576	19.2252	20.2945	20.8532	23.8866	26.1695	29.7949	(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)

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	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month																		
	250.6806	221.7272	235.4722	206.6411	200.0886	180.0384	177.4107	184.5396	186.6754	208.4866	222.1176	247.8750	(62)					
WWHRS	-28.5003	-25.2059	-26.3942	-21.8554	-20.3685	-17.4295	-16.3373	-17.3731	-18.0332	-21.2591	-24.0840	-27.9726	(63a)					
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)					
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)					
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)					

Output from w/h	222.1803	196.5213	209.0780	184.7856	179.7201	162.6090	161.0733	167.1665	168.6422	187.2275	198.0336	219.9024	(64)
Total per year (kWh/year)												2256.9398	(64)
Electric shower(s)												2257	(64)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)

Heat gains from water heating, kWh/month											
106.3723	94.5174	101.3155	90.9865	89.5504	82.1411	82.0100	84.3804	84.3479	92.3427	96.1325	105.4394 (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	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.6656	113.6655	102.6656	106.0878	102.6656	106.0878	102.6656	102.6656	106.0878	102.6656	106.0878	102.6656 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.9661	202.0411	196.8121	185.6802	171.6282	158.4213	149.5982	147.5232	152.7522	163.8841	177.9361	191.1430 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686 (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)	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487 (71)
Water heating gains (Table 5)	142.9735	140.6509	136.1767	126.3701	120.3634	114.0849	110.2285	113.4145	117.1499	124.1166	133.5173	141.7196 (72)
Total internal gains	505.7109	516.4633	495.7602	478.2439	454.7630	435.6997	419.5981	420.7091	433.0957	450.7721	477.6470	495.6340 (73)

6. Solar gains

[Jan]	Area m2		Solar flux Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
Southeast	5.9600		36.7938		0.6300		0.7000		0.7700		67.0183 (77)	
Southwest	7.1300		36.7938		0.6300		0.7000		0.7700		80.1745 (79)	
Solar gains	147.1928	250.7238	343.0512	425.0570	476.0993	472.6564	455.6912	417.6114	371.4519	277.1032	176.3030	125.9663 (83)
Total gains	652.9037	767.1870	838.8113	903.3010	930.8623	908.3561	875.2893	838.3205	804.5475	727.8752	653.9500	621.6004 (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	56.5089	56.6712	56.8312	57.5950	57.7401	58.4257	58.4257	58.5545	58.1597	57.7401	57.4472	57.1441
alpha	4.7673	4.7781	4.7887	4.8397	4.8493	4.8950	4.8950	4.9036	4.8773	4.8493	4.8298	4.8096
util living area	0.9859	0.9697	0.9399	0.8670	0.7387	0.5559	0.4054	0.4401	0.6579	0.8883	0.9705	0.9886 (86)
MIT	19.8263	20.0647	20.3456	20.6676	20.8805	20.9766	20.9959	20.9939	20.9474	20.6763	20.2027	19.7895 (87)
Th 2	19.9355	19.9382	19.9409	19.9534	19.9558	19.9668	19.9668	19.9668	19.9625	19.9558	19.9510	19.9461 (88)
util rest of house	0.9817	0.9612	0.9232	0.8323	0.6785	0.4731	0.3118	0.3439	0.5747	0.8511	0.9607	0.9851 (89)
MIT 2	18.6015	18.9016	19.2491	19.6362	19.8618	19.9541	19.9655	19.9667	19.9303	19.6575	19.0877	18.5627 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.1124	19.3868	19.7065	20.0665	20.2867	20.3806	20.3953	20.3952	20.3546	20.0825	19.5528	19.0744 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.1124	19.3868	19.7065	20.0665	20.2867	20.3806	20.3953	20.3952	20.3546	20.0825	19.5528	19.0744 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9775	0.9557	0.9188	0.8364	0.6986	0.5069	0.3509	0.3841	0.6074	0.8562	0.9561	0.9814 (94)
Useful gains	638.2046	733.2314	770.7242	755.5223	650.2871	460.4872	307.1447	322.0014	488.6948	623.1915	625.2119	610.0427 (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	1244.2826	1213.4434	1103.0890	920.3271	705.9286	469.6571	308.3564	323.8833	510.4884	779.5661	1028.9824	1235.6024 (97)
Space heating kWh	450.9221	322.7024	247.2794	118.6594	41.3973	0.0000	0.0000	0.0000	0.0000	116.3427	290.7148	465.4164 (98a)
Space heating requirement - total per year (kWh/year)												2053.4344
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	450.9221	322.7024	247.2794	118.6594	41.3973	0.0000	0.0000	0.0000	0.0000	116.3427	290.7148	465.4164 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2053.4344
Space heating per m2												28.8606 (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	450.9221	322.7024	247.2794	118.6594	41.3973	0.0000	0.0000	0.0000	0.0000	116.3427	290.7148	465.4164 (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)	488.5396	349.6234	267.9083	128.5584	44.8508	0.0000	0.0000	0.0000	0.0000	126.0484	314.9672	504.2431 (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	222.1803	196.5213	209.0780	184.7856	179.7201	162.6090	161.0733	167.1665	168.6422	187.2275	198.0336	219.9024 (64)

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Efficiency of water heater (217)m	85.6128	85.1646	84.4371	83.0932	81.3435	79.8000	79.8000	79.8000	79.8000	83.0249	84.9194	79.8000 (216)
Fuel for water heating, kWh/month	259.5175	230.7547	247.6139	222.3836	220.9398	203.7706	201.8463	209.4818	211.3311	225.5076	233.2019	85.6986 (217)
Space cooling fuel requirement												256.5997 (219)
(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	21.3319	17.1132	15.4086	11.2890	8.7199	7.1243	7.9546	10.3397	13.4303	17.6212	19.9031	21.9248 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-15.7697	-23.6506	-36.1379	-43.2770	-49.0155	-46.6173	-46.0514	-42.3016	-36.1145	-28.1826	-17.8337	-13.4737 (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	-5.0658	-10.9431	-22.2960	-34.3053	-46.1739	-46.6936	-46.1432	-38.6925	-27.8719	-15.9116	-6.8462	-3.9848 (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												2224.7393 (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												2722.9484 (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)												172.1606 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-703.3534 (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												4502.4949 (238)

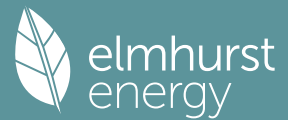
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2224.7393	0.2100	467.1953 (261)	
Total CO2 associated with community systems			0.0000 (373)	
Water heating (other fuel)	2722.9484	0.2100	571.8192 (264)	
Space and water heating			1039.0144 (265)	
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)	
Energy for lighting	172.1606	0.1443	24.8481 (268)	
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-398.4256	0.1333	-53.1138	
PV Unit electricity exported	-304.9278	0.1252	-38.1759	
Total			-91.2896 (269)	
Total CO2, kg/year			984.5021 (272)	
EPC Target Carbon Dioxide Emission Rate (TER)			13.8400 (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	2224.7393	1.1300	2513.9554 (275)	
Total CO2 associated with community systems			0.0000 (473)	
Water heating (other fuel)	2722.9484	1.1300	3076.9317 (278)	
Space and water heating			5590.8871 (279)	
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)	
Energy for lighting	172.1606	1.5338	264.0656 (282)	
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-398.4256	1.4926	-594.6961	
PV Unit electricity exported	-304.9278	0.4595	-140.1213	
Total			-734.8174 (283)	
Total Primary energy kWh/year			5250.2361 (286)	
Target Primary Energy Rate (TPER)			73.7900 (287)	

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Plot Reference	A 104				Issued on Date	15/05/2026	
Assessment Reference	Be Green 260515			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	83 B	DER	4.86	TER	13.84		
Environmental	96 A	% DER < TER				64.88	
CO ₂ Emissions (t/year)	0.31	DFEE	33.19	TFEE	36.37		
Compliance Check	See BREL	% DFEE < TFEE				8.74	
% DPER < TPER	30.33	DPER	51.41	TPER	73.79		
Assessor Details	Mr. Robert Tanner				Assessor ID	W344-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	71.1500 (1b)	2.8000 (2b)	199.2200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.1500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	199.2200 (5)

2. Ventilation rate

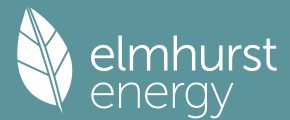
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1506 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.3006 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2555 (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	0.3258	0.3194	0.3130	0.2810	0.2747	0.2427	0.2427	0.2363	0.2555	0.2747	0.2874	0.3002 (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	0.5531	0.5510	0.5490	0.5395	0.5377	0.5295	0.5295	0.5279	0.5326	0.5377	0.5413	0.5451 (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			13.0900	1.1450	14.9885		(27)
Heatloss Floor 1			71.1500	0.1000	7.1150	110.0000	7826.5000 (28b)
External Wall 1	42.8400	13.0900	29.7500	0.1500	4.4625	70.0000	2082.5000 (29a)
Corridor wall	12.0400	2.4200	9.6200	0.1900	1.8278	70.0000	673.4000 (29a)
Total net area of external elements Aum(A, m ²)			126.0300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	30.8138		(33)
Main dwelling							
Party Wall 1			40.5400	0.0000	0.0000	70.0000	2837.8000 (32)
Party Ceiling 1			71.1500			30.0000	2134.5000 (32b)
Internal Wall 1			170.4600			9.0000	1534.1400 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	17088.8400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							240.1805 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					8.2500	0.0500	0.4125
E3 Sill					4.7600	0.0400	0.1904

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E4 Jamb													18.6000	0.0400	0.7440
E7 Party floor between dwellings (in blocks of flats)													10.9400	0.0500	0.5470
E7 Party floor between dwellings (in blocks of flats)													4.3000	0.0390	0.1677
E9 Balcony between dwellings, wall insulation continuous													4.3600	0.1000	0.4360
E9 Balcony between dwellings, wall insulation continuous													4.3600	0.0500	0.2180
E16 Corner (normal)													2.8000	0.0500	0.1400
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)													10.9400	0.1000	1.0940
E21 Exposed floor (inverted)													4.3000	0.1000	0.4300
E25 Staggered party wall between dwellings													2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)													14.4800	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)													14.4800	0.0800	1.1584
E16 Corner (normal)													2.8000	0.0390	0.1092
Thermal bridges (Sum(L x Psi) calculated using Appendix K)															6.1456 (36)
Point Thermal bridges															0.0000
Total fabric heat loss														(33) + (36) + (36a) =	36.9594 (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	36.3596	36.2242	36.0914	35.4678	35.3511	34.8079	34.8079	34.7073	35.0171	35.3511	35.5871	35.8339	(38)		
Average = Sum(39)m / 12 =	73.3191	73.1836	73.0508	72.4272	72.3105	71.7674	71.7674	71.6668	71.9766	72.3105	72.5466	72.7933	(39)		
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
HLP (average)	1.0305	1.0286	1.0267	1.0180	1.0163	1.0087	1.0087	1.0073	1.0116	1.0163	1.0196	1.0231	(40)		
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31			

4. Water heating energy requirements (kWh/year)															

Assumed occupancy															2.2737 (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															
	26.3321	25.9346	25.3691	24.5223	23.7591	22.7084	21.9114	22.8861	23.3976	24.4386	25.5209	26.3112	(42b)		
Hot water usage for other uses															
	37.9151	36.5364	35.1577	33.7789	32.4002	31.0215	31.0215	32.4002	33.7789	35.1577	36.5364	37.9151	(42c)		
Average daily hot water use (litres/day)															58.8844 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Energy conte	64.2472	62.4710	60.5268	58.3012	56.1593	53.7299	52.9328	55.2863	57.1765	59.5963	62.0573	64.2264	(44)		
Energy content (annual)	94.5831	82.6618	86.4916	76.1560	72.3669	62.1369	58.4923	65.0729	66.3219	76.7958	83.8726	94.3211	(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															
WWHRS	80.3956	70.2625	73.5178	64.7326	61.5119	52.8163	49.7185	55.3120	56.3736	65.2765	71.2917	80.1730	(62)		
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	(63a)		
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	(63b)		
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	(63c)		
Output from w/h	80.3956	70.2625	73.5178	64.7326	61.5119	52.8163	49.7185	55.3120	56.3736	65.2765	71.2917	80.1730	(64)		
12Total per year (kWh/year)															
Electric shower(s)	49.9259	44.4844	48.5752	46.3547	47.2246	45.0477	46.5493	47.2246	46.3547	48.5752	47.6618	49.9259	(64a)		
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =															567.9040 (64a)
Heat gains from water heating, kWh/month															
	32.5804	28.6867	30.5233	27.7718	27.1841	24.4660	24.0669	25.6341	25.6821	28.4629	29.7384	32.5247	(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	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	(66)		
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	102.6656	113.6655	102.6656	106.0878	102.6656	106.0878	102.6656	102.6656	106.0878	102.6656	106.0878	102.6656	(67)		
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	199.9661	202.0411	196.8121	185.6802	171.6282	158.4213	149.5982	147.5232	152.7522	163.8841	177.9361	191.1430	(68)		
Pumps, fans	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	(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)	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	(71)		
Total internal gains	43.7908	42.6886	41.0259	38.5720	36.5378	33.9806	32.3480	34.4545	35.6696	38.2566	41.3033	43.7160	(72)		
	403.5283	415.5009	397.6094	387.4458	367.9374	355.5954	341.7177	341.7491	351.6153	361.9121	382.4330	394.6304	(73)		

6. Solar gains															

[Jan]															
				Area	Solar flux	g	FF								
				m2	Table 6a	Specific data	Specific data								
					W/m2	or Table 6b	or Table 6c								
Southeast				5.9600	36.7938	0.3500	0.7000								
Southwest				7.1300	36.7938	0.3500	0.7000								
Solar gains	81.7738	139.2910	190.5840	236.1428	264.4996	262.5869	253.1618	232.0063	206.3622	153.9462	97.9461	69.9813	(83)		

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Total gains 485.3020 554.7919 588.1934 623.5886 632.4370 618.1823 594.8794 573.7554 557.9775 515.8583 480.3791 464.6117 (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	64.7430	64.8629	64.9808	65.5403	65.6460	66.1429	66.1429	66.2357	65.9506	65.6460	65.4325	65.2106
alpha	5.3162	5.3242	5.3321	5.3694	5.3764	5.4095	5.4095	5.4157	5.3967	5.3764	5.3622	5.3474
util living area	0.9956	0.9903	0.9802	0.9476	0.8679	0.6980	0.5226	0.5621	0.7907	0.9545	0.9901	0.9965 (86)
MIT	19.8209	19.9994	20.2317	20.5448	20.8028	20.9556	20.9922	20.9885	20.9115	20.5859	20.1508	19.7895 (87)
Th 2	20.0580	20.0596	20.0611	20.0684	20.0698	20.0761	20.0761	20.0773	20.0737	20.0698	20.0670	20.0641 (88)
util rest of house	0.9942	0.9874	0.9738	0.9300	0.8241	0.6146	0.4171	0.4556	0.7172	0.9356	0.9865	0.9954 (89)
MIT 2	18.9877	19.1659	19.3960	19.7033	19.9357	20.0552	20.0740	20.0739	20.0261	19.7474	19.3229	18.9613 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.3353	19.5136	19.7446	20.0544	20.2974	20.4308	20.4570	20.4554	20.3954	20.0972	19.6682	19.3068 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.3353	19.5136	19.7446	20.0544	20.2974	20.4308	20.4570	20.4554	20.3954	20.0972	19.6682	19.3068 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9928	0.9852	0.9712	0.9297	0.8359	0.6481	0.4613	0.5002	0.7446	0.9363	0.9845	0.9942 (94)
Useful gains	481.8169	546.5546	571.2349	579.7372	528.6238	400.6209	274.4296	286.9878	415.4975	482.9930	472.9374	461.9225 (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	1102.3718	1069.4730	967.5279	807.8788	621.6832	418.4619	276.8075	290.6396	453.1240	686.7448	911.7828	1099.6722 (97)
Space heating kWh	461.6929	351.4012	294.8420	164.2620	69.2362	0.0000	0.0000	0.0000	0.0000	151.5914	315.9687	474.4858 (98a)
Space heating requirement - total per year (kWh/year)	2283.4801											
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	461.6929	351.4012	294.8420	164.2620	69.2362	0.0000	0.0000	0.0000	0.0000	151.5914	315.9687	474.4858 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2283.4801											
Space heating per m2	(98c) / (4) = 32.0939 (99)											

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
Ext. temp.	Jan 4.3000	Feb 4.9000	Mar 6.5000	Apr 8.9000	May 11.7000	Jun 14.6000	Jul 16.6000	Aug 16.4000	Sep 14.1000	Oct 10.6000	Nov 7.1000	Dec 4.2000
Heat loss rate W												
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	674.6132	531.0785	544.6675	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.8490	0.9188	0.9010	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	572.7334	487.9610	490.7353	0.0000	0.0000	0.0000	0.0000 (102)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	682.7231	657.6290	634.8216	0.0000	0.0000	0.0000	0.0000 (103)
Cooled fraction	0.0000	0.0000	0.0000	0.0000	0.0000	79.1926	126.2330	107.2001	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)
	0.0000	0.0000	0.0000	0.0000	0.0000	19.7982	31.5582	26.8000	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												78.1564 (107)
Energy for space heating												32.0939 (99)
Energy for space cooling												1.0985 (108)
Total												33.1924 (109)
Fabric Energy Efficiency (DFEE)												33.2 (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	71.1500 (1b)	x 2.8000 (2b)	= 199.2200 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.1500		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	199.2200 (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	3 * 10 = 30.0000 (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
30.0000 / (5) = 0.1506 (8)
Yes
Blower Door
5.0000 (17)
0.4006 (18)
2 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3405 (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	0.4341	0.4256	0.4171	0.3745	0.3660	0.3235	0.3235	0.3150	0.3405	0.3660	0.3831	0.4001	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)													(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =													(23c)
Effective ac	0.5942	0.5906	0.5870	0.5701	0.5670	0.5523	0.5523	0.5496	0.5580	0.5670	0.5734	0.5800	(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			13.0900	1.1450	14.9885			(27)
Heatloss Floor 1			71.1500	0.1300	9.2495			(28b)
External Wall 1	42.8400	13.0900	29.7500	0.1800	5.3550			(29a)
Corridor wall	12.0400	2.4200	9.6200	0.1800	1.7316			(29a)
Total net area of external elements Aum(A, m2)			126.0300					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	33.7446		(33)
Main dwelling								
Party Wall 1			40.5400	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								240.1805 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	8.2500	0.0500	0.4125	
E3 Sill	4.7600	0.0500	0.2380	
E4 Jamb	18.6000	0.0500	0.9300	
E7 Party floor between dwellings (in blocks of flats)	10.9400	0.0700	0.7658	
E7 Party floor between dwellings (in blocks of flats)	4.3000	0.0700	0.3010	
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872	
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872	
E16 Corner (normal)	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)	10.9400	0.3200	3.5008	
E21 Exposed floor (inverted)	4.3000	0.3200	1.3760	
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	14.4800	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	14.4800	0.1600	2.3168	
E16 Corner (normal)	2.8000	0.0900	0.2520	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				11.1913 (36)

Point Thermal bridges

Total fabric heat loss (33) + (36) + (36a) = 44.9359 (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	39.0667	38.8261	38.5903	37.4827	37.2755	36.3108	36.3108	36.1322	36.6824	37.2755	37.6947	38.1330	(38)
Heat transfer coeff	84.0027	83.7621	83.5263	82.4187	82.2114	81.2468	81.2468	81.0681	81.6183	82.2114	82.6307	83.0689	(39)
Average = Sum(39)m / 12 =												82.4177	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1806	1.1773	1.1739	1.1584	1.1555	1.1419	1.1419	1.1394	1.1471	1.1555	1.1614	1.1675	(40)
HLP (average)												1.1584	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2737 (42)
Hot water usage for mixer showers													(42a)
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													
Hot water usage for baths													(42b)
26.9325 26.5325 25.9693 24.9307 24.1530 23.2907 22.8250 23.3843 23.9933 24.9160 25.9759 26.8415													
Hot water usage for other uses													(42c)
37.9151 36.5364 35.1577 33.7789 32.4002 31.0215 31.0215 32.4002 33.7789 35.1577 36.5364 37.9151													
Average daily hot water use (litres/day)													(43)
Daily hot water use	64.8476	63.0689	61.1269	58.7096	56.5533	54.3122	53.8464	55.7845	57.7722	60.0737	62.5123	64.7566	(44)
Energy conte	102.7028	89.8093	93.9498	80.3706	76.1315	66.7832	65.1226	69.0729	71.2389	81.5194	89.0603	101.3932	(45)
Energy content (annual)										Total = Sum(45)m =		987.1545	
Distribution loss (46)m = 0.15 x (45)m													(46)
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													
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													
87.2974 76.3379 79.8573 68.3150 64.7118 56.7657 55.3542 58.7119 60.5531 69.2915 75.7012 86.1842													(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	87.2974	76.3379	79.8573	68.3150	64.7118	56.7657	55.3542	58.7119	60.5531	69.2915	75.7012	86.1842 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											839.0813 (64)
Electric shower(s)	49.9259	44.4844	48.5752	46.3547	47.2246	45.0477	46.5493	47.2246	46.3547	48.5752	47.6618	49.9259 (64a)
Heat gains from water heating, kWh/month	34.3058	30.2056	32.1081	28.6674	27.9841	25.4533	25.4759	26.4841	26.7270	29.4667	30.8408	567.9040 (64a)
												34.0275 (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	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859	113.6859 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.6656	113.6655	102.6656	106.0878	102.6656	106.0878	102.6656	102.6656	106.0878	102.6656	106.0878	102.6656 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.9661	202.0411	196.8121	185.6802	171.6282	158.4213	149.5982	147.5232	152.7522	163.8841	177.9361	191.1430 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686	34.3686 (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)	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487	-90.9487 (71)
Water heating gains (Table 5)	46.1100	44.9488	43.1561	39.8159	37.6130	35.3519	34.2418	35.5969	37.1208	39.6058	42.8344	45.7359 (72)
Total internal gains	405.8474	417.7611	399.7396	388.6897	369.0126	356.9667	343.6114	342.8915	353.0666	363.2612	383.9641	396.6503 (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	
Southeast				5.9600	36.7938	0.6300	0.7000		0.7700		67.0183 (77)	
Southwest				7.1300	36.7938	0.6300	0.7000		0.7700		80.1745 (79)	
Solar gains	147.1928	250.7238	343.0512	425.0570	476.0993	472.6564	455.6912	417.6114	371.4519	277.1032	176.3030	125.9663 (83)
Total gains	553.0402	668.4849	742.7908	813.7467	845.1119	829.6231	799.3026	760.5029	724.5184	640.3644	560.2671	522.6167 (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	56.5089	56.6712	56.8312	57.5950	57.7401	58.4257	58.4257	58.5545	58.1597	57.7401	57.4472	57.1441
alpha	4.7673	4.7781	4.7887	4.8397	4.8493	4.8950	4.8950	4.9036	4.8773	4.8493	4.8298	4.8096
util living area	0.9928	0.9821	0.9605	0.9011	0.7850	0.6014	0.4424	0.4826	0.7117	0.9242	0.9838	0.9944 (86)
MIT	19.6800	19.9294	20.2296	20.5901	20.8429	20.9672	20.9940	20.9909	20.9261	20.5912	20.0731	19.6426 (87)
Th 2	19.9355	19.9382	19.9409	19.9534	19.9558	19.9668	19.9668	19.9688	19.9625	19.9558	19.9510	19.9461 (88)
util rest of house	0.9906	0.9767	0.9485	0.8720	0.7276	0.5146	0.3410	0.3784	0.6279	0.8953	0.9779	0.9927 (89)
MIT 2	18.7519	18.9996	19.2936	19.6407	19.8566	19.9526	19.9653	19.9663	19.9259	19.6516	19.1535	18.7229 (90)
Living area fraction	fLA = Living area / (4) =											0.4171 (91)
MIT	19.1391	19.3874	19.6841	20.0367	20.2680	20.3759	20.3944	20.3937	20.3431	20.0436	19.5371	19.1066 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1391	19.3874	19.6841	20.0367	20.2680	20.3759	20.3944	20.3937	20.3431	20.0436	19.5371	19.1066 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9883	0.9731	0.9450	0.8746	0.7459	0.5500	0.3834	0.4220	0.6604	0.8981	0.9750	0.9908 (94)
Ext temp.	546.5905	650.5266	701.9228	711.6737	630.4024	456.2878	306.4890	320.9218	478.4633	575.1322	546.2525	517.8178 (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	1246.5206	1213.4984	1101.2145	917.8741	704.3915	469.2691	308.2818	323.7633	509.5540	776.3694	1027.6876	1238.2726 (97)
Space heating requirement - total per year (kWh/year)	520.7480	378.3171	297.0730	148.4643	55.0479	0.0000	0.0000	0.0000	0.0000	149.7205	346.6333	536.0183 (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)
Solar heating contribution - total per year (kWh/year)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Space heating kWh	520.7480	378.3171	297.0730	148.4643	55.0479	0.0000	0.0000	0.0000	0.0000	149.7205	346.6333	536.0183 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2432.0223											2432.0223
Space heating per m2	(98c) / (4) =											34.1816 (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	763.7195	601.2260	616.1177	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9006	0.9485	0.9340	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	687.8358	570.2462	575.4355	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	929.6303	896.2454	852.9050	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	174.0920	242.5434	206.4373	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											1.0000 (105)
Intermittency factor (Table 10b)												

Full SAP Calculation Printout



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	43.5230	60.6359	51.6093	0.0000	0.0000	0.0000	0.0000 (107)
Energy for space heating												155.7682 (107)
Energy for space cooling												34.1816 (99)
Total												2.1893 (108)
Fabric Energy Efficiency (TFEE)												36.3709 (109)
												36.4 (109)