

Summary for Input Data

Plot Reference	A 504	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	4.90	TER	13.19
Environmental	96 A	% DER < TER			62.85
CO ₂ Emissions (t/year)	0.31	DFEE	32.25	TFEE	33.15
Compliance Check	See BREL	% DFEE < TFEE			2.72
% DPER < TPER	26.29	DPER	51.84	TPER	70.33

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

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

Orientation	Northeast
Property Tenure	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, End-Terrace
Position of Flat	Top-floor flat
Which Floor	5
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	149.19 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:	19.60 m	71.14 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	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	71.14	71.14	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data



Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete planks floor, screed, carpeted	40.00	71.14

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	0.05	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
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
E14 Flat roof	Independently assessed	19.60	0.05	0.05	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	14.48	0.05	0.05	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

Summary for Input Data

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m²/(h.m²) @ 50 Pa

Test Method

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	15.00	1125.00	7

24.0 Main Heating 1

25.0 Main Heating 2

26.0 Heat Networks

Space Community Heating

Distribution Loss

Distribution Loss Value

SAP Code

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

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower 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

Insulation Type

Cylinder Volume L

Loss kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Diverter

Summary for Input Data



Battery Capacity [kWh]

0.00

PV Cells kWp

Orientation

Elevation

Overshading

FGHRS

MCS Certificate

**Overshading
Factor**

**MCS
Certificate
Reference**

**Panel
Manufacturer**

0.34

South East

Horizontal

Modest

No

0.80

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Compliance Check	See BREL	% DFEE < TFEE				2.72	
% DPER < TPER	26.29	DPER	51.84	TPER	70.33		
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	71.1400 (1b)	2.8000 (2b)	199.1920 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.1400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	199.1920 (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)
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)
External Roof 1	71.1400		71.1400	0.1000	7.1140	9.0000	640.2600 (30)
Total net area of external elements Aum(A, m ²)			126.0200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	30.8128		(33)
Main dwelling							
Party Wall 1			40.5400	0.0000	0.0000	70.0000	2837.8000 (32)
Party Floor 1			71.1400			40.0000	2845.6000 (32d)
Internal Wall 1			170.4600			9.0000	1534.1400 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	10613.7000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							149.1945 (35)
List of Thermal Bridges							

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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	0.0500	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
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
E14 Flat roof	19.6000	0.0500	0.9800
P4 Party wall - Roof (insulation at ceiling level)	14.4800	0.0500	0.7240
E16 Corner (normal)	2.8000	0.0390	0.1092
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.7312 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	35.5440 (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	17.2262	17.0167	16.8072	15.7596	15.5500	14.5024	14.5024	14.2929	14.9215	15.5500	15.9691	16.3881	(38)
Heat transfer coeff	52.7703	52.5608	52.3512	51.3036	51.0941	50.0465	50.0465	49.8369	50.4655	51.0941	51.5131	51.9322	(39)
Average = Sum(39)m / 12 =												51.2512	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.7418	0.7388	0.7359	0.7212	0.7182	0.7035	0.7035	0.7005	0.7094	0.7182	0.7241	0.7300	(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													2.2735 (42)
Hot water usage for mixer showers	60.7635	59.8332	58.4622	56.3531	54.4635	51.8199	49.7290	52.1734	53.4028	56.0212	58.7480	60.7087	(42a)
Hot water usage for baths	26.3304	25.9330	25.3675	24.5207	23.7576	22.7070	21.9100	22.8846	23.3961	24.4370	25.5193	26.3096	(42b)
Hot water usage for other uses	37.9127	36.5341	35.1554	33.7768	32.3981	31.0195	31.0195	32.3981	33.7768	35.1554	36.5341	37.9127	(42c)
Average daily hot water use (litres/day)												114.8999	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	125.0066	122.3002	118.9851	114.6506	110.6192	105.5464	102.6584	107.4561	110.5757	115.6137	120.8014	124.9309	(44)
Energy content (annual)	184.0313	161.8279	170.0273	149.7624	142.5440	122.0609	113.4406	126.4778	128.2623	148.9799	163.2671	183.4703	(45)
Distribution loss (46)m = 0.15 x (45)m	27.6047	24.2742	25.5041	22.4644	21.3816	18.3091	17.0161	18.9717	19.2393	22.3470	24.4901	27.5205	(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	239.3081	211.7554	225.3041	203.2561	197.8208	175.5546	168.7174	181.7546	181.7560	204.2567	216.7608	238.7471	(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	239.3081	211.7554	225.3041	203.2561	197.8208	175.5546	168.7174	181.7546	181.7560	204.2567	216.7608	238.7471	(64)
12Total per year (kWh/year)												2444.9917	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	105.4119	93.7497	100.7555	92.5909	91.6173	83.3802	81.9404	86.2753	85.4422	93.7573	97.0813	105.2253	(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	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.6516	113.6500	102.6516	106.0733	102.6516	106.0733	102.6516	102.6516	106.0733	102.6516	106.0733	102.6516	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.9430	202.0178	196.7894	185.6588	171.6084	158.4030	149.5810	147.5062	152.7346	163.8652	177.9156	191.1210	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	(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)	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	(71)
Water heating gains (Table 5)	141.6826	139.5085	135.4241	128.5985	123.1416	115.8058	110.1350	115.9615	118.6697	126.0178	134.8351	141.4319	(72)
Total internal gains	501.3794	512.2785	491.9673	477.4328	454.5038	437.3843	419.4698	423.2214	434.5798	449.6368	475.9262	492.3066	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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					W/m2	or Table 6b		or Table 6c		Table 6d			
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	97.9461	69.9813 (83)	
Total gains	583.1532	651.5695	682.5513	713.5756	719.0034	699.9712	672.6316	655.2278	640.9419	603.5830	573.8723	562.2879 (84)	
7. Mean internal temperature (heating season)													
Temperature during heating periods in the living area from Table 9, Th1 (C)													
Utilisation factor for gains for living area, nil,m (see Table 9a)												21.0000 (85)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	55.8695	56.0922	56.3167	57.4667	57.7024	58.9102	58.9102	59.1579	58.4211	57.7024	57.2330	56.7711	
alpha	4.7246	4.7395	4.7544	4.8311	4.8468	4.9273	4.9273	4.9439	4.8947	4.8468	4.8155	4.7847	
util living area	0.9469	0.9142	0.8670	0.7662	0.6278	0.4523	0.3265	0.3486	0.5304	0.7722	0.9055	0.9528 (86)	
MIT	20.1830	20.3774	20.5839	20.8150	20.9406	20.9906	20.9985	20.9979	20.9793	20.8368	20.5098	20.1611 (87)	
Th 2	20.3041	20.3067	20.3092	20.3222	20.3248	20.3377	20.3377	20.3403	20.3326	20.3248	20.3196	20.3144 (88)	
util rest of house	0.9389	0.9022	0.8491	0.7382	0.5894	0.4072	0.2777	0.2992	0.4829	0.7398	0.8905	0.9456 (89)	
MIT 2	19.3577	19.5989	19.8516	20.1323	20.2707	20.3309	20.3370	20.3392	20.3165	20.1632	19.7753	19.3387 (90)	
Living area fraction									fLA = Living area /	(4) =		0.4172 (91)	
MIT	19.7020	19.9237	20.1571	20.4171	20.5502	20.6062	20.6129	20.6140	20.5930	20.4442	20.0818	19.6818 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.7020	19.9237	20.1571	20.4171	20.5502	20.6062	20.6129	20.6140	20.5930	20.4442	20.0818	19.6818 (93)	
8. Space heating requirement													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9308	0.8948	0.8448	0.7423	0.6025	0.4256	0.2980	0.3197	0.5017	0.7458	0.8847	0.9378 (94)	
Useful gains	542.7963	582.9995	576.6309	529.6707	433.2037	297.9068	200.4686	209.4987	321.5544	450.1413	507.7333	527.3249 (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	812.7681	789.6553	714.9665	590.8694	452.1908	300.5879	200.8338	210.0138	327.6741	502.9810	668.7312	804.0038 (97)	
Space heating kWh	200.8590	138.8727	102.9217	44.0631	14.1264	0.0000	0.0000	0.0000	0.0000	39.3127	115.9185	205.8491 (98a)	
Space heating requirement - total per year (kWh/year)												861.9232	
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	200.8590	138.8727	102.9217	44.0631	14.1264	0.0000	0.0000	0.0000	0.0000	39.3127	115.9185	205.8491 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												861.9232	
Space heating per m2										(98c) / (4) =		12.1159 (99)	
9b. Energy requirements													
Fraction of space heat from secondary/supplementary system (Table 11)													
Fraction of space heat from community system												0.0000 (301)	
Fraction of heat from community Heat pump-Space and Water												1.0000 (302)	
Factor for control and charging method (Table 4c(3)) for space heating												1.0000 (303a)	
Factor for charging method (Table 4c(3)) for water heating												1.0000 (305)	
Distribution loss factor (Table 12c) for community heating system												1.0000 (305a)	
Efficiency of secondary/supplementary heating system, %												1.5000 (306)	
Space heating:												0.0000 (208)	
Space heating requirement													
	200.8590	138.8727	102.9217	44.0631	14.1264	0.0000	0.0000	0.0000	0.0000	39.3127	115.9185	205.8491 (98)	
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50													
307a	301.2885	208.3090	154.3825	66.0946	21.1895	0.0000	0.0000	0.0000	0.0000	58.9691	173.8778	308.7737	
Space heating requirement	301.2885	208.3090	154.3825	66.0946	21.1895	0.0000	0.0000	0.0000	0.0000	58.9691	173.8778	308.7737 (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													
	239.3081	211.7554	225.3041	203.2561	197.8208	175.5546	168.7174	181.7546	181.7560	204.2567	216.7608	238.7471 (64)	
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50													
310a	358.9622	317.6330	337.9562	304.8841	296.7313	263.3318	253.0761	272.6319	272.6340	306.3851	325.1412	358.1206	
Water heating fuel	358.9622	317.6330	337.9562	304.8841	296.7313	263.3318	253.0761	272.6319	272.6340	306.3851	325.1412	358.1206 (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	15.7377	14.2147	15.7377	15.2300	15.7377	15.2300	15.7377	15.7377	15.2300	15.7377	15.2300	15.7377 (331)	
Lighting	21.8231	17.5073	15.7634	11.5489	8.9207	7.2883	8.1378	10.5778	13.7395	18.0270	20.3614	22.4296 (332)	
Electricity generated by PVs (Appendix M) (negative quantity)	(333a)m	-3.7296	-6.6232	-12.2242	-17.2121	-21.5247	-21.2319	-20.7871	-17.8841	-13.4401	-8.6377	-4.4790	-3.0445 (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 (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 (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 (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 (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 (335b)	
Annual totals kWh/year													
Space heating fuel - community heating												1292.8848 (307)	
Space heating fuel - secondary												0.0000 (309)	
Water heating fuel - community heating												3667.4875 (310)	
Efficiency of water heater												0.0000 (311)	
Electricity used for heat distribution												12.9288 (313)	
Space cooling fuel												0.0000 (321)	
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)													
mechanical ventilation fans (SFP = 0.7625)												185.2984 (330a)	

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Total electricity for the above, kWh/year	185.2984 (331)
Electricity for lighting (calculated in Appendix L)	176.1246 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-150.8184 (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	5170.9769 (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	2138.0915	0.1569	87.4629 (367)
Electrical energy for heat distribution (space & water)	12.9288	0.0000	7.1935 (372)
Overall CO2 factor for heat network			0.0640 (386)
Total CO2 associated with community systems			317.2564 (373)
Space and water heating			317.2564 (376)
Pumps, fans and electric keep-hot	185.2984	0.1387	25.7032 (378)
Energy for lighting	176.1246	0.1443	25.4202 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-150.8184	0.1305	-19.6858
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-19.6858 (380)
Total CO2, kg/year			348.6941 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.9000 (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	2138.0915	1.5810	881.0646 (467)
Electrical energy for heat distribution (space & water)	12.9288	0.0000	76.2112 (472)
Overall CO2 factor for heat network			0.6776 (486)
Total CO2 associated with community systems			3361.1753 (473)
Space and water heating			3361.1753 (476)
Pumps, fans and electric keep-hot	185.2984	1.5128	280.3193 (478)
Energy for lighting	176.1246	1.5338	270.1458 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-150.8184	1.4822	-223.5378
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-223.5378 (480)
Total Primary energy kWh/year			3688.1027 (483)
Dwelling Primary energy Rate (DPER)			51.8400 (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	71.1400 (1b)	2.8000 (2b)	199.1920 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.1400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	199.1920 (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	0.4342	0.4256	0.4171	0.3746	0.3661	0.3235	0.3235	0.3150	0.3405	0.3661	0.3831	0.4001	(22b)
	0.5942	0.5906	0.5870	0.5702	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)
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)
External Roof 1	71.1400		71.1400	0.1100	7.8254			(30)
Total net area of external elements Aum(A, m2)			126.0200					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.3205			(33)
Main dwelling								
Party Wall 1			40.5400	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							149.1945	(35)

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

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	
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	
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	
E14 Flat roof	19.6000	0.0800	1.5680	
P4 Party wall - Roof (insulation at ceiling level)	14.4800	0.1200	1.7376	
E16 Corner (normal)	2.8000	0.0900	0.2520	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				7.2161 (36)
Point Thermal bridges				(36a) = 0.0000
Total fabric heat loss				(33) + (36) + (36a) = 39.5366 (37)

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

Point Thermal bridges

Total fabric heat loss

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

(38)m	Jan 39.0619	Feb 38.8213	Mar 38.5855	Apr 37.4779	May 37.2707	Jun 36.3061	Jul 36.3061	Aug 36.1274	Sep 36.6776	Oct 37.2707	Nov 37.6899	Dec 38.1282	(38)
Heat transfer coeff	78.5985	78.3579	78.1221	77.0146	76.8074	75.8427	75.8427	75.6641	76.2143	76.8074	77.2266	77.6648	(39)
Average = Sum(39)m / 12 =												77.0136	

HLP	Jan 1.1048	Feb 1.1015	Mar 1.0981	Apr 1.0826	May 1.0797	Jun 1.0661	Jul 1.0661	Aug 1.0636	Sep 1.0713	Oct 1.0797	Nov 1.0856	Dec 1.0917	(40)
HLP (average)												1.0826	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2735	(42)
Hot water usage for mixer showers														
62.3384	61.4016	60.0365	57.4245	55.4970	53.3474	52.1256	53.4804	54.9655	57.2735	59.9415	62.0996	(42a)		
Hot water usage for baths														
26.9308	26.5308	25.9676	24.9291	24.1515	23.2893	22.8235	23.3828	23.9918	24.9144	25.9743	26.8398	(42b)		
Hot water usage for other uses														
37.9127	36.5341	35.1554	33.7768	32.3981	31.0195	31.0195	32.3981	33.7768	35.1554	36.5341	37.9127	(42c)		
Average daily hot water use (litres/day)													116.9091	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
127.1819	124.4665	121.1595	116.1304	112.0466	107.6561	105.9686	109.2613	112.7340	117.3433	122.4499	126.8521	(44)		
Energy content (annual)	201.4251	177.2387	186.2177	158.9767	150.8363	132.3758	128.1598	135.2883	139.0123	159.2338	174.4523	198.6197	(45)	
Distribution loss (46)m = 0.15 x (45)m														
30.2138	26.5858	27.9326	23.8465	22.6254	19.8564	19.2240	20.2933	20.8519	23.8851	26.1678	29.7930	(46)		
Water storage loss (or HIU loss):														
Store volume													180.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.5520	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													0.8381	(55)
Total storage loss														
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)	
If cylinder contains dedicated solar storage														
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month														
250.6678	221.7159	235.4603	206.6309	200.0790	180.0300	177.4025	184.5310	186.6665	208.4765	222.1065	247.8623	(62)		
WWHRS	-28.4985	-25.2043	-26.3925	-21.8541	-20.3672	-17.4284	-16.3363	-17.3720	-18.0320	-21.2578	-24.0825	-27.9708	(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														
222.1693	196.5116	209.0678	184.7769	179.7118	162.6016	161.0662	167.1590	168.6345	187.2187	198.0240	219.8916	(64)		
12Total per year (kWh/year)													2256.8328	(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														
106.3680	94.5137	101.3115	90.9831	89.5472	82.1383	82.0073	84.3775	84.3450	92.3394	96.1288	105.4352	(65)		

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

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Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.6516	113.6500	102.6516	106.0733	102.6516	106.0733	102.6516	102.6516	106.0733	102.6516	106.0733	102.6516	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.9430	202.0178	196.7894	185.6588	171.6084	158.4030	149.5810	147.5062	152.7346	163.8652	177.9156	191.1210	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	(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)	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	(71)
Water heating gains (Table 5)	142.9677	140.6453	136.1714	126.3655	120.3591	114.0810	110.2248	113.4106	117.1458	124.1121	133.5122	141.7139	(72)
Total internal gains	505.6645	516.4153	495.7146	478.1998	454.7213	435.6595	419.5596	420.6706	433.0559	450.7311	477.6033	495.5887	(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	652.8573	767.1391	838.7658	903.2568	930.8206	908.3159	875.2508	838.2820	804.5078	727.8342	653.9063	621.5551	(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	37.5103	37.6254	37.7390	38.2817	38.3850	38.8732	38.8732	38.9650	38.6837	38.3850	38.1766	37.9612	
alpha	3.5007	3.5084	3.5159	3.5521	3.5590	3.5915	3.5915	3.5977	3.5789	3.5590	3.5451	3.5307	
util living area	0.9544	0.9234	0.8785	0.7923	0.6681	0.5066	0.3738	0.4047	0.5960	0.8154	0.9247	0.9604	(86)
MIT	19.4563	19.7604	20.1119	20.5130	20.7917	20.9429	20.9852	20.9801	20.8952	20.5372	19.9448	19.4096	(87)
Th 2	19.9969	19.9996	20.0023	20.0151	20.0175	20.0286	20.0286	20.0307	20.0243	20.0175	20.0126	20.0126	(88)
util rest of house	0.9462	0.9104	0.8581	0.7589	0.6176	0.4384	0.2944	0.3237	0.5277	0.7782	0.9096	0.9532	(89)
MIT 2	18.2271	18.6056	19.0379	19.5222	19.8324	19.9895	20.0218	20.0209	19.9461	19.5636	18.8505	18.1761	(90)
Living area fraction									fLA = Living area / (4) =			0.4172	(91)
MIT	18.7399	19.0874	19.4860	19.9355	20.2326	20.3872	20.4237	20.4211	20.3421	19.9698	19.3070	18.6907	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7399	19.0874	19.4860	19.9355	20.2326	20.3872	20.4237	20.4211	20.3421	19.9698	19.3070	18.6907	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	609.2175	687.4795	709.6275	682.8411	585.6524	421.6633	286.3090	299.1487	443.1347	564.9656	586.3160	584.8554	(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	1134.9549	1111.6943	1014.4924	849.8981	655.3671	438.9206	290.0019	304.2540	475.7335	719.6680	942.7079	1125.4204	(97)
Space heating kWh	391.1487	285.0724	226.8195	120.2811	51.8677	0.0000	0.0000	0.0000	0.0000	115.0986	256.6022	402.1803	(98a)
Space heating requirement - total per year (kWh/year)												1849.0704	
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	391.1487	285.0724	226.8195	120.2811	51.8677	0.0000	0.0000	0.0000	0.0000	115.0986	256.6022	402.1803	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1849.0704	
Space heating per m2										(98c) / (4) =		25.9920	(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)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
391.1487	285.0724	226.8195	120.2811	51.8677	0.0000	0.0000	0.0000	0.0000	0.0000	115.0986	256.6022	402.1803	(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)	423.7797	308.8542	245.7416	130.3153	56.1947	0.0000	0.0000	0.0000	0.0000	124.7005	278.0089	435.7317	(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	222.1693	196.5116	209.0678	184.7769	179.7118	162.6016	161.0662	167.1590	168.6345	187.2187	198.0240	219.8916	(64)
Efficiency of water heater	85.3145	84.8931	84.2429	83.1217	81.6535	79.8000	79.8000	79.8000	79.8000	83.0028	84.6420	79.8000	(216)
Fuel for water heating, kWh/month	260.4120	231.4811	248.1725	222.2968	220.0906	203.7614	201.8373	209.4724	211.3214	225.5571	233.9549	257.4976	(219)

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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	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	21.3290	17.1109	15.4065	11.2874	8.7187	7.1233	7.9535	10.3383	13.4284	17.6188	19.9004	21.9218	21.9218	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-15.7675	-23.6475	-36.1332	-43.2714	-49.0092	-46.6113	-46.0455	-42.2961	-36.1098	-28.1788	-17.8313	-13.4718	-13.4718	(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	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	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	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233b)m	-5.0650	-10.9414	-22.2926	-34.3001	-46.1668	-46.6864	-46.1361	-38.6865	-27.8676	-15.9091	-6.8451	-3.9842	-3.9842	(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	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	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	0.0000	(235d)
Annual totals kWh/year														
Space heating fuel - main system 1													2003.3265	(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													2725.8552	(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)													172.1371	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-703.2545	(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													4284.0642	(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	2003.3265	0.2100	420.6986	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2725.8552	0.2100	572.4296	(264)
Space and water heating			993.1282	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	172.1371	0.1443	24.8447	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-398.3735	0.1333	-53.1068	
PV Unit electricity exported	-304.8811	0.1252	-38.1700	
Total			-91.2768	(269)
Total CO2, kg/year			938.6253	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.1900	(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	2003.3265	1.1300	2263.7590	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2725.8552	1.1300	3080.2164	(278)
Space and water heating			5343.9753	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	172.1371	1.5338	264.0296	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-398.3735	1.4926	-594.6183	
PV Unit electricity exported	-304.8811	0.4595	-140.0998	
Total			-734.7181	(283)
Total Primary energy kWh/year			5003.3877	(286)
Target Primary Energy Rate (TPER)			70.3300	(287)

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Plot Reference	A 504			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	4.90	TER	13.19
Environmental	96 A	% DER < TER			62.85
CO ₂ Emissions (t/year)	0.31	DFEE	32.25	TFEE	33.15
Compliance Check	See BREL	% DFEE < TFEE			2.72
% DPER < TPER	26.29	DPER	51.84	TPER	70.33
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	71.1400 (1b)	2.8000 (2b)	199.1920 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.1400		199.1920 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 199.1920 (5)

2. Ventilation rate

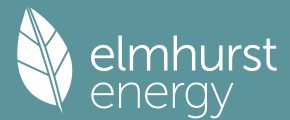
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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	0.2811	0.2747	0.2427	0.2427	0.2364	0.2555	0.2747	0.2875	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)
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)
External Roof 1	71.1400		71.1400	0.1000	7.1140	9.0000	640.2600 (30)
Total net area of external elements Aum(A, m ²)			126.0200				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 30.8128		(33)
Main dwelling							
Party Wall 1			40.5400	0.0000	0.0000	70.0000	2837.8000 (32)
Party Floor 1			71.1400			40.0000	2845.6000 (32a)
Internal Wall 1			170.4600			9.0000	1534.1400 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 10613.7000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							149.1945 (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	0.0500	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	
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	
E14 Flat roof									19.6000	0.0500	0.9800	
P4 Party wall - Roof (insulation at ceiling level)									14.4800	0.0500	0.7240	
E16 Corner (normal)									2.8000	0.0390	0.1092	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)												4.7312 (36)
Point Thermal bridges												0.0000
Total fabric heat loss												(33) + (36) + (36a) = 35.5440 (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	36.3550	36.2195	36.0868	35.4631	35.3465	34.8033	34.8033	34.7027	35.0125	35.3465	35.5825	35.8293 (38)
Average = Sum(39)m / 12 =	71.8990	71.7636	71.6308	71.0072	70.8905	70.3473	70.3473	70.2468	70.5566	70.8905	71.1265	71.3733 (39)
												71.0066
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0107	1.0088	1.0069	0.9981	0.9965	0.9889	0.9889	0.9874	0.9918	0.9965	0.9998	1.0033 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31
												0.9981
												0.9981
4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.2735 (42)
Hot water usage for mixer showers												0.0000 (42a)
Hot water usage for baths												26.3304 (42b)
Hot water usage for other uses												37.9127 (42c)
Average daily hot water use (litres/day)												58.8807 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	64.2432	62.4670	60.5229	58.2975	56.1557	53.7265	52.9295	55.2827	57.1729	59.5925	62.0534	64.2223 (44)
Energy conte	94.5770	82.6565	86.4860	76.1511	72.3623	62.1329	58.4886	65.0688	66.3177	76.7909	83.8672	94.3151 (45)
Energy content (annual)										Total = Sum(45)m =		919.2142
Distribution loss (46)m = 0.15 x (45)m												0.0000 (46)
Water storage loss (or HIU loss):												0.0000 (46)
Total storage loss												0.0000 (56)
If cylinder contains dedicated solar storage												0.0000 (57)
Primary loss												0.0000 (59)
Combi loss												0.0000 (61)
Total heat required for water heating calculated for each month												80.3905 (62)
WWHRS												0.0000 (63a)
PV diverter												0.0000 (63b)
Solar input												0.0000 (63c)
FGHRS												0.0000 (63d)
Output from w/h												80.3905 (64)
12Total per year (kWh/year)												781.3321 (64)
Electric shower(s)												781 (64)
	49.9227	44.4815	48.5721	46.3518	47.2216	45.0448	46.5463	47.2216	46.3518	48.5721	47.6588	49.9227 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												567.8678 (64a)
Heat gains from water heating, kWh/month												32.5783 (65)
	32.5783	28.6849	30.5213	27.7701	27.1824	24.4644	24.0654	25.6325	25.6805	28.4611	29.7365	32.5226 (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	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	102.6516	113.6500	102.6516	106.0733	102.6516	106.0733	102.6516	102.6516	106.0733	102.6516	106.0733	102.6516 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	199.9430	202.0178	196.7894	185.6588	171.6084	158.4030	149.5810	147.5062	152.7346	163.8652	177.9156	191.1210 (68)
Pumps, fans	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674 (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)	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392 (71)
Total internal gains	43.7880	42.6859	41.0233	38.5695	36.5355	33.9784	32.3460	34.4523	35.6673	38.2542	41.3007	43.7132 (72)
	403.4848	415.4558	397.5665	387.4038	367.8976	355.5569	341.6808	341.7123	351.5774	361.8732	382.3918	394.5880 (73)
6. Solar gains												
[Jan]												
			Area	Solar flux	g	FF	Access	Gains				
			m2	Table 6a	or Table 6b	or Table 6c	factor	W				
				W/m2			Table 6d					
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	97.9461	69.9813 (83)
Total gains	485.2586	554.7468	588.1505	623.5466	632.3973	618.1438	594.8425	573.7186	557.9396	515.8194	480.3379	464.5693 (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	41.0054	41.0828	41.1590	41.5204	41.5888	41.9099	41.9099	41.9699	41.7856	41.5888	41.4508	41.3075
alpha	3.7337	3.7389	3.7439	3.7680	3.7726	3.7940	3.7940	3.7980	3.7857	3.7726	3.7634	3.7538
util living area	0.9795	0.9655	0.9447	0.8953	0.8066	0.6523	0.4985	0.5335	0.7341	0.9046	0.9649	0.9824 (86)
MIT	19.3334	19.5752	19.8891	20.3063	20.6559	20.8913	20.9699	20.9606	20.8215	20.3757	19.7897	19.2901 (87)
Th 2	20.0745	20.0760	20.0776	20.0849	20.0863	20.0926	20.0926	20.0938	20.0902	20.0863	20.0835	20.0806 (88)
util rest of house	0.9755	0.9589	0.9338	0.8738	0.7654	0.5810	0.4045	0.4398	0.6702	0.8807	0.9571	0.9790 (89)
MIT 2	18.5563	18.7954	19.1039	19.5100	19.8314	20.0297	20.0808	20.0773	19.9777	19.5830	19.0148	18.5182 (90)
Living area fraction									fLA = Living area /	(4) =		0.4172 (91)
MIT	18.8805	19.1207	19.4315	19.8422	20.1754	20.3892	20.4517	20.4458	20.3297	19.9137	19.3381	18.8402 (92)
Temperature adjustment												0.0000
adjusted MIT	18.8805	19.1207	19.4315	19.8422	20.1754	20.3892	20.4517	20.4458	20.3297	19.9137	19.3381	18.8402 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9689	0.9505	0.9246	0.8673	0.7698	0.6055	0.4427	0.4774	0.6882	0.8755	0.9492	0.9729 (94)
Useful gains	470.1746	527.2976	543.8069	540.8137	486.7983	374.2618	263.3151	273.8984	383.9960	451.5836	455.9230	451.9947 (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	1048.3230	1020.5308	926.2910	776.9771	600.8248	407.2516	270.9603	284.2060	439.5484	660.2527	870.4547	1044.9226 (97)
Space heating kWh	430.1424	331.4527	284.5681	170.0377	84.8357	0.0000	0.0000	0.0000	0.0000	155.2498	298.4628	441.1383 (98a)
Space heating requirement - total per year (kWh/year)												2195.8876
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	430.1424	331.4527	284.5681	170.0377	84.8357	0.0000	0.0000	0.0000	0.0000	155.2498	298.4628	441.1383 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2195.8876
Space heating per m2										(98c) / (4) =		30.8671 (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	661.2650	520.5703	533.8754	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8038	0.8726	0.8540	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	531.5444	454.2277	455.9413	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	682.6861	657.5934	634.7858	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	108.8220	151.3041	133.0603	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	27.2055	37.8260	33.2651	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												98.2966 (107)
Energy for space heating												30.8671 (99)
Energy for space cooling												1.3817 (108)
Total												32.2489 (109)
Fabric Energy Efficiency (DFEE)												32.2 (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	71.1400	x 2.8000	199.1920
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	71.1400		(1b) - (3b)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	(4) (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)

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Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											Air changes per hour	(8)
Pressure test												30.0000 / (5) =	0.1506
Pressure Test Method												Yes	
Measured/design AP50												Blower Door	
Infiltration rate												5.0000	(17)
Number of sides sheltered												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)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	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)
Adj infilt rate	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)
	0.4342	0.4256	0.4171	0.3746	0.3661	0.3235	0.3235	0.3150	0.3405	0.3661	0.3831	0.4001	(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	0.5942	0.5906	0.5870	0.5702	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)
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)
External Roof 1	71.1400		71.1400	0.1100	7.8254		(30)
Total net area of external elements Aum(A, m2)			126.0200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.3205		(33)
Main dwelling							
Party Wall 1			40.5400	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							149.1945 (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	
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	
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	
E14 Flat roof				19.6000	0.0800	1.5680	
P4 Party wall - Roof (insulation at ceiling level)				14.4800	0.1200	1.7376	
E16 Corner (normal)				2.8000	0.0900	0.2520	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.2161 (36)
Point Thermal bridges							(36a) = 0.0000
Total fabric heat loss							(33) + (36) + (36a) = 39.5366 (37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2735 (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	0.0000 (42a)
Hot water usage for baths												
26.9308	26.5308	25.9676	24.9291	24.1515	23.2893	22.8235	23.3828	23.9918	24.9144	25.9743	26.8398	(42b)
Hot water usage for other uses												
37.9127	36.5341	35.1554	33.7768	32.3981	31.0195	31.0195	32.3981	33.7768	35.1554	36.5341	37.9127	(42c)
Average daily hot water use (litres/day)												59.4352 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	64.8435	63.0649	61.1230	58.7059	56.5496	54.3088	53.8430	55.7809	57.7685	60.0698	62.5083	64.7525 (44)
Energy content	102.6963	89.8036	93.9438	80.3654	76.1267	66.7789	65.1185	69.0685	71.2344	81.5142	89.0546	101.3867 (45)
Energy content (annual)	Total = Sum(45)m =											987.0915
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	87.2918	76.3330	79.8522	68.3106	64.7077	56.7621	55.3507	58.7082	60.5492	69.2871	75.6964	86.1787 (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	87.2918	76.3330	79.8522	68.3106	64.7077	56.7621	55.3507	58.7082	60.5492	69.2871	75.6964	86.1787 (64)
	Total per year (kWh/year) = Sum(64)m =											839.0278 (64)
12Total per year (kWh/year)												839 (64)

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Electric shower(s)	49.9227	44.4815	48.5721	46.3518	47.2216	45.0448	46.5463	47.2216	46.3518	48.5721	47.6588	49.9227 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												567.8678 (64a)
Heat gains from water heating, kWh/month	34.3036	30.2036	32.1061	28.6656	27.9823	25.4517	25.4742	26.4824	26.7253	29.4648	30.8388	34.0254 (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	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740	113.6740 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.6516	113.6500	102.6516	106.0733	102.6516	106.0733	102.6516	102.6516	106.0733	102.6516	106.0733	102.6516 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.9430	202.0178	196.7894	185.6588	171.6084	158.4030	149.5810	147.5062	152.7346	163.8652	177.9156	191.1210 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674	34.3674 (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)	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392	-90.9392 (71)
Water heating gains (Table 5)	46.1070	44.9459	43.1534	39.8133	37.6106	35.3496	34.2396	35.5947	37.1184	39.6032	42.8317	45.7330 (72)
Total internal gains	405.8038	417.7159	399.6966	388.6476	368.9728	356.9281	343.5744	342.8547	353.0285	363.2222	383.9228	396.6078 (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	552.9966	668.4396	742.7477	813.7047	845.0721	829.5845	799.2656	760.4661	724.4804	640.3254	560.2258	522.5741 (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	37.5103	37.6254	37.7390	38.2817	38.3850	38.8732	38.8732	38.9650	38.6837	38.3850	38.1766	37.9612
alpha	3.5007	3.5084	3.5159	3.5521	3.5590	3.5915	3.5915	3.5977	3.5789	3.5590	3.5451	3.5307
util living area	0.9713	0.9463	0.9083	0.8299	0.7109	0.5464	0.4068	0.4423	0.6437	0.8578	0.9497	0.9759 (86)
MIT	19.2638	19.5904	19.9724	20.4221	20.7441	20.9273	20.9806	20.9736	20.8655	20.4375	19.7815	19.2142 (87)
Th 2	19.9969	19.9996	20.0023	20.0151	20.0175	20.0286	20.0286	20.0307	20.0243	20.0175	20.0126	20.0076 (88)
util rest of house	0.9658	0.9365	0.8916	0.7997	0.6614	0.4753	0.3214	0.3553	0.5744	0.8256	0.9388	0.9713 (89)
MIT 2	18.4304	18.7510	19.1217	19.5526	19.8373	19.9891	20.0215	20.0204	19.9444	19.5786	18.9520	18.3895 (90)
Living area fraction	18.7781	19.1012	19.4766	19.9153	20.2156	20.3805	20.4216	20.4181	20.3287	19.9369	19.2981	18.7336 (91)
MIT	18.7781	19.1012	19.4766	19.9153	20.2156	20.3805	20.4216	20.4181	20.3287	19.9369	19.2981	18.7336 (92)
Temperature adjustment	18.7781	19.1012	19.4766	19.9153	20.2156	20.3805	20.4216	20.4181	20.3287	19.9369	19.2981	18.7336 (93)
adjusted MIT	18.7781	19.1012	19.4766	19.9153	20.2156	20.3805	20.4216	20.4181	20.3287	19.9369	19.2981	18.7336 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9572	0.9257	0.8813	0.7963	0.6720	0.5018	0.3565	0.3908	0.5971	0.8226	0.9291	0.9635 (94)
Ext temp.	529.3478	618.8033	654.5994	647.9443	567.8625	416.3077	284.9626	297.1815	432.5871	526.7237	520.5066	503.4861 (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	1137.9570	1112.7737	1013.7601	848.3410	654.0628	438.4124	289.8437	304.0235	474.7141	717.1438	942.0136	1128.7458 (97)
Space heating requirement - total per year (kWh/year)	452.8052	331.9481	267.2156	144.2856	64.1330	0.0000	0.0000	0.0000	0.0000	141.6726	303.4851	465.1932 (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)	452.8052	331.9481	267.2156	144.2856	64.1330	0.0000	0.0000	0.0000	0.0000	141.6726	303.4851	465.1932 (98c)
Space heating requirement after solar 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	2170.7383 (99)
Space heating per m ²	(98c) / (4) = 30.5136 (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	712.9215	561.2361	575.0470	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8724	0.9212	0.9057	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	621.9617	517.0224	520.8256	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	929.5931	896.2097	852.8692	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	221.4946	282.1154	247.0404	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	55.3736	70.5289	61.7601	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	187.6626 (107)											

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Energy for space heating
Energy for space cooling
Total
Fabric Energy Efficiency (TFEE)

30.5136 (99)
2.6379 (108)
33.1515 (109)
33.2 (109)