

Summary for Input Data



Plot Reference	B 1507	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	5.88	TER	15.46
Environmental	95 A	% DER < TER			61.97
CO ₂ Emissions (t/year)	0.35	DFEE	39.68	TFEE	37.95
Compliance Check	See BREL	% DFEE < TFEE			-4.56
% DPER < TPER	26.63	DPER	61.90	TPER	84.36

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

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

Orientation	Southeast	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Top-floor flat	
Which Floor	15	
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	136.85	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:	23.13 m	65.59 m ²	2.50 m

8.0 Living Area	32.61	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	42.43	21.77	0.00	None	20.66	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	15.40	12.98	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	31.78	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	122.75

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	65.59	65.59	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	65.59

12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South East	2.42	
NE windows	Window	External Wall 1	North East	10.33	
NW windows	Window	External Wall 1	North West	10.33	

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	9.62	0.05	0.05	No
E4 Jamb	Independently assessed	33.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	13.57	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	6.16	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.40	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.50	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.50	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	5.00	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	5.00	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	2.50	0.04	0.04	No
E25 Staggered party wall between dwellings	Independently assessed	2.50	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	12.71	0.00	0.00	No
E14 Flat roof	Independently assessed	23.13	0.05	0.05	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	12.71	0.05	0.05	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

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

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0

Summary for Input Data

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(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	6

24.0 Main Heating 1

25.0 Main Heating 2

26.0 Heat Networks

Space Community Heating

Distribution Loss

Distribution Loss Value

SAP Code

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

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

28.1 Showers

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

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type

Cylinder Volume L

Loss kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Summary for Input Data



Diverter

No

Battery Capacity [kWh]

0.00

PV Cells kWp

Orientation

Elevation

Overshading

FGHRS

MCS Certificate

**Overshading
Factor**

**MCS
Certificate
Reference**

**Panel
Manufacturer**

0.31

North West

Horizontal

Modest

No

0.80

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Compliance Check	See BREL	DFEE	39.68
% DPER < TPER	26.63	TFEE	37.95
		% DFEE < TFEE	-4.56
		TPER	84.36
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	65.5900 (1b)	2.5000 (2b)	163.9750 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5900		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	163.9750 (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)

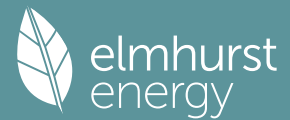
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (21)

	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) =												81.0000 (23c)
Effective ac	0.2576	0.2544	0.2512	0.2352	0.2321	0.2161	0.2161	0.2129	0.2225	0.2321	0.2384	0.2448 (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			20.6600	1.1450	23.6565		(27)
External Wall 1	42.4300	20.6600	21.7700	0.1500	3.2655	70.0000	1523.9000 (29a)
Corridor wall	15.4000	2.4200	12.9800	0.1900	2.4662	70.0000	908.6000 (29a)
External Roof 1	65.5900		65.5900	0.1000	6.5590	9.0000	590.3100 (30)
Total net area of external elements Aum(A, m ²)			123.4200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.3672		(33)
Main dwelling							
Party Wall 1			31.7800	0.0000	0.0000	70.0000	2224.6000 (32)
Party Floor 1			65.5900			40.0000	2623.6000 (32d)
Internal Wall 1			122.7500			9.0000	1104.7500 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		8975.7600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							136.8465 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.6200	0.0500	0.4810
E4 Jamb	33.6000	0.0400	1.3440
E7 Party floor between dwellings (in blocks of flats)	13.5700	0.0500	0.6785
E7 Party floor between dwellings (in blocks of flats)	6.1600	0.0390	0.2402
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0500	0.1700
E16 Corner (normal)	2.5000	0.0500	0.1250
E16 Corner (normal)	2.5000	0.0390	0.0975
E17 Corner (inverted - internal area greater than external area)	5.0000	0.0000	0.0000
E18 Party wall between dwellings	5.0000	0.0500	0.2500
E18 Party wall between dwellings	2.5000	0.0390	0.0975
E25 Staggered party wall between dwellings	2.5000	0.0390	0.0975
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.7100	0.0000	0.0000
E14 Flat roof	23.1300	0.0500	1.1565
P4 Party wall - Roof (insulation at ceiling level)	12.7100	0.0500	0.6355
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			5.3732 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	43.7404 (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	13.9372	13.7647	13.5922	12.7298	12.5573	11.6949	11.6949	11.5224	12.0399	12.5573	12.9023	13.2472	(38)
Heat transfer coeff	57.6776	57.5051	57.3326	56.4702	56.2977	55.4353	55.4353	55.2628	55.7803	56.2977	56.6427	56.9877	(39)
Average = Sum(39)m / 12 =												56.4271	
HLP	0.8794	0.8767	0.8741	0.8610	0.8583	0.8452	0.8452	0.8425	0.8504	0.8583	0.8636	0.8688	(40)
HLP (average)												0.8603	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.1345 (42)
Hot water usage for mixer showers	58.4921	57.5966	56.2768	54.2466	52.4276	49.8828	47.8701	50.2231	51.4066	53.9271	56.5520	58.4393	(42a)
Hot water usage for baths	25.3507	24.9680	24.4236	23.6083	22.8736	21.8621	21.0947	22.0331	22.5255	23.5278	24.5698	25.3306	(42b)
Hot water usage for other uses	36.4894	35.1625	33.8356	32.5088	31.1819	29.8550	29.8550	31.1819	32.5088	33.8356	35.1625	36.4894	(42c)
Average daily hot water use (litres/day)												110.6035	(43)
Daily hot water use	120.3322	117.7271	114.5361	110.3637	106.4830	101.5999	98.8198	103.4380	106.4409	111.2905	116.2842	120.2593	(44)
Energy conte	177.1498	155.7768	163.6697	144.1626	137.2142	117.4969	109.1987	121.7485	123.4661	143.4090	157.1620	176.6097	(45)
Energy content (annual)										Total = Sum(45)m =		1727.0639	
Distribution loss (46)m = 0.15 x (45)m	26.5725	23.3665	24.5505	21.6244	20.5821	17.6245	16.3798	18.2623	18.5199	21.5114	23.5743	26.4914	(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	232.4266	205.7042	218.9465	197.6562	192.4910	170.9906	164.4755	177.0253	176.9598	198.6858	210.6557	231.8865	(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	232.4266	205.7042	218.9465	197.6562	192.4910	170.9906	164.4755	177.0253	176.9598	198.6858	210.6557	231.8865	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2377.9037	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
												0.0000	(64a)
Heat gains from water heating, kWh/month	103.1237	91.7377	98.6416	90.7290	89.8452	81.8627	80.5300	84.7028	83.8474	91.9049	95.0513	102.9442	(65)

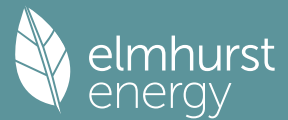
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	94.2161	104.3107	94.2161	97.3567	94.2161	97.3567	94.2161	94.2161	97.3567	94.2161	97.3567	94.2161	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	186.7940	188.7324	183.8478	173.4492	160.3228	147.9858	139.7440	137.8057	142.6902	153.0888	166.2152	178.5522	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	(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)	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	(71)
Water heating gains (Table 5)	138.6072	136.5145	132.5828	126.0125	120.7596	113.6981	108.2393	113.8479	116.4547	123.5282	132.0157	138.3658	(72)
Total internal gains	474.6349	484.5751	465.6643	451.8359	430.3161	414.0582	397.2169	400.8872	411.5191	425.8506	450.6051	466.1516	(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			
Northeast		10.3300		11.2829		0.3500		0.7000		0.7700		19.7889 (75)	
Northwest		10.3300		11.2829		0.3500		0.7000		0.7700		19.7889 (81)	
Solar gains	39.5778	80.5618	145.1468	238.3727	320.4197	341.6013	319.5610	254.7577	176.8636	98.4529	49.7992	32.3212	(83)
Total gains	514.2127	565.1369	610.8111	690.2086	750.7357	755.6594	716.7779	655.6449	588.3828	524.3036	500.4043	498.4729	(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	43.2277	43.3573	43.4877	44.1519	44.2872	44.9761	44.9761	45.1165	44.6980	44.2872	44.0174	43.7510	
alpha	3.8818	3.8905	3.8992	3.9435	3.9525	3.9984	3.9984	4.0078	3.9799	3.9525	3.9345	3.9167	
util living area	0.9572	0.9373	0.8976	0.7937	0.6364	0.4571	0.3373	0.3824	0.6066	0.8396	0.9314	0.9612	(86)
MIT	19.7017	19.9072	20.2185	20.6244	20.8729	20.9739	20.9940	20.9902	20.9222	20.5969	20.1101	19.6774	(87)
Th 2	20.1851	20.1873	20.1896	20.2008	20.2031	20.2143	20.2143	20.2166	20.2098	20.2031	20.1986	20.1941	(88)
util rest of house	0.9504	0.9276	0.8820	0.7653	0.5939	0.4048	0.2783	0.3194	0.5495	0.8101	0.9193	0.9551	(89)
MIT 2	18.6730	18.9311	19.3176	19.8097	20.0862	20.1953	20.2112	20.2112	20.1475	19.7905	19.1966	18.6490	(90)
Living area fraction	fLA = Living area / (4) = 0.4972 (91)												
MIT	19.1844	19.4164	19.7656	20.2148	20.4773	20.5824	20.6004	20.5985	20.5327	20.1914	19.6508	19.1603	(92)
Temperature adjustment	0.0000												
adjusted MIT	19.1844	19.4164	19.7656	20.2148	20.4773	20.5824	20.6004	20.5985	20.5327	20.1914	19.6508	19.1603	(93)
8. Space heating requirement													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9403	0.9168	0.8728	0.7658	0.6089	0.4296	0.3074	0.3503	0.5735	0.8097	0.9096	0.9453	(94)
Useful gains	483.4977	518.1433	533.1274	528.5830	457.1427	324.6084	220.3514	229.6744	337.4385	424.5076	455.1887	471.2268	(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	858.4979	834.7667	760.5491	638.9471	494.1430	331.6354	221.7613	232.0194	358.8162	539.9752	710.9099	852.5542	(97)
Space heating kWh	279.0001	212.7709	169.2018	79.4622	27.5282	0.0000	0.0000	0.0000	0.0000	85.9079	184.1192	283.7076	(98a)
Space heating requirement - total per year (kWh/year)													1321.6979
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	279.0001	212.7709	169.2018	79.4622	27.5282	0.0000	0.0000	0.0000	0.0000	85.9079	184.1192	283.7076	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)													1321.6979
Space heating per m2	(98c) / (4) =												20.1509 (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	279.0001	212.7709	169.2018	79.4622	27.5282	0.0000	0.0000	0.0000	0.0000	85.9079	184.1192	283.7076	(98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50													
307a	418.5002	319.1564	253.8027	119.1932	41.2923	0.0000	0.0000	0.0000	0.0000	128.8618	276.1789	425.5613	
Space heating requirement	418.5002	319.1564	253.8027	119.1932	41.2923	0.0000	0.0000	0.0000	0.0000	128.8618	276.1789	425.5613	(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	232.4266	205.7042	218.9465	197.6562	192.4910	170.9906	164.4755	177.0253	176.9598	198.6858	210.6557	231.8865	(64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50													
310a	348.6399	308.5563	328.4198	296.4844	288.7365	256.4858	246.7133	265.5379	265.4397	298.0288	315.9836	347.8297	
Water heating fuel	348.6399	308.5563	328.4198	296.4844	288.7365	256.4858	246.7133	265.5379	265.4397	298.0288	315.9836	347.8297	(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	13.3800	12.0852	13.3800	12.9484	13.3800	12.9484	13.3800	13.3800	12.9484	13.3800	12.9484	13.3800	(331)
Lighting	20.5785	16.5088	14.8644	10.8903	8.4120	6.8726	7.6737	9.9745	12.9559	16.9989	19.2002	21.1504	(332)
Electricity generated by PVs (Appendix M) (negative quantity)													
(333a)m	-3.4053	-6.0512	-11.1766	-15.7495	-19.7073	-19.4432	-19.0350	-16.3706	-12.2951	-7.8949	-4.0906	-2.7795	(333a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(334a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(334a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(335a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(335a)
Electricity generated by PVs (Appendix M) (negative quantity)													
(333b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(333b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(334b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(334b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(335b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(335b)
Annual totals kWh/year													
Space heating fuel - community heating													1982.5469 (307)
Space heating fuel - secondary													0.0000 (309)
Water heating fuel - community heating													3566.8555 (310)
Efficiency of water heater													0.0000 (311)
Electricity used for heat distribution													19.8255 (313)
Space cooling fuel													0.0000 (321)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)													
mechanical ventilation fans (SFP = 0.7875)												157.5390	(330a)

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Total electricity for the above, kWh/year	157.5390 (331)
Electricity for lighting (calculated in Appendix L)	166.0801 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-137.9987 (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	5735.0227 (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	2391.9838	0.1560	133.2769 (367)
Electrical energy for heat distribution (space & water)	19.8255	0.0000	8.1139 (372)
Overall CO2 factor for heat network			0.0645 (386)
Total CO2 associated with community systems			357.8498 (373)
Space and water heating			357.8498 (376)
Pumps, fans and electric keep-hot	157.5390	0.1387	21.8526 (378)
Energy for lighting	166.0801	0.1443	23.9705 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-137.9987	0.1305	-18.0108
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-18.0108 (380)
Total CO2, kg/year			385.6620 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.8800 (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	2391.9838	1.5774	1347.9649 (467)
Electrical energy for heat distribution (space & water)	19.8255	0.0000	85.5101 (472)
Overall CO2 factor for heat network			0.6796 (486)
Total CO2 associated with community systems			3771.2902 (473)
Space and water heating			3771.2902 (476)
Pumps, fans and electric keep-hot	157.5390	1.5128	238.3250 (478)
Energy for lighting	166.0801	1.5338	254.7391 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-137.9987	1.4821	-204.5308
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-204.5308 (480)
Total Primary energy kWh/year			4059.8234 (483)
Dwelling Primary energy Rate (DPER)			61.9000 (484)

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

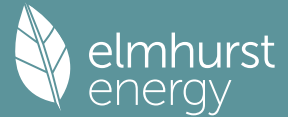
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	65.5900 (1b)	x 2.5000 (2b)	= 163.9750 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	163.9750 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1220 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3720 (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) = 0.3162 (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	0.4031	0.3952	0.3873	0.3478	0.3399	0.3004	0.3004	0.2925	0.3162	0.3399	0.3557	0.3715	(22b)
	0.5813	0.5781	0.5750	0.5605	0.5578	0.5451	0.5451	0.5428	0.5500	0.5578	0.5633	0.5690	(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			13.9700	1.1450	15.9962		(27)
External Wall 1	42.4300	13.9700	28.4600	0.1800	5.1228		(29a)
Corridor wall	15.4000	2.4200	12.9800	0.1800	2.3364		(29a)
External Roof 1	65.5900		65.5900	0.1100	7.2149		(30)
Total net area of external elements Aum(A, m2)			123.4200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.0903		(33)
Main dwelling							
Party Wall 1			31.7800	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							136.8465 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.6200	0.0500	0.4810
E4 Jamb	33.6000	0.0500	1.6800
E7 Party floor between dwellings (in blocks of flats)	13.5700	0.0700	0.9499
E7 Party floor between dwellings (in blocks of flats)	6.1600	0.0700	0.4312
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680
E16 Corner (normal)	2.5000	0.0900	0.2250
E16 Corner (normal)	2.5000	0.0900	0.2250
E17 Corner (inverted - internal area greater than external area)	5.0000	-0.0900	-0.4500
E18 Party wall between dwellings	5.0000	0.0600	0.3000
E18 Party wall between dwellings	2.5000	0.0600	0.1500
E25 Staggered party wall between dwellings	2.5000	0.0600	0.1500
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.7100	0.0000	0.0000
E14 Flat roof	23.1300	0.0800	1.8504
P4 Party wall - Roof (insulation at ceiling level)	12.7100	0.1200	1.5252
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.5857 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	40.6760 (37)

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

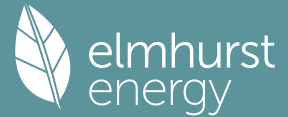
(38)m	Jan 31.4527	Feb 31.2819	Mar 31.1146	Apr 30.3285	May 30.1815	Jun 29.4968	Jul 29.4968	Aug 29.3701	Sep 29.7605	Oct 30.1815	Nov 30.4790	Dec 30.7900	(38)
Heat transfer coeff	72.1286	71.9579	71.7906	71.0045	70.8574	70.1728	70.1728	70.0460	70.4365	70.8574	71.1550	71.4660	(39)
Average = Sum(39)m / 12 =												71.0038	
HLP	Jan 1.0997	Feb 1.0971	Mar 1.0945	Apr 1.0826	May 1.0803	Jun 1.0699	Jul 1.0699	Aug 1.0679	Sep 1.0739	Oct 1.0803	Nov 1.0848	Dec 1.0896	(40)
HLP (average)												1.0825	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.1345 (42)
Hot water usage for mixer showers													
60.0082	59.1064	57.7923	55.2780	53.4225	51.3532	50.1771	51.4812	52.9108	55.1326	57.7009	59.7783	59.7783	(42a)
Hot water usage for baths													
25.9287	25.5436	25.0014	24.0015	23.2528	22.4227	21.9743	22.5127	23.0990	23.9873	25.0078	25.8410	25.8410	(42b)
Hot water usage for other uses													
36.4894	35.1625	33.8356	32.5088	31.1819	29.8550	29.8550	31.1819	32.5088	33.8356	35.1625	36.4894	36.4894	(42c)
Average daily hot water use (litres/day)													112.5377 (43)
Daily hot water use	Jan 122.4263	Feb 119.8125	Mar 116.6293	Apr 111.7882	May 107.8572	Jun 103.6309	Jul 102.0063	Aug 105.1758	Sep 108.5186	Oct 112.9556	Nov 117.8712	Dec 122.1087	(44)
Energy conte	193.8933	170.6114	179.2548	153.0325	145.1965	127.4263	123.3678	130.2297	133.8143	153.2796	167.9291	191.1928	(45)
Energy content (annual)										Total = Sum(45)m =		1869.2281	
Distribution loss (46)m = 0.15 x (45)m													
29.0840	25.5917	26.8882	22.9549	21.7795	19.1139	18.5052	19.5344	20.0721	22.9919	25.1894	28.6789	28.6789	(46)
Water storage loss (or HIU storage):													
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													
243.1360	215.0887	228.4975	200.6867	194.4391	175.0805	172.6105	179.4723	181.4685	202.5223	215.5833	240.4354	240.4354	(62)
WWHRS	-27.4332	-24.2622	-25.4060	-21.0371	-19.6059	-16.7769	-15.7256	-16.7226	-17.3580	-20.4632	-23.1823	-26.9252	(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	215.7028	190.8265	203.0916	179.6495	174.8333	158.3036	156.8848	162.7497	164.1105	182.0591	192.4010	213.5102	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2194.1227	(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	103.8637	92.3101	98.9964	89.0067	87.6720	80.4926	80.4139	82.6955	82.6166	90.3596	93.9598	102.9657	(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	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	94.3882	104.5012	94.3882	97.5345	94.3882	97.5345	94.3882	94.3882	97.5345	94.3882	97.5345	94.3882	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	186.7940	188.7324	183.8478	173.4492	160.3228	147.9858	139.7440	137.8057	142.6902	153.0888	166.2152	178.5522	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	(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)	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	(71)
Water heating gains (Table 5)	139.6017	137.3662	133.0596	123.6204	117.8387	111.7953	108.0832	111.1499	114.7453	121.4511	130.4997	138.3948	(72)
Total internal gains	478.8015	488.6173	469.3132	452.6216	430.5672	412.3331	397.2330	398.3612	409.9875	426.9456	452.2669	469.3527	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W		
Northeast				6.9800	11.2829	0.6300	0.7000	0.7700		24.0685 (75)		
Northwest				6.9900	11.2829	0.6300	0.7000	0.7700		24.1030 (81)		
Solar gains	48.1715	98.0546	176.6631	290.1316	389.9938	415.7747	388.9487	310.0744	215.2668	119.8305	60.6123	39.3393 (83)
Total gains	526.9730	586.6719	645.9763	742.7532	820.5610	828.1078	786.1817	708.4357	625.2543	546.7761	512.8792	508.6920 (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	34.5669	34.6490	34.7297	35.1142	35.1871	35.5304	35.5304	35.5947	35.3974	35.1871	35.0400	34.8875	
alpha	3.3045	3.3099	3.3153	3.3409	3.3458	3.3687	3.3687	3.3730	3.3598	3.3458	3.3360	3.3258	
util living area	0.9623	0.9452	0.9106	0.8222	0.6795	0.5084	0.3823	0.4369	0.6659	0.8692	0.9428	0.9660 (86)	
MIT	19.1994	19.4394	19.8294	20.3553	20.7367	20.9268	20.9787	20.9668	20.8188	20.3206	19.6893	19.1636 (87)	
Th 2	20.0011	20.0032	20.0053	20.0151	20.0169	20.0255	20.0255	20.0271	20.0222	20.0169	20.0132	20.0093 (88)	
util rest of house	0.9557	0.9357	0.8949	0.7924	0.6305	0.4410	0.3018	0.3513	0.5984	0.8399	0.9314	0.9600 (89)	
MIT 2	17.9176	18.2200	18.7066	19.3471	19.7773	19.9736	20.0152	20.0098	19.8787	19.3238	18.5454	17.8780 (90)	
Living area fraction									fLA = Living area / (4) =			0.4972 (91)	
MIT	18.5549	18.8263	19.2648	19.8483	20.2543	20.4475	20.4942	20.4856	20.3461	19.8194	19.1141	18.5172 (92)	
Temperature adjustment												0.0000	
adjusted MIT	18.5549	18.8263	19.2648	19.8483	20.2543	20.4475	20.4942	20.4856	20.3461	19.8194	19.1141	18.5172 (93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9433	0.9217	0.8811	0.7868	0.6429	0.4709	0.3411	0.3924	0.6220	0.8331	0.9183	0.9483 (94)	
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	1028.1854	1002.1041	916.3914	777.3812	606.1369	410.3375	273.2673	286.1804	439.9537	653.2647	854.8657	1023.1927 (97)	
Space heating kWh	395.1477	310.0205	258.3102	138.9216	58.4477	0.0000	0.0000	0.0000	0.0000	147.1222	276.3909	402.3643 (98a)	
Space heating requirement - total per year (kWh/year)												1986.7251	
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	395.1477	310.0205	258.3102	138.9216	58.4477	0.0000	0.0000	0.0000	0.0000	147.1222	276.3909	402.3643 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												1986.7251	
Space heating per m2										(98c) / (4) =		30.2901 (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	
395.1477	310.0205	258.3102	138.9216	58.4477	0.0000	0.0000	0.0000	0.0000	0.0000	147.1222	276.3909	402.3643 (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)	428.1124	335.8835	279.8594	150.5109	63.3236	0.0000	0.0000	0.0000	0.0000	159.3957	299.4485	435.9310 (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	215.7028	190.8265	203.0916	179.6495	174.8333	158.3036	156.8848	162.7497	164.1105	182.0591	192.4010	213.5102 (64)	
Efficiency of water heater	85.3990	85.1414	84.6002	83.4900	81.8792	79.8000	79.8000	79.8000	79.8000	83.5862	84.8715	79.8000 (216)	
Fuel for water heating, kWh/month	252.5825	224.1289	240.0602	215.1749	213.5260	198.3754	196.5975	203.9470	205.6523	217.8099	226.6969	249.8404 (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	19.6120	15.7335	14.1663	10.3788	8.0169	6.5499	7.3133	9.5061	12.3474	16.2005	18.2984	20.1571	20.1571	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-5.4693	-8.5735	-13.6843	-17.1409	-20.1034	-19.3749	-19.1421	-17.2449	-14.2326	-10.5209	-6.3113	-4.6337	-4.6337	(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	-0.9331	-2.0567	-4.2715	-6.6990	-9.1469	-9.2981	-9.1879	-7.6434	-5.4294	-3.0286	-1.2725	-0.7311	-0.7311	(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													2152.4649	(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													2644.3920	(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)													158.2801	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-216.1300	(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													4825.0070	(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	2152.4649	0.2100	452.0176	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2644.3920	0.2100	555.3223	(264)
Space and water heating			1007.3400	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	158.2801	0.1443	22.8447	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-156.4318	0.1324	-20.7185	
PV Unit electricity exported	-59.6982	0.1247	-7.4420	
Total			-28.1605	(269)
Total CO2, kg/year			1013.9534	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.4600	(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	2152.4649	1.1300	2432.2853	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2644.3920	1.1300	2988.1630	(278)
Space and water heating			5420.4483	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	158.2801	1.5338	242.7753	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-156.4318	1.4894	-232.9843	
PV Unit electricity exported	-59.6982	0.4575	-27.3138	
Total			-260.2981	(283)
Total Primary energy kWh/year			5533.0263	(286)
Target Primary Energy Rate (TPER)			84.3600	(287)

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Plot Reference	B 1507				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	81 B	DER	5.88	TER	15.46		
Environmental	95 A	% DER < TER				61.97	
CO ₂ Emissions (t/year)	0.35	DFEE	39.68	TFEE	37.95		
Compliance Check	See BREL	% DFEE < TFEE				-4.56	
% DPER < TPER	26.63	DPER	61.90	TPER	84.36		
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	65.5900 (1b)	2.5000 (2b)	163.9750 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5900		163.9750 (4)
Dwelling volume			163.9750 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1220 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2720 (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) = 0.2312 (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	0.2947	0.2890	0.2832	0.2543	0.2485	0.2196	0.2196	0.2138	0.2312	0.2485	0.2601	0.2716 (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	0.5434	0.5418	0.5401	0.5323	0.5309	0.5241	0.5241	0.5229	0.5267	0.5309	0.5338	0.5369 (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			20.6600	1.1450	23.6565		(27)
External Wall 1	42.4300	20.6600	21.7700	0.1500	3.2655	70.0000	1523.9000 (29a)
Corridor wall	15.4000	2.4200	12.9800	0.1900	2.4662	70.0000	908.6000 (29a)
External Roof 1	65.5900		65.5900	0.1000	6.5590	9.0000	590.3100 (30)
Total net area of external elements Aum(A, m ²)			123.4200				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 38.3672		(33)
Main dwelling							
Party Wall 1			31.7800	0.0000	0.0000	70.0000	2224.6000 (32)
Party Floor 1			65.5900			40.0000	2623.6000 (32a)
Internal Wall 1			122.7500			9.0000	1104.7500 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	8975.7600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							136.8465 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					9.6200	0.0500	0.4810
E4 Jamb					33.6000	0.0400	1.3440

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
	29.4064	29.3151	29.2256	28.8054	28.7268	28.3608	28.3608	28.2930	28.5018	28.7268	28.8859	29.0521 (38)
Heat transfer coeff												
	73.1468	73.0555	72.9661	72.5459	72.4672	72.1012	72.1012	72.0335	72.2422	72.4672	72.6263	72.7926 (39)
Average = Sum(39)m / 12 =												72.5455
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.1152	1.1138	1.1125	1.1061	1.1049	1.0993	1.0993	1.0982	1.1014	1.1049	1.1073	1.1098 (40)
HLP (average)												1.1060
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												
Hot water usage for mixer showers												2.1345 (42)
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												25.3507 24.9680 24.4236 23.6083 22.8736 21.8621 21.0947 22.0331 22.5255 23.5278 24.5698 25.3306 (42b)
Hot water usage for other uses												36.4894 35.1625 33.8356 32.5088 31.1819 29.8550 29.8550 31.1819 32.5088 33.8356 35.1625 36.4894 (42c)
Average daily hot water use (litres/day)												56.6783 (43)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec												
Daily hot water use												61.8401 60.1305 58.2592 56.1171 54.0554 51.7171 50.9497 53.2149 55.0343 57.3634 59.7323 61.8200 (44)
Energy content (annual)												91.0393 79.5649 83.2513 73.3029 69.6559 59.8091 56.3009 62.6350 63.8370 73.9185 80.7302 90.7872 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 884.8322
Water storage loss (or HIU 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 (46)
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												
77.3834 67.6301 70.7636 62.3075 59.2075 50.8377 47.8558 53.2397 54.2615 62.8308 68.6206 77.1691 (62)												77.1691 (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												77.3834 67.6301 70.7636 62.3075 59.2075 50.8377 47.8558 53.2397 54.2615 62.8308 68.6206 77.1691 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 752.1073 752 (64)
Electric shower(s)												48.0565 42.8188 46.7565 44.6191 45.4564 43.3610 44.8063 45.4564 44.6191 46.7565 45.8773 48.0565 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												546.6404 (64a)
Heat gains from water heating, kWh/month												
31.3600 27.6122 29.3800 26.7317 26.1660 23.5497 23.1655 24.6740 24.7202 27.3968 28.6245 31.3064 (65)												31.3064 (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	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	94.2161	104.3107	94.2161	97.3567	94.2161	97.3567	94.2161	94.2161	97.3567	94.2161	97.3567	94.2161	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	186.7940	188.7324	183.8478	173.4492	160.3228	147.9858	139.7440	137.8057	142.6902	153.0888	166.2152	178.5522	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	(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)	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	(71)
Water heating gains (Table 5)	42.1505	41.0896	39.4893	37.1273	35.1693	32.7079	31.1365	33.1640	34.3335	36.8237	39.7562	42.0785	(72)
Total internal gains	378.1782	389.1502	372.5707	362.9507	344.7258	333.0679	320.1141	320.2033	329.3979	339.1461	358.3456	369.8644	(73)

6. Solar gains												
[Jan]					Area	Solar flux		g		FF	Access	Gains
					m2	Table 6a		Specific data			factor	W
						W/m2		or Table 6b		Specific data	Table 6d	
								or Table 6c				
Northeast					10.3300	11.2829		0.3500		0.7000	0.7700	19.7889 (75)
Northwest					10.3300	11.2829		0.3500		0.7000	0.7700	19.7889 (81)
Solar gains	39.5778	80.5618	145.1468	238.3727	320.4197	341.6013	319.5610	254.7577	176.8636	98.4529	49.7992	32.3212 (83)
Total gains	417.7561	469.7121	517.7175	601.3234	665.1454	674.6692	639.6751	574.9611	506.2615	437.5991	408.1448	402.1856 (84)

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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)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
tau	34.0858	34.1284	34.1702	34.3681	34.4054	34.5801	34.5801	34.6126	34.5126	34.4054	34.3301
alpha	3.2724	3.2752	3.2780	3.2912	3.2937	3.3053	3.3053	3.3075	3.3008	3.2937	3.2887
util living area	0.9801	0.9697	0.9485	0.8870	0.7721	0.6075	0.4701	0.5328	0.7615	0.9225	0.9691
MIT	18.9127	19.1468	19.5416	20.1124	20.5866	20.8667	20.9573	20.9354	20.7085	20.0978	19.4182
Th 2	19.9884	19.9896	19.9907	19.9959	19.9969	20.0014	20.0014	20.0023	19.9997	19.9969	19.9949
util rest of house	0.9764	0.9640	0.9384	0.8643	0.7270	0.5334	0.3733	0.4329	0.6977	0.9020	0.9622
MIT 2	18.0872	18.3192	18.7082	19.2608	19.6934	19.9251	19.9847	19.9749	19.8113	19.2590	18.5940
Living area fraction	fLA = Living area / (4) =										
MIT	18.4976	18.7307	19.1226	19.6842	20.1375	20.3933	20.4683	20.4524	20.2574	19.6760	19.0038
Temperature adjustment	0.0000										
adjusted MIT	18.4976	18.7307	19.1226	19.6842	20.1375	20.3933	20.4683	20.4524	20.2574	19.6760	19.0038

8. Space heating requirement											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Utilisation	0.9690	0.9547	0.9276	0.8562	0.7338	0.5638	0.4197	0.4796	0.7156	0.8941	0.9534
Useful gains	404.8079	448.4560	480.2217	514.8543	488.1084	380.3475	268.4946	275.7730	362.2920	391.2781	389.1295
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	1038.5114	1010.4070	921.0201	782.3508	611.4408	417.7024	278.9058	291.9118	444.8223	657.7138	864.5276
Space heating kWh	471.4754	377.6310	327.9540	192.5975	91.7593	0.0000	0.0000	0.0000	0.0000	198.2282	342.2866
Space heating requirement - total per year (kWh/year)	2483.0616										
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										
Space heating kWh	471.4754	377.6310	327.9540	192.5975	91.7593	0.0000	0.0000	0.0000	0.0000	198.2282	342.2866
Space heating requirement after solar contribution - total per year (kWh/year)	2483.0616										
Space heating per m2	(98c) / (4) = 37.8573										

8c. Space cooling requirement											
Calculated for June, July and August. See Table 10b											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
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	0.0000	0.0000	0.0000	0.0000	0.0000	677.7516	533.5491	547.4543	0.0000	0.0000	0.0000
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8067	0.8653	0.8243	0.0000	0.0000	0.0000
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	546.7662	461.6807	451.2541	0.0000	0.0000	0.0000
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	753.7316	714.7614	640.8226	0.0000	0.0000	0.0000
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	149.0150	188.2921	141.0390	0.0000	0.0000	0.0000
Cooled fraction	fc = cooled area / (4) =										
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	37.2538	47.0730	35.2597	0.0000	0.0000	0.0000
Space cooling requirement	119.5865										
Energy for space heating	37.8573										
Energy for space cooling	1.8232										
Total	39.6806										
Fabric Energy Efficiency (DFEE)	39.7										

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

1. Overall dwelling characteristics											
Main dwelling						Area (m2)	Storey height (m)			Volume (m3)	
Ground floor						65.5900 (1b)	x	2.5000 (2b)	=	163.9750 (1b) - (3b)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)						65.5900				(4)	
Dwelling volume							(3a) + (3b) + (3c) + (3d) + (3e) ... (3n)	=		163.9750 (5)	

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

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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	20.0000 / (5) =	0.1220 (8)
Pressure test												Yes		
Pressure Test Method												Blower Door		
Measured/design AP50												5.0000	(17)	
Infiltration rate												0.3720	(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) =	0.3162	(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)	
	0.4031	0.3952	0.3873	0.3478	0.3399	0.3004	0.3004	0.2925	0.3162	0.3399	0.3557	0.3715	(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	0.5813	0.5781	0.5750	0.5605	0.5578	0.5451	0.5451	0.5428	0.5500	0.5578	0.5633	0.5690	(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			13.9700	1.1450	15.9962		(27)						
External Wall 1	42.4300	13.9700	28.4600	0.1800	5.1228		(29a)						
Corridor wall	15.4000	2.4200	12.9800	0.1800	2.3364		(29a)						
External Roof 1	65.5900		65.5900	0.1100	7.2149		(30)						
Total net area of external elements Aum(A, m2)			123.4200				(31)						
Fabric heat loss, W/K = Sum (A x U)				(26)... (30) + (32) =	33.0903		(33)						
Main dwelling													
Party Wall 1			31.7800	0.0000	0.0000		(32)						
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							136.8465 (35)						
List of Thermal Bridges													
K1 Element				Length	Psi-value	Total							
E1 Steel lintel with perforated steel base plate				9.6200	0.0500	0.4810							
E4 Jamb				33.6000	0.0500	1.6800							
E7 Party floor between dwellings (in blocks of flats)				13.5700	0.0700	0.9499							
E7 Party floor between dwellings (in blocks of flats)				6.1600	0.0700	0.4312							
E9 Balcony between dwellings, wall insulation continuous				3.4000	0.0200	0.0680							
E16 Corner (normal)				2.5000	0.0900	0.2250							
E16 Corner (normal)				2.5000	0.0900	0.2250							
E17 Corner (inverted - internal area greater than external area)				5.0000	-0.0900	-0.4500							
E18 Party wall between dwellings				5.0000	0.0600	0.3000							
E18 Party wall between dwellings				2.5000	0.0600	0.1500							
E25 Staggered party wall between dwellings				2.5000	0.0600	0.1500							
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				12.7100	0.0000	0.0000							
E14 Flat roof				23.1300	0.0800	1.8504							
P4 Party wall - Roof (insulation at ceiling level)				12.7100	0.1200	1.5252							
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.5857 (36)						
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	40.6760 (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	31.4527	31.2819	31.1146	30.3285	30.1815	29.4968	29.4968	29.3701	29.7605	30.1815	30.4790	30.7900	(38)
Average = Sum(39)m / 12 =	72.1286	71.9579	71.7906	71.0045	70.8574	70.1728	70.1728	70.0460	70.4365	70.8574	71.1550	71.4660	(39)
													71.0038
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0997	1.0971	1.0945	1.0826	1.0803	1.0699	1.0699	1.0679	1.0739	1.0803	1.0848	1.0896	(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												2.1345 (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												
25.9287	25.5436	25.0014	24.0015	23.2528	22.4227	21.9743	22.5127	23.0990	23.9873	25.0078	25.8410	(42b)
Hot water usage for other uses												
36.4894	35.1625	33.8356	32.5088	31.1819	29.8550	29.8550	31.1819	32.5088	33.8356	35.1625	36.4894	(42c)
Average daily hot water use (litres/day)												57.2122 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	62.4181	60.7062	58.8370	56.5103	54.4347	52.2777	51.8292	53.6946	55.6078	57.8230	60.1703	62.3305 (44)
Energy content	98.8551	86.4448	90.4303	77.3597	73.2796	64.2815	62.6830	66.4851	68.5700	78.4653	85.7236	97.5945 (45)
Energy content (annual)	Total = Sum(45)m =											950.1724
Distribution loss (46)m = 0.15 x (45)m												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	84.0268	73.4781	76.8657	65.7558	62.2876	54.6393	53.2805	56.5124	58.2845	66.6955	72.8651	82.9553 (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	84.0268	73.4781	76.8657	65.7558	62.2876	54.6393	53.2805	56.5124	58.2845	66.6955	72.8651	82.9553 (64)
	Total per year (kWh/year) = Sum(64)m =											807.6465 (64)
12Total per year (kWh/year)												808 (64)

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Electric shower(s)	48.0565	42.8188	46.7565	44.6191	45.4564	43.3610	44.8063	45.4564	44.6191	46.7565	45.8773	48.0565 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												546.6404 (64a)
Heat gains from water heating, kWh/month	33.0208	29.0742	30.9056	27.5937	26.9360	24.5001	24.5217	25.4922	25.7259	28.3630	29.6856	32.7530 (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	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	94.3882	104.5012	94.3882	97.5345	94.3882	97.5345	94.3882	94.3882	97.5345	94.3882	97.5345	94.3882 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	186.7940	188.7324	183.8478	173.4492	160.3228	147.9858	139.7440	137.8057	142.6902	153.0888	166.2152	178.5522 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725 (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)	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800 (71)
Water heating gains (Table 5)	44.3828	43.2652	41.5397	38.3246	36.2043	34.0279	32.9593	34.2637	35.7304	38.1223	41.2300	44.0228 (72)
Total internal gains	380.5826	391.5163	374.7933	364.3258	345.9328	334.5657	322.1090	321.4751	330.9726	340.6168	359.9972	371.9807 (73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d			Gains W
Northeast					6.9800	11.2829	0.6300	0.7000	0.7700			24.0685 (75)
Northwest					6.9900	11.2829	0.6300	0.7000	0.7700			24.1030 (81)
Solar gains	48.1715	98.0546	176.6631	290.1316	389.9938	415.7747	388.9487	310.0744	215.2668	119.8305	60.6123	39.3393 (83)
Total gains	428.7541	489.5709	551.4564	654.4574	735.9267	750.3404	711.0577	631.5495	546.2394	460.4473	420.6095	411.3200 (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	34.5669	34.6490	34.7297	35.1142	35.1871	35.5304	35.5304	35.5947	35.3974	35.1871	35.0400	34.8875	
alpha	3.3045	3.3099	3.3153	3.3409	3.3458	3.3687	3.3687	3.3730	3.3598	3.3458	3.3360	3.3258	
util living area	0.9785	0.9658	0.9388	0.8615	0.7257	0.5508	0.4190	0.4829	0.7237	0.9106	0.9660	0.9812 (86)	
MIT	18.9733	19.2283	19.6471	20.2338	20.6757	20.9068	20.9719	20.9551	20.7641	20.1754	19.4890	18.9362 (87)	
Th 2	20.0011	20.0032	20.0053	20.0151	20.0169	20.0255	20.0255	20.0271	20.0222	20.0169	20.0132	20.0093 (88)	
util rest of house	0.9745	0.9595	0.9272	0.8358	0.6783	0.4806	0.3322	0.3909	0.6581	0.8881	0.9586	0.9776 (89)	
MIT 2	18.1560	18.4089	18.8205	19.3867	19.7829	19.9731	20.0147	20.0084	19.8723	19.3462	18.6762	18.1251 (90)	
Living area fraction	18.5623	18.8163	19.2315	19.8078	20.2268	20.4373	20.4906	20.4791	20.3157	19.7585	19.0803	18.5283 (92)	
MIT	18.5623	18.8163	19.2315	19.8078	20.2268	20.4373	20.4906	20.4791	20.3157	19.7585	19.0803	18.5283 (93)	
Temperature adjustment												0.0000	
adjusted MIT	18.5623	18.8163	19.2315	19.8078	20.2268	20.4373	20.4906	20.4791	20.3157	19.7585	19.0803	18.5283 (93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	414.5569	465.0243	505.2709	543.0285	507.0712	383.5609	266.2205	274.6006	371.0453	405.6945	399.4326	399.2369 (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	1028.7220	1001.3875	913.9982	774.5047	604.1841	409.6213	273.0133	285.7255	437.8124	648.9456	852.4598	1023.9886 (97)
Space heating kWh	456.9388	360.4360	304.0931	166.6629	72.2520	0.0000	0.0000	0.0000	0.0000	180.9789	326.1796	464.8153 (98a)
Space heating requirement - total per year (kWh/year)												2332.3566
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	456.9388	360.4360	304.0931	166.6629	72.2520	0.0000	0.0000	0.0000	0.0000	180.9789	326.1796	464.8153 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2332.3566
Space heating per m ²												35.5596 (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	659.6245	519.2789	532.3499	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8548	0.9029	0.8664	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	563.8349	468.8745	461.2168	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	841.7628	797.7031	706.5993	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	200.1081	244.6484	182.5646	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	50.0270	61.1621	45.6412	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												156.8303 (107)

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

35.5596 (99)
2.3911 (108)
37.9507 (109)
38.0 (109)