

Summary for Input Data



Plot Reference	B 207	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	5.56	TER	15.86
Environmental	96 A	% DER < TER			64.94
CO ₂ Emissions (t/year)	0.26	DFEE	33.80	TFEE	34.15
Compliance Check	See BREL	% DFEE < TFEE			1.02
% DPER < TPER	32.01	DPER	59.03	TPER	86.82

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	Mid-floor flat	
Which Floor	2	
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	180.73	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
		17.56 m	51.96 m ²	2.80 m

8.0 Living Area	28.96	m ²
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9.0 External Walls	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	41.05	28.61	0.00	None	12.44	Enter Gross Area
	Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	8.12	5.70	0.90	Stairwell Access Corridor 4	2.42	Enter Gross Area

9.1 Party Walls	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	32.93	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	116.20

10.1 Party Ceilings	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	51.96

11.1 Party Floors	Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
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Party Floor 1 Lowest occupied Precast concrete planks floor, screed, carpeted 40.00 51.96

12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South East	2.42	
NW windows	Windows	External Wall 1	North West	8.69	
NE windows	Windows	External Wall 1	North East	3.74	

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	7.81	0.05	0.05	No
E3 Sill	Independently assessed	4.32	0.04	0.04	No
E4 Jamb	Independently assessed	21.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	22.52	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	5.80	0.04	0.04	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
E25 Staggered party wall between dwellings	Independently assessed	5.60	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	23.52	0.00	0.00	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	6.80	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
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

Summary for Input Data

22.0 Pressure Testing

Designed AP ₅₀	Yes	
Test Method	3.00	m ³ /(h.m ²) @ 50 Pa
	Blower Door	

22.0 Lighting

No Fixed Lighting	No				
	Name	Efficacy	Power	Capacity	Count
	Lighting 1	75.00	15.00	1125.00	5

24.0 Main Heating 1

None

25.0 Main Heating 2

None

26.0 Heat Networks

Space Community Heating

Distribution Loss	Space and Water Combined
Distribution Loss Value	Calculated
SAP Code	1.50
	2306

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

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Community Heating
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Cold Water Source	From header tank
Bath Count	1

28.1 Showers

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

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type	Internal Store	
Cylinder Volume	Measured Loss	
Loss	180.00	L
	1.20	kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?	Multiple Dwellings – Not Connected
Connected To Dwelling	No
Diverter	Yes
Battery Capacity [kWh]	No
	0.00

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

Summary for Input Data



34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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% DPER < TPER	32.01	DPER	59.03	TPER	86.82
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	51.9600 (1b)	2.8000 (2b)	145.4880 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9600		145.4880 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	145.4880 (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)

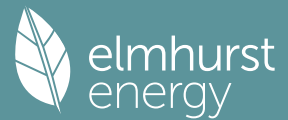
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	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							
Windows			12.4300	1.1450	14.2328		(27)
Door			2.4200	1.0000	2.4200		(26)
External Wall 1	41.0500	12.4300	28.6200	0.1500	4.2930	70.0000	2003.3999 (29a)
Corridor wall	8.1200	2.4200	5.7000	0.1800	1.0260	70.0000	399.0000 (29a)
Total net area of external elements Aum(A, m ²)			49.1700				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	21.9718	(33)
Main dwelling							
Party Wall 1			32.9300	0.0000	0.0000	70.0000	2305.1000 (32)
Party Floor 1			51.9600			40.0000	2078.4000 (32d)
Party Ceiling 1			51.9600			30.0000	1558.8000 (32b)
Internal Wall 1			116.2000			9.0000	1045.8000 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	9390.4999 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		180.7256 (35)
List of Thermal Bridges		

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	7.8100	0.0500	0.3905
E3 Sill	4.3200	0.0400	0.1728
E4 Jamb	21.6000	0.0400	0.8640
E7 Party floor between dwellings (in blocks of flats)	22.5200	0.0500	1.1260
E7 Party floor between dwellings (in blocks of flats)	5.8000	0.0360	0.2088
E16 Corner (normal)	2.8000	0.0500	0.1400
E18 Party wall between dwellings	5.6000	0.0500	0.2800
E25 Staggered party wall between dwellings	5.6000	0.0360	0.2016
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	23.5200	0.0000	0.0000
E9 Balcony between dwellings, wall insulation continuous	6.8000	0.0500	0.3400
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			3.7237 (36)
Point Thermal Bridges			0.0000 (36a) =
Total fabric heat loss			25.6955 (37) (33) + (36) + (36a) =

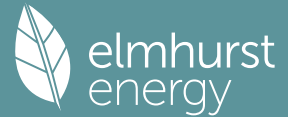
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	12.3658	12.2128	12.0598	11.2946	11.1416	10.3764	10.3764	10.2234	10.6825	11.1416	11.4476	11.7537	(38)
Heat transfer coeff	38.0614	37.9083	37.7553	36.9901	36.8371	36.0719	36.0719	35.9189	36.3780	36.8371	37.1432	37.4492	(39)
Average = Sum(39)m / 12 =												36.9519	
HLP	0.7325	0.7296	0.7266	0.7119	0.7090	0.6942	0.6942	0.6913	0.7001	0.7090	0.7148	0.7207	(40)
HLP (average)												0.7112	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)													
Assumed occupancy													1.7479 (42)
Hot water usage for mixer showers	52.1736	51.3748	50.1976	48.3867	46.7642	44.4943	42.6990	44.7978	45.8535	48.1017	50.4430	52.1265	(42a)
Hot water usage for baths	22.6252	22.2837	21.7978	21.0702	20.4144	19.5117	18.8268	19.6643	20.1038	20.9983	21.9283	22.6073	(42b)
Hot water usage for other uses	32.5301	31.3472	30.1643	28.9814	27.7985	26.6156	26.6156	27.7985	28.9814	30.1643	31.3472	32.5301	(42c)
Average daily hot water use (litres/day)												98.6518	(43)
Daily hot water use	107.3289	105.0057	102.1598	98.4383	94.9771	90.6216	88.1414	92.2606	94.9387	99.2643	103.7185	107.2640	(44)
Energy conte	158.0068	138.9438	145.9842	128.5850	122.3876	104.8008	97.3988	108.5924	110.1241	127.9121	140.1790	157.5250	(45)
Energy content (annual)										Total = Sum(45)m =		1540.4397	
Distribution loss (46)m = 0.15 x (45)m	23.7010	20.8416	21.8976	19.2878	18.3581	15.7201	14.6098	16.2889	16.5186	19.1868	21.0269	23.6287	(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	213.2836	188.8712	201.2610	182.0787	177.6644	158.2945	152.6756	163.8692	163.6178	183.1889	193.6727	212.8018	(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	213.2836	188.8712	201.2610	182.0787	177.6644	158.2945	152.6756	163.8692	163.6178	183.1889	193.6727	212.8018	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2191.2795	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	96.7587	86.1408	92.7612	85.5495	84.9153	77.6412	76.6065	80.3284	79.4112	86.7522	89.4045	96.5985	(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	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.8290	85.0607	76.8290	79.3900	76.8290	79.3900	76.8290	76.8290	79.3900	76.8290	79.3900	76.8290	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	152.3222	153.9028	149.9197	141.4401	130.7361	120.6758	113.9550	112.3743	116.3575	124.8371	135.5411	145.6013	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	(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)	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	(71)
Water heating gains (Table 5)	130.0520	128.1857	124.6790	118.8187	114.1335	107.8350	102.9658	107.9683	110.2934	116.6024	124.1729	129.8367	(72)
Total internal gains	408.4216	416.3676	400.6461	388.8671	370.9170	357.1192	342.9682	346.3901	355.2592	367.4869	388.3223	401.4854	(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	3.7400	11.2829	0.3500	0.7000	0.7700	7.1646 (75)
Northwest	8.6900	11.2829	0.3500	0.7000	0.7700	16.6472 (81)

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Solar gains	23.8118	48.4697	87.3269	143.4159	192.7791	205.5229	192.2625	153.2739	106.4092	59.2338	29.9614	19.4459 (83)
Total gains	432.2334	464.8372	487.9730	532.2830	563.6961	562.6422	535.2307	499.6640	461.6684	426.7207	418.2838	420.9314 (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	68.5333	68.8100	69.0889	70.5181	70.8110	72.3131	72.3131	72.6212	71.7047	70.8110	70.2275	69.6536
alpha	5.5689	5.5873	5.6059	5.7012	5.7207	5.8209	5.8209	5.8414	5.7803	5.7207	5.6818	5.6436
util living area	0.9594	0.9376	0.8929	0.7684	0.5934	0.4090	0.2964	0.3303	0.5363	0.8017	0.9240	0.9632 (86)
MIT	20.3534	20.4889	20.6724	20.8864	20.9762	20.9977	20.9997	20.9995	20.9899	20.8793	20.6183	20.3433 (87)
Th 2	20.3122	20.3148	20.3174	20.3303	20.3329	20.3459	20.3459	20.3485	20.3407	20.3329	20.3277	20.3226 (88)
util rest of house	0.9521	0.9268	0.8755	0.7384	0.5547	0.3677	0.2524	0.2837	0.4876	0.7683	0.9096	0.9565 (89)
MIT 2	19.5689	19.7378	19.9620	20.2180	20.3127	20.3445	20.3458	20.3483	20.3335	20.2170	19.9095	19.5648 (90)
Living area fraction	20.0061	20.1564	20.3580	20.5905	20.6825	20.7086	20.7103	20.7112	20.6993	20.5861	20.3046	0.5574 (91)
MIT	20.0061	20.1564	20.3580	20.5905	20.6825	20.7086	20.7103	20.7112	20.6993	20.5861	20.3046	19.9987 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0061	20.1564	20.3580	20.5905	20.6825	20.7086	20.7103	20.7112	20.6993	20.5861	20.3046	19.9987 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9484	0.9241	0.8766	0.7504	0.5752	0.3906	0.2769	0.3097	0.5142	0.7815	0.9090	0.9528 (94)
Useful gains	409.9097	429.5580	427.7393	399.4097	324.2166	219.7745	148.2043	154.7408	237.4073	333.4707	380.2340	401.0804 (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	597.7963	578.3447	523.2114	432.4345	330.8901	220.3476	148.2652	154.8549	240.0691	367.8599	490.4596	591.6482 (97)
Space heating kWh	139.7877	99.9847	71.0313	23.7778	4.9650	0.0000	0.0000	0.0000	0.0000	25.5855	79.3625	141.7825 (98a)
Space heating requirement - total per year (kWh/year)												586.2770
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	139.7877	99.9847	71.0313	23.7778	4.9650	0.0000	0.0000	0.0000	0.0000	25.5855	79.3625	141.7825 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												586.2770
Space heating per m2										(98c) / (4) =		11.2832 (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	139.7877	99.9847	71.0313	23.7778	4.9650	0.0000	0.0000	0.0000	0.0000	25.5855	79.3625	141.7825 (98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												
307a	209.6815	149.9770	106.5470	35.6667	7.4476	0.0000	0.0000	0.0000	0.0000	38.3783	119.0437	212.6737
Space heating requirement	209.6815	149.9770	106.5470	35.6667	7.4476	0.0000	0.0000	0.0000	0.0000	38.3783	119.0437	212.6737 (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	213.2836	188.8712	201.2610	182.0787	177.6644	158.2945	152.6756	163.8692	163.6178	183.1889	193.6727	212.8018 (64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												
310a	319.9253	283.3069	301.8915	273.1181	266.4966	237.4418	229.0134	245.8039	245.4267	274.7833	290.5091	319.2027
Water heating fuel	319.9253	283.3069	301.8915	273.1181	266.4966	237.4418	229.0134	245.8039	245.4267	274.7833	290.5091	319.2027 (310)
Cooling System Energy Efficiency Ratio												0.0000 (314)
Space coolin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (315)
Pumps and Fa	11.8715	10.7227	11.8715	11.4886	11.8715	11.4886	11.8715	11.8715	11.4886	11.8715	11.4886	11.8715 (331)
Lighting	16.4434	13.1915	11.8775	8.7020	6.7217	5.4916	6.1317	7.9702	10.3526	13.5831	15.3421	16.9004 (332)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333a)m	-2.7503	-4.8906	-9.0409	-12.7538	-15.9751	-15.7700	-15.4406	-13.2717	-9.9573	-6.3853	-3.3050	-2.2446 (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												879.4154 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3286.9192 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												8.7942 (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)												139.7776 (330a)
Total electricity for the above, kWh/year												139.7776 (331)
Electricity for lighting (calculated in Appendix L)												132.7079 (332)
Energy saving/generation technologies (Appendices M ,N and Q)												

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PV generation	-111.7851 (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	4327.0350 (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	1795.8339	0.1574	59.6640 (367)
Electrical energy for heat distribution (space & water)	8.7942	0.0000	6.0097 (372)
Overall CO2 factor for heat network			0.0636 (386)
Total CO2 associated with community systems			265.0499 (373)
Space and water heating			265.0499 (376)
Pumps, fans and electric keep-hot	139.7776	0.1387	19.3889 (378)
Energy for lighting	132.7079	0.1443	19.1539 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-111.7851	0.1305	-14.5874
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.5874 (380)
Total CO2, kg/year			289.0052 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.5600 (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	1795.8339	1.5827	599.9366 (467)
Electrical energy for heat distribution (space & water)	8.7942	0.0000	63.8909 (472)
Overall CO2 factor for heat network			0.6763 (486)
Total CO2 associated with community systems			2817.8104 (473)
Space and water heating			2817.8104 (476)
Pumps, fans and electric keep-hot	139.7776	1.5128	211.4555 (478)
Energy for lighting	132.7079	1.5338	203.5518 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-111.7851	1.4820	-165.6709
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-165.6709 (480)
Total Primary energy kWh/year			3067.1469 (483)
Dwelling Primary energy Rate (DPER)			59.0300 (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	51.9600 (1b)	x 2.8000 (2b)	= 145.4880 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 145.4880 (5)

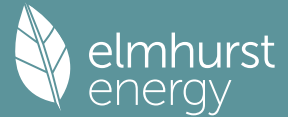
2. Ventilation rate

	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) =	0.1375 (8)
Pressure Test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3875	(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) =		0.3293 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												

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Effective ac	0.4199	0.4117	0.4035	0.3623	0.3540	0.3129	0.3129	0.3046	0.3293	0.3540	0.3705	0.3870 (22b)
	0.5882	0.5847	0.5814	0.5656	0.5627	0.5489	0.5489	0.5464	0.5542	0.5627	0.5686	0.5749 (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			10.5700	1.1450	12.1031		(27)
External Wall 1	41.0500	10.5700	30.4800	0.1800	5.4864		(29a)
Corridor wall	8.1200	2.4200	5.7000	0.1800	1.0260		(29a)
Total net area of external elements Aum(A, m2)			49.1700				(31)
Fabric heat loss, W/K = Sum (A x U)					(26) ... (30) + (32) =	21.0355	(33)
Main dwelling							
Party Wall 1			32.9300	0.0000	0.0000		(32)

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

180.7256 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	7.8100	0.0500	0.3905
E3 Sill	4.3200	0.0500	0.2160
E4 Jamb	21.6000	0.0500	1.0800
E7 Party floor between dwellings (in blocks of flats)	22.5200	0.0700	1.5764
E7 Party floor between dwellings (in blocks of flats)	5.8000	0.0700	0.4060
E16 Corner (normal)	2.8000	0.0900	0.2520
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E25 Staggered party wall between dwellings	5.6000	0.0600	0.3360
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	23.5200	0.0000	0.0000
E9 Balcony between dwellings, wall insulation continuous	6.8000	0.0200	0.1360
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.7289 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 25.7644 (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
28.2385	28.0741	27.9130	27.1562	27.0146	26.3555	26.3555	26.2335	26.6094	27.0146	27.3011	27.6005	(38)
Heat transfer coeff	54.0028	53.8384	53.6773	52.9206	52.7790	52.1199	52.1199	51.9978	52.3738	52.7790	53.0654	53.3649 (39)
Average = Sum(39)m / 12 =												52.9199
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0393	1.0362	1.0331	1.0185	1.0158	1.0031	1.0031	1.0007	1.0080	1.0158	1.0213	1.0270 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

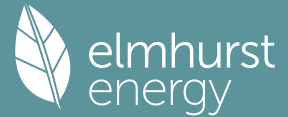
4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7479 (42)
Hot water usage for mixer showers												
53.5259	52.7215	51.5493	49.3066	47.6516	45.8059	44.7568	45.9200	47.1952	49.1770	51.4678	53.3208	(42a)
Hot water usage for baths												
23.1411	22.7974	22.3135	21.4211	20.7529	20.0120	19.6118	20.0924	20.6157	21.4085	22.3192	23.0629	(42b)
Hot water usage for other uses												
32.5301	31.3472	30.1643	28.9814	27.7985	26.6156	26.6156	27.7985	28.9814	30.1643	31.3472	32.5301	(42c)
Average daily hot water use (litres/day)												100.3774 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
109.1971	106.8662	104.0271	99.7092	96.2030	92.4335	90.9842	93.8109	96.7923	100.7497	105.1343	108.9138	(44)
Energy conte	172.9416	152.1760	159.8858	136.4968	129.5077	113.6577	110.0375	116.1575	119.3546	136.7164	149.7830	170.5327 (45)
Energy content (annual)										Total = Sum(45)m =		1667.2475
Distribution loss (46)m = 0.15 x (45)m												
25.9412	22.8264	23.9829	20.4745	19.4262	17.0487	16.5056	17.4236	17.9032	20.5075	22.4675	25.5799	(46)
Water storage loss (or HIU loss):												
Store volume												180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.5520 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8381 (55)
Total storage loss												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)
If cylinder contains dedicated solar storage												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month												
222.1843	196.6532	209.1285	184.1510	178.7504	161.3119	159.2801	165.4002	167.0088	185.9591	197.4372	219.7754	(62)
WWHRS	-24.4698	-21.6413	-22.6615	-18.7646	-17.4880	-14.9646	-14.9162	-15.4829	-18.2527	-20.6780	-24.0167	(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	(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	(63c)
FGHRS	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	197.7145	175.0120	186.4670	165.3864	161.2624	146.3473	145.2532	150.4840	151.5259	167.7065	176.7592	195.7588 (64)
12Total per year (kWh/year)												2019.6770 (64)
Electric shower(s)												2020 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month												
96.8972	86.1803	92.5562	83.5086	82.4555	75.9145	75.9816	78.0165	77.8088	84.8524	87.9262	96.0963	(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
87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
77.2406	85.5163	77.2406	79.8153	77.2406	79.8153	77.2406	77.2406	79.8153	77.2406	79.8153	77.2406	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
152.3222	153.9028	149.9197	141.4401	130.7361	120.6758	113.9550	112.3743	116.3575	124.8371	135.5411	145.6013	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	(69)

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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)											
Water heating gains (Table 5)	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156 (71)
Total internal gains	130.2382	128.2445	124.4035	115.9841	110.8272	105.4369	102.1258	104.8609	108.0677	114.0489	122.1197	129.1617 (72)
	412.0193	419.8820	403.7821	389.4578	371.0222	355.1463	342.5397	343.6942	353.4588	368.3449	389.6944	404.2219 (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			3.1800		11.2829	0.6300		0.7000		0.7700		10.9653 (75)
Northwest			7.3900		11.2829	0.6300		0.7000		0.7700		25.4823 (81)
Solar gains	36.4476	74.1902	133.6671	219.5198	295.0777	314.5840	294.2869	234.6089	162.8755	90.6663	45.8605	29.7650 (83)
Total gains	448.4669	494.0722	537.4492	608.9776	666.0999	669.7303	636.8266	578.3031	516.3343	459.0112	435.5550	433.9869 (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)												
tau	48.3025	48.4500	48.5954	49.2903	49.4226	50.0476	50.0476	50.1650	49.8049	49.4226	49.1558	48.8800
alpha	4.2202	4.2300	4.2397	4.2860	4.2948	4.3365	4.3365	4.3443	4.3203	4.2948	4.2771	4.2587
util living area	0.9729	0.9579	0.9248	0.8306	0.6717	0.4856	0.3573	0.4083	0.6470	0.8759	0.9541	0.9760 (86)
MIT	19.7376	19.9320	20.2361	20.6334	20.8816	20.9772	20.9952	20.9916	20.9254	20.5995	20.1229	19.7137 (87)
Th 2	20.0507	20.0533	20.0559	20.0680	20.0702	20.0808	20.0808	20.0827	20.0767	20.0702	20.0656	20.0609 (88)
util rest of house	0.9671	0.9490	0.9091	0.7985	0.6200	0.4204	0.2840	0.3293	0.5767	0.8440	0.9430	0.9708 (89)
MIT 2	18.6001	18.8451	19.2227	19.7016	19.9695	20.0663	20.0788	20.0790	20.0232	19.6768	19.0965	18.5773 (90)
Living area fraction	19.2341	19.4509	19.7875	20.2209	20.4779	20.5740	20.5896	20.5877	20.5261	20.1911	19.6686	19.2106 (92)
MIT	19.2341	19.4509	19.7875	20.2209	20.4779	20.5740	20.5896	20.5877	20.5261	20.1911	19.6686	19.2106 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2341	19.4509	19.7875	20.2209	20.4779	20.5740	20.5896	20.5877	20.5261	20.1911	19.6686	19.2106 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9609	0.9423	0.9039	0.8041	0.6434	0.4558	0.3248	0.3731	0.6120	0.8486	0.9373	0.9649 (94)
Ext temp.	430.9182	465.5478	485.8223	489.7037	428.5473	305.2455	206.8400	215.7896	316.0058	389.5053	408.2484	418.7589 (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	806.4840	783.3987	713.2391	599.1106	463.2864	311.3631	207.9350	217.7496	336.5572	506.2062	666.9568	801.0406 (97)
Space heating requirement - total per year (kWh/year)	279.4210	213.5958	169.1981	78.7730	25.8458	0.0000	0.0000	0.0000	0.0000	86.8254	186.2701	284.4176 (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)	279.4210	213.5958	169.1981	78.7730	25.8458	0.0000	0.0000	0.0000	0.0000	86.8254	186.2701	284.4176 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1324.3469 (99)
Space heating per m2										(98c) / (4) =		25.4878 (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
Space heating efficiency (main heating system 1)	279.4210	213.5958	169.1981	78.7730	25.8458	0.0000	0.0000	0.0000	0.0000	86.8254	186.2701	284.4176 (98)
Space heating fuel (main heating system)	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 efficiency (main heating system 2)	302.7313	231.4148	183.3132	85.3445	28.0020	0.0000	0.0000	0.0000	0.0000	94.0687	201.8094	308.1448 (211)
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 (212)
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 (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	197.7145	175.0120	186.4670	165.3864	161.2624	146.3473	145.2532	150.4840	151.5259	167.7065	176.7592	195.7588 (64)
Efficiency of water heater (217)m	84.8353	84.5077	83.8425	82.4976	80.9331	79.8000	79.8000	79.8000	79.8000	82.6577	84.1775	79.8000 (216)
Fuel for water heating, kWh/month	233.0569	207.0959	222.4015	200.4743	199.2541	183.3927	182.0216	188.5764	189.8820	202.8927	209.9839	84.8965 (217)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	16.0491	12.8752	11.5926	8.4933	6.5604	5.3599	5.9847	7.7791	10.1043	13.2573	14.9741	16.4951 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-4.3488	-6.8261	-10.9105	-13.6877	-16.0755	-15.5042	-15.3210	-13.7934	-11.3693	-8.3875	-5.0221	-3.6835 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												

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(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-0.7232	-1.5951	-3.3140	-5.1981	-7.0964	-7.2104	-7.1219	-5.9229	-4.2069	-2.3463	-0.9857	-0.5664	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1434.8287	(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												2449.6171	(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)												129.5251	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-171.2169	(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												3928.7540	(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	1434.8287	0.2100	301.3140 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2449.6171	0.2100	514.4196 (264)
Space and water heating			815.7336 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	129.5251	0.1443	18.6945 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-124.9296	0.1324	-16.5421
PV Unit electricity exported	-46.2873	0.1247	-5.7706
Total			-22.3127 (269)
Total CO2, kg/year			824.0446 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.8600 (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	1434.8287	1.1300	1621.3564 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2449.6171	1.1300	2768.0673 (278)
Space and water heating			4389.4237 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	129.5251	1.5338	198.6700 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-124.9296	1.4892	-186.0508
PV Unit electricity exported	-46.2873	0.4576	-21.1792
Total			-207.2299 (283)
Total Primary energy kWh/year			4510.9645 (286)
Target Primary Energy Rate (TPER)			86.8200 (287)

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Plot Reference	B 207	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	82 B	DER	5.56
Environmental	96 A	TER	15.86
CO ₂ Emissions (t/year)	0.26	% DER < TER	64.94
Compliance Check	See BREL	DFEE	33.80
% DPER < TPER	32.01	TFEE	34.15
		% DFEE < TFEE	1.02
		DFEE	59.03
		TPER	86.82
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	51.9600	2.8000	145.4880
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9600		
Dwelling volume			

2. Ventilation rate

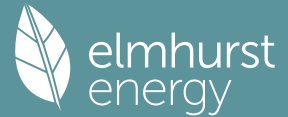
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1375 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2875 (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) = 0.2443 (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	0.3115	0.3054	0.2993	0.2688	0.2627	0.2321	0.2321	0.2260	0.2443	0.2627	0.2749	0.2871 (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	0.5485	0.5466	0.5448	0.5361	0.5345	0.5269	0.5269	0.5255	0.5299	0.5345	0.5378	0.5412 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Windows			12.4300	1.1450	14.2328		(27)
Door			2.4200	1.0000	2.4200		(26)
External Wall 1	41.0500	12.4300	28.6200	0.1500	4.2930	70.0000	2003.3999 (29a)
Corridor wall	8.1200	2.4200	5.7000	0.1800	1.0260	70.0000	399.0000 (29a)
Total net area of external elements Aum(A, m ²)			49.1700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	21.9718		(33)
Main dwelling							
Party Wall 1			32.9300	0.0000	0.0000	70.0000	2305.1000 (32)
Party Floor 1			51.9600			40.0000	2078.4000 (32a)
Party Ceiling 1			51.9600			30.0000	1558.8000 (32b)
Internal Wall 1			116.2000			9.0000	1045.8000 (32c)
Heat capacity Cm = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	9390.4999 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							180.7256 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				7.8100	0.0500	0.3905	
E3 Sill				4.3200	0.0400	0.1728	

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E4 Jamb						21.6000		0.0400		0.8640		
E7 Party floor between dwellings (in blocks of flats)						22.5200		0.0500		1.1260		
E7 Party floor between dwellings (in blocks of flats)						5.8000		0.0360		0.2088		
E16 Corner (normal)						2.8000		0.0500		0.1400		
E18 Party wall between dwellings						5.6000		0.0500		0.2800		
E25 Staggered party wall between dwellings						5.6000		0.0360		0.2016		
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)						23.5200		0.0000		0.0000		
E9 Balcony between dwellings, wall insulation continuous						6.8000		0.0500		0.3400		
Thermal bridges (Sum(L x Psi) calculated using Appendix K)											3.7237	(36)
Point Thermal bridges											0.0000	
Total fabric heat loss											(33) + (36) + (36a) =	25.6955 (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	26.3355	26.2450	26.1563	25.7398	25.6618	25.2990	25.2990	25.2319	25.4388	25.6618	25.8195	25.9843 (38)
Average = Sum(39)m / 12 =	52.0310	51.9405	51.8518	51.4353	51.3574	50.9946	50.9946	50.9274	51.1343	51.3574	51.5150	51.6799 (39)
												51.4349
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0014	0.9996	0.9979	0.9899	0.9884	0.9814	0.9814	0.9801	0.9841	0.9884	0.9914	0.9946 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31
												0.9899

4. Water heating energy requirements (kWh/year)												

Assumed occupancy												1.7479 (42)
Hot water usage for mixer showers												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths												
	22.6252	22.2837	21.7978	21.0702	20.4144	19.5117	18.8268	19.6643	20.1038	20.9983	21.9283	22.6073 (42b)
Hot water usage for other uses												
	32.5301	31.3472	30.1643	28.9814	27.7985	26.6156	26.6156	27.7985	28.9814	30.1643	31.3472	32.5301 (42c)
Average daily hot water use (litres/day)												50.5518 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	55.1554	53.6309	51.9621	50.0516	48.2129	46.1273	45.4424	47.4628	49.0852	51.1626	53.2755	55.1374 (44)
Energy content (annual)	81.1983	70.9646	74.2528	65.3799	62.1272	53.3446	50.2152	55.8646	56.9364	65.9282	72.0036	80.9734 (45)
Distribution loss (46)m = 0.15 x (45)m												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU loss):												
Total storage loss												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	69.0185	60.3199	63.1149	55.5729	52.8081	45.3429	42.6829	47.4849	48.3959	56.0390	61.2031	68.8274 (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	69.0185	60.3199	63.1149	55.5729	52.8081	45.3429	42.6829	47.4849	48.3959	56.0390	61.2031	68.8274 (64)
												670.8104 (64)
12Total per year (kWh/year)												671 (64)
Electric shower(s)												
	42.8653	38.1933	41.7057	39.7992	40.5460	38.6770	39.9662	40.5460	39.7992	41.7057	40.9214	42.8653 (64a)
												487.5904 (64a)
Heat gains from water heating, kWh/month												
	27.9710	24.6283	26.2051	23.8430	23.3385	21.0050	20.6623	22.0077	22.0488	24.4362	25.5311	27.9232 (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	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	76.8290	85.0607	76.8290	79.3900	76.8290	79.3900	76.8290	76.8290	79.3900	76.8290	79.3900	76.8290 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	152.3222	153.9028	149.9197	141.4401	130.7361	120.6758	113.9550	112.3743	116.3575	124.8371	135.5411	145.6013 (68)
Pumps, fans	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395 (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)	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156 (71)
Total internal gains	37.5954	36.6493	35.2220	33.1153	31.3690	29.1736	27.7719	29.5803	30.6233	32.8443	35.4599	37.5311 (72)
	315.9650	324.8312	311.1891	303.1638	288.1525	278.4578	267.7743	268.0020	275.5892	283.7288	299.6094	309.1799 (73)

6. Solar gains												

[Jan]												
	Area											
	m2											
	Solar flux											
	Table 6a											
	W/m2											
	Specific data											
	or Table 6b											
	g											
	Specific data											
	or Table 6c											
	FF											
	Access											
	factor											
	Table 6d											
	Gains											
	W											
Northeast	3.7400											7.1646 (75)
Northwest	8.6900											16.6472 (81)

Solar gains	23.8118	48.4697	87.3269	143.4159	192.7791	205.5229	192.2625	153.2739	106.4092	59.2338	29.9614	19.4459 (83)
Total gains	339.7768	373.3008	398.5160	446.5797	480.9316	483.9807	460.0368	421.2759	381.9984	342.9626	329.5708	328.6258 (84)

7. Mean internal temperature (heating season)												

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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	50.1330	50.2204	50.3063	50.7137	50.7906	51.1520	51.1520	51.2194	51.0122	50.7906	50.6352	50.4737
alpha	4.3422	4.3480	4.3538	4.3809	4.3860	4.4101	4.4101	4.4146	4.4008	4.3860	4.3757	4.3649
util living area	0.9896	0.9832	0.9693	0.9207	0.8115	0.6305	0.4770	0.5368	0.7811	0.9435	0.9816	0.9910 (86)
MIT	19.5423	19.7154	19.9988	20.4204	20.7602	20.9417	20.9864	20.9776	20.8504	20.4221	19.9232	19.5128 (87)
Th 2	20.0822	20.0836	20.0851	20.0918	20.0930	20.0988	20.0988	20.0999	20.0966	20.0930	20.0905	20.0878 (88)
util rest of house	0.9872	0.9792	0.9618	0.9010	0.7672	0.5562	0.3842	0.4401	0.7161	0.9254	0.9766	0.9889 (89)
MIT 2	18.7529	18.9253	19.2056	19.6163	19.9226	20.0680	20.0942	20.0916	20.0056	19.6259	19.1376	18.7280 (90)
Living area fraction									fLA = Living area /	(4) =		0.5574 (91)
MIT	19.1929	19.3656	19.6477	20.0645	20.3895	20.5549	20.5915	20.5854	20.4765	20.0696	19.5754	19.1654 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1929	19.3656	19.6477	20.0645	20.3895	20.5549	20.5915	20.5854	20.4765	20.0696	19.5754	19.1654 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9842	0.9754	0.9575	0.9004	0.7827	0.5949	0.4356	0.4933	0.7452	0.9248	0.9730	0.9861 (94)
Useful gains	334.3918	364.1105	381.5713	402.0804	376.4048	287.9216	200.3923	207.8164	284.6738	317.1831	320.6855	324.0718 (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	774.8903	751.3533	681.7310	574.2481	446.2678	303.6699	203.5434	213.1529	326.0556	486.3354	642.6732	773.4094 (97)
Space heating kWh	327.7309	260.2272	223.3188	123.9608	51.9781	0.0000	0.0000	0.0000	0.0000	125.8493	231.8311	334.3072 (98a)
Space heating requirement - total per year (kWh/year)												1679.2033
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	327.7309	260.2272	223.3188	123.9608	51.9781	0.0000	0.0000	0.0000	0.0000	125.8493	231.8311	334.3072 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1679.2033
Space heating per m2										(98c) / (4) =		32.3172 (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	479.3490	377.3598	387.0482	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8592	0.9153	0.8836	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	411.8553	345.3922	342.0081	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	538.4237	512.0330	468.0891	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	91.1293	123.9807	93.8042	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	22.7823	30.9952	23.4511	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												77.2286 (107)
Energy for space heating												32.3172 (99)
Energy for space cooling												1.4863 (108)
Total												33.8035 (109)
Fabric Energy Efficiency (DFEE)												33.8 (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	51.9600 (1b)	x 2.8000 (2b)	= 145.4880 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9600		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	145.4880 (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)+(7a)+(7b)+(7c) = 20.0000 / (5) = 0.1375 (8)
Pressure test	Yes

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Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Blower Door
5.0000 (17)
0.3875 (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) = 0.3293 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.4199	0.4117	0.4035	0.3623	0.3540	0.3129	0.3129	0.3046	0.3293	0.3540	0.3705	0.3870	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)													(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =													(23c)
Effective ac	0.5882	0.5847	0.5814	0.5656	0.5627	0.5489	0.5489	0.5464	0.5542	0.5627	0.5686	0.5749	(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			10.5700	1.1450	12.1031			(27)
External Wall 1	41.0500	10.5700	30.4800	0.1800	5.4864			(29a)
Corridor wall	8.1200	2.4200	5.7000	0.1800	1.0260			(29a)
Total net area of external elements Aum(A, m2)			49.1700					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	21.0355		(33)
Main dwelling								
Party Wall 1			32.9300	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							180.7256	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	7.8100	0.0500	0.3905	
E3 Sill	4.3200	0.0500	0.2160	
E4 Jamb	21.6000	0.0500	1.0800	
E7 Party floor between dwellings (in blocks of flats)	22.5200	0.0700	1.5764	
E7 Party floor between dwellings (in blocks of flats)	5.8000	0.0700	0.4060	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E18 Party wall between dwellings	5.6000	0.0600	0.3360	
E25 Staggered party wall between dwellings	5.6000	0.0600	0.3360	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	23.5200	0.0000	0.0000	
E9 Balcony between dwellings, wall insulation continuous	6.8000	0.0200	0.1360	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				4.7289 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	25.7644 (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	
	28.2385	28.0741	27.9130	27.1562	27.0146	26.3555	26.3555	26.2335	26.6094	27.0146	27.3011	27.6005	(38)
Heat transfer coeff	54.0028	53.8384	53.6773	52.9206	52.7790	52.1199	52.1199	51.9978	52.3738	52.7790	53.0654	53.3649	(39)
Average = Sum(39)m / 12 =												52.9199	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	1.0393	1.0362	1.0331	1.0185	1.0158	1.0031	1.0031	1.0007	1.0080	1.0158	1.0213	1.0270	(40)
HLP (average)												1.0185	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7479 (42)
Hot water usage for mixer showers													(42a)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hot water usage for baths	23.1411	22.7974	22.3135	21.4211	20.7529	20.0120	19.6118	20.0924	20.6157	21.4085	22.3192	23.0629	(42b)
Hot water usage for other uses	32.5301	31.3472	30.1643	28.9814	27.7985	26.6156	26.6156	27.7985	28.9814	30.1643	31.3472	32.5301	(42c)
Average daily hot water use (litres/day)												51.0283	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	55.6713	54.1447	52.4778	50.4025	48.5514	46.6276	46.2274	47.8909	49.5971	51.5728	53.6664	55.5930	(44)
Energy conte	88.1697	77.1013	80.6564	68.9985	65.3595	57.3341	55.9080	59.2989	61.1581	69.9838	76.4577	87.0452	(45)
Energy content (annual)										Total = Sum(45)m =		847.4713	
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss (or HIU loss):													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	74.9442	65.5361	68.5579	58.6487	55.5556	48.7340	47.5218	50.4041	51.9844	59.4862	64.9890	73.9885	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	74.9442	65.5361	68.5579	58.6487	55.5556	48.7340	47.5218	50.4041	51.9844	59.4862	64.9890	73.9885	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		720.3506	(64)
Electric shower(s)	42.8653	38.1933	41.7057	39.7992	40.5460	38.6770	39.9662	40.5460	39.7992	41.7057	40.9214	42.8653	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												487.5904	(64a)
Heat gains from water heating, kWh/month	29.4524	25.9324	27.5659	24.6120	24.0254	21.8527	21.8720	22.7375	22.9459	25.2980	26.4776	29.2134	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	77.2406	85.5163	77.2406	79.8153	77.2406	79.8153	77.2406	77.2406	79.8153	77.2406	79.8153	77.2406	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	152.3222	153.9028	149.9197	141.4401	130.7361	120.6758	113.9550	112.3743	116.3575	124.8371	135.5411	145.6013	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	(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)	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	(71)
Water heating gains (Table 5)	39.5865	38.5898	37.0509	34.1833	32.2922	30.3510	29.3979	30.5612	31.8693	34.0027	36.7745	39.2654	(72)
Total internal gains	318.3676	327.2273	313.4295	304.6570	289.4872	280.0605	269.8118	269.3945	277.2604	285.2987	301.3492	311.3256	(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				3.1800	11.2829	0.6300	0.7000	0.7700	10.9653 (75)			
Northwest				7.3900	11.2829	0.6300	0.7000	0.7700	25.4823 (81)			
Solar gains	36.4476	74.1902	133.6671	219.5198	295.0777	314.5840	294.2869	234.6089	162.8755	90.6663	45.8605	29.7650 (83)
Total gains	354.8153	401.4175	447.0967	524.1768	584.5649	594.6445	564.0987	504.0034	440.1359	375.9649	347.2097	341.0906 (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	48.3025	48.4500	48.5954	49.2903	49.4226	50.0476	50.0476	50.1650	49.8049	49.4226	49.1558	48.8800	
alpha	4.2202	4.2300	4.2397	4.2860	4.2948	4.3365	4.3365	4.3443	4.3203	4.2948	4.2771	4.2587	
util living area	0.9881	0.9789	0.9571	0.8822	0.7344	0.5399	0.4016	0.4646	0.7246	0.9283	0.9785	0.9898	(86)
MIT	19.5051	19.7141	20.0483	20.5151	20.8321	20.9658	20.9924	20.9862	20.8840	20.4549	19.9164	19.4799	(87)
Th 2	20.0507	20.0533	20.0559	20.0680	20.0702	20.0808	20.0808	20.0827	20.0767	20.0702	20.0656	20.0609	(88)
util rest of house	0.9853	0.9741	0.9470	0.8561	0.6840	0.4698	0.3200	0.3764	0.6549	0.9063	0.9727	0.9874	(89)
MIT 2	18.6921	18.9004	19.2296	19.6802	19.9559	20.0635	20.0783	20.0778	20.0090	19.6364	19.1116	18.6749	(90)
Living area fraction										fLA = Living area / (4) =		0.5574	(91)
MIT	19.1452	19.3539	19.6859	20.1455	20.4443	20.5664	20.5878	20.5841	20.4967	20.0926	19.5602	19.1236	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1452	19.3539	19.6859	20.1455	20.4443	20.5664	20.5878	20.5841	20.4967	20.0926	19.5602	19.1236	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9819	0.9696	0.9423	0.8584	0.7051	0.5075	0.3654	0.4252	0.6882	0.9069	0.9687	0.9844	(94)
Useful gains	348.3818	389.2171	421.2855	449.9795	412.2033	301.7583	206.1060	214.3148	302.8842	340.9735	336.3590	335.7596	(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	801.6849	778.1767	707.7840	595.1194	461.5128	310.9681	207.8432	217.5663	335.0176	501.0080	661.2031	796.3932	(97)
Space heating kWh	337.2575	261.3808	213.1549	104.5007	36.6863	0.0000	0.0000	0.0000	0.0000	119.0656	233.8877	342.7114	(98a)
Space heating requirement - total per year (kWh/year)												1648.6451	
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	337.2575	261.3808	213.1549	104.5007	36.6863	0.0000	0.0000	0.0000	0.0000	119.0656	233.8877	342.7114	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1648.6451	
Space heating per m ²										(98c) / (4) =		31.7291	(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	489.9268	385.6871	395.1834	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9138	0.9509	0.9250	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	447.6733	366.7577	365.5570	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	667.1111	632.9472	564.1875	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	157.9952	198.0450	147.7811	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	39.4988	49.5112	36.9453	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												125.9553	(107)
Energy for space heating												31.7291	(99)
Energy for space cooling												2.4241	(108)
Total												34.1532	(109)
Fabric Energy Efficiency (TFEE)												34.2	(109)