

Summary for Input Data



Plot Reference	A 119	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	5.25	TER	15.64
Environmental	96 A	% DER < TER			66.43
CO ₂ Emissions (t/year)	0.38	DFEE	42.07	TFEE	46.60
Compliance Check	See BREL	% DFEE < TFEE			9.71
% DPER < TPER	34.10	DPER	55.16	TPER	83.70

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

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

Orientation	Southwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	230.40	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
		25.85 m	81.16 m ²	2.80 m

8.0 Living Area	44.26	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	53.23	32.05	0.00	None	21.18	Enter Gross Area
	Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	19.14	16.72	0.70	Stairwell Access Corridor 3	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	34.09	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	170.72

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	81.16

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Heatloss Floor 1	Exposed Floor - Solid	Lowest occupied	Other	0.10	None	0.00	110.00	81.16

Summary for Input Data

12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South West	2.42	
NE window	Window	External Wall 1	North East	11.41	
NW windows	Window	External Wall 1	North West	9.77	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	12.18	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	12.18	0.08	0.08	No
E1 Steel lintel with perforated steel base plate	Independently assessed	9.84	0.05	0.05	No
E4 Jamb	Independently assessed	28.80	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	14.65	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	6.84	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	0.05	0.05	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	0.10	0.10	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	2.80	0.00	0.28	No
E18 Party wall between dwellings	Independently assessed	5.60	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
E20 Exposed floor (normal)	Independently assessed	14.65	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	6.84	0.10	0.10	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.04	0.04	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	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

Summary for Input Data

Number of flueless gas fires

0

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀

2.00

m³/(h.m²) @ 50 Pa

Test Method

Blower Door

22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	15.00	1125.00	6

24.0 Main Heating 1

None

25.0 Main Heating 2

None

26.0 Heat Networks

Space Community Heating

Space and Water Combined

Distribution Loss

Calculated

Distribution Loss Value

1.50

SAP Code

2306

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

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating

Community Heating

SAP Code

901

Flue Gas Heat Recovery System

No

Waste Water Heat Recovery Instantaneous System 1

No

Waste Water Heat Recovery Instantaneous System 2

No

Waste Water Heat Recovery Storage System

No

Solar Panel

No

Water use <= 125 litres/person/day

Yes

Cold Water Source

From header tank

Bath Count

1

28.1 Showers

Description

Shower Type

Flow Rate
[l/min]

Rated Power
[kW]

Connected
[kW]

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

Internal Store

Insulation Type

Measured Loss

Cylinder Volume

180.00

L

Loss

1.20

kWh/day

32.0 Photovoltaic Unit

Multiple Dwellings – Not Connected

Export Capable Meter?

No

Connected To Dwelling

Yes

Diverter

No

Battery Capacity [kWh]

0.00

Summary for Input Data



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

34.0 Small-scale Hydro

None

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

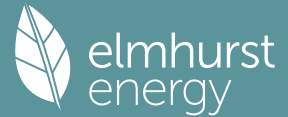
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Compliance Check	See BREL	% DFEE < TFEE				9.71	
% DPER < TPER	34.10	DPER	55.16	TPER	83.70		
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	81.1600 (1b)	2.8000 (2b)	227.2480 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	227.2480 (5)

2. Ventilation rate

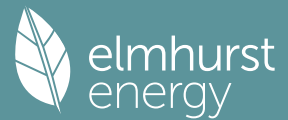
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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	2.0000 (17)
Infiltration rate	0.1000 (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) = 0.0850 (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	0.1084	0.1063	0.1041	0.0935	0.0914	0.0808	0.0808	0.0786	0.0850	0.0914	0.0956	0.0999 (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	0.2034	0.2012	0.1991	0.1885	0.1864	0.1757	0.1757	0.1736	0.1800	0.1864	0.1906	0.1949 (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			21.1800	1.1450	24.2519		(27)
Heatloss Floor 1			81.1600	0.1000	8.1160	110.0000	8927.6000 (28b)
External Wall 1	53.2300	21.1800	32.0500	0.1500	4.8075	70.0000	2243.5000 (29a)
Corridor wall	19.1400	2.4200	16.7200	0.1900	3.1768	70.0000	1170.4000 (29a)
Total net area of external elements Aum(A, m ²)			153.5300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	42.7722		(33)
Main dwelling							
Party Wall 1			34.0900	0.0000	0.0000	70.0000	2386.3000 (32)
Party Ceiling 1			81.1600			30.0000	2434.8000 (32b)
Internal Wall 1			170.7200			9.0000	1536.4800 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		18699.0799 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							230.3977 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total									
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.1800	0.0000	0.0000									
P7 Party Wall - Exposed floor (normal)	12.1800	0.0800	0.9744									
E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920									
E4 Jamb	28.8000	0.0400	1.1520									
E7 Party floor between dwellings (in blocks of flats)	14.6500	0.0500	0.7325									
E7 Party floor between dwellings (in blocks of flats)	6.8400	0.0390	0.2668									
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0500	0.2180									
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.1000	0.4360									
E16 Corner (normal)	2.8000	0.0500	0.1400									
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000									
E18 Party wall between dwellings	5.6000	0.0500	0.2800									
E18 Party wall between dwellings	2.8000	0.0390	0.1092									
E20 Exposed floor (normal)	14.6500	0.1000	1.4650									
E21 Exposed floor (inverted)	6.8400	0.1000	0.6840									
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092									
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.0591 (36)									
Point Thermal bridges			(36a) = 0.0000									
Total fabric heat loss		(33) + (36) + (36a) =	49.8313 (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	15.2515	15.0921	14.9328	14.1360	13.9766	13.1798	13.1798	13.0205	13.4985	13.9766	14.2953	14.6140 (38)
Average = Sum(39)m / 12 =	65.0827	64.9234	64.7640	63.9672	63.8079	63.0111	63.0111	62.8517	63.3298	63.8079	64.1266	64.4453 (39)
												63.9274
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.8019	0.7999	0.7980	0.7882	0.7862	0.7764	0.7764	0.7744	0.7803	0.7862	0.7901	0.7941 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31
												31

4. Water heating energy requirements (kWh/year)												

Assumed occupancy												2.4845 (42)
Hot water usage for mixer showers	64.2123	63.2292	61.7804	59.5516	57.5548	54.7611	52.5515	55.1346	56.4339	59.2009	62.0824	64.1544 (42a)
Hot water usage for baths	27.8181	27.3981	26.8007	25.9061	25.0998	23.9899	23.1479	24.1775	24.7179	25.8177	26.9611	27.7960 (42b)
Hot water usage for other uses	40.0738	38.6166	37.1593	35.7021	34.2449	32.7876	32.7876	34.2449	35.7021	37.1593	38.6166	40.0738 (42c)
Average daily hot water use (litres/day)												121.4234 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	132.1041	129.2439	125.7405	121.1599	116.8995	111.5387	108.4870	113.5571	116.8539	122.1779	127.6601	132.0242 (44)
Energy content (annual)	194.4801	171.0158	179.6806	158.2651	150.6368	128.9907	119.8813	133.6587	135.5447	157.4386	172.5369	193.8872 (45)
Distribution loss (46)m = 0.15 x (45)m	29.1720	25.6524	26.9521	23.7398	22.5955	19.3486	17.9822	20.0488	20.3317	23.6158	25.8805	29.0831 (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	249.7569	220.9433	234.9574	211.7587	205.9136	182.4844	175.1581	188.9356	189.0384	212.7154	226.0306	249.1640 (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	249.7569	220.9433	234.9574	211.7587	205.9136	182.4844	175.1581	188.9356	189.0384	212.7154	226.0306	249.1640 (64)
12Total per year (kWh/year)												2546.8563 (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	108.8861	96.8047	103.9652	95.4181	94.3082	85.6844	84.0820	88.6630	87.8636	96.5698	100.1635	108.6889 (65)

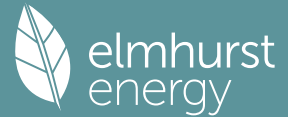
5. Internal gains (see Table 5 and 5a)												

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	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	111.8968	123.8857	111.8968	115.6266	111.8968	115.6266	111.8968	111.8968	115.6266	111.8968	115.6266	111.8968 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	221.8478	224.1499	218.3487	205.9987	190.4090	175.7569	165.9684	163.6663	169.4675	181.8175	197.4072	212.0593 (68)
Pumps, fans	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225 (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)	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801 (71)
Total internal gains	146.3523	144.0546	139.7382	132.5251	126.7583	119.0061	113.0134	119.1707	122.0327	129.7981	139.1159	146.0873 (72)
	540.3644	552.3578	530.2512	514.4180	489.3316	470.6571	451.1461	455.0012	467.3944	483.7799	512.4173	530.3109 (73)

6. Solar gains												

[Jan]	Area	Solar flux	g	FF	Access	Gains						

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	m2		Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		factor Table 6d		W	
Northeast	11.4100		11.2829		0.3500		0.7000		0.7700		21.8578 (75)	
Northwest	9.7700		11.2829		0.3500		0.7000		0.7700		18.7161 (81)	
Solar gains	40.5740	82.5895	148.8000	244.3724	328.4844	350.1992	327.6042	261.1698	181.3152	100.9309	51.0526	33.1348 (83)
Total gains	580.9384	634.9473	679.0513	758.7904	817.8160	820.8563	778.7502	716.1711	648.7095	584.7108	563.4699	563.4456 (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	79.8090	80.0049	80.2018	81.2008	81.4036	82.4329	82.4329	82.6419	82.0181	81.4036	80.9990	80.5984
alpha	6.3206	6.3337	6.3468	6.4134	6.4269	6.4955	6.4955	6.5095	6.4679	6.4269	6.3999	6.3732
util living area	0.9910	0.9829	0.9610	0.8735	0.6977	0.4888	0.3557	0.4030	0.6556	0.9135	0.9798	0.9925 (86)
MIT	20.2281	20.3637	20.5670	20.8316	20.9654	20.9969	20.9997	20.9993	20.9823	20.8038	20.4864	20.2082 (87)
Th 2	20.2517	20.2534	20.2551	20.2636	20.2653	20.2738	20.2738	20.2756	20.2704	20.2653	20.2619	20.2585 (88)
util rest of house	0.9886	0.9783	0.9509	0.8458	0.6508	0.4344	0.2972	0.3399	0.5931	0.8873	0.9736	0.9904 (89)
MIT 2	19.3528	19.5252	19.7796	20.0982	20.2375	20.2721	20.2737	20.2753	20.2588	20.0749	19.6880	19.3329 (90)
Living area fraction	19.8301	19.9825	20.2090	20.4982	20.6344	20.6674	20.6696	20.6701	20.6533	20.4724	20.1234	19.8102 (92)
MIT	19.8301	19.9825	20.2090	20.4982	20.6344	20.6674	20.6696	20.6701	20.6533	20.4724	20.1234	19.8102 (93)
Temperature adjustment												0.0000
adjusted MIT	19.8301	19.9825	20.2090	20.4982	20.6344	20.6674	20.6696	20.6701	20.6533	20.4724	20.1234	19.8102 (93)
8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9869	0.9764	0.9502	0.8552	0.6748	0.4640	0.3291	0.3744	0.6265	0.8953	0.9723	0.9889 (94)
Useful gains	573.3493	619.9620	645.2031	648.9018	551.8524	380.8782	256.3044	268.1017	406.3958	523.5142	547.8475	557.1959 (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	1010.7431	979.2045	887.8511	741.9044	570.0882	382.3105	256.4309	268.3838	415.0207	629.9393	835.1462	1006.0068 (97)
Space heating kWh	325.4210	241.4109	180.5301	66.9619	13.5675	0.0000	0.0000	0.0000	0.0000	79.1803	206.8550	333.9153 (98a)
Space heating requirement - total per year (kWh/year)												1447.8420
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	325.4210	241.4109	180.5301	66.9619	13.5675	0.0000	0.0000	0.0000	0.0000	79.1803	206.8550	333.9153 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1447.8420
Space heating per m2										(98c) / (4) =		17.8394 (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	325.4210	241.4109	180.5301	66.9619	13.5675	0.0000	0.0000	0.0000	0.0000	79.1803	206.8550	333.9153 (98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												
307a	488.1315	362.1164	270.7952	100.4428	20.3512	0.0000	0.0000	0.0000	0.0000	118.7704	310.2825	500.8730
Space heating requirement	488.1315	362.1164	270.7952	100.4428	20.3512	0.0000	0.0000	0.0000	0.0000	118.7704	310.2825	500.8730 (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	249.7569	220.9433	234.9574	211.7587	205.9136	182.4844	175.1581	188.9356	189.0384	212.7154	226.0306	249.1640 (64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												
310a	374.6354	331.4149	352.4361	317.6381	308.8704	273.7266	262.7372	283.4033	283.5576	319.0731	339.0459	373.7460
Water heating fuel	374.6354	331.4149	352.4361	317.6381	308.8704	273.7266	262.7372	283.4033	283.5576	319.0731	339.0459	373.7460 (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	18.5430	16.7485	18.5430	17.9448	18.5430	17.9448	18.5430	18.5430	17.9448	18.5430	17.9448	18.5430 (331)
Lighting	26.2555	21.0632	18.9650	13.8946	10.7326	8.7686	9.7906	12.7262	16.5301	21.6884	24.4970	26.9853 (332)
Electricity generated by PVs (Appendix M) (negative quantity)	-4.2707	-7.5778	-13.9712	-19.6476	-24.5450	-24.2008	-23.6963	-20.4022	-15.3495	-9.8778	-5.1273	-3.4869 (333a)
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 (334a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (335a)
Electricity generated by PVs (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (333b)
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 (334b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (335b)
Annual totals kWh/year												
Space heating fuel - community heating												2171.7630 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3820.2844 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												21.7176 (313)
Space cooling fuel												0.0000 (321)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)												

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mechanical ventilation fans (SFP = 0.7875) 218.3285 (330a)
 Total electricity for the above, kWh/year 218.3285 (331)
 Electricity for lighting (calculated in Appendix L) 211.8972 (332)

Energy saving/generation technologies (Appendices M ,N and Q)
 PV generation -172.1531 (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 6250.1200 (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	2582.7791	0.1568	146.8246 (367)
Electrical energy for heat distribution (space & water)	21.7176	0.0000	8.7870 (372)
Overall CO2 factor for heat network			0.0647 (386)
Total CO2 associated with community systems			387.5359 (373)
Space and water heating			387.5359 (376)
Pumps, fans and electric keep-hot	218.3285	0.1387	30.2849 (378)
Energy for lighting	211.8972	0.1443	30.5833 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-172.1531	0.1305	-22.4738
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-22.4738 (380)
Total CO2, kg/year			425.9304 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.2500 (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	2582.7791	1.5807	1479.6706 (467)
Electrical energy for heat distribution (space & water)	21.7176	0.0000	92.4267 (472)
Overall CO2 factor for heat network			0.6803 (486)
Total CO2 associated with community systems			4076.3375 (473)
Space and water heating			4076.3375 (476)
Pumps, fans and electric keep-hot	218.3285	1.5128	330.2874 (478)
Energy for lighting	211.8972	1.5338	325.0151 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-172.1531	1.4822	-255.1716
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-255.1716 (480)
Total Primary energy kWh/year			4476.4683 (483)
Dwelling Primary energy Rate (DPER)			55.1600 (484)

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

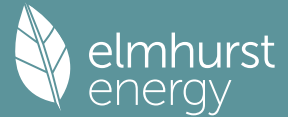
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	81.1600 (1b)	2.8000 (2b)	227.2480 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.1600		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 227.2480 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1320 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3820 (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) = 0.3247 (21)

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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)
Effective ac	0.4140	0.4059	0.3978	0.3572	0.3491	0.3085	0.3085	0.3004	0.3247	0.3491	0.3653	0.3815	(22b)
	0.5857	0.5824	0.5791	0.5638	0.5609	0.5476	0.5476	0.5451	0.5527	0.5609	0.5667	0.5728	(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			17.8700	1.1450	20.4618			(27)
Heatloss Floor 1			81.1600	0.1300	10.5508			(28b)
External Wall 1	53.2300	17.8700	35.3600	0.1800	6.3648			(29a)
Corridor wall	19.1400	2.4200	16.7200	0.1800	3.0096			(29a)
Total net area of external elements Aum (A, m2)			153.5300					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	42.8070		(33)
Main dwelling								
Party Wall 1			34.0900	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								230.3977 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.1800	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	12.1800	0.1600	1.9488	
E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920	
E4 Jamb	28.8000	0.0500	1.4400	
E7 Party floor between dwellings (in blocks of flats)	14.6500	0.0700	1.0255	
E7 Party floor between dwellings (in blocks of flats)	6.8400	0.0700	0.4788	
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872	
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520	
E18 Party wall between dwellings	5.6000	0.0600	0.3360	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E20 Exposed floor (normal)	14.6500	0.3200	4.6880	
E21 Exposed floor (inverted)	6.8400	0.3200	2.1888	
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				13.1083 (36)
Point Thermal bridges				0.0000
Total fabric heat loss		(33) + (36) + (36a) =		55.9153 (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	43.9228	43.6733	43.4286	42.2797	42.0647	41.0640	41.0640	40.8786	41.4494	42.0647	42.4996	42.9542	(38)
Average = Sum(39)m / 12 =	99.8382	99.5886	99.3440	98.1950	97.9800	96.9793	96.9793	96.7940	97.3647	97.9800	98.4149	98.8695	(39)
												98.1940	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.2301	1.2271	1.2241	1.2099	1.2072	1.1949	1.1949	1.1926	1.1997	1.2072	1.2126	1.2182	(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												2.4845	(42)
Hot water usage for mixer showers													
65.8767	64.8867	63.4440	60.6838	58.6469	56.3753	55.0841	56.5158	58.0852	60.5242	63.3437	65.6243	(42a)	
Hot water usage for baths													
28.4523	28.0298	27.4347	26.3376	25.5160	24.6051	24.1130	24.7039	25.3473	26.3220	27.4418	28.3562	(42b)	
Hot water usage for other uses													
40.0738	38.6166	37.1593	35.7021	34.2449	32.7876	32.7876	34.2449	35.7021	37.1593	38.6166	40.0738	(42c)	
Average daily hot water use (litres/day)												123.5466	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	134.4028	131.5330	128.0381	122.7235	118.4078	113.7680	111.9848	115.4646	119.1346	124.0056	129.4021	134.0542	(44)
Energy conte	212.8612	187.3012	196.7898	168.0024	159.3996	139.8910	135.4359	142.9693	146.9049	168.2744	184.3570	209.8965	(45)
Energy content (annual)													
										Total = Sum(45)m =		2052.0831	

Distribution loss (46)m = 0.15 x (45)m											Total = Sum(47)m = 180.0000	
	31.9292	28.0952	29.5185	25.2004	23.9099	20.9837	20.3154	21.4454	22.0357	25.2412	27.6535	31.4845 (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												

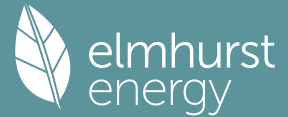
	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (56)
If cylinder contains dedicated solar storage												
	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	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	0.0000 (61)

Total heat required for water heating calculated for each month												
	262.1038	231.7785	246.0325	215.6566	208.6423	187.5452	184.6785	192.2120	194.5591	217.5171	232.0112	259.1391 (62)
WWHRS	-30.1161	-26.6349	-27.8905	-23.0945	-21.5232	-18.4176	-17.2635	-18.3580	-19.0555	-22.4643	-25.4494	-29.5584 (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												

Output from w/h	231.9878	205.1436	218.1419	192.5621	187.1191	169.1277	167.4150	173.8539	175.5036	195.0527	206.5618	229.5808	(64)
12Total per year (kWh/year)												2352.0500	(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	110.1705	97.8595	104.8267	93.9841	92.3945	84.6371	84.4266	86.9314	86.9692	95.3454	99.4220	109.1847	(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	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	111.9324	123.9251	111.9324	115.6635	111.9324	115.6635	111.9324	111.9324	115.6635	111.9324	115.6635	111.9324	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	221.8478	224.1499	218.3487	205.9987	190.4090	175.7569	165.9684	163.6663	169.4675	181.8175	197.4072	212.0593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	(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)	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	(71)
Water heating gains (Table 5)	148.0786	145.6242	140.8962	130.5335	124.1862	117.5516	113.4766	116.8433	120.7906	128.1524	138.0862	146.7536	(72)
Total internal gains	545.1263	556.9668	534.4448	515.4632	489.7951	469.2394	451.6449	452.7095	466.1891	485.1698	514.4244	534.0129	(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				9.6300	11.2829		0.6300		0.7000		0.7700		33.2063 (75)
Northwest				8.2400	11.2829		0.6300		0.7000		0.7700		28.4133 (81)
Solar gains	61.6196	125.4284	225.9821	371.1276	498.8683	531.8464	497.5314	396.6378	275.3628	153.2835	77.5334		50.3216 (83)
Total gains	606.7459	682.3952	760.4269	886.5908	988.6634	1001.0858	949.1763	849.3473	741.5518	638.4533	591.9577		584.3345 (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	52.0261	52.1565	52.2849	52.8967	53.0127	53.5598	53.5598	53.6623	53.3477	53.0127	52.7785	52.5358		
alpha	4.4684	4.4771	4.4857	4.5264	4.5342	4.5707	4.5707	4.5775	4.5565	4.5342	4.5186	4.5024		
util living area	0.9930	0.9873	0.9723	0.9159	0.7844	0.5915	0.4431	0.5109	0.7773	0.9515	0.9870	0.9941	(86)	
MIT	19.5237	19.7103	20.0267	20.4764	20.8110	20.9602	20.9914	20.9842	20.8670	20.4270	19.9097	19.4990	(87)	
Th 2	19.8960	19.8984	19.9008	19.9121	19.9142	19.9241	19.9241	19.9259	19.9203	19.9142	19.9099	19.9055	(88)	
util rest of house	0.9909	0.9835	0.9635	0.8900	0.7264	0.5033	0.3380	0.3981	0.6960	0.9310	0.9823	0.9923	(89)	
MIT 2	18.1954	18.4341	18.8346	19.3900	19.7594	19.9018	19.9213	19.9202	19.8297	19.3456	18.6975	18.1705	(90)	
Living area fraction										FLA = Living area / (4) =		0.5453	(91)	
MIT	18.9197	19.1301	19.4847	19.9825	20.3329	20.4790	20.5049	20.5004	20.3954	19.9353	19.3586	18.8950	(92)	
Temperature adjustment												0.0000		
adjusted MIT	18.9197	19.1301	19.4847	19.9825	20.3329	20.4790	20.5049	20.5004	20.3954	19.9353	19.3586	18.8950	(93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9883	0.9800	0.9594	0.8919	0.7502	0.5500	0.3954	0.4595	0.7344	0.9315	0.9792	0.9900	(94)
Useful gains	599.6705	668.7235	729.5637	790.7316	741.6977	550.5625	375.2592	390.3066	544.5976	594.6983	579.6343	578.5119	(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	1459.6075	1417.1537	1289.9524	1088.2448	845.8489	570.1395	378.6934	396.8986	612.9485	914.6719	1206.4240	1452.8840	(97)
Space heating kWh	639.7931	502.9451	416.9292	214.2095	77.4885	0.0000	0.0000	0.0000	0.0000	238.0604	451.2885	650.5329	(98a)
Space heating requirement - total per year (kWh/year)												3191.2473	
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	639.7931	502.9451	416.9292	214.2095	77.4885	0.0000	0.0000	0.0000	0.0000	238.0604	451.2885	650.5329	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3191.2473	
Space heating per m2										(98c) / (4) =		39.3204	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												92.3000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	639.7931	502.9451	416.9292	214.2095	77.4885	0.0000	0.0000	0.0000	0.0000	238.0604	451.2885	650.5329	(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)	693.1670	544.9026	451.7109	232.0796	83.9529	0.0000	0.0000	0.0000	0.0000	257.9202	488.9366	704.8027	(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 requirement	231.9878	205.1436	218.1419	192.5621	187.1191	169.1277	167.4150	173.8539	175.5036	195.0527	206.5618	229.5808	(64)
Efficiency of water heater	86.2126	85.9903	85.4882	84.2993	82.2409	79.8000	79.8000	79.8000	79.8000	84.5077	85.7629	86.2622	(216)
(217)m													(217)

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Fuel for water heating, kWh/month	269.0881	238.5660	255.1720	228.4268	227.5256	211.9394	209.7933	217.8621	219.9293	230.8105	240.8522	266.1430	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	23.2573	18.6579	16.7994	12.3079	9.5070	7.7673	8.6726	11.2730	14.6425	19.2117	21.6996	23.9037	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-15.2931	-23.1046	-35.5584	-42.8961	-48.8556	-46.5562	-45.9837	-42.1034	-35.7503	-27.6562	-17.3501	-13.0476	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-4.5126	-9.7793	-19.9874	-30.8517	-41.6289	-42.1427	-41.6541	-34.8875	-25.0735	-14.2585	-6.1100	-3.5480	(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												3457.4727	(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												2816.1081	(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)												187.7000	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-668.5894	(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												5878.6914	(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	3457.4727	0.2100	726.0693	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2816.1081	0.2100	591.3827	(264)
Space and water heating			1317.4520	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	187.7000	0.1443	27.0909	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-394.1553	0.1332	-52.4889	
PV Unit electricity exported	-274.4342	0.1251	-34.3319	
Total			-86.8209	(269)
Total CO2, kg/year			1269.6513	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.6400	(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	3457.4727	1.1300	3906.9441	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2816.1081	1.1300	3182.2022	(278)
Space and water heating			7089.1463	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	187.7000	1.5338	287.9006	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-394.1553	1.4921	-588.1135	
PV Unit electricity exported	-274.4342	0.4592	-126.0110	
Total			-714.1245	(283)
Total Primary energy kWh/year			6793.0232	(286)
Target Primary Energy Rate (TPER)			83.7000	(287)

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Plot Reference	A 119			Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	82 B	DER	5.25	TER	15.64
Environmental	96 A	% DER < TER			66.43
CO ₂ Emissions (t/year)	0.38	DFEE	42.07	TFEE	46.60
Compliance Check	See BREL	% DFEE < TFEE			9.71
% DPER < TPER	34.10	DPER	55.16	TPER	83.70
Assessor Details	Mr. Robert Tanner			Assessor ID	W344-0001
Client					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	81.1600 (1b)	2.8000 (2b)	227.2480 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.1600		227.2480 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 227.2480 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1320 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	2.0000 (17)
Infiltration rate	0.2320 (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) = 0.1972 (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	0.2514	0.2465	0.2416	0.2169	0.2120	0.1874	0.1874	0.1824	0.1972	0.2120	0.2219	0.2317 (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	0.5316	0.5304	0.5292	0.5235	0.5225	0.5176	0.5176	0.5166	0.5194	0.5225	0.5246	0.5268 (25)

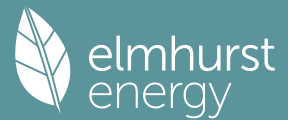
3. Heat losses and heat loss parameter

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			21.1800	1.1450	24.2519		(27)
Heatloss Floor 1			81.1600	0.1000	8.1160	110.0000	8927.6000 (28b)
External Wall 1	53.2300	21.1800	32.0500	0.1500	4.8075	70.0000	2243.5000 (29a)
Corridor wall	19.1400	2.4200	16.7200	0.1900	3.1768	70.0000	1170.4000 (29a)
Total net area of external elements Aum(A, m ²)			153.5300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 42.7722		(33)
Main dwelling							
Party Wall 1			34.0900	0.0000	0.0000	70.0000	2386.3000 (32)
Party Ceiling 1			81.1600			30.0000	2434.8000 (32b)
Internal Wall 1			170.7200			9.0000	1536.4800 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 18699.0799 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K	230.3977 (35)

List of Thermal Bridges	Length	Psi-value	Total
K1 Element			
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.1800	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	12.1800	0.0800	0.9744

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E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920
E4 Jamb	28.8000	0.0400	1.1520
E7 Party floor between dwellings (in blocks of flats)	14.6500	0.0500	0.7325
E7 Party floor between dwellings (in blocks of flats)	6.8400	0.0390	0.2668
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0500	0.2180
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.1000	0.4360
E16 Corner (normal)	2.8000	0.0500	0.1400
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	5.6000	0.0500	0.2800
E18 Party wall between dwellings	2.8000	0.0390	0.1092
E20 Exposed floor (normal)	14.6500	0.1000	1.4650
E21 Exposed floor (inverted)	6.8400	0.1000	0.6840
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.0591 (36)
Point Thermal bridges		(36a) =	0.0000
Total fabric heat loss		(33) + (36) + (36a) =	49.8313 (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	39.8666	39.7745	39.6843	39.2605	39.1812	38.8121	38.8121	38.7437	38.9542	39.1812	39.3416	39.5093 (38)
Average = Sum(39)m / 12 =	89.6979	89.6058	89.5156	89.0918	89.0125	88.6433	88.6433	88.5750	88.7855	89.0125	89.1729	89.3406 (39)
												89.0914
HLP	1.1052	1.1041	1.1030	1.0977	1.0968	1.0922	1.0922	1.0914	1.0940	1.0968	1.0987	Dec 1.1008 (40)
HLP (average)												1.0977
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.4845 (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	27.8181	27.3981	26.8007	25.9061	25.0998	23.9899	23.1479	24.1775	24.7179	25.8177	26.9611	27.7960 (42b)
Hot water usage for other uses	40.0738	38.6166	37.1593	35.7021	34.2449	32.7876	32.7876	34.2449	35.7021	37.1593	38.6166	40.0738 (42c)
Average daily hot water use (litres/day)												62.2247 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	67.8919	66.0147	63.9601	61.6082	59.3447	56.7776	55.9355	58.4224	60.4200	62.9770	65.5777	67.8698 (44)
Energy content (annual)	99.9485	87.3508	91.3976	80.4757	76.4717	65.6614	61.8104	68.7643	70.0842	81.1523	88.6304	99.6718 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Total heat required for water heating calculated for each month												
WWHRS	84.9563	74.2482	77.6880	68.4044	65.0009	55.8121	52.5388	58.4496	59.5716	68.9794	75.3359	84.7210 (62)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	84.9563	74.2482	77.6880	68.4044	65.0009	55.8121	52.5388	58.4496	59.5716	68.9794	75.3359	84.7210 (64)
12Total per year (kWh/year)												825.7062 (64)
Electric shower(s)	52.7562	47.0062	51.3290	48.9826	49.9018	47.6015	49.1882	49.9018	48.9826	51.3290	50.3638	52.7562 (64a)
Heat gains from water heating, kWh/month	34.4281	30.3136	32.2542	29.3467	28.7257	25.8534	25.4317	27.0878	27.1386	30.0771	31.4249	34.3693 (65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 600.0989 (64a)												

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	111.8968	123.8857	111.8968	115.6266	111.8968	115.6266	111.8968	111.8968	115.6266	111.8968	115.6266	111.8968 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	221.8478	224.1499	218.3487	205.9987	190.4090	175.7569	165.9684	163.6663	169.4675	181.8175	197.4072	212.0593 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225 (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)	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801 (71)
Water heating gains (Table 5)	46.2744	45.1095	43.3525	40.7594	38.6098	35.9075	34.1825	36.4084	37.6924	40.4262	43.6457	46.1953 (72)
Total internal gains	440.2865	453.4127	433.8655	422.6523	401.1831	387.5586	372.3151	372.2390	383.0541	394.4080	416.9471	430.4189 (73)

6. Solar gains												
[Jan]			Area	Solar flux	g	FF	Access	Gains				
			m2	Table 6a	Specific data	Specific data	factor	W				
				W/m2	or Table 6b	or Table 6c	Table 6d					
Northeast			11.4100	11.2829	0.3500	0.7000	0.7700	21.8578 (75)				
Northwest			9.7700	11.2829	0.3500	0.7000	0.7700	18.7161 (81)				
Solar gains	40.5740	82.5895	148.8000	244.3724	328.4844	350.1992	327.6042	261.1698	181.3152	100.9309	51.0526	33.1348 (83)
Total gains	480.8605	536.0022	582.6655	667.0246	729.6675	737.7578	699.9193	633.4088	564.3693	495.3389	467.9997	463.5537 (84)

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7. Mean internal temperature (heating season)													
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)	
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	57.9076	57.9671	58.0255	58.3016	58.3535	58.5965	58.5965	58.6417	58.5027	58.3535	58.2485	58.1392	
alpha	4.8605	4.8645	4.8684	4.8868	4.8902	4.9064	4.9064	4.9094	4.9002	4.8902	4.8832	4.8759	
util living area	0.9973	0.9949	0.9887	0.9612	0.8780	0.7069	0.5428	0.6149	0.8627	0.9776	0.9946	0.9978 (86)	
MIT	19.5534	19.7080	19.9742	20.3785	20.7337	20.9347	20.9856	20.9744	20.8210	20.3718	19.8992	19.5237 (87)	
Th 2	19.9966	19.9975	19.9984	20.0027	20.0035	20.0072	20.0072	20.0079	20.0058	20.0035	20.0019	20.0002 (88)	
util rest of house	0.9964	0.9933	0.9849	0.9473	0.8355	0.6199	0.4275	0.4957	0.7986	0.9671	0.9926	0.9971 (89)	
MIT 2	18.6773	18.8319	19.0968	19.4945	19.8193	19.9759	20.0032	19.9999	19.9009	19.4942	19.0263	18.6504 (90)	
Living area fraction									fLA = Living area / (4) =				0.5453 (91)
MIT	19.1551	19.3097	19.5753	19.9766	20.3180	20.4988	20.5389	20.5313	20.4027	19.9728	19.5023	19.1267 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.1551	19.3097	19.5753	19.9766	20.3180	20.4988	20.5389	20.5313	20.4027	19.9728	19.5023	19.1267 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9955	0.9918	0.9829	0.9469	0.8503	0.6649	0.4905	0.5605	0.8270	0.9667	0.9913	0.9962 (94)
Useful gains	478.6864	531.6232	572.6929	631.6129	620.4402	490.5253	343.2953	355.0563	466.7106	478.8529	463.9237	461.8004 (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	1332.4681	1291.1889	1170.4415	986.8330	767.1077	522.8902	349.1613	365.9324	559.5859	834.2959	1105.9482	1333.5573 (97)
Space heating kWh	635.2135	510.4281	444.7250	255.7584	109.1207	0.0000	0.0000	0.0000	0.0000	264.4496	462.2576	648.5872 (98a)
Space heating requirement - total per year (kWh/year)												3330.5402
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	635.2135	510.4281	444.7250	255.7584	109.1207	0.0000	0.0000	0.0000	0.0000	264.4496	462.2576	648.5872 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3330.5402
Space heating per m2										(98c) / (4) =		41.0367 (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	833.2472	655.9606	673.1697	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8237	0.8928	0.8476	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	686.3220	585.6647	570.5719	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	819.4270	777.4710	701.7824	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	95.8356	142.7039	97.6207	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	23.9589	35.6760	24.4052	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												84.0400 (107)
Energy for space heating												41.0367 (99)
Energy for space cooling												1.0355 (108)
Total												42.0722 (109)
Fabric Energy Efficiency (DFEE)												42.1 (109)

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	81.1600 (1b)	x 2.8000 (2b)	= 227.2480 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	81.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	227.2480 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)

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

Air changes per hour
30.0000 / (5) = 0.1320 (8)
Yes
Blower Door
5.0000 (17)
0.3820 (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) = 0.3247 (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	0.4140	0.4059	0.3978	0.3572	0.3491	0.3085	0.3085	0.3004	0.3247	0.3491	0.3653	0.3815 (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	0.5857	0.5824	0.5791	0.5638	0.5609	0.5476	0.5476	0.5451	0.5527	0.5609	0.5667	0.5728 (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			17.8700	1.1450	20.4618		(27)
Heatloss Floor 1			81.1600	0.1300	10.5508		(28b)
External Wall 1	53.2300	17.8700	35.3600	0.1800	6.3648		(29a)
Corridor wall	19.1400	2.4200	16.7200	0.1800	3.0096		(29a)
Total net area of external elements Aum(A, m2)			153.5300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 42.8070		(33)
Main dwelling							
Party Wall 1			34.0900	0.0000	0.0000		(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 230.3977 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.1800	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	12.1800	0.1600	1.9488
E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920
E4 Jamb	28.8000	0.0500	1.4400
E7 Party floor between dwellings (in blocks of flats)	14.6500	0.0700	1.0255
E7 Party floor between dwellings (in blocks of flats)	6.8400	0.0700	0.4788
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
E16 Corner (normal)	2.8000	0.0900	0.2520
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	14.6500	0.3200	4.6880
E21 Exposed floor (inverted)	6.8400	0.3200	2.1888
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 13.1083 (36)

Point Thermal Bridges

Total fabric heat loss (33) + (36) + (36a) = 55.9153 (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
(38)m	43.9228	43.6733	43.4286	42.2797	42.0647	41.0640	41.0640	40.8786	41.4494	42.0647	42.4996	42.9542 (38)
Heat transfer coeff	99.8382	99.5886	99.3440	98.1950	97.9800	96.9793	96.9793	96.7940	97.3647	97.9800	98.4149	98.8695 (39)
Average = Sum(39)m / 12 =												98.1940

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2301	1.2271	1.2241	1.2099	1.2072	1.1949	1.1949	1.1926	1.1997	1.2072	1.2126	1.2182 (40)
HLP (average)												1.2099
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4845 (42)
Hot water usage for mixer showers												0.0000 (42a)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hot water usage for baths												28.3562 (42b)
28.4523	28.0298	27.4347	26.3376	25.5160	24.6051	24.1130	24.7039	25.3473	26.3220	27.4418	28.3562	
Hot water usage for other uses												40.0738 (42c)
40.0738	38.6166	37.1593	35.7021	34.2449	32.7876	32.7876	34.2449	35.7021	37.1593	38.6166	40.0738	
Average daily hot water use (litres/day)												62.8105 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	68.5261	66.6463	64.5941	62.0397	59.7609	57.3927	56.9007	58.9488	61.0494	63.4814	66.0583	68.4299 (44)
Energy conte	108.5286	94.9035	99.2787	84.9292	80.4497	70.5710	68.8164	72.9909	75.2800	86.1436	94.1122	107.1448 (45)
Energy content (annual)										Total = Sum(45)m =		1043.1486
Distribution loss (46)m = 0.15 x (45)m												0.0000 (46)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Water storage loss (or HIU loss):												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 (57)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
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												
92.2493	80.6680	84.3869	72.1898	68.3822	59.9854	58.4940	62.0423	63.9880	73.2221	79.9954	91.0730 (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	92.2493	80.6680	84.3869	72.1898	68.3822	59.9854	58.4940	62.0423	63.9880	73.2221	79.9954	91.0730 (64)

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12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =										886.6763 (64)
Electric shower(s)	887 (64)										
52.7562	47.0062	51.3290	48.9826	49.9018	47.6015	49.1882	49.9018	48.9826	51.3290	50.3638	52.7562 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =										600.0989 (64a)	
Heat gains from water heating, kWh/month											
36.2514	31.9186	33.9290	30.2931	29.5710	26.8967	26.9205	27.9860	28.2427	31.1378	32.5898	35.9573 (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	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	124.2251	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	111.9324	123.9251	111.9324	115.6635	111.9324	115.6635	111.9324	111.9324	115.6635	111.9324	115.6635	111.9324	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	221.8478	224.1499	218.3487	205.9987	190.4090	175.7569	165.9684	163.6663	169.4675	181.8175	197.4072	212.0593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	35.4225	(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)	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	-99.3801	(71)
Water heating gains (Table 5)	48.7250	47.4978	45.6035	42.0738	39.7460	37.3565	36.1835	37.6156	39.2259	41.8518	45.2636	48.3297	(72)
Total internal gains	442.7727	455.8404	436.1521	424.0035	402.3549	389.0444	374.3518	373.4818	384.6244	395.8693	418.6018	432.5890	(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				9.6300	11.2829	0.6300	0.7000			0.7700			33.2063 (75)
Northwest				8.2400	11.2829	0.6300	0.7000			0.7700			28.4133 (81)
Solar gains	61.6196	125.4284	225.9821	371.1276	498.8683	531.8464	497.5314	396.6378	275.3628	153.2835	77.5334		50.3216 (83)
Total gains	504.3923	581.2689	662.1342	795.1311	901.2232	920.8908	871.8832	770.1196	659.9871	549.1527	496.1352		482.9106 (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	52.0261	52.1565	52.2849	52.8967	53.0127	53.5598	53.5598	53.6623	53.3477	53.0127	52.7785	52.5358
alpha	4.4684	4.4771	4.4857	4.5264	4.5342	4.5707	4.5707	4.5775	4.5565	4.5342	4.5186	4.5024
util living area	0.9967	0.9932	0.9832	0.9398	0.8238	0.6333	0.4797	0.5573	0.8272	0.9711	0.9935	0.9973 (86)
MIT	19.3853	19.5765	19.9041	20.3863	20.7649	20.9477	20.9882	20.9776	20.8245	20.3236	19.7826	19.3610 (87)
Th 2	19.8960	19.8984	19.9008	19.9121	19.9142	19.9241	19.9241	19.9259	19.9203	19.9142	19.9099	19.9055 (88)
util rest of house	0.9956	0.9910	0.9776	0.9195	0.7701	0.5425	0.3673	0.4371	0.7525	0.9576	0.9910	0.9964 (89)
MIT 2	18.4333	18.6254	18.9513	19.4246	19.7599	19.9006	19.9211	19.9194	19.8226	19.3757	18.8401	18.4163 (90)
Living area fraction	fLA = Living area / (4) = 0.5453 (91)											
MIT	18.9525	19.1441	19.4709	19.9490	20.3080	20.4716	20.5030	20.4965	20.3690	19.8926	19.3541	18.9315 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.9525	19.1441	19.4709	19.9490	20.3080	20.4716	20.5030	20.4965	20.3690	19.8926	19.3541	18.9315 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9944	0.9890	0.9748	0.9203	0.7911	0.5902	0.4287	0.5026	0.7866	0.9573	0.9893	0.9954	(94)
Useful gains	501.5474	574.9014	645.4609	731.7247	712.9885	543.4956	373.7386	387.0687	519.1377	525.7102	490.8182	480.6652	(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	1462.8751	1418.5459	1288.5844	1084.9594	843.4128	569.4258	378.5101	396.5153	610.3769	910.4903	1205.9838	1456.4921	(97)
Space heating kWh	715.2278	566.9291	478.4839	254.3289	97.0357	0.0000	0.0000	0.0000	0.0000	286.2764	514.9192	726.0153	(98a)
Space heating requirement - total per year (kWh/year)											3639.2164		
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	715.2278	566.9291	478.4839	254.3289	97.0357	0.0000	0.0000	0.0000	0.0000	286.2764	514.9192	726.0153	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)											3639.2164		
Space heating per m2											(98c) / (4) =	44.8400	(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	911.6053	717.6467	735.6341	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8678	0.9213	0.8789	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	791.0594	661.1695	646.5184	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1033.1941	978.0917	861.3332	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	174.3370	235.7901	159.8222	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													

Full SAP Calculation Printout



	0.0000	0.0000	0.0000	0.0000	0.0000	43.5842	58.9475	39.9555	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement													142.4873 (107)
Energy for space heating													44.8400 (99)
Energy for space cooling													1.7556 (108)
Total													46.5957 (109)
Fabric Energy Efficiency (TFEE)													46.6 (109)