

Summary for Input Data



Plot Reference	A 118	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	5.28	TER	14.82
Environmental	96 A	% DER < TER			64.37
CO ₂ Emissions (t/year)	0.35	DFEE	38.64	TFEE	41.23
Compliance Check	See BREL	% DFEE < TFEE			6.29
% DPER < TPER	29.90	DPER	55.60	TPER	79.31

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

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

Orientation	Northeast	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	230.72	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	22.53 m	74.77 m ²	2.80 m

8.0 Living Area	33.46	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.15	70.00	48.55	28.99	0.00	None	19.56	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	14.52	12.10	0.70	Stairwell Access Corridor 3	2.42	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00	70.00	34.03	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	169.40

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	74.77

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	74.77

Summary for Input Data

12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	North East	2.42	
SW windows	Window	External Wall 1	South West	9.79	
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
E1 Steel lintel with perforated steel base plate	Independently assessed	9.16	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	12.98	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	5.19	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
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	12.93	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	5.19	0.10	0.10	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	12.16	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	12.16	0.08	0.08	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	2
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	89.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

Summary for Input Data

21.0 Fixed Cooling System		No	
22.0 Pressure Testing		Yes	
Designed AP ₅₀	3.00	m ² /(h.m ²) @ 50 Pa	
Test Method	Blower Door		
22.0 Lighting		No	
No Fixed Lighting	No		
	Name	Efficacy	Power
	Lighting 1	75.00	15.00
			Capacity
			1125.00
			Count
			7
24.0 Main Heating 1		None	
25.0 Main Heating 2		None	
26.0 Heat Networks		Space and Water Combined	
Space Community Heating			
Distribution Loss	Calculated		
Distribution Loss Value	1.50		
SAP Code	2306		
	Heat Source	Fuel Type	Heating Use
	Heat source 1	Heat pump	Electricity
	Heat source 2	None	Space and Water
	Heat source 3	None	
	Heat source 4	None	
	Heat source 5	None	
			Efficiency
			232.00
			Percentage Of Heat
			100.00
			Heat
			Heat Power Ratio
			Electrical
			Fuel Factor
			Efficiency type
27.0 Secondary Heating		None	
28.0 Water Heating		Community 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]
Shower 1	Combi boiler or unvented hot water system	8.00	
Shower 2	Combi boiler or unvented hot water system	8.00	
			Connected
			No
			Connected To
			No
28.3 Waste Water Heat Recovery System			
29.0 Hot Water Cylinder		Internal Store	
Insulation Type	Measured Loss		
Cylinder Volume	180.00		
Loss	1.20		
			L
			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		
PV Cells kWp	Orientation	Elevation	Overshading FGHRs
			MCS Certificate
			Overshading Factor
			MCS Certificate
			Panel Manufacturer

Summary for Input Data



0.36		North East	Horizontal	Modest	No		0.80		Reference		
34.0 Small-scale Hydro				None							
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Compliance Check	See BREL	% DFEE < TFEE				6.29	
% DPER < TPER	29.90	DPER	55.60	TPER	79.31		
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	74.7700 (1b)	2.8000 (2b)	209.3560 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.7700		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	209.3560 (5)

2. Ventilation rate

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

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.1500	(18)
Number of sides sheltered	2	(19)

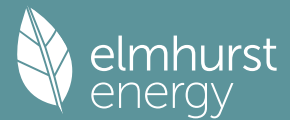
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			2.4200	1.0000	2.4200		(26)
Window			19.5600	1.1450	22.3969		(27)
Heatloss Floor 1			74.7700	0.1000	7.4770	110.0000	8224.7000 (28b)
External Wall 1	48.5500	19.5600	28.9900	0.1500	4.3485	70.0000	2029.2999 (29a)
Corridor wall	14.5200	2.4200	12.1000	0.1900	2.2990	70.0000	847.0000 (29a)
Total net area of external elements Aum(A, m ²)			137.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.9414		(33)
Main dwelling							
Party Wall 1			34.0300	0.0000	0.0000	70.0000	2382.0999 (32)
Party Ceiling 1			74.7700			30.0000	2243.1000 (32b)
Internal Wall 1			169.4000			9.0000	1524.5999 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		17250.7998 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							230.7182 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.1600	0.0500	0.4580
E4 Jamb	28.8000	0.0400	1.1520
E7 Party floor between dwellings (in blocks of flats)	12.9800	0.0500	0.6490
E7 Party floor between dwellings (in blocks of flats)	5.1900	0.0390	0.2024
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
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)	12.9300	0.1000	1.2930
E21 Exposed floor (inverted)	5.1900	0.1000	0.5190
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.1600	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	12.1600	0.0800	0.9728
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			6.5386 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	45.4801 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	18.1052	17.8850	17.6648	16.5637	16.3435	15.2424	15.2424	15.0222	15.6829	16.3435	16.7839	17.2244	(38)
Heat transfer coeff	63.5853	63.3651	63.1449	62.0438	61.8236	60.7225	60.7225	60.5023	61.1629	61.8236	62.2640	62.7044	(39)
Average = Sum(39)m / 12 =												61.9887	
HLP	0.8504	0.8475	0.8445	0.8298	0.8268	0.8121	0.8121	0.8092	0.8180	0.8268	0.8327	0.8386	(40)
HLP (average)												0.8291	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3562 (42)
Hot water usage for mixer showers	62.1146	61.1637	59.7622	57.6062	55.6746	52.9722	50.8348	53.3335	54.5903	57.2669	60.0544	62.0586	(42a)
Hot water usage for baths	26.9133	26.5070	25.9290	25.0635	24.2834	23.2096	22.3949	23.3911	23.9140	24.9780	26.0842	26.8919	(42b)
Hot water usage for other uses	38.7594	37.3499	35.9405	34.5311	33.1216	31.7122	31.7122	33.1216	34.5311	35.9405	37.3499	38.7594	(42c)
Average daily hot water use (litres/day)												117.4556	(43)
Daily hot water use	127.7873	125.0206	121.6317	117.2008	113.0797	107.8940	104.9419	109.8463	113.0354	118.1854	123.4885	127.7099	(44)
Energy conte	188.1249	165.4275	173.8092	153.0935	145.7146	124.7758	115.9639	129.2911	131.1154	152.2938	166.8988	187.5514	(45)
Energy content (annual)										Total = Sum(45)m =		1834.0601	
Distribution loss (46)m = 0.15 x (45)m	28.2187	24.8141	26.0714	22.9640	21.8572	18.7164	17.3946	19.3937	19.6673	22.8441	25.0348	28.1327	(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	243.4017	215.3550	229.0860	206.5872	200.9914	178.2695	171.2407	184.5679	184.6090	207.5706	220.3925	242.8282	(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	243.4017	215.3550	229.0860	206.5872	200.9914	178.2695	171.2407	184.5679	184.6090	207.5706	220.3925	242.8282	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2484.8999	(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	106.7730	94.9466	102.0130	93.6985	92.6715	84.2829	82.7794	87.2107	86.3908	94.8591	98.2888	106.5823	(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	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	104.9952	116.2447	104.9952	108.4951	104.9952	108.4951	104.9952	104.9952	108.4951	104.9952	108.4951	104.9952	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	208.1648	210.3249	204.8815	193.2932	178.6651	164.9167	155.7319	153.5718	159.0151	170.6035	185.2316	198.9800	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	(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)	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	(71)
Water heating gains (Table 5)	143.5121	141.2896	137.1143	130.1369	124.5585	117.0596	111.2627	117.2187	119.9872	127.4988	136.5122	143.2557	(72)
Total internal gains	515.0145	526.2016	505.3334	490.2675	466.5611	448.8136	430.3321	434.1281	445.8398	461.4399	488.5812	505.5733	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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												W/m2	or Table 6b		or Table 6c		Table 6d			
Southwest				9.7900		36.7938				0.3500		0.7000		0.7700		61.1585 (79)				
Northwest				9.7700		11.2829				0.3500		0.7000		0.7700		18.7161 (81)				
Solar gains	79.8747	142.2728	211.1767	289.3361	349.3437	357.9299	340.4581	293.9909	237.9759	161.6941	96.8036	67.6235 (83)								
Total gains	594.8891	668.4744	716.5101	779.6036	815.9049	806.7435	770.7902	728.1189	683.8157	623.1339	585.3848	573.1968 (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	75.3616	75.6235	75.8872	77.2340	77.5091	78.9146	78.9146	79.2018	78.3463	77.5091	76.9608	76.4203								
alpha	6.0241	6.0416	6.0591	6.1489	6.1673	6.2610	6.2610	6.2801	6.2231	6.1673	6.1307	6.0947								
util living area	0.9864	0.9717	0.9402	0.8434	0.6785	0.4791	0.3463	0.3817	0.6051	0.8736	0.9686	0.9887 (86)								
MIT	20.2299	20.3989	20.6073	20.8482	20.9652	20.9966	20.9996	20.9993	20.9865	20.8394	20.5145	20.2091 (87)								
Th 2	20.2099	20.2124	20.2149	20.2276	20.2301	20.2428	20.2428	20.2454	20.2377	20.2301	20.2250	20.2200 (88)								
util rest of house	0.9828	0.9647	0.9258	0.8118	0.6301	0.4236	0.2869	0.3194	0.5430	0.8401	0.9596	0.9857 (89)								
MIT 2	19.3217	19.5351	19.7928	20.0816	20.2025	20.2409	20.2427	20.2451	20.2291	20.0799	19.6917	19.3035 (90)								
Living area fraction	fLA = Living area / (4) =												0.4475 (91)							
MIT	19.7281	19.9217	20.1573	20.4247	20.5438	20.5791	20.5814	20.5826	20.5681	20.4198	20.0599	19.7088 (92)								
Temperature adjustment													0.0000							
adjusted MIT	19.7281	19.9217	20.1573	20.4247	20.5438	20.5791	20.5814	20.5826	20.5681	20.4198	20.0599	19.7088 (93)								
8. Space heating requirement																				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec								
Utilisation	0.9801	0.9616	0.9246	0.8203	0.6503	0.4484	0.3135	0.3473	0.5703	0.8490	0.9573	0.9832 (94)								
Useful gains	583.0320	642.8153	662.4677	639.5434	530.5619	361.7130	241.6456	252.8426	389.9647	529.0466	560.3869	563.5838 (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	981.0011	951.8500	862.3876	715.0339	546.7564	363.0640	241.7624	253.0591	395.6059	607.0941	806.9329	972.4687 (97)								
Space heating kWh	296.0890	207.6713	148.7404	54.3531	12.0487	0.0000	0.0000	0.0000	0.0000	58.0674	177.5131	304.2104 (98a)								
Space heating requirement - total per year (kWh/year)													1258.6934							
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	296.0890	207.6713	148.7404	54.3531	12.0487	0.0000	0.0000	0.0000	0.0000	58.0674	177.5131	304.2104 (98c)								
Space heating requirement after solar contribution - total per year (kWh/year)													1258.6934							
Space heating per m2													(98c) / (4) =	16.8342 (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																				
296.0890 207.6713 148.7404 54.3531 12.0487 0.0000 0.0000 0.0000 0.0000 58.0674 177.5131 304.2104 (98)																				
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50																				
307a 444.1335 311.5069 223.1106 81.5297 18.0731 0.0000 0.0000 0.0000 0.0000 87.1010 266.2697 456.3155																				
Space heating requirement																				
444.1335 311.5069 223.1106 81.5297 18.0731 0.0000 0.0000 0.0000 0.0000 87.1010 266.2697 456.3155 (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																				
243.4017 215.3550 229.0860 206.5872 200.9914 178.2695 171.2407 184.5679 184.6090 207.5706 220.3925 242.8282 (64)																				
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50																				
310a 365.1026 323.0324 343.6291 309.8808 301.4871 267.4043 256.8611 276.8519 276.9136 311.3559 330.5887 364.2423																				
Water heating fuel																				
365.1026 323.0324 343.6291 309.8808 301.4871 267.4043 256.8611 276.8519 276.9136 311.3559 330.5887 364.2423 (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 16.5407 14.9400 16.5407 16.0071 16.5407 16.0071 16.5407 16.5407 16.0071 16.5407 16.0071 16.5407 (331)																				
Lighting 22.7248 18.2307 16.4147 12.0261 9.2893 7.5895 8.4740 11.0149 14.3072 18.7718 21.2028 23.3564 (332)																				
Electricity generated by PVs (Appendix M) (negative quantity)																				
(333a)m -3.9445 -7.0014 -12.9144 -18.1716 -22.7123 -22.3983 -21.9293 -18.8731 -14.1914 -9.1276 -4.7361 -3.2203 (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														1888.0400 (307)						
Space heating fuel - secondary														0.0000 (309)						
Water heating fuel - community heating														3727.3498 (310)						
Efficiency of water heater														0.0000 (311)						
Electricity used for heat distribution														18.8804 (313)						
Space cooling fuel														0.0000 (321)						
Electricity for pumps and fans:																				
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)																				
mechanical ventilation fans (SFP = 0.7625)																				
194.7534 (330a)																				

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Total electricity for the above, kWh/year	194.7534 (331)
Electricity for lighting (calculated in Appendix L)	183.4023 (332)

Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-159.2202 (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	5834.3253 (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	2420.4267	0.1572	127.9513 (367)
Electrical energy for heat distribution (space & water)	18.8804	0.0000	8.2175 (372)
Overall CO2 factor for heat network			0.0645 (386)
Total CO2 associated with community systems			362.4220 (373)
Space and water heating			362.4220 (376)
Pumps, fans and electric keep-hot	194.7534	0.1387	27.0147 (378)
Energy for lighting	183.4023	0.1443	26.4706 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-159.2202	0.1305	-20.7841
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-20.7841 (380)
Total CO2, kg/year			395.1231 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.2800 (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	2420.4267	1.5820	1287.4841 (467)
Electrical energy for heat distribution (space & water)	18.8804	0.0000	86.5521 (472)
Overall CO2 factor for heat network			0.6798 (486)
Total CO2 associated with community systems			3817.2469 (473)
Space and water heating			3817.2469 (476)
Pumps, fans and electric keep-hot	194.7534	1.5128	294.6230 (478)
Energy for lighting	183.4023	1.5338	281.3085 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-159.2202	1.4822	-235.9971
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-235.9971 (480)
Total Primary energy kWh/year			4157.1812 (483)
Dwelling Primary energy Rate (DPER)			55.6000 (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	74.7700 (1b)	2.8000 (2b)	209.3560 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.7700		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 209.3560 (5)
Dwelling volume			

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	Air changes per hour
Pressure test	30.0000 / (5) = 0.1433 (8)
Pressure Test Method	Yes
Measured/design AP50	Blower Door
Infiltration rate	5.0000 (17)
Number of sides sheltered	0.3933 (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) = 0.3343 (21)

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Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												
Effective ac	0.4262	0.4179	0.4095	0.3677	0.3594	0.3176	0.3176	0.3092	0.3343	0.3594	0.3761	0.3928 (22b)
	0.5908	0.5873	0.5839	0.5676	0.5646	0.5504	0.5504	0.5478	0.5559	0.5646	0.5707	0.5771 (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			16.2600	1.1450	18.6183		(27)
Heatloss Floor 1			74.7700	0.1300	9.7201		(28b)
External Wall 1	48.5500	16.2600	32.2900	0.1800	5.8122		(29a)
Corridor wall	14.5200	2.4200	12.1000	0.1800	2.1780		(29a)
Total net area of external elements Aum(A, m2)			137.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.7486		(33)
Main dwelling							
Party Wall 1			34.0300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							230.7182 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.1600	0.0500	0.4580
E4 Jamb	28.8000	0.0500	1.4400
E7 Party floor between dwellings (in blocks of flats)	12.9800	0.0700	0.9086
E7 Party floor between dwellings (in blocks of flats)	5.1900	0.0700	0.3633
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
E16 Corner (normal)	2.8000	0.0900	0.2520
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	12.9300	0.3200	4.1376
E21 Exposed floor (inverted)	5.1900	0.3200	1.6608
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.1600	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	12.1600	0.1600	1.9456
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			12.0123 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	50.7609 (37)

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

(38)m	Jan 40.8195	Feb 40.5758	Mar 40.3370	Apr 39.2150	May 39.0051	Jun 38.0279	Jul 38.0279	Aug 37.8469	Sep 38.4043	Oct 39.0051	Nov 39.4297	Dec 39.8737 (38)
Heat transfer coeff	91.5804	91.3367	91.0979	89.9759	89.7660	88.7888	88.7888	88.6078	89.1652	89.7660	90.1906	90.6346 (39)
Average = Sum(39)m / 12 =												89.9749
HLP	Jan 1.2248	Feb 1.2216	Mar 1.2184	Apr 1.2034	May 1.2006	Jun 1.1875	Jul 1.1875	Aug 1.1851	Sep 1.1925	Oct 1.2006	Nov 1.2062	Dec 1.2122 (40)
HLP (average)												1.2034
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3562 (42)
Hot water usage for mixer showers												
63.7246	62.7670	61.3715	58.7015	56.7310	54.5337	53.2847	54.6696	56.1877	58.5471	61.2744	63.4805 (42a)	
Hot water usage for baths												
27.5269	27.1181	26.5424	25.4809	24.6861	23.8048	23.3287	23.9004	24.5228	25.4659	26.5492	27.4338 (42b)	
Hot water usage for other uses												
38.7594	37.3499	35.9405	34.5311	33.1216	31.7122	31.7122	33.1216	34.5311	35.9405	37.3499	38.7594 (42c)	
Average daily hot water use (litres/day)												119.5095 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
130.0109	127.2350	123.8544	118.7134	114.5388	110.0506	108.3256	111.6916	115.2416	119.9534	125.1736	129.6737 (44)	
Energy content (annual)	205.9055	181.1809	190.3596	162.5128	154.1912	135.3201	131.0104	138.2976	142.1045	162.7757	178.3327	203.0377 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1985.0286
30.8858	27.1771	28.5539	24.3769	23.1287	20.2980	19.6516	20.7446	21.3157	24.4164	26.7499	30.4556 (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												
255.1482	225.6582	239.6022	210.1670	203.4339	182.9743	180.2531	187.5402	189.7587	212.0184	225.9869	252.2803 (62)	
WWHRS	-29.1322	-25.7648	-26.9794	-22.3400	-20.8201	-17.8159	-16.6996	-17.7583	-18.4330	-21.7305	-24.6180	-28.5928 (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												
226.0159	199.8934	212.6228	187.8270	182.6138	165.1584	163.5535	169.7819	171.3256	190.2879	201.3689	223.6876 (64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2294.1367 (64)
Electric shower(s)												2294 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)	
Total Energy used by instantaneous electric shower (s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
107.8577	95.8245	102.6887	92.1589	90.6627	83.1173	82.9551	85.3781	85.3731	93.5171	97.4190	106.9042 (65)	

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

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Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	105.0763	116.3345	105.0763	108.5788	105.0763	108.5788	105.0763	105.0763	108.5788	105.0763	108.5788	105.0763	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	208.1648	210.3249	204.8815	193.2932	178.6651	164.9167	155.7319	153.5718	159.0151	170.6035	185.2316	198.9800	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	(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)	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	(71)
Water heating gains (Table 5)	144.9700	142.5959	138.0224	127.9984	121.8585	115.4407	111.4988	114.7555	118.5737	125.6950	135.3042	143.6884	(72)
Total internal gains	519.5535	530.5976	509.3226	491.2128	466.9422	447.2785	430.6493	431.7458	444.5100	462.7170	490.4569	509.0870	(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
Southwest					8.1400	36.7938	0.6300	0.7000			0.7700	91.5316 (79)
Northwest					8.1200	11.2829	0.6300	0.7000			0.7700	27.9995 (81)
Solar gains	119.5311	212.9060	316.0106	432.9589	522.7439	535.5880	509.4457	439.9205	356.1097	241.9672	144.8644	101.1978 (83)
Total gains	639.0846	743.5037	825.3332	924.1717	989.6861	982.8665	940.0950	871.6663	800.6198	704.6842	635.3214	610.2848 (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	52.3244	52.4640	52.6015	53.2575	53.3820	53.9695	53.9695	54.0797	53.7417	53.3820	53.1307	52.8704		
alpha	4.4883	4.4976	4.5068	4.5505	4.5588	4.5980	4.5980	4.6053	4.5828	4.5588	4.5420	4.5247		
util living area	0.9883	0.9764	0.9513	0.8799	0.7442	0.5576	0.4112	0.4600	0.6994	0.9140	0.9770	0.9904	(86)	
MIT	19.6489	19.8788	20.1927	20.5837	20.8514	20.9693	20.9938	20.9899	20.9162	20.5623	20.0440	19.6147	(87)	
Th 2	19.9002	19.9028	19.9053	19.9173	19.9196	19.9300	19.9300	19.9320	19.9260	19.9196	19.9150	19.9103	(88)	
util rest of house	0.9849	0.9697	0.9373	0.8473	0.6837	0.4727	0.3135	0.3570	0.6144	0.8827	0.9692	0.9875	(89)	
MIT 2	18.3567	18.6481	19.0399	19.5136	19.8008	19.9132	19.9281	19.9285	19.8724	19.5033	18.8684	18.3205	(90)	
Living area fraction									fLA = Living area / (4) =			0.4475	(91)	
MIT	18.9350	19.1988	19.5558	19.9925	20.2710	20.3858	20.4050	20.4035	20.3395	19.9772	19.3945	18.8997	(92)	
Temperature adjustment												0.0000		
adjusted MIT	18.9350	19.1988	19.5558	19.9925	20.2710	20.3858	20.4050	20.4035	20.3395	19.9772	19.3945	18.8997	(93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9808	0.9642	0.9319	0.8499	0.7045	0.5097	0.3573	0.4031	0.6489	0.8846	0.9643	0.9839	(94)
Ext temp.	626.8350	716.8875	769.1453	785.4199	697.2450	500.9614	335.8792	351.3685	519.5032	623.3793	612.6676	600.4867	(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	1340.2786	1306.0094	1189.3518	998.0541	769.3803	513.7142	337.8432	354.7390	556.3461	841.7518	1108.8468	1332.3017	(97)
Space heating requirement - total per year (kWh/year)	530.8021	395.8899	312.6336	153.0966	53.6687	0.0000	0.0000	0.0000	0.0000	162.4691	357.2490	544.4703	(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)	530.8021	395.8899	312.6336	153.0966	53.6687	0.0000	0.0000	0.0000	0.0000	162.4691	357.2490	544.4703	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2510.2794	
Space heating per m2										(98c) / (4) =		33.5734	(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	530.8021	395.8899	312.6336	153.0966	53.6687	0.0000	0.0000	0.0000	0.0000	162.4691	357.2490	544.4703	(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)	575.0835	428.9165	338.7147	165.8685	58.1459	0.0000	0.0000	0.0000	0.0000	176.0229	387.0520	589.8920	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	226.0159	199.8934	212.6228	187.8270	182.6138	165.1584	163.5535	169.7819	171.3256	190.2879	201.3689	223.6876	(64)
Efficiency of water heater	85.9066	85.5623	84.9229	83.6051	81.6803	79.8000	79.8000	79.8000	79.8000	83.7074	85.3308	85.9764	(216)
Fuel for water heating, kWh/month	263.0950	233.6231	250.3715	224.6596	223.5713	206.9654	204.9543	212.7593	214.6938	227.3250	235.9861	260.1734	(219)

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Space cooling fuel requirement														
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	(231)
Lighting	21.8328	17.5151	15.7704	11.5541	8.9247	7.2915	8.1414	10.5825	13.7456	18.0350	20.3705	22.4396	22.4396	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-14.1313	-21.3728	-32.9298	-39.7728	-45.3441	-43.2304	-42.7027	-39.0793	-33.1506	-25.6066	-16.0412	-12.0542	-12.0542	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)														
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)														
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)														
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233b)m	-4.1150	-8.9221	-18.2427	-28.1685	-38.0163	-38.4849	-38.0350	-31.8498	-22.8844	-13.0080	-5.5717	-3.2348	-3.2348	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)														
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)														
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)														
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year														
Space heating fuel - main system 1													2719.6960	(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													2758.1777	(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)													176.2030	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-615.9491	(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													5124.1277	(238)

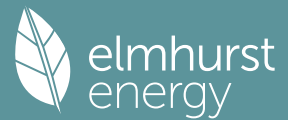
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2719.6960	0.2100	571.1362	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2758.1777	0.2100	579.2173	(264)
Space and water heating			1150.3535	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	176.2030	0.1443	25.4315	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-365.4159	0.1331	-48.6527	
PV Unit electricity exported	-250.5332	0.1251	-31.3400	
Total			-79.9927	(269)
Total CO2, kg/year			1107.7216	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.8200	(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	2719.6960	1.1300	3073.2564	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2758.1777	1.1300	3116.7408	(278)
Space and water heating			6189.9973	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	176.2030	1.5338	270.2661	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-365.4159	1.4920	-545.1979	
PV Unit electricity exported	-250.5332	0.4591	-115.0296	
Total			-660.2274	(283)
Total Primary energy kWh/year			5930.1368	(286)
Target Primary Energy Rate (TPER)			79.3100	(287)

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Plot Reference	A 118				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.28	TER	14.82		
Environmental	96 A	% DER < TER				64.37	
CO ₂ Emissions (t/year)	0.35	DFEE	38.64	TFEE	41.23		
Compliance Check	See BREL	% DFEE < TFEE				6.29	
% DPER < TPER	29.90	DPER	55.60	TPER	79.31		
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	74.7700 (1b)	2.8000 (2b)	209.3560 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.7700		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	209.3560 (5)

2. Ventilation rate

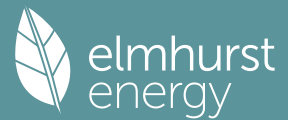
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1433 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2933 (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) = 0.2493 (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	0.3179	0.3116	0.3054	0.2742	0.2680	0.2368	0.2368	0.2306	0.2493	0.2680	0.2805	0.2929 (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	0.5505	0.5486	0.5466	0.5376	0.5359	0.5280	0.5280	0.5266	0.5311	0.5359	0.5393	0.5429 (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			19.5600	1.1450	22.3969		(27)
Heatloss Floor 1			74.7700	0.1000	7.4770	110.0000	8224.7000 (28b)
External Wall 1	48.5500	19.5600	28.9900	0.1500	4.3485	70.0000	2029.2999 (29a)
Corridor wall	14.5200	2.4200	12.1000	0.1900	2.2990	70.0000	847.0000 (29a)
Total net area of external elements Aum(A, m ²)			137.8400				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 38.9414		(33)
Main dwelling							
Party Wall 1			34.0300	0.0000	0.0000	70.0000	2382.0999 (32)
Party Ceiling 1			74.7700			30.0000	2243.1000 (32b)
Internal Wall 1			169.4000			9.0000	1524.5999 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	17250.7998 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							230.7182 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					9.1600	0.0500	0.4580
E4 Jamb					28.8000	0.0400	1.1520

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E7 Party floor between dwellings (in blocks of flats)	12.9800	0.0500	0.6490										
E7 Party floor between dwellings (in blocks of flats)	5.1900	0.0390	0.2024										
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										
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)	12.9300	0.1000	1.2930										
E21 Exposed floor (inverted)	5.1900	0.1000	0.5190										
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092										
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.1600	0.0000	0.0000										
P7 Party Wall - Exposed floor (normal)	12.1600	0.0800	0.9728										
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				6.5386 (36)									
Point Thermal bridges			(36a) =	0.0000									
Total fabric heat loss		(33) + (36) + (36a) =		45.4801 (37)									
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 38.0339	Feb 37.8983	Mar 37.7655	Apr 37.1415	May 37.0248	Jun 36.4814	Jul 36.4814	Aug 36.3807	Sep 36.6907	Oct 37.0248	Nov 37.2610	Dec 37.5079	(38)
Heat transfer coeff	83.5139	83.3784	83.2456	82.6216	82.5049	81.9614	81.9614	81.8608	82.1707	82.5049	82.7410	82.9879	(39)
Average = Sum(39)m / 12 =												82.6210	
HLP	Jan 1.1169	Feb 1.1151	Mar 1.1134	Apr 1.1050	May 1.1034	Jun 1.0962	Jul 1.0962	Aug 1.0948	Sep 1.0990	Oct 1.1034	Nov 1.1066	Dec 1.1099	(40)
HLP (average)												1.1050	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)													

Assumed occupancy													2.3562 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	26.9133	26.5070	25.9290	25.0635	24.2834	23.2096	22.3949	23.3911	23.9140	24.9780	26.0842	26.8919	(42b)
Hot water usage for other uses	38.7594	37.3499	35.9405	34.5311	33.1216	31.7122	31.7122	33.1216	34.5311	35.9405	37.3499	38.7594	(42c)
Average daily hot water use (litres/day)												60.1908	(43)
Daily hot water use	Jan 65.6726	Feb 63.8569	Mar 61.8695	Apr 59.5946	May 57.4051	Jun 54.9218	Jul 54.1072	Aug 56.5128	Sep 58.4450	Oct 60.9185	Nov 63.4341	Dec 65.6513	(44)
Energy conte	96.6815	84.4956	88.4103	77.8454	73.9722	63.5153	59.7900	66.5166	67.7933	78.4996	85.7333	96.4137	(45)
Energy content (annual)										Total = Sum(45)m =		939.6669	
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	0.0000	(46)
Water storage loss (or HIU loss):													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
82.1792	71.8213	75.1487	66.1686	62.8764	53.9880	50.8215	56.5391	57.6243	66.7247	72.8733	81.9517	81.9517	(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	82.1792	71.8213	75.1487	66.1686	62.8764	53.9880	50.8215	56.5391	57.6243	66.7247	72.8733	81.9517	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		798.7168	(64)
Electric shower(s)	51.0328	45.4707	49.6522	47.3825	48.2716	46.0464	47.5813	48.2716	47.3825	49.6522	48.7186	51.0328	(64a)
												580.4952	(64a)
Heat gains from water heating, kWh/month	33.3030	29.3230	31.2002	28.3878	27.7870	25.0086	24.6007	26.2027	26.2517	29.0942	30.3980	33.2461	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 117.8077	Feb 117.8077	Mar 117.8077	Apr 117.8077	May 117.8077	Jun 117.8077	Jul 117.8077	Aug 117.8077	Sep 117.8077	Oct 117.8077	Nov 117.8077	Dec 117.8077	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
104.9952	116.2447	104.9952	108.4951	104.9952	108.4951	104.9952	108.4951	104.9952	108.4951	104.9952	108.4951	104.9952	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
208.1648	210.3249	204.8815	193.2932	178.6651	164.9167	155.7319	153.5718	159.0151	170.6035	185.2316	198.9800	198.9800	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	(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)													
-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	(71)
Water heating gains (Table 5)													
44.7621	43.6354	41.9358	39.4275	37.3481	34.7342	33.0655	35.2187	36.4607	39.1051	42.2194	44.6856	44.6856	(72)
Total internal gains	416.2645	428.5474	410.1549	399.5581	379.3507	366.4882	352.1349	352.1280	362.3132	373.0461	394.2884	407.0032	(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					
Southwest			9.7900	36.7938	0.3500	0.7000	0.7700	61.1585	(79)				
Northwest			9.7700	11.2829	0.3500	0.7000	0.7700	18.7161	(81)				

Solar gains	79.8747	142.2728	211.1767	289.3361	349.3437	357.9299	340.4581	293.9909	237.9759	161.6941	96.8036	67.6235	(83)
Total gains	496.1392	570.8202	621.3316	688.8942	728.6945	724.4181	692.5930	646.1188	600.2892	534.7402	491.0920	474.6267	(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	57.3783	57.4716	57.5633	57.9980	58.0801	58.4652	58.4652	58.5371	58.3162	58.0801	57.9143	57.7420
alpha	4.8252	4.8314	4.8376	4.8665	4.8720	4.8977	4.8977	4.9025	4.8877	4.8720	4.8610	4.8495
util living area	0.9956	0.9907	0.9801	0.9428	0.8504	0.6758	0.5103	0.5648	0.8056	0.9599	0.9908	0.9964 (86)
MIT	19.6159	19.8058	20.0803	20.4606	20.7725	20.9460	20.9888	20.9821	20.8714	20.4688	19.9783	19.5824 (87)
Th 2	19.9870	19.9885	19.9899	19.9967	19.9980	20.0040	20.0040	20.0051	20.0017	19.9980	19.9954	19.9927 (88)
util rest of house	0.9942	0.9879	0.9737	0.9239	0.8028	0.5888	0.4000	0.4514	0.7314	0.9428	0.9874	0.9954 (89)
MIT 2	18.7319	18.9215	19.1934	19.5649	19.8445	19.9787	20.0009	19.9997	19.9309	19.5801	19.0992	18.7030 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.1275	19.3172	19.5903	19.9657	20.2598	20.4116	20.4430	20.4393	20.3518	19.9778	19.4926	19.0965 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.1275	19.3172	19.5903	19.9657	20.2598	20.4116	20.4430	20.4393	20.3518	19.9778	19.4926	19.0965 (93)

8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9927	0.9854	0.9705	0.9232	0.8165	0.6260	0.4495	0.5022	0.7597	0.9423	0.9853	0.9940 (94)
Useful gains	492.5192	562.5064	603.0095	636.0099	594.9437	453.4692	311.3243	324.4934	456.0636	503.9116	483.8519	471.7990 (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	1238.3024	1202.0835	1089.7070	914.2688	706.2277	476.3255	314.9809	330.6615	513.7132	773.7151	1025.3789	1236.2331 (97)
Space heating kWh	554.8626	429.7958	362.1030	200.3464	82.7953	0.0000	0.0000	0.0000	0.0000	200.7337	389.8995	568.7390 (98a)
Space heating requirement - total per year (kWh/year)	2789.2753											
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	554.8626	429.7958	362.1030	200.3464	82.7953	0.0000	0.0000	0.0000	0.0000	200.7337	389.8995	568.7390 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2789.2753											
Space heating per m2	(98c) / (4) = 37.3047 (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	770.4373	606.5145	622.1419	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8491	0.9133	0.8849	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	654.1919	553.9577	550.5128	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	807.0408	771.9818	719.5750	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	110.0512	162.2100	125.7822	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	27.5128	40.5525	31.4456	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	99.5109 (107)											
Energy for space heating	37.3047 (99)											
Energy for space cooling	1.3309 (108)											
Total	38.6356 (109)											
Fabric Energy Efficiency (DFEE)	38.6 (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	Storey height				Volume		
		(m2)	(m)				(m3)		
Main dwelling		74.7700	(1b)	x	2.8000	(2b)	=	209.3560	(1b) - (3b)
Ground floor									
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	74.7700								
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)... (3n)		=			209.3560	(4)	(5)

2. Ventilation rate												
												m3 per hour
Number of open chimneys												0 * 80 = 0.0000 (6a)
Number of open flues												0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire												0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler												0 * 20 = 0.0000 (6d)
Number of flues attached to other heater												0 * 35 = 0.0000 (6e)
Number of blocked chimneys												0 * 20 = 0.0000 (6f)
Number of intermittent extract fans												3 * 10 = 30.0000 (7a)
Number of passive vents												0 * 10 = 0.0000 (7b)
Number of flueless gas fires												0 * 40 = 0.0000 (7c)

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Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											Air changes per hour	(8)
Pressure test												30.0000 / (5) =	0.1433
Pressure Test Method												Yes	
Measured/design AP50												Blower Door	
Infiltration rate												5.0000	(17)
Number of sides sheltered												0.3933	(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) =	0.3343 (21)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
	0.4262	0.4179	0.4095	0.3677	0.3594	0.3176	0.3176	0.3092	0.3343	0.3594	0.3761	0.3928	(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	0.5908	0.5873	0.5839	0.5676	0.5646	0.5504	0.5504	0.5478	0.5559	0.5646	0.5707	0.5771	(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			16.2600	1.1450	18.6183		(27)
Heatloss Floor 1			74.7700	0.1300	9.7201		(28b)
External Wall 1	48.5500	16.2600	32.2900	0.1800	5.8122		(29a)
Corridor wall	14.5200	2.4200	12.1000	0.1800	2.1780		(29a)
Total net area of external elements Aum(A, m2)			137.8400				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)... (30) + (32) =		38.7486		(33)
Main dwelling							
Party Wall 1			34.0300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							230.7182 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				9.1600	0.0500	0.4580	
E4 Jamb				28.8000	0.0500	1.4400	
E7 Party floor between dwellings (in blocks of flats)				12.9800	0.0700	0.9086	
E7 Party floor between dwellings (in blocks of flats)				5.1900	0.0700	0.3633	
E9 Balcony between dwellings, wall insulation continuous				4.3600	0.0200	0.0872	
E9 Balcony between dwellings, wall insulation continuous				4.3600	0.0200	0.0872	
E16 Corner (normal)				2.8000	0.0900	0.2520	
E18 Party wall between dwellings				5.6000	0.0600	0.3360	
E18 Party wall between dwellings				2.8000	0.0600	0.1680	
E20 Exposed floor (normal)				12.9300	0.3200	4.1376	
E21 Exposed floor (inverted)				5.1900	0.3200	1.6608	
E25 Staggered party wall between dwellings				2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				12.1600	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)				12.1600	0.1600	1.9456	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							12.0123 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	50.7609 (37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3562 (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	27.5269	27.1181	26.5424	25.4809	24.6861	23.8048	23.3287	23.9004	24.5228	25.4659	26.5492	27.4338 (42b)
Hot water usage for other uses	38.7594	37.3499	35.9405	34.5311	33.1216	31.7122	31.7122	33.1216	34.5311	35.9405	37.3499	38.7594 (42c)
Average daily hot water use (litres/day)												60.7576 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	66.2863	64.4680	62.4829	60.0120	57.8077	55.5170	55.0409	57.0220	59.0539	61.4064	63.8992	66.1932 (44)
Distribution loss (46)m = 0.15 x (45)m	104.9813	91.8016	96.0339	82.1534	77.8203	68.2646	66.5672	70.6052	72.8194	83.3279	91.0361	103.6426 (45)
Total storage loss	Total = Sum(45)m = 1009.0534											
Water storage loss (or HIU loss):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
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 (56)
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	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)
WWHRS	89.2341	78.0314	81.6288	69.8304	66.1473	58.0249	56.5821	60.0144	61.8965	70.8287	77.3806	88.0962 (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	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)
12Total per year (kWh/year)	89.2341	78.0314	81.6288	69.8304	66.1473	58.0249	56.5821	60.0144	61.8965	70.8287	77.3806	88.0962 (64)
	Total per year (kWh/year) = Sum(64)m = 857.6954 (64)											
	858 (64)											

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Electric shower(s)	51.0328	45.4707	49.6522	47.3825	48.2716	46.0464	47.5813	48.2716	47.3825	49.6522	48.7186	51.0328 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												580.4952 (64a)
Heat gains from water heating, kWh/month	35.0667	30.8755	32.8203	29.3032	28.6047	26.0178	26.0409	27.0715	27.3197	30.1202	31.5248	34.7822 (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	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	105.0763	116.3345	105.0763	108.5788	105.0763	108.5788	105.0763	105.0763	108.5788	105.0763	108.5788	105.0763	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	208.1648	210.3249	204.8815	193.2932	178.6651	164.9167	155.7319	153.5718	159.0151	170.6035	185.2316	198.9800	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	(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)	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	(71)
Water heating gains (Table 5)	47.1327	45.9457	44.1132	40.6989	38.4472	36.1359	35.0012	36.3864	37.9441	40.4842	43.7844	46.7503	(72)
Total internal gains	418.7161	430.9474	412.4134	400.9133	380.5309	367.9737	354.1516	353.3768	363.8804	374.5062	395.9372	409.1490	(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
Southwest					8.1400	36.7938	0.6300	0.7000	0.7700				91.5316 (79)
Northwest					8.1200	11.2829	0.6300	0.7000	0.7700				27.9995 (81)
Solar gains	119.5311	212.9060	316.0106	432.9589	522.7439	535.5880	509.4457	439.9205	356.1097	241.9672	144.8644	101.1978	(83)
Total gains	538.2473	643.8534	728.4240	833.8722	903.2748	903.5617	863.5974	793.2973	719.9901	616.4734	540.8016	510.3468	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)

Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	21.0000 (85)
tau	52.3244	52.4640	52.6015	53.2575	53.3820	53.9695	53.9695	54.0797	53.7417	53.3820	53.1307	52.8704	
alpha	4.4883	4.4976	4.5068	4.5505	4.5588	4.5980	4.5980	4.6053	4.5828	4.5588	4.5420	4.5247	
util living area	0.9940	0.9862	0.9681	0.9099	0.7864	0.5990	0.4458	0.5019	0.7510	0.9431	0.9874	0.9953	(86)
MIT	19.5035	19.7417	20.0722	20.5014	20.8117	20.9591	20.9914	20.9857	20.8871	20.4676	19.9131	19.4692	(87)
Th 2	19.9002	19.9028	19.9053	19.9173	19.9196	19.9300	19.9300	19.9320	19.9260	19.9196	19.9150	19.9103	(88)
util rest of house	0.9922	0.9820	0.9583	0.8828	0.7287	0.5107	0.3407	0.3912	0.6678	0.9199	0.9828	0.9938	(89)
MIT 2	18.5538	18.7914	19.1170	19.5318	19.7992	19.9121	19.9279	19.9280	19.8674	19.5121	18.9722	18.5273	(90)
Living area fraction	18.9788	19.2166	19.5445	19.9657	20.2523	20.3806	20.4038	20.4013	20.3238	19.9397	19.3932	18.9488	(91)
MIT	18.9788	19.2166	19.5445	19.9657	20.2523	20.3806	20.4038	20.4013	20.3238	19.9397	19.3932	18.9488	(92)
Temperature adjustment	18.9788	19.2166	19.5445	19.9657	20.2523	20.3806	20.4038	20.4013	20.3238	19.9397	19.3932	18.9488	(93)
adjusted MIT	18.9788	19.2166	19.5445	19.9657	20.2523	20.3806	20.4038	20.4013	20.3238	19.9397	19.3932	18.9488	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9901	0.9786	0.9543	0.8842	0.7478	0.5490	0.3879	0.4408	0.7008	0.9204	0.9800	0.9920	(94)
Useful gains	532.9070	630.0705	695.1148	737.3248	675.4454	496.0695	334.9792	349.6880	504.6004	567.4226	529.9737	506.2826	(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	1344.2925	1307.6360	1188.3242	995.6470	767.7083	513.2530	337.7377	354.5461	554.9428	838.3856	1108.7351	1336.7531	(97)
Space heating kWh	603.6708	455.3240	366.9478	185.9920	68.6435	0.0000	0.0000	0.0000	0.0000	201.5965	416.7082	617.8701	(98a)
Space heating requirement - total per year (kWh/year)												2916.7530	
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	603.6708	455.3240	366.9478	185.9920	68.6435	0.0000	0.0000	0.0000	0.0000	201.5965	416.7082	617.8701	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2916.7530	
Space heating per m ²										(98c) / (4) =		39.0097	(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	834.6146	657.0371	673.4195	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8917	0.9396	0.9151	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	744.2561	617.3727	616.2760	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1016.1020	971.4432	891.3198	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	195.7290	263.4284	204.6325	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	48.9323	65.8571	51.1581	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												165.9475	(107)

Full SAP Calculation Printout



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

39.0097 (99)
2.2194 (108)
41.2291 (109)
41.2 (109)