

Summary for Input Data



Plot Reference	A 102		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	82 B	DER	5.37	TER	15.05
Environmental	96 A	% DER < TER			64.32
CO ₂ Emissions (t/year)	0.35	DFEE	38.72	TFEE	40.10
Compliance Check	See BREL	% DFEE < TFEE			3.45
% DPER < TPER	30.43	DPER	56.54	TPER	81.28

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

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

Orientation	Northwest
Property Tenture	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, Semi-Detached
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	238.39 kJ/m ² K
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
		31.07 m	73.53 m ²	2.80 m

8.0 Living Area	33.80 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	47.07	29.69	0.00	None	17.38	Enter Gross Area
	Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	39.93	37.51	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	16.20	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	155.20

10.1 Party Ceilings	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	73.53

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	73.53

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)
Windows	Manufacturer	Window	Double Low-E Soft 0.1			0.35		0.70	1.20
Door	Manufacturer	Door to Corridor				0.00			1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	North West	2.42	
S windows	Windows	External Wall 1	South	9.77	
SE windows	Windows	External Wall 1	South East	7.61	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	8.25	0.05	0.05	No
E4 Jamb	Independently assessed	24.00	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	8.27	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	14.26	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	8.54	0.10	0.10	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	8.54	0.05	0.05	No
E16 Corner (normal)	Independently assessed	8.40	0.05	0.05	No
E16 Corner (normal)	Independently assessed	5.60	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	5.60	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	2.80	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	8.27	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	14.26	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	5.79	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	5.79	0.08	0.08	No
Y-value	0.05			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

Summary for Input Data

Number of flueless gas fires

0

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀

3.00

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

Connected To

Shower 1

Combi boiler or unvented hot water system

8.00

No

Shower 2

Combi boiler or unvented hot water system

8.00

No

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

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
0.35	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				3.45	
% DPER < TPER	30.43	DPER	56.54	TPER	81.28		
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	73.5300 (1b)	2.8000 (2b)	205.8840 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.5300		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	205.8840 (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

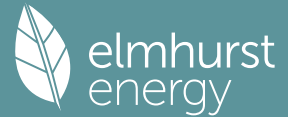
Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Windows			17.3800	1.1450	19.9008		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			73.5300	0.1000	7.3530	110.0000	8088.3000 (28b)
External Wall 1	47.0700	17.3800	29.6900	0.1500	4.4535	70.0000	2078.3000 (29a)
Corridor wall	39.9300	2.4200	37.5100	0.1900	7.1269	70.0000	2625.7000 (29a)
Total net area of external elements Aum(A, m ²)			160.5300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.2542		(33)
Main dwelling							
Party Wall 1			16.2000	0.0000	0.0000	70.0000	1134.0001 (32)
Party Ceiling 1			73.5300			30.0000	2205.9000 (32b)
Internal Wall 1			155.2000			9.0000	1396.8000 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		17529.0000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							238.3925 (35)
List of Thermal Bridges							

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.3287 (42)
Hot water usage for mixer showers	61.6657	60.7216	59.3303	57.1899	55.2722	52.5894	50.4674	52.9481	54.1958	56.8531	59.6204	61.6101 (42a)
Hot water usage for baths	26.7196	26.3163	25.7425	24.8832	24.1087	23.0426	22.2338	23.2229	23.7419	24.7983	25.8965	26.6984 (42b)
Hot water usage for other uses	38.4781	37.0789	35.6797	34.2805	32.8813	31.4821	31.4821	32.8813	34.2805	35.6797	37.0789	38.4781 (42c)
Average daily hot water use (litres/day)												116.6065 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	126.8635	124.1168	120.7525	116.3536	112.2622	107.1141	104.1833	109.0522	112.2182	117.3310	122.5958	126.7867 (44)
Energy content (annual)	186.7649	164.2316	172.5528	151.9869	144.6613	123.8739	115.1256	128.3565	130.1675	151.1929	165.6923	186.1955 (45)
Distribution loss (46)m = 0.15 x (45)m	28.0147	24.6347	25.8829	22.7980	21.6992	18.5811	17.2688	19.2535	19.5251	22.6789	24.8538	27.9293 (46)
Water storage loss (or HIU loss):												110.0000 (47)
Store volume												
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	242.0417	214.1591	227.8296	205.4805	199.9381	177.3675	170.4024	183.6333	183.6612	206.4697	219.1859	241.4723 (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	242.0417	214.1591	227.8296	205.4805	199.9381	177.3675	170.4024	183.6333	183.6612	206.4697	219.1859	241.4723 (64)
12Total per year (kWh/year)												2471.6413 (64a)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
												0.0000 (64a)
Heat gains from water heating, kWh/month	106.3208	94.5490	101.5952	93.3306	92.3213	83.9830	82.5007	86.9000	86.0756	94.4931	97.8876	106.1315 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	103.5966	103.5966	103.5966	103.5966	103.5966	103.5966	103.5966	103.5966	103.5966	103.5966	103.5966	103.5966 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	205.3918	205.3918	205.3918	205.3918	205.3918	205.3918	205.3918	205.3918	205.3918	205.3918	205.3918	205.3918 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434 (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)	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475 (71)
Water heating gains (Table 5)	142.9043	140.6979	136.5527	129.6258	124.0878	116.6431	110.8880	116.8010	119.5495	127.0068	135.9550	142.6498 (72)
Total internal gains	509.8230	520.8475	500.2319	485.3242	461.8997	444.3429	426.0722	429.8539	441.4265	456.8645	483.6992	500.5060 (73)

[Jan]	Area	Solar flux	α	FF	Access	Gains
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Full SAP Calculation Printout



				m2	Table 6a W/m2	Specific data or Table 6b		Specific data or Table 6c		factor Table 6d		W
Southeast				7.6100	36.7938	0.3500		0.7000		0.7700		47.5400 (77)
South				9.7700	46.7521	0.3500		0.7000		0.7700		77.5523 (78)
Solar gains	125.0923	207.9889	272.5870	320.1407	344.3175	336.0341	326.3482	308.8781	288.9785	226.4911	148.8679	107.6966 (83)
Total gains	634.9152	728.8364	772.8188	805.4649	806.2172	780.3770	752.4204	738.7321	730.4049	683.3556	632.5671	608.2027 (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	73.4569	73.6976	73.9400	75.1761	75.4283	76.7151	76.7151	76.9778	76.1952	75.4283	74.9256	74.4295
alpha	5.8971	5.9132	5.9293	6.0117	6.0286	6.1143	6.1143	6.1319	6.0797	6.0286	5.9950	5.9620
util living area	0.9836	0.9637	0.9293	0.8454	0.7079	0.5159	0.3706	0.3931	0.5922	0.8500	0.9614	0.9867 (86)
MIT	20.2338	20.4258	20.6237	20.8361	20.9527	20.9942	20.9993	20.9991	20.9866	20.8556	20.5296	20.2058 (87)
Th 2	20.1662	20.1687	20.1712	20.1838	20.1863	20.1989	20.1989	20.2014	20.1939	20.1863	20.1813	20.1763 (88)
util rest of house	0.9792	0.9546	0.9123	0.8126	0.6568	0.4533	0.3034	0.3253	0.5277	0.8119	0.9502	0.9830 (89)
MIT 2	19.2899	19.5305	19.7729	20.0275	20.1488	20.1956	20.1987	20.2011	20.1856	20.0552	19.6720	19.2627 (90)
Living area fraction	fLA = Living area / (4) =											0.4597 (91)
MIT	19.7238	19.9420	20.1640	20.3992	20.5183	20.5627	20.5667	20.5679	20.5538	20.4232	20.0662	19.6962 (92)
Temperature adjustment												0.0000
adjusted MIT	19.7238	19.9420	20.1640	20.3992	20.5183	20.5627	20.5667	20.5679	20.5538	20.4232	20.0662	19.6962 (93)
8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9763	0.9517	0.9121	0.8217	0.6782	0.4820	0.3343	0.3565	0.5569	0.8237	0.9484	0.9804 (94)
Useful gains	619.8563	693.6553	704.9004	661.8822	546.7807	376.1100	251.5633	263.3307	406.7654	562.9117	599.9075	596.2943 (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	1022.3833	993.8197	899.8126	744.8055	569.2559	378.4581	251.7708	263.6367	412.4245	634.1199	842.6324	1013.7587 (97)
Space heating kWh	299.4801	201.7105	145.0147	59.7048	16.7216	0.0000	0.0000	0.0000	0.0000	52.9789	174.7619	310.5935 (98a)
Space heating requirement - total per year (kWh/year)												1260.9660
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	299.4801	201.7105	145.0147	59.7048	16.7216	0.0000	0.0000	0.0000	0.0000	52.9789	174.7619	310.5935 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1260.9660
Space heating per m2	(98c) / (4) =											17.1490 (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												
	299.4801	201.7105	145.0147	59.7048	16.7216	0.0000	0.0000	0.0000	0.0000	52.9789	174.7619	310.5935 (98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												
307a	449.2201	302.5658	217.5220	89.5572	25.0823	0.0000	0.0000	0.0000	0.0000	79.4683	262.1429	465.8903
Space heating requirement	449.2201	302.5658	217.5220	89.5572	25.0823	0.0000	0.0000	0.0000	0.0000	79.4683	262.1429	465.8903 (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												
	242.0417	214.1591	227.8296	205.4805	199.9381	177.3675	170.4024	183.6333	183.6612	206.4697	219.1859	241.4723 (64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												
310a	363.0626	321.2386	341.7444	308.2208	299.9071	266.0513	255.6036	275.4499	275.4918	309.7045	328.7789	362.2085
Water heating fuel	363.0626	321.2386	341.7444	308.2208	299.9071	266.0513	255.6036	275.4499	275.4918	309.7045	328.7789	362.2085 (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	16.2664	14.6922	16.2664	15.7417	16.2664	15.7417	16.2664	16.2664	15.7417	16.2664	15.7417	16.2664 (331)
Lighting	23.5733	18.9114	17.0276	12.4752	9.6362	7.8728	8.7904	11.4261	14.8414	19.4728	21.9944	24.2285 (332)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333a)m	-3.8396	-6.8184	-12.5838	-17.7168	-22.1532	-21.8505	-21.3935	-18.4082	-13.8359	-8.8927	-4.6112	-3.1343 (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												1891.4490 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3707.4620 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												18.9145 (313)
Space cooling fuel												0.0000 (321)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)												

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mechanical ventilation fans (SFP = 0.7625) 191.5236 (330a)
 Total electricity for the above, kWh/year 191.5236 (331)
 Electricity for lighting (calculated in Appendix L) 190.2502 (332)

Energy saving/generation technologies (Appendices M ,N and Q)
 PV generation -155.2379 (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 5825.4468 (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	2413.3237	0.1572	128.1738 (367)
Electrical energy for heat distribution (space & water)	18.9145	0.0000	8.1945 (372)
Overall CO2 factor for heat network			0.0645 (386)
Total CO2 associated with community systems			361.4078 (373)
Space and water heating			361.4078 (376)
Pumps, fans and electric keep-hot	191.5236	0.1387	26.5667 (378)
Energy for lighting	190.2502	0.1443	27.4590 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-155.2379	0.1305	-20.2628
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-20.2628 (380)
Total CO2, kg/year			395.1706 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.3700 (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	2413.3237	1.5820	1289.7670 (467)
Electrical energy for heat distribution (space & water)	18.9145	0.0000	86.3021 (472)
Overall CO2 factor for heat network			0.6798 (486)
Total CO2 associated with community systems			3806.2196 (473)
Space and water heating			3806.2196 (476)
Pumps, fans and electric keep-hot	191.5236	1.5128	289.7369 (478)
Energy for lighting	190.2502	1.5338	291.8121 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-155.2379	1.4822	-230.0891
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-230.0891 (480)
Total Primary energy kWh/year			4157.6794 (483)
Dwelling Primary energy Rate (DPER)			56.5400 (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	73.5300 (1b)	2.8000 (2b)	205.8840 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.5300		
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 205.8840 (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) = 0.1457 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3957 (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) = 0.3364 (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	0.4289	0.4204	0.4120	0.3700	0.3616	0.3195	0.3195	0.3111	0.3364	0.3616	0.3784	0.3952	(22b)
	0.5920	0.5884	0.5849	0.5684	0.5654	0.5511	0.5511	0.5484	0.5566	0.5654	0.5716	0.5781	(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			15.9500	1.1450	18.2634			(27)
Heatloss Floor 1			73.5300	0.1300	9.5589			(28b)
External Wall 1	47.0700	15.9500	31.1200	0.1800	5.6016			(29a)
Corridor wall	39.9300	2.4200	37.5100	0.1800	6.7518			(29a)
Total net area of external elements Aum(A, m2)			160.5300					(31)
Fabric heat loss, W/K = Sum (A x U)						42.5957		(33)
Main dwelling								
Party Wall 1			16.2000	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							238.3925	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	8.2500	0.0500	0.4125	
E4 Jamb	24.0000	0.0500	1.2000	
E7 Party floor between dwellings (in blocks of flats)	8.2700	0.0700	0.5789	
E7 Party floor between dwellings (in blocks of flats)	14.2600	0.0700	0.9982	
E9 Balcony between dwellings, wall insulation continuous	8.5400	0.0200	0.1708	
E9 Balcony between dwellings, wall insulation continuous	8.5400	0.0200	0.1708	
E16 Corner (normal)	8.4000	0.0900	0.7560	
E16 Corner (normal)	5.6000	0.0900	0.5040	
E17 Corner (inverted - internal area greater than external area)	5.6000	-0.0900	-0.5040	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E20 Exposed floor (normal)	8.2700	0.3200	2.6464	
E21 Exposed floor (inverted)	14.2600	0.3200	4.5632	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	5.7900	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	5.7900	0.1600	0.9264	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				12.7592 (36)
Point Thermal bridges				0.0000 (36a) =
Total fabric heat loss				55.3549 (37) (33) + (36) + (36a) =

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	40.2186	39.9760	39.7382	38.6213	38.4123	37.4394	37.4394	37.2593	37.8142	38.4123	38.8350	39.2770	(38)
Average = Sum(39)m / 12 =	95.5735	95.3309	95.0931	93.9761	93.7671	92.7943	92.7943	92.6141	93.1690	93.7671	94.1899	94.6319	(39)
												93.9751	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.2998	1.2965	1.2933	1.2781	1.2752	1.2620	1.2620	1.2595	1.2671	1.2752	1.2810	1.2870	(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													2.3287	(42)
Hot water usage for mixer showers														
63.2641	62.3134	60.9280	58.2772	56.3211	54.1395	52.8996	54.2745	55.7817	58.1240	60.8316	63.0217	63.0217	(42a)	
Hot water usage for baths														
27.3289	26.9230	26.3514	25.2976	24.5085	23.6335	23.1609	23.7284	24.3464	25.2827	26.3582	27.2365	27.2365	(42b)	
Hot water usage for other uses														
38.4781	37.0789	35.6797	34.2805	32.8813	31.4821	31.4821	32.8813	34.2805	35.6797	37.0789	38.4781	38.4781	(42c)	
Average daily hot water use (litres/day)													118.6456	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
129.0711	126.3152	122.9591	117.8553	113.7108	109.2551	107.5425	110.8842	114.4085	119.0863	124.2687	128.7363	128.7363	(44)	
Energy content (annual)	204.4170	179.8712	188.9835	161.3380	153.0766	134.3419	130.0634	137.2978	141.0772	161.5990	177.0436	201.5699	(45)	
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =			1970.6791	
30.6625	26.9807	28.3475	24.2007	22.9615	20.1513	19.5095	20.5947	21.1616	24.2398	26.5565	30.2355	30.2355	(46)	
Water storage loss (or HIU loss):														
Store volume													180.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.5520	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													0.8381	(55)
Total storage loss														
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)	
If cylinder contains dedicated solar storage														
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month														
253.6597	224.3485	238.2262	208.9922	202.3193	181.9961	179.3060	186.5405	188.7314	210.8416	224.6978	250.8126	250.8126	(62)	
WWHRS	-28.9217	-25.5786	-26.7844	-22.1786	-20.6696	-17.6871	-16.5789	-17.6300	-18.2998	-21.5735	-24.4401	-28.3861	(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														
224.7380	198.7699	211.4418	186.8136	181.6497	164.3090	162.7272	168.9105	170.4316	189.2682	200.2577	222.4264	222.4264	(64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2281.7434	(64)	
Electric shower(s)												2282	(64)	
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)	
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)	
Heat gains from water heating, kWh/month														
107.3628	95.3890	102.2312	91.7682	90.2921	82.7920	82.6402	85.0457	85.0315	93.1258	96.9903	106.4161	106.4161	(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	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	103.6878	114.7972	103.6878	107.1441	103.6878	107.1441	103.6878	103.6878	107.1441	103.6878	107.1441	103.6878 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	205.3918	207.5231	202.1522	190.7183	176.2850	162.7197	153.6573	151.5260	156.8969	168.3308	182.7641	196.3294 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434 (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)	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475 (71)
Water heating gains (Table 5)	144.3048	141.9479	137.4075	127.4559	121.3604	114.9890	111.0755	114.3087	118.0993	125.1691	134.7088	143.0324 (72)
Total internal gains	514.3147	525.1985	504.1778	486.2486	462.2635	442.7831	426.3510	427.4528	440.0706	458.1180	485.5473	503.9799 (73)

6. Solar gains

[Jan]	Area m ²		Solar flux Table 6a W/m ²		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
Southeast	6.9900		36.7938		0.6300		0.7000		0.7700		78.6003	(77)
South	8.9600		46.7521		0.6300		0.7000		0.7700		128.0208	(78)
Solar gains	206.6211	343.5505	450.2639	528.8326	568.7855	555.1085	539.1052	510.2345	477.3462	374.1153	245.8933	177.8872 (83)
Total gains	720.9358	868.7490	954.4418	1015.0812	1031.0489	997.8916	965.4562	937.6873	917.4168	832.2333	731.4406	681.8671 (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	50.9468	51.0765	51.2042	51.8128	51.9283	52.4727	52.4727	52.5748	52.2616	51.9283	51.6952	51.4538
alpha	4.3965	4.4051	4.4136	4.4542	4.4619	4.4982	4.4982	4.5050	4.4841	4.4619	4.4463	4.4303
util living area	0.9831	0.9629	0.9297	0.8598	0.7427	0.5704	0.4178	0.4472	0.6511	0.8752	0.9654	0.9864 (86)
MIT	19.6941	19.9717	20.2758	20.6094	20.8429	20.9634	20.9927	20.9900	20.9326	20.6352	20.1093	19.6469 (87)
Th 2	19.8410	19.8436	19.8461	19.8581	19.8603	19.8707	19.8707	19.8727	19.8667	19.8603	19.8558	19.8510 (88)
util rest of house	0.9781	0.9526	0.9103	0.8225	0.6792	0.4798	0.3132	0.3412	0.5624	0.8338	0.9538	0.9824 (89)
MIT 2	18.3677	18.7154	19.0893	19.4885	19.7372	19.8512	19.8686	19.8694	19.8261	19.5295	18.9011	18.3154 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	18.9774	19.2929	19.6347	20.0037	20.2455	20.3624	20.3853	20.3845	20.3348	20.0377	19.4565	18.9275 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.9774	19.2929	19.6347	20.0037	20.2455	20.3624	20.3853	20.3845	20.3348	20.0377	19.4565	18.9275 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9732	0.9465	0.9062	0.8277	0.7019	0.5203	0.3614	0.3900	0.6006	0.8411	0.9488	0.9780 (94)
Useful gains	701.6275	822.2559	864.8937	840.2250	723.7432	519.2216	348.8772	365.6513	550.9966	699.9730	694.0013	666.8873 (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	1402.7707	1372.0841	1249.0196	1043.4860	801.2851	534.7191	351.2522	369.0233	580.8859	884.9494	1163.8540	1393.6890 (97)
Space heating kWh	521.6505	369.4846	285.7896	146.3479	57.6912	0.0000	0.0000	0.0000	0.0000	137.6225	338.2939	540.7405 (98a)
Space heating requirement - total per year (kWh/year)	2397.6207											
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	521.6505	369.4846	285.7896	146.3479	57.6912	0.0000	0.0000	0.0000	0.0000	137.6225	338.2939	540.7405 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2397.6207											
Space heating per m ²	(98c) / (4) = 32.6074 (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	521.6505	369.4846	285.7896	146.3479	57.6912	0.0000	0.0000	0.0000	0.0000	137.6225	338.2939	540.7405 (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)	565.1685	400.3083	309.6312	158.5568	62.5040	0.0000	0.0000	0.0000	0.0000	149.1034	366.5156	585.8510 (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	224.7380	198.7699	211.4418	186.8136	181.6497	164.3090	162.7272	168.9105	170.4316	189.2682	200.2577	222.4264 (64)
Efficiency of water heater	79.8000 (216)											
(217)m	85.8835	85.4298	84.7361	83.5183	81.7983	79.8000	79.8000	79.8000	79.8000	83.3568	85.2258	85.9740 (217)

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Fuel for water heating, kWh/month	261.6777	232.6704	249.5297	223.6799	222.0701	205.9010	203.9187	211.6673	213.5734	227.0579	234.9729	258.7136	(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	21.5443	17.2836	15.5620	11.4014	8.8068	7.1952	8.0338	10.4427	13.5640	17.7967	20.1013	22.1431	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-9.7229	-14.9668	-23.4641	-28.8518	-33.3536	-31.9671	-31.5789	-28.6770	-24.0010	-18.1432	-11.1263	-8.2659	(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	-2.2396	-4.8948	-10.0851	-15.6913	-21.2984	-21.6063	-21.3536	-17.8249	-12.7361	-7.1730	-3.0434	-1.7578	(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												2597.6389	(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												2745.4327	(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)												173.8747	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-403.8227	(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												5199.1236	(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	2597.6389	0.2100	545.5042	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2745.4327	0.2100	576.5409	(264)
Space and water heating			1122.0450	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	173.8747	0.1443	25.0955	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-264.1186	0.1328	-35.0741	
PV Unit electricity exported	-139.7042	0.1249	-17.4461	
Total			-52.5202	(269)
Total CO2, kg/year			1106.5496	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.0500	(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	2597.6389	1.1300	2935.3320	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2745.4327	1.1300	3102.3390	(278)
Space and water heating			6037.6709	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	173.8747	1.5338	266.6948	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-264.1186	1.4907	-393.7194	
PV Unit electricity exported	-139.7042	0.4583	-64.0321	
Total			-457.7516	(283)
Total Primary energy kWh/year			5976.7150	(286)
Target Primary Energy Rate (TPER)			81.2800	(287)

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Plot Reference	A 102				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.37	TER	15.05		
Environmental	96 A	% DER < TER				64.32	
CO ₂ Emissions (t/year)	0.35	DFEE	38.72	TFEE	40.10		
Compliance Check	See BREL	% DFEE < TFEE				3.45	
% DPER < TPER	30.43	DPER	56.54	TPER	81.28		
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.5300		
Dwelling volume			

2. Ventilation rate

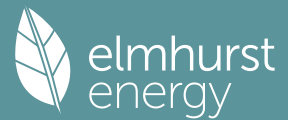
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	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) = 0.1457 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2957 (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) = 0.2514 (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	0.3205	0.3142	0.3079	0.2765	0.2702	0.2388	0.2388	0.2325	0.2514	0.2702	0.2828	0.2953 (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	0.5514	0.5494	0.5474	0.5382	0.5365	0.5285	0.5285	0.5270	0.5316	0.5365	0.5400	0.5436 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Windows			17.3800	1.1450	19.9008		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			73.5300	0.1000	7.3530	110.0000	8088.3000 (28b)
External Wall 1	47.0700	17.3800	29.6900	0.1500	4.4535	70.0000	2078.3000 (29a)
Corridor wall	39.9300	2.4200	37.5100	0.1900	7.1269	70.0000	2625.7000 (29a)
Total net area of external elements Aum(A, m ²)			160.5300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 41.2542		(33)
Main dwelling							
Party Wall 1			16.2000	0.0000	0.0000	70.0000	1134.0001 (32)
Party Ceiling 1			73.5300			30.0000	2205.9000 (32b)
Internal Wall 1			155.2000			9.0000	1396.8000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	17529.0000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							238.3925 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					8.2500	0.0500	0.4125
E4 Jamb					24.0000	0.0400	0.9600

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E7 Party floor between dwellings (in blocks of flats)						8.2700			0.0500		0.4135	
E7 Party floor between dwellings (in blocks of flats)						14.2600			0.0390		0.5561	
E9 Balcony between dwellings, wall insulation continuous						8.5400			0.1000		0.8540	
E9 Balcony between dwellings, wall insulation continuous						8.5400			0.0500		0.4270	
E16 Corner (normal)						8.4000			0.0500		0.4200	
E16 Corner (normal)						5.6000			0.0390		0.2184	
E17 Corner (inverted - internal area greater than external area)						5.6000			0.0000		0.0000	
E18 Party wall between dwellings						2.8000			0.0500		0.1400	
E18 Party wall between dwellings						2.8000			0.0390		0.1092	
E20 Exposed floor (normal)						8.2700			0.1000		0.8270	
E21 Exposed floor (inverted)						14.2600			0.1000		1.4260	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)						5.7900			0.0000		0.0000	
P7 Party Wall - Exposed floor (normal)						5.7900			0.0800		0.4632	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)												7.2269 (36)
Point Thermal bridges												0.0000
Total fabric heat loss									(33) + (36) + (36a) =			48.4811 (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	37.4599	37.3244	37.1916	36.5679	36.4511	35.9079	35.9079	35.8073	36.1171	36.4511	36.6872	36.9341 (38)
Average = Sum(39)m / 12 =	85.9410	85.8055	85.6727	85.0490	84.9323	84.3890	84.3890	84.2884	84.5982	84.9323	85.1683	85.4152 (39)
												85.0484
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1688	1.1669	1.1651	1.1567	1.1551	1.1477	1.1477	1.1463	1.1505	1.1551	1.1583	1.1616 (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												2.3287 (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	26.7196	26.3163	25.7425	24.8832	24.1087	23.0426	22.2338	23.2229	23.7419	24.7983	25.8965	26.6984 (42b)
Hot water usage for other uses	38.4781	37.0789	35.6797	34.2805	32.8813	31.4821	31.4821	32.8813	34.2805	35.6797	37.0789	38.4781 (42c)
Average daily hot water use (litres/day)												59.7555 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	65.1977	63.3952	61.4222	59.1636	56.9900	54.5247	53.7159	56.1041	58.0224	60.4779	62.9754	65.1765 (44)
Energy content (annual)	95.9823	83.8846	87.7710	77.2825	73.4374	63.0560	59.3576	66.0356	67.3031	77.9319	85.1134	95.7165 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		932.8720
Water storage loss (or HIU loss):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	81.5850	71.3019	74.6054	65.6901	62.4218	53.5976	50.4540	56.1303	57.2076	66.2421	72.3464	81.3590 (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	81.5850	71.3019	74.6054	65.6901	62.4218	53.5976	50.4540	56.1303	57.2076	66.2421	72.3464	81.3590 (64)
12Total per year (kWh/year)									Total per year (kWh/year) = Sum(64)m =			792.9412 (64)
Electric shower(s)	50.6640	45.1420	49.2934	47.0401	47.9228	45.7137	47.2375	47.9228	47.0401	49.2934	48.3665	50.6640 (64a)
Heat gains from water heating, kWh/month	33.0622	29.1110	30.9747	28.1826	27.5861	24.8278	24.4229	26.0133	26.0619	28.8839	30.1782	33.0058 (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	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	103.5966	114.6962	103.5966	107.0498	103.5966	107.0498	103.5966	103.5966	107.0498	103.5966	107.0498	103.5966 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	205.3918	207.5231	202.1522	190.7183	176.2850	162.7197	153.6573	151.5260	156.8969	168.3308	182.7641	196.3294 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434 (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)	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475 (71)
Water heating gains (Table 5)	44.4385	43.3199	41.6326	39.1424	37.0781	34.4831	32.8264	34.9641	36.1971	38.8224	41.9142	44.3626 (72)
Total internal gains	411.3572	423.4696	405.3118	394.8408	374.8900	362.1829	348.0106	348.0169	358.0741	368.6801	389.6584	402.2188 (73)

6. Solar gains												

[Jan]												
	Area											
	m2											
	Solar flux											
	Table 6a											
	W/m2											
	Specific data											
	or Table 6b											
	g											
	Specific data											
	or Table 6c											
	FF											
	Access											
	factor											
	Table 6d											
	Gains											
	W											
Southeast	7.6100											47.5400 (77)
South	9.7700											77.5523 (78)
Solar gains	125.0923	207.9889	272.5870	320.1407	344.3175	336.0341	326.3482	308.8781	288.9785	226.4911	148.8679	107.6966 (83)
Total gains	536.4495	631.4584	677.8987	714.9816	719.2076	698.2170	674.3588	656.8951	647.0525	595.1712	538.5262	509.9155 (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	56.6571	56.7465	56.8345	57.2513	57.3300	57.6991	57.6991	57.7680	57.5564	57.3300	57.1711	57.0059
alpha	4.7771	4.7831	4.7890	4.8168	4.8220	4.8466	4.8466	4.8512	4.8371	4.8220	4.8114	4.8004
util living area	0.9943	0.9870	0.9742	0.9400	0.8646	0.7086	0.5365	0.5706	0.7834	0.9460	0.9876	0.9955 (86)
MIT	19.6400	19.8562	20.1220	20.4603	20.7459	20.9314	20.9855	20.9805	20.8837	20.5157	20.0148	19.5996 (87)
Th 2	19.9451	19.9465	19.9480	19.9548	19.9561	19.9621	19.9621	19.9632	19.9598	19.9561	19.9535	19.9508 (88)
util rest of house	0.9925	0.9830	0.9660	0.9196	0.8176	0.6178	0.4170	0.4516	0.7035	0.9235	0.9830	0.9941 (89)
MIT 2	18.7203	18.9353	19.1975	19.5275	19.7850	19.9301	19.9583	19.9576	19.8985	19.5857	19.0993	18.6847 (90)
Living area fraction	19.1431	19.3586	19.6225	19.9563	20.2267	20.3903	20.4305	20.4278	20.3514	20.0132	19.5201	0.4597 (91)
MIT	19.1431	19.3586	19.6225	19.9563	20.2267	20.3903	20.4305	20.4278	20.3514	20.0132	19.5201	19.1052 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1431	19.3586	19.6225	19.9563	20.2267	20.3903	20.4305	20.4278	20.3514	20.0132	19.5201	19.1052 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9907	0.9802	0.9628	0.9196	0.8311	0.6573	0.4722	0.5064	0.7360	0.9250	0.9805	0.9925 (94)
Useful gains	531.4567	618.9442	652.6791	657.5182	597.7225	458.9480	318.4191	332.6793	476.2292	550.5064	528.0504	506.1147 (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	1275.6284	1240.6275	1124.2374	940.3274	724.1914	488.6415	323.2527	339.4951	528.8556	799.4851	1057.7988	1273.1334 (97)
Space heating kWh	553.6637	417.7712	350.8394	203.6227	94.0928	0.0000	0.0000	0.0000	0.0000	185.2401	381.4189	570.6619 (98a)
Space heating requirement - total per year (kWh/year)												2757.3106
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	553.6637	417.7712	350.8394	203.6227	94.0928	0.0000	0.0000	0.0000	0.0000	185.2401	381.4189	570.6619 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2757.3106
Space heating per m2										(98c) / (4) =		37.4991 (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	793.2564	624.4784	640.5916	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8203	0.8957	0.8797	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	650.7047	559.3544	563.5141	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	777.0543	751.2805	732.7542	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	90.9717	142.7930	125.9146	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)												
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	22.7429	35.6983	31.4787	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												89.9198 (107)
Energy for space heating												37.4991 (99)
Energy for space cooling												1.2229 (108)
Total												38.7220 (109)
Fabric Energy Efficiency (DFEE)												38.7 (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	73.5300 (1b)	x 2.8000 (2b)	= 205.8840 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	205.8840 (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) =

Air changes per hour
30.0000 / (5) = 0.1457 (8)

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

Yes
Blower Door
5.0000 (17)
0.3957 (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) = 0.3364 (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	0.4289	0.4204	0.4120	0.3700	0.3616	0.3195	0.3195	0.3111	0.3364	0.3616	0.3784	0.3952 (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	0.5920	0.5884	0.5849	0.5684	0.5654	0.5511	0.5511	0.5484	0.5566	0.5654	0.5716	0.5781 (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			15.9500	1.1450	18.2634		(27)
Heatloss Floor 1			73.5300	0.1300	9.5589		(28b)
External Wall 1	47.0700	15.9500	31.1200	0.1800	5.6016		(29a)
Corridor wall	39.9300	2.4200	37.5100	0.1800	6.7518		(29a)
Total net area of external elements Aum (A, m2)			160.5300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 42.5957		(33)
Main dwelling							
Party Wall 1			16.2000	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							238.3925 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.2500	0.0500	0.4125
E4 Jamb	24.0000	0.0500	1.2000
E7 Party floor between dwellings (in blocks of flats)	8.2700	0.0700	0.5789
E7 Party floor between dwellings (in blocks of flats)	14.2600	0.0700	0.9982
E9 Balcony between dwellings, wall insulation continuous	8.5400	0.0200	0.1708
E9 Balcony between dwellings, wall insulation continuous	8.5400	0.0200	0.1708
E16 Corner (normal)	8.4000	0.0900	0.7560
E16 Corner (normal)	5.6000	0.0900	0.5040
E17 Corner (inverted - internal area greater than external area)	5.6000	-0.0900	-0.5040
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	8.2700	0.3200	2.6464
E21 Exposed floor (inverted)	14.2600	0.3200	4.5632
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	5.7900	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	5.7900	0.1600	0.9264

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

Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 55.3549 (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	40.2186	39.9760	39.7382	38.6213	38.4123	37.4394	37.4394	37.2593	37.8142	38.4123	38.8350	39.2770 (38)
Heat transfer coeff	95.5735	95.3309	95.0931	93.9761	93.7671	92.7943	92.7943	92.6141	93.1690	93.7671	94.1899	94.6319 (39)
Average = Sum(39)m / 12 =												93.9751

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2998	1.2965	1.2933	1.2781	1.2752	1.2620	1.2620	1.2595	1.2671	1.2752	1.2810	1.2870 (40)
HLP (average)												1.2781
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3287 (42)
Hot water usage for mixer showers												
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000												0.0000 (42a)
Hot water usage for baths												
27.3289 26.9230 26.3514 25.2976 24.5085 23.6335 23.1609 23.7284 24.3464 25.2827 26.3582 27.2365												(42b)
Hot water usage for other uses												
38.4781 37.0789 35.6797 34.2805 32.8813 31.4821 31.4821 32.8813 34.2805 35.6797 37.0789 38.4781												(42c)
Average daily hot water use (litres/day)												60.3182 (43)
Daily hot water use												
65.8069 64.0019 62.0311 59.5781 57.3898 55.1156 54.6429 56.6097 58.6269 60.9623 63.4371 65.7146												(44)
Energy content (annual)	104.2221 91.1378 95.3395 81.5594 77.2577 67.7710 66.0859 70.0946 72.2928 82.7253 90.3778 102.8931											(45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1001.7571
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):												
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000												(56)
If cylinder contains dedicated solar storage												
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000												(57)
Primary loss	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000											(59)
Combi loss	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000											(61)
Total heat required for water heating calculated for each month												
88.5888 77.4671 81.0386 69.3255 65.6690 57.6054 56.1730 59.5804 61.4489 70.3165 76.8211 87.4591												(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	88.5888 77.4671 81.0386 69.3255 65.6690 57.6054 56.1730 59.5804 61.4489 70.3165 76.8211 87.4591											(64)

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12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =										851.4935 (64)
Electric shower(s)	851 (64)										
50.6640	45.1420	49.2934	47.0401	47.9228	45.7137	47.2375	47.9228	47.0401	49.2934	48.3665	50.6640 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =										576.3001 (64a)	
Heat gains from water heating, kWh/month	34.8132	30.6523	32.5830	29.0914	28.3979	25.8298	25.8526	26.8758	27.1222	29.9025	31.2969
											34.5308 (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	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	116.4344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	103.6878	114.7972	103.6878	107.1441	103.6878	107.1441	103.6878	103.6878	107.1441	103.6878	107.1441	103.6878	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	205.3918	207.5231	202.1522	190.7183	176.2850	162.7197	153.6573	151.5260	156.8969	168.3308	182.7641	196.3294	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	34.6434	(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)	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	-93.1475	(71)
Water heating gains (Table 5)	46.7919	45.6135	43.7943	40.4047	38.1693	35.8747	34.7481	36.1234	37.6698	40.1915	43.4679	46.4123	(72)
Total internal gains	413.8019	425.8642	407.5647	396.1974	376.0724	363.6688	350.0236	349.2675	359.6410	370.1404	391.3064	404.3598	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
Southeast					6.9900	36.7938	0.6300	0.7000			0.7700			78.6003 (77)
South					8.9600	46.7521	0.6300	0.7000			0.7700			128.0208 (78)
Solar gains	206.6211	343.5505	450.2639	528.8326	568.7855	555.1085	539.1052	510.2345	477.3462	374.1153	245.8933			177.8872 (83)
Total gains	620.4229	769.4146	857.8286	925.0300	944.8579	918.7773	889.1288	859.5020	836.9872	744.2558	637.1997			582.2471 (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	50.9468	51.0765	51.2042	51.8128	51.9283	52.4727	52.4727	52.5748	52.2616	51.9283	51.6952	51.4538
alpha	4.3965	4.4051	4.4136	4.4542	4.4619	4.4982	4.4982	4.5050	4.4841	4.4619	4.4463	4.4303
util living area	0.9903	0.9756	0.9496	0.8899	0.7827	0.6111	0.4516	0.4849	0.6967	0.9081	0.9787	0.9926 (86)
MIT	19.5553	19.8452	20.1686	20.5362	20.8041	20.9519	20.9900	20.9862	20.9116	20.5575	19.9875	19.5072 (87)
Th 2	19.8410	19.8436	19.8461	19.8581	19.8603	19.8707	19.8707	19.8727	19.8667	19.8603	19.8558	19.8510 (88)
util rest of house	0.9873	0.9684	0.9346	0.8576	0.7220	0.5173	0.3396	0.3714	0.6074	0.8738	0.9711	0.9902 (89)
MIT 2	18.5566	18.8429	19.1574	19.5086	19.7376	19.8502	19.8684	19.8691	19.8239	19.5381	18.9952	18.5167 (90)
Living area fraction	19.0156	19.3036	19.6222	19.9809	20.2279	20.3566	20.3839	20.3826	20.3239	FLA = Living area / (4) =		0.4597 (91)
MIT	19.0156	19.3036	19.6222	19.9809	20.2279	20.3566	20.3839	20.3826	20.3239	20.0067	19.4513	18.9720 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0156	19.3036	19.6222	19.9809	20.2279	20.3566	20.3839	20.3826	20.3239	20.0067	19.4513	18.9720 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9845	0.9642	0.9312	0.8615	0.7430	0.5590	0.3912	0.4237	0.6454	0.8789	0.9677	0.9878	(94)
Ext temp.	610.8147	741.8348	798.7819	796.9163	702.0371	513.6396	347.8561	364.1426	540.2153	654.1243	616.5982	575.1716	(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)
Heat loss rate W	1406.4260	1373.1123	1247.8349	1041.3445	799.6329	534.1829	351.1288	368.8456	579.8738	882.0349	1163.3707	1397.9040	(97)
Space heating kWh	591.9348	424.2185	334.0955	175.9883	72.6113	0.0000	0.0000	0.0000	0.0000	169.5655	393.6762	612.1129	(98a)
Space heating requirement - total per year (kWh/year)												2774.2030	
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	591.9348	424.2185	334.0955	175.9883	72.6113	0.0000	0.0000	0.0000	0.0000	169.5655	393.6762	612.1129	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2774.2030	
Space heating per m ²												37.7289	(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	872.2665	686.6778	703.8675	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8804	0.9342	0.9218	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	767.9092	641.5262	648.8082	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1034.5149	1001.8879	969.2763	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	191.9561	268.1091	238.4282	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													

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	0.0000	0.0000	0.0000	0.0000	0.0000	47.9890	67.0273	59.6071	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement													174.6234 (107)
Energy for space heating													37.7289 (99)
Energy for space cooling													2.3749 (108)
Total													40.1037 (109)
Fabric Energy Efficiency (TFEE)													40.1 (109)