

Summary for Input Data



Plot Reference	A 103		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	82 B	DER	5.83	TER	16.70
Environmental	96 A	% DER < TER			65.09
CO ₂ Emissions (t/year)	0.27	DFEE	37.07	TFEE	41.16
Compliance Check	See BREL	% DFEE < TFEE			9.95
% DPER < TPER	31.04	DPER	61.77	TPER	89.57

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, Mid-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	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	255.68	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:	20.80 m	50.82 m ²	2.80 m

8.0 Living Area	29.08	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	18.14	9.80	0.00	None	8.34	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	40.10	37.68	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	21.92	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	113.43

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	50.82

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	50.82

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	
Windows	Window	External Wall 1	South West	8.34	

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	5.08	0.05	0.05	No
E3 Sill	Independently assessed	1.59	0.04	0.04	No
E4 Jamb	Independently assessed	12.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	3.12	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	14.32	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.36	0.10	0.10	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.36	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.04	0.04	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	3.12	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	14.32	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	7.83	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	7.83	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	1
Manufacturer SFP	0.63
Duct Type	Rigid
MVHR Efficiency	90.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

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

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
			5
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	Combi boiler or unvented hot water system	8.00	
			Connected
			No
			Connected To
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 Reference
			Panel Manufacturer

Summary for Input Data



0.24

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

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Compliance Check	See BREL		% DFEE < TFEE				9.95
% DPER < TPER	31.04		DPER	61.77		TPER	89.57
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	50.8200 (1b)	2.8000 (2b)	142.2960 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.8200		142.2960 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	142.2960 (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	3	(19)

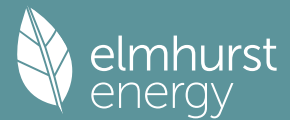
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1162 (21)

	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	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												81.0000 (23c)
Effective ac	0.2432	0.2403	0.2374	0.2229	0.2200	0.2054	0.2054	0.2025	0.2112	0.2200	0.2258	0.2316 (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			8.3400	1.1450	9.5496		(27)
Heatloss Floor 1			50.8200	0.1000	5.0820	110.0000	5590.2000 (28b)
External Wall 1	18.1400	8.3400	9.8000	0.1500	1.4700	70.0000	686.0000 (29a)
Corridor wall	40.1000	2.4200	37.6800	0.1900	7.1592	70.0000	2637.5999 (29a)
Total net area of external elements Aum(A, m ²)			109.0600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	25.6808		(33)
Main dwelling							
Party Wall 1			21.9200	0.0000	0.0000	70.0000	1534.4000 (32)
Party Ceiling 1			50.8200			30.0000	1524.6000 (32b)
Internal Wall 1			113.4300			9.0000	1020.8700 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		12993.6699 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							255.6802 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.0800	0.0500	0.2540
E3 Sill	1.5900	0.0400	0.0636
E4 Jamb	12.6000	0.0400	0.5040
E7 Party floor between dwellings (in blocks of flats)	3.1200	0.0500	0.1560
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0390	0.5585
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.1000	0.3360
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0500	0.1680
E16 Corner (normal)	2.8000	0.0500	0.1400
E16 Corner (normal)	2.8000	0.0390	0.1092
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)	3.1200	0.1000	0.3120
E21 Exposed floor (inverted)	14.3200	0.1000	1.4320
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.8300	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	7.8300	0.0800	0.6264
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.9089 (36)
Point Thermal bridges		(36a) =	0.0000
Total fabric heat loss		(33) + (36) + (36a) =	30.5897 (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	11.4210	11.2845	11.1480	10.4657	10.3292	9.6469	9.6469	9.5104	9.9198	10.3292	10.6022	10.8751 (38)
Average = Sum(39)m / 12 =	42.0107	41.8742	41.7377	41.0554	40.9189	40.2366	40.2366	40.1001	40.5095	40.9189	41.1919	41.4648 (39)
												41.0213
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.8267	0.8240	0.8213	0.8079	0.8052	0.7917	0.7917	0.7891	0.7971	0.8052	0.8105	0.8159 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7143 (42)
Hot water usage for mixer showers	51.6240	50.8336	49.6688	47.8770	46.2716	44.0256	42.2492	44.3259	45.3704	47.5950	49.9117	51.5774 (42a)
Hot water usage for baths	22.3882	22.0502	21.5694	20.8494	20.2005	19.3072	18.6296	19.4583	19.8932	20.7783	21.6985	22.3704 (42b)
Hot water usage for other uses	32.1858	31.0154	29.8450	28.6746	27.5042	26.3338	26.3338	27.5042	28.6746	29.8450	31.0154	32.1858 (42c)
Average daily hot water use (litres/day)												97.6122 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	106.1979	103.8992	101.0832	97.4010	93.9763	89.6667	87.2125	91.2884	93.9382	98.2182	102.6255	106.1336 (44)
Energy content (annual)	156.3417	137.4797	144.4459	127.2301	121.0980	103.6965	96.3724	107.4481	108.9636	126.5641	138.7018	155.8650 (45)
Distribution loss (46)m = 0.15 x (45)m	23.4513	20.6219	21.6669	19.0845	18.1647	15.5545	14.4559	16.1172	16.3445	18.9846	20.8053	23.3797 (46)
Water storage loss (or HIU loss):												110.0000 (47)
Store volume												
b) If manufacturer declared loss factor is not known :												0.0152 (51)
Hot water storage loss factor from Table 2 (kWh/litre/day)												1.0294 (52)
Volume factor from Table 2a												0.6000 (53)
Temperature factor from Table 2b												1.0327 (55)
Enter (49) or (54) in (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	22.5120	23.2624	22.5120	23.2624	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	211.6185	187.4071	199.7227	180.7238	176.3748	157.1902	151.6492	162.7249	162.4573	181.8409	192.1955	211.1418 (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	211.6185	187.4071	199.7227	180.7238	176.3748	157.1902	151.6492	162.7249	162.4573	181.8409	192.1955	211.1418 (64)
12Total per year (kWh/year)												2175.0466 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month	96.2050	85.6539	92.2497	85.0989	84.4865	77.2740	76.2653	79.9479	79.0254	86.3040	88.9133	96.0465 (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	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	78.2112	86.5909	78.2112	80.8182	78.2112	80.8182	78.2112	78.2112	80.8182	78.2112	80.8182	78.2112 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.3634	150.9134	147.0076	138.6927	128.1966	118.3318	111.7415	110.1916	114.0973	122.4122	132.9083	142.7731 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713 (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)	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705 (71)
Water heating gains (Table 5)	129.3079	127.4612	123.9915	118.1930	113.5572	107.3250	102.5071	107.4569	109.7574	116.0000	123.4907	129.0948 (72)
Total internal gains	405.5964	413.6794	397.9242	386.4178	368.6789	355.1890	341.1737	344.5736	353.3869	365.3374	385.9311	398.7931 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
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				m2	Table 6a W/m2	Specific data or Table 6b		Specific data or Table 6c		factor Table 6d		W
Southwest				8.3400	36.7938	0.3500		0.7000		0.7700		52.1003 (79)
Solar gains	52.1003	88.7461	121.4263	150.4531	168.5200	167.3014	161.2964	147.8176	131.4790	98.0834	62.4042	44.5870 (83)
Total gains	457.6967	502.4256	519.3506	536.8709	537.1989	522.4903	502.4700	492.3912	484.8659	463.4207	448.3353	443.3801 (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	85.9151	86.1951	86.4769	87.9142	88.2074	89.7033	89.7033	90.0086	89.0989	88.2074	87.6230	87.0462
alpha	6.7277	6.7463	6.7651	6.8609	6.8805	6.9802	6.9802	7.0006	6.9399	6.8805	6.8415	6.8031
util living area	0.9796	0.9610	0.9275	0.8365	0.6878	0.4911	0.3522	0.3744	0.5711	0.8330	0.9523	0.9827 (86)
MIT	20.4431	20.5789	20.7281	20.8947	20.9755	20.9979	20.9998	20.9997	20.9942	20.9127	20.6787	20.4250 (87)
Th 2	20.2303	20.2326	20.2349	20.2465	20.2489	20.2605	20.2605	20.2628	20.2558	20.2489	20.2442	20.2396 (88)
util rest of house	0.9741	0.9511	0.9100	0.8032	0.6389	0.4352	0.2931	0.3145	0.5118	0.7936	0.9388	0.9779 (89)
MIT 2	19.5998	19.7690	19.9505	20.1485	20.2301	20.2594	20.2604	20.2627	20.2524	20.1721	19.9029	19.5849 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	20.0823	20.2324	20.3955	20.5755	20.6567	20.6820	20.6835	20.6845	20.6769	20.5959	20.3469	20.0656 (92)
Temperature adjustment	0.0000											
adjusted MIT	20.0823	20.2324	20.3955	20.5755	20.6567	20.6820	20.6835	20.6845	20.6769	20.5959	20.3469	20.0656 (93)

8. Space heating requirement												

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9729	0.9511	0.9140	0.8183	0.6658	0.4671	0.3269	0.3488	0.5456	0.8125	0.9408	0.9767 (94)
Useful gains	445.2755	477.8534	474.6667	439.3227	357.6774	244.0637	164.2619	171.7367	264.5277	376.5476	421.7948	433.0355 (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	663.0270	642.0338	579.9657	479.3419	366.4969	244.7182	164.3071	171.8071	266.4259	409.0210	545.6627	657.8653 (97)
Space heating kWh	162.0072	110.3292	78.3424	28.8138	6.5617	0.0000	0.0000	0.0000	0.0000	24.1602	89.1849	167.2733 (98a)
Space heating requirement - total per year (kWh/year)												666.6727
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	162.0072	110.3292	78.3424	28.8138	6.5617	0.0000	0.0000	0.0000	0.0000	24.1602	89.1849	167.2733 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												666.6727
Space heating per m2												(98c) / (4) = 13.1183 (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												
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												167.2733 (98)
307a	243.0108	165.4938	117.5137	43.2207	9.8426	0.0000	0.0000	0.0000	0.0000	36.2402	133.7773	250.9100
Space heating requirement												
Space heating fuel												250.9100 (307)
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)												0.0000 (308)
Space heating fuel for secondary/supplementary system												
Space heating fuel												0.0000 (309)
Water heating												
Annual water heating requirement												
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												211.1418 (64)
310a	317.4277	281.1106	299.5840	271.0856	264.5622	235.7853	227.4738	244.0874	243.6860	272.7614	288.2932	316.7127
Water heating fuel												
Cooling System Energy Efficiency Ratio												316.7127 (310)
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 (314)
Pumps and Fa	11.6111	10.4874	11.6111	11.2365	11.6111	11.2365	11.6111	11.6111	11.2365	11.6111	11.2365	11.6111 (315)
Lighting	16.6272	13.3389	12.0102	8.7992	6.7968	5.5530	6.2002	8.0593	10.4682	13.7349	15.5135	17.0893 (332)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333a)m	-2.6442	-4.7049	-8.7040	-12.2885	-15.4018	-15.2078	-14.8902	-12.7941	-9.5929	-6.1458	-3.1784	-2.1577 (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												1000.0091 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3262.5700 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												10.0001 (313)
Space cooling fuel												0.0000 (321)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)												
mechanical ventilation fans (SFP = 0.7875)												136.7109 (330a)

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Total electricity for the above, kWh/year	136.7109 (331)
Electricity for lighting (calculated in Appendix L)	134.1909 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-107.7104 (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	4425.7704 (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	1837.3185	0.1576	67.9209 (367)
Electrical energy for heat distribution (space & water)	10.0001	0.0000	6.1668 (372)
Overall CO2 factor for heat network			0.0638 (386)
Total CO2 associated with community systems			271.9780 (373)
Space and water heating			271.9780 (376)
Pumps, fans and electric keep-hot	136.7109	0.1387	18.9635 (378)
Energy for lighting	134.1909	0.1443	19.3679 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.7104	0.1305	-14.0543
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.0543 (380)
Total CO2, kg/year			296.2551 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.8300 (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	1837.3185	1.5833	682.4784 (467)
Electrical energy for heat distribution (space & water)	10.0001	0.0000	65.4349 (472)
Overall CO2 factor for heat network			0.6770 (486)
Total CO2 associated with community systems			2885.9062 (473)
Space and water heating			2885.9062 (476)
Pumps, fans and electric keep-hot	136.7109	1.5128	206.8162 (478)
Energy for lighting	134.1909	1.5338	205.8264 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.7104	1.4820	-159.6267
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-159.6267 (480)
Total Primary energy kWh/year			3138.9221 (483)
Dwelling Primary energy Rate (DPER)			61.7700 (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	50.8200 (1b)	2.8000 (2b)	142.2960 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.8200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	142.2960 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	(6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 20.0000 / (5) = 0.1406 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3906 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3027 (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	0.3859	0.3783	0.3708	0.3329	0.3254	0.2875	0.2875	0.2800	0.3027	0.3254	0.3405	0.3556	(22b)
	0.5745	0.5716	0.5687	0.5554	0.5529	0.5413	0.5413	0.5392	0.5458	0.5529	0.5580	0.5632	(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			8.3400	1.1450	9.5496			(27)
Heatloss Floor 1			50.8200	0.1300	6.6066			(28b)
External Wall 1	18.1400	8.3400	9.8000	0.1800	1.7640			(29a)
Corridor wall	40.1000	2.4200	37.6800	0.1800	6.7824			(29a)
Total net area of external elements Aum(A, m2)			109.0600					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	27.1226		(33)
Main dwelling								
Party Wall 1			21.9200	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							255.6802	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	5.0800	0.0500	0.2540	
E3 Sill	1.5900	0.0500	0.0795	
E4 Jamb	12.6000	0.0500	0.6300	
E7 Party floor between dwellings (in blocks of flats)	3.1200	0.0700	0.2184	
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0700	1.0024	
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672	
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E16 Corner (normal)	2.8000	0.0900	0.2520	
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)	3.1200	0.3200	0.9984	
E21 Exposed floor (inverted)	14.3200	0.3200	4.5824	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.8300	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	7.8300	0.1600	1.2528	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			9.9923	(36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	37.1149 (37)

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

(38)m	Jan 26.9755	Feb 26.8398	Mar 26.7067	Apr 26.0815	May 25.9646	Jun 25.4201	Jul 25.4201	Aug 25.3193	Sep 25.6298	Oct 25.9646	Nov 26.2012	Dec 26.4485	(38)
Heat transfer coeff	64.0905	63.9547	63.8216	63.1965	63.0795	62.5350	62.5350	62.4342	62.7447	63.0795	63.3161	63.5635	(39)
Average = Sum(39)m / 12 =												63.1959	
HLP	Jan 1.2611	Feb 1.2585	Mar 1.2558	Apr 1.2435	May 1.2412	Jun 1.2305	Jul 1.2305	Aug 1.2285	Sep 1.2346	Oct 1.2412	Nov 1.2459	Dec 1.2508	(40)
HLP (average)												1.2435	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7143	(42)	
Hot water usage for mixer showers	52.9620	52.1661	51.0063	48.7872	47.1496	45.3234	44.2853	45.4363	46.6981	48.6589	50.9257	52.7591	(42a)	
Hot water usage for baths	22.8986	22.5586	22.0797	21.1967	20.5355	19.8023	19.4063	19.8819	20.3997	21.1842	22.0853	22.8212	(42b)	
Hot water usage for other uses	32.1858	31.0154	29.8450	28.6746	27.5042	26.3338	26.3338	27.5042	28.6746	29.8450	31.0154	32.1858	(42c)	
Average daily hot water use (litres/day)												99.3197	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	108.0465	105.7401	102.9310	98.6585	95.1893	91.4595	90.0254	92.8224	95.7723	99.6881	104.0264	107.7661	(44)	
Energy content (annual)	171.1192	150.5725	158.2011	135.0586	128.1431	112.4601	108.8780	114.9335	118.0969	135.2758	148.2047	168.7357	(45)	
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m =	1649.6789	
Water storage loss (or HIU loss):	25.6679	22.5859	23.7302	20.2588	19.2215	16.8690	16.3317	17.2400	17.7145	20.2914	22.2307	25.3104	(46)	
Store volume												180.0000	(47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.5520	(48)	
Temperature factor from Table 2b												0.5400	(49)	
Enter (49) or (54) in (55)												0.8381	(55)	
Total storage loss	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)	
If cylinder contains dedicated solar storage	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month	220.3618	195.0497	207.4437	182.7127	177.3858	160.1143	158.1206	164.1762	165.7510	184.5184	195.8589	217.9784	(62)	
WWHRS	-24.2120	-21.4133	-22.4228	-18.5670	-17.3037	-14.8069	-13.8791	-14.7591	-15.3198	-18.0604	-20.4602	-23.7637	(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	196.1498	173.6364	185.0209	164.1458	160.0820	145.3074	144.2415	149.4171	150.4312	166.4580	175.3986	194.2147	(64)	
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m =	2004.5035	(64)
Electric shower(s)												2005	(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	96.2913	85.6471	91.9960	83.0303	82.0017	75.5163	75.5961	77.6095	77.3906	84.3733	87.4014	95.4988	(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	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	78.2112	86.5909	78.2112	80.8182	78.2112	80.8182	78.2112	78.2112	80.8182	78.2112	80.8182	78.2112 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	149.3634	150.9134	147.0076	138.6927	128.1966	118.3318	111.7415	110.1916	114.0973	122.4122	132.9083	142.7731 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713 (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)												
	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705 (71)
Water heating gains (Table 5)												
	129.4237	127.4511	123.6505	115.3199	110.2174	104.8838	101.6076	104.3139	107.4869	113.4050	121.3908	128.3585 (72)
Total internal gains												
	408.7123	416.6693	400.5832	386.5447	368.3391	352.7478	340.2742	341.4306	351.1164	365.7423	386.8313	401.0568 (73)

6. Solar gains

[Jan]	Area		Solar flux		g		FF		Access		Gains	
	m2		Table 6a		Specific data		Specific data		factor		W	
			W/m2		or Table 6b		or Table 6c		Table 6d			
Southwest	8.3400		36.7938		0.6300		0.7000		0.7700		93.7806 (79)	
Solar gains	93.7806	159.7430	218.5674	270.8156	303.3360	301.1424	290.3334	266.0717	236.6622	176.5501	112.3275	80.2566 (83)
Total gains	502.4929	576.4124	619.1506	657.3603	671.6751	653.8902	630.6076	607.5023	587.7786	542.2924	499.1588	481.3134 (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
tau	56.3165	56.4361	56.5538	57.1132	57.2191	57.7173	57.7173	57.8105	57.5244	57.2191	57.0053	56.7834
alpha	4.7544	4.7624	4.7703	4.8075	4.8146	4.8478	4.8478	4.8540	4.8350	4.8146	4.8004	4.7856
util living area	0.9852	0.9712	0.9460	0.8839	0.7676	0.5888	0.4319	0.4661	0.6834	0.8965	0.9705	0.9878 (86)
MIT	19.8313	20.0449	20.3092	20.6258	20.8552	20.9689	20.9943	20.9917	20.9362	20.6536	20.1939	19.7941 (87)
Th 2	19.8714	19.8735	19.8756	19.8853	19.8872	19.8957	19.8957	19.8972	19.8924	19.8872	19.8835	19.8796 (88)
util rest of house	0.9806	0.9625	0.9296	0.8496	0.7049	0.4970	0.3258	0.3578	0.5938	0.8584	0.9599	0.9839 (89)
MIT 2	18.5542	18.8228	19.1499	19.5303	19.7746	19.8795	19.8941	19.8947	19.8545	19.5723	19.0202	18.5134 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.2850	19.5221	19.8133	20.1572	20.3929	20.5029	20.5236	20.5224	20.4735	20.1910	19.6918	19.2462 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.2850	19.5221	19.8133	20.1572	20.3929	20.5029	20.5236	20.5224	20.4735	20.1910	19.6918	19.2462 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9775	0.9592	0.9286	0.8588	0.7349	0.5486	0.3866	0.4199	0.6426	0.8700	0.9577	0.9811 (94)
Useful gains	491.2076	552.8950	574.9124	564.5439	493.6076	358.7140	243.8139	255.0707	377.6986	471.7854	478.0480	472.1992 (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	960.3941	935.1537	849.6757	711.4136	548.3457	369.1363	245.3633	257.3811	399.9026	604.9985	797.2642	956.3908 (97)
Space heating kWh	349.0747	256.8779	204.4239	105.7462	40.7252	0.0000	0.0000	0.0000	0.0000	99.1106	229.8357	360.2385 (98a)
Space heating requirement - total per year (kWh/year)	1646.0327											
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	349.0747	256.8779	204.4239	105.7462	40.7252	0.0000	0.0000	0.0000	0.0000	99.1106	229.8357	360.2385 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1646.0327											
Space heating per m2	(98c) / (4) =											
	32.3895 (99)											

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

Fraction of space heat from secondary/supplementary system (Table 11)												
Fraction of space heat from main system(s)												
Efficiency of main space heating system 1 (in %)												
Efficiency of main space heating system 2 (in %)												
Efficiency of secondary/supplementary heating system, %												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	349.0747	256.8779	204.4239	105.7462	40.7252	0.0000	0.0000	0.0000	0.0000	99.1106	229.8357	360.2385 (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)	378.1958	278.3076	221.4777	114.5679	44.1226	0.0000	0.0000	0.0000	0.0000	107.3787	249.0094	390.2909 (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	196.1498	173.6364	185.0209	164.1458	160.0820	145.3074	144.2415	149.4171	150.4312	166.4580	175.3986	194.2147 (64)
Efficiency of water heater	85.3375	84.9364	84.2839	83.0999	81.4747	79.8000	79.8000	79.8000	79.8000	82.9370	84.6669	79.8000 (216)
Fuel for water heating, kWh/month	229.8519	204.4309	219.5210	197.5282	196.4807	182.0894	180.7537	187.2395	188.5103	200.7041	207.1631	227.3505 (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	16.2507	13.0369	11.7383	8.6000	6.6429	5.4273	6.0599	7.8768	10.2312	13.4239	15.1623	16.7024	16.7024	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-11.3749	-17.1203	-26.2561	-31.5712	-35.8844	-34.1915	-33.7939	-30.9905	-26.3694	-20.4708	-12.8901	-9.7133	-9.7133	(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	-3.5072	-7.5888	-15.4812	-23.8433	-32.1061	-32.4572	-32.0575	-26.8608	-19.3339	-11.0242	-4.7379	-2.7568	-2.7568	(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													1783.3507	(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													2421.6233	(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)													131.1527	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-502.3812	(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													3919.7456	(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	1783.3507	0.2100	374.5036	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2421.6233	0.2100	508.5409	(264)
Space and water heating			883.0445	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	131.1527	0.1443	18.9294	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-290.6263	0.1332	-38.7178	
PV Unit electricity exported	-211.7548	0.1252	-26.5079	
Total			-65.2256	(269)
Total CO2, kg/year			848.6776	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			16.7000	(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	1783.3507	1.1300	2015.1862	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2421.6233	1.1300	2736.4344	(278)
Space and water heating			4751.6206	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	131.1527	1.5338	201.1664	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-290.6263	1.4923	-433.6979	
PV Unit electricity exported	-211.7548	0.4595	-97.2950	
Total			-530.9930	(283)
Total Primary energy kWh/year			4551.8949	(286)
Target Primary Energy Rate (TPER)			89.5700	(287)

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Plot Reference	A 103				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.83	TER	16.70		
Environmental	96 A	% DER < TER				65.09	
CO ₂ Emissions (t/year)	0.27	DFEE	37.07	TFEE	41.16		
Compliance Check	See BREL	% DFEE < TFEE				9.95	
% DPER < TPER	31.04	DPER	61.77	TPER	89.57		
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	50.8200 (1b)	2.8000 (2b)	142.2960 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.8200		142.2960 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	142.2960 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1406 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2906 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2252 (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 infiltr rate	0.2871	0.2815	0.2758	0.2477	0.2421	0.2139	0.2139	0.2083	0.2252	0.2421	0.2533	0.2646 (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	0.5412	0.5396	0.5380	0.5307	0.5293	0.5229	0.5229	0.5217	0.5254	0.5293	0.5321	0.5350 (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			8.3400	1.1450	9.5496		(27)
Heatloss Floor 1			50.8200	0.1000	5.0820	110.0000	5590.2000 (28b)
External Wall 1	18.1400	8.3400	9.8000	0.1500	1.4700	70.0000	686.0000 (29a)
Corridor wall	40.1000	2.4200	37.6800	0.1900	7.1592	70.0000	2637.5999 (29a)
Total net area of external elements Aum(A, m ²)			109.0600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	25.6808		(33)
Main dwelling							
Party Wall 1			21.9200	0.0000	0.0000	70.0000	1534.4000 (32)
Party Ceiling 1			50.8200			30.0000	1524.6000 (32b)
Internal Wall 1			113.4300			9.0000	1020.8700 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12993.6699 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							255.6802 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					5.0800	0.0500	0.2540
E3 Sill					1.5900	0.0400	0.0636

elmhurst
energy

Ventilation heat loss calculated monthly (39)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	25.4141	25.3390	25.2653	24.9193	24.8546	24.5533	24.5533	24.4975	24.6693	24.8546	24.9856	25.1225 (38)
Heat transfer coeff												
	56.0038	55.9287	55.8550	55.5090	55.4443	55.1430	55.1430	55.0872	55.2590	55.4443	55.5753	55.7122 (39)
Average = Sum(39)m / 12 =												55.5087
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.1020	1.1005	1.0991	1.0923	1.0910	1.0851	1.0851	1.0840	1.0873	1.0910	1.0936	1.0963 (40)
HLP (average)												1.0923
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy												1.7143 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	22.3882	22.0502	21.5694	20.8494	20.2005	19.3072	18.6296	19.4583	19.8932	20.7783	21.6985	22.3704 (42b)
Hot water usage for other uses	32.1858	31.0154	29.8450	28.6746	27.5042	26.3338	26.3338	27.5042	28.6746	29.8450	31.0154	32.1858 (42c)
Average daily hot water use (litres/day)												50.0189 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	54.5739	53.0656	51.4144	49.5240	47.7047	45.6411	44.9634	46.9625	48.5678	50.6232	52.7139	54.5562 (44)
Energy content (annual)	80.3423	70.2165	73.4701	64.6907	61.4724	52.7824	49.6858	55.2757	56.3362	65.2332	71.2446	80.1198 (45)
Distribution loss (46)m = 0.15 x (45)m												780.8695
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	68.2909	59.6840	62.4496	54.9871	52.2515	44.8650	42.2330	46.9843	47.8858	55.4482	60.5579	68.1018 (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	68.2909	59.6840	62.4496	54.9871	52.2515	44.8650	42.2330	46.9843	47.8858	55.4482	60.5579	68.1018 (64)
12Total per year (kWh/year)												663.7391 (64a)
Electric shower(s)	42.4138	37.7910	41.2663	39.3800	40.1189	38.2696	39.5452	40.1189	39.3800	41.2663	40.4904	42.4138 (64a)
												482.4542 (64a)
Heat gains from water heating, kWh/month	27.6762	24.3688	25.9290	23.5918	23.0926	20.7836	20.4445	21.7758	21.8164	24.1786	25.2621	27.6289 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	78.2112	86.5909	78.2112	80.8182	78.2112	80.8182	78.2112	78.2112	80.8182	78.2112	80.8182	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.3634	150.9134	147.0076	138.6927	128.1966	118.3318	111.7415	110.1916	114.0973	122.4122	132.9083	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	(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	(70)
Losses e.g. evaporation (negative values) (Table 5)	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	(71)
Water heating gains (Table 5)	37.1992	36.2630	34.8508	32.7664	31.0384	28.8662	27.4792	29.2686	30.3006	32.4982	35.0862	(72)
Total internal gains	313.4877	322.4813	308.7835	300.9912	286.1602	276.7301	266.1458	266.3852	273.9301	281.8355	297.5266	(73)

[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					8.3400	36.7938		0.3500	0.7000	0.7700		52.1003 (79)
Solar gains	52.1003	88.7461	121.4263	150.4531	168.5200	167.3014	161.2964	147.8176	131.4790	98.0834	62.4042	44.5870 (83)
Total gains	365.5880	411.2274	430.2098	451.4443	454.6802	444.0315	427.4422	414.2029	405.4091	379.9189	359.9308	351.4209 (84)

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7. Mean internal temperature (heating season)											
Temperature during heating periods in the living area from Table 9, Th1 (C)											
Utilisation factor for gains for living area, nil,m (see Table 9a)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
tau	64.4483	64.5349	64.6200	65.0228	65.0987	65.4545	65.4545	65.5208	65.3170	65.0987	64.9453
alpha	5.2966	5.3023	5.3080	5.3349	5.3399	5.3636	5.3636	5.3681	5.3545	5.3399	5.3297
util living area	0.9958	0.9914	0.9834	0.9572	0.8901	0.7328	0.5555	0.5940	0.8157	0.9604	0.9908
MIT	19.8061	19.9698	20.1910	20.4984	20.7677	20.9423	20.9892	20.9846	20.8940	20.5566	20.1295
Th 2	19.9992	20.0004	20.0016	20.0072	20.0082	20.0130	20.0130	20.0139	20.0112	20.0082	20.0061
util rest of house	0.9944	0.9886	0.9775	0.9410	0.8477	0.6438	0.4373	0.4757	0.7398	0.9423	0.9872
MIT 2	18.9214	19.0847	19.3040	19.6057	19.8507	19.9866	20.0103	20.0097	19.9552	19.6655	19.2485
Living area fraction	fLA = Living area / (4) =										
MIT	19.4276	19.5912	19.8116	20.1166	20.3754	20.5335	20.5704	20.5675	20.4923	20.1754	19.7526
Temperature adjustment	0.0000										
adjusted MIT	19.4276	19.5912	19.8116	20.1166	20.3754	20.5335	20.5704	20.5675	20.4923	20.1754	19.7526

8. Space heating requirement											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Utilisation	0.9933	0.9871	0.9762	0.9431	0.8650	0.6929	0.5052	0.5436	0.7794	0.9459	0.9860
Useful gains	363.1521	405.9274	419.9506	425.7583	393.2872	307.6532	215.9464	225.1661	315.9641	359.3580	354.9077
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000
Heat loss rate W	847.2057	821.6583	743.5183	622.6202	481.0035	327.1891	218.9411	229.5768	353.2351	530.9005	703.1709
Space heating kWh	360.1359	279.3712	240.7344	141.7405	65.2610	0.0000	0.0000	0.0000	0.0000	127.6276	250.7495
Space heating requirement - total per year (kWh/year)											
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Solar heating contribution - total per year (kWh/year)											
Space heating kWh	360.1359	279.3712	240.7344	141.7405	65.2610	0.0000	0.0000	0.0000	0.0000	127.6276	250.7495
Space heating requirement after solar contribution - total per year (kWh/year)											
Space heating per m2	(98c) / (4) =										

8c. Space cooling requirement											
Calculated for June, July and August. See Table 10b											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	518.3438	408.0579	418.6624	0.0000	0.0000	0.0000
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8174	0.8969	0.8778	0.0000	0.0000	0.0000
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	423.7163	365.9863	367.4820	0.0000	0.0000	0.0000
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	489.1561	471.4652	457.4039	0.0000	0.0000	0.0000
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	47.1167	78.4762	66.9019	0.0000	0.0000	0.0000
Cooled fraction	fc = cooled area / (4) =										
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	11.7792	19.6191	16.7255	0.0000	0.0000	0.0000
Space cooling requirement											
Energy for space heating											
Energy for space cooling											
Total											
Fabric Energy Efficiency (DFEE)											

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						50.8200 (1b)	x	2.8000 (2b)	=	142.2960 (1b) - (3b)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)						50.8200				(4)	
Dwelling volume								(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	142.2960 (5)	

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

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Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											Air changes per hour	(8)
Pressure test												20.0000 / (5) =	0.1406
Pressure Test Method												Yes	
Measured/design AP50												Blower Door	
Infiltration rate												5.0000	(17)
Number of sides sheltered												0.3906	(18)
												3	(19)
Shelter factor												(20) = 1 - [0.075 x (19)] =	0.7750
Infiltration rate adjusted to include shelter factor												(21) = (18) x (20) =	0.3027
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)
	0.3859	0.3783	0.3708	0.3329	0.3254	0.2875	0.2875	0.2800	0.3027	0.3254	0.3405	0.3556	(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	0.5745	0.5716	0.5687	0.5554	0.5529	0.5413	0.5413	0.5392	0.5458	0.5529	0.5580	0.5632	(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			8.3400	1.1450	9.5496		(27)
Heatloss Floor 1			50.8200	0.1300	6.6066		(28b)
External Wall 1	18.1400	8.3400	9.8000	0.1800	1.7640		(29a)
Corridor wall	40.1000	2.4200	37.6800	0.1800	6.7824		(29a)
Total net area of external elements Aum(A, m2)			109.0600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)... (30) + (32) =	27.1226		(33)
Main dwelling							
Party Wall 1			21.9200	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							255.6802 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				5.0800	0.0500	0.2540	
E3 Sill				1.5900	0.0500	0.0795	
E4 Jamb				12.6000	0.0500	0.6300	
E7 Party floor between dwellings (in blocks of flats)				3.1200	0.0700	0.2184	
E7 Party floor between dwellings (in blocks of flats)				14.3200	0.0700	1.0024	
E9 Balcony between dwellings, wall insulation continuous				3.3600	0.0200	0.0672	
E9 Balcony between dwellings, wall insulation continuous				3.3600	0.0200	0.0672	
E16 Corner (normal)				2.8000	0.0900	0.2520	
E16 Corner (normal)				2.8000	0.0900	0.2520	
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)				3.1200	0.3200	0.9984	
E21 Exposed floor (inverted)				14.3200	0.3200	4.5824	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				7.8300	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)				7.8300	0.1600	1.2528	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							9.9923 (36)
Point Thermal bridges							(36a) = 0.0000
Total fabric heat loss							(33) + (36) + (36a) = 37.1149 (37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7143	(42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	22.8986	22.5586	22.0797	21.1967	20.5355	19.8023	19.4063	19.8819	20.3997	21.1842	22.0853	22.8212	(42b)
Hot water usage for other uses	32.1858	31.0154	29.8450	28.6746	27.5042	26.3338	26.3338	27.5042	28.6746	29.8450	31.0154	32.1858	(42c)
Average daily hot water use (litres/day)												50.4904	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	55.0844	53.5739	51.9246	49.8713	48.0397	46.1361	45.7401	47.3861	49.0742	51.0291	53.1007	55.0070	(44)
Energy content (annual)	87.2402	76.2886	79.8063	68.2713	64.6706	56.7298	55.3187	58.6739	60.5135	69.2461	75.6517	86.1277	(45)
Distribution loss (46)m = 0.15 x (45)m												838.5382	
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	74.1542	64.8453	67.8353	58.0306	54.9700	48.2203	47.0209	49.8728	51.4364	58.8591	64.3039	73.2085	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	74.1542	64.8453	67.8353	58.0306	54.9700	48.2203	47.0209	49.8728	51.4364	58.8591	64.3039	73.2085	(64)
Total per year (kWh/year) = Sum(64)m =												712.7575	(64)

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12Total per year (kWh/year)	713 (64)										
Electric shower(s)	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =										
42.4138	37.7910	41.2663	39.3800	40.1189	38.2696	39.5452	40.1189	39.3800	41.2663	40.4904	42.4138 (64a)
Heat gains from water heating, kWh/month											482.4542 (64a)
29.1420	25.6591	27.2754	24.3526	23.7722	21.6225	21.6415	22.4979	22.7041	25.0314	26.1986	28.9056 (65)

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

Metabolic gains (Table 5), Watts											
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131	85.7131 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5											
	78.2112	86.5909	78.2112	80.8182	78.2112	80.8182	78.2112	78.2112	80.8182	78.2112	80.8182 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5											
	149.3634	150.9134	147.0076	138.6927	128.1966	118.3318	111.7415	110.1916	114.0973	122.4122	132.9083 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5											
	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713	31.5713 (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 (70)
Losses e.g. evaporation (negative values) (Table 5)											
	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705	-68.5705 (71)
Water heating gains (Table 5)											
	39.1693	38.1832	36.6605	33.8231	31.9519	30.0312	29.0881	30.2391	31.5335	33.6443	36.3869 (72)
Total internal gains											
	315.4579	324.4014	310.5932	302.0479	287.0737	277.8951	267.7547	267.3558	275.1629	282.9817	298.8274 (73)

6. Solar gains

[Jan]	Area		Solar flux		g		FF		Access		Gains
	m2		Table 6a		Specific data		Specific data		factor		W
			W/m2		or Table 6b		or Table 6c		Table 6d		
Southwest	8.3400		36.7938		0.6300		0.7000		0.7700		93.7806 (79)
Solar gains	93.7806	159.7430	218.5674	270.8156	303.3360	301.1424	290.3334	266.0717	236.6622	176.5501	112.3275 (83)
Total gains	409.2385	484.1444	529.1606	572.8635	590.4097	579.0376	558.0881	533.4275	511.8252	459.5317	411.1549 (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
tau	56.3165	56.4361	56.5538	57.1132	57.2191	57.7173	57.7173	57.8105	57.5244	57.2191	57.0053
alpha	4.7544	4.7624	4.7703	4.8075	4.8146	4.8478	4.8478	4.8540	4.8350	4.8146	4.8004
util living area	0.9936	0.9852	0.9690	0.9230	0.8254	0.6509	0.4848	0.5258	0.7528	0.9382	0.9860
MIT	19.6515	19.8766	20.1608	20.5192	20.7975	20.9524	20.9906	20.9862	20.9027	20.5415	20.0330
Th 2	19.8714	19.8735	19.8756	19.8853	19.8872	19.8957	19.8957	19.8972	19.8924	19.8872	19.8835
util rest of house	0.9914	0.9804	0.9585	0.8968	0.7683	0.5550	0.3674	0.4061	0.6646	0.9114	0.9806
MIT 2	18.6681	18.8918	19.1711	19.5175	19.7591	19.8756	19.8935	19.8938	19.8448	19.5467	19.0559
Living area fraction	FLA = Living area / (4) =										
MIT	19.2309	19.4553	19.7374	20.0907	20.3533	20.4918	20.5213	20.5189	20.4502	20.1159	19.6150
Temperature adjustment	0.0000										
adjusted MIT	19.2309	19.4553	19.7374	20.0907	20.3533	20.4918	20.5213	20.5189	20.4502	20.1159	19.6150 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Utilisation	0.9898	0.9782	0.9570	0.9023	0.7940	0.6085	0.4348	0.4748	0.7116	0.9178	0.9789
Useful gains	405.0794	473.5725	506.4074	516.8672	468.7811	352.3222	242.6457	253.2469	364.1983	421.7781	402.4808
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000
Heat loss rate W	956.9252	930.8806	844.8337	707.2120	545.8439	368.4408	245.2183	257.1593	398.4412	600.2612	792.4011
Space heating kWh	410.5733	307.3110	251.7892	137.0482	57.3347	0.0000	0.0000	0.0000	0.0000	132.7914	280.7426
Space heating requirement - total per year (kWh/year)	1999.8527										
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Solar heating contribution - total per year (kWh/year)	0.0000 (98b)										
Space heating kWh	410.5733	307.3110	251.7892	137.0482	57.3347	0.0000	0.0000	0.0000	0.0000	132.7914	280.7426
Space heating requirement after solar contribution - total per year (kWh/year)	1999.8527 (98c)										
Space heating per m2	(98c) / (4) = 39.3517 (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
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	587.8292	462.7592	474.4999	0.0000	0.0000	0.0000
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8660	0.9265	0.9088	0.0000	0.0000	0.0000
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	509.0851	428.7532	431.2145	0.0000	0.0000	0.0000
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	646.7588	623.8966	596.5936	0.0000	0.0000	0.0000
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	99.1250	145.1867	123.0420	0.0000	0.0000	0.0000
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
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	24.7813	36.2967	30.7605	0.0000	0.0000	0.0000
Space cooling requirement	91.8384 (107)										

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

39.3517 (99)
1.8071 (108)
41.1588 (109)
41.2 (109)