

Summary for Input Data

Plot Reference	A 408		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	84 B	DER	4.55	TER	12.78
Environmental	97 A	% DER < TER			64.40
CO ₂ Emissions (t/year)	0.27	DFEE	27.21	TFEE	28.82
Compliance Check	See BREL	% DFEE < TFEE			5.59
% DPER < TPER	28.98	DPER	48.49	TPER	68.27

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

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

Orientation	Southwest
Property Tenture	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, Mid-Terrace
Position of Flat	Mid-floor flat
Which Floor	4
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	176.34 kJ/m ² K
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:	18.26 m	64.73 m ²	2.80 m

8.0 Living Area	33.09 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	28.22	18.51	0.00	None	9.71	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	22.89	20.47	0.90	Stairwell Access Corridor 4	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	41.69	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	137.37

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	64.73

Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
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Summary for Input Data

Party Floor 1 Lowest occupied Precast concrete planks floor, screed, carpeted 40.00 64.73

12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South West	2.42	
Windows	Window	External Wall 1	North East	9.71	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	5.99	0.05	0.05	No
E3 Sill	Independently assessed	2.50	0.04	0.04	No
E4 Jamb	Independently assessed	15.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	10.89	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	16.35	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	6.72	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	2.80	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	5.60	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	29.78	0.00	0.00	No
E16 Corner (normal)	Independently assessed	2.80	0.04	0.04	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	2.55	0.05	0.05	No

Y-value 0.07 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	1
Manufacturer SFP	0.63
Duct Type	Rigid
MVHR Efficiency	90.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

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

Summary for Input Data



Number of flueless gas fires	0									
21.0 Fixed Cooling System	No									
22.0 Pressure Testing	Yes									
Designed AP ₅₀	3.00					m ³ /(h.m ²) @ 50 Pa				
Test Method	Blower Door									
22.0 Lighting	No									
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 and Water Combined									
Space Community Heating										
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	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
0.31	South 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

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Environmental	97 A	% DER < TER				64.40	
CO ₂ Emissions (t/year)	0.27	DFEE	27.21	TFEE	28.82		
Compliance Check	See BREL	% DFEE < TFEE				5.59	
% DPER < TPER	28.98	DPER	48.49	TPER	68.27		
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	64.7300 (1b)	2.8000 (2b)	181.2440 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	64.7300		181.2440 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	181.2440 (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)

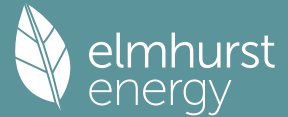
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1482	0.1453	0.1424	0.1279	0.1250	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			9.7100	1.1450	11.1183		(27)
External Wall 1	28.2200	9.7100	18.5100	0.1500	2.7765	70.0000	1295.7000 (29a)
Corridor wall	22.8900	2.4200	20.4700	0.1800	3.6846	70.0000	1432.9000 (29a)
Total net area of external elements Aum(A, m ²)			51.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	19.9994	(33)
Main dwelling							
Party Wall 1			41.6900	0.0000	0.0000	70.0000	2918.2999 (32)
Party Floor 1			64.7300			40.0000	2589.2000 (32d)
Party Ceiling 1			64.7300			30.0000	1941.9000 (32b)
Internal Wall 1			137.3700			9.0000	1236.3300 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	11414.3298 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		176.3375 (35)
List of Thermal Bridges		

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.9900	0.0500	0.2995
E3 Sill	2.5000	0.0400	0.1000
E4 Jamb	15.6000	0.0400	0.6240
E7 Party floor between dwellings (in blocks of flats)	10.8900	0.0500	0.5445
E7 Party floor between dwellings (in blocks of flats)	16.3500	0.0360	0.5886
E9 Balcony between dwellings, wall insulation continuous	6.7200	0.0500	0.3360
E16 Corner (normal)	2.8000	0.0500	0.1400
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	5.6000	0.0500	0.2800
E18 Party wall between dwellings	2.8000	0.0360	0.1008
E25 Staggered party wall between dwellings	2.8000	0.0360	0.1008
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	29.7800	0.0000	0.0000
E16 Corner (normal)	2.8000	0.0360	0.1008
E24 Eaves (insulation at ceiling level - inverted)	2.5500	0.0500	0.1275
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			3.3425 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	23.3419 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	14.5470	14.3732	14.1994	13.3303	13.1564	12.2873	12.2873	12.1135	12.6350	13.1564	13.5041	13.8517	(38)
Heat transfer coeff	37.8890	37.7151	37.5413	36.6722	36.4984	35.6292	35.6292	35.4554	35.9769	36.4984	36.8460	37.1937	(39)
Average = Sum(39)m / 12 =												36.6287	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.5853	0.5827	0.5800	0.5665	0.5639	0.5504	0.5504	0.5477	0.5558	0.5639	0.5692	0.5746	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												0.5659	
												31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.1117 (42)
Hot water usage for mixer showers	58.1200	57.2302	55.9189	53.9016	52.0942	49.5655	47.5656	49.9037	51.0796	53.5841	56.1923	58.0676	(42a)
Hot water usage for baths	25.1902	24.8100	24.2690	23.4589	22.7288	21.7237	20.9612	21.8936	22.3829	23.3788	24.4142	25.1702	(42b)
Hot water usage for other uses	36.2563	34.9379	33.6195	32.3011	30.9827	29.6642	29.6642	30.9827	32.3011	33.6195	34.9379	36.2563	(42c)
Average daily hot water use (litres/day)												109.8997	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	119.5666	116.9781	113.8074	109.6615	105.8056	100.9535	98.1910	102.7799	105.7636	110.5824	115.5444	119.4942	(44)
Energy content (annual)	176.0226	154.7857	162.6284	143.2454	136.3412	116.7493	108.5040	120.9738	122.6805	142.4966	156.1621	175.4860	(45)
Distribution loss (46)m = 0.15 x (45)m	26.4034	23.2178	24.3943	21.4868	20.4512	17.5124	16.2756	18.1461	18.4021	21.3745	23.4243	26.3229	(46)
Water storage loss (or HIU loss):													
Store volume													110.0000 (47)
b) If manufacturer declared loss factor is not known :													
Hot water storage loss factor from Table 2 (kWh/litre/day)													0.0152 (51)
Volume factor from Table 2a													1.0294 (52)
Temperature factor from Table 2b													0.6000 (53)
Enter (49) or (54) in (55)													1.0327 (55)
Total storage loss	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	(56)
If cylinder contains dedicated solar storage	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	231.2994	204.7131	217.9052	196.7390	191.6180	170.2430	163.7808	176.2506	176.1742	197.7734	209.6557	230.7628	(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	231.2994	204.7131	217.9052	196.7390	191.6180	170.2430	163.7808	176.2506	176.1742	197.7734	209.6557	230.7628	(64)
12Total per year (kWh/year)													
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	102.7490	91.4082	98.2954	90.4240	89.5549	81.6141	80.2990	84.4452	83.5862	91.6016	94.7188	102.5705	(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	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	98.4777	109.0289	98.4777	101.7603	98.4777	101.7603	98.4777	98.4777	101.7603	98.4777	101.7603	98.4777	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	184.6996	186.6162	181.7864	171.5044	158.5252	146.3265	138.1771	136.2605	141.0903	151.3723	164.3515	176.5501	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	(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)	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	(71)
Water heating gains (Table 5)	138.1035	136.0241	132.1174	125.5889	120.3695	113.3529	107.9288	113.5017	116.0920	123.1204	131.5539	137.8636	(72)
Total internal gains	475.9568	486.3452	467.0577	453.5297	432.0484	416.1158	399.2597	402.9160	413.6186	427.6465	452.3418	467.5676	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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SAP 10 Online 2.26.14 Page 3 of 7

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Electricity for lighting (calculated in Appendix L)	172.6993 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-137.9840 (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	4379.4268 (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	1797.6644	0.1581	42.2720 (367)
Electrical energy for heat distribution (space & water)	6.2021	0.0000	5.9792 (372)
Overall CO2 factor for heat network			0.0632 (386)
Total CO2 associated with community systems			263.7045 (373)
Space and water heating			263.7045 (376)
Pumps, fans and electric keep-hot	174.1302	0.1387	24.1540 (378)
Energy for lighting	172.6993	0.1443	24.9258 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-137.9840	0.1305	-18.0088
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-18.0088 (380)
Total CO2, kg/year			294.7755 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5500 (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	1797.6644	1.5854	423.8199 (467)
Electrical energy for heat distribution (space & water)	6.2021	0.0000	63.8188 (472)
Overall CO2 factor for heat network			0.6749 (486)
Total CO2 associated with community systems			2814.6298 (473)
Space and water heating			2814.6298 (476)
Pumps, fans and electric keep-hot	174.1302	1.5128	263.4241 (478)
Energy for lighting	172.6993	1.5338	264.8920 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-137.9840	1.4821	-204.5087
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-204.5087 (480)
Total Primary energy kWh/year			3138.4372 (483)
Dwelling Primary energy Rate (DPER)			48.4900 (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	64.7300 (1b)	2.8000 (2b)	181.2440 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	64.7300		181.2440 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	181.2440 (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) = 0.1103 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3603 (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) = 0.2793 (21)

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

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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												
	0.3561	0.3491	0.3421	0.3072	0.3002	0.2653	0.2653	0.2583	0.2793	0.3002	0.3142	0.3281 (22b)
Effective ac	0.5634	0.5609	0.5585	0.5472	0.5451	0.5352	0.5352	0.5334	0.5390	0.5451	0.5494	0.5538 (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			9.7100	1.1450	11.1183		(27)
External Wall 1	28.2200	9.7100	18.5100	0.1800	3.3318		(29a)
Corridor wall	22.8900	2.4200	20.4700	0.1800	3.6846		(29a)
Total net area of external elements Aum(A, m2)			51.1100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		20.5547		(33)
Main dwelling							
Party Wall 1			41.6900	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							176.3375 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.9900	0.0500	0.2995
E3 Sill	2.5000	0.0500	0.1250
E4 Jamb	15.6000	0.0500	0.7800
E7 Party floor between dwellings (in blocks of flats)	10.8900	0.0700	0.7623
E7 Party floor between dwellings (in blocks of flats)	16.3500	0.0700	1.1445
E9 Balcony between dwellings, wall insulation continuous	6.7200	0.0200	0.1344
E16 Corner (normal)	2.8000	0.0900	0.2520
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	29.7800	0.0000	0.0000
E16 Corner (normal)	2.8000	0.0900	0.2520
E24 Eaves (insulation at ceiling level - inverted)	2.5500	0.2400	0.6120
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.7817 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 25.3364 (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
	33.6968	33.5496	33.4053	32.7274	32.6006	32.0102	32.0102	31.9009	32.2376	32.6006	32.8572	33.1254 (38)
Heat transfer coeff	59.0332	58.8860	58.7417	58.0638	57.9370	57.3466	57.3466	57.2373	57.5740	57.9370	58.1936	58.4618 (39)
Average = Sum(39)m / 12 =												58.0632
HLP	0.9120	0.9097	0.9075	0.8970	0.8951	0.8859	0.8859	0.8842	0.8894	0.8951	0.8990	0.9032 (40)
HLP (average)												0.8970
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

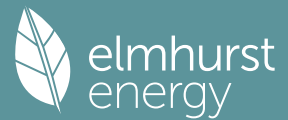
4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1117 (42)
Hot water usage for mixer showers												
59.6265	58.7304	57.4247	54.9264	53.0827	51.0266	49.8579	51.1538	52.5743	54.7819	57.3339	59.3980	(42a)
Hot water usage for baths												
25.7646	25.3819	24.8431	23.8496	23.1056	22.2807	21.8352	22.3702	22.9528	23.8355	24.8495	25.6775	(42b)
Hot water usage for other uses												
36.2563	34.9379	33.6195	32.3011	30.9827	29.6642	29.6642	30.9827	32.3011	33.6195	34.9379	36.2563	(42c)
Average daily hot water use (litres/day)												111.8217 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	121.6474	119.0502	115.8872	111.0770	107.1710	102.9716	101.3573	104.5067	107.8282	112.2369	117.1212	121.3318 (44)
Energy conte	192.6597	169.5260	178.1144	152.0589	144.2727	126.6156	122.5829	129.4011	132.9629	152.3044	166.8607	189.9763 (45)
Energy content (annual)										Total = Sum(45)m =		1857.3355
Distribution loss (46)m = 0.15 x (45)m												
28.8990	25.4289	26.7172	22.8088	21.6409	18.9923	18.3874	19.4102	19.9444	22.8457	25.0291	28.4964	(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												
241.9024	214.0032	227.3571	199.7131	193.5154	174.2698	171.8256	178.6438	180.6171	201.5470	214.5149	239.2190	(62)
WWHRS	-27.2587	-24.1079	-25.2444	-20.9033	-19.4812	-16.6702	-15.6256	-16.6163	-17.2476	-20.3330	-23.0348	-26.7540 (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												
214.6436	189.8954	202.1127	178.8097	174.0342	157.5996	156.2000	162.0275	163.3695	181.2140	191.4801	212.4650	(64)
12Total per year (kWh/year)												2183.8514 (64)
Electric shower(s)												2184 (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												
103.4535	91.9492	98.6172	88.6829	87.3648	80.2230	80.1530	82.4200	82.3335	90.0353	93.6045	102.5613	(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
----------------------------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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(66)m	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	98.4777	109.0289	98.4777	101.7603	98.4777	101.7603	98.4777	98.4777	101.7603	98.4777	101.7603	98.4777	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	184.6996	186.6162	181.7864	171.5044	158.5252	146.3265	138.1771	136.2605	141.0903	151.3723	164.3515	176.5501	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	(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)	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	(71)
Water heating gains (Table 5)	139.0504	136.8291	132.5500	123.1707	117.4258	111.4209	107.7325	110.7796	114.3521	121.0152	130.0063	137.8512	(72)
Total internal gains	479.9038	490.1503	470.4902	454.1115	432.1048	414.1838	399.0634	400.1939	411.8788	428.5413	453.7942	470.5551	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c				Access factor Table 6d	Gains W	
-----								-----					
Northeast				9.7100	11.2829	0.6300	0.7000				0.7700	33.4822 (75)	
-----								-----					
Solar gains	33.4822	68.1539	122.7916	201.6591	271.0695	288.9887	270.3430	215.5206	149.6235	83.2895	42.1292	27.3432	(83)
Total gains	513.3859	558.3042	593.2818	655.7707	703.1742	703.1725	669.4064	615.7145	561.5023	511.8308	495.9234	497.8983	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	53.7095	53.8438	53.9761	54.6062	54.7258	55.2892	55.2892	55.3948	55.0708	54.7258	54.4845	54.2345		
alpha	4.5806	4.5896	4.5984	4.6404	4.6484	4.6859	4.6859	4.6930	4.6714	4.6484	4.6323	4.6156		
util living area	0.9752	0.9618	0.9337	0.8498	0.6995	0.5098	0.3745	0.4230	0.6597	0.8829	0.9572	0.9781	(86)	
MIT	19.8898	20.0588	20.3178	20.6663	20.8920	20.9803	20.9962	20.9935	20.9382	20.6538	20.2327	19.8644	(87)	
Th 2	20.1573	20.1592	20.1611	20.1700	20.1717	20.1795	20.1795	20.1809	20.1765	20.1717	20.1683	20.1648	(88)	
util rest of house	0.9701	0.9542	0.9203	0.8218	0.6524	0.4488	0.3058	0.3498	0.5954	0.8543	0.9472	0.9736	(89)	
MIT 2	18.8711	19.0844	19.4072	19.8298	20.0771	20.1664	20.1778	20.1778	20.1306	19.8258	19.3119	18.8447	(90)	
Living area fraction									fLA = Living area / (4) =			0.5112	(91)	
MIT	19.3918	19.5825	19.8727	20.2574	20.4937	20.5825	20.5962	20.5948	20.5435	20.2490	19.7826	19.3659	(92)	
Temperature adjustment												0.0000		
adjusted MIT	19.3918	19.5825	19.8727	20.2574	20.4937	20.5825	20.5962	20.5948	20.5435	20.2490	19.7826	19.3659	(93)	

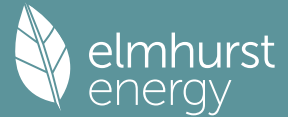
8. Space heating requirement

Utilisation	0.9644	0.9479	0.9150	0.8250	0.6713	0.4791	0.3409	0.3871	0.6249	0.8572	0.9418	0.9682	(94)	
Useful gains	495.1261	529.2071	542.8693	541.0139	472.0285	336.8862	228.1737	238.3275	350.9050	438.7489	467.0543	482.0600	(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	890.9186	864.5959	785.5341	659.4548	509.4808	343.0760	229.1684	240.0993	370.9762	559.0369	738.0462	886.6287	(97)	
Space heating kWh	294.4696	225.3812	180.5427	85.2774	27.8645	0.0000	0.0000	0.0000	0.0000	89.4942	195.1142	300.9991	(98a)	
Space heating requirement - total per year (kWh/year)												1399.1430		
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	294.4696	225.3812	180.5427	85.2774	27.8645	0.0000	0.0000	0.0000	0.0000	89.4942	195.1142	300.9991	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												1399.1430		
Space heating per m2										(98c) / (4) =		21.6151	(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	294.4696	225.3812	180.5427	85.2774	27.8645	0.0000	0.0000	0.0000	0.0000	89.4942	195.1142	300.9991	(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)	319.0354	244.1834	195.6042	92.3916	30.1891	0.0000	0.0000	0.0000	0.0000	96.9602	211.3913	326.1095	(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	214.6436	189.8954	202.1127	178.8097	174.0342	157.5996	156.2000	162.0275	163.3695	181.2140	191.4801	212.4650	(64)	
Efficiency of water heater	84.7693	84.4450	83.8076	82.5000	80.9321	79.8000	79.8000	79.8000	79.8000	82.5665	84.1020	84.8407	(216)	
Fuel for water heating, kWh/month	253.2092	224.8747	241.1627	216.7390	215.0375	197.4932	195.7393	203.0420	204.7237	219.4765	227.6760	250.4282	(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)	

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Lighting	20.4617	16.4152	14.7800	10.8285	8.3642	6.8337	7.6301	9.9179	12.8824	16.9024	19.0913	21.0304	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-14.3959	-21.6158	-33.0672	-39.6483	-44.9516	-42.7740	-42.2627	-38.8054	-33.0988	-25.7873	-16.2915	-12.2976	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-4.5596	-9.8565	-20.0942	-30.9337	-41.6487	-42.1173	-41.6130	-34.8804	-25.1140	-14.3282	-6.1614	-3.5856	(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												1515.8646	(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												2649.6020	(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)												165.1379	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-639.8885	(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												3776.7160	(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	1515.8646	0.2100	318.3316 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2649.6020	0.2100	556.4164 (264)
Space and water heating			874.7480 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	165.1379	0.1443	23.8345 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-364.9960	0.1333	-48.6475
PV Unit electricity exported	-274.8925	0.1252	-34.4126
Total			-83.0602 (269)
Total CO2, kg/year			827.4516 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.7800 (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	1515.8646	1.1300	1712.9270 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2649.6020	1.1300	2994.0503 (278)
Space and water heating			4706.9773 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	165.1379	1.5338	253.2940 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-364.9960	1.4925	-544.7620
PV Unit electricity exported	-274.8925	0.4595	-126.3086
Total			-671.0705 (283)
Total Primary energy kWh/year			4419.3016 (286)
Target Primary Energy Rate (TPER)			68.2700 (287)

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Plot Reference	A 408				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	84 B	DER	4.55	TER	12.78		
Environmental	97 A	% DER < TER				64.40	
CO ₂ Emissions (t/year)	0.27	DFEE	27.21	TFEE	28.82		
Compliance Check	See BREL	% DFEE < TFEE				5.59	
% DPER < TPER	28.98	DPER	48.49	TPER	68.27		
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	64.7300 (1b)	2.8000 (2b)	181.2440 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	64.7300		181.2440 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 181.2440 (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) = 0.1103 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2603 (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) = 0.2018 (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	0.2573	0.2522	0.2472	0.2219	0.2169	0.1917	0.1917	0.1866	0.2018	0.2169	0.2270	0.2371 (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	0.5331	0.5318	0.5305	0.5246	0.5235	0.5184	0.5184	0.5174	0.5204	0.5235	0.5258	0.5281 (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			9.7100	1.1450	11.1183		(27)
External Wall 1	28.2200	9.7100	18.5100	0.1500	2.7765	70.0000	1295.7000 (29a)
Corridor wall	22.8900	2.4200	20.4700	0.1800	3.6846	70.0000	1432.9000 (29a)
Total net area of external elements Aum(A, m ²)			51.1100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	19.9994		(33)
Main dwelling							
Party Wall 1			41.6900	0.0000	0.0000	70.0000	2918.2999 (32)
Party Floor 1			64.7300			40.0000	2589.2000 (32d)
Party Ceiling 1			64.7300			30.0000	1941.9000 (32b)
Internal Wall 1			137.3700			9.0000	1236.3300 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	11414.3298 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							176.3375 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					5.9900	0.0500	0.2995
E3 Sill					2.5000	0.0400	0.1000

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E4 Jamb	15.6000	0.0400	0.6240
E7 Party floor between dwellings (in blocks of flats)	10.8900	0.0500	0.5445
E7 Party floor between dwellings (in blocks of flats)	16.3500	0.0360	0.5886
E9 Balcony between dwellings, wall insulation continuous	6.7200	0.0500	0.3360
E16 Corner (normal)	2.8000	0.0500	0.1400
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	5.6000	0.0500	0.2800
E18 Party wall between dwellings	2.8000	0.0360	0.1008
E25 Staggered party wall between dwellings	2.8000	0.0360	0.1008
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	29.7800	0.0000	0.0000
E16 Corner (normal)	2.8000	0.0360	0.1008
E24 Eaves (insulation at ceiling level - inverted)	2.5500	0.0500	0.1275
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			3.3425 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	23.3419 (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	31.8844	31.8076	31.7322	31.3784	31.3122	31.0040	31.0040	30.9470	31.1227	31.3122	31.4461	31.5861 (38)
Average = Sum(39)m / 12 =	55.2263	55.1495	55.0742	54.7203	54.6541	54.3460	54.3460	54.2889	54.4647	54.6541	54.7881	54.9281 (39)
	54.7200											
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.8532	0.8520	0.8508	0.8454	0.8443	0.8396	0.8396	0.8387	0.8414	0.8443	0.8464	0.8486 (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												2.1117 (42)
Hot water usage for mixer showers												
Hot water usage for baths	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 other uses	25.1902	24.8100	24.2690	23.4589	22.7288	21.7237	20.9612	21.8936	22.3829	23.3788	24.4142	25.1702 (42b)
Average daily hot water use (litres/day)	36.2563	34.9379	33.6195	32.3011	30.9827	29.6642	29.6642	30.9827	32.3011	33.6195	34.9379	36.2563 (42c)
												56.3176 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	61.4465	59.7478	57.8885	55.7599	53.7114	51.3879	50.6254	52.8763	54.6840	56.9983	59.3521	61.4265 (44)
Energy content (annual)	90.4599	79.0585	82.7214	72.8364	69.2126	59.4284	55.9426	62.2363	63.4307	73.4481	80.2164	90.2094 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	76.8909	67.1997	70.3132	61.9110	58.8307	50.5142	47.5512	52.9009	53.9161	62.4309	68.1839	76.6780 (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	76.8909	67.1997	70.3132	61.9110	58.8307	50.5142	47.5512	52.9009	53.9161	62.4309	68.1839	76.6780 (64)
12Total per year (kWh/year)												747 (64)
Electric shower(s)	47.7509	42.5464	46.4591	44.3353	45.1673	43.0852	44.5214	45.1673	44.3353	46.4591	45.5855	47.7509 (64a)
												543.1635 (64a)
Heat gains from water heating, kWh/month	31.1604	27.4365	29.1931	26.5616	25.9995	23.3998	23.0181	24.5170	24.5629	27.2225	28.4423	31.1072 (65)

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	98.4777	109.0289	98.4777	101.7603	98.4777	101.7603	98.4777	98.4777	101.7603	98.4777	101.7603	98.4777 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	184.6996	186.6162	181.7864	171.5044	158.5252	146.3265	138.1771	136.2605	141.0903	151.3723	164.3515	176.5501 (68)
Pumps, fans	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587 (69)
Losses e.g. evaporation (negative values) (Table 5)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Water heating gains (Table 5)	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695 (71)
Total internal gains	41.8823	40.8282	39.2380	36.8911	34.9456	32.4998	30.9384	32.9530	34.1151	36.5894	39.5033	41.8108 (72)
	379.7357	391.1494	374.1782	364.8318	346.6245	335.2627	322.2693	322.3673	331.6418	341.1155	360.2912	371.5147 (73)

6. Solar gains												
[Jan]												
	Area	Solar flux	g	FF	Access	Gains						
	m2	Table 6a	Specific data	Specific data	factor	W						
		W/m2	or Table 6b	or Table 6c	Table 6d							
Northeast	9.7100	11.2829	0.3500	0.7000	0.7700	18.6012 (75)						
Solar gains	18.6012	37.8633	68.2176	112.0329	150.5941	160.5493	150.1906	119.7337	83.1242	46.2719	23.4051	15.1907 (83)
Total gains	398.3369	429.0126	442.3958	476.8647	497.2187	495.8120	472.4598	442.1010	414.7659	387.3874	383.6963	386.7054 (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 from living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	57.4119	57.4919	57.5705	57.9428	58.0129	58.3419	58.3419	58.4032	58.2148	58.0129	57.8711	57.7236
alpha	4.8275	4.8328	4.8380	4.8629	4.8675	4.8895	4.8895	4.8935	4.8810	4.8675	4.8581	4.8482
util living area	0.9901	0.9844	0.9736	0.9336	0.8386	0.6593	0.4970	0.5493	0.7866	0.9449	0.9819	0.9914 (86)
MIT	19.7739	19.9183	20.1450	20.4952	20.7874	20.9512	20.9900	20.9840	20.8846	20.5289	20.1047	19.7456 (87)
Th 2	20.2075	20.2085	20.2095	20.2142	20.2151	20.2192	20.2192	20.2199	20.2176	20.2151	20.2133	20.2114 (88)
util rest of house	0.9879	0.9810	0.9674	0.9176	0.8010	0.5924	0.4129	0.4629	0.7284	0.9285	0.9773	0.9895 (89)
MIT 2	19.0810	19.2248	19.4494	19.7917	20.0588	20.1920	20.2155	20.2135	20.1452	19.8290	19.4142	19.0561 (90)
Living area fraction									fLA = Living area / (4) =			0.5112 (91)
MIT	19.4352	19.5793	19.8050	20.1513	20.4313	20.5801	20.6114	20.6074	20.5232	20.1868	19.7672	19.4086 (92)
Temperature adjustment												0.0000
adjusted MIT	19.4352	19.5793	19.8050	20.1513	20.4313	20.5801	20.6114	20.6074	20.5232	20.1868	19.7672	19.4086 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9852	0.9776	0.9636	0.9162	0.8121	0.6243	0.4557	0.5066	0.7525	0.9278	0.9741	0.9870 (94)
Useful gains	392.4341	419.4034	426.2902	436.8871	403.7845	309.5126	215.2990	223.9626	312.1216	359.4140	373.7476	381.6877 (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	835.8607	809.5556	732.7609	615.6753	477.2004	324.9954	218.0024	228.4137	349.8351	523.9601	694.0093	835.3782 (97)
Space heating kWh	329.9094	262.1822	228.0142	128.7275	54.6214	0.0000	0.0000	0.0000	0.0000	122.4223	230.5884	337.5457 (98a)
Space heating requirement - total per year (kWh/year)												1694.0112
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	329.9094	262.1822	228.0142	128.7275	54.6214	0.0000	0.0000	0.0000	0.0000	122.4223	230.5884	337.5457 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1694.0112
Space heating per m2										(98c) / (4) =		26.1704 (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	510.8520	402.1601	412.5955	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8518	0.9143	0.8868	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	435.1457	367.6764	365.8814	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	539.1859	514.0475	480.3941	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	74.9090	108.9001	85.1975	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	18.7272	27.2250	21.2994	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												67.2516 (107)
Energy for space heating												26.1704 (99)
Energy for space cooling												1.0390 (108)
Total												27.2094 (109)
Fabric Energy Efficiency (DFEE)												27.2 (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	64.7300 (1b)	x 2.8000 (2b)	= 181.2440 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	64.7300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	181.2440 (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) = 20.0000 / (5) = 0.1103 (8)
Pressure test Yes
Pressure Test Method Blower Door
Measured/design AP50 5.0000 (17)
Infiltration rate 0.3603 (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) = 0.2793 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
	0.3561	0.3491	0.3421	0.3072	0.3002	0.2653	0.2653	0.2583	0.2793	0.3002	0.3142	0.3281 (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	0.5634	0.5609	0.5585	0.5472	0.5451	0.5352	0.5352	0.5334	0.5390	0.5451	0.5494	0.5538 (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			9.7100	1.1450	11.1183		(27)
External Wall 1	28.2200	9.7100	18.5100	0.1800	3.3318		(29a)
Corridor wall	22.8900	2.4200	20.4700	0.1800	3.6846		(29a)
Total net area of external elements Aum(A, m2)			51.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 20.5547		(33)
Main dwelling							
Party Wall 1			41.6900	0.0000	0.0000		(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 176.3375 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.9900	0.0500	0.2995
E3 Sill	2.5000	0.0500	0.1250
E4 Jamb	15.6000	0.0500	0.7800
E7 Party floor between dwellings (in blocks of flats)	10.8900	0.0700	0.7623
E7 Party floor between dwellings (in blocks of flats)	16.3500	0.0700	1.1445
E9 Balcony between dwellings, wall insulation continuous	6.7200	0.0200	0.1344
E16 Corner (normal)	2.8000	0.0900	0.2520
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	29.7800	0.0000	0.0000
E16 Corner (normal)	2.8000	0.0900	0.2520
E24 Eaves (insulation at ceiling level - inverted)	2.5500	0.2400	0.6120

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 4.7817 (36)

Point Thermal bridges

Total fabric heat loss (33) + (36) + (36a) = 25.3364 (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	33.6968	33.5496	33.4053	32.7274	32.6006	32.0102	32.0102	31.9009	32.2376	32.6006	32.8572	33.1254 (38)
Average = Sum(39)m / 12 =	59.0332	58.8860	58.7417	58.0638	57.9370	57.3466	57.3466	57.2373	57.5740	57.9370	58.1936	58.4618 (39)
												58.0632

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9120	0.9097	0.9075	0.8970	0.8951	0.8859	0.8859	0.8842	0.8894	0.8951	0.8990	0.9032 (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 2.1117 (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 25.7646 25.3819 24.8431 23.8496 23.1056 22.2807 21.8352 22.3702 22.9528 23.8355 24.8495 25.6775 (42b)
Hot water usage for other uses 36.2563 34.9379 33.6195 32.3011 30.9827 29.6642 29.6642 30.9827 32.3011 33.6195 34.9379 36.2563 (42c)
Average daily hot water use (litres/day) 56.8481 (43)

Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	62.0209	60.3198	58.4626	56.1506	54.0883	51.9450	51.4994	53.3529	55.2539	57.4550	59.7874	61.9338 (44)
Energy content (annual)	98.2259	85.8946	89.8548	76.8674	72.8132	63.8724	62.2841	66.0620	68.1336	77.9659	85.1781	96.9733 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU loss):	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)
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	83.4920	73.0104	76.3766	65.3373	61.8913	54.2916	52.9415	56.1527	57.9135	66.2710	72.4014	82.4273 (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	83.4920	73.0104	76.3766	65.3373	61.8913	54.2916	52.9415	56.1527	57.9135	66.2710	72.4014	82.4273 (64)
12Total per year (kWh/year)												802.5065 (64)
Electric shower(s)	47.7509	42.5464	46.4591	44.3353	45.1673	43.0852	44.5214	45.1673	44.3353	46.4591	45.5855	47.7509 (64a)

Full SAP Calculation Printout



Heat gains from water heating, kWh/month
 32.8107 28.8892 30.7089 27.4182 26.7646 24.3442 24.3657 25.3300 25.5622 28.1825 29.4967 32.5446 (65)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 543.1635 (64a)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	105.5869	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	98.4777	109.0289	98.4777	101.7603	98.4777	101.7603	98.4777	98.4777	101.7603	98.4777	101.7603	98.4777	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	184.6996	186.6162	181.7864	171.5044	158.5252	146.3265	138.1771	136.2605	141.0903	151.3723	164.3515	176.5501	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	33.5587	(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)	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	-84.4695	(71)
Water heating gains (Table 5)	44.1004	42.9899	41.2754	38.0808	35.9740	33.8114	32.7496	34.0457	35.5031	37.8797	40.9676	43.7427	(72)
Total internal gains	381.9538	393.3111	376.2156	366.0215	347.6529	336.5743	324.0805	323.4600	333.0297	342.4058	361.7556	373.4466	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d	Gains W	

Northeast					9.7100	11.2829	0.6300	0.7000			0.7700	33.4822 (75)	

Solar gains	33.4822	68.1539	122.7916	201.6591	271.0695	288.9887	270.3430	215.5206	149.6235	83.2895	42.1292	27.3432	(83)
Total gains	415.4360	461.4650	499.0073	567.6807	618.7224	625.5630	594.4235	538.9806	482.6533	425.6953	403.8848	400.7898	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	53.7095	53.8438	53.9761	54.6062	54.7258	55.2892	55.2892	55.3948	55.0708	54.7258	54.4845	54.2345	
alpha	4.5806	4.5896	4.5984	4.6404	4.6484	4.6859	4.6859	4.6930	4.6714	4.6484	4.6323	4.6156	
util living area	0.9889	0.9808	0.9627	0.8979	0.7618	0.5658	0.4200	0.4797	0.7354	0.9321	0.9795	0.9905	(86)
MIT	19.6841	19.8656	20.1493	20.5571	20.8449	20.9698	20.9939	20.9891	20.9026	20.5271	20.0512	19.6580	(87)
Th 2	20.1573	20.1592	20.1611	20.1700	20.1717	20.1795	20.1795	20.1809	20.1765	20.1717	20.1683	20.1648	(88)
util rest of house	0.9864	0.9766	0.9542	0.8758	0.7167	0.5004	0.3438	0.3982	0.6720	0.9123	0.9743	0.9884	(89)
MIT 2	18.9529	19.1338	19.4136	19.8089	20.0628	20.1636	20.1773	20.1768	20.1177	19.7898	19.3258	18.9328	(90)
Living area fraction	19.3267	19.5079	19.7897	20.1914	20.4626	20.5757	20.5948	20.5920	20.5189	20.1667	19.6966	19.3035	(91)
MIT	19.3267	19.5079	19.7897	20.1914	20.4626	20.5757	20.5948	20.5920	20.5189	20.1667	19.6966	19.3035	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3267	19.5079	19.7897	20.1914	20.4626	20.5757	20.5948	20.5920	20.5189	20.1667	19.6966	19.3035	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9833	0.9726	0.9498	0.8764	0.7333	0.5325	0.3827	0.4396	0.6996	0.9122	0.9706	0.9856	(94)
Useful gains	408.4957	448.8031	473.9677	497.5082	453.6843	333.1409	227.4649	236.9252	337.6669	388.3241	392.0064	395.0083	(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	887.0763	860.1998	780.6584	655.6203	507.6789	342.6878	229.0871	239.9394	369.5645	554.2686	733.0428	882.9781	(97)
Space heating kWh	356.0640	276.4586	228.1779	113.8407	40.1719	0.0000	0.0000	0.0000	0.0000	123.4627	245.5462	363.0495	(98a)
Space heating requirement - total per year (kWh/year)												1746.7716	
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	356.0640	276.4586	228.1779	113.8407	40.1719	0.0000	0.0000	0.0000	0.0000	123.4627	245.5462	363.0495	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1746.7716	
Space heating per m ²												26.9855	(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	539.0584	424.3651	435.0036	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9090	0.9500	0.9251	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	490.0251	403.1482	402.4040	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	690.6215	656.2967	593.4456	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	144.4294	188.3424	142.1350	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	36.1074	47.0856	35.5337	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												118.7267	(107)
Energy for space heating												26.9855	(99)
Energy for space cooling												1.8342	(108)
Total												28.8197	(109)

