

Summary for Input Data



Plot Reference	A 215	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	83 B	DER	4.83	TER	13.22
Environmental	96 A	% DER < TER			63.46
CO ₂ Emissions (t/year)	0.32	DFEE	31.45	TFEE	32.69
Compliance Check	See BREL	% DFEE < TFEE			3.78
% DPER < TPER	27.64	DPER	51.24	TPER	70.82

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	2
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	170.97 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:	27.53 m	72.81 m ²	2.80 m

8.0 Living Area	35.90 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	35.03	22.95	0.00	None	12.08	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	42.04	39.62	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	22.81	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	152.88

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	72.81

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 72.81

12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South West	2.42	
NE windows	Window	External Wall 1	North East	10.72	
SE windows	Window	External Wall 1	South East	1.36	

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	7.58	0.05	0.05	No
E3 Sill	Independently assessed	4.08	0.04	0.04	No
E4 Jamb	Independently assessed	18.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	16.30	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	30.03	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	8.72	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E16 Corner (normal)	Independently assessed	8.40	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	5.60	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	16.30	0.00	0.00	No

Y-value 0.06 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

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

20.0 Fans, Open Fireplaces, Flues

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

Summary for Input Data



21.0 Fixed Cooling System		No	
22.0 Pressure Testing		Yes	
Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa	
Test Method	Blower Door		
22.0 Lighting		No	
No Fixed Lighting	No		
	Name	Efficacy	Power
	Lighting 1	75.00	15.00
			Capacity
			1125.00
			Count
			7
24.0 Main Heating 1		None	
25.0 Main Heating 2		None	
26.0 Heat Networks		Space and Water Combined	
Space Community Heating			
Distribution Loss	Calculated		
Distribution Loss Value	1.50		
SAP Code	2306		
	Heat Source	Fuel Type	Heating Use
			Efficiency
			Percentage Of Heat
			Heat
			Heat Power Ratio
			Electrical
			Fuel Factor
			Efficiency type
Heat source 1	Heat pump	Electricity	Space and Water
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		Community Heating	
Water 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 mains		
Bath Count	1		
28.1 Showers			
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]
Shower 1	Combi boiler or unvented hot water system	8.00	
Shower 2	Combi boiler or unvented hot water system	8.00	
			Connected
			Connected To
			No
			No
28.3 Waste Water Heat Recovery System			
29.0 Hot Water Cylinder		Internal Store	
Insulation Type	Measured Loss		
Cylinder Volume	180.00		
Loss	1.20		
			L
			kWh/day
32.0 Photovoltaic Unit		Multiple Dwellings – Not Connected	
Export Capable Meter?	No		
Connected To Dwelling	Yes		
Diverter	No		
Battery Capacity [kWh]	0.00		

Summary for Input Data



PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.35	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	96 A	% DER < TER				63.46	
CO ₂ Emissions (t/year)	0.32	DFEE	31.45	TFEE	32.69		
Compliance Check	See BREL	% DFEE < TFEE				3.78	
% DPER < TPER	27.64	DPER	51.24	TPER	70.82		
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	72.8100 (1b)	2.8000 (2b)	203.8680 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.8100		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	203.8680 (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) =												80.1000 (23c)
Effective ac	0.2477	0.2448	0.2419	0.2274	0.2245	0.2099	0.2099	0.2070	0.2157	0.2245	0.2303	0.2361 (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			12.0900	1.1450	13.8435		(27)
External Wall 1	35.0300	12.0900	22.9400	0.1500	3.4410	70.0000	1605.7999 (29a)
Corridor wall	42.0400	2.4200	39.6200	0.1800	7.1316	70.0000	2773.4001 (29a)
Total net area of external elements Aum(A, m ²)			77.0700				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 26.8361		(33)
Main dwelling							
Party Wall 1			22.8100	0.0000	0.0000	70.0000	1596.7000 (32)
Party Floor 1			72.8100			40.0000	2912.4000 (32d)
Party Ceiling 1			72.8100			30.0000	2184.3000 (32b)
Internal Wall 1			152.8800			9.0000	1375.9200 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12448.5200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							170.9727 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	7.5800	0.0500	0.3790
E3 Sill	4.0800	0.0400	0.1632
E4 Jamb	18.6000	0.0400	0.7440
E7 Party floor between dwellings (in blocks of flats)	16.3000	0.0500	0.8150
E7 Party floor between dwellings (in blocks of flats)	30.0300	0.0360	1.0811
E9 Balcony between dwellings, wall insulation continuous	8.7200	0.0500	0.4360
E16 Corner (normal)	2.8000	0.0500	0.1400
E16 Corner (normal)	8.4000	0.0360	0.3024
E17 Corner (inverted - internal area greater than external area)	5.6000	0.0000	0.0000
E18 Party wall between dwellings	2.8000	0.0360	0.1008
E25 Staggered party wall between dwellings	2.8000	0.0500	0.1400
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	16.3000	0.0000	0.0000
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.3015 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	31.1376 (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	16.6656	16.4701	16.2746	15.2970	15.1015	14.1238	14.1238	13.9283	14.5149	15.1015	15.4925	15.8835	(38)
Heat transfer coeff	47.8032	47.6077	47.4122	46.4346	46.2390	45.2614	45.2614	45.0659	45.6525	46.2390	46.6301	47.0211	(39)
Average = Sum(39)m / 12 =												46.3857	
HLP	0.6565	0.6539	0.6512	0.6377	0.6351	0.6216	0.6216	0.6190	0.6270	0.6351	0.6404	0.6458	(40)
HLP (average)												0.6371	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.3124 (42)
Hot water usage for mixer showers	62.9905	62.0438	60.6644	58.0252	56.0774	53.9054	52.6708	54.0397	55.5404	57.8725	60.5685	62.7491 (42a)
Hot water usage for baths	27.2112	26.8071	26.2380	25.1887	24.4030	23.5317	23.0611	23.6263	24.2416	25.1738	26.2447	27.1192 (42b)
Hot water usage for other uses	38.3110	36.9178	35.5247	34.1316	32.7384	31.3453	31.3453	32.7384	34.1316	35.5247	36.9178	38.3110 (42c)
Average daily hot water use (litres/day)												118.1323 (43)
Daily hot water use	128.5126	125.7687	122.4271	117.3454	113.2188	108.7824	107.0772	110.4044	113.9135	118.5710	123.7310	128.1793 (44)
Energy conte	203.5325	179.0930	188.1659	160.6400	152.4143	133.7607	129.5006	136.7038	140.4668	160.8998	176.2775	200.6977 (45)
Energy content (annual)										Total = Sum(45)m =		1962.1526
Distribution loss (46)m = 0.15 x (45)m	30.5299	26.8639	28.2249	24.0960	22.8621	20.0641	19.4251	20.5056	21.0700	24.1350	26.4416	30.1047 (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	258.8093	229.0204	243.4427	214.1337	207.6911	187.2544	184.7774	191.9806	193.9605	216.1766	229.7712	255.9745 (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	258.8093	229.0204	243.4427	214.1337	207.6911	187.2544	184.7774	191.9806	193.9605	216.1766	229.7712	255.9745 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2612.9924 (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)
												0.0000 (64a)
Heat gains from water heating, kWh/month	111.8960	99.4904	106.7866	96.2077	94.8992	87.2704	87.2804	89.6754	89.5001	97.7206	101.4072	110.9534 (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	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.4600	117.8664	106.4600	110.0086	106.4600	110.0086	106.4600	106.4600	110.0086	106.4600	110.0086	106.4600 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	203.7646	205.8790	200.5507	189.2073	174.8884	161.4306	152.4400	150.3255	155.6538	166.9972	181.3161	194.7739 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618 (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)	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947 (71)
Water heating gains (Table 5)	150.3979	148.0511	143.5304	133.6219	127.5527	121.2089	117.3124	120.5315	124.3058	131.3449	140.8434	149.1310 (72)
Total internal gains	518.3079	529.4821	508.2265	490.5233	466.5866	450.3336	433.8978	435.0025	447.6537	462.4876	489.8537	508.0504 (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							

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Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-155.0159 (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	5230.9241 (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	2160.4883	0.1573	74.0888 (367)
Electrical energy for heat distribution (space & water)	10.9284	0.0000	7.2400 (372)
Overall CO2 factor for heat network			0.0637 (386)
Total CO2 associated with community systems			319.3099 (373)
Space and water heating			319.3099 (376)
Pumps, fans and electric keep-hot	189.6482	0.1387	26.3065 (378)
Energy for lighting	183.9591	0.1443	26.5510 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-155.0159	0.1305	-20.2346
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-20.2346 (380)
Total CO2, kg/year			351.9328 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.8300 (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	2160.4883	1.5823	745.3360 (467)
Electrical energy for heat distribution (space & water)	10.9284	0.0000	76.9019 (472)
Overall CO2 factor for heat network			0.6767 (486)
Total CO2 associated with community systems			3391.6375 (473)
Space and water heating			3391.6375 (476)
Pumps, fans and electric keep-hot	189.6482	1.5128	286.8998 (478)
Energy for lighting	183.9591	1.5338	282.1626 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-155.0159	1.4822	-229.7627
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-229.7627 (480)
Total Primary energy kWh/year			3730.9371 (483)
Dwelling Primary energy Rate (DPER)			51.2400 (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	72.8100 (1b)	x 2.8000 (2b)	= 203.8680 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.8100		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 203.8680 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 30.0000 / (5) = 0.1472 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3972 (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) = 0.3078 (21)

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

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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	0.3924	0.3847	0.3770	0.3386	0.3309	0.2924	0.2924	0.2847	0.3078	0.3309	0.3463	0.3617 (22b)
Effective ac	0.5770	0.5740	0.5711	0.5573	0.5547	0.5428	0.5428	0.5405	0.5474	0.5547	0.5600	0.5654 (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			12.0900	1.1450	13.8435		(27)
External Wall 1	35.0300	12.0900	22.9400	0.1800	4.1292		(29a)
Corridor wall	42.0400	2.4200	39.6200	0.1800	7.1316		(29a)
Total net area of external elements Aum(A, m2)			77.0700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.5243		(33)
Main dwelling							
Party Wall 1			22.8100	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							170.9727 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	7.5800	0.0500	0.3790
E3 Sill	4.0800	0.0500	0.2040
E4 Jamb	18.6000	0.0500	0.9300
E7 Party floor between dwellings (in blocks of flats)	16.3000	0.0700	1.1410
E7 Party floor between dwellings (in blocks of flats)	30.0300	0.0700	2.1021
E9 Balcony between dwellings, wall insulation continuous	8.7200	0.0200	0.1744
E16 Corner (normal)	2.8000	0.0900	0.2520
E16 Corner (normal)	8.4000	0.0900	0.7560
E17 Corner (inverted - internal area greater than external area)	5.6000	-0.0900	-0.5040
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	16.3000	0.0000	0.0000
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			5.7705 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	33.2948 (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	38.8188	38.6176	38.4204	37.4942	37.3210	36.5143	36.5143	36.3649	36.8250	37.3210	37.6715	38.0380 (38)
Heat transfer coeff	72.1136	71.9124	71.7152	70.7891	70.6158	69.8091	69.8091	69.6597	70.1198	70.6158	70.9663	71.3328 (39)
Average = Sum(39)m / 12 =												70.7882
HLP	0.9904	0.9877	0.9850	0.9722	0.9699	0.9588	0.9588	0.9567	0.9631	0.9699	0.9747	0.9797 (40)
HLP (average)												0.9722
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3124 (42)
Hot water usage for mixer showers												
62.9905	62.0438	60.6644	58.0252	56.0774	53.9054	52.6708	54.0397	55.5404	57.8725	60.5685	62.7491	(42a)
Hot water usage for baths												
27.2112	26.8071	26.2380	25.1887	24.4030	23.5317	23.0611	23.6263	24.2416	25.1738	26.2447	27.1192	(42b)
Hot water usage for other uses												
38.3110	36.9178	35.5247	34.1316	32.7384	31.3453	31.3453	32.7384	34.1316	35.5247	36.9178	38.3110	(42c)
Average daily hot water use (litres/day)												118.1323 (43)
Daily hot water use												
128.5126	125.7687	122.4271	117.3454	113.2188	108.7824	107.0772	110.4044	113.9135	118.5710	123.7310	128.1793	(44)
Energy conte	203.5325	179.0930	188.1659	160.6400	152.4143	133.7607	129.5006	136.7038	140.4668	160.8998	176.2775	200.6977 (45)
Energy content (annual)												
Distribution loss (46)m = 0.15 x (45)m												
30.5299	26.8639	28.2249	24.0960	22.8621	20.0641	19.4251	20.5056	21.0700	24.1350	26.4416	30.1047	(46)
Water storage loss (or HIU loss):												
Store volume												180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.5520 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8381 (55)
Total storage loss												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)
If cylinder contains dedicated solar storage												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month												
252.7752	223.5702	237.4085	208.2942	201.6570	181.4149	178.7433	185.9464	188.1210	210.1424	223.9317	249.9404	(62)
WWHRS	-28.7966	-25.4680	-26.6686	-22.0826	-20.5802	-17.6106	-16.5072	-17.5537	-18.2206	-21.4801	-24.3344	-28.2633 (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	(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	(63c)
FGHRS	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												
223.9786	198.1023	210.7400	186.2115	181.0768	163.8042	162.2361	168.3927	169.9003	188.6623	199.5973	221.6771	(64)
12Total per year (kWh/year)												2274.3793 (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)
Heat gains from water heating, kWh/month												
107.0687	95.1302	101.9593	91.5361	90.0719	82.5988	82.4531	84.8481	84.8286	92.8933	96.7356	106.1261	(65)

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

Metabolic gains (Table 5), Watts												
(66)m	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
106.4600	117.8664	106.4600	110.0086	106.4600	110.0086	106.4600	106.4600	110.0086	106.4600	110.0086	106.4600	(67)

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Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	203.7646	205.8790	200.5507	189.2073	174.8884	161.4306	152.4400	150.3255	155.6538	166.9972	181.3161	194.7739 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618 (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)	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947 (71)
Water heating gains (Table 5)	143.9095	141.5628	137.0421	127.1335	121.0644	114.7205	110.8241	114.0432	117.8174	124.8566	134.3551	142.6427 (72)
Total internal gains	514.8196	525.9937	504.7382	487.0350	463.0982	443.8453	427.4095	428.5142	441.1654	458.9993	486.3653	504.5621 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g	FF		Access factor Table 6d	Gains W		
						Specific data or Table 6b	Specific data or Table 6c					
Northeast				10.7200	11.2829	0.6300	0.7000		0.7700	36.9648 (75)		
Southeast				1.3700	36.7938	0.6300	0.7000		0.7700	15.4052 (77)		
Solar gains	52.3701	101.4838	171.4677	267.1215	349.0937	368.5166	346.1558	281.6455	204.0630	120.9546	64.9632	43.3710 (83)
Total gains	567.1897	627.4775	676.2060	754.1565	812.1920	812.3618	773.5653	710.1597	645.2284	579.9538	551.3286	547.9331 (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	47.9511	48.0852	48.2174	48.8483	48.9681	49.5340	49.5340	49.6402	49.3145	48.9681	48.7262	48.4759
alpha	4.1967	4.2057	4.2145	4.2566	4.2645	4.3023	4.3023	4.3093	4.2876	4.2645	4.2484	4.2317
util living area	0.9771	0.9637	0.9362	0.8575	0.7157	0.5302	0.3925	0.4431	0.6800	0.8920	0.9609	0.9799 (86)
MIT	19.6726	19.8698	20.1682	20.5695	20.8451	20.9670	20.9928	20.9881	20.9074	20.5544	20.0638	19.6457 (87)
Th 2	20.0913	20.0936	20.0959	20.1065	20.1085	20.1178	20.1178	20.1195	20.1142	20.1085	20.1045	20.1003 (88)
util rest of house	0.9723	0.9562	0.9230	0.8297	0.6671	0.4639	0.3159	0.3618	0.6127	0.8643	0.9516	0.9757 (89)
MIT 2	18.5526	18.8021	19.1753	19.6654	19.9716	20.0958	20.1146	20.1139	20.0447	19.6602	19.0570	18.5250 (90)
Living area fraction	19.1048	19.3285	19.6649	20.1112	20.4023	20.5254	20.5476	20.5449	FLA = Living area / (4) =	20.1011	19.5534	0.4931 (91)
MIT	19.1048	19.3285	19.6649	20.1112	20.4023	20.5254	20.5476	20.5449	20.4700	20.1011	19.5534	19.0775 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1048	19.3285	19.6649	20.1112	20.4023	20.5254	20.5476	20.5449	20.4700	20.1011	19.5534	19.0775 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9657	0.9486	0.9157	0.8298	0.6838	0.4951	0.3535	0.4015	0.6409	0.8640	0.9447	0.9696 (94)
Ext temp.	547.7633	595.2129	619.1963	625.8187	555.3666	402.1964	273.4792	285.1598	413.5269	501.0890	520.8300	531.2494 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	1067.6277	1037.5911	944.1215	793.6276	614.5207	413.6450	275.5796	288.7340	446.6650	670.9290	883.7725	1061.2562 (97)
Space heating requirement - total per year (kWh/year)	386.7790	297.2782	241.7443	120.8224	44.0107	0.0000	0.0000	0.0000	0.0000	126.3609	261.3186	394.3250 (98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	386.7790	297.2782	241.7443	120.8224	44.0107	0.0000	0.0000	0.0000	0.0000	126.3609	261.3186	394.3250 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1872.6392
Space heating per m2										(98c) / (4) =		25.7195 (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)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
386.7790	297.2782	241.7443	120.8224	44.0107	0.0000	0.0000	0.0000	0.0000	0.0000	126.3609	261.3186	394.3250 (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)	419.0456	322.0782	261.9115	130.9019	47.6822	0.0000	0.0000	0.0000	0.0000	136.9024	283.1188	427.2210 (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	223.9786	198.1023	210.7400	186.2115	181.0768	163.8042	162.2361	168.3927	169.9003	188.6623	199.5973	221.6771 (64)
Water heating requirement	85.2731	84.9678	84.3684	83.1149	81.4134	79.8000	79.8000	79.8000	79.8000	83.1816	84.6650	79.8000 (216)
Efficiency of water heater (217)m	262.6602	233.1497	249.7855	224.0411	222.4165	205.2685	203.3034	211.0184	212.9077	226.8076	235.7496	259.7681 (219)
Fuel for water heating, kWh/month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Space cooling fuel requirement (221)m	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)
Pumps and Fa	22.1203	17.7457	15.9780	11.7062	9.0422	7.3876	8.2486	10.7218	13.9266	18.2725	20.6387	22.7351 (232)
Lighting												
Electricity generated by PVs (Appendix M) (negative quantity)												

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(233a)m	-13.7779	-20.8465	-32.1304	-38.8208	-44.2704	-42.2121	-41.7003	-38.1598	-32.3635	-24.9863	-15.6441	-11.7520	(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	-3.9901	-8.6542	-17.7007	-27.3396	-36.9048	-37.3612	-36.9210	-30.9099	-22.2025	-12.6161	-5.4024	-3.1362	(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												2028.8615	(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												2746.8765	(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)												178.5233	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-599.8028	(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												4440.4585	(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	2028.8615	0.2100	426.0609	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2746.8765	0.2100	576.8441	(264)
Space and water heating			1002.9050	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	178.5233	0.1443	25.7664	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-356.6641	0.1331	-47.4847	
PV Unit electricity exported	-243.1387	0.1251	-30.4134	
Total			-77.8981	(269)
Total CO2, kg/year			962.7026	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.2200	(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	2028.8615	1.1300	2292.6135	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2746.8765	1.1300	3103.9704	(278)
Space and water heating			5396.5839	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	178.5233	1.5338	273.8250	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-356.6641	1.4920	-532.1297	
PV Unit electricity exported	-243.1387	0.4591	-111.6286	
Total			-643.7583	(283)
Total Primary energy kWh/year			5156.7515	(286)
Target Primary Energy Rate (TPER)			70.8200	(287)

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Plot Reference	A 215				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	83 B	DER	4.83	TER	13.22		
Environmental	96 A	% DER < TER				63.46	
CO ₂ Emissions (t/year)	0.32	DFEE	31.45	TFEE	32.69		
Compliance Check	See BREL	% DFEE < TFEE				3.78	
% DPER < TPER	27.64	DPER	51.24	TPER	70.82		
Assessor Details	Mr. Robert Tanner				Assessor ID	W344-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	72.8100 (1b)	2.8000 (2b)	203.8680 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.8100		203.8680 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	203.8680 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1472 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2972 (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) = 0.2303 (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	0.2936	0.2879	0.2821	0.2533	0.2476	0.2188	0.2188	0.2130	0.2303	0.2476	0.2591	0.2706 (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	0.5431	0.5414	0.5398	0.5321	0.5306	0.5239	0.5239	0.5227	0.5265	0.5306	0.5336	0.5366 (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			12.0900	1.1450	13.8435		(27)
External Wall 1	35.0300	12.0900	22.9400	0.1500	3.4410	70.0000	1605.7999 (29a)
Corridor wall	42.0400	2.4200	39.6200	0.1800	7.1316	70.0000	2773.4001 (29a)
Total net area of external elements Aum(A, m ²)			77.0700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.8361		(33)
Main dwelling							
Party Wall 1			22.8100	0.0000	0.0000	70.0000	1596.7000 (32)
Party Floor 1			72.8100			40.0000	2912.4000 (32a)
Party Ceiling 1			72.8100			30.0000	2184.3000 (32b)
Internal Wall 1			152.8800			9.0000	1375.9200 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12448.5200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							170.9727 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					7.5800	0.0500	0.3790
E3 Sill					4.0800	0.0400	0.1632

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E4 Jamb									18.6000	0.0400	0.7440	
E7 Party floor between dwellings (in blocks of flats)									16.3000	0.0500	0.8150	
E7 Party floor between dwellings (in blocks of flats)									30.0300	0.0360	1.0811	
E9 Balcony between dwellings, wall insulation continuous									8.7200	0.0500	0.4360	
E16 Corner (normal)									2.8000	0.0500	0.1400	
E16 Corner (normal)									8.4000	0.0360	0.3024	
E17 Corner (inverted - internal area greater than external area)									5.6000	0.0000	0.0000	
E18 Party wall between dwellings									2.8000	0.0360	0.1008	
E25 Staggered party wall between dwellings									2.8000	0.0500	0.1400	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)									16.3000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)												4.3015 (36)
Point Thermal bridges												0.0000
Total fabric heat loss										(33) + (36) + (36a) =		31.1376 (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	36.5384	36.4257	36.3154	35.7969	35.6999	35.2483	35.2483	35.1647	35.4222	35.6999	35.8961	36.1013 (38)
Average = Sum(39)m / 12 =	67.6760	67.5633	67.4530	66.9345	66.8375	66.3859	66.3859	66.3023	66.5598	66.8375	67.0337	67.2389 (39)
												66.9340
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9295	0.9279	0.9264	0.9193	0.9180	0.9118	0.9118	0.9106	0.9142	0.9180	0.9207	0.9235 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31
												0.9193
4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.3124 (42)
Hot water usage for mixer showers												0.0000 (42a)
Hot water usage for baths												27.2112 (42b)
Hot water usage for other uses												38.3110 (42c)
Average daily hot water use (litres/day)												60.0572 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	65.5221	63.7249	61.7627	59.3202	57.1414	54.8771	54.4065	56.3647	58.3731	60.6985	63.1625	65.4301 (44)
Energy content (annual)	103.7710	90.7434	94.9269	81.2064	76.9233	67.4777	65.7999	69.7913	71.9799	82.3673	89.9866	102.4478 (45)
Distribution loss (46)m = 0.15 x (45)m												997.4216
Water storage loss (or HIU loss):												0.0000 (46)
Total storage loss												0.0000 (56)
If cylinder contains dedicated solar storage												0.0000 (57)
Primary loss												0.0000 (59)
Combi loss												0.0000 (61)
Total heat required for water heating calculated for each month												
WWHRS	88.2054	77.1319	80.6879	69.0255	65.3848	57.3561	55.9299	59.3226	61.1829	70.0122	76.4886	87.0806 (62)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	88.2054	77.1319	80.6879	69.0255	65.3848	57.3561	55.9299	59.3226	61.1829	70.0122	76.4886	87.0806 (64)
12Total per year (kWh/year)												847.8084 (64)
Electric shower(s)	50.4449	44.9468	49.0802	46.8366	47.7155	45.5159	47.0331	47.7155	46.8366	49.0802	48.1573	50.4449 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												573.8073 (64a)
Heat gains from water heating, kWh/month	34.6626	30.5197	32.4420	28.9655	28.2751	25.7180	25.7408	26.7595	27.0049	29.7731	31.1615	34.3814 (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	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	106.4600	117.8664	106.4600	110.0086	106.4600	110.0086	106.4600	106.4600	110.0086	106.4600	110.0086	106.4600 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	203.7646	205.8790	200.5507	189.2073	174.8884	161.4306	152.4400	150.3255	155.6538	166.9972	181.3161	194.7739 (68)
Pumps, fans	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618 (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)	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947 (71)
Total internal gains	46.5895	45.4162	43.6049	40.2299	38.0041	35.7195	34.5978	35.9671	37.5068	40.0176	43.2798	46.2115 (72)
	414.4995	426.8471	408.3010	397.1314	377.0380	364.8442	351.1832	350.4381	360.8548	371.1603	392.2901	405.1309 (73)
6. Solar gains												
[Jan]												
			Area	Solar flux	g	Specific data	FF	Access	Gains			
			m2	Table 6a	W/m2	or Table 6b	or Table 6c	factor	W			
								Table 6d				
Northeast			10.7200	11.2829	0.3500	0.7000	0.7700	20.5360 (75)				
Southeast			1.3700	36.7938	0.3500	0.7000	0.7700	8.5584 (77)				
Solar gains	29.0945	56.3799	95.2599	148.4008	193.9410	204.7314	192.3088	156.4697	113.3683	67.1970	36.0907	24.0950 (83)
Total gains	443.5940	483.2270	503.5609	545.5322	570.9790	569.5756	543.4920	506.9078	474.2231	438.3572	428.3808	429.2259 (84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	51.0953	51.1805	51.2642	51.6613	51.7363	52.0882	52.0882	52.1539	51.9521	51.7363	51.5848	51.4274
alpha	4.4064	4.4120	4.4176	4.4441	4.4491	4.4725	4.4725	4.4769	4.4635	4.4491	4.4390	4.4285
util living area	0.9901	0.9843	0.9734	0.9362	0.8494	0.6820	0.5214	0.5754	0.8036	0.9483	0.9826	0.9914 (86)
MIT	19.5670	19.7301	19.9874	20.3779	20.7159	20.9241	20.9819	20.9722	20.8373	20.4188	19.9382	19.5376 (87)
Th 2	20.1425	20.1438	20.1451	20.1511	20.1523	20.1575	20.1575	20.1585	20.1555	20.1523	20.1500	20.1476 (88)
util rest of house	0.9879	0.9808	0.9672	0.9205	0.8121	0.6117	0.4286	0.4810	0.7451	0.9325	0.9781	0.9895 (89)
MIT 2	18.8278	18.9904	19.2457	19.6294	19.9417	20.1147	20.1507	20.1473	20.0520	19.6745	19.2026	18.8026 (90)
Living area fraction									fLA = Living area /	(4) =		0.4931 (91)
MIT	19.1923	19.3551	19.6114	19.9985	20.3234	20.5138	20.5605	20.5540	20.4392	20.0415	19.5653	19.1650 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1923	19.3551	19.6114	19.9985	20.3234	20.5138	20.5605	20.5540	20.4392	20.0415	19.5653	19.1650 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9848	0.9768	0.9625	0.9172	0.8203	0.6426	0.4739	0.5266	0.7663	0.9300	0.9742	0.9867 (94)
Useful gains	436.8368	472.0290	484.6527	500.3794	468.3718	366.0321	257.5488	266.9266	363.3955	407.6820	417.3339	423.5131 (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	1007.8504	976.6355	884.4036	742.8695	576.3664	392.5932	262.9246	275.4217	421.9338	631.0463	835.5949	1006.2301 (97)
Space heating kWh	424.8341	339.0955	297.4146	174.5929	80.3480	0.0000	0.0000	0.0000	0.0000	166.1831	301.1479	433.5415 (98a)
Space heating requirement - total per year (kWh/year)												2217.1577
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	424.8341	339.0955	297.4146	174.5929	80.3480	0.0000	0.0000	0.0000	0.0000	166.1831	301.1479	433.5415 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2217.1577
Space heating per m2										(98c) / (4) =		30.4513 (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	624.0273	491.2556	503.8972	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8164	0.8857	0.8537	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	509.4574	435.1282	430.1990	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	622.7058	594.3955	553.7370	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	81.5389	118.4949	91.9123	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	20.3847	29.6237	22.9781	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												72.9865 (107)
Energy for space heating												30.4513 (99)
Energy for space cooling												1.0024 (108)
Total												31.4537 (109)
Fabric Energy Efficiency (DFEE)												31.5 (109)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	72.8100 (1b)	x 2.8000 (2b)	= 203.8680 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.8100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	203.8680 (5)

2. Ventilation rate

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

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Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											30.0000 / (5) =	0.1472 (8)
Pressure test													Yes
Pressure Test Method													Blower Door
Measured/design AP50													5.0000 (17)
Infiltration rate													0.3972 (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) =	0.3078 (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)
	0.3924	0.3847	0.3770	0.3386	0.3309	0.2924	0.2924	0.2847	0.3078	0.3309	0.3463	0.3617	(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	0.5770	0.5740	0.5711	0.5573	0.5547	0.5428	0.5428	0.5405	0.5474	0.5547	0.5600	0.5654	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			12.0900	1.1450	13.8435			(27)
External Wall 1	35.0300	12.0900	22.9400	0.1800	4.1292			(29a)
Corridor wall	42.0400	2.4200	39.6200	0.1800	7.1316			(29a)
Total net area of external elements Aum(A, m2)			77.0700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.5243			(33)
Main dwelling								
Party Wall 1			22.8100	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							170.9727	(35)
List of Thermal Bridges								
K1 Element				Length	Psi-value	Total		
E1 Steel lintel with perforated steel base plate				7.5800	0.0500	0.3790		
E3 Sill				4.0800	0.0500	0.2040		
E4 Jamb				18.6000	0.0500	0.9300		
E7 Party floor between dwellings (in blocks of flats)				16.3000	0.0700	1.1410		
E7 Party floor between dwellings (in blocks of flats)				30.0300	0.0700	2.1021		
E9 Balcony between dwellings, wall insulation continuous				8.7200	0.0200	0.1744		
E16 Corner (normal)				2.8000	0.0900	0.2520		
E16 Corner (normal)				8.4000	0.0900	0.7560		
E17 Corner (inverted - internal area greater than external area)				5.6000	-0.0900	-0.5040		
E18 Party wall between dwellings				2.8000	0.0600	0.1680		
E25 Staggered party wall between dwellings				2.8000	0.0600	0.1680		
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				16.3000	0.0000	0.0000		
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.7705	(36)
Point Thermal bridges							0.0000	
Total fabric heat loss						(33) + (36) + (36a) =	33.2948	(37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3124	(42)
Hot water usage for mixer showers												0.0000	(42a)
Hot water usage for baths	27.2112	26.8071	26.2380	25.1887	24.4030	23.5317	23.0611	23.6263	24.2416	25.1738	26.2447	27.1192	(42b)
Hot water usage for other uses	38.3110	36.9178	35.5247	34.1316	32.7384	31.3453	31.3453	32.7384	34.1316	35.5247	36.9178	38.3110	(42c)
Average daily hot water use (litres/day)												60.0572	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	65.5221	63.7249	61.7627	59.3202	57.1414	54.8771	54.4065	56.3647	58.3731	60.6985	63.1625	65.4301	(44)
Energy content (annual)	103.7710	90.7434	94.9269	81.2064	76.9233	67.4777	65.7999	69.7913	71.9799	82.3673	89.9866	102.4478	(45)
Distribution loss (46)m = 0.15 x (45)m												997.4216	
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	88.2054	77.1319	80.6879	69.0255	65.3848	57.3561	55.9299	59.3226	61.1829	70.0122	76.4886	87.0806	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	88.2054	77.1319	80.6879	69.0255	65.3848	57.3561	55.9299	59.3226	61.1829	70.0122	76.4886	87.0806	(64)
12Total per year (kWh/year)												847.8084	(64)
Electric shower(s)	50.4449	44.9468	49.0802	46.8366	47.7155	45.5159	47.0331	47.7155	46.8366	49.0802	48.1573	50.4449	(64a)
Total Energy used by instantaneous electric shower (s) (kWh/year) = Sum(64a)m =												573.8073	(64a)
Heat gains from water heating, kWh/month	34.6626	30.5197	32.4420	28.9655	28.2751	25.7180	25.7408	26.7595	27.0049	29.7731	31.1615	34.3814	(65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.4600	117.8664	106.4600	110.0086	106.4600	110.0086	106.4600	106.4600	110.0086	106.4600	110.0086	106.4600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	203.7646	205.8790	200.5507	189.2073	174.8884	161.4306	152.4400	150.3255	155.6538	166.9972	181.3161	194.7739	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	(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)	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	(71)
Water heating gains (Table 5)	46.5895	45.4162	43.6049	40.2299	38.0041	35.7195	34.5978	35.9671	37.5068	40.0176	43.2798	46.2115	(72)
Total internal gains	414.4995	426.8471	408.3010	397.1314	377.0380	364.8442	351.1832	350.4381	360.8548	371.1603	392.2901	405.1309	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	Specific data or Table 6c	FF	Access factor Table 6d	Gains W	
					10.7200	11.2829	0.6300		0.7000	0.7700	36.9648 (75)	
					1.3700	36.7938	0.6300		0.7000	0.7700	15.4052 (77)	
Solar gains	52.3701	101.4838	171.4677	267.1215	349.0937	368.5166	346.1558	281.6455	204.0630	120.9546	64.9632	43.3710 (83)
Total gains	466.8696	528.3309	579.7688	664.2529	726.1317	733.3607	697.3391	632.0836	564.9178	492.1148	457.2533	448.5019 (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	47.9511	48.0852	48.2174	48.8483	48.9681	49.5340	49.5340	49.6402	49.3145	48.9681	48.7262	48.4759		
alpha	4.1967	4.2057	4.2145	4.2566	4.2645	4.3023	4.3023	4.3093	4.2876	4.2645	4.2484	4.2317		
util living area	0.9884	0.9796	0.9604	0.8968	0.7673	0.5788	0.4331	0.4932	0.7433	0.9319	0.9792	0.9902	(86)	
MIT	19.4832	19.6918	20.0123	20.4649	20.7956	20.9541	20.9895	20.9821	20.8686	20.4339	19.8956	19.4556	(87)	
Th 2	20.0913	20.0936	20.0959	20.1065	20.1085	20.1178	20.1178	20.1195	20.1142	20.1085	20.1045	20.1003	(88)	
util rest of house	0.9859	0.9751	0.9514	0.8741	0.7210	0.5091	0.3496	0.4047	0.6778	0.9118	0.9738	0.9880	(89)	
MIT 2	18.7059	18.9138	19.2301	19.6702	19.9644	20.0934	20.1141	20.1127	20.0345	19.6514	19.1254	18.6853	(90)	
Living area fraction									fLA = Living area / (4) =			0.4931	(91)	
MIT	19.0892	19.2974	19.6158	20.0621	20.3742	20.5178	20.5457	20.5414	20.4458	20.0372	19.5052	19.0651	(92)	
Temperature adjustment												0.0000		
adjusted MIT	19.0892	19.2974	19.6158	20.0621	20.3742	20.5178	20.5457	20.5414	20.4458	20.0372	19.5052	19.0651	(93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9822	0.9702	0.9457	0.8728	0.7356	0.5414	0.3906	0.4478	0.7038	0.9100	0.9693	0.9847	(94)
Useful gains	458.5625	512.5798	548.3070	579.7650	534.1336	397.0777	272.3618	283.0650	397.6035	447.8123	443.2105	441.6401	(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	1066.5003	1035.3499	940.6004	790.1525	612.5378	413.1150	275.4479	288.4880	444.9637	666.4157	880.3486	1060.3702	(97)
Space heating kWh	452.3058	351.3015	291.8663	151.4790	58.3327	0.0000	0.0000	0.0000	0.0000	162.6409	314.7394	460.3352	(98a)
Space heating requirement - total per year (kWh/year)												2243.0009	
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	452.3058	351.3015	291.8663	151.4790	58.3327	0.0000	0.0000	0.0000	0.0000	162.6409	314.7394	460.3352	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2243.0009	
Space heating per m2												30.8062	(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	656.2057	516.5874	529.4140	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8874	0.9339	0.9054	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	582.3244	482.4413	479.3381	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	814.1430	774.2168	700.0464	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	166.9094	217.0809	164.2069	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	41.7274	54.2702	41.0517	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												137.0493	(107)
Energy for space heating												30.8062	(99)
Energy for space cooling												1.8823	(108)
Total												32.6885	(109)
Fabric Energy Efficiency (TFEE)												32.7	(109)

