

Summary for Input Data

Plot Reference	B 1207	Issued on Date	19/03/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	85 B	DER	12.65	TER	14.63
Environmental	90 B	% DER < TER			13.53
CO ₂ Emissions (t/year)	0.76	DFEE	33.83	TFEE	34.38
Compliance Check	See BREL	% DFEE < TFEE			1.59
% DPER < TPER	8.53	DPER	73.06	TPER	79.88

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

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

Orientation	Southeast	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	12	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	0.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	23.13 m	65.59 m ²	2.80 m

8.0 Living Area	32.61	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	47.52	32.37	0.00	None	15.15	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	17.25	14.83	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	35.59	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	137.48

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	65.59

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 65.59

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 East	2.42	
NE windows	Window	External Wall 1	North East	6.46	
NW windows	Window	External Wall 1	North West	8.69	

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	9.62	0.05	0.05	No
E3 Sill	Independently assessed	6.13	0.04	0.04	No
E4 Jamb	Independently assessed	24.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	27.14	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	12.32	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	6.80	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.04	0.04	No
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	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	25.42	0.00	0.00	No

19.0 Mechanical Ventilation

Mechanical Ventilation

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

20.0 Fans, Open Fireplaces, Flues

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

Summary for Input Data

21.0 Fixed Cooling System	No				
22.0 Pressure Testing	Yes				
Designed AP ₅₀	3.00	m ² /(h.m ²) @ 50 Pa			
Test Method	Blower Door				
22.0 Lighting	No				
No Fixed Lighting	No				
	Name Lighting 1	Efficacy 75.00	Power 15.00	Capacity 1125.00	Count 6
24.0 Main Heating 1	Manufacturer				
Percentage of Heat	100.00 %				
Fuel Type	Mains gas				
SAP Code	102				
In Winter	88.80				
In Summer	79.80				
Model Name	x				
Manufacturer	x				
Controls SAP Code	2110				
Delayed Start Stat	Yes				
Burner Control	Modulating				
Flue Type	Balanced				
Fan Assisted Flue	Yes				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators				
Flow Temperature	Enter value				
Flow Temperature Value	55.00				
Boiler Interlock	Yes				
25.0 Main Heating 2	None				
26.0 Heat Networks	None				
27.0 Secondary Heating	None				
28.0 Water Heating	Main Heating 1				
Water Heating	Main Heating 1				
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	Hot Water Cylinder				
Cylinder Stat	Yes				

Summary for Input Data

Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	180.00	L
Loss	1.20	kWh/day
Pipes insulation	Fully insulated primary pipework	

31.0 Thermal Store

None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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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	65.5900 (1b)	2.8000 (2b)	183.6520 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	183.6520 (5)

2. Ventilation rate

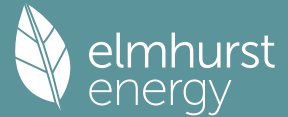
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1275 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												81.0000 (23c)
Effective ac	0.2576	0.2544	0.2512	0.2352	0.2321	0.2161	0.2161	0.2129	0.2225	0.2321	0.2384	0.2448 (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			15.1500	1.1450	17.3473		(27)
External Wall 1	47.5200	15.1500	32.3700	0.1500	4.8555	70.0000	2265.9000 (29a)
Corridor wall	17.2500	2.4200	14.8300	0.1800	2.6694	70.0000	1038.1000 (29a)
Total net area of external elements Aum(A, m ²)			64.7700				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 27.2922		(33)
Main dwelling							
Party Wall 1			35.5900	0.0000	0.0000	70.0000	2491.3000 (32)
Party Floor 1			65.5900			40.0000	2623.6000 (32d)
Party Ceiling 1			65.5900			30.0000	1967.7000 (32b)
Internal Wall 1			137.4800			9.0000	1237.3200 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	11623.9200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							177.2209 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.6200	0.0500	0.4810
E3 Sill	6.1300	0.0400	0.2452
E4 Jamb	24.6000	0.0400	0.9840
E7 Party floor between dwellings (in blocks of flats)	27.1400	0.0500	1.3570
E7 Party floor between dwellings (in blocks of flats)	12.3200	0.0360	0.4435
E9 Balcony between dwellings, wall insulation continuous	6.8000	0.0500	0.3400
E16 Corner (normal)	2.8000	0.0500	0.1400
E16 Corner (normal)	2.8000	0.0360	0.1008
E17 Corner (inverted - internal area greater than external area)	5.6000	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)	25.4200	0.0000	0.0000
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.5731 (36)
Point Thermal bridges			0.0000 (36a) =
Total fabric heat loss		(33) + (36) + (36a) =	31.8653 (37)

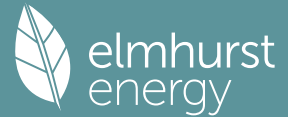
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	15.6096	15.4164	15.2233	14.2574	14.0642	13.0983	13.0983	12.9051	13.4846	14.0642	14.4505	14.8369 (38)
Average = Sum(39)m / 12 =	47.4750	47.2818	47.0886	46.1227	45.9295	44.9636	44.9636	44.7705	45.3500	45.9295	46.3159	46.7022 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.7238	0.7209	0.7179	0.7032	0.7003	0.6855	0.6855	0.6826	0.6914	0.7003	0.7061	0.7120 (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												2.1345 (42)
Hot water usage for mixer showers	58.4921	57.5966	56.2768	54.2466	52.4276	49.8828	47.8701	50.2231	51.4066	53.9271	56.5520	58.4393 (42a)
Hot water usage for baths	25.3507	24.9680	24.4236	23.6083	22.8736	21.8621	21.0947	22.0331	22.5255	23.5278	24.5698	25.3306 (42b)
Hot water usage for other uses	36.4894	35.1625	33.8356	32.5088	31.1819	29.8550	29.8550	31.1819	32.5088	33.8356	35.1625	36.4894 (42c)
Average daily hot water use (litres/day)												110.6035 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	120.3322	117.7271	114.5361	110.3637	106.4830	101.5999	98.8198	103.4380	106.4409	111.2905	116.2842	120.2593 (44)
Energy content (annual)	177.1498	155.7768	163.6697	144.1626	137.2142	117.4969	109.1987	121.7485	123.4661	143.4090	157.1620	176.6097 (45)
Distribution loss (46)m = 0.15 x (45)m	26.5725	23.3665	24.5505	21.6244	20.5821	17.6245	16.3798	18.2623	18.5199	21.5114	23.5743	26.4914 (46)
Water storage loss (or HIU loss):												180.0000 (47)
Store volume												1.2000 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.6480 (55)
Enter (49) or (54) in (55)												
Total storage loss	20.0880	18.1440	20.0880	19.4400	20.0880	19.4400	20.0880	20.0880	19.4400	20.0880	19.4400	20.0880 (56)
If cylinder contains dedicated solar storage	20.0880	18.1440	20.0880	19.4400	20.0880	19.4400	20.0880	20.0880	19.4400	20.0880	19.4400	20.0880 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	220.5002	194.9320	207.0201	186.1146	180.5646	159.4489	152.5491	165.0989	165.4181	186.7594	199.1140	219.9601 (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	220.5002	194.9320	207.0201	186.1146	180.5646	159.4489	152.5491	165.0989	165.4181	186.7594	199.1140	219.9601 (64)
12Total per year (kWh/year)												2237.4799 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month	93.5826	83.1199	89.1005	81.4957	80.3040	72.6293	70.9889	75.1617	74.6141	82.3638	85.8180	93.4030 (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	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	94.2161	104.3107	94.2161	97.3567	94.2161	97.3567	94.2161	94.2161	97.3567	94.2161	97.3567	94.2161 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	186.7940	188.7324	183.8478	173.4492	160.3228	147.9858	139.7440	137.8057	142.6902	153.0888	166.2152	178.5522 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800 (71)
Water heating gains (Table 5)	125.7831	123.6904	119.7587	113.1884	107.9355	100.8740	95.4152	101.0238	103.6307	110.7041	119.1916	125.5417 (72)
Total internal gains	464.8108	474.7510	455.8402	442.0118	420.4920	401.2341	384.3928	388.0631	398.6951	416.0266	440.7811	456.3276 (73)

6. Solar gains												
[Jan]	Area	Solar flux	g	FF	Access	Gains						
	m2	Table 6a	W/m2	Specific data	factor	W						
				or Table 6b	or Table 6c							
Northeast	6.4600	11.2829	0.3500	0.7000	0.7700	12.3753 (75)						

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Northwest	8.6900		11.2829		0.3500		0.7000		0.7700		16.6472 (81)	
Solar gains	29.0225	59.0761	106.4363	174.7989	234.9641	250.4966	234.3344	186.8141	129.6943	72.1956	36.5178	23.7012 (83)
Total gains	493.8332	533.8271	562.2765	616.8107	655.4561	651.7307	618.7273	574.8772	528.3893	488.2222	477.2988	480.0288 (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	68.0120	68.2899	68.5700	70.0060	70.3004	71.8106	71.8106	72.1205	71.1988	70.3004	69.7140	69.1373
alpha	5.5341	5.5527	5.5713	5.6671	5.6867	5.7874	5.7874	5.8080	5.7466	5.6867	5.6476	5.6092
util living area	0.9712	0.9538	0.9170	0.8044	0.6306	0.4394	0.3195	0.3576	0.5800	0.8410	0.9447	0.9743 (86)
MIT	20.2605	20.4045	20.6047	20.8530	20.9672	20.9966	20.9996	20.9992	20.9846	20.8407	20.5425	20.2495 (87)
Th 2	20.3198	20.3224	20.3250	20.3380	20.3406	20.3536	20.3536	20.3562	20.3484	20.3406	20.3354	20.3302 (88)
util rest of house	0.9658	0.9455	0.9025	0.7764	0.5912	0.3958	0.2727	0.3079	0.5292	0.8109	0.9335	0.9695 (89)
MIT 2	19.4607	19.6419	19.8895	20.1899	20.3121	20.3514	20.3534	20.3558	20.3371	20.1837	19.8258	19.4552 (90)
Living area fraction	19.8584	20.0210	20.2451	20.5196	20.6378	20.6722	20.6747	20.6757	20.6590	fLA = Living area / (4) =	20.1821	0.4972 (91)
MIT	19.8584	20.0210	20.2451	20.5196	20.6378	20.6722	20.6747	20.6757	20.6590	20.5103	20.1821	19.8501 (92)
Temperature adjustment	19.7084	19.8710	20.0951	20.3696	20.4878	20.5222	20.5247	20.5257	20.5090	20.3603	20.0321	-0.1500
adjusted MIT	19.7084	19.8710	20.0951	20.3696	20.4878	20.5222	20.5247	20.5257	20.5090	20.3603	20.0321	19.7001 (93)

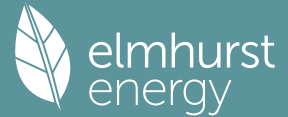
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9600	0.9391	0.8971	0.7778	0.6002	0.4072	0.2851	0.3210	0.5419	0.8119	0.9277	0.9640 (94)
Useful gains	474.0784	501.3178	504.3926	479.7832	393.3764	265.3937	176.3790	184.5379	286.3571	396.3806	442.7737	462.7392 (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	731.5117	707.8573	640.1743	529.0078	403.6188	266.2820	176.4677	184.7095	290.6480	448.2871	598.9623	723.8895 (97)
Space heating kWh	191.5304	138.7945	101.0216	35.4417	7.6203	0.0000	0.0000	0.0000	0.0000	38.6185	112.4558	194.2958 (98a)
Space heating requirement - total per year (kWh/year)												819.7786
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	191.5304	138.7945	101.0216	35.4417	7.6203	0.0000	0.0000	0.0000	0.0000	38.6185	112.4558	194.2958 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												819.7786
Space heating per m2										(98c) / (4) =		12.4985 (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 %)												88.8000 (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	191.5304	138.7945	101.0216	35.4417	7.6203	0.0000	0.0000	0.0000	0.0000	38.6185	112.4558	194.2958 (98)
Space heating efficiency (main heating system 1)	88.8000	88.8000	88.8000	88.8000	88.8000	0.0000	0.0000	0.0000	0.0000	88.8000	88.8000	88.8000 (210)
Space heating fuel (main heating system)	215.6873	156.3002	113.7630	39.9118	8.5815	0.0000	0.0000	0.0000	0.0000	43.4893	126.6394	218.8016 (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	220.5002	194.9320	207.0201	186.1146	180.5646	159.4489	152.5491	165.0989	165.4181	186.7594	199.1140	219.9601 (64)
Efficiency of water heater (217)m	83.7455	83.3117	82.5436	81.1151	80.1289	79.8000	79.8000	79.8000	79.8000	81.2103	82.8300	79.8000 (216)
Fuel for water heating, kWh/month	263.2980	233.9791	250.8010	229.4450	225.3427	199.8106	191.1643	206.8908	207.2908	229.9700	240.3888	83.7827 (217)
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	22.2897	20.1327	22.2897	21.5707	22.2897	21.5707	22.2897	22.2897	21.5707	22.2897	21.5707	22.2897 (231)
Lighting	20.5785	16.5088	14.8644	10.8903	8.4120	6.8726	7.6737	9.9745	12.9559	16.9989	19.2002	21.1504 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)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 (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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (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												923.1742 (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												2740.9176 (219)
Space cooling fuel												0.0000 (221)

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Electricity for pumps and fans:		
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)		
mechanical ventilation fans (SFP = 0.7875)		176.4436 (230a)
central heating pump		41.0000 (230c)
main heating flue fan		45.0000 (230e)
Total electricity for the above, kWh/year		262.4436 (231)
Electricity for lighting (calculated in Appendix L)		166.0801 (232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation		0.0000 (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		4092.6155 (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	923.1742	0.2100	193.8666 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2740.9176	0.2100	575.5927 (264)
Space and water heating			769.4593 (265)
Pumps, fans and electric keep-hot	262.4436	0.1387	36.4042 (267)
Energy for lighting	166.0801	0.1443	23.9705 (268)
Total CO2, kg/year			829.8339 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			12.6500 (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	923.1742	1.1300	1043.1868 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2740.9176	1.1300	3097.2369 (278)
Space and water heating			4140.4237 (279)
Pumps, fans and electric keep-hot	262.4436	1.5128	397.0247 (281)
Energy for lighting	166.0801	1.5338	254.7391 (282)
Total Primary energy kWh/year			4792.1876 (286)
Dwelling Primary energy Rate (DPER)			73.0600 (287)

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	65.5900 (1b)	x 2.8000 (2b)	= 183.6520 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5900		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 183.6520 (5)
Dwelling volume			

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1089 (8)
Pressure Test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3589 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3051 (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	0.3890	0.3813	0.3737	0.3356	0.3279	0.2898	0.2898	0.2822	0.3051	0.3279	0.3432	0.3585 (22b)
Effective ac	0.5756	0.5727	0.5698	0.5563	0.5538	0.5420	0.5420	0.5398	0.5465	0.5538	0.5589	0.5642 (25)

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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			13.9900	1.1450	16.0191			(27)
External Wall 1	47.5200	13.9900	33.5300	0.1800	6.0354			(29a)
Corridor wall	17.2500	2.4200	14.8300	0.1800	2.6694			(29a)
Total net area of external elements Aum(A, m2)			64.7700					(31)
Fabric heat loss, W/K = Sum (A x U)					27.1439			(33)
Main dwelling								
Party Wall 1			35.5900	0.0000	0.0000			(32)

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

177.2209 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	9.6200	0.0500	0.4810	
E3 Sill	6.1300	0.0500	0.3065	
E4 Jamb	24.6000	0.0500	1.2300	
E7 Party floor between dwellings (in blocks of flats)	27.1400	0.0700	1.8998	
E7 Party floor between dwellings (in blocks of flats)	12.3200	0.0700	0.8624	
E9 Balcony between dwellings, wall insulation continuous	6.8000	0.0200	0.1360	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E17 Corner (inverted - internal area greater than external area)	5.6000	-0.0900	-0.5040	
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)	25.4200	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				5.5877 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	32.7316 (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	34.8870	34.7090	34.5345	33.7149	33.5616	32.8477	32.7155	33.1227	33.5616	33.8718	34.1961	34.1961	(38)
Average = Sum(39)m / 12 =	67.6186	67.4406	67.2661	66.4465	66.2932	65.5793	65.5793	65.4471	65.8543	66.2932	66.6034	66.9277	(39)
												66.4458	
HLP	1.0309	1.0282	1.0256	1.0131	1.0107	0.9998	0.9998	0.9978	1.0040	1.0107	1.0155	1.0204	(40)
HLP (average)												1.0130	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.1345 (42)
Hot water usage for mixer showers	60.0082	59.1064	57.7923	55.2780	53.4225	51.3532	50.1771	51.4812	52.9108	55.1326	57.7009	59.7783	(42a)
Hot water usage for baths	25.9287	25.5436	25.0014	24.0015	23.2528	22.4227	21.9743	22.5127	23.0990	23.9873	25.0078	25.8410	(42b)
Hot water usage for other uses	36.4894	35.1625	33.8356	32.5088	31.1819	29.8550	29.8550	31.1819	32.5088	33.8356	35.1625	36.4894	(42c)
Average daily hot water use (litres/day)												112.5377	(43)
Daily hot water use	122.4263	119.8125	116.6293	111.7882	107.8572	103.6309	102.0063	105.1758	108.5186	112.9556	117.8712	122.1087	(44)
Energy conte	193.8933	170.6114	179.2548	153.0325	145.1965	127.4263	123.3678	130.2297	133.8143	153.2796	167.9291	191.1928	(45)
Energy content (annual)										Total = Sum(45)m =		1869.2281	
Distribution loss (46)m = 0.15 x (45)m	29.0840	25.5917	26.8882	22.9549	21.7795	19.1139	18.5052	19.5344	20.0721	22.9919	25.1894	28.6789	(46)
Water storage loss (or HIU loss):												180.0000	(47)
Store volume												1.5520	(48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400	(49)
Temperature factor from Table 2b												0.8381	(55)
Enter (49) or (54) in (55)													
Total storage loss	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)
If cylinder contains dedicated solar storage	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	243.1360	215.0887	228.4975	200.6867	194.4391	175.0805	172.6105	179.4723	181.4685	202.5223	215.5833	240.4354	(62)
WWHRS	-27.4332	-24.2622	-25.4060	-21.0371	-19.6059	-16.7769	-15.7256	-16.7226	-17.3580	-20.4632	-23.1823	-26.9252	(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	215.7028	190.8265	203.0916	179.6495	174.8333	158.3036	156.8848	162.7497	164.1105	182.0591	192.4010	213.5102	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2194.1227	(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	103.8637	92.3101	98.9964	89.0067	87.6720	80.4926	80.4139	82.6955	82.6166	90.3596	93.9598	102.9657	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	94.3803	104.4925	94.3803	97.5263	94.3803	97.5263	94.3803	94.3803	97.5263	94.3803	97.5263	94.3803	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	186.7940	188.7324	183.8478	173.4492	160.3228	147.9858	139.7440	137.8057	142.6902	153.0888	166.2152	178.5522	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	(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)													

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	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800 (71)
Water heating gains (Table 5)	139.6017	137.3662	133.0596	123.6204	117.8387	111.7953	108.0832	111.1499	114.7453	121.4511	130.4997	138.3948 (72)
Total internal gains	478.7936	488.6086	469.3053	452.6134	430.5593	412.3249	397.2250	398.3533	409.9793	426.9377	452.2588	469.3448 (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	5.9700		11.2829		0.6300		0.7000		0.7700		20.5858 (75)	
Northwest	8.0200		11.2829		0.6300		0.7000		0.7700		27.6547 (81)	
Solar gains	48.2405	98.1949	176.9161	290.5470	390.5522	416.3700	389.5056	310.5183	215.5750	120.0020	60.6990	39.3956 (83)
Total gains	527.0341	586.8035	646.2213	743.1604	821.1115	828.6949	786.7306	708.8717	625.5543	546.9397	512.9578	508.7404 (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	47.7511	47.8772	48.0014	48.5935	48.7059	49.2360	49.2360	49.3355	49.0305	48.7059	48.4790	48.2441
alpha	4.1834	4.1918	4.2001	4.2396	4.2471	4.2824	4.2824	4.2890	4.2687	4.2471	4.2319	4.2163
util living area	0.9776	0.9637	0.9321	0.8396	0.6796	0.4925	0.3636	0.4184	0.6640	0.8901	0.9616	0.9804 (86)
MIT	19.6587	19.8627	20.1842	20.6049	20.8716	20.9745	20.9945	20.9902	20.9142	20.5552	20.0516	19.6298 (87)
Th 2	20.0576	20.0599	20.0621	20.0725	20.0744	20.0835	20.0835	20.0851	20.0800	20.0744	20.0705	20.0664 (88)
util rest of house	0.9727	0.9560	0.9178	0.8087	0.6285	0.4270	0.2893	0.3380	0.5941	0.8609	0.9521	0.9761 (89)
MIT 2	18.5079	18.7656	19.1662	19.6745	19.9642	20.0672	20.0812	20.0807	20.0174	19.6315	19.0140	18.4776 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.0801	19.3111	19.6723	20.1371	20.4153	20.5183	20.5353	20.5329	20.4633	20.0907	19.5299	19.0505 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.0801	19.3111	19.6723	20.1371	20.4153	20.5183	20.5353	20.5329	20.4633	20.0907	19.5299	19.0505 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9663	0.9484	0.9108	0.8110	0.6480	0.4585	0.3262	0.3778	0.6244	0.8615	0.9454	0.9701 (94)
Useful gains	509.2579	556.5519	588.5972	602.7348	532.0559	379.9557	256.6015	267.7857	390.5891	471.1733	484.9293	493.5299 (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	999.4081	971.8901	886.0509	746.6644	577.7669	388.1179	258.0713	270.4864	419.0506	629.1704	827.8715	993.9083 (97)
Space heating kWh	364.6717	279.1073	221.3055	103.6293	34.0090	0.0000	0.0000	0.0000	0.0000	117.5498	246.9184	372.2816 (98a)
Space heating requirement - total per year (kWh/year)												1739.4726
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	364.6717	279.1073	221.3055	103.6293	34.0090	0.0000	0.0000	0.0000	0.0000	117.5498	246.9184	372.2816 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1739.4726
Space heating per m2												(98c) / (4) = 26.5204 (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	364.6717	279.1073	221.3055	103.6293	34.0090	0.0000	0.0000	0.0000	0.0000	117.5498	246.9184	372.2816 (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)	395.0940	302.3914	239.7676	112.2744	36.8461	0.0000	0.0000	0.0000	0.0000	127.3562	267.5172	403.3386 (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	215.7028	190.8265	203.0916	179.6495	174.8333	158.3036	156.8848	162.7497	164.1105	182.0591	192.4010	213.5102 (64)
Efficiency of water heater (217)m	85.2275	84.9113	84.2528	82.8726	81.1392	79.8000	79.8000	79.8000	79.8000	83.1046	84.6203	85.2938 (217)
Fuel for water heating, kWh/month	253.0905	224.7364	241.0502	216.7779	215.4734	198.3754	196.5975	203.9470	205.6523	219.0722	227.3698	250.3232 (219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	19.6104	15.7322	14.1651	10.3779	8.0162	6.5493	7.3127	9.5053	12.3464	16.1992	18.2969	20.1554 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-5.4693	-8.5735	-13.6843	-17.1408	-20.1034	-19.3749	-19.1421	-17.2448	-14.2326	-10.5209	-6.3113	-4.6337 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)												

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(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	-0.9331	-2.0567	-4.2715	-6.6991	-9.1469	-9.2981	-9.1879	-7.6434	-5.4295	-3.0286	-1.2725	-0.7311	(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												1884.5857	(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												2652.4657	(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)												158.2669	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-216.1300	(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												4565.1882	(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	1884.5857	0.2100	395.7630 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2652.4657	0.2100	557.0178 (264)
Space and water heating			952.7808 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	158.2669	0.1443	22.8428 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-156.4317	0.1324	-20.7184
PV Unit electricity exported	-59.6983	0.1247	-7.4421
Total			-28.1605 (269)
Total CO2, kg/year			959.3923 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.6300 (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	1884.5857	1.1300	2129.5818 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2652.4657	1.1300	2997.2862 (278)
Space and water heating			5126.8680 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	158.2669	1.5338	242.7550 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-156.4317	1.4894	-232.9842
PV Unit electricity exported	-59.6983	0.4575	-27.3138
Total			-260.2980 (283)
Total Primary energy kWh/year			5239.4258 (286)
Target Primary Energy Rate (TPER)			79.8800 (287)

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Plot Reference	B 1207	Issued on Date	19/03/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	85 B	DER	12.65
Environmental	90 B	TER	14.63
CO ₂ Emissions (t/year)	0.76	% DER < TER	13.53
Compliance Check	See BREL	DFEE	33.83
% DPER < TPER	8.53	TFEE	34.38
		% DFEE < TFEE	1.59
		DPER	73.06
		TPER	79.88
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	65.5900	2.8000	183.6520
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5900		
Dwelling volume			

2. Ventilation rate

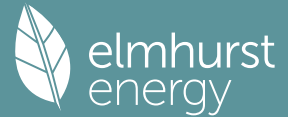
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	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) = 0.1089 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2589 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2201 (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	0.2806	0.2751	0.2696	0.2421	0.2366	0.2091	0.2091	0.2036	0.2201	0.2366	0.2476	0.2586 (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	0.5394	0.5378	0.5363	0.5293	0.5280	0.5219	0.5219	0.5207	0.5242	0.5280	0.5306	0.5334 (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			15.1500	1.1450	17.3473		(27)
External Wall 1	47.5200	15.1500	32.3700	0.1500	4.8555	70.0000	2265.9000 (29a)
Corridor wall	17.2500	2.4200	14.8300	0.1800	2.6694	70.0000	1038.1000 (29a)
Total net area of external elements Aum(A, m ²)			64.7700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.2922		(33)
Main dwelling							
Party Wall 1			35.5900	0.0000	0.0000	70.0000	2491.3000 (32)
Party Floor 1			65.5900			40.0000	2623.6000 (32a)
Party Ceiling 1			65.5900			30.0000	1967.7000 (32b)
Internal Wall 1			137.4800			9.0000	1237.3200 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	11623.9200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							177.2209 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					9.6200	0.0500	0.4810
E3 Sill					6.1300	0.0400	0.2452

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E4 Jamb	24.6000	0.0400	0.9840
E7 Party floor between dwellings (in blocks of flats)	27.1400	0.0500	1.3570
E7 Party floor between dwellings (in blocks of flats)	12.3200	0.0360	0.4435
E9 Balcony between dwellings, wall insulation continuous	6.8000	0.0500	0.3400
E16 Corner (normal)	2.8000	0.0500	0.1400
E16 Corner (normal)	2.8000	0.0360	0.1008
E17 Corner (inverted - internal area greater than external area)	5.6000	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)	25.4200	0.0000	0.0000
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.5731 (36)
Point Thermal Bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	31.8653 (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	32.6882	32.5956	32.5048	32.0783	31.9985	31.6270	31.6270	31.5582	31.7701	31.9985	32.1599	32.3287 (38)
Average = Sum(39)m / 12 =	64.5536	64.4609	64.3701	63.9436	63.8638	63.4924	63.4924	63.4236	63.6355	63.8638	64.0253	64.1940 (39)
												63.9433
HLP	0.9842	0.9828	0.9814	0.9749	0.9737	0.9680	0.9680	0.9670	0.9702	0.9737	0.9761	0.9787 (40)
HLP (average)												0.9749
Days in month	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1345 (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	25.3507	24.9680	24.4236	23.6083	22.8736	21.8621	21.0947	22.0331	22.5255	23.5278	24.5698	25.3306 (42b)
Hot water usage for other uses	36.4894	35.1625	33.8356	32.5088	31.1819	29.8550	29.8550	31.1819	32.5088	33.8356	35.1625	36.4894 (42c)
Average daily hot water use (litres/day)												56.6783 (43)
Daily hot water use	61.8401	60.1305	58.2592	56.1171	54.0554	51.7171	50.9497	53.2149	55.0343	57.3634	59.7323	61.8200 (44)
Energy content (annual)	91.0393	79.5649	83.2513	73.3029	69.6559	59.8091	56.3009	62.6350	63.8370	73.9185	80.7302	90.7872 (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 (57)
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 (59)
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 (61)
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 (62)
Total heat required for water heating calculated for each month	77.3834	67.6301	70.7636	62.3075	59.2075	50.8377	47.8558	53.2397	54.2615	62.8308	68.6206	77.1691 (63a)
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 (63b)
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 (63c)
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 (63d)
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 (64)
Output from w/h	77.3834	67.6301	70.7636	62.3075	59.2075	50.8377	47.8558	53.2397	54.2615	62.8308	68.6206	77.1691 (64)
12Total per year (kWh/year)												752.1073 (64)
Electric shower(s)	48.0565	42.8188	46.7565	44.6191	45.4564	43.3610	44.8063	45.4564	44.6191	46.7565	45.8773	48.0565 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												546.6404 (64a)
Heat gains from water heating, kWh/month	31.3600	27.6122	29.3800	26.7317	26.1660	23.5497	23.1655	24.6740	24.7202	27.3968	28.6245	31.3064 (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	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	94.2161	104.3107	94.2161	97.3567	94.2161	97.3567	94.2161	94.2161	97.3567	94.2161	97.3567	94.2161 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	186.7940	188.7324	183.8478	173.4492	160.3228	147.9858	139.7440	137.8057	142.6902	153.0888	166.2152	178.5522 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725 (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)	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800 (71)
Water heating gains (Table 5)	42.1505	41.0896	39.4893	37.1273	35.1693	32.7079	31.1365	33.1640	34.3335	36.8237	39.7562	42.0785 (72)
Total internal gains	378.1782	389.1502	372.5707	362.9507	344.7258	333.0679	320.1141	320.2033	329.3979	339.1461	358.3456	369.8644 (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				6.4600	11.2829	0.3500	0.7000	0.7700	12.3753 (75)			
Northwest				8.6900	11.2829	0.3500	0.7000	0.7700	16.6472 (81)			
Solar gains	29.0225	59.0761	106.4363	174.7989	234.9641	250.4966	234.3344	186.8141	129.6943	72.1956	36.5178	23.7012 (83)
Total gains	407.2007	448.2263	479.0070	537.7496	579.6899	583.5645	554.4485	507.0174	459.0922	411.3418	394.8634	393.5656 (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	50.0184	50.0903	50.1609	50.4955	50.5586	50.8544	50.8544	50.9096	50.7401	50.5586	50.4311	50.2985
alpha	4.3346	4.3394	4.3441	4.3664	4.3706	4.3903	4.3903	4.3940	4.3827	4.3706	4.3621	4.3532
util living area	0.9908	0.9850	0.9724	0.9274	0.8235	0.6460	0.4912	0.5527	0.7956	0.9492	0.9837	0.9921 (86)
MIT	19.5094	19.6819	19.9661	20.3910	20.7418	20.9349	20.9844	20.9745	20.8363	20.3936	19.8897	19.4777 (87)
Th 2	20.0965	20.0977	20.0989	20.1043	20.1053	20.1101	20.1101	20.1109	20.1082	20.1053	20.1033	20.1011 (88)
util rest of house	0.9887	0.9815	0.9656	0.9093	0.7812	0.5724	0.3975	0.4555	0.7331	0.9329	0.9793	0.9902 (89)
MIT 2	18.7329	18.9047	19.1861	19.6005	19.9194	20.0750	20.1046	20.1012	20.0068	19.6106	19.1162	18.7049 (90)
Living area fraction	fLA = Living area / (4) =											0.4972 (91)
MIT	19.1190	19.2911	19.5739	19.9935	20.3283	20.5025	20.5421	20.5354	20.4192	19.9999	19.5007	19.0891 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1190	19.2911	19.5739	19.9935	20.3283	20.5025	20.5421	20.5354	20.4192	19.9999	19.5007	19.0891 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9857	0.9775	0.9608	0.9067	0.7926	0.6060	0.4438	0.5031	0.7566	0.9306	0.9755	0.9875 (94)
Useful gains	401.3698	438.1548	460.2419	487.5829	459.4660	353.6343	246.0518	255.0815	347.3697	382.7780	385.2059	388.6584 (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	956.6185	927.6640	841.5682	709.3594	551.0368	374.7628	250.2903	262.2796	402.1260	600.3131	793.9604	955.7934 (97)
Space heating kWh	413.1051	328.9502	283.7067	159.6790	68.1286	0.0000	0.0000	0.0000	0.0000	161.8461	294.3033	421.9484 (98a)
Space heating requirement - total per year (kWh/year)	2131.6675											
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	413.1051	328.9502	283.7067	159.6790	68.1286	0.0000	0.0000	0.0000	0.0000	161.8461	294.3033	421.9484 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2131.6675											
Space heating per m2	(98c) / (4) = 32.4999 (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	596.8283	469.8436	482.0192	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8459	0.9055	0.8709	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	504.8699	425.4581	419.7986	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	647.2455	615.1459	561.4080	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	102.5105	141.1278	105.3574	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	25.6276	35.2819	26.3394	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												87.2489 (107)
Energy for space heating												32.4999 (99)
Energy for space cooling												1.3302 (108)
Total												33.8301 (109)
Fabric Energy Efficiency (DFEE)												33.8 (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	65.5900 (1b)	x 2.8000 (2b)	= 183.6520 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	183.6520 (5)

2. Ventilation rate

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

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Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											Air changes per hour	20.0000 / (5) =	0.1089 (8)
Pressure test												Yes		
Pressure Test Method												Blower Door		
Measured/design AP50												5.0000	(17)	
Infiltration rate												0.3589	(18)	
Number of sides sheltered												2	(19)	
Shelter factor	(20) = 1 - [0.075 x (19)] =											0.8500	(20)	
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =											0.3051	(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)	
	0.3890	0.3813	0.3737	0.3356	0.3279	0.2898	0.2898	0.2822	0.3051	0.3279	0.3432	0.3585	(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	0.5756	0.5727	0.5698	0.5563	0.5538	0.5420	0.5420	0.5398	0.5465	0.5538	0.5589	0.5642	(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			13.9900	1.1450	16.0191			(27)
External Wall 1	47.5200	13.9900	33.5300	0.1800	6.0354			(29a)
Corridor wall	17.2500	2.4200	14.8300	0.1800	2.6694			(29a)
Total net area of external elements Aum(A, m2)			64.7700					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.1439			(33)
Main dwelling								
Party Wall 1			35.5900	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								177.2209 (35)
List of Thermal Bridges								
K1 Element				Length	Psi-value	Total		
E1 Steel lintel with perforated steel base plate				9.6200	0.0500	0.4810		
E3 Sill				6.1300	0.0500	0.3065		
E4 Jamb				24.6000	0.0500	1.2300		
E7 Party floor between dwellings (in blocks of flats)				27.1400	0.0700	1.8998		
E7 Party floor between dwellings (in blocks of flats)				12.3200	0.0700	0.8624		
E9 Balcony between dwellings, wall insulation continuous				6.8000	0.0200	0.1360		
E16 Corner (normal)				2.8000	0.0900	0.2520		
E16 Corner (normal)				2.8000	0.0900	0.2520		
E17 Corner (inverted - internal area greater than external area)				5.6000	-0.0900	-0.5040		
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)				25.4200	0.0000	0.0000		
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.5877	(36)
Point Thermal bridges							(36a) =	0.0000
Total fabric heat loss							(33) + (36) + (36a) =	32.7316 (37)

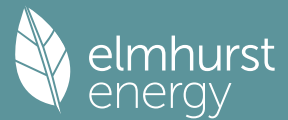
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	34.8870	34.7090	34.5345	33.7149	33.5616	32.8477	32.8477	32.7155	33.1227	33.5616	33.8718	34.1961	(38)
Average = Sum(39)m / 12 =	67.6186	67.4406	67.2661	66.4465	66.2932	65.5793	65.5793	65.4471	65.8543	66.2932	66.6034	66.9277	(39)
													66.4458
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0309	1.0282	1.0256	1.0131	1.0107	0.9998	0.9998	0.9978	1.0040	1.0107	1.0155	1.0204	(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												2.1345	(42)
Hot water usage for mixer showers												0.0000	(42a)
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	
Hot water usage for other uses	25.9287	25.5436	25.0014	24.0015	23.2528	22.4227	21.9743	22.5127	23.0990	23.9873	25.0078	25.8410	(42b)
Average daily hot water use (litres/day)	36.4894	35.1625	33.8356	32.5088	31.1819	29.8550	29.8550	31.1819	32.5088	33.8356	35.1625	36.4894	(42c)
													57.2122 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	62.4181	60.7062	58.8370	56.5103	54.4347	52.2777	51.8292	53.6946	55.6078	57.8230	60.1703	62.3305	(44)
Energy content (annual)	98.8551	86.4448	90.4303	77.3597	73.2796	64.2815	62.6830	66.4851	68.5700	78.4653	85.7236	97.5945	(45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m =	950.1724
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	84.0268	73.4781	76.8657	65.7558	62.2876	54.6393	53.2805	56.5124	58.2845	66.6955	72.8651	82.9553	(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	84.0268	73.4781	76.8657	65.7558	62.2876	54.6393	53.2805	56.5124	58.2845	66.6955	72.8651	82.9553	(64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m =	807.6465 (64)
Electric shower(s)	48.0565	42.8188	46.7565	44.6191	45.4564	43.3610	44.8063	45.4564	44.6191	46.7565	45.8773	48.0565	(64a)
												Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	546.6404 (64a)

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Heat gains from water heating, kWh/month
33.0208 29.0742 30.9056 27.5937 26.9360 24.5001 24.5217 25.4922 25.7259 28.3630 29.6856 32.7530 (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	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	106.7250	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	94.3803	104.4925	94.3803	97.5263	94.3803	97.5263	94.3803	94.3803	97.5263	94.3803	97.5263	94.3803	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	186.7940	188.7324	183.8478	173.4492	160.3228	147.9858	139.7440	137.8057	142.6902	153.0888	166.2152	178.5522	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	33.6725	(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)	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	-85.3800	(71)
Water heating gains (Table 5)	44.3828	43.2652	41.5397	38.3246	36.2043	34.0279	32.9593	34.2637	35.7304	38.1223	41.2300	44.0228	(72)
Total internal gains	380.5747	391.5076	374.7854	364.3176	345.9249	334.5575	322.1011	321.4672	330.9644	340.6089	359.9890	371.9728	(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			5.9700	11.2829		0.6300		0.7000		0.7700		20.5858 (75)
Northwest			8.0200	11.2829		0.6300		0.7000		0.7700		27.6547 (81)
Solar gains	48.2405	98.1949	176.9161	290.5470	390.5522	416.3700	389.5056	310.5183	215.5750	120.0020	60.6990	39.3956 (83)
Total gains	428.8152	489.7025	551.7014	654.8646	736.4771	750.9275	711.6067	631.9855	546.5394	460.6109	420.6881	411.3684 (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	47.7511	47.8772	48.0014	48.5935	48.7059	49.2360	49.2360	49.3355	49.0305	48.7059	48.4790	48.2441	
alpha	4.1834	4.1918	4.2001	4.2396	4.2471	4.2824	4.2824	4.2890	4.2687	4.2471	4.2319	4.2163	
util living area	0.9891	0.9802	0.9582	0.8820	0.7315	0.5375	0.4004	0.4658	0.7289	0.9320	0.9803	0.9908	(86)
MIT	19.4598	19.6758	20.0228	20.5033	20.8292	20.9646	20.9920	20.9853	20.8769	20.4288	19.8743	19.4302	(87)
Th 2	20.0576	20.0599	20.0621	20.0725	20.0744	20.0835	20.0835	20.0851	20.0800	20.0744	20.0705	20.0664	(88)
util rest of house	0.9866	0.9757	0.9484	0.8562	0.6815	0.4680	0.3193	0.3778	0.6601	0.9111	0.9750	0.9887	(89)
MIT 2	18.6543	18.8694	19.2112	19.6739	19.9575	20.0655	20.0808	20.0798	20.0073	19.6169	19.0756	18.6315	(90)
Living area fraction									fLA = Living area / (4) =			0.4972	(91)
MIT	19.0548	19.2703	19.6147	20.0862	20.3909	20.5125	20.5339	20.5300	20.4396	20.0206	19.4727	19.0286	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0548	19.2703	19.6147	20.0862	20.3909	20.5125	20.5339	20.5300	20.4396	20.0206	19.4727	19.0286	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9831	0.9709	0.9429	0.8566	0.6994	0.5012	0.3595	0.4212	0.6885	0.9097	0.9707	0.9856	(94)
Useful gains	421.5774	475.4357	520.1758	560.9767	515.1012	376.3309	255.8366	266.2019	376.3065	419.0091	408.3553	405.4316	(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	997.6965	969.1441	882.1762	743.2859	576.1477	387.7388	257.9796	270.2972	417.4925	624.5185	824.0644	992.4415	(97)
Space heating kWh	428.6327	331.7720	269.3283	131.2626	45.4186	0.0000	0.0000	0.0000	0.0000	152.8990	299.3105	436.7354	(98a)
Space heating requirement - total per year (kWh/year)												2095.3590	
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	428.6327	331.7720	269.3283	131.2626	45.4186	0.0000	0.0000	0.0000	0.0000	152.8990	299.3105	436.7354	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2095.3590	
Space heating per m ²												31.9463	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b													
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	616.4456	485.2870	497.3982	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9128	0.9499	0.9223	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	562.7210	460.9593	458.7639	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	842.4579	798.3531	707.1172	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	201.4106	251.0210	184.7749	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	50.3526	62.7553	46.1937	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												159.3016	(107)
Energy for space heating												31.9463	(99)
Energy for space cooling												2.4287	(108)
Total												34.3751	(109)

