

Summary for Input Data



Plot Reference	A 218	Issued on Date	19/03/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	86 B	DER	11.12	TER	12.44
Environmental	91 B	% DER < TER			10.61
CO ₂ Emissions (t/year)	0.76	DFEE	29.33	TFEE	29.99
Compliance Check	See BREL	% DFEE < TFEE			2.21
% DPER < TPER	2.94	DPER	64.58	TPER	66.54

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

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

Orientation	Northeast
Property Tenture	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, End-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	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	0.00 kJ/m ² K
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter 22.53 m	Internal Floor Area 74.77 m ²	Average Storey Height 2.80 m
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8.0 Living Area	33.46 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	48.55	34.09	0.00	None	14.46	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	14.52	12.10	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	34.03	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	169.40

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	74.77

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 74.77

12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	North East	2.42	
SW windows	Window	External Wall 1	South West	6.12	
NW windows	Window	External Wall 1	North West	8.34	

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	9.16	0.05	0.05	No
E4 Jamb	Independently assessed	21.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	25.96	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	10.37	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
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	24.31	0.00	0.00	No
E3 Sill	Independently assessed	5.67	0.04	0.04	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	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

21.0 Fixed Cooling System

No

Summary for Input Data

22.0 Pressure Testing

	Yes	
Designed AP ₅₀	3.00	m ³ /(h.m ²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No				
	Name Lighting 1	Efficacy 75.00	Power 15.00	Capacity 1125.00	Count 7

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

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 1	Combi boiler or unvented hot water system	8.00		No	
Shower 2	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes

Summary for Input Data

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

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Compliance Check	See BREL	% DFEE < TFEE				2.21	
% DPER < TPER	2.94	DPER	64.58	TPER	66.54		
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	74.7700 (1b)	2.8000 (2b)	209.3560 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.7700		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	209.3560 (5)

2. Ventilation rate

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

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.1500	(18)
Number of sides sheltered	2	(19)

Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (25)

3. Heat losses and heat loss parameter

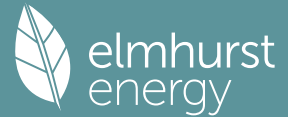
Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			2.4200	1.0000	2.4200		(26)
Window			14.4600	1.1450	16.5573		(27)
External Wall 1	48.5500	14.4600	34.0900	0.1500	5.1135	70.0000	2386.2999 (29a)
Corridor wall	14.5200	2.4200	12.1000	0.1800	2.1780	70.0000	847.0000 (29a)
Total net area of external elements Aum(A, m ²)			63.0700				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	26.2688	(33)
Main dwelling							
Party Wall 1			34.0300	0.0000	0.0000	70.0000	2382.0999 (32)
Party Floor 1			74.7700			40.0000	2990.8000 (32d)
Party Ceiling 1			74.7700			30.0000	2243.1000 (32b)
Internal Wall 1			169.4000			9.0000	1524.5999 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12373.8998 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		165.4928 (35)
List of Thermal Bridges		

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.3562 (42)
Hot water usage for mixer showers												62.0586 (42a)
Hot water usage for baths												26.8919 (42b)
Hot water usage for other uses												38.7594 (42c)
Average daily hot water use (litres/day)												117.4556 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
Energy content (annual)	127.7873	125.0206	121.6317	117.2008	113.0797	107.8940	104.9419	109.8463	113.0354	118.1854	123.4885	127.7099 (44)
Distribution loss (46)m = 0.15 x (45)m	188.1249	165.4275	173.8092	153.0935	145.7146	124.7758	115.9639	129.2911	131.1154	152.2938	166.8988	187.5514 (45)
Water storage loss (or HIU loss):	28.2187	24.8141	26.0714	22.9640	21.8572	18.7164	17.3946	19.3937	19.6673	22.8441	25.0348	28.1327 (46)
Store volume												180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.6480 (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												
WWHRS	231.4753	204.5827	217.1596	195.0455	189.0650	166.7278	159.3143	172.6415	173.0674	195.6442	208.8508	230.9018 (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	231.4753	204.5827	217.1596	195.0455	189.0650	166.7278	159.3143	172.6415	173.0674	195.6442	208.8508	230.9018 (64)
Total per year (kWh/year) = Sum(64)m =												2344.4761 (64)
Electric shower(s)												2344 (64)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												0.0000 (64a)
	97.2319	86.3288	92.4719	84.4652	83.1304	75.0496	73.2383	77.6696	77.1575	85.3180	89.0554	97.0411 (65)

6. Solar gains						
[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Southwest	6.1200	36.7938	0.3500	0.7000	0.7700	38.2319 (79)
Northwest	8.3400	11.2829	0.3500	0.7000	0.7700	15.9767 (81)

Full SAP Calculation Printout



Solar gains	54.2086	97.6441	147.6968	206.6304	253.0087	260.6650	247.3613	211.3107	167.8771	111.7182	65.8958	45.7659 (83)
Total gains	560.5466	615.2922	644.3537	688.2596	710.8934	697.8404	666.0169	633.7623	602.0786	564.4816	545.8388	542.6628 (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	70.6490	70.9702	71.2944	72.9607	73.3034	75.0661	75.0661	75.4289	74.3509	73.3034	72.6213	71.9517
alpha	5.7099	5.7313	5.7530	5.8640	5.8869	6.0044	6.0044	6.0286	5.9567	5.8869	5.8414	5.7968
util living area	0.9594	0.9319	0.8843	0.7633	0.5996	0.4186	0.3023	0.3305	0.5241	0.7856	0.9207	0.9640 (86)
MIT	20.3864	20.5387	20.7108	20.8996	20.9779	20.9979	20.9998	20.9996	20.9922	20.9006	20.6512	20.3737 (87)
Th 2	20.3846	20.3872	20.3899	20.4030	20.4057	20.4189	20.4189	20.4215	20.4136	20.4057	20.4004	20.3951 (88)
util rest of house	0.9527	0.9216	0.8678	0.7362	0.5647	0.3811	0.2625	0.2890	0.4814	0.7548	0.9073	0.9580 (89)
MIT 2	19.6724	19.8622	20.0727	20.3016	20.3861	20.4174	20.4187	20.4213	20.4077	20.3084	20.0135	19.6653 (90)
Living area fraction	19.9919	20.1649	20.3582	20.5692	20.6509	20.6772	20.6787	20.6801	20.6693	20.5734	20.2989	19.9823 (92)
MIT	19.9919	20.1649	20.3582	20.5692	20.6509	20.6772	20.6787	20.6801	20.6693	20.5734	20.2989	19.9823 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.8419	20.0149	20.2082	20.4192	20.5009	20.5272	20.5287	20.5301	20.5193	20.4234	20.1489	19.8323 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9459	0.9145	0.8625	0.7370	0.5704	0.3881	0.2700	0.2968	0.4892	0.7558	0.9010	0.9515 (94)
Useful gains	530.2277	562.7109	555.7494	507.2544	405.4595	270.8261	179.8422	188.1149	294.5178	426.6413	491.8068	516.3543 (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	756.1397	732.0380	660.8910	542.6721	412.6748	271.3984	179.8929	188.2025	296.7590	460.6213	617.6094	746.7681 (97)
Space heating kWh	168.0785	113.7878	78.2253	25.5007	5.3682	0.0000	0.0000	0.0000	0.0000	25.2812	90.5778	171.4278 (98a)
Space heating requirement - total per year (kWh/year)												678.2474
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	168.0785	113.7878	78.2253	25.5007	5.3682	0.0000	0.0000	0.0000	0.0000	25.2812	90.5778	171.4278 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												678.2474
Space heating per m2										(98c) / (4) =		9.0711 (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	168.0785	113.7878	78.2253	25.5007	5.3682	0.0000	0.0000	0.0000	0.0000	25.2812	90.5778	171.4278 (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)	189.2776	128.1395	88.0916	28.7170	6.0453	0.0000	0.0000	0.0000	0.0000	28.4698	102.0021	193.0494 (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	231.4753	204.5827	217.1596	195.0455	189.0650	166.7278	159.3143	172.6415	173.0674	195.6442	208.8508	230.9018 (64)
Efficiency of water heater	83.3538	82.7993	82.0009	80.7462	80.0239	79.8000	79.8000	79.8000	79.8000	80.7364	82.3240	79.8000 (216)
Fuel for water heating, kWh/month	277.7022	247.0827	264.8258	241.5537	236.2606	208.9321	199.6420	216.3428	216.8764	242.3247	253.6938	276.8551 (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	23.8448	21.5372	23.8448	23.0756	23.8448	23.0756	23.8448	23.8448	23.0756	23.8448	23.0756	23.8448 (231)
Lighting	22.9732	18.4299	16.5941	12.1576	9.3909	7.6724	8.5667	11.1353	14.4636	18.9770	21.4345	23.6117 (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												763.7921 (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												2882.0919 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans:
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)

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mechanical ventilation fans (SFP = 0.7625)	194.7534 (230a)
central heating pump	41.0000 (230c)
main heating flue fan	45.0000 (230e)
Total electricity for the above, kWh/year	280.7534 (231)
Electricity for lighting (calculated in Appendix L)	185.4068 (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	4112.0443 (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	763.7921	0.2100	160.3963 (261)
Total CO2 associated with community systems			0.0000 (273)
Water heating (other fuel)	2882.0919	0.2100	605.2393 (264)
Space and water heating			765.6357 (265)
Pumps, fans and electric keep-hot	280.7534	0.1387	38.9440 (267)
Energy for lighting	185.4068	0.1443	26.7599 (268)
Total CO2, kg/year			831.3396 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.1200 (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	763.7921	1.1300	863.0851 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2882.0919	1.1300	3256.7639 (278)
Space and water heating			4119.8490 (279)
Pumps, fans and electric keep-hot	280.7534	1.5128	424.7238 (281)
Energy for lighting	185.4068	1.5338	284.3832 (282)
Total Primary energy kWh/year			4828.9560 (286)
Dwelling Primary energy Rate (DPER)			64.5800 (287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022) CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

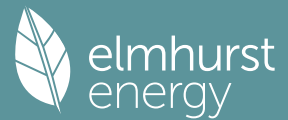
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	74.7700 (1b)	x 2.8000 (2b)	= 209.3560 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.7700		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 209.3560 (5)
Dwelling volume			

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	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) = 0.1433 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3933 (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) = 0.3343 (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	0.4262	0.4179	0.4095	0.3677	0.3594	0.3176	0.3176	0.3092	0.3343	0.3594	0.3761	0.3928 (22b)
Effective ac	0.5908	0.5873	0.5839	0.5676	0.5646	0.5504	0.5504	0.5478	0.5559	0.5646	0.5707	0.5771 (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			14.4600	1.1450	16.5573			(27)
External Wall 1	48.5500	14.4600	34.0900	0.1800	6.1362			(29a)
Corridor wall	14.5200	2.4200	12.1000	0.1800	2.1780			(29a)
Total net area of external elements Aum(A, m2)			63.0700					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	27.2915		(33)
Main dwelling								
Party Wall 1			34.0300	0.0000	0.0000			(32)

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

165.4928 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	9.1600	0.0500	0.4580	
E4 Jamb	21.6000	0.0500	1.0800	
E7 Party floor between dwellings (in blocks of flats)	25.9600	0.0700	1.8172	
E7 Party floor between dwellings (in blocks of flats)	10.3700	0.0700	0.7259	
E9 Balcony between dwellings, wall insulation continuous	8.7200	0.0200	0.1744	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E18 Party wall between dwellings	5.6000	0.0600	0.3360	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	24.3100	0.0000	0.0000	
E3 Sill	5.6700	0.0500	0.2835	

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

5.4630 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 32.7545 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	40.8195	40.5758	40.3370	39.2150	39.0051	38.0279	38.0279	37.8469	38.4043	39.0051	39.4297	39.8737	(38)
Heat transfer coeff	73.5740	73.3303	73.0914	71.9694	71.7595	70.7823	70.7823	70.6014	71.1587	71.7595	72.1842	72.6281	(39)
Average = Sum(39)m / 12 =												71.9684	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9840	0.9807	0.9775	0.9625	0.9597	0.9467	0.9467	0.9442	0.9517	0.9597	0.9654	0.9714	(40)
HLP (average)												0.9625	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3562 (42)
Hot water usage for mixer showers													
63.7246	62.7670	61.3715	58.7015	56.7310	54.5337	53.2847	54.6696	56.1877	58.5471	61.2744	63.4805	63.4805	(42a)
Hot water usage for baths													
27.5269	27.1181	26.5424	25.4809	24.6861	23.8048	23.3287	23.9004	24.5228	25.4659	26.5492	27.4338	27.4338	(42b)
Hot water usage for other uses													
38.7594	37.3499	35.9405	34.5311	33.1216	31.7122	31.7122	33.1216	34.5311	35.9405	37.3499	38.7594	38.7594	(42c)
Average daily hot water use (litres/day)												119.5095	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
130.0109	127.2350	123.8544	118.7134	114.5388	110.0506	108.3256	111.6916	115.2416	119.9534	125.1736	129.6737	129.6737	(44)
Energy conte	205.9055	181.1809	190.3596	162.5128	154.1912	135.3201	131.0104	138.2976	142.1045	162.7757	178.3327	203.0377	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													
30.8858	27.1771	28.5539	24.3769	23.1287	20.2980	19.6516	20.7446	21.3157	24.4164	26.7499	30.4556	30.4556	(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	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	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	23.2624	(58)
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													
255.1482	225.6582	239.6022	210.1670	203.4339	182.9743	180.2531	187.5402	189.7587	212.0184	225.9869	252.2803	252.2803	(62)
WWHRS	-29.1322	-25.7648	-26.9794	-22.3400	-20.8201	-17.8159	-16.6996	-17.7583	-18.4330	-21.7305	-24.6180	-28.5928	(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	226.0159	199.8934	212.6228	187.8270	182.6138	165.1584	163.5535	169.7819	171.3256	190.2879	201.3689	223.6876	(64)
12Total per year (kWh/year)												2294.1367	(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	107.8577	95.8245	102.6887	92.1589	90.6627	83.1173	82.9551	85.3781	85.3731	93.5171	97.4190	106.9042	(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	
117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
106.1428	117.5153	106.1428	109.6809	106.1428	109.6809	106.1428	106.1428	109.6809	106.1428	109.6809	106.1428	106.1428	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
208.1648	210.3249	204.8815	193.2932	178.6651	164.9167	155.7319	153.5718	159.0151	170.6035	185.2316	198.9800	198.9800	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	(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)													
-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	(71)
Water heating gains (Table 5)													
144.9700	142.5959	138.0224	127.9984	121.8585	115.4407	111.4988	114.7555	118.5737	125.6950	135.3042	143.6884	143.6884	(72)
Total internal gains													

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520.6200 531.7785 510.3891 492.3149 468.0087 448.3806 431.7158 432.8124 445.6121 463.7836 491.5590 510.1536 (73)

6. Solar gains

[Jan]	Area m2		Solar flux Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
Southwest	6.1200		36.7938		0.6300		0.7000		0.7700		68.8174	(79)
Northwest	8.3400		11.2829		0.6300		0.7000		0.7700		28.7581	(81)
Solar gains	97.5755	175.7594	265.8543	371.9347	455.4157	469.1970	445.2503	380.3593	302.1787	201.0927	118.6125	82.3787 (83)
Total gains	618.1955	707.5379	776.2435	864.2496	923.4244	917.5776	876.9661	813.1717	747.7908	664.8763	610.1715	592.5322 (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	46.7175	46.8728	47.0260	47.7591	47.8988	48.5601	48.5601	48.6845	48.3032	47.8988	47.6170	47.3259
alpha	4.1145	4.1249	4.1351	4.1839	4.1933	4.2373	4.2373	4.2456	4.2202	4.1933	4.1745	4.1551
util living area	0.9697	0.9477	0.9075	0.8101	0.6597	0.4808	0.3523	0.3945	0.6136	0.8510	0.9468	0.9738 (86)
MIT	19.7159	19.9582	20.2735	20.6498	20.8805	20.9756	20.9948	20.9918	20.9339	20.6294	20.1272	19.6832 (87)
Th 2	20.0967	20.0994	20.1021	20.1147	20.1170	20.1280	20.1280	20.1301	20.1238	20.1170	20.1123	20.1073 (88)
util rest of house	0.9637	0.9379	0.8905	0.7785	0.6112	0.4197	0.2838	0.3220	0.5485	0.8181	0.9352	0.9686 (89)
MIT 2	18.6133	18.9175	19.3074	19.7611	20.0127	20.1118	20.1257	20.1261	20.0750	19.7507	19.1422	18.5798 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.1067	19.3832	19.7397	20.1588	20.4010	20.4984	20.5146	20.5135	20.4593	20.1439	19.5830	19.0736 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.1067	19.3832	19.7397	20.1588	20.4010	20.4984	20.5146	20.5135	20.4593	20.1439	19.5830	19.0736 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9555	0.9286	0.8827	0.7802	0.6273	0.4460	0.3143	0.3542	0.5742	0.8192	0.9269	0.9610 (94)
Useful gains	590.6928	657.0156	685.1640	674.3132	579.2863	409.2778	275.6470	288.0492	429.3882	544.6736	565.5382	569.4233 (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	1089.3897	1062.0592	967.7102	810.2895	624.3819	417.5007	277.0875	290.4185	452.5213	684.8678	901.0727	1080.2413 (97)
Space heating kWh	371.0305	272.1893	210.2144	97.9029	33.5511	0.0000	0.0000	0.0000	0.0000	104.3044	241.5848	380.0486 (98a)
Space heating requirement - total per year (kWh/year)												1710.8261
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	371.0305	272.1893	210.2144	97.9029	33.5511	0.0000	0.0000	0.0000	0.0000	104.3044	241.5848	380.0486 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1710.8261
Space heating per m2												(98c) / (4) = 22.8812 (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	371.0305	272.1893	210.2144	97.9029	33.5511	0.0000	0.0000	0.0000	0.0000	104.3044	241.5848	380.0486 (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)	401.9832	294.8963	227.7512	106.0703	36.3501	0.0000	0.0000	0.0000	0.0000	113.0059	261.7387	411.7537 (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	226.0159	199.8934	212.6228	187.8270	182.6138	165.1584	163.5535	169.7819	171.3256	190.2879	201.3689	223.6876 (64)
Efficiency of water heater	85.1640	84.7526	84.0342	82.6709	81.0754	79.8000	79.8000	79.8000	79.8000	82.7702	84.4692	79.8000 (216)
Fuel for water heating, kWh/month	265.3891	235.8551	253.0193	227.1983	225.2395	206.9654	204.9543	212.7593	214.6938	229.8990	238.3934	262.4264 (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	22.0544	17.6928	15.9304	11.6713	9.0153	7.3656	8.2240	10.6899	13.8851	18.2180	20.5772	22.6673 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-14.1328	-21.3755	-32.9342	-39.7781	-45.3496	-43.2354	-42.7083	-39.0855	-33.1565	-25.6109	-16.0433	-12.0554 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	-4.1135	-8.9194	-18.2382	-28.1633	-38.0108	-38.4799	-38.0294	-31.8435	-22.8784	-13.0038	-5.5697	-3.2336 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												

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(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												1853.5494	(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												2776.7929	(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)												177.9915	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-615.9491	(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												4278.3848	(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	1853.5494	0.2100	389.2454	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2776.7929	0.2100	583.1265	(264)
Space and water heating			972.3719	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	177.9915	0.1443	25.6897	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-365.4655	0.1331	-48.6593	
PV Unit electricity exported	-250.4835	0.1251	-31.3335	
Total			-79.9927	(269)
Total CO2, kg/year			929.9981	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.4400	(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	1853.5494	1.1300	2094.5108	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2776.7929	1.1300	3137.7760	(278)
Space and water heating			5232.2868	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	177.9915	1.5338	273.0094	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-365.4655	1.4920	-545.2718	
PV Unit electricity exported	-250.4835	0.4591	-115.0055	
Total			-660.2773	(283)
Total Primary energy kWh/year			4975.1197	(286)
Target Primary Energy Rate (TPER)			66.5400	(287)

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Plot Reference	A 218			Issued on Date	19/03/2026
Assessment Reference	Be Lean	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	86 B	DER	11.12	TER	12.44
Environmental	91 B	% DER < TER			10.61
CO ₂ Emissions (t/year)	0.76	DFEE	29.33	TFEE	29.99
Compliance Check	See BREL	% DFEE < TFEE			2.21
% DPER < TPER	2.94	DPER	64.58	TPER	66.54
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	74.7700 (1b)	x 2.8000 (2b)	= 209.3560 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.7700		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 209.3560 (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) = 0.1433 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2933 (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) = 0.2493 (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	0.3179	0.3116	0.3054	0.2742	0.2680	0.2368	0.2368	0.2306	0.2493	0.2680	0.2805	0.2929 (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	0.5505	0.5486	0.5466	0.5376	0.5359	0.5280	0.5280	0.5266	0.5311	0.5359	0.5393	0.5429 (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			14.4600	1.1450	16.5573		(27)
External Wall 1	48.5500	14.4600	34.0900	0.1500	5.1135	70.0000	2386.2999 (29a)
Corridor wall	14.5200	2.4200	12.1000	0.1800	2.1780	70.0000	847.0000 (29a)
Total net area of external elements Aum(A, m ²)			63.0700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.2688		(33)
Main dwelling							
Party Wall 1			34.0300	0.0000	0.0000	70.0000	2382.0999 (32)
Party Floor 1			74.7700			40.0000	2990.8000 (32d)
Party Ceiling 1			74.7700			30.0000	2243.1000 (32b)
Internal Wall 1			169.4000			9.0000	1524.5999 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12373.8998 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							165.4928 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					9.1600	0.0500	0.4580
E4 Jamb					21.6000	0.0400	0.8640

elmhurst
energy

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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	50.1192	50.2185	50.3161	50.7800	50.8677	51.2801	51.2801	51.3572	51.1205	50.8677	50.6905	50.5066
alpha	4.3413	4.3479	4.3544	4.3853	4.3912	4.4187	4.4187	4.4238	4.4080	4.3912	4.3794	4.3671
util living area												
	0.9874	0.9784	0.9622	0.9129	0.8112	0.6368	0.4800	0.5277	0.7559	0.9293	0.9772	0.9893 (86)
MIT	19.5887	19.7827	20.0590	20.4489	20.7614	20.9398	20.9862	20.9792	20.8701	20.4765	19.9761	19.5555 (87)
Th 2	20.1529	20.1544	20.1559	20.1630	20.1643	20.1705	20.1705	20.1717	20.1681	20.1643	20.1617	20.1589 (88)
util rest of house												
	0.9847	0.9739	0.9539	0.8937	0.7706	0.5685	0.3943	0.4400	0.6947	0.9097	0.9716	0.9870 (89)
MIT 2	18.8596	19.0525	19.3253	19.7056	19.9898	20.1368	20.1653	20.1633	20.0870	19.7386	19.2508	18.8313 (90)
Living area fraction												
										fLA = Living area / (4) =		0.4475 (91)
MIT	19.1859	19.3792	19.6536	20.0383	20.3351	20.4961	20.5327	20.5284	20.4375	20.0688	19.5754	19.1554 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1859	19.3792	19.6536	20.0383	20.3351	20.4961	20.5327	20.5284	20.4375	20.0688	19.5754	19.1554 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9809	0.9688	0.9481	0.8905	0.7795	0.5962	0.4323	0.4786	0.7158	0.9071	0.9668	0.9835 (94)
Useful gains	462.5948	510.9992	529.9712	540.8455	493.8479	374.6381	259.6660	270.1987	380.3452	440.7520	446.0364	446.4216 (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												
	1020.8769	991.0294	898.5507	753.9267	583.4841	395.2040	263.5978	276.3034	426.1126	639.8208	845.9244	1017.7814 (97)
Space heating kWh												
	415.3619	322.5802	274.2232	153.4184	66.6893	0.0000	0.0000	0.0000	0.0000	148.1072	287.9194	425.0917 (98a)
Space heating requirement - total per year (kWh/year)												2093.3913
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												
	415.3619	322.5802	274.2232	153.4184	66.6893	0.0000	0.0000	0.0000	0.0000	148.1072	287.9194	425.0917 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2093.3913
Space heating per m2												(98c) / (4) = 27.9977 (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	630.0616	496.0059	508.6467	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8523	0.9119	0.8878	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	536.9942	452.3233	451.6001	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	693.4551	663.2758	623.0769	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	112.6518	156.9487	127.5787	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	28.1630	39.2372	31.8947	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												99.2948 (107)
Energy for space heating												27.9977 (99)
Energy for space cooling												1.3280 (108)
Total												29.3257 (109)
Fabric Energy Efficiency (DFEE)												29.3 (109)

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

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

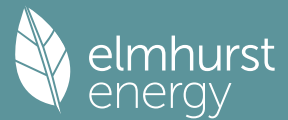
1. Overall dwelling characteristics

		Area (m2)	Storey height (m)	Volume (m3)
Main dwelling		74.7700 (1b)	x 2.8000 (2b)	= 209.3560 (1b) - (3b)
Ground floor				(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)		74.7700		
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	209.3560 (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
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1433 (8)

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Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.3933 (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) =	0.3343 (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)
	0.4262	0.4179	0.4095	0.3677	0.3594	0.3176	0.3176	0.3092	0.3343	0.3594	0.3761	0.3928 (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	0.5908	0.5873	0.5839	0.5676	0.5646	0.5504	0.5504	0.5478	0.5559	0.5646	0.5707	0.5771 (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			14.4600	1.1450	16.5573		(27)
External Wall 1	48.5500	14.4600	34.0900	0.1800	6.1362		(29a)
Corridor wall	14.5200	2.4200	12.1000	0.1800	2.1780		(29a)
Total net area of external elements Aum(A, m2)			63.0700				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	27.2915	(33)
Main dwelling							
Party Wall 1			34.0300	0.0000	0.0000		(32)

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

165.4928 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.1600	0.0500	0.4580
E4 Jamb	21.6000	0.0500	1.0800
E7 Party floor between dwellings (in blocks of flats)	25.9600	0.0700	1.8172
E7 Party floor between dwellings (in blocks of flats)	10.3700	0.0700	0.7259
E9 Balcony between dwellings, wall insulation continuous	8.7200	0.0200	0.1744
E16 Corner (normal)	2.8000	0.0900	0.2520
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	24.3100	0.0000	0.0000
E3 Sill	5.6700	0.0500	0.2835

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

5.4630 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 32.7545 (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	40.8195	40.5758	40.3370	39.2150	39.0051	38.0279	38.0279	37.8469	38.4043	39.0051	39.4297	39.8737 (38)
Average = Sum(39)m / 12 =	73.5740	73.3303	73.0914	71.9694	71.7595	70.7823	70.7823	70.6014	71.1587	71.7595	72.1842	72.6281 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9840	0.9807	0.9775	0.9625	0.9597	0.9467	0.9467	0.9442	0.9517	0.9597	0.9654	0.9714 (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													2.3562 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	27.5269	27.1181	26.5424	25.4809	24.6861	23.8048	23.3287	23.9004	24.5228	25.4659	26.5492	27.4338	(42b)
Hot water usage for other uses	38.7594	37.3499	35.9405	34.5311	33.1216	31.7122	31.7122	33.1216	34.5311	35.9405	37.3499	38.7594	(42c)
Average daily hot water use (litres/day)													60.7576 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	66.2863	64.4680	62.4829	60.0120	57.8077	55.5170	55.0409	57.0220	59.0539	61.4064	63.8992	66.1932	(44)
Distribution loss (46)m = 0.15 x (45)m	104.9813	91.8016	96.0339	82.1534	77.8203	68.2646	66.5672	70.6052	72.8194	83.3279	91.0361	103.6426	(45)
										Total = Sum(45)m =		1009.0534	
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													
WWHRS	89.2341	78.0314	81.6288	69.8304	66.1473	58.0249	56.5821	60.0144	61.8965	70.8287	77.3806	88.0962	(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	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)
	89.2341	78.0314	81.6288	69.8304	66.1473	58.0249	56.5821	60.0144	61.8965	70.8287	77.3806	88.0962	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		857.6954	(64)
Electric shower(s)	51.0328	45.4707	49.6522	47.3825	48.2716	46.0464	47.5813	48.2716	47.3825	49.6522	48.7186	51.0328	(64a)
													580.4952 (64a)
Heat gains from water heating, kWh/month													
	35.0667	30.8755	32.8203	29.3032	28.6047	26.0178	26.0409	27.0715	27.3197	30.1202	31.5248	34.7822	(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	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	117.8077	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.1428	117.5153	106.1428	109.6809	106.1428	109.6809	106.1428	106.1428	109.6809	106.1428	109.6809	106.1428	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	208.1648	210.3249	204.8815	193.2932	178.6651	164.9167	155.7319	153.5718	159.0151	170.6035	185.2316	198.9800	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	34.7808	(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)	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	-94.2462	(71)
Water heating gains (Table 5)	47.1327	45.9457	44.1132	40.6989	38.4472	36.1359	35.0012	36.3864	37.9441	40.4842	43.7844	46.7503	(72)
Total internal gains	419.7827	432.1282	413.4799	402.0154	381.5974	369.0758	355.2182	354.4433	364.9825	375.5728	397.0393	410.2155	(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	
Southwest				6.1200	36.7938	0.6300	0.7000		0.7700		68.8174 (79)	
Northwest				8.3400	11.2829	0.6300	0.7000		0.7700		28.7581 (81)	
Solar gains	97.5755	175.7594	265.8543	371.9347	455.4157	469.1970	445.2503	380.3593	302.1787	201.0927	118.6125	82.3787 (83)
Total gains	517.3582	607.8877	679.3343	773.9501	837.0131	838.2728	800.4685	734.8027	667.1612	576.6655	515.6518	492.5942 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	46.7175	46.8728	47.0260	47.7591	47.8988	48.5601	48.5601	48.6845	48.3032	47.8988	47.6170	47.3259	21.0000 (85)
alpha	4.1145	4.1249	4.1351	4.1839	4.1933	4.2373	4.2373	4.2456	4.2202	4.1933	4.1745	4.1551	
util living area	0.9833	0.9675	0.9365	0.8515	0.7069	0.5213	0.3847	0.4342	0.6692	0.8955	0.9688	0.9861	(86)
MIT	19.5308	19.7899	20.1340	20.5653	20.8446	20.9671	20.9928	20.9882	20.9083	20.5279	19.9669	19.4964	(87)
Th 2	20.0967	20.0994	20.1021	20.1147	20.1170	20.1280	20.1280	20.1301	20.1238	20.1170	20.1123	20.1073	(88)
util rest of house	0.9798	0.9610	0.9236	0.8236	0.6590	0.4567	0.3104	0.3554	0.6031	0.8690	0.9614	0.9832	(89)
MIT 2	18.7594	19.0161	19.3524	19.7665	20.0093	20.1107	20.1255	20.1256	20.0697	19.7437	19.2027	18.7334	(90)
Living area fraction									fLA = Living area / (4) =			0.4475	(91)
MIT	19.1046	19.3624	19.7022	20.1240	20.3831	20.4939	20.5136	20.5116	20.4450	20.0946	19.5447	19.0748	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1046	19.3624	19.7022	20.1240	20.3831	20.4939	20.5136	20.5116	20.4450	20.0946	19.5447	19.0748	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9749	0.9544	0.9170	0.8240	0.6740	0.4843	0.3435	0.3904	0.6283	0.8683	0.9555	0.9788	(94)
Useful gains	504.3749	580.1608	622.9251	637.7046	564.1795	406.0019	274.9853	286.8526	419.2023	500.6975	492.7065	482.1566	(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	1089.2319	1060.5291	964.9640	807.7844	623.0970	417.1845	277.0128	290.2835	451.5001	681.3295	898.3106	1080.3324	(97)
Space heating kWh	435.1336	322.8076	254.4770	122.4575	43.8346	0.0000	0.0000	0.0000	0.0000	134.3902	292.0349	445.0428	(98a)
Space heating requirement - total per year (kWh/year)												2050.1782	
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	435.1336	322.8076	254.4770	122.4575	43.8346	0.0000	0.0000	0.0000	0.0000	134.3902	292.0349	445.0428	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2050.1782	
Space heating per m ²										(98c) / (4) =		27.4198	(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	665.3538	523.7892	536.5703	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9189	0.9546	0.9364	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	611.3715	500.0299	502.4472	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	938.5955	896.5104	821.8339	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	235.6013	294.9815	237.6237	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	58.9003	73.7454	59.4059	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												192.0516	(107)
Energy for space heating												27.4198	(99)
Energy for space cooling												2.5686	(108)
Total												29.9884	(109)
Fabric Energy Efficiency (TFEE)												30.0	(109)

