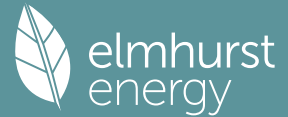


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Plot Reference	79596-07			Issued on Date	05/03/2026
Assessment Reference	001	Plot Type Ref	GF Flat		
Plot Address	32 Dalton Avenue, MANCHESTER, M14 7NR			SAP Version	10.2
SAP Rating	81 B	DER	6.93	TER	16.15
Environmental	96 A	% DER < TER			57.09
CO ₂ Emissions (t/year)	0.24	DFEE	38.95	TFEE	45.23
Compliance Check	See BREL	% DFEE < TFEE			13.89
% DPER < TPER	16.23	DPER	71.46	TPER	85.30
Assessor Details	Mr. Daniel Goddard			Assessor ID	CP52-0001
Client	Denton Construction, -				

SAP 10 WORKSHEET FOR New Build (As Built) (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	39.1600	2.3500	92.0260
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	39.1600		
Dwelling volume			92.0260

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	2.7500	(17)
Infiltration rate	0.1375	(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) =	0.1169 (21)

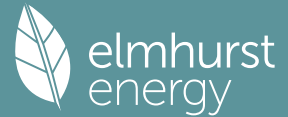
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1490	0.1461	0.1432	0.1286	0.1256	0.1110	0.1110	0.1081	0.1169	0.1256	0.1315	0.1373 (22b)
Mechanical extract ventilation - decentralised												
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)
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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			2.1500	1.0000	2.1500		(26)
Window			4.2500	1.2357	5.2519		(27)
Glazed Door			3.8000	1.3258	5.0379		(27)
GF			39.1600	0.1100	4.3076	75.0000	2937.0000 (28a)
Main	57.6700	10.2000	47.4700	0.1900	9.0193	110.0000	5221.6998 (29a)
Total net area of external elements Aum(A, m ²)			96.8300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	25.7667	(33)
Main dwelling							
Party Wall 1			15.1600	0.0000	0.0000	110.0000	1667.6000 (32)
Party Ceiling 1			39.1600			20.0000	783.2000 (32b)
Timber			25.7000			9.0000	231.3000 (32c)
Solid			16.9600			75.0000	1271.9999 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) =
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							12112.7997 (34)
List of Thermal Bridges							309.3156 (35)

6. Solar gains						
[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	1.0800	10.6334	0.7300	0.7000	0.7700	4.0668 (74)
East	0.7700	19.6403	0.7300	0.7000	0.7700	5.3554 (76)
South	0.7200	46.7521	0.7300	0.7000	0.7700	11.9203 (78)
West	1.6800	19.6403	0.7300	0.7000	0.7700	11.6845 (80)
East	3.8000	19.6403	0.6800	0.7000	0.7700	24.6190 (76)

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Solar gains	57.6460	108.7880	172.2829	245.0541	297.7447	304.3377	289.8838	250.2206	197.9459	127.0073	71.0903	47.9488 (83)
Total gains	350.1715	407.2595	457.7159	518.3143	555.9809	551.8782	527.1668	488.7069	444.4375	383.4847	345.2053	334.2391 (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	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557
alpha	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037
util living area	0.9946	0.9862	0.9624	0.8817	0.7212	0.5245	0.3810	0.4289	0.6800	0.9298	0.9874	0.9958 (86)
MIT	20.0446	20.2304	20.4879	20.7782	20.9439	20.9924	20.9990	20.9981	20.9692	20.7261	20.3219	19.9986 (87)
Th 2	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456 (88)
util rest of house	0.9924	0.9811	0.9486	0.8440	0.6547	0.4411	0.2902	0.3315	0.5893	0.8973	0.9817	0.9942 (89)
MIT 2	18.8597	19.0941	19.4122	19.7456	19.9067	19.9423	19.9454	19.9451	19.9295	19.6996	19.2120	18.8013 (90)
Living area fraction									fLA =	Living area / (4) =		0.5603 (91)
MIT	19.5235	19.7307	20.0149	20.3241	20.4878	20.5306	20.5357	20.5351	20.5120	20.2747	19.8339	19.4721 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5235	19.7307	20.0149	20.3241	20.4878	20.5306	20.5357	20.5351	20.5120	20.2747	19.8339	19.4721 (93)

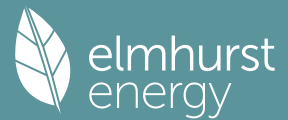
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9913	0.9798	0.9497	0.8586	0.6900	0.4878	0.3411	0.3862	0.6395	0.9088	0.9809	0.9932 (94)
Useful gains	347.1380	399.0137	434.6749	445.0387	383.6143	269.1868	179.8226	188.7231	284.2128	348.5041	338.6201	331.9804 (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	696.3716	678.4027	618.2125	522.5748	401.9813	271.2862	180.0313	189.1507	293.3051	442.5513	582.4862	698.5938 (97)
Space heating kWh	259.8298	187.7494	136.5520	55.8259	13.6650	0.0000	0.0000	0.0000	0.0000	69.9711	175.5836	272.7604 (98a)
Space heating requirement - total per year (kWh/year)												1171.9373
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	259.8298	187.7494	136.5520	55.8259	13.6650	0.0000	0.0000	0.0000	0.0000	69.9711	175.5836	272.7604 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1171.9373
Space heating per m2										(98c) / (4) =		29.9269 (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)
Fraction of main heating from main system 2												0.0000 (203)
Fraction of total heating from main system 1												1.0000 (204)
Fraction of total heating from main system 2												0.0000 (205)
Efficiency of main space heating system 1 (in %)												100.0000 (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	259.8298	187.7494	136.5520	55.8259	13.6650	0.0000	0.0000	0.0000	0.0000	69.9711	175.5836	272.7604 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	259.8298	187.7494	136.5520	55.8259	13.6650	0.0000	0.0000	0.0000	0.0000	69.9711	175.5836	272.7604 (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)
Space heating fuel used, main 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)
Water heating												
Water heating requirement	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104 (64)
Efficiency of water heater (217)m	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100 (216)
Fuel for water heating, kWh/month	51.7934	45.7541	48.4578	42.2210	40.6731	36.3709	35.6804	37.2446	37.8191	42.5086	45.6170	51.1750 (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	1.0625	0.9597	1.0625	1.0282	1.0625	1.0282	1.0625	1.0625	1.0282	1.0625	1.0282	1.0625 (231)
Lighting	11.6023	9.3078	8.3807	6.1400	4.7427	3.8749	4.3265	5.6237	7.3047	9.5841	10.8252	11.9248 (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												1171.9373 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												349.4100

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Water heating fuel used	515.3150 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
(MEVDecentralised, Database: total watage = 2.3400, total flow = 21.0000, SFP = 0.1114)	
mechanical ventilation fans (SFP = 0.1114)	12.5103 (230a)
Total electricity for the above, kWh/year	12.5103 (231)
Electricity for lighting (calculated in Appendix L)	93.6375 (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	1793.4001 (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	1171.9373	0.1566	183.5606 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	515.3150	0.1411	72.7047 (264)
Space and water heating			256.2653 (265)
Pumps, fans and electric keep-hot	12.5103	0.1387	1.7353 (267)
Energy for lighting	93.6375	0.1443	13.5148 (268)
Total CO2, kg/year			271.5155 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.9300 (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	1171.9373	1.5798	1851.4827 (275)
Space heating - main system 2	0.0000	0.0000	0.0000 (276)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	515.3150	1.5217	784.1554 (278)
Space and water heating			2635.6381 (279)
Pumps, fans and electric keep-hot	12.5103	1.5128	18.9255 (281)
Energy for lighting	93.6375	1.5338	143.6244 (282)
Total Primary energy kWh/year			2798.1880 (286)
Dwelling Primary energy Rate (DPER)			71.4600 (287)

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

1. Overall dwelling characteristics

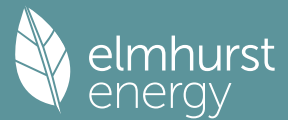
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	39.1600 (1b)	x 2.3500 (2b)	= 92.0260 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	39.1600		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	92.0260 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.2173 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4673 (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) = 0.3972 (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	0.5065	0.4965	0.4866	0.4370	0.4270	0.3774	0.3774	0.3674	0.3972	0.4270	0.4469	0.4667 (22b)
Effective ac	0.6283	0.6233	0.6184	0.5955	0.5912	0.5712	0.5712	0.5675	0.5789	0.5912	0.5999	0.6089 (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			2.1500	1.0000	2.1500			(26)					
TER Opening Type			7.6300	1.1450	8.7366			(27)					
GF			39.1600	0.1300	5.0908			(28a)					
Main	57.6700	9.7800	47.8900	0.1800	8.6202			(29a)					
Total net area of external elements Aum(A, m2)			96.8300					(31)					
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	24.5976		(33)					
Main dwelling													
Party Wall 1			15.1600	0.0000	0.0000			(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							309.3156	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value		Total						
E2 Other lintels (including other steel lintels)				6.4900	0.0500		0.3245						
E3 Sill				6.4900	0.0500		0.3245						
E4 Jamb				20.1000	0.0500		1.0050						
E5 Ground floor (normal)				22.4400	0.1600		3.5904						
E7 Party floor between dwellings (in blocks of flats)				22.4400	0.0700		1.5708						
E16 Corner (normal)				10.2800	0.0900		0.9252						
E17 Corner (inverted - internal area greater than external area)				5.1400	-0.0900		-0.4626						
E18 Party wall between dwellings				5.1400	0.0600		0.3084						
P1 Party wall - Ground floor				5.9000	0.0800		0.4720						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								8.0582 (36)					
Point Thermal Bridges							(36a) =	0.0000					
Total fabric heat loss							(33) + (36) + (36a) =	32.6558 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 19.0792	Feb 18.9280	Mar 18.7797	Apr 18.0834	May 17.9531	Jun 17.3466	Jul 17.3466	Aug 17.2343	Sep 17.5802	Oct 17.9531	Nov 18.2167	Dec 18.4922	(38)
Heat transfer coeff	51.7351	51.5838	51.4356	50.7392	50.6090	50.0025	50.0025	49.8902	50.2361	50.6090	50.8725	51.1481	(39)
Average = Sum(39)m / 12 =												50.7386	
HLP	Jan 1.3211	Feb 1.3173	Mar 1.3135	Apr 1.2957	May 1.2924	Jun 1.2769	Jul 1.2769	Aug 1.2740	Sep 1.2828	Oct 1.2924	Nov 1.2991	Dec 1.3061	(40)
HLP (average)												1.2957	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

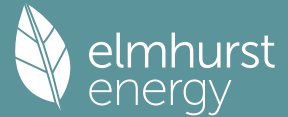
4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.3842 (42)
Hot water usage for mixer showers	60.8393	59.9250	58.5927	56.0436	54.1624	52.0645	50.8720	52.1943	53.6437	55.8962	58.5001	60.6062	(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	(42b)
Hot water usage for other uses	28.8055	27.7580	26.7106	25.6631	24.6156	23.5682	23.5682	24.6156	25.6631	26.7106	27.7580	28.8055	(42c)
Average daily hot water use (litres/day)													82.2787 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	89.6448	87.6831	85.3033	81.7067	78.7780	75.6326	74.4402	76.8099	79.3068	82.6068	86.2581	89.4117	(44)
Energy content (annual)	141.9755	124.8595	131.1080	111.8524	106.0503	92.9992	90.0290	95.1067	97.7932	112.0966	122.8905	139.9972	(45)
Distribution loss (46)m = 0.15 x (45)m	21.2963	18.7289	19.6662	16.7779	15.9076	13.9499	13.5043	14.2660	14.6690	16.8145	18.4336	20.9996	(46)
Water storage loss (or HIU loss):													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	188.5704	166.9452	177.7029	156.9442	152.6452	138.0910	136.6239	141.7016	142.8850	158.6915	167.9823	186.5921	(62)
PV diverter	-27.8132	-24.5982	-25.7578	-21.3285	-19.8774	-17.0092	-15.9434	-16.9543	-17.5984	-20.7466	-23.5034	-27.2981	(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)
	160.7572	142.3470	151.9450	135.6157	132.7678	121.0818	120.6804	124.7473	125.2866	137.9449	144.4790	159.2939	(64)
12Total per year (kWh/year)													Total per year (kWh/year) = Sum(64)m = 1656.9468 (64)
Electric shower(s)													1657 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
													Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)
Heat gains from water heating, kWh/month	84.4828	75.1844	80.8693	73.2644	72.5377	66.9957	67.2106	68.8989	68.5897	74.5480	76.9346	83.8250	(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	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	60.8399	67.3584	60.8399	62.8679	60.8399	62.8679	60.8399	60.8399	62.8679	60.8399	62.8679	60.8399 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	119.4268	120.6660	117.5431	110.8947	102.5024	94.6147	89.3453	88.1060	91.2290	97.8773	106.2697	114.1573 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677 (71)

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Water heating gains (Table 5)	113.5521	111.8815	108.6953	101.7561	97.4969	93.0496	90.3368	92.6060	95.2635	100.1990	106.8536	112.6680 (72)
Total internal gains	340.5816	346.6688	333.8412	322.2816	307.6020	294.2951	284.2848	285.3148	293.1232	305.6791	322.7540	334.4281 (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
North					1.0200	10.6334	0.6300	0.7000			0.7700	3.3147 (74)
East					4.3400	19.6403	0.6300	0.7000			0.7700	26.0501 (76)
South					0.6800	46.7521	0.6300	0.7000			0.7700	9.7159 (78)
West					1.5900	19.6403	0.6300	0.7000			0.7700	9.5437 (80)
Solar gains	48.6243	91.8756	145.7021	207.4361	252.1191	257.7163	245.4722	211.8471	167.4800	107.3237	59.9870	40.4293 (83)
Total gains	389.2060	438.5444	479.5433	529.7176	559.7211	552.0114	529.7570	497.1619	460.6033	413.0028	382.7410	374.8573 (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	65.0365	65.2272	65.4152	66.3129	66.4836	67.2900	67.2900	67.4415	66.9771	66.4836	66.1392	65.7829
alpha	5.3358	5.3485	5.3610	5.4209	5.4322	5.4860	5.4860	5.4961	5.4651	5.4322	5.4093	5.3855
util living area	0.9921	0.9842	0.9644	0.8993	0.7632	0.5671	0.4133	0.4580	0.7057	0.9270	0.9831	0.9935 (86)
MIT	19.9268	20.1036	20.3629	20.6898	20.9019	20.9843	20.9976	20.9960	20.9513	20.6763	20.2544	19.9040 (87)
Th 2	19.8243	19.8273	19.8303	19.8442	19.8468	19.8590	19.8590	19.8612	19.8543	19.8468	19.8415	19.8360 (88)
util rest of house	0.9891	0.9782	0.9507	0.8635	0.6938	0.4721	0.3073	0.3467	0.6083	0.8921	0.9755	0.9910 (89)
MIT 2	18.6190	18.8439	19.1674	19.5609	19.7774	19.8521	19.8585	19.8603	19.8286	19.5587	19.0468	18.5989 (90)
Living area fraction	19.3517	19.5496	19.8372	20.1934	20.4074	20.4864	20.4967	20.4966	20.4576	20.1849	19.7234	19.3301 (92)
MIT	19.3517	19.5496	19.8372	20.1934	20.4074	20.4864	20.4967	20.4966	20.4576	20.1849	19.7234	19.3301 (93)
Temperature adjustment												0.0000
adjusted MIT	19.3517	19.5496	19.8372	20.1934	20.4074	20.4864	20.4967	20.4966	20.4576	20.1849	19.7234	19.3301 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9875	0.9764	0.9508	0.8754	0.7291	0.5252	0.3668	0.4093	0.6617	0.9038	0.9745	0.9895 (94)
Useful gains	384.3349	428.1958	455.9554	463.7284	408.1118	289.8979	194.3349	203.4666	304.7726	373.2741	372.9782	370.9213 (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	778.7005	755.6837	686.0045	573.0195	440.6735	294.3352	194.8456	204.3786	319.3799	485.0808	642.1825	773.8741 (97)
Space heating kWh	293.4080	220.0718	171.1565	78.6896	24.2259	0.0000	0.0000	0.0000	0.0000	83.1842	193.8271	299.7969 (98a)
Space heating requirement - total per year (kWh/year)												1364.3600
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	293.4080	220.0718	171.1565	78.6896	24.2259	0.0000	0.0000	0.0000	0.0000	83.1842	193.8271	299.7969 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1364.3600
Space heating per m ²										(98c) / (4) =		34.8407 (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	293.4080	220.0718	171.1565	78.6896	24.2259	0.0000	0.0000	0.0000	0.0000	83.1842	193.8271	299.7969 (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)	317.8851	238.4310	185.4350	85.2542	26.2469	0.0000	0.0000	0.0000	0.0000	90.1237	209.9969	324.8070 (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	160.7572	142.3470	151.9450	135.6157	132.7678	121.0818	120.6804	124.7473	125.2866	137.9449	144.4790	159.2939 (64)
Efficiency of water heater	85.3911	85.0333	84.3274	82.8845	81.0679	79.8000	79.8000	79.8000	79.8000	82.9631	84.7195	79.8000 (216)
(217)m	85.3911	85.0333	84.3274	82.8845	81.0679	79.8000	79.8000	79.8000	79.8000	82.9631	84.7195	85.4559 (217)
Fuel for water heating, kWh/month	188.2598	167.4016	180.1846	163.6201	163.7737	151.7315	151.2286	156.3250	157.0008	166.2727	170.5381	186.4049 (219)
Space cooling fuel requirement	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)
(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	12.6413	10.1413	9.1312	6.6899	5.1674	4.2219	4.7139	6.1273	7.9588	10.4424	11.7946	12.9927 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-18.8993	-26.9508	-39.2087	-44.6841	-48.7606	-45.7968	-45.3009	-42.5166	-37.6389	-31.1551	-20.9122	-16.3095 (233a)
(233a)m	-18.8993	-26.9508	-39.2087	-44.6841	-48.7606	-45.7968	-45.3009	-42.5166	-37.6389	-31.1551	-20.9122	-16.3095 (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)
(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)	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)
(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)

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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	-9.7697	-20.6490	-41.1944	-62.0667	-82.2167	-82.5958	-81.5557	-68.9284	-50.4043	-29.5170	-13.0465	-7.7129	(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												1478.1799	(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												2002.7413	(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)												102.0227	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-967.7906	(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												2701.1534	(238)

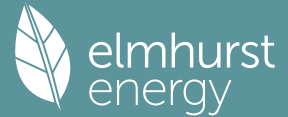
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1478.1799	0.2100	310.4178	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2002.7413	0.2100	420.5757	(264)
Space and water heating			730.9935	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	102.0227	0.1443	14.7250	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-418.1335	0.1343	-56.1490	
PV Unit electricity exported	-549.6571	0.1258	-69.1601	
Total			-125.3091	(269)
Total CO2, kg/year			632.3387	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			16.1500	(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	1478.1799	1.1300	1670.3433	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2002.7413	1.1300	2263.0977	(278)
Space and water heating			3933.4410	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	102.0227	1.5338	156.4858	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-418.1335	1.4963	-625.6433	
PV Unit electricity exported	-549.6571	0.4619	-253.8643	
Total			-879.5077	(283)
Total Primary energy kWh/year			3340.5200	(286)
Target Primary Energy Rate (TPER)			85.3000	(287)

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Plot Reference	79596-07			Issued on Date	05/03/2026
Assessment Reference	001	Plot Type Ref	GF Flat		
Plot Address	32 Dalton Avenue, MANCHESTER, M14 7NR			SAP Version	10.2
SAP Rating	81 B	DER	6.93	TER	16.15
Environmental	96 A	% DER < TER			57.09
CO ₂ Emissions (t/year)	0.24	DFEE	38.95	TFEE	45.23
Compliance Check	See BREL	% DFEE < TFEE			13.89
% DPER < TPER	16.23	DPER	71.46	TPER	85.30
Assessor Details	Mr. Daniel Goddard			Assessor ID	CP52-0001
Client	Denton Construction, -				

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	39.1600	2.3500	92.0260
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	39.1600		
Dwelling volume			92.0260

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) = 0.2173 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	2.7500 (17)
Infiltration rate	0.3548 (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) = 0.3016 (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	0.3845	0.3770	0.3695	0.3318	0.3242	0.2865	0.2865	0.2790	0.3016	0.3242	0.3393	0.3544 (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	0.5739	0.5711	0.5683	0.5550	0.5526	0.5410	0.5410	0.5389	0.5455	0.5526	0.5576	0.5628 (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			2.1500	1.0000	2.1500		(26)
Window			4.2500	1.2357	5.2519		(27)
Glazed Door			3.8000	1.3258	5.0379		(27)
GF			39.1600	0.1100	4.3076	75.0000	2937.0000 (28a)
Main	57.6700	10.2000	47.4700	0.1900	9.0193	110.0000	5221.6998 (29a)
Total net area of external elements Aum(A, m ²)			96.8300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 25.7667		(33)
Main dwelling							
Party Wall 1			15.1600	0.0000	0.0000	110.0000	1667.6000 (32)
Party Ceiling 1			39.1600			20.0000	783.2000 (32b)
Timber			25.7000			9.0000	231.3000 (32c)
Solid			16.9600			75.0000	1271.9999 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12112.7997 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							309.3156 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E2 Other lintels (including other steel lintels)					6.4900	0.0200	0.1298

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E3 Sill						6.4900		0.0300		0.1947				
E4 Jamb						20.1000		0.0260		0.5226				
E5 Ground floor (normal)						22.4400		0.0930		2.0869				
E7 Party floor between dwellings (in blocks of flats)						22.4400		0.0370		0.8303				
E16 Corner (normal)						10.2800		0.0510		0.5243				
E17 Corner (inverted - internal area greater than external area)						5.1400		-0.0910		-0.4677				
E18 Party wall between dwellings						5.1400		0.0650		0.3341				
P1 Party wall - Ground floor						5.9000		0.1080		0.6372				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)											4.7921	(36)		
Point Thermal bridges											0.0000			
Total fabric heat loss									(33) + (36) + (36a) =		30.5588	(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	17.4297	17.3425	17.2570	16.8556	16.7805	16.4309	16.4309	16.3661	16.5655	16.7805	16.9324	17.0913	(38)	
Average = Sum(39)m / 12 =	47.9885	47.9013	47.8158	47.4144	47.3393	46.9897	46.9897	46.9249	47.1244	47.3393	47.4913	47.6501	(39)	
												47.4141		
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
HLP (average)	1.2254	1.2232	1.2210	1.2108	1.2089	1.1999	1.1999	1.1983	1.2034	1.2089	1.2127	1.2168	(40)	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31		

4. Water heating energy requirements (kWh/year)														

Assumed occupancy												1.3842	(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														
	20.5187	20.2140	19.7849	18.9936	18.4012	17.7442	17.3894	17.8155	18.2795	18.9824	19.7899	20.4494	(42b)	
Hot water usage for other uses														
	28.8055	27.7580	26.7106	25.6631	24.6156	23.5682	23.5682	24.6156	25.6631	26.7106	27.7580	28.8055	(42c)	
Average daily hot water use (litres/day)												45.2109	(43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Energy conte	49.3242	47.9720	46.4954	44.6567	43.0168	41.3124	40.9575	42.4311	43.9426	45.6930	47.5480	49.2549	(44)	
Energy content (annual)	78.1175	68.3115	71.4618	61.1328	57.9089	50.7984	49.5346	52.5386	54.1856	62.0050	67.7408	77.1212	(45)	
Distribution loss (46)m = 0.15 x (45)m														
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)	
Water storage loss (or HIU loss):														
Total storage loss														
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)	
If cylinder contains dedicated solar storage														
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)	
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month														
	66.3999	58.0648	60.7425	51.9629	49.2225	43.1786	42.1044	44.6578	46.0577	52.7042	57.5797	65.5530	(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	66.3999	58.0648	60.7425	51.9629	49.2225	43.1786	42.1044	44.6578	46.0577	52.7042	57.5797	65.5530	(64)	
												638.2282	(64)	
12Total per year (kWh/year)												638	(64)	
Electric shower(s)														
	37.9817	33.8420	36.9542	35.2649	35.9267	34.2706	35.4129	35.9267	35.2649	36.9542	36.2593	37.9817	(64a)	
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												432.0400	(64a)	
Heat gains from water heating, kWh/month														
	26.0954	22.9767	24.4242	21.8070	21.2873	19.3623	19.3793	20.1461	20.3307	22.4146	23.4598	25.8837	(65)	

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

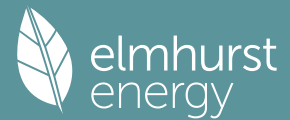
Metabolic gains (Table 5), Watts														
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	(66)	
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	60.5030	66.9855	60.5030	62.5198	60.5030	62.5198	60.5030	60.5030	62.5198	60.5030	62.5198	60.5030	(67)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	119.4268	120.6660	117.5431	110.8947	102.5024	94.6147	89.3453	88.1060	91.2290	97.8773	106.2697	114.1573	(68)	
Pumps, fans	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	(69)	
Losses e.g. evaporation (negative values) (Table 5)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)	
Water heating gains (Table 5)	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	(71)	
Total internal gains	35.0745	34.1915	32.8282	30.2875	28.6120	26.8921	26.0475	27.0781	28.2370	30.1272	32.5830	34.7899	(72)	
	258.7671	265.6059	254.6372	247.4649	235.3803	227.7895	219.6587	219.4501	225.7487	232.2704	245.1354	253.2131	(73)	

6. Solar gains														

[Jan]			Area		Solar flux		g		FF		Access		Gains	
			m2		Table 6a		Specific data		Specific data		factor		W	
					W/m2		or Table 6b		or Table 6c		Table 6d			
North			1.0800		10.6334		0.7300		0.7000		0.7700		4.0668	(74)
East			0.7700		19.6403		0.7300		0.7000		0.7700		5.3554	(76)
South			0.7200		46.7521		0.7300		0.7000		0.7700		11.9203	(78)
West			1.6800		19.6403		0.7300		0.7000		0.7700		11.6845	(80)
East			3.8000		19.6403		0.6800		0.7000		0.7700		24.6190	(76)

Solar gains	57.6460	108.7880	172.2829	245.0541	297.7447	304.3377	289.8838	250.2206	197.9459	127.0073	71.0903	47.9488	(83)	
Total gains	316.4132	374.3939	426.9201	492.5190	533.1249	532.1271	509.5425	469.6707	423.6946	359.2777	316.2257	301.1620	(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	70.1140	70.2416	70.3672	70.9629	71.0755	71.6044	71.6044	71.7032	71.3997	71.0755	70.8481	70.6120	
alpha	5.6743	5.6828	5.6911	5.7309	5.7384	5.7736	5.7736	5.7802	5.7600	5.7384	5.7232	5.7075	
util living area	0.9969	0.9915	0.9747	0.9081	0.7596	0.5558	0.4044	0.4568	0.7208	0.9497	0.9922	0.9976 (86)	
MIT	19.8926	20.0882	20.3679	20.7111	20.9194	20.9887	20.9985	20.9970	20.9548	20.6547	20.2092	19.8590 (87)	
Th 2	19.8997	19.9015	19.9032	19.9114	19.9129	19.9200	19.9200	19.9214	19.9173	19.9129	19.9098	19.9066 (88)	
util rest of house	0.9956	0.9881	0.9646	0.8751	0.6927	0.4666	0.3059	0.3513	0.6274	0.9236	0.9885	0.9967 (89)	
MIT 2	18.9117	19.1067	19.3808	19.7033	19.8683	19.9162	19.9198	19.9208	19.8983	19.6638	19.2346	18.8838 (90)	
Living area fraction									fLA = Living area / (4) =				0.5603 (91)
MIT	19.4613	19.6566	19.9339	20.2680	20.4572	20.5170	20.5241	20.5238	20.4902	20.2190	19.7806	19.4302 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.4613	19.6566	19.9339	20.2680	20.4572	20.5170	20.5241	20.5238	20.4902	20.2190	19.7806	19.4302 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9950	0.9871	0.9649	0.8870	0.7276	0.5166	0.3612	0.4106	0.6788	0.9321	0.9879	0.9961 (94)
Useful gains	314.8204	369.5686	411.9471	436.8504	387.8943	274.8720	184.0605	192.8289	287.6022	334.8776	312.4129	299.9949 (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	727.5667	706.8601	642.3510	539.0058	414.5595	278.0403	184.3935	193.5068	301.1349	455.3559	602.2192	725.7191 (97)
Space heating kWh	307.0832	226.6599	171.4205	73.5519	19.8389	0.0000	0.0000	0.0000	0.0000	89.6359	208.6605	316.7388 (98a)
Space heating requirement - total per year (kWh/year)												1413.5896
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	307.0832	226.6599	171.4205	73.5519	19.8389	0.0000	0.0000	0.0000	0.0000	89.6359	208.6605	316.7388 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1413.5896
Space heating per m2										(98c) / (4) =		36.0978 (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	441.7031	347.7237	356.6296	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9490	0.9778	0.9647	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	419.1893	340.0119	344.0380	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	601.4944	576.3172	530.8538	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	131.2597	175.8112	138.9910	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	32.8149	43.9528	34.7477	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												111.5155 (107)
Energy for space heating												36.0978 (99)
Energy for space cooling												2.8477 (108)
Total												38.9455 (109)
Fabric Energy Efficiency (DFEE)												38.9 (109)

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

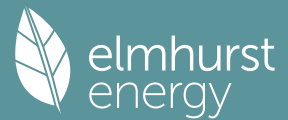
1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	39.1600 (1b)	x 2.3500 (2b)	= 92.0260 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	39.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	92.0260 (5)

2. Ventilation rate

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

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Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 20.0000 / (5) = 0.2173 (8)
Pressure test Yes
Pressure Test Method Blower Door
Measured/design AP50 5.0000 (17)
Infiltration rate 0.4673 (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) = 0.3972 (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	0.5065	0.4965	0.4866	0.4370	0.4270	0.3774	0.3774	0.3674	0.3972	0.4270	0.4469	0.4667	(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	0.6283	0.6233	0.6184	0.5955	0.5912	0.5712	0.5712	0.5675	0.5789	0.5912	0.5999	0.6089	(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			2.1500	1.0000	2.1500			(26)
TER Opening Type			7.6300	1.1450	8.7366			(27)
GF			39.1600	0.1300	5.0908			(28a)
Main	57.6700	9.7800	47.8900	0.1800	8.6202			(29a)
Total net area of external elements Aum(A, m2)			96.8300					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	24.5976		(33)
Main dwelling								
Party Wall 1			15.1600	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								309.3156 (35)
List of Thermal Bridges								
K1 Element				Length	Psi-value	Total		
E2 Other lintels (including other steel lintels)				6.4900	0.0500	0.3245		
E3 Sill				6.4900	0.0500	0.3245		
E4 Jamb				20.1000	0.0500	1.0050		
E5 Ground floor (normal)				22.4400	0.1600	3.5904		
E7 Party floor between dwellings (in blocks of flats)				22.4400	0.0700	1.5708		
E16 Corner (normal)				10.2800	0.0900	0.9252		
E17 Corner (inverted - internal area greater than external area)				5.1400	-0.0900	-0.4626		
E18 Party wall between dwellings				5.1400	0.0600	0.3084		
P1 Party wall - Ground floor				5.9000	0.0800	0.4720		
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.0582	(36)
Point Thermal bridges							(36a) =	0.0000
Total fabric heat loss							(33) + (36) + (36a) =	32.6558 (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	
	19.0792	18.9280	18.7797	18.0834	17.9531	17.3466	17.3466	17.2343	17.5802	17.9531	18.2167	18.4922	(38)
Heat transfer coeff	51.7351	51.5838	51.4356	50.7392	50.6090	50.0025	50.0025	49.8902	50.2361	50.6090	50.8725	51.1481	(39)
Average = Sum(39)m / 12 =												50.7386	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3211	1.3173	1.3135	1.2957	1.2924	1.2769	1.2769	1.2740	1.2828	1.2924	1.2991	1.3061	(40)
HLP (average)												1.2957	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.3842 (42)

Hot water usage for mixer showers

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	20.5187	20.2140	19.7849	18.9936	18.4012	17.7442	17.3894	17.8155	18.2795	18.9824	19.7899	20.4494	(42b)

Hot water usage for other uses

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	28.8055	27.7580	26.7106	25.6631	24.6156	23.5682	23.5682	24.6156	25.6631	26.7106	27.7580	28.8055	(42c)

Average daily hot water use (litres/day)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	49.3242	47.9720	46.4954	44.6567	43.0168	41.3124	40.9575	42.4311	43.9426	45.6930	47.5480	49.2549	(44)

Energy conte

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	78.1175	68.3115	71.4618	61.1328	57.9089	50.7984	49.5346	52.5386	54.1856	62.0050	67.7408	77.1212	(45)

Energy content (annual)

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

Distribution loss (46)m = 0.15 x (45)m

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

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

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

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

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	66.3999	58.0648	60.7425	51.9629	49.2225	43.1786	42.1044	44.6578	46.0577	52.7042	57.5797	65.5530	(62)

WWHRS

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

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

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	66.3999	58.0648	60.7425	51.9629	49.2225	43.1786	42.1044	44.6578	46.0577	52.7042	57.5797	65.5530	(64)

Total per year (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	37.9817	33.8420	36.9542	35.2649	35.9267	34.2706	35.4129	35.9267	35.2649	36.9542	36.2593	37.9817	(64a)

Electric shower(s)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
													(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 432.0400 (64a)

Heat gains from water heating, kWh/month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	26.0954	22.9767	24.4242	21.8070	21.2873	19.3623	19.3793	20.1461	20.3307	22.4146	23.4598	25.8837	(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	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	60.8399	67.3584	60.8399	62.8679	60.8399	62.8679	60.8399	60.8399	62.8679	60.8399	62.8679	60.8399 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	119.4268	120.6660	117.5431	110.8947	102.5024	94.6147	89.3453	88.1060	91.2290	97.8773	106.2697	114.1573 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210 (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)	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677 (71)
Water heating gains (Table 5)	35.0745	34.1915	32.8282	30.2875	28.6120	26.8921	26.0475	27.0781	28.2370	30.1272	32.5830	34.7899 (72)
Total internal gains	259.1040	265.9789	254.9740	247.8129	235.7171	228.1376	219.9956	219.7869	226.0968	232.6073	245.4834	253.5500 (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	
North	1.0200		10.6334		0.6300		0.7000		0.7700		3.3147 (74)	
East	4.3400		19.6403		0.6300		0.7000		0.7700		26.0501 (76)	
South	0.6800		46.7521		0.6300		0.7000		0.7700		9.7159 (78)	
West	1.5900		19.6403		0.6300		0.7000		0.7700		9.5437 (80)	
Solar gains	48.6243	91.8756	145.7021	207.4361	252.1191	257.7163	245.4722	211.8471	167.4800	107.3237	59.9870	40.4293 (83)
Total gains	307.7283	357.8545	400.6761	455.2490	487.8363	485.8539	465.4677	431.6340	393.5768	339.9310	305.4704	293.9793 (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	65.0365	65.2272	65.4152	66.3129	66.4836	67.2900	67.2900	67.4415	66.9771	66.4836	66.1392	65.7829
alpha	5.3358	5.3485	5.3610	5.4209	5.4322	5.4860	5.4860	5.4961	5.4651	5.4322	5.4093	5.3855
util living area	0.9974	0.9937	0.9831	0.9401	0.8290	0.6343	0.4685	0.5238	0.7870	0.9650	0.9939	0.9980 (86)
MIT	19.7488	19.9327	20.2087	20.5807	20.8506	20.9732	20.9957	20.9923	20.9167	20.5526	20.0907	19.7261 (87)
Th 2	19.8243	19.8273	19.8303	19.8442	19.8468	19.8590	19.8590	19.8612	19.8543	19.8468	19.8415	19.8360 (88)
util rest of house	0.9963	0.9910	0.9759	0.9148	0.7658	0.5325	0.3494	0.3985	0.6927	0.9447	0.9909	0.9971 (89)
MIT 2	18.7090	18.8939	19.1677	19.5312	19.7595	19.8494	19.8582	19.8597	19.8171	19.5156	19.0629	18.6955 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.2916	19.4759	19.7509	20.1192	20.3708	20.4790	20.4955	20.4943	20.4332	20.0966	19.6387	19.2729 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.2916	19.4759	19.7509	20.1192	20.3708	20.4790	20.4955	20.4943	20.4332	20.0966	19.6387	19.2729 (93)

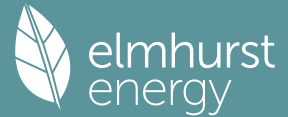
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9956	0.9900	0.9753	0.9217	0.7966	0.5893	0.4164	0.4691	0.7436	0.9500	0.9902	0.9966 (94)
Useful gains	306.3862	354.2865	390.7677	419.6163	388.6018	286.2971	193.8294	202.4885	292.6448	322.9358	302.4776	292.9660 (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	775.5893	751.8792	681.5701	569.2551	438.8190	293.9667	194.7846	204.2643	318.1546	480.6140	637.8770	770.9496 (97)
Space heating kWh	349.0871	267.1823	216.3569	107.7400	37.3616	0.0000	0.0000	0.0000	0.0000	117.3126	241.4876	355.6198 (98a)
Space heating requirement - total per year (kWh/year)	1692.1479											
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	0.0000											
Space heating kWh	349.0871	267.1823	216.3569	107.7400	37.3616	0.0000	0.0000	0.0000	0.0000	117.3126	241.4876	355.6198 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1692.1479											
Space heating per m2	(98c) / (4) =											
	43.2111 (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	470.0233	370.0184	379.1653	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9022	0.9515	0.9299	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	424.0580	352.0706	352.5693	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	547.0314	524.4394	486.0429	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	88.5409	128.2424	99.3044	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fC = cooled area / (4) =											
Intermittency factor (Table 10b)												1.0000 (105)
	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	22.1352	32.0606	24.8261	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	79.0219 (107)											
Energy for space heating	43.2111 (99)											
Energy for space cooling	2.0179 (108)											
Total	45.2291 (109)											
Fabric Energy Efficiency (TFEE)	45.2 (109)											

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Plot Reference	79596-07			Issued on Date	05/03/2026
Assessment Reference	001	Plot Type Ref	GF Flat		
Plot Address	32 Dalton Avenue, MANCHESTER, M14 7NR			SAP Version	10.2
SAP Rating	81 B	DER	6.93	TER	16.15
Environmental	96 A	% DER < TER			57.09
CO ₂ Emissions (t/year)	0.24	DFEE	38.95	TFEE	45.23
Compliance Check	See BREL	% DFEE < TFEE			13.89
% DPER < TPER	16.23	DPER	71.46	TPER	85.30
Assessor Details	Mr. Daniel Goddard			Assessor ID	CP52-0001
Client	Denton Construction, -				

SAP 10 WORKSHEET FOR New Build (As Built) (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	39.1600	2.3500	92.0260
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	39.1600		
Dwelling volume			92.0260

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	2.7500	(17)
Infiltration rate	0.1375	(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) =	0.1169 (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	0.1490	0.1461	0.1432	0.1286	0.1256	0.1110	0.1110	0.1081	0.1169	0.1256	0.1315	0.1373 (22b)
Mechanical extract ventilation - decentralised												
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)
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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			2.1500	1.0000	2.1500		(26)
Window			4.2500	1.2357	5.2519		(27)
Glazed Door			3.8000	1.3258	5.0379		(27)
GF			39.1600	0.1100	4.3076	75.0000	2937.0000 (28a)
Main	57.6700	10.2000	47.4700	0.1900	9.0193	110.0000	5221.6998 (29a)
Total net area of external elements Aum(A, m ²)			96.8300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	25.7667	(33)
Main dwelling							
Party Wall 1			15.1600	0.0000	0.0000	110.0000	1667.6000 (32)
Party Ceiling 1			39.1600			20.0000	783.2000 (32b)
Timber			25.7000			9.0000	231.3000 (32c)
Solid			16.9600			75.0000	1271.9999 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) =
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							12112.7997 (34)
List of Thermal Bridges							309.3156 (35)

elmhurst
energy

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
North	1.0800	10.6334	0.7300	0.7000	0.7700	4.0668 (74)
East	0.7700	19.6403	0.7300	0.7000	0.7700	5.3554 (76)
South	0.7200	46.7521	0.7300	0.7000	0.7700	11.9203 (78)
West	1.6800	19.6403	0.7300	0.7000	0.7700	11.6845 (80)
East	3.8000	19.6403	0.6800	0.7000	0.7700	24.6190 (76)

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Solar gains	57.6460	108.7880	172.2829	245.0541	297.7447	304.3377	289.8838	250.2206	197.9459	127.0073	71.0903	47.9488 (83)
Total gains	350.1715	407.2595	457.7159	518.3143	555.9809	551.8782	527.1668	488.7069	444.4375	383.4847	345.2053	334.2391 (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	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557
alpha	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037
util living area	0.9946	0.9862	0.9624	0.8817	0.7212	0.5245	0.3810	0.4289	0.6800	0.9298	0.9874	0.9958 (86)
MIT	20.0446	20.2304	20.4879	20.7782	20.9439	20.9924	20.9990	20.9981	20.9692	20.7261	20.3219	19.9986 (87)
Th 2	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456 (88)
util rest of house	0.9924	0.9811	0.9486	0.8440	0.6547	0.4411	0.2902	0.3315	0.5893	0.8973	0.9817	0.9942 (89)
MIT 2	18.8597	19.0941	19.4122	19.7456	19.9067	19.9423	19.9454	19.9451	19.9295	19.6996	19.2120	18.8013 (90)
Living area fraction									fLA =	Living area / (4) =		0.5603 (91)
MIT	19.5235	19.7307	20.0149	20.3241	20.4878	20.5306	20.5357	20.5351	20.5120	20.2747	19.8339	19.4721 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5235	19.7307	20.0149	20.3241	20.4878	20.5306	20.5357	20.5351	20.5120	20.2747	19.8339	19.4721 (93)

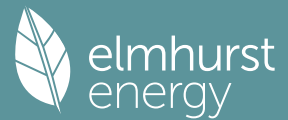
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9913	0.9798	0.9497	0.8586	0.6900	0.4878	0.3411	0.3862	0.6395	0.9088	0.9809	0.9932 (94)
Useful gains	347.1380	399.0137	434.6749	445.0387	383.6143	269.1868	179.8226	188.7231	284.2128	348.5041	338.6201	331.9804 (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	696.3716	678.4027	618.2125	522.5748	401.9813	271.2862	180.0313	189.1507	293.3051	442.5513	582.4862	698.5938 (97)
Space heating kWh	259.8298	187.7494	136.5520	55.8259	13.6650	0.0000	0.0000	0.0000	0.0000	69.9711	175.5836	272.7604 (98a)
Space heating requirement - total per year (kWh/year)												1171.9373
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	259.8298	187.7494	136.5520	55.8259	13.6650	0.0000	0.0000	0.0000	0.0000	69.9711	175.5836	272.7604 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1171.9373
Space heating per m2										(98c) / (4) =		29.9269 (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)
Fraction of main heating from main system 2												0.0000 (203)
Fraction of total heating from main system 1												1.0000 (204)
Fraction of total heating from main system 2												0.0000 (205)
Efficiency of main space heating system 1 (in %)												100.0000 (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	259.8298	187.7494	136.5520	55.8259	13.6650	0.0000	0.0000	0.0000	0.0000	69.9711	175.5836	272.7604 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	259.8298	187.7494	136.5520	55.8259	13.6650	0.0000	0.0000	0.0000	0.0000	69.9711	175.5836	272.7604 (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)
Space heating fuel used, main 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)
Water heating												
Water heating requirement	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104 (64)
Efficiency of water heater (217)m	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100 (216)
Fuel for water heating, kWh/month	51.7934	45.7541	48.4578	42.2210	40.6731	36.3709	35.6804	37.2446	37.8191	42.5086	45.6170	51.1750 (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	1.0625	0.9597	1.0625	1.0282	1.0625	1.0282	1.0625	1.0625	1.0282	1.0625	1.0282	1.0625 (231)
Lighting	11.6023	9.3078	8.3807	6.1400	4.7427	3.8749	4.3265	5.6237	7.3047	9.5841	10.8252	11.9248 (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												1171.9373 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												349.4100

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Water heating fuel used	515.3150 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
(MEVDecentralised, Database: total watage = 2.3400, total flow = 21.0000, SFP = 0.1114)	
mechanical ventilation fans (SFP = 0.1114)	12.5103 (230a)
Total electricity for the above, kWh/year	12.5103 (231)
Electricity for lighting (calculated in Appendix L)	93.6375 (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	1793.4001 (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	1171.9373	0.1566	183.5606 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	515.3150	0.1411	72.7047 (264)
Space and water heating			256.2653 (265)
Pumps, fans and electric keep-hot	12.5103	0.1387	1.7353 (267)
Energy for lighting	93.6375	0.1443	13.5148 (268)
Total CO2, kg/year			271.5155 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.9300 (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	1171.9373	1.5798	1851.4827 (275)
Space heating - main system 2	0.0000	0.0000	0.0000 (276)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	515.3150	1.5217	784.1554 (278)
Space and water heating			2635.6381 (279)
Pumps, fans and electric keep-hot	12.5103	1.5128	18.9255 (281)
Energy for lighting	93.6375	1.5338	143.6244 (282)
Total Primary energy kWh/year			2798.1880 (286)
Dwelling Primary energy Rate (DPER)			71.4600 (287)

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

1. Overall dwelling characteristics

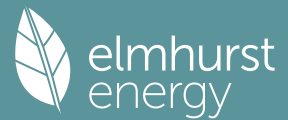
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	39.1600 (1b)	x 2.3500 (2b)	= 92.0260 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	39.1600		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	92.0260 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.2173 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4673 (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) = 0.3972 (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	0.5065	0.4965	0.4866	0.4370	0.4270	0.3774	0.3774	0.3674	0.3972	0.4270	0.4469	0.4667 (22b)
Effective ac	0.6283	0.6233	0.6184	0.5955	0.5912	0.5712	0.5712	0.5675	0.5789	0.5912	0.5999	0.6089 (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			2.1500	1.0000	2.1500			(26)					
TER Opening Type			7.6300	1.1450	8.7366			(27)					
GF			39.1600	0.1300	5.0908			(28a)					
Main	57.6700	9.7800	47.8900	0.1800	8.6202			(29a)					
Total net area of external elements Aum(A, m2)			96.8300					(31)					
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	24.5976		(33)					
Main dwelling													
Party Wall 1			15.1600	0.0000	0.0000			(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							309.3156	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value		Total						
E2 Other lintels (including other steel lintels)				6.4900	0.0500		0.3245						
E3 Sill				6.4900	0.0500		0.3245						
E4 Jamb				20.1000	0.0500		1.0050						
E5 Ground floor (normal)				22.4400	0.1600		3.5904						
E7 Party floor between dwellings (in blocks of flats)				22.4400	0.0700		1.5708						
E16 Corner (normal)				10.2800	0.0900		0.9252						
E17 Corner (inverted - internal area greater than external area)				5.1400	-0.0900		-0.4626						
E18 Party wall between dwellings				5.1400	0.0600		0.3084						
P1 Party wall - Ground floor				5.9000	0.0800		0.4720						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								8.0582 (36)					
Point Thermal Bridges							(36a) =	0.0000					
Total fabric heat loss							(33) + (36) + (36a) =	32.6558 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 19.0792	Feb 18.9280	Mar 18.7797	Apr 18.0834	May 17.9531	Jun 17.3466	Jul 17.3466	Aug 17.2343	Sep 17.5802	Oct 17.9531	Nov 18.2167	Dec 18.4922	(38)
Heat transfer coeff	51.7351	51.5838	51.4356	50.7392	50.6090	50.0025	50.0025	49.8902	50.2361	50.6090	50.8725	51.1481	(39)
Average = Sum(39)m / 12 =												50.7386	
HLP	Jan 1.3211	Feb 1.3173	Mar 1.3135	Apr 1.2957	May 1.2924	Jun 1.2769	Jul 1.2769	Aug 1.2740	Sep 1.2828	Oct 1.2924	Nov 1.2991	Dec 1.3061	(40)
HLP (average)												1.2957	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

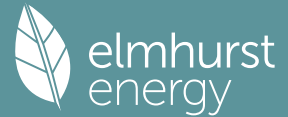
4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.3842 (42)
Hot water usage for mixer showers													
	60.8393	59.9250	58.5927	56.0436	54.1624	52.0645	50.8720	52.1943	53.6437	55.8962	58.5001	60.6062	(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	(42b)
Hot water usage for other uses													
	28.8055	27.7580	26.7106	25.6631	24.6156	23.5682	23.5682	24.6156	25.6631	26.7106	27.7580	28.8055	(42c)
Average daily hot water use (litres/day)													82.2787 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	89.6448	87.6831	85.3033	81.7067	78.7780	75.6326	74.4402	76.8099	79.3068	82.6068	86.2581	89.4117	(44)
Energy conte	141.9755	124.8595	131.1080	111.8524	106.0503	92.9992	90.0290	95.1067	97.7932	112.0966	122.8905	139.9972	(45)
Energy content (annual)													Total = Sum(45)m = 1366.7580
Distribution loss (46)m = 0.15 x (45)m													
	21.2963	18.7289	19.6662	16.7779	15.9076	13.9499	13.5043	14.2660	14.6690	16.8145	18.4336	20.9996	(46)
Water storage loss (or HIU loss):													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss													
	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage													
	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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													
	188.5704	166.9452	177.7029	156.9442	152.6452	138.0910	136.6239	141.7016	142.8850	158.6915	167.9823	186.5921	(62)
WWHRS	-27.8132	-24.5982	-25.7578	-21.3285	-19.8774	-17.0092	-15.9434	-16.9543	-17.5984	-20.7466	-23.5034	-27.2981	(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													
	160.7572	142.3470	151.9450	135.6157	132.7678	121.0818	120.6804	124.7473	125.2866	137.9449	144.4790	159.2939	(64)
Total per year (kWh/year)													Total per year (kWh/year) = Sum(64)m = 1656.9468 (64)
Electric shower(s)													1657 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													0.0000 (64a)
Heat gains from water heating, kWh/month													
	84.4828	75.1844	80.8693	73.2644	72.5377	66.9957	67.2106	68.8989	68.5897	74.5480	76.9346	83.8250	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	69.2097	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	60.8399	67.3584	60.8399	62.8679	60.8399	62.8679	60.8399	60.8399	62.8679	60.8399	62.8679	60.8399	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	119.4268	120.6660	117.5431	110.8947	102.5024	94.6147	89.3453	88.1060	91.2290	97.8773	106.2697	114.1573	(68)
Pumps, fans	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	29.9210	(69)
Losses e.g. evaporation (negative values) (Table 5)	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)
	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	(71)

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Water heating gains (Table 5)	113.5521	111.8815	108.6953	101.7561	97.4969	93.0496	90.3368	92.6060	95.2635	100.1990	106.8536	112.6680 (72)
Total internal gains	340.5816	346.6688	333.8412	322.2816	307.6020	294.2951	284.2848	285.3148	293.1232	305.6791	322.7540	334.4281 (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
North					1.0200	10.6334	0.6300	0.7000			0.7700	3.3147 (74)
East					4.3400	19.6403	0.6300	0.7000			0.7700	26.0501 (76)
South					0.6800	46.7521	0.6300	0.7000			0.7700	9.7159 (78)
West					1.5900	19.6403	0.6300	0.7000			0.7700	9.5437 (80)
Solar gains	48.6243	91.8756	145.7021	207.4361	252.1191	257.7163	245.4722	211.8471	167.4800	107.3237	59.9870	40.4293 (83)
Total gains	389.2060	438.5444	479.5433	529.7176	559.7211	552.0114	529.7570	497.1619	460.6033	413.0028	382.7410	374.8573 (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	65.0365	65.2272	65.4152	66.3129	66.4836	67.2900	67.2900	67.4415	66.9771	66.4836	66.1392	65.7829
alpha	5.3358	5.3485	5.3610	5.4209	5.4322	5.4860	5.4860	5.4961	5.4651	5.4322	5.4093	5.3855
util living area	0.9921	0.9842	0.9644	0.8993	0.7632	0.5671	0.4133	0.4580	0.7057	0.9270	0.9831	0.9935 (86)
MIT	19.9268	20.1036	20.3629	20.6898	20.9019	20.9843	20.9976	20.9960	20.9513	20.6763	20.2544	19.9040 (87)
Th 2	19.8243	19.8273	19.8303	19.8442	19.8468	19.8590	19.8590	19.8612	19.8543	19.8468	19.8415	19.8360 (88)
util rest of house	0.9891	0.9782	0.9507	0.8635	0.6938	0.4721	0.3073	0.3467	0.6083	0.8921	0.9755	0.9910 (89)
MIT 2	18.6190	18.8439	19.1674	19.5609	19.7774	19.8521	19.8585	19.8603	19.8286	19.5587	19.0468	18.5989 (90)
Living area fraction	19.3517	19.5496	19.8372	20.1934	20.4074	20.4864	20.4967	20.4966	20.4576	20.1849	19.7234	19.3301 (92)
MIT	19.3517	19.5496	19.8372	20.1934	20.4074	20.4864	20.4967	20.4966	20.4576	20.1849	19.7234	19.3301 (93)
Temperature adjustment												0.0000
adjusted MIT	19.3517	19.5496	19.8372	20.1934	20.4074	20.4864	20.4967	20.4966	20.4576	20.1849	19.7234	19.3301 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9875	0.9764	0.9508	0.8754	0.7291	0.5252	0.3668	0.4093	0.6617	0.9038	0.9745	0.9895 (94)
Useful gains	384.3349	428.1958	455.9554	463.7284	408.1118	289.8979	194.3349	203.4666	304.7726	373.2741	372.9782	370.9213 (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	778.7005	755.6837	686.0045	573.0195	440.6735	294.3352	194.8456	204.3786	319.3799	485.0808	642.1825	773.8741 (97)
Space heating kWh	293.4080	220.0718	171.1565	78.6896	24.2259	0.0000	0.0000	0.0000	0.0000	83.1842	193.8271	299.7969 (98a)
Space heating requirement - total per year (kWh/year)												1364.3600
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	293.4080	220.0718	171.1565	78.6896	24.2259	0.0000	0.0000	0.0000	0.0000	83.1842	193.8271	299.7969 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1364.3600
Space heating per m ²										(98c) / (4) =		34.8407 (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	293.4080	220.0718	171.1565	78.6896	24.2259	0.0000	0.0000	0.0000	0.0000	83.1842	193.8271	299.7969 (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)	317.8851	238.4310	185.4350	85.2542	26.2469	0.0000	0.0000	0.0000	0.0000	90.1237	209.9969	324.8070 (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	160.7572	142.3470	151.9450	135.6157	132.7678	121.0818	120.6804	124.7473	125.2866	137.9449	144.4790	159.2939 (64)
Efficiency of water heater	85.3911	85.0333	84.3274	82.8845	81.0679	79.8000	79.8000	79.8000	79.8000	82.9631	84.7195	79.8000 (216)
(217)m	85.3911	85.0333	84.3274	82.8845	81.0679	79.8000	79.8000	79.8000	79.8000	82.9631	84.7195	85.4559 (217)
Fuel for water heating, kWh/month	188.2598	167.4016	180.1846	163.6201	163.7737	151.7315	151.2286	156.3250	157.0008	166.2727	170.5381	186.4049 (219)
Space cooling fuel requirement	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)
(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	12.6413	10.1413	9.1312	6.6899	5.1674	4.2219	4.7139	6.1273	7.9588	10.4424	11.7946	12.9927 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-18.8993	-26.9508	-39.2087	-44.6841	-48.7606	-45.7968	-45.3009	-42.5166	-37.6389	-31.1551	-20.9122	-16.3095 (233a)
(233a)m	-18.8993	-26.9508	-39.2087	-44.6841	-48.7606	-45.7968	-45.3009	-42.5166	-37.6389	-31.1551	-20.9122	-16.3095 (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)
(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)	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)
(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)

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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	-9.7697	-20.6490	-41.1944	-62.0667	-82.2167	-82.5958	-81.5557	-68.9284	-50.4043	-29.5170	-13.0465	-7.7129	(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												1478.1799	(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												2002.7413	(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)												102.0227	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-967.7906	(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												2701.1534	(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	1478.1799	0.2100	310.4178	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2002.7413	0.2100	420.5757	(264)
Space and water heating			730.9935	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	102.0227	0.1443	14.7250	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-418.1335	0.1343	-56.1490	
PV Unit electricity exported	-549.6571	0.1258	-69.1601	
Total			-125.3091	(269)
Total CO2, kg/year			632.3387	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			16.1500	(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	1478.1799	1.1300	1670.3433	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2002.7413	1.1300	2263.0977	(278)
Space and water heating			3933.4410	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	102.0227	1.5338	156.4858	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-418.1335	1.4963	-625.6433	
PV Unit electricity exported	-549.6571	0.4619	-253.8643	
Total			-879.5077	(283)
Total Primary energy kWh/year			3340.5200	(286)
Target Primary Energy Rate (TPER)			85.3000	(287)

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Plot Reference	79596-07			Issued on Date	05/03/2026
Assessment Reference	001	Plot Type Ref	GF Flat		
Plot Address	32 Dalton Avenue, MANCHESTER, M14 7NR			SAP Version	10.2
SAP Rating	81 B	DER	6.93	TER	16.15
Environmental	96 A	% DER < TER			57.09
CO ₂ Emissions (t/year)	0.24	DFEE	38.95	TFEE	45.23
Compliance Check	See BREL	% DFEE < TFEE			13.89
% DPER < TPER	16.23	DPER	71.46	TPER	85.30
Assessor Details	Mr. Daniel Goddard			Assessor ID	CP52-0001
Client	Denton Construction, -				

SAP 10 WORKSHEET FOR New Build (As Built) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	39.1600 (1b)	2.3500 (2b)	92.0260 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	39.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	92.0260 (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	2.7500	(17)
Infiltration rate	0.1375	(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) =	0.1169 (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)
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	0.1490	0.1461	0.1432	0.1286	0.1256	0.1110	0.1110	0.1081	0.1169	0.1256	0.1315	0.1373 (22b)
Mechanical extract ventilation - decentralised												
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)
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (25)

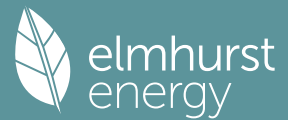
3. Heat losses and heat loss parameter

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			2.1500	1.0000	2.1500		(26)
Window			4.2500	1.2357	5.2519		(27)
Glazed Door			3.8000	1.3258	5.0379		(27)
GF			39.1600	0.1100	4.3076	75.0000	2937.0000 (28a)
Main	57.6700	10.2000	47.4700	0.1900	9.0193	110.0000	5221.6998 (29a)
Total net area of external elements Aum(A, m ²)			96.8300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	25.7667	(33)
Main dwelling							
Party Wall 1			15.1600	0.0000	0.0000	110.0000	1667.6000 (32)
Party Ceiling 1			39.1600			20.0000	783.2000 (32b)
Timber			25.7000			9.0000	231.3000 (32c)
Solid			16.9600			75.0000	1271.9999 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12112.7997 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		309.3156 (35)
List of Thermal Bridges		

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
North	1.0800	10.6334	0.7300	0.7000	0.7700	4.0668 (74)
East	0.7700	19.6403	0.7300	0.7000	0.7700	5.3554 (76)
South	0.7200	46.7521	0.7300	0.7000	0.7700	11.9203 (78)
West	1.6800	19.6403	0.7300	0.7000	0.7700	11.6845 (80)
East	3.8000	19.6403	0.6800	0.7000	0.7700	24.6190 (76)

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Solar gains	57.6460	108.7880	172.2829	245.0541	297.7447	304.3377	289.8838	250.2206	197.9459	127.0073	71.0903	47.9488 (83)
Total gains	390.3563	440.0902	493.2923	546.2733	579.9929	569.1445	544.2229	506.6347	464.0852	410.7499	376.4174	372.1970 (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	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557
alpha	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037
util living area	0.9906	0.9802	0.9487	0.8607	0.6979	0.5094	0.3692	0.4140	0.6561	0.9099	0.9810	0.9928 (86)
MIT	20.1329	20.2987	20.5511	20.8085	20.9526	20.9935	20.9992	20.9984	20.9744	20.7656	20.3873	20.0829 (87)
Th 2	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456 (88)
util rest of house	0.9871	0.9730	0.9312	0.8198	0.6314	0.4280	0.2811	0.3199	0.5665	0.8717	0.9728	0.9901 (89)
MIT 2	18.9712	19.1787	19.4863	19.7762	19.9133	19.9428	19.9454	19.9452	19.9324	19.7407	19.2925	18.9081 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.6221	19.8062	20.0829	20.3545	20.4956	20.5315	20.5358	20.5353	20.5162	20.3149	19.9059	19.5663 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.6221	19.8062	20.0829	20.3545	20.4956	20.5315	20.5358	20.5353	20.5162	20.3149	19.9059	19.5663 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9858	0.9719	0.9338	0.8367	0.6670	0.4736	0.3305	0.3727	0.6162	0.8866	0.9724	0.9888 (94)
Useful gains	384.7972	427.7216	460.6200	457.0848	386.8742	269.5226	179.8601	188.8073	285.9643	364.1527	366.0436	368.0417 (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	700.8785	681.8546	621.3241	523.9662	402.3370	271.3231	180.0359	189.1608	293.4963	444.3906	585.7803	702.9024 (97)
Space heating kWh	235.1644	170.7774	119.5638	48.1546	11.5043	0.0000	0.0000	0.0000	0.0000	59.6970	158.2104	249.1363 (98a)
Space heating requirement - total per year (kWh/year)	1052.2083											
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	235.1644	170.7774	119.5638	48.1546	11.5043	0.0000	0.0000	0.0000	0.0000	59.6970	158.2104	249.1363 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1052.2083											
Space heating per m2	(98c) / (4) = 26.8695 (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)											
Fraction of main heating from main system 2	0.0000 (203)											
Fraction of total heating from main system 1	1.0000 (204)											
Fraction of total heating from main system 2	0.0000 (205)											
Efficiency of main space heating system 1 (in %)	100.0000 (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	235.1644	170.7774	119.5638	48.1546	11.5043	0.0000	0.0000	0.0000	0.0000	59.6970	158.2104	249.1363 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	235.1644	170.7774	119.5638	48.1546	11.5043	0.0000	0.0000	0.0000	0.0000	59.6970	158.2104	249.1363 (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)
Space heating fuel used, main 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)
Water heating												
Water heating requirement	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104 (64)
Efficiency of water heater (217)m	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100 (216)
Fuel for water heating, kWh/month	51.7934	45.7541	48.4578	42.2210	40.6731	36.3709	35.6804	37.2446	37.8191	42.5086	45.6170	51.1750 (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	1.0625	0.9597	1.0625	1.0282	1.0625	1.0282	1.0625	1.0625	1.0282	1.0625	1.0282	1.0625 (231)
Lighting	11.6023	9.3078	8.3807	6.1400	4.7427	3.8749	4.3265	5.6237	7.3047	9.5841	10.8252	11.9248 (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	1052.2083 (211)											
Space heating fuel - main system 2	0.0000 (213)											
Space heating fuel - secondary	0.0000 (215)											
Efficiency of water heater	349.4100											
Water heating fuel used	515.3150 (219)											

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Space cooling fuel	0.0000 (221)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 2.3400, total flow = 21.0000, SFP = 0.1114)	
mechanical ventilation fans (SFP = 0.1114)	12.5103 (230a)
Total electricity for the above, kWh/year	12.5103 (231)
Electricity for lighting (calculated in Appendix L)	93.6375 (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	1673.6711 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1052.2083	16.4900	173.5091 (240)
Space heating - main system 2	0.0000	16.4900	0.0000 (241)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	515.3150	16.4900	84.9754 (247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000 (247a)
Pumps, fans and electric keep-hot	12.5103	16.4900	2.0629 (249)
Energy for lighting	93.6375	16.4900	15.4408 (250)
Additional standing charges			0.0000 (251)
Total energy cost			275.9884 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):	0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] = 1.1806 (257)
SAP value	80.8631
SAP rating (Section 12)	81 (258)
SAP band	B

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	1052.2083	0.1568	164.9719 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	515.3150	0.1411	72.7047 (264)
Space and water heating			237.6766 (265)
Pumps, fans and electric keep-hot	12.5103	0.1387	1.7353 (267)
Energy for lighting	93.6375	0.1443	13.5148 (268)
Total CO2, kg/year			252.9267 (272)
CO2 emissions per m2			6.4600 (273)
EI value			95.9729
EI rating			96 (274)
EI band			A

SAP 10 WORKSHEET FOR New Build (As Built) (Version 10.2, February 2022) CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

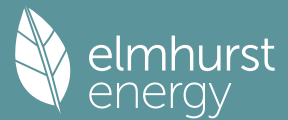
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	39.1600 (1b)	x 2.3500 (2b)	= 92.0260 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	39.1600		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	92.0260 (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	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) =	Air changes per hour 0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door

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Measured/design AP50 2.7500 (17)
Infiltration rate 0.1375 (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) = 0.1169 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	4.3000	4.2000	4.2000	3.9000	4.0000	3.4000	3.3000	3.3000	3.4000	3.8000	3.8000	3.9000
Adj infilt rate	1.0750	1.0500	1.0500	0.9750	1.0000	0.8500	0.8250	0.8250	0.8500	0.9500	0.9500	0.9750
	0.1256	0.1227	0.1227	0.1140	0.1169	0.0993	0.0964	0.0964	0.0993	0.1110	0.1110	0.1140
Mechanical extract ventilation - decentralised												
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)
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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							
Door			2.1500	1.0000	2.1500		(26)
Window			4.2500	1.2357	5.2519		(27)
Glazed Door			3.8000	1.3258	5.0379		(27)
GF			39.1600	0.1100	4.3076	75.0000	2937.0000 (28a)
Main	57.6700	10.2000	47.4700	0.1900	9.0193	110.0000	5221.6998 (29a)
Total net area of external elements Aum(A, m2)			96.8300				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	25.7667			(33)
Main dwelling							
Party Wall 1			15.1600	0.0000	0.0000	110.0000	1667.6000 (32)
Party Ceiling 1			39.1600			20.0000	783.2000 (32b)
Timber			25.7000			9.0000	231.3000 (32c)
Solid			16.9600			75.0000	1271.9999 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 12112.7997 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 309.3156 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	6.4900	0.0200	0.1298
E3 Sill	6.4900	0.0300	0.1947
E4 Jamb	20.1000	0.0260	0.5226
E5 Ground floor (normal)	22.4400	0.0930	2.0869
E7 Party floor between dwellings (in blocks of flats)	22.4400	0.0370	0.8303
E16 Corner (normal)	10.2800	0.0510	0.5243
E17 Corner (inverted - internal area greater than external area)	5.1400	-0.0910	-0.4677
E18 Party wall between dwellings	5.1400	0.0650	0.3341
P1 Party wall - Ground floor	5.9000	0.1080	0.6372

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 4.7921 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 30.5588 (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	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843
Average = Sum(39)m / 12 =	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431

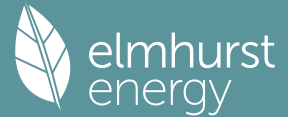
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.3842 (42)
Hot water usage for mixer showers 68.4442 67.4157 65.9168 63.0490 60.9327 58.5726 57.2311 58.7186 60.3491 62.8832 65.8126 68.1820 (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 (42b)
Hot water usage for other uses 28.8055 27.7580 26.7106 25.6631 24.6156 23.5682 23.5682 24.6156 25.6631 26.7106 27.7580 28.8055 (42c)
Average daily hot water use (litres/day) 89.2901 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	97.2498	95.1737	92.6274	88.7121	85.5483	82.1407	80.7992	83.3342	86.0122	89.5938	93.5706	96.9875
Energy conte	154.0198	135.5261	142.3648	121.4425	115.1645	101.0016	97.7196	103.1851	106.0617	121.5779	133.3085	151.8590
Energy content (annual)										Total = Sum(45)m =		1483.2311
Distribution loss (46)m = 0.15 x (45)m	23.1030	20.3289	21.3547	18.2164	17.2747	15.1502	14.6579	15.4778	15.9093	18.2367	19.9963	22.7789
Water storage loss (or HIU loss):												
Store volume												201.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6100 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8694 (55)
Total storage loss	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514
If cylinder contains dedicated solar storage	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514
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
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
Total heat required for water heating calculated for each month	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104
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
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
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
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
Output from w/h	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104
Electric shower(s)								Total per year (kWh/year) = Sum(64)m =				1800.5621 (64)

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	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	51.2116	45.0624	47.3363	40.3796	38.2922	33.5830	32.4918	34.3091	35.2655	40.4247	44.3251	50.4931 (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
	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	13.2554	11.7733	9.5747	7.2487	5.4185	4.5745	4.9429	6.4250	8.6236	10.9496	12.7798	13.6238 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	178.2489	180.0985	175.4374	165.5145	152.9886	141.2160	133.3512	131.5015	136.1626	146.0856	158.6115	170.3841 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894 (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)	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677 (71)
Water heating gains (Table 5)	68.8328	67.0572	63.6241	56.0828	51.4680	46.6431	43.6717	46.1143	48.9799	54.3342	61.5626	67.8671 (72)
Total internal gains	332.7102	331.3022	321.0094	301.2192	282.2483	264.8068	254.3391	256.4140	266.1393	283.7426	305.3271	324.2482 (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			
North				1.0800	9.3942	0.7300	0.7000	0.7700	3.5928 (74)			
East				0.7700	17.3606	0.7300	0.7000	0.7700	4.7338 (76)			
South				0.7200	41.2355	0.7300	0.7000	0.7700	10.5138 (78)			
West				1.6800	17.3606	0.7300	0.7000	0.7700	10.3283 (80)			
East				3.8000	17.3606	0.6800	0.7000	0.7700	21.7615 (76)			
Solar gains	50.9301	98.6013	163.1566	236.7253	280.5512	292.0481	272.8938	232.5520	192.6214	121.1034	64.5477	43.3264 (83)
Total gains	383.6404	429.9035	484.1660	537.9445	562.7994	556.8549	527.2329	488.9660	458.7607	404.8460	369.8748	367.5745 (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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557
util living area	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037
MIT	0.9890	0.9775	0.9404	0.8335	0.6449	0.4415	0.3294	0.3735	0.6211	0.8949	0.9778	0.9914 (86)
Th 2	20.2003	20.3572	20.6061	20.8530	20.9721	20.9974	20.9996	20.9992	20.9820	20.8024	20.4434	20.1553 (87)
util rest of house	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456 (88)
MIT	0.9848	0.9690	0.9194	0.7852	0.5707	0.3564	0.2382	0.2755	0.5269	0.8500	0.9678	0.9880 (89)
Living area fraction	19.0569	19.2523	19.5524	19.8227	19.9289	19.9447	19.9455	19.9455	19.9373	19.7806	19.3627	19.0002 (90)
MIT	19.6975	19.8713	20.1427	20.3999	20.5134	20.5345	20.5361	20.5358	20.5226	20.3531	19.9682	19.6474 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6975	19.8713	20.1427	20.3999	20.5134	20.5345	20.5361	20.5358	20.5226	20.3531	19.9682	19.6474 (93)

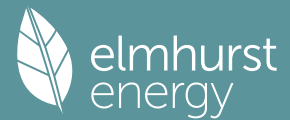
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9835	0.9683	0.9238	0.8072	0.6115	0.4042	0.2893	0.3305	0.5795	0.8691	0.9681	0.9868 (94)
Ext temp.	377.3098	416.2886	447.2786	434.2533	344.1265	225.0687	152.5319	161.5823	265.8350	351.8616	358.0583	362.7048 (95)
Heat loss rate W	5.1000	5.7000	7.3000	9.8000	12.8000	15.6000	17.2000	17.0000	14.6000	11.2000	7.8000	5.0000 (96)
Space heating kWh	667.7365	648.2414	587.4655	484.8728	352.8326	225.7194	152.6037	161.7401	270.9187	418.6899	556.6098	670.0161 (97)
Space heating requirement - total per year (kWh/year)	216.0775	155.8723	104.2990	36.4460	6.4774	0.0000	0.0000	0.0000	0.0000	49.7203	142.9571	228.6396 (98a)
Solar heating kWh												940.4892
Solar heating contribution - total per year (kWh/year)	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)
Space heating kWh	216.0775	155.8723	104.2990	36.4460	6.4774	0.0000	0.0000	0.0000	0.0000	49.7203	142.9571	228.6396 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												940.4892
Space heating per m2										(98c) / (4) =		24.0166 (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)
Fraction of main heating from main system 2												0.0000 (203)
Fraction of total heating from main system 1												1.0000 (204)
Fraction of total heating from main system 2												0.0000 (205)
Efficiency of main space heating system 1 (in %)												100.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating efficiency (main heating system 1)	216.0775	155.8723	104.2990	36.4460	6.4774	0.0000	0.0000	0.0000	0.0000	49.7203	142.9571	228.6396 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)

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Space heating fuel (main heating system)	216.0775	155.8723	104.2990	36.4460	6.4774	0.0000	0.0000	0.0000	0.0000	49.7203	142.9571	228.6396	(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)
Space heating fuel used, main system 2												0.0000	(213)
Water heating requirement	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104	(64)
Efficiency of water heater (217)m	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	(216)
Fuel for water heating, kWh/month	51.7934	45.7541	48.4578	42.2210	40.6731	36.3709	35.6804	37.2446	37.8191	42.5086	45.6170	51.1750	(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	1.0625	0.9597	1.0625	1.0282	1.0625	1.0282	1.0625	1.0625	1.0282	1.0625	1.0282	1.0625	(231)
Lighting	11.6023	9.3078	8.3807	6.1400	4.7427	3.8749	4.3265	5.6237	7.3047	9.5841	10.8252	11.9248	(232)
Electricity generated by PVs (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	(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)	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)	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)	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)	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)	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												940.4892	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												349.4100	
Water heating fuel used												515.3150	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(MEV)Decentralised, Database: total watage = 2.3400, total flow = 21.0000, SFP = 0.1114)													
mechanical ventilation fans (SFP = 0.1114)												12.5103	(230a)
Total electricity for the above, kWh/year												12.5103	(231)
Electricity for lighting (calculated in Appendix L)												93.6375	(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												1561.9520	(238)

10a. Fuel costs - using BEDF prices (591)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	940.4892	28.4300	267.3811	(240)
Space heating - main system 2	0.0000	28.4300	0.0000	(241)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	515.3150	28.4300	146.5041	(247)
Energy for instantaneous electric shower(s)	0.0000	28.4300	0.0000	(247a)
Pumps, fans and electric keep-hot	12.5103	28.4300	3.5567	(249)
Energy for lighting	93.6375	28.4300	26.6212	(250)
Additional standing charges			0.0000	(251)
Total energy cost			444.0630	(255)

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	940.4892	0.1572	147.8015	(261)
Space heating - main system 2	0.0000	0.0000	0.0000	(262)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	515.3150	0.1411	72.7047	(264)
Space and water heating			220.5062	(265)
Pumps, fans and electric keep-hot	12.5103	0.1387	1.7353	(267)
Energy for lighting	93.6375	0.1443	13.5148	(268)
Total CO2, kg/year			235.7563	(272)

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	940.4892	1.5818	1487.6402	(275)
Space heating - main system 2	0.0000	0.0000	0.0000	(276)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	515.3150	1.5217	784.1554	(278)
Space and water heating			2271.7956	(279)
Pumps, fans and electric keep-hot	12.5103	1.5128	18.9255	(281)
Energy for lighting	93.6375	1.5338	143.6244	(282)
Total Primary energy kWh/year			2434.3455	(286)

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SAP 10 EPC IMPROVEMENTS

001

Current energy efficiency rating: B 81
Current environmental impact rating: A 96

N Solar water heating Not applicable
U Solar photovoltaic panels Not applicable
V2 Wind turbine Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures Typical annual savings Energy Environmental
(none) efficiency impact
Total Savings £0 0.00 kg/m²

Potential energy efficiency rating: B 81
Potential environmental impact rating: A 96

Fuel prices for cost data on this page from database revision number 591 TEST (27 Feb 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
	£444	£444	£0
Electricity			
Space heating	£271	£271	£0
Water heating	£147	£147	£0
Lighting	£27	£27	£0
Total cost of fuels	£444	£444	£0
Total cost of uses	£445	£445	£0
Delivered energy	40 kWh/m ²	40 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.2 tonnes	0.2 tonnes	0.0 tonnes
CO2 emissions per m ²	6 kg/m ²	6 kg/m ²	0 kg/m ²
Primary energy	62 kWh/m ²	62 kWh/m ²	0 kWh/m ²

SAP 10 WORKSHEET FOR New Build (As Built) (Version 10.2, February 2022) CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling	39.1600 (1b)	x 2.3500 (2b)	= 92.0260 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	39.1600		= 92.0260 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 92.0260 (5)

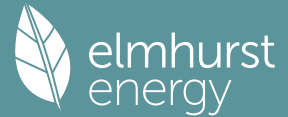
2. Ventilation rate

	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 2.7500 (17)
Infiltration rate 0.1375 (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) = 0.1169 (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	0.1490	0.1461	0.1432	0.1286	0.1256	0.1110	0.1110	0.1081	0.1169	0.1256	0.1315	0.1373 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation												0.5000 (23b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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								
Door			2.1500	1.0000	2.1500			(26)
Window			4.2500	1.2357	5.2519			(27)
Glazed Door			3.8000	1.3258	5.0379			(27)
GF			39.1600	0.1100	4.3076	75.0000	2937.0000	(28a)
Main	57.6700	10.2000	47.4700	0.1900	9.0193	110.0000	5221.6998	(29a)
Total net area of external elements Aum(A, m2)			96.8300					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	25.7667		(33)
Main dwelling								
Party Wall 1			15.1600	0.0000	0.0000	110.0000	1667.6000	(32)
Party Ceiling 1			39.1600			20.0000	783.2000	(32b)
Timber			25.7000			9.0000	231.3000	(32c)
Solid			16.9600			75.0000	1271.9999	(32c)

Heat capacity Cm = Sum(A x k)

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

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)	6.4900	0.0200	0.1298	
E3 Sill	6.4900	0.0300	0.1947	
E4 Jamb	20.1000	0.0260	0.5226	
E5 Ground floor (normal)	22.4400	0.0930	2.0869	
E7 Party floor between dwellings (in blocks of flats)	22.4400	0.0370	0.8303	
E16 Corner (normal)	10.2800	0.0510	0.5243	
E17 Corner (inverted - internal area greater than external area)	5.1400	-0.0910	-0.4677	
E18 Party wall between dwellings	5.1400	0.0650	0.3341	
P1 Party wall - Ground floor	5.9000	0.1080	0.6372	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				4.7921 (36)
Point Thermal bridges				(36a) = 0.0000
Total fabric heat loss				(33) + (36) + (36a) = 30.5588 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	15.1843	(38)
Heat transfer coeff	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	45.7431	(39)
Average = Sum(39)m / 12 =													45.7431 (39)
HLP	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	1.1681	(40)
HLP (average)													1.1681
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

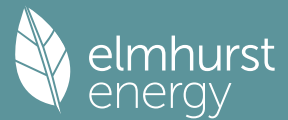
4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.3842 (42)
Hot water usage for mixer showers													
68.4442	67.4157	65.9168	63.0490	60.9327	58.5726	57.2311	58.7186	60.3491	62.8832	65.8126	68.1820	68.1820	(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	0.0000	(42b)
Hot water usage for other uses													
28.8055	27.7580	26.7106	25.6631	24.6156	23.5682	23.5682	24.6156	25.6631	26.7106	27.7580	28.8055	28.8055	(42c)
Average daily hot water use (litres/day)													89.2901 (43)
Daily hot water use													
97.2498	95.1737	92.6274	88.7121	85.5483	82.1407	80.7992	83.3342	86.0122	89.5938	93.5706	96.9875	96.9875	(44)
Energy conte	154.0198	135.5261	142.3648	121.4425	115.1645	101.0016	97.7196	103.1851	106.0617	121.5779	133.3085	151.8590	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													
23.1030	20.3289	21.3547	18.2164	17.2747	15.1502	14.6579	15.4778	15.9093	18.2367	19.9963	22.7789	22.7789	(46)
Water storage loss (or HIU loss):													
Store volume													201.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6100 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8694 (55)
Total storage loss													
26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	(56)
If cylinder contains dedicated solar storage													
26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	(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													
180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104	178.8104	(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													
180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104	178.8104	(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	0.0000	(64a)
Heat gains from water heating, kWh/month													
51.2116	45.0624	47.3363	40.3796	38.2922	33.5830	32.4918	34.3091	35.2655	40.4247	44.3251	50.4931	50.4931	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
13.2554	11.7733	9.5747	7.2487	5.4185	4.5745	4.9429	6.4250	8.6236	10.9496	12.7798	13.6238	13.6238	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
178.2489	180.0985	175.4374	165.5145	152.9886	141.2160	133.3512	131.5015	136.1626	146.0856	158.6115	170.3841	170.3841	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													

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Pumps, fans	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894 (69)
Losses e.g. evaporation (negative values) (Table 5)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Water heating gains (Table 5)	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677 (71)
Total internal gains	68.8328	67.0572	63.6241	56.0828	51.4680	46.6431	43.6717	46.1143	48.9799	54.3342	61.5626	67.8671 (72)
	332.7102	331.3022	321.0094	301.2192	282.2483	264.8068	254.3391	256.4140	266.1393	283.7426	305.3271	324.2482 (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	
North					1.0800	10.6334	0.7300	0.7000	0.7700		4.0668 (74)	
East					0.7700	19.6403	0.7300	0.7000	0.7700		5.3554 (76)	
South					0.7200	46.7521	0.7300	0.7000	0.7700		11.9203 (78)	
West					1.6800	19.6403	0.7300	0.7000	0.7700		11.6845 (80)	
East					3.8000	19.6403	0.6800	0.7000	0.7700		24.6190 (76)	
Solar gains	57.6460	108.7880	172.2829	245.0541	297.7447	304.3377	289.8838	250.2206	197.9459	127.0073	71.0903	47.9488 (83)
Total gains	390.3563	440.0902	493.2923	546.2733	579.9929	569.1445	544.2229	506.6347	464.0852	410.7499	376.4174	372.1970 (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	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557
alpha	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037
util living area	0.9906	0.9802	0.9487	0.8607	0.6979	0.5094	0.3692	0.4140	0.6561	0.9099	0.9810	0.9928 (86)
MIT	20.1329	20.2987	20.5511	20.8085	20.9526	20.9935	20.9992	20.9984	20.9744	20.7656	20.3873	20.0829 (87)
Th 2	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456 (88)
util rest of house	0.9871	0.9730	0.9312	0.8198	0.6314	0.4280	0.2811	0.3199	0.5665	0.8717	0.9728	0.9901 (89)
MIT 2	18.9712	19.1787	19.4863	19.7762	19.9133	19.9428	19.9454	19.9452	19.9324	19.7407	19.2925	18.9081 (90)
Living area fraction	19.6221	19.8062	20.0829	20.3545	20.4956	20.5315	20.5358	20.5353	FLA = Living area / (4) =	20.5162	20.3149	19.9059
MIT	19.6221	19.8062	20.0829	20.3545	20.4956	20.5315	20.5358	20.5353	20.5162	20.3149	19.9059	19.5663 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6221	19.8062	20.0829	20.3545	20.4956	20.5315	20.5358	20.5353	20.5162	20.3149	19.9059	19.5663 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9858	0.9719	0.9338	0.8367	0.6670	0.4736	0.3305	0.3727	0.6162	0.8866	0.9724	0.9888	(94)
Useful gains	384.7972	427.7216	460.6200	457.0848	386.8742	269.5226	179.8601	188.8073	285.9643	364.1527	366.0436	368.0417	(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	700.8785	681.8546	621.3241	523.9662	402.3370	271.3231	180.0359	189.1608	293.4963	444.3906	585.7803	702.9024	(97)
Space heating kWh	235.1644	170.7774	119.5638	48.1546	11.5043	0.0000	0.0000	0.0000	0.0000	59.6970	158.2104	249.1363	(98a)
Space heating requirement - total per year (kWh/year)												1052.2083	
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	(98b)
Space heating kWh	235.1644	170.7774	119.5638	48.1546	11.5043	0.0000	0.0000	0.0000	0.0000	59.6970	158.2104	249.1363	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1052.2083	
Space heating per m2											(98c) / (4) =	26.8695	(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)	
Fraction of main heating from main system 2												0.0000 (203)	
Fraction of total heating from main system 1												1.0000 (204)	
Fraction of total heating from main system 2												0.0000 (205)	
Efficiency of main space heating system 1 (in %)												100.0000 (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	235.1644	170.7774	119.5638	48.1546	11.5043	0.0000	0.0000	0.0000	0.0000	59.6970	158.2104	249.1363	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	235.1644	170.7774	119.5638	48.1546	11.5043	0.0000	0.0000	0.0000	0.0000	59.6970	158.2104	249.1363	(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)
Space heating fuel used, main system 2												0.0000	(213)
Water heating													
Water heating requirement	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104	(64)
Efficiency of water heater (217)m	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	(216)
Fuel for water heating, kWh/month	51.7934	45.7541	48.4578	42.2210	40.6731	36.3709	35.6804	37.2446	37.8191	42.5086	45.6170	51.1750	(219)
Space cooling fuel requirement													

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(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	1.0625	0.9597	1.0625	1.0282	1.0625	1.0282	1.0625	1.0625	1.0282	1.0625	1.0282	1.0625	(231)
Lighting	11.6023	9.3078	8.3807	6.1400	4.7427	3.8749	4.3265	5.6237	7.3047	9.5841	10.8252	11.9248	(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												1052.2083	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												349.4100	
Water heating fuel used												515.3150	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(MEV)Decentralised, Database: total watage = 2.3400, total flow = 21.0000, SFP = 0.1114)													
mechanical ventilation fans (SFP = 0.1114)												12.5103	(230a)
Total electricity for the above, kWh/year												12.5103	(231)
Electricity for lighting (calculated in Appendix L)												93.6375	(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												1673.6711	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1052.2083	16.4900	173.5091	(240)
Space heating - main system 2	0.0000	16.4900	0.0000	(241)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	515.3150	16.4900	84.9754	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	12.5103	16.4900	2.0629	(249)
Energy for lighting	93.6375	16.4900	15.4408	(250)
Additional standing charges			0.0000	(251)
Total energy cost			275.9884	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):	0.3600	(256)
Energy cost factor (ECF)	1.1806	(257)
SAP value	80.8631	
SAP rating (Section 12)	81	(258)
SAP band	B	

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	1052.2083	0.1568	164.9719	(261)
Space heating - main system 2	0.0000	0.0000	0.0000	(262)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	515.3150	0.1411	72.7047	(264)
Space and water heating			237.6766	(265)
Pumps, fans and electric keep-hot	12.5103	0.1387	1.7353	(267)
Energy for lighting	93.6375	0.1443	13.5148	(268)
Total CO2, kg/year			252.9267	(272)
CO2 emissions per m2			6.4600	(273)
EI value			95.9729	
EI rating			96	(274)
EI band			A	

SAP 10 WORKSHEET FOR New Build (As Built) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling	39.1600 (1b)	x 2.3500 (2b)	=	92.0260 (1b) - (3b)
Ground floor				

$$(3a) + (3b) + (3c) + (3d) + (3e) \dots (3n) = 92.0260 \quad (5)$$

m3 per hour

Air changes per hour

Blower Door

0 5000 (23a)

$$\frac{K_0}{\Gamma_0} = \frac{K_0}{K_0} = 1 \quad (26)$$

309.3156 (35)

0.1298

$$+ (36a) = 30.5588 \quad (37)$$

Nov	Dec
15, 1843	15, 1843 (38)

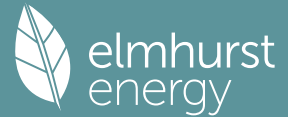
1.1681
30 31

1.3842 (42)

65.8126 68.1820 (42a)

93.5706 96.9875 (44)

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Energy conte	154.0198	135.5261	142.3648	121.4425	115.1645	101.0016	97.7196	103.1851	106.0617	121.5779	133.3085	151.8590 (45)
Energy content (annual)										Total = Sum(45)m =		1483.2311
Distribution loss (46)m = 0.15 x (45)m												
	23.1030	20.3289	21.3547	18.2164	17.2747	15.1502	14.6579	15.4778	15.9093	18.2367	19.9963	22.7789 (46)
Water storage loss (or HIU loss):												
Store volume												201.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6100 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8694 (55)
Total storage loss												
	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514 (56)
If cylinder contains dedicated solar storage												
	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514 (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												
	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104 (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												
	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104 (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												
	51.2116	45.0624	47.3363	40.3796	38.2922	33.5830	32.4918	34.3091	35.2655	40.4247	44.3251	50.4931 (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
	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516	83.0516 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	13.2554	11.7733	9.5747	7.2487	5.4185	4.5745	4.9429	6.4250	8.6236	10.9496	12.7798	13.6238 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	178.2489	180.0985	175.4374	165.5145	152.9886	141.2160	133.3512	131.5015	136.1626	146.0856	158.6115	170.3841 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894	44.6894 (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)												
	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677	-55.3677 (71)
Water heating gains (Table 5)												
	68.8328	67.0572	63.6241	56.0828	51.4680	46.6431	43.6717	46.1143	48.9799	54.3342	61.5626	67.8671 (72)
Total internal gains												
	332.7102	331.3022	321.0094	301.2192	282.2483	264.8068	254.3391	256.4140	266.1393	283.7426	305.3271	324.2482 (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
North						1.0800	9.3942	0.7300	0.7000			0.7700	3.5928 (74)
East						0.7700	17.3606	0.7300	0.7000			0.7700	4.7338 (76)
South						0.7200	41.2355	0.7300	0.7000			0.7700	10.5138 (78)
West						1.6800	17.3606	0.7300	0.7000			0.7700	10.3283 (80)
East						3.8000	17.3606	0.6800	0.7000			0.7700	21.7615 (76)
Solar gains	50.9301	98.6013	163.1566	236.7253	280.5512	292.0481	272.8938	232.5520	192.6214	121.1034	64.5477	43.3264	(83)
Total gains	383.6404	429.9035	484.1660	537.9445	562.7994	556.8549	527.2329	488.9660	458.7607	404.8460	369.8748	367.5745	(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	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557	73.5557
alpha	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037	5.9037
util living area	0.9890	0.9775	0.9404	0.8335	0.6449	0.4415	0.3294	0.3735	0.6211	0.8949	0.9778	0.9914 (86)
MIT	20.2003	20.3572	20.6061	20.8530	20.9721	20.9974	20.9996	20.9992	20.9820	20.8024	20.4434	20.1553 (87)
Th 2	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456	19.9456 (88)
util rest of house	0.9848	0.9690	0.9194	0.7852	0.5707	0.3564	0.2382	0.2755	0.5269	0.8500	0.9678	0.9880 (89)
MIT 2	19.0569	19.2523	19.5524	19.8227	19.9289	19.9447	19.9455	19.9455	19.9373	19.7806	19.3627	19.0002 (90)
Living area fraction									FLA = Living area / (4) =			0.5603 (91)
MIT	19.6975	19.8713	20.1427	20.3999	20.5134	20.5345	20.5361	20.5358	20.5226	20.3531	19.9682	19.6474 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6975	19.8713	20.1427	20.3999	20.5134	20.5345	20.5361	20.5358	20.5226	20.3531	19.9682	19.6474 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9835	0.9683	0.9238	0.8072	0.6115	0.4042	0.2893	0.3305	0.5795	0.8691	0.9681	0.9868 (94)
Useful gains	377.3098	416.2886	447.2786	434.2533	344.1265	225.0687	152.5319	161.5823	265.8350	351.8616	358.0583	362.7048 (95)
Ext temp.	5.1000	5.7000	7.3000	9.8000	12.8000	15.6000	17.2000	17.0000	14.6000	11.2000	7.8000	5.0000 (96)
Heat loss rate W												
	667.7365	648.2414	587.4655	484.8728	352.8326	225.7194	152.6037	161.7401	270.9187	418.6899	556.6098	670.0161 (97)
Space heating kWh												
	216.0775	155.8723	104.2990	36.4460	6.4774	0.0000	0.0000	0.0000	0.0000	49.7203	142.9571	228.6396 (98a)
Space heating requirement - total per year (kWh/year)												940.4892
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)

Full SAP Calculation Printout



Solar heating contribution - total per year (kWh/year)	0.0000										
Space heating kWh	216.0775	155.8723	104.2990	36.4460	6.4774	0.0000	0.0000	0.0000	0.0000	49.7203	142.9571
Space heating requirement after solar contribution - total per year (kWh/year)	228.6396 (98c)										
Space heating per m2	940.4892										
	(98c) / (4) = 24.0166 (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)
Fraction of main heating from main system 2												0.0000 (203)
Fraction of total heating from main system 1												1.0000 (204)
Fraction of total heating from main system 2												0.0000 (205)
Efficiency of main space heating system 1 (in %)												100.0000 (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	216.0775	155.8723	104.2990	36.4460	6.4774	0.0000	0.0000	0.0000	0.0000	49.7203	142.9571	228.6396 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	216.0775	155.8723	104.2990	36.4460	6.4774	0.0000	0.0000	0.0000	0.0000	49.7203	142.9571	228.6396 (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)
Space heating fuel used, main system 2												0.0000 (213)
Water heating												
Water heating requirement	180.9712	159.8693	169.3162	147.5245	142.1159	127.0836	124.6710	130.1365	132.1437	148.5293	159.3905	178.8104 (64)
Efficiency of water heater	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100 (216)
(217)m	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100 (217)
Fuel for water heating, kWh/month	51.7934	45.7541	48.4578	42.2210	40.6731	36.3709	35.6804	37.2446	37.8191	42.5086	45.6170	51.1750 (219)
Space cooling fuel requirement	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)
(221)m	1.0625	0.9597	1.0625	1.0282	1.0625	1.0282	1.0625	1.0625	1.0282	1.0625	1.0282	1.0625 (231)
Pumps and Fa	11.6023	9.3078	8.3807	6.1400	4.7427	3.8749	4.3265	5.6237	7.3047	9.5841	10.8252	11.9248 (232)
Lighting	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 PVs (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 (233a)
(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 (234a)
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)
(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 (235a)
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)
(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 (235c)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	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)
(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 (233b)
Electricity generated by PVs (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 (233b)
(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 (234b)
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 (234b)
(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 (235b)
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 (235b)
(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 (235d)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	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)
(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 (211)
Annual totals kWh/year												940.4892 (211)
Space heating fuel - main system 1												0.0000 (213)
Space heating fuel - main system 2												0.0000 (215)
Space heating fuel - secondary												349.4100
Efficiency of water heater												515.3150 (219)
Water heating fuel used												0.0000 (221)
Space cooling fuel												
Electricity for pumps and fans:												
(MEV)Decentralised, Database: total watage = 2.3400, total flow = 21.0000, SFP = 0.1114)												
mechanical ventilation fans (SFP = 0.1114)												12.5103 (230a)
Total electricity for the above, kWh/year												12.5103 (231)
Electricity for lighting (calculated in Appendix L)												93.6375 (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												1561.9520 (238)

10a. Fuel costs - using BEDF prices (591)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	940.4892	28.4300	267.3811 (240)
Space heating - main system 2	0.0000	28.4300	0.0000 (241)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	515.3150	28.4300	146.5041 (247)
Energy for instantaneous electric shower(s)	0.0000	28.4300	0.0000 (247a)
Pumps, fans and electric keep-hot	12.5103	28.4300	3.5567 (249)
Energy for lighting	93.6375	28.4300	26.6212 (250)
Additional standing charges			0.0000 (251)
Total energy cost			444.0630 (255)

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	940.4892	0.1572	147.8015 (261)

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Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	515.3150	0.1411	72.7047 (264)
Space and water heating			220.5062 (265)
Pumps, fans and electric keep-hot	12.5103	0.1387	1.7353 (267)
Energy for lighting	93.6375	0.1443	13.5148 (268)
Total CO2, kg/year			235.7563 (272)

----- 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	940.4892	1.5818	1487.6402 (275)
Space heating - main system 2	0.0000	0.0000	0.0000 (276)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	515.3150	1.5217	784.1554 (278)
Space and water heating			2271.7956 (279)
Pumps, fans and electric keep-hot	12.5103	1.5128	18.9255 (281)
Energy for lighting	93.6375	1.5338	143.6244 (282)
Total Primary energy kWh/year			2434.3455 (286)