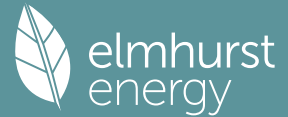


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Property Reference	4907-AU06-6316-049				Issued on Date	19/03/2025	
Assessment Reference	Plot 049			Prop Type Ref	TF Flat-TC		
Property	FLAT 7, 38 Spey Road, Tilehurst, Reading, RG30 4NF						
SAP Rating	83 B		DER	4.83		TER	12.05
Environmental	96 A		% DER < TER				59.92
CO ₂ Emissions (t/year)	0.26		DFEE	24.72		TFEE	28.59
Compliance Check	See BREL		% DFEE < TFEE				13.52
% DPER < TPER	21.13		DPER	50.11		TPER	63.53
Assessor Details	Mr. Paul Frearson					Assessor ID	AA61-0001
Client	Bellway Homes, Thames Valley						

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	62.5100	2.4600	153.7746
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.5100		
Dwelling volume			153.7746

2. Ventilation rate

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

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.2800	(17)
Infiltration rate		0.1640	(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) =	0.1394	(21)

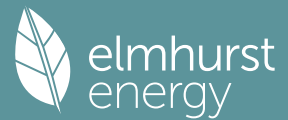
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1777	0.1742	0.1708	0.1533	0.1499	0.1324	0.1324	0.1289	0.1394	0.1499	0.1568	0.1638 (22b)
Mechanical extract ventilation - centralised												
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							
Window			7.6400	1.2357	9.4411		(27)
Corridor Door			2.0800	1.0000	2.0800		(26)
EW Brick AAC018/019	22.2600	7.6400	14.6200	0.2600	3.8012	60.0000	877.2000 (29a)
E-WM-30 Corridor Wall	6.5400	2.0800	4.4600	0.2100	0.9366	52.3000	233.2580 (29a)
PR 500mm MW044	62.5100		62.5100	0.0900	5.6259	9.0000	562.5900 (30)
Total net area of external elements Aum(A, m ²)			91.3100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	21.8848	(33)
Main dwelling							
Party Wall			49.1000	0.0000	0.0000	45.0000	2209.4999 (32)
Party Floor			62.5100			70.0000	4375.7000 (32d)
GF Timber			134.3400			9.0000	1209.0600 (32c)
Masonry Walls			4.0500			39.0000	157.9500 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	9625.2579	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		153.9795	(35)
List of Thermal Bridges			

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K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	3.6400	0.0370	0.1347
E4 Jamb	16.6700	0.0140	0.2334
E7 Party floor between dwellings (in blocks of flats)	9.0500	0.0390	0.3530
E16 Corner (normal)	4.9200	0.0410	0.2017
E18 Party wall between dwellings	4.9200	0.0390	0.1919
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	19.9600	0.0000	0.0000
E2 Other lintels (including other steel lintels)	1.0200	0.0270	0.0275
E4 Jamb	4.2000	0.0850	0.3570
E7 Party floor between dwellings (in blocks of flats)	2.6600	0.0330	0.0878
E25 Staggered party wall between dwellings	4.9200	0.0380	0.1870
P4 Party wall - Roof (insulation at ceiling level)	19.9600	0.0330	0.6587
E10 Eaves (insulation at ceiling level)	0.7100	0.0360	0.0256
E12 Gable (insulation at ceiling level)	2.6600	0.0280	0.0745
E12 Gable (insulation at ceiling level)	8.3400	0.0330	0.2752
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			2.8078 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	24.6926 (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	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	(38)
Heat transfer coeff	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	(39)
Average = Sum(39)m / 12 =												50.0654	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.0516 (42)
Hot water usage for mixer showers	58.6188	57.7379	56.4542	53.9981	52.1856	50.1643	49.0153	50.2893	51.6858	53.8561	56.3650	58.3942	(42a)
Hot water usage for baths	25.3312	24.9550	24.4253	23.4485	22.7170	21.9060	21.4679	21.9940	22.5668	23.4346	24.4315	25.2456	(42b)
Hot water usage for other uses	35.6408	34.3448	33.0488	31.7527	30.4567	29.1607	29.1607	30.4567	31.7527	33.0488	34.3448	35.6408	(42c)
Average daily hot water use (litres/day)												109.9314	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	119.5909	117.0378	113.9283	109.1993	105.3593	101.2310	99.6440	102.7400	106.0054	110.3395	115.1413	119.2807	(44)
Energy content (annual)	189.4028	166.6602	175.1035	149.4884	141.8339	124.4753	120.5107	127.2136	130.7152	149.7297	164.0399	186.7648	(45)
Distribution loss (46)m = 0.15 x (45)m	28.4104	24.9990	26.2655	22.4233	21.2751	18.6713	18.0766	19.0820	19.6073	22.4595	24.6060	28.0147	(46)
Water storage loss:													
Store volume												200.0000	(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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162	(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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162	(64)
12Total per year (kWh/year)												2143.2691	(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	62.9764	55.4145	58.2219	49.7049	47.1598	41.3880	40.0698	42.2985	43.4628	49.7851	54.5433	62.0993	(65)

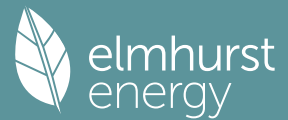
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	99.9350	110.6423	99.9350	103.2661	99.9350	103.2661	99.9350	99.9350	103.2661	99.9350	103.2661	99.9350	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	179.2299	181.0898	176.4030	166.4255	153.8306	141.9932	134.0851	132.2253	136.9120	146.8896	159.4844	171.3218	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	(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)	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	(71)
Water heating gains (Table 5)	84.6457	82.4621	78.2553	69.0346	63.3868	57.4834	53.8573	56.8529	60.3650	66.9155	75.7545	83.4668	(72)
Total internal gains	417.5852	427.9687	408.3679	392.5008	370.9270	356.5174	341.6520	342.7877	354.3178	367.5146	392.2797	408.4982	(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
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Northeast	7.6400		11.2829		0.4600		0.0000		0.7700		30.5326 (75)	
Solar gains	30.5326	62.1501	111.9746	183.8945	247.1903	263.5310	246.5279	196.5349	136.4428	75.9523	38.4180	24.9345 (83)
Total gains	448.1179	490.1188	520.3425	576.3953	618.1173	620.0484	588.1799	539.3226	490.7606	443.4669	430.6977	433.4326 (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	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038
alpha	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603
util living area	0.9721	0.9567	0.9264	0.8399	0.6889	0.5041	0.3719	0.4219	0.6549	0.8792	0.9541	0.9758 (86)
MIT	19.9147	20.0863	20.3390	20.6703	20.8922	20.9788	20.9957	20.9926	20.9348	20.6456	20.2277	19.8668 (87)
Th 2	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525 (88)
util rest of house	0.9672	0.9493	0.9137	0.8144	0.6469	0.4494	0.3099	0.3555	0.5975	0.8535	0.9449	0.9715 (89)
MIT 2	18.9824	19.1976	19.5115	19.9083	20.1540	20.2374	20.2504	20.2486	20.2010	19.8882	19.3779	18.9221 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.3501	19.5481	19.8378	20.2088	20.4451	20.5297	20.5443	20.5419	20.4904	20.1869	19.7130	19.2946 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.3501	19.5481	19.8378	20.2088	20.4451	20.5297	20.5443	20.5419	20.4904	20.1869	19.7130	19.2946 (93)

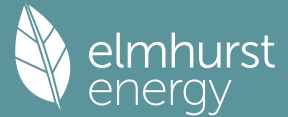
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9599	0.9409	0.9056	0.8127	0.6581	0.4700	0.3342	0.3815	0.6164	0.8510	0.9370	0.9646 (94)
Useful gains	430.1368	461.1619	471.2478	468.4609	406.7614	291.4016	196.5677	205.7271	302.4926	377.3894	403.5472	418.0870 (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	753.4870	733.3606	667.7648	566.1800	437.8251	296.8752	197.4740	207.3682	319.9367	479.9710	631.4734	755.7178 (97)
Space heating kWh	240.5725	182.9175	146.2086	70.3578	23.1114	0.0000	0.0000	0.0000	0.0000	76.3208	164.1069	251.1973 (98a)
Space heating requirement - total per year (kWh/year)	1154.7928											
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	240.5725	182.9175	146.2086	70.3578	23.1114	0.0000	0.0000	0.0000	0.0000	76.3208	164.1069	251.1973 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1154.7928											
Space heating per m2	(98c) / (4) = 18.4737 (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	240.5725	182.9175	146.2086	70.3578	23.1114	0.0000	0.0000	0.0000	0.0000	76.3208	164.1069	251.1973 (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)	240.5725	182.9175	146.2086	70.3578	23.1114	0.0000	0.0000	0.0000	0.0000	76.3208	164.1069	251.1973 (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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162 (64)
Efficiency of water heater (217)m	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200 (216)
Fuel for water heating, kWh/month	66.6690	58.8572	62.2627	54.1016	52.0108	46.3938	45.4401	47.5056	48.3167	54.4438	58.5856	65.8561 (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	3.5691	3.2237	3.5691	3.4540	3.5691	3.4540	3.5691	3.5691	3.4540	3.5691	3.4540	3.5691 (231)
Lighting	19.5497	15.6835	14.1212	10.3458	7.9914	6.5290	7.2900	9.4759	12.3082	16.1490	18.2403	20.0930 (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	1154.7928 (211)											
Space heating fuel - main system 2	0.0000 (213)											
Space heating fuel - secondary	0.0000 (215)											

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Efficiency of water heater	324.5200	
Water heating fuel used	660.4428	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
(MEVCentralised, Database: in-use factor = 1.4000, SFP = 0.2240)		
mechanical ventilation fans (SFP = 0.2240)	42.0235	(230a)
Total electricity for the above, kWh/year	42.0235	(231)
Electricity for lighting (calculated in Appendix L)	157.7771	(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	2015.0363	(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	1154.7928	0.1559	180.0668	(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)	660.4428	0.1412	93.2240	(264)
Space and water heating			273.2909	(265)
Pumps, fans and electric keep-hot	42.0235	0.1387	5.8292	(267)
Energy for lighting	157.7771	0.1443	22.7721	(268)
Total CO2, kg/year			301.8922	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.8300	(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	1154.7928	1.5773	1821.4394	(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)	660.4428	1.5219	1005.1598	(278)
Space and water heating			2826.5992	(279)
Pumps, fans and electric keep-hot	42.0235	1.5128	63.5732	(281)
Energy for lighting	157.7771	1.5338	242.0038	(282)
Total Primary energy kWh/year			3132.1762	(286)
Dwelling Primary energy Rate (DPER)			50.1100	(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	62.5100	x 2.4600	= 153.7746	(1b) - (3b)
Ground floor				(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.5100			
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	153.7746	(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) =	0.1301 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3801	(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) =	0.3231 (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
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
Adj infilt rate	0.4119	0.4038	0.3957	0.3554	0.3473	0.3069	0.3069	0.2988	0.3231	0.3473	0.3634	0.3796

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Effective ac 0.5848 0.5815 0.5783 0.5631 0.5603 0.5471 0.5471 0.5446 0.5522 0.5603 0.5660 0.5720 (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			2.0800	1.0000	2.0800			(26)
TER Opening Type			7.6400	1.1450	8.7481			(27)
EW Brick AAC018/019	22.2600	7.6400	14.6200	0.1800	2.6316			(29a)
E-WM-30 Corridor Wall	6.5400	2.0800	4.4600	0.1800	0.8028			(29a)
PR 500mm MW044	62.5100		62.5100	0.1100	6.8761			(30)
Total net area of external elements Aum(A, m2)			91.3100					(31)
Fabric heat loss, W/K = Sum (A x U)				(26) ... (30) + (32) =	21.1386			(33)
Main dwelling								
Party Wall			49.1000	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 153.9795 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)	3.6400	0.0500	0.1820	
E4 Jamb	16.6700	0.0500	0.8335	
E7 Party floor between dwellings (in blocks of flats)	9.0500	0.0700	0.6335	
E16 Corner (normal)	4.9200	0.0900	0.4428	
E18 Party wall between dwellings	4.9200	0.0600	0.2952	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	19.9600	0.0000	0.0000	
E2 Other lintels (including other steel lintels)	1.0200	0.0500	0.0510	
E4 Jamb	4.2000	0.0500	0.2100	
E7 Party floor between dwellings (in blocks of flats)	2.6600	0.0700	0.1862	
E25 Staggered party wall between dwellings	4.9200	0.0600	0.2952	
P4 Party wall - Roof (insulation at ceiling level)	19.9600	0.1200	2.3952	
E10 Eaves (insulation at ceiling level)	0.7100	0.0600	0.0426	
E12 Gable (insulation at ceiling level)	2.6600	0.0600	0.1596	
E12 Gable (insulation at ceiling level)	8.3400	0.0600	0.5004	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			6.2272	(36)
Point Thermal bridges			0.0000	(36a) =
Total fabric heat loss			27.3658	(33) + (36) + (36a) =

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	29.6774	29.5103	29.3464	28.5768	28.4329	27.7626	27.7626	27.6385	28.0208	28.4329	28.7241	29.0287	(38)
Heat transfer coeff	57.0432	56.8760	56.7122	55.9426	55.7987	55.1284	55.1284	55.0043	55.3866	55.7987	56.0899	56.3944	(39)
Average = Sum(39)m / 12 =												55.9419	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9125	0.9099	0.9073	0.8949	0.8926	0.8819	0.8819	0.8799	0.8860	0.8926	0.8973	0.9022	(40)
HLP (average)												0.8949	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.0516 (42)
Hot water usage for mixer showers													
58.6188	57.7379	56.4542	53.9981	52.1856	50.1643	49.0153	50.2893	51.6858	53.8561	56.3650	58.3942	58.3942	(42a)
Hot water usage for baths													
25.3312	24.9550	24.4253	23.4485	22.7170	21.9060	21.4679	21.9940	22.5668	23.4346	24.4315	25.2456	25.2456	(42b)
Hot water usage for other uses													
35.6408	34.3448	33.0488	31.7527	30.4567	29.1607	29.1607	30.4567	31.7527	33.0488	34.3448	35.6408	35.6408	(42c)
Average daily hot water use (litres/day)													109.9314 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	119.5909	117.0378	113.9283	109.1993	105.3593	101.2310	99.6440	102.7400	106.0054	110.3395	115.1413	119.2807	(44)
Energy conte	189.4028	166.6602	175.1035	149.4884	141.8339	124.4753	120.5107	127.2136	130.7152	149.7297	164.0399	186.7648	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													
28.4104	24.9990	26.2655	22.4233	21.2751	18.6713	18.0766	19.0820	19.6073	22.4595	24.6060	28.0147	28.0147	(46)
Water storage 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	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	23.3325	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	(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													
235.9977	208.7459	221.6984	194.5803	188.4288	169.5671	167.1056	173.8085	175.8070	196.3246	209.1318	233.3597	233.3597	(62)
WWHRS	-26.7981	-23.7004	-24.8177	-20.5501	-19.1519	-16.3884	-15.3616	-16.3355	-16.9561	-19.9894	-22.6456	-26.3018	(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													
209.1996	185.0455	196.8807	174.0302	169.2769	153.1787	151.7441	157.4730	158.8509	176.3352	186.4862	207.0578	207.0578	(64)
12Total per year (kWh/year)													
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
100.2524	89.0831	95.4978	85.7784	84.4357	77.4615	77.3457	79.5744	79.5363	87.0610	90.6167	99.3752	99.3752	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
99.9350	110.6423	99.9350	103.2661	99.9350	103.2661	99.9350	99.9350	99.9350	103.2661	99.9350	103.2661	99.9350	(67)

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Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	179.2299	181.0898	176.4030	166.4255	153.8306	141.9932	134.0851	132.2253	136.9120	146.8896	159.4844	171.3218 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656 (71)
Water heating gains (Table 5)	134.7478	132.5641	128.3573	119.1366	113.4889	107.5854	103.9593	106.9549	110.4671	117.0175	125.8566	133.5688 (72)
Total internal gains	470.6873	481.0708	461.4699	445.6028	424.0290	406.6194	391.7540	392.8898	404.4198	420.6167	445.3818	461.6002 (73)

6. Solar gains

[Jan]	Area m2				Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d	Gains W
Northeast	7.6400				11.2829		0.6300		0.7000		0.7700	26.3444 (75)
Solar gains	26.3444	53.6247	96.6146	158.6690	213.2822	227.3814	212.7107	169.5754	117.7264	65.5336	33.1480	21.5141 (83)
Total gains	497.0316	534.6955	558.0845	604.2718	637.3113	634.0008	604.4647	562.4652	522.1463	486.1503	478.5298	483.1143 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	46.8712	47.0089	47.1448	47.7933	47.9166	48.4992	48.4992	48.6086	48.2731	47.9166	47.6678	47.4104
alpha	4.1247	4.1339	4.1430	4.1862	4.1944	4.2333	4.2333	4.2406	4.2182	4.1944	4.1779	4.1607
util living area	0.9661	0.9520	0.9253	0.8500	0.7169	0.5348	0.3962	0.4413	0.6665	0.8716	0.9454	0.9693 (86)
MIT	19.7595	19.9313	20.1956	20.5693	20.8362	20.9636	20.9919	20.9873	20.9096	20.5866	20.1371	19.7383 (87)
Th 2	20.1568	20.1591	20.1613	20.1718	20.1738	20.1829	20.1829	20.1846	20.1794	20.1738	20.1698	20.1657 (88)
util rest of house	0.9600	0.9435	0.9118	0.8240	0.6724	0.4735	0.3248	0.3666	0.6048	0.8435	0.9343	0.9638 (89)
MIT 2	18.7170	18.9338	19.2642	19.7226	20.0237	20.1571	20.1789	20.1780	20.1084	19.7532	19.2022	18.6966 (90)
Living area fraction	FLA = Living area / (4) =											0.3943 (91)
MIT	19.1281	19.3272	19.6315	20.0565	20.3441	20.4751	20.4995	20.4971	20.4243	20.0818	19.5708	19.1074 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1281	19.3272	19.6315	20.0565	20.3441	20.4751	20.4995	20.4971	20.4243	20.0818	19.5708	19.1074 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9508	0.9333	0.9019	0.8200	0.6820	0.4959	0.3527	0.3957	0.6240	0.8400	0.9248	0.9550 (94)
Useful gains	472.5574	499.0260	503.3423	495.5016	434.6688	314.3779	213.2241	222.5435	325.8354	408.3813	442.5413	461.3666 (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	845.8418	820.5594	744.7153	624.1225	482.3300	323.8862	214.9730	225.3601	350.2839	529.0744	699.4885	840.6936 (97)
Space heating kWh	277.7236	216.0705	179.5816	92.6070	35.4599	0.0000	0.0000	0.0000	0.0000	89.7957	185.0020	282.2193 (98a)
Space heating requirement - total per year (kWh/year)												1358.4596
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	277.7236	216.0705	179.5816	92.6070	35.4599	0.0000	0.0000	0.0000	0.0000	89.7957	185.0020	282.2193 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1358.4596
Space heating per m2												(98c) / (4) = 21.7319 (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	277.7236	216.0705	179.5816	92.6070	35.4599	0.0000	0.0000	0.0000	0.0000	89.7957	185.0020	282.2193 (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)	300.8923	234.0959	194.5629	100.3327	38.4181	0.0000	0.0000	0.0000	0.0000	97.2868	200.4355	305.7631 (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	209.1996	185.0455	196.8807	174.0302	169.2769	153.1787	151.7441	157.4730	158.8509	176.3352	186.4862	207.0578 (64)
Efficiency of water heater (217)m	84.6960	84.4083	83.8541	82.7115	81.2258	79.8000	79.8000	79.8000	79.8000	82.6256	84.0419	79.8000 (216)
Fuel for water heating, kWh/month	247.0005	219.2267	234.7896	210.4063	208.4028	191.9532	190.1555	197.3346	199.0613	213.4148	221.8968	244.3022 (219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	20.7645	16.6581	14.9987	10.9887	8.4880	6.9348	7.7430	10.0647	13.0730	17.1525	19.3738	21.3416 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-21.3871	-31.1841	-46.3405	-53.9283	-59.7426	-56.3584	-55.6939	-51.8135	-45.2011	-36.5003	-23.8865	-18.3737 (233a)

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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	-9.1219	-19.4707	-39.2230	-59.6738	-79.6410	-80.2745	-79.3045	-66.7843	-48.4927	-28.0658	-12.2517	-7.1904	(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												1471.7872	(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												2577.9443	(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)												167.5815	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1029.9044	(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												3273.4086	(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	1471.7872	0.2100	309.0753 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2577.9443	0.2100	541.3683 (264)
Space and water heating			850.4436 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	167.5815	0.1443	24.1872 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-500.4100	0.1339	-66.9919
PV Unit electricity exported	-529.4944	0.1255	-66.4655
Total			-133.4574 (269)
Total CO2, kg/year			753.1026 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.0500 (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	1471.7872	1.1300	1663.1195 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2577.9443	1.1300	2913.0771 (278)
Space and water heating			4576.1966 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	167.5815	1.5338	257.0421 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-500.4100	1.4947	-747.9806
PV Unit electricity exported	-529.4944	0.4608	-243.9652
Total			-991.9458 (283)
Total Primary energy kWh/year			3971.3937 (286)
Target Primary Energy Rate (TPER)			63.5300 (287)

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

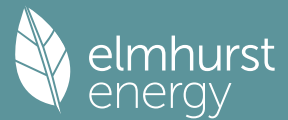
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	62.5100 (1b)	x 2.4600 (2b)	= 153.7746 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.5100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	153.7746 (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)

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

0 * 20 = 0.0000 (6d)
0 * 35 = 0.0000 (6e)
0 * 20 = 0.0000 (6f)
2 * 10 = 20.0000 (7a)
0 * 10 = 0.0000 (7b)
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) = 0.1301 (8)
Pressure test Yes
Pressure Test Method Blower Door
Measured/design AP50 3.2800 (17)
Infiltration rate 0.2941 (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) = 0.2500 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000
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
Adj infilt rate	0.3187	0.3124	0.3062	0.2749	0.2687	0.2375	0.2375	0.2312	0.2500	0.2687	0.2812	0.2937
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000
Effective ac	0.5508	0.5488	0.5469	0.5378	0.5361	0.5282	0.5282	0.5267	0.5312	0.5361	0.5395	0.5431

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							
Window			7.6400	1.2357	9.4411		(27)
Corridor Door			2.0800	1.0000	2.0800		(26)
EW Brick AAC018/019	22.2600	7.6400	14.6200	0.2600	3.8012	60.0000	877.2000 (29a)
E-WM-30 Corridor Wall	6.5400	2.0800	4.4600	0.2100	0.9366	52.3000	233.2580 (29a)
PR 500mm MW044	62.5100		62.5100	0.0900	5.6259	9.0000	562.5900 (30)
Total net area of external elements Aum(A, m2)			91.3100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	21.8848		(33)
Main dwelling							
Party Wall			49.1000	0.0000	0.0000	45.0000	2209.4999 (32)
Party Floor			62.5100			70.0000	4375.7000 (32d)
GF Timber			134.3400			9.0000	1209.0600 (32c)
Masonry Walls			4.0500			39.0000	157.9500 (32c)

Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K (28)...(30) + (32) + (32a)...(32e) = 9625.2579 (34)
List of Thermal Bridges 153.9795 (35)

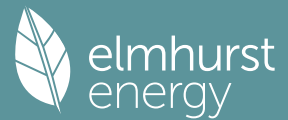
Element	Length	Psi-value	Total
K1 Element	3.6400	0.0370	0.1347
E2 Other lintels (including other steel lintels)	16.6700	0.0140	0.2334
E4 Jamb	9.0500	0.0390	0.3530
E16 Corner (normal)	4.9200	0.0410	0.2017
E18 Party wall between dwellings	4.9200	0.0390	0.1919
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	19.9600	0.0000	0.0000
E2 Other lintels (including other steel lintels)	1.0200	0.0270	0.0275
E4 Jamb	4.2000	0.0850	0.3570
E7 Party floor between dwellings (in blocks of flats)	2.6600	0.0330	0.0878
E25 Staggered party wall between dwellings	4.9200	0.0380	0.1870
P4 Party wall - Roof (insulation at ceiling level)	19.9600	0.0330	0.6587
E10 Eaves (insulation at ceiling level)	0.7100	0.0360	0.0256
E12 Gable (insulation at ceiling level)	2.6600	0.0280	0.0745
E12 Gable (insulation at ceiling level)	8.3400	0.0330	0.2752
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			2.8078 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 24.6926 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan 27.9497 Feb 27.8497 Mar 27.7516 Apr 27.2909 May 27.2047 Jun 26.8034 Jul 26.8034 Aug 26.7291 Sep 26.9580 Oct 27.2047 Nov 27.3791 Dec 27.5614 (38)
Heat transfer coeff 52.6423 52.5423 52.4442 51.9835 51.8973 51.4960 51.4960 51.4217 51.6506 51.8973 52.0717 52.2539 (39)
Average = Sum(39)m / 12 = 51.9831
HLP Jan 0.8421 Feb 0.8405 Mar 0.8390 Apr 0.8316 May 0.8302 Jun 0.8238 Jul 0.8238 Aug 0.8226 Sep 0.8263 Oct 0.8302 Nov 0.8330 Dec 0.8359 (40)
HLP (average) 0.8316
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0516 (42)
Hot water usage for mixer showers 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42a)
Hot water usage for baths 25.3312 24.9550 24.4253 23.4485 22.7170 21.9060 21.4679 21.9940 22.5668 23.4346 24.4315 25.2456 (42b)
Hot water usage for other uses 35.6408 34.3448 33.0488 31.7527 30.4567 29.1607 29.1607 30.4567 31.7527 33.0488 34.3448 35.6408 (42c)
Average daily hot water use (litres/day) 55.8868 (43)
Daily hot water use Jan 60.9721 Feb 59.2999 Mar 57.4740 Apr 55.2012 May 53.1738 Jun 51.0667 Jul 50.6286 Aug 52.4507 Sep 54.3195 Oct 56.4834 Nov 58.7764 Dec 60.8865 (44)
Energy conte 96.5649 84.4422 88.3355 75.5677 71.5821 62.7925 61.2309 64.9449 66.9814 76.6474 83.7377 95.3335 (45)
Energy content (annual) Total = Sum(45)m = 928.1607
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 (46)
Water storage 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)

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Total heat required for water heating calculated for each month												
	82.0802	71.7759	75.0852	64.2325	60.8448	53.3736	52.0463	55.2032	56.9342	65.1503	71.1770	81.0334 (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	82.0802	71.7759	75.0852	64.2325	60.8448	53.3736	52.0463	55.2032	56.9342	65.1503	71.1770	81.0334 (64)
Total per year (kWh/year)												788.9366 (64)
Electric shower(s)	46.9439	41.8274	45.6739	43.5861	44.4040	42.3571	43.7690	44.4040	43.5861	45.6739	44.8151	46.9439 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												533.9844 (64a)
Heat gains from water heating, kWh/month												
	32.2560	28.4008	30.1898	26.9547	26.3122	23.9327	23.9538	24.9018	25.1301	27.7061	28.9980	31.9943 (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	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820	102.5820 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	99.9350	110.6423	99.9350	103.2661	99.9350	103.2661	99.9350	99.9350	103.2661	99.9350	103.2661	99.9350 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	179.2299	181.0898	176.4030	166.4255	153.8306	141.9932	134.0851	132.2253	136.9120	146.8896	159.4844	171.3218 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582	33.2582 (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)												
	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656 (71)
Water heating gains (Table 5)												
	43.3549	42.2631	40.5777	37.4370	35.3658	33.2398	32.1960	33.4701	34.9029	37.2393	40.2750	43.0031 (72)
Total internal gains	376.2944	387.7698	370.6902	360.9032	342.9060	332.2738	319.9907	319.4050	328.8557	337.8385	356.8002	368.0345 (73)

6. Solar gains

[Jan]	Area m2		Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast	7.6400		11.2829		0.4600		0.0000		0.7700		30.5326 (75)	
Solar gains	30.5326	62.1501	111.9746	183.8945	247.1903	263.5310	246.5279	196.5349	136.4428	75.9523	38.4180	24.9345 (83)
Total gains	406.8270	449.9198	482.6649	544.7977	590.0963	595.8048	566.5186	515.9399	465.2985	413.7908	395.2182	392.9690 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	50.7896	50.8863	50.9815	51.4333	51.5187	51.9202	51.9202	51.9952	51.7648	51.5187	51.3462	51.1671
alpha	4.3860	4.3924	4.3988	4.4289	4.4346	4.4613	4.4613	4.4663	4.4510	4.4346	4.4231	4.4111
util living area	0.9814	0.9698	0.9459	0.8692	0.7260	0.5348	0.3959	0.4507	0.6945	0.9060	0.9675	0.9839 (86)
MIT	19.7148	19.9024	20.1854	20.5824	20.8543	20.9706	20.9938	20.9893	20.9106	20.5570	20.0832	19.6820 (87)
Th 2	20.2170	20.2183	20.2197	20.2260	20.2272	20.2327	20.2327	20.2338	20.2306	20.2272	20.2248	20.2223 (88)
util rest of house												
	0.9779	0.9642	0.9357	0.8460	0.6837	0.4766	0.3286	0.3789	0.6358	0.8838	0.9606	0.9808 (89)
MIT 2	19.0384	19.2241	19.5016	19.8825	20.1222	20.2163	20.2303	20.2293	20.1747	19.8673	19.4090	19.0101 (90)
Living area fraction												
	19.3051	19.4916	19.7712	20.1585	20.4109	20.5137	20.5314	20.5290	20.4649	20.1393	19.6749	19.2751 (91)
fLA = Living area / (4) =												
MIT	19.3051	19.4916	19.7712	20.1585	20.4109	20.5137	20.5314	20.5290	20.4649	20.1393	19.6749	19.2751 (92)
Temperature adjustment												
	19.3051	19.4916	19.7712	20.1585	20.4109	20.5137	20.5314	20.5290	20.4649	20.1393	19.6749	19.2751 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9728	0.9579	0.9289	0.8438	0.6942	0.4983	0.3550	0.4069	0.6545	0.8810	0.9546	0.9761 (94)
Useful gains	395.7710	430.9637	448.3360	459.6860	409.6636	296.8821	201.1272	209.9318	304.5526	364.5348	377.2625	383.5877 (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	789.9033	766.6746	695.9978	585.2572	452.0719	304.5336	202.4519	212.3188	328.7503	495.0643	654.7962	787.7316 (97)
Space heating kWh	293.2344	225.5977	184.2604	90.4112	31.5517	0.0000	0.0000	0.0000	0.0000	97.1140	199.8243	300.6830 (98a)
Space heating requirement - total per year (kWh/year)												1422.6767
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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Space heating kWh	293.2344	225.5977	184.2604	90.4112	31.5517	0.0000	0.0000	0.0000	0.0000	97.1140	199.8243	300.6830 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1422.6767
Space heating per m2												(98c) / (4) = 22.7592 (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	484.0627	381.0706	390.8051	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9152	0.9528	0.9308	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	443.0260	363.0966	363.7474	0.0000	0.0000	0.0000	0.0000 (102)

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Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	652.3315	620.3149	563.2127	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	150.6999	191.3704	148.4022	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	0.0000	0.0000	0.0000	0.0000	0.0000	150.6999	191.3704	148.4022	fc = cooled area / (4) =	0.0000	0.0000	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	37.6750	47.8426	37.1006	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												122.6181 (107)
Energy for space heating												22.7592 (99)
Energy for space cooling												1.9616 (108)
Total												24.7208 (109)
Fabric Energy Efficiency (DFEE)												24.7 (109)

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling	62.5100 (1b)	x 2.4600 (2b)	= 153.7746 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.5100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	153.7746 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1301 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3801 (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) = 0.3231 (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	0.4119	0.4038	0.3957	0.3554	0.3473	0.3069	0.3069	0.2988	0.3231	0.3473	0.3634	0.3796 (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	0.5848	0.5815	0.5783	0.5631	0.5603	0.5471	0.5471	0.5446	0.5522	0.5603	0.5660	0.5720 (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							
TER Opaque door			2.0800	1.0000	2.0800		(26)
TER Opening Type			7.6400	1.1450	8.7481		(27)
EW Brick AAC018/019	22.2600	7.6400	14.6200	0.1800	2.6316		(29a)
E-WM-30 Corridor Wall	6.5400	2.0800	4.4600	0.1800	0.8028		(29a)
PR 500mm MW044	62.5100		62.5100	0.1100	6.8761		(30)
Total net area of external elements Aum(A, m ²)			91.3100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	21.1386		(33)
Main dwelling							
Party Wall			49.1000	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							153.9795 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value		Total
E2 Other lintels (including other steel lintels)				3.6400	0.0500		0.1820
E4 Jamb				16.6700	0.0500		0.8335
E7 Party floor between dwellings (in blocks of flats)				9.0500	0.0700		0.6335
E16 Corner (normal)				4.9200	0.0900		0.4428
E18 Party wall between dwellings				4.9200	0.0600		0.2952
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				19.9600	0.0000		0.0000
E2 Other lintels (including other steel lintels)				1.0200	0.0500		0.0510
E4 Jamb				4.2000	0.0500		0.2100
E7 Party floor between dwellings (in blocks of flats)				2.6600	0.0700		0.1862
E25 Staggered party wall between dwellings				4.9200	0.0600		0.2952
P4 Party wall - Roof (insulation at ceiling level)				19.9600	0.1200		2.3952
E10 Eaves (insulation at ceiling level)				0.7100	0.0600		0.0426
E12 Gable (insulation at ceiling level)				2.6600	0.0600		0.1596
E12 Gable (insulation at ceiling level)				8.3400	0.0600		0.5004
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							6.2272 (36)

$$(33) + (36) + (36a) = 27.3658 \quad (37)$$
[illegible]

4. Water heating energy requirements (kWh/year)

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

6. Solar gains

7. Mean internal temperature (heating season)

Page 11 of 26

Full SAP Calculation Printout



Th 2	20.1568	20.1591	20.1613	20.1718	20.1738	20.1829	20.1829	20.1846	20.1794	20.1738	20.1698	20.1657 (88)
util rest of house	0.9800	0.9690	0.9472	0.8765	0.7369	0.5293	0.3673	0.4191	0.6809	0.9018	0.9652	0.9824 (89)
MIT 2	18.8179	19.0025	19.2880	19.7096	20.0076	20.1524	20.1779	20.1760	20.0930	19.7237	19.2292	18.8024 (90)
Living area fraction									fLA = Living area / (4) =			0.3943 (91)
MIT	19.1019	19.2869	19.5737	19.9991	20.3095	20.4654	20.4971	20.4929	20.3971	20.0100	19.5107	19.0838 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1019	19.2869	19.5737	19.9991	20.3095	20.4654	20.4971	20.4929	20.3971	20.0100	19.5107	19.0838 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9748	0.9625	0.9398	0.8716	0.7442	0.5524	0.3981	0.4510	0.6978	0.8972	0.9589	0.9776	(94)
Useful gains	392.4795	424.8517	439.1621	452.8839	413.9315	309.1608	212.0722	220.5183	311.6210	361.8908	373.9162	380.8216	(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	844.3504	818.2674	741.4375	620.9129	480.3960	323.3510	214.8402	225.1263	348.7744	525.0639	696.1169	839.3608	(97)
Space heating kWh	336.1919	264.3753	224.8929	120.9809	49.4496	0.0000	0.0000	0.0000	0.0000	121.4008	231.9845	341.1532	(98a)
Space heating requirement - total per year (kWh/year)												1690.4291	
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	336.1919	264.3753	224.8929	120.9809	49.4496	0.0000	0.0000	0.0000	0.0000	121.4008	231.9845	341.1532	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1690.4291	
Space heating per m2											(98c) / (4) =	27.0425	(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	518.2068	407.9501	418.0324	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8686	0.9208	0.8924	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	450.1212	375.6499	373.0527	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	610.0787	580.7883	531.7017	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	115.1694	152.6230	118.0348	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction									fC = cooled area / (4) =			1.0000	(105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	28.7924	38.1558	29.5087	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement													96.4568 (107)
Energy for space heating													27.0425 (99)
Energy for space cooling													1.5431 (108)
Total													28.5856 (109)
Fabric Energy Efficiency (TFEE)													28.6 (109)

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

1. Overall dwelling characteristics

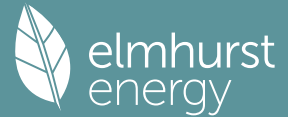
Main dwelling	Area (m2)	Storey height (m)	Volume (m3)	
Ground floor	62.5100 (1b)	x 2.4600 (2b)	= 153.7746 (1b) - (3b)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.5100		(4)	
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	153.7746 (5)	

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)	
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)	
Pressure test	Yes		
Pressure Test Method	Blower Door		
Measured/design AP50	3.2800	(17)	
Infiltration rate	0.1640	(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) =	0.1394 (21)	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1777	0.1742	0.1708	0.1533	0.1499	0.1324	0.1324	0.1289	0.1394	0.1499	0.1568	0.1638 (22b)
Mechanical extract ventilation - centralised												
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								
Window			7.6400	1.2357	9.4411			(27)
Corridor Door			2.0800	1.0000	2.0800			(26)
EW Brick AAC018/019	22.2600	7.6400	14.6200	0.2600	3.8012	60.0000	877.2000	(29a)
E-WM-30 Corridor Wall	6.5400	2.0800	4.4600	0.2100	0.9366	52.3000	233.2580	(29a)
PR 500mm MW044	62.5100		62.5100	0.0900	5.6259	9.0000	562.5900	(30)
Total net area of external elements Aum(A, m2)			91.3100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8848			(33)
Main dwelling								
Party Wall			49.1000	0.0000	0.0000	45.0000	2209.4999	(32)
Party Floor			62.5100			70.0000	4375.7000	(32d)
GF Timber			134.3400			9.0000	1209.0600	(32c)
Masonry Walls			4.0500			39.0000	157.9500	(32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9625.2579	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							153.9795	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	3.6400	0.0370	0.1347
E4 Jamb	16.6700	0.0140	0.2334
E7 Party floor between dwellings (in blocks of flats)	9.0500	0.0390	0.3530
E16 Corner (normal)	4.9200	0.0410	0.2017
E18 Party wall between dwellings	4.9200	0.0390	0.1919
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	19.9600	0.0000	0.0000
E2 Other lintels (including other steel lintels)	1.0200	0.0270	0.0275
E4 Jamb	4.2000	0.0850	0.3570
E7 Party floor between dwellings (in blocks of flats)	2.6600	0.0330	0.0878
E25 Staggered party wall between dwellings	4.9200	0.0380	0.1870
P4 Party wall - Roof (insulation at ceiling level)	19.9600	0.0330	0.6587
E10 Eaves (insulation at ceiling level)	0.7100	0.0360	0.0256
E12 Gable (insulation at ceiling level)	2.6600	0.0280	0.0745
E12 Gable (insulation at ceiling level)	8.3400	0.0330	0.2752
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			2.8078 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 24.6926 (37)

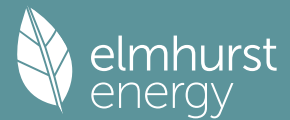
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728 (38)
Heat transfer coeff	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654 (39)
Average = Sum(39)m / 12 =												50.0654
HLP	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009 (40)
HLP (average)												0.8009
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0516 (42)
Hot water usage for mixer showers	58.6188	57.7379	56.4542	53.9981	52.1856	50.1643	49.0153	50.2893	51.6858	53.8561	56.3650	58.3942 (42a)
Hot water usage for baths	25.3312	24.9550	24.4253	23.4485	22.7170	21.9060	21.4679	21.9940	22.5668	23.4346	24.4315	25.2456 (42b)
Hot water usage for other uses	35.6408	34.3448	33.0488	31.7527	30.4567	29.1607	29.1607	30.4567	31.7527	33.0488	34.3448	35.6408 (42c)
Average daily hot water use (litres/day)												109.9314 (43)
Daily hot water use	119.5909	117.0378	113.9283	109.1993	105.3593	101.2310	99.6440	102.7400	106.0054	110.3395	115.1413	119.2807 (44)
Energy conte	189.4028	166.6602	175.1035	149.4884	141.8339	124.4753	120.5107	127.2136	130.7152	149.7297	164.0399	186.7648 (45)
Energy content (annual)										Total = Sum(45)m =		1825.9381
Distribution loss (46)m = 0.15 x (45)m	28.4104	24.9990	26.2655	22.4233	21.2751	18.6713	18.0766	19.0820	19.6073	22.4595	24.6060	28.0147 (46)
Water storage loss:												
Store volume												200.0000 (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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162 (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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162 (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	62.9764	55.4145	58.2219	49.7049	47.1598	41.3880	40.0698	42.2985	43.4628	49.7851	54.5433	62.0993 (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	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.3350	19.8377	16.1331	12.2138	9.1300	7.7079	8.3287	10.8259	14.5305	18.4498	21.5337	22.9557	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	267.5073	270.2832	263.2881	248.3962	229.5979	211.9302	200.1271	197.3512	204.3463	219.2382	238.0365	255.7042	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	(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)	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	(71)
Water heating gains (Table 5)	84.6457	82.4621	78.2553	69.0346	63.3868	57.4834	53.8573	56.8529	60.3650	66.9155	75.7545	83.4668	(72)
Total internal gains	464.8823	462.9773	448.0707	420.0389	392.5090	367.5158	352.7073	355.4242	369.6361	394.9978	425.7190	452.5210	(73)

6. Solar gains

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

Northeast					7.6400	11.2829		0.4600	0.0000	0.7700		30.5326 (75)

Solar gains	30.5326	62.1501	111.9746	183.8945	247.1903	263.5310	246.5279	196.5349	136.4428	75.9523	38.4180	24.9345 (83)
Total gains	495.4150	525.1274	560.0454	603.9334	639.6993	631.0468	599.2352	551.9591	506.0790	470.9501	464.1369	477.4555 (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	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	
alpha	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	
util living area	0.9604	0.9456	0.9083	0.8214	0.6717	0.4961	0.3652	0.4127	0.6395	0.8587	0.9413	0.9658	(86)
MIT	20.0236	20.1613	20.4113	20.7027	20.9027	20.9801	20.9960	20.9932	20.9408	20.6849	20.2981	19.9703	(87)
Th 2	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	(88)
util rest of house	0.9537	0.9366	0.8935	0.7944	0.6296	0.4420	0.3042	0.3476	0.5822	0.8306	0.9301	0.9600	(89)
MIT 2	19.1183	19.2900	19.5982	19.9444	20.1641	20.2384	20.2506	20.2489	20.2060	19.9323	19.4639	19.0517	(90)
Living area fraction	19.4752	19.6336	19.9189	20.2434	20.4554	20.5309	20.5445	20.5424	20.4958	20.2291	19.7928	19.4140	(91)
MIT	19.4752	19.6336	19.9189	20.2434	20.4554	20.5309	20.5445	20.5424	20.4958	20.2291	19.7928	19.4140	(92)
Temperature adjustment	19.4752	19.6336	19.9189	20.2434	20.4554	20.5309	20.5445	20.5424	20.4958	20.2291	19.7928	19.4140	(93)
adjusted MIT	19.4752	19.6336	19.9189	20.2434	20.4554	20.5309	20.5445	20.5424	20.4958	20.2291	19.7928	19.4140	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9454	0.9279	0.8860	0.7941	0.6414	0.4624	0.3282	0.3730	0.6014	0.8296	0.9221	0.9521	(94)
Useful gains	468.3825	487.2858	496.1956	479.5551	410.2997	291.8017	196.6444	205.8939	304.3809	390.6993	427.9687	454.5773	(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	759.7549	737.6429	671.8202	567.9133	438.3413	296.9309	197.4848	207.3915	320.2079	482.0827	635.4721	761.6931	(97)
Space heating kWh	216.7811	168.2400	130.6647	63.6179	20.8629	0.0000	0.0000	0.0000	0.0000	67.9892	149.4024	228.4941	(98a)
Space heating requirement - total per year (kWh/year)												1046.0523	
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	216.7811	168.2400	130.6647	63.6179	20.8629	0.0000	0.0000	0.0000	0.0000	67.9892	149.4024	228.4941	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1046.0523	
Space heating per m ²												16.7342	(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	216.7811	168.2400	130.6647	63.6179	20.8629	0.0000	0.0000	0.0000	0.0000	67.9892	149.4024	228.4941	(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)	216.7811	168.2400	130.6647	63.6179	20.8629	0.0000	0.0000	0.0000	0.0000	67.9892	149.4024	228.4941	(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)

elmhurst
energy

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP			
	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1	1046.0523	0.1560	163.1475 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	660.4428	0.1412	93.2240 (264)
Space and water heating			256.3715 (265)
Pumps, fans and electric keep-hot	42.0235	0.1387	5.8292 (267)
Energy for lighting	157.7771	0.1443	22.7721 (268)
Total CO ₂ , kg/year			284.9728 (272)
CO ₂ emissions per m ²			4.5600 (273)
EI value			96.4481
EI rating			96 (274)
EI band			A

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1. Overall dwelling characteristics

Main dwelling	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	62.5100	2.4600	153.7746
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.5100	x	= 153.7746
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 153.7746

2. Ventilation rate

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

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.2800	(17)
Infiltration rate		0.1640	(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) =	0.1394	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.4000	4.1000	4.1000	3.9000	3.9000	3.4000	3.4000	3.3000	3.4000	3.8000	3.7000	4.0000 (22)
Wind factor	1.1000	1.0250	1.0250	0.9750	0.9750	0.8500	0.8500	0.8250	0.8500	0.9500	0.9250	1.0000 (22a)
Adj infilt rate	0.1533	0.1429	0.1429	0.1359	0.1359	0.1185	0.1185	0.1150	0.1185	0.1324	0.1289	0.1394 (22b)
Mechanical extract ventilation - centralised												
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							
Window			7.6400	1.2357	9.4411		(27)
Corridor Door			2.0800	1.0000	2.0800		(26)
EW Brick AAC018/019	22.2600	7.6400	14.6200	0.2600	3.8012	60.0000	877.2000 (29a)
E-WM-30 Corridor Wall	6.5400	2.0800	4.4600	0.2100	0.9366	52.3000	233.2580 (29a)
PR 500mm MW044	62.5100		62.5100	0.0900	5.6259	9.0000	562.5900 (30)
Total net area of external elements Aum(A, m ²)			91.3100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8848		(33)
Main dwelling							
Party Wall			49.1000	0.0000	0.0000	45.0000	2209.4999 (32)
Party Floor			62.5100			70.0000	4375.7000 (32d)
GF Timber			134.3400			9.0000	1209.0600 (32c)
Masonry Walls			4.0500			39.0000	157.9500 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	9625.2579 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		153.9795 (35)

List of Thermal Bridges

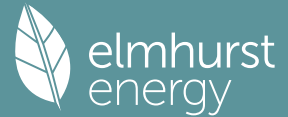
K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	3.6400	0.0370	0.1347
E4 Jamb	16.6700	0.0140	0.2334
E7 Party floor between dwellings (in blocks of flats)	9.0500	0.0390	0.3530
E16 Corner (normal)	4.9200	0.0410	0.2017
E18 Party wall between dwellings	4.9200	0.0390	0.1919
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	19.9600	0.0000	0.0000
E2 Other lintels (including other steel lintels)	1.0200	0.0270	0.0275
E4 Jamb	4.2000	0.0850	0.3570
E7 Party floor between dwellings (in blocks of flats)	2.6600	0.0330	0.0878
E25 Staggered party wall between dwellings	4.9200	0.0380	0.1870
P4 Party wall - Roof (insulation at ceiling level)	19.9600	0.0330	0.6587
E10 Eaves (insulation at ceiling level)	0.7100	0.0360	0.0256
E12 Gable (insulation at ceiling level)	2.6600	0.0280	0.0745
E12 Gable (insulation at ceiling level)	8.3400	0.0330	0.2752

Thermal bridges (Sum(L x Psi) calculated using Appendix K)		2.8078 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	24.6926 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)		
(38)m	Jan 25.3728	Feb 25.3728
Heat transfer coeff	50.0654	50.0654
Average = Sum(39)m / 12 =	50.0654	50.0654

HLP	Jan 0.8009	Feb 0.8009
HLP (average)	0.8009	0.8009
Days in mont	31	28

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0516 (42)
Hot water usage for mixer showers												58.3942 (42a)
Hot water usage for baths												25.2456 (42b)
Hot water usage for other uses												35.6408 (42c)
Average daily hot water use (litres/day)												109.9314 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	119.5909	117.0378	113.9283	109.1993	105.3593	101.2310	99.6440	102.7400	106.0054	110.3395	115.1413	119.2807 (44)
Energy content (annual)	189.4028	166.6602	175.1035	149.4884	141.8339	124.4753	120.5107	127.2136	130.7152	149.7297	164.0399	186.7648 (45)
Distribution loss (46)m = 0.15 x (45)m	28.4104	24.9990	26.2655	22.4233	21.2751	18.6713	18.0766	19.0820	19.6073	22.4595	24.6060	28.0147 (46)
Water storage loss:												
Store volume												200.0000 (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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162 (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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162 (64)
	Total per year (kWh/year) = Sum(64)m =											2143.2691 (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	62.9764	55.4145	58.2219	49.7049	47.1598	41.3880	40.0698	42.2985	43.4628	49.7851	54.5433	62.0993 (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	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.3350	19.8377	16.1331	12.2138	9.1300	7.7079	8.3287	10.8259	14.5305	18.4498	21.5337	22.9557 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	267.5073	270.2832	263.2881	248.3962	229.5979	211.9302	200.1271	197.3512	204.3463	219.2382	238.0365	255.7042 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615 (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)	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656 (71)
Water heating gains (Table 5)	84.6457	82.4621	78.2553	69.0346	63.3868	57.4834	53.8573	56.8529	60.3650	66.9155	75.7545	83.4668 (72)
Total internal gains	464.8823	462.9773	448.0707	420.0389	392.5090	367.5158	352.7073	355.4242	369.6361	394.9978	425.7190	452.5210 (73)

6. Solar gains

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

Northeast				7.6400			13.7758		0.4600		0.0000	0.7700	37.2784 (75)

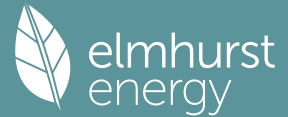
Solar gains	37.2784	66.6945	119.8032	199.5854	260.4541	293.0530	271.7225	221.6095	155.6618	87.6716	46.2940	30.5591	(83)
Total gains	502.1608	529.6718	567.8739	619.6243	652.9631	660.5688	624.4298	577.0337	525.2980	482.6694	472.0130	483.0801	(84)

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	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038
alpha	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603
util living area	0.9531	0.9368	0.8881	0.7810	0.6043	0.4051	0.2721	0.3113	0.5677	0.8184	0.9272	0.9588 (86)
MIT	20.1126	20.2417	20.5080	20.7782	20.9433	20.9926	20.9991	20.9983	20.9670	20.7680	20.3951	20.0708 (87)
Th 2	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525 (88)
util rest of house	0.9451	0.9263	0.8700	0.7493	0.5579	0.3506	0.2125	0.2472	0.5067	0.7835	0.9132	0.9517 (89)
MIT 2	19.2300	19.3903	19.7155	20.0299	20.2044	20.2480	20.2522	20.2519	20.2289	20.0264	19.5835	19.1783 (90)
Living area fraction	19.5780	19.7260	20.0280	20.3250	20.4958	20.5416	20.5467	20.5462	20.5199	20.3188	19.9036	19.5303 (91)
MIT	19.5780	19.7260	20.0280	20.3250	20.4958	20.5416	20.5467	20.5462	20.5199	20.3188	19.9036	19.5303 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5780	19.7260	20.0280	20.3250	20.4958	20.5416	20.5467	20.5462	20.5199	20.3188	19.9036	19.5303 (93)

8. Space heating requirement

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9366	0.9177	0.8640	0.7526	0.5733	0.3719	0.2360	0.2724	0.5290	0.7868	0.9058	0.9434	(94)
Useful gains	470.3157	486.0966	490.6267	466.3061	374.3647	245.6403	147.3736	157.2105	277.8905	379.7831	427.5264	455.7312	(95)
Ext temp.	4.9000	5.5000	7.3000	9.7000	12.7000	15.6000	17.6000	17.4000	14.8000	11.4000	7.8000	4.9000	(96)
Heat loss rate W	734.8615	712.2314	637.2324	531.9452	390.2979	247.4042	147.5301	157.5179	286.3708	446.5253	605.9701	732.4701	(97)
Space heating kWh	196.8221	151.9626	109.0746	47.2602	11.8543	0.0000	0.0000	0.0000	0.0000	49.6562	128.4795	205.8937	(98a)
Space heating requirement - total per year (kWh/year)												901.0032	
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	196.8221	151.9626	109.0746	47.2602	11.8543	0.0000	0.0000	0.0000	0.0000	49.6562	128.4795	205.8937	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												901.0032	
Space heating per m2										(98c) / (4) =		14.4137	(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	196.8221	151.9626	109.0746	47.2602	11.8543	0.0000	0.0000	0.0000	0.0000	49.6562	128.4795	205.8937	(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)	196.8221	151.9626	109.0746	47.2602	11.8543	0.0000	0.0000	0.0000	0.0000	49.6562	128.4795	205.8937	(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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162	(64)	
Efficiency of water heater (217)m	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	(216)	
Fuel for water heating, kWh/month	66.6690	58.8572	62.2627	54.1016	52.0108	46.3938	45.4401	47.5056	48.3167	54.4438	58.5856	65.8561	(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	3.5691	3.2237	3.5691	3.4540	3.5691	3.4540	3.5691	3.5691	3.4540	3.5691	3.4540	3.5691	(231)	
Lighting	19.5497	15.6835	14.1212	10.3458	7.9914	6.5290	7.2900	9.4759	12.3082	16.1490	18.2403	20.0930	(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													901.0032	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													324.5200	
Water heating fuel used													660.4428	(219)
Space cooling fuel													0.0000	(221)
Electricity for pumps and fans:														
(MEV)Centralised, Database: in-use factor = 1.4000, SFP = 0.2240)														
mechanical ventilation fans (SFP = 0.2240)													42.0235	(230a)
Total electricity for the above, kWh/year													42.0235	(231)
Electricity for lighting (calculated in Appendix L)													157.7771	(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													1761.2466	(238)

10a. Fuel costs - using BEDF prices (567)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	901.0032	26.0600	234.8014	(240)
Space heating - main system 2	0.0000	26.0600	0.0000	(241)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	660.4428	26.0600	172.1114	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	42.0235	26.0600	10.9513	(249)
Energy for lighting	157.7771	26.0600	41.1167	(250)
Additional standing charges			0.0000	(251)

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Total energy cost

458.9809 (255)

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

	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1	901.0032	0.1566	141.1217 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	660.4428	0.1412	93.2240 (264)
Space and water heating			234.3458 (265)
Pumps, fans and electric keep-hot	42.0235	0.1387	5.8292 (267)
Energy for lighting	157.7771	0.1443	22.7721 (268)
Total CO ₂ , kg/year			262.9470 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1	901.0032	1.5799	1423.4573 (275)
Space heating - main system 2	0.0000	0.0000	0.0000 (276)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	660.4428	1.5219	1005.1598 (278)
Space and water heating			2428.6171 (279)
Pumps, fans and electric keep-hot	42.0235	1.5128	63.5732 (281)
Energy for lighting	157.7771	1.5338	242.0038 (282)
Total Primary energy kWh/year			2734.1941 (286)

SAP 10 EPC IMPROVEMENTS

Plot 049

Current energy efficiency rating: B 83
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: (none)	SAP change	Cost change	CO ₂ change
---------------------------------	------------	-------------	------------------------

Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
Total Savings	£0	0.00 kg/m ²	

Potential energy efficiency rating: B 83
Potential environmental impact rating: A 96

Fuel prices for cost data on this page from database revision number 567 TEST (07 Mar 2025)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):

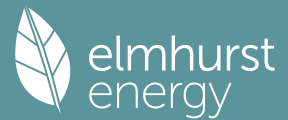
	Current £459	Potential £459	Saving £0
Electricity			
Space heating	£246	£246	£0
Water heating	£172	£172	£0
Lighting	£41	£41	£0
Total cost of fuels	£459	£459	£0
Total cost of uses	£459	£459	£0
Delivered energy	28 kWh/m ²	28 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.3 tonnes	0.3 tonnes	0.0 tonnes
CO ₂ emissions per m ²	4 kg/m ²	4 kg/m ²	0 kg/m ²
Primary energy	44 kWh/m ²	44 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	62.5100 (1b)	x 2.4600 (2b)	= 153.7746 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.5100		= 153.7746 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 153.7746 (5)

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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)			
											Air changes per hour				
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											0.0000 / (5) =		0.0000 (8)	
Pressure test												Yes			
Pressure Test Method												Blower Door			
Measured/design AP50												3.2800		(17)	
Infiltration rate												0.1640		(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) =		0.1394 (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	0.1777	0.1742	0.1708	0.1533	0.1499	0.1324	0.1324	0.1289	0.1394	0.1499	0.1568	0.1638	(22b)		
Mechanical extract ventilation - centralised															
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

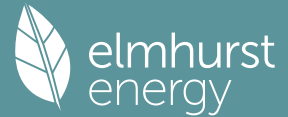
Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Window			7.6400	1.2357	9.4411			(27)
Corridor Door			2.0800	1.0000	2.0800			(26)
EW Brick AAC018/019	22.2600		14.6200	0.2600	3.8012	60.0000	877.2000	(29a)
E-WM-30 Corridor Wall	6.5400	2.0800	4.4600	0.2100	0.9366	52.3000	233.2580	(29a)
PR 500mm MW044	62.5100		62.5100	0.0900	5.6259	9.0000	562.5900	(30)
Total net area of external elements Aum(A, m2)			91.3100					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 21.8848			(33)
Main dwelling								
Party Wall			49.1000	0.0000	0.0000	45.0000	2209.4999	(32)
Party Floor			62.5100			70.0000	4375.7000	(32d)
GF Timber			134.3400			9.0000	1209.0600	(32c)
Masonry Walls			4.0500			39.0000	157.9500	(32c)
Heat capacity Cm = Sum(A x k)								(28)...(30) + (32) + (32a)...(32e) = 9625.2579 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								153.9795 (35)
List of Thermal Bridges								
K1 Element				Length	Psi-value	Total		
E2 Other lintels (including other steel lintels)				3.6400	0.0370	0.1347		
E4 Jamb				16.6700	0.0140	0.2334		
E7 Party floor between dwellings (in blocks of flats)				9.0500	0.0390	0.3530		
E16 Corner (normal)				4.9200	0.0410	0.2017		
E18 Party wall between dwellings				4.9200	0.0390	0.1919		
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				19.9600	0.0000	0.0000		
E2 Other lintels (including other steel lintels)				1.0200	0.0270	0.0275		
E4 Jamb				4.2000	0.0850	0.3570		
E7 Party floor between dwellings (in blocks of flats)				2.6600	0.0330	0.0878		
E25 Staggered party wall between dwellings				4.9200	0.0380	0.1870		
P4 Party wall - Roof (insulation at ceiling level)				19.9600	0.0330	0.6587		
E10 Eaves (insulation at ceiling level)				0.7100	0.0360	0.0256		
E12 Gable (insulation at ceiling level)				2.6600	0.0280	0.0745		
E12 Gable (insulation at ceiling level)				8.3400	0.0330	0.2752		
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							2.8078	(36)
Point Thermal bridges							0.0000	
Total fabric heat loss							(33) + (36) + (36a) = 24.6926	(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	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728	25.3728 (38)
Average = Sum(39)m / 12 =	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654	50.0654 (39)
												50.0654
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009	0.8009 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0516 (42)
Hot water usage for mixer showers												
Hot water usage for baths	58.6188	57.7379	56.4542	53.9981	52.1856	50.1643	49.0153	50.2893	51.6858	53.8561	56.3650	58.3942 (42a)
Hot water usage for other uses	25.3312	24.9550	24.4253	23.4485	22.7170	21.9060	21.4679	21.9940	22.5668	23.4346	24.4315	25.2456 (42b)
Average daily hot water use (litres/day)	35.6408	34.3448	33.0488	31.7527	30.4567	29.1607	29.1607	30.4567	31.7527	33.0488	34.3448	35.6408 (42c)
												109.9314 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	119.5909	117.0378	113.9283	109.1993	105.3593	101.2310	99.6440	102.7400	106.0054	110.3395	115.1413	119.2807 (44)
Energy content (annual)	189.4028	166.6602	175.1035	149.4884	141.8339	124.4753	120.5107	127.2136	130.7152	149.7297	164.0399	186.7648 (45)
	Total = Sum(45)m = 1825.9381											

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Distribution loss (46)m = 0.15 x (45)m	28.4104	24.9990	26.2655	22.4233	21.2751	18.6713	18.0766	19.0820	19.6073	22.4595	24.6060	28.0147 (46)
Water storage loss:												
Store volume												200.0000 (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	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month												
216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162	(62)
WWHRS	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	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h												
216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162	(64)
Electric shower(s)												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month												
62.9764	55.4145	58.2219	49.7049	47.1598	41.3880	40.0698	42.2985	43.4628	49.7851	54.5433	62.0993	(65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)												

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

Metabolic gains (Table 5), Watts												
(66)m	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	123.0984	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
22.3350	19.8377	16.1331	12.2138	9.1300	7.7079	8.3287	10.8259	14.5305	18.4498	21.5337	22.9557	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
267.5073	270.2832	263.2881	248.3962	229.5979	211.9302	200.1271	197.3512	204.3463	219.2382	238.0365	255.7042	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	49.3615	(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	(70)
Losses e.g. evaporation (negative values) (Table 5)												
-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	-82.0656	(71)
Water heating gains (Table 5)												
84.6457	82.4621	78.2553	69.0346	63.3868	57.4834	53.8573	56.8529	60.3650	66.9155	75.7545	83.4668	(72)
Total internal gains												
464.8823	462.9773	448.0707	420.0389	392.5090	367.5158	352.7073	355.4242	369.6361	394.9978	425.7190	452.5210	(73)

6. Solar gains

[Jan]												
	Area	Solar flux	g	FF	Access	Gains						
	m2	Table 6a	Specific data	Specific data	factor	W						
		W/m2	or Table 6b	or Table 6c	Table 6d							
Northeast	7.6400	11.2829	0.4600	0.0000	0.7700	30.5326	(75)					
Solar gains	30.5326	62.1501	111.9746	183.8945	247.1903	263.5310	246.5279	196.5349	136.4428	75.9523	38.4180	24.9345 (83)
Total gains	495.4150	525.1274	560.0454	603.9334	639.6993	631.0468	599.2352	551.9591	506.0790	470.9501	464.1369	477.4555 (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	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	
alpha	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	
util living area												
0.9604	0.9456	0.9083	0.8214	0.6717	0.4961	0.3652	0.4127	0.6395	0.8587	0.9413	0.9658	(86)
MIT	20.0236	20.1613	20.4113	20.7027	20.9027	20.9801	20.9960	20.9932	20.9408	20.6849	20.2981	19.9703 (87)
Th 2	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525 (88)
util rest of house												
0.9537	0.9366	0.8935	0.7944	0.6296	0.4420	0.3042	0.3476	0.5822	0.8306	0.9301	0.9600	(89)
MIT 2	19.1183	19.2900	19.5982	19.9444	20.1641	20.2384	20.2506	20.2489	20.2060	19.9323	19.4639	19.0517 (90)
Living area fraction												
MIT	19.4752	19.6336	19.9189	20.2434	20.4554	20.5309	20.5445	20.5424	20.4958	20.2291	19.7928	19.4140 (92)
Temperature adjustment												0.0000
adjusted MIT	19.4752	19.6336	19.9189	20.2434	20.4554	20.5309	20.5445	20.5424	20.4958	20.2291	19.7928	19.4140 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9454	0.9279	0.8860	0.7941	0.6414	0.4624	0.3282	0.3730	0.6014	0.8296	0.9221	0.9521	(94)
Useful gains	468.3825	487.2858	496.1956	479.5551	410.2997	291.8017	196.6444	205.8939	304.3809	390.6993	427.9687	454.5773	(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													
759.7549	737.6429	671.8202	567.9133	438.3413	296.9309	197.4848	207.3915	320.2079	482.0827	635.4721	761.6931	(97)	
Space heating kWh	216.7811	168.2400	130.6647	63.6179	20.8629	0.0000	0.0000	0.0000	0.0000	67.9892	149.4024	228.4941	(98a)
Space heating requirement - total per year (kWh/year)												1046.0523	
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	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	216.7811	168.2400	130.6647	63.6179	20.8629	0.0000	0.0000	0.0000	0.0000	67.9892	149.4024	228.4941	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1046.0523	
Space heating per m2											(98c) / (4) =	16.7342	(99)

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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	216.7811	168.2400	130.6647	63.6179	20.8629	0.0000	0.0000	0.0000	0.0000	67.9892	149.4024	228.4941	(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)	216.7811	168.2400	130.6647	63.6179	20.8629	0.0000	0.0000	0.0000	0.0000	67.9892	149.4024	228.4941	(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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162	(64)	
Efficiency of water heater	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	(216)	
Fuel for water heating, kWh/month	66.6690	58.8572	62.2627	54.1016	52.0108	46.3938	45.4401	47.5056	48.3167	54.4438	58.5856	65.8561	(217)	
Space cooling fuel requirement														
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)	
Pumps and Fa	3.5691	3.2237	3.5691	3.4540	3.5691	3.4540	3.5691	3.5691	3.4540	3.5691	3.4540	3.5691	(231)	
Lighting	19.5497	15.6835	14.1212	10.3458	7.9914	6.5290	7.2900	9.4759	12.3082	16.1490	18.2403	20.0930	(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													1046.0523	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													324.5200	
Water heating fuel used													660.4428	(219)
Space cooling fuel													0.0000	(221)
Electricity for pumps and fans:														
(MEVCentralised, Database: in-use factor = 1.4000, SFP = 0.2240)														
mechanical ventilation fans (SFP = 0.2240)													42.0235	(230a)
Total electricity for the above, kWh/year													42.0235	(231)
Electricity for lighting (calculated in Appendix L)													157.7771	(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													1906.2958	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1046.0523	16.4900	172.4940	(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)	660.4428	16.4900	108.9070	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	42.0235	16.4900	6.9297	(249)
Energy for lighting	157.7771	16.4900	26.0174	(250)
Additional standing charges			0.0000	(251)
Total energy cost			314.3482	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)		1.0526	(257)
SAP value	$[(255) \times (256)] / [(4) + 45.0] =$	82.9373	
SAP rating (Section 12)		83	(258)
SAP band		B	

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

	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1	1046.0523	0.1560	163.1475 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	660.4428	0.1412	93.2240 (264)
Space and water heating			256.3715 (265)
Pumps, fans and electric keep-hot	42.0235	0.1387	5.8292 (267)
Energy for lighting	157.7771	0.1443	22.7721 (268)
Total CO ₂ , kg/year			284.9728 (272)
CO ₂ emissions per m ²			4.5600 (273)
EI value			96.4481
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 (m ²)	Storey height (m)	Volume (m ³)
Main dwelling	62.5100 (1b)	x 2.4600 (2b)	= 153.7746 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.5100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 153.7746 (5)

2. Ventilation rate

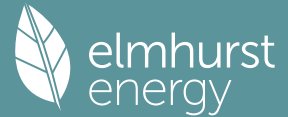
		m ³ per hour
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
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)+(7a)+(7b)+(7c) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.2800	(17)
Infiltration rate	0.1640	(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) =	0.1394 (21)
Wind speed	Jan 4.4000 Feb 4.1000 Mar 4.1000 Apr 3.9000 May 3.9000 Jun 3.4000 Jul 3.4000 Aug 3.3000 Sep 3.4000 Oct 3.8000 Nov 3.7000 Dec 4.0000	(22)
Wind factor	1.1000 1.0250 1.0250 0.9750 0.9750 0.8500 0.8500 0.8250 0.8500 0.9500 0.9250 1.0000	(22a)
Adj infilt rate	0.1533 0.1429 0.1429 0.1359 0.1359 0.1185 0.1185 0.1150 0.1185 0.1324 0.1289 0.1394	(22b)
Mechanical extract ventilation - centralised		
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							
Window			7.6400	1.2357	9.4411		(27)
Corridor Door			2.0800	1.0000	2.0800		(26)
EW Brick AAC018/019	22.2600	7.6400	14.6200	0.2600	3.8012	60.0000	877.2000 (29a)
E-WM-30 Corridor Wall	6.5400	2.0800	4.4600	0.2100	0.9366	52.3000	233.2580 (29a)
PR 500mm MW044	62.5100		62.5100	0.0900	5.6259	9.0000	562.5900 (30)
Total net area of external elements Aum(A, m ²)			91.3100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8848		(33)
Main dwelling							
Party Wall			49.1000	0.0000	0.0000	45.0000	2209.4999 (32)
Party Floor			62.5100			70.0000	4375.7000 (32d)
GF Timber			134.3400			9.0000	1209.0600 (32c)
Masonry Walls			4.0500			39.0000	157.9500 (32c)
Heat capacity Cm = Sum (A x k)							(28)...(30) + (32) + (32a)...(32e) = 9625.2579 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							153.9795 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value		Total
E2 Other lintels (including other steel lintels)				3.6400	0.0370		0.1347
E4 Jamb				16.6700	0.0140		0.2334
E7 Party floor between dwellings (in blocks of flats)				9.0500	0.0390		0.3530
E16 Corner (normal)				4.9200	0.0410		0.2017
E18 Party wall between dwellings				4.9200	0.0390		0.1919
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				19.9600	0.0000		0.0000

6. Solar gains														
[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
Northeast					7.6400	13.7758	0.4600	0.0000			0.7700			37.2784 (75)
Solar gains	37.2784	66.6945	119.8032	199.5854	260.4541	293.0530	271.7225	221.6095	155.6618	87.6716	46.2940			30.5591 (83)
Total gains	502.1608	529.6718	567.8739	619.6243	652.9631	660.5688	624.4298	577.0337	525.2980	482.6694	472.0130			483.0801 (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	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038	53.4038
alpha	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603	4.5603
util living area	0.9531	0.9368	0.8881	0.7810	0.6043	0.4051	0.2721	0.3113	0.5677	0.8184	0.9272	0.9588 (86)
MIT	20.1126	20.2417	20.5080	20.7782	20.9433	20.9926	20.9991	20.9983	20.9670	20.7680	20.3951	20.0708 (87)
Th 2	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525	20.2525 (88)
util rest of house	0.9451	0.9263	0.8700	0.7493	0.5579	0.3506	0.2125	0.2472	0.5067	0.7835	0.9132	0.9517 (89)
MIT 2	19.2300	19.3903	19.7155	20.0299	20.2044	20.2480	20.2522	20.2519	20.2289	20.0264	19.5835	19.1783 (90)
Living area fraction									fLA = Living area / (4) =			0.3943 (91)
MIT	19.5780	19.7260	20.0280	20.3250	20.4958	20.5416	20.5467	20.5462	20.5199	20.3188	19.9036	19.5303 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5780	19.7260	20.0280	20.3250	20.4958	20.5416	20.5467	20.5462	20.5199	20.3188	19.9036	19.5303 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9366	0.9177	0.8640	0.7526	0.5733	0.3719	0.2360	0.2724	0.5290	0.7868	0.9058	0.9434 (94)
Useful gains	470.3157	486.0966	490.6267	466.3061	374.3647	245.6403	147.3736	157.2105	277.8905	379.7831	427.5264	455.7312 (95)
Ext temp.	4.9000	5.5000	7.3000	9.7000	12.7000	15.6000	17.6000	17.4000	14.8000	11.4000	7.8000	4.9000 (96)
Heat loss rate W	734.8615	712.2314	637.2324	531.9452	390.2979	247.4042	147.5301	157.5179	286.3708	446.5253	605.9701	732.4701 (97)
Space heating kWh	196.8221	151.9626	109.0746	47.2602	11.8543	0.0000	0.0000	0.0000	0.0000	49.6562	128.4795	205.8937 (98a)
Space heating requirement - total per year (kWh/year)												901.0032
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	196.8221	151.9626	109.0746	47.2602	11.8543	0.0000	0.0000	0.0000	0.0000	49.6562	128.4795	205.8937 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												901.0032
Space heating per m2										(98c) / (4) =		14.4137 (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	196.8221	151.9626	109.0746	47.2602	11.8543	0.0000	0.0000	0.0000	0.0000	49.6562	128.4795	205.8937 (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)	196.8221	151.9626	109.0746	47.2602	11.8543	0.0000	0.0000	0.0000	0.0000	49.6562	128.4795	205.8937 (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	216.3542	191.0034	202.0549	175.5704	168.7853	150.5573	147.4621	154.1650	156.7972	176.6811	190.1219	213.7162 (64)
Efficiency of water heater												324.5200 (216)
(217)m	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200	324.5200 (217)
Fuel for water heating, kWh/month	66.6690	58.8572	62.2627	54.1016	52.0108	46.3938	45.4401	47.5056	48.3167	54.4438	58.5856	65.8561 (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	3.5691	3.2237	3.5691	3.4540	3.5691	3.4540	3.5691	3.5691	3.4540	3.5691	3.4540	3.5691 (231)
Lighting	19.5497	15.6835	14.1212	10.3458	7.9914	6.5290	7.2900	9.4759	12.3082	16.1490	18.2403	20.0930 (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												901.0032 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												324.5200
Water heating fuel used												660.4428 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans:

(MEVCentralised, Database: in-use factor = 1.4000, SFP = 0.2240)

mechanical ventilation fans (SFP = 0.2240)

42.0235 (230a)

Total electricity for the above, kWh/year

42.0235 (231)

Full SAP Calculation Printout



Electricity for lighting (calculated in Appendix L)	157.7771	(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	1761.2466	(238)

10a. Fuel costs - using BEDF prices (567)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	901.0032	26.0600	234.8014	(240)
Space heating - main system 2	0.0000	26.0600	0.0000	(241)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	660.4428	26.0600	172.1114	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	42.0235	26.0600	10.9513	(249)
Energy for lighting	157.7771	26.0600	41.1167	(250)
Additional standing charges			0.0000	(251)
Total energy cost			458.9809	(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	901.0032	0.1566	141.1217	(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)	660.4428	0.1412	93.2240	(264)
Space and water heating			234.3458	(265)
Pumps, fans and electric keep-hot	42.0235	0.1387	5.8292	(267)
Energy for lighting	157.7771	0.1443	22.7721	(268)
Total CO2, kg/year			262.9470	(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	901.0032	1.5799	1423.4573	(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)	660.4428	1.5219	1005.1598	(278)
Space and water heating			2428.6171	(279)
Pumps, fans and electric keep-hot	42.0235	1.5128	63.5732	(281)
Energy for lighting	157.7771	1.5338	242.0038	(282)
Total Primary energy kWh/year			2734.1941	(286)