elmhurst energy

SAP Report Submission for Building Regulations Compliance

Client:

Project: Plot 103

Contact: Benjamin Wood
Benjamin Wood
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Report Issue Date: 15/03/2021

EXCELLENCE IN ENERGY ASSESSMENT

THERMAL BRIDGING
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	007818 - Plot 103	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2324-MT
Property	Plot 103		

SAP Rating	84 B	**DER**	17.19	**TER**	18.75
Environmental	86 B	**% DER<TER**	8.30		
CO_2 Emissions (t/year)	1.29	**DFEE**	48.18	**TFEE**	57.42
General Requirements Compliance	Pass	**% DFEE<TFEE**	16.10		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E2 Other lintels (including other steel lintels)	Independently assessed	0.040	13.02	0.52	
External wall	E3 Sill	Independently assessed	0.027	10.51	0.28	
External wall	E4 Jamb	Independently assessed	0.029	30.00	0.87	
External wall	E5 Ground floor (normal)	Independently assessed	0.049	27.46	1.35	
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.003	27.46	0.08	
External wall	E10 Eaves (insulation at ceiling level)	Independently assessed	0.083	16.09	1.34	
External wall	E12 Gable (insulation at ceiling level)	Independently assessed	0.054	11.37	0.61	
External wall	E16 Corner (normal)	Independently assessed	0.050	19.92	1.00	

Total: 6.05 **W/mK:**

Y-Value: 0.026 **W/m²K:**

FULL SAP CALCULATION PRINTOUT
Calculation Type: New Build (As Designed)

Design SAP
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REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

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DWELLING AS DESIGNED

Detached House, total floor area 91 m²

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER
Fuel for main heating:Mains gas
Fuel factor:1.00 (mains gas)
Target Carbon Dioxide Emission Rate (TER) 18.75 kgCO□/m²
Dwelling Carbon Dioxide Emission Rate (DER) 17.19 kgCO□/m²OK

1b TFEE and DFEE
Target Fabric Energy Efficiency (TFEE)57.4 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)48.2 kWh/m²/yrOK

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2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	OK
Roof	0.09 (max. 0.20)	0.09 (max. 0.35)	OK
Openings	1.21 (max. 2.00)	1.40 (max. 3.30)	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

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3 Air permeability
Air permeability at 50 pascals: 5.00 (design value)
Maximum 10.0 OK

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4 Heating efficiency
Main heating system: Boiler system with radiators or underfloor - Mains gas
Data from database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Combi boiler
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK

Secondary heating system: None

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5 Cylinder insulation
Hot water storage: No cylinder

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6 Controls
Space heating controls: Time and temperature zone control OK

Hot water controls: No cylinder

Boiler interlock: Yes OK

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7 Low energy lights
Percentage of fixed lights with low-energy fittings:100%
Minimum 75% OK

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8 Mechanical ventilation
Not applicable

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9 Summertime temperature
Overheating risk (Thames Valley): Not significant OK
Based on:
Overshading: Average
Windows facing North East: 3.35 m², No overhang
Windows facing South West: 5.85 m², No overhang
Windows facing North West: 6.78 m², No overhang
Air change rate: 8.00 ach
Blinds/curtains: None

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10 Key features
Party wall U-value 0.00 W/m²K
Roof U-value 0.09 W/m²K
Door U-value 1.00 W/m²K
Thermal bridging y-value 0.026 W/m²K

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	45.7400	(1b)	x 2.3900	(2b) =	109.3186	(1b) - (3b)
First floor	45.7400	(1c)	x 2.6000	(2c) =	118.9240	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	91.4800					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		228.2426	(5)

2. Ventilation rate

	main heating		secondary heating		other		total		m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =		0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =		0.0000	(6b)
Number of intermittent fans							4 * 10 =		40.0000	(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)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.1753	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.4253	(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) =	0.3615	(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	0.4609	0.4518	0.4428	0.3976	0.3886	0.3434	0.3434	0.3344	0.3615	0.3886	0.4066	0.4247	(22b)
Effective ac	0.6062	0.6021	0.5980	0.5790	0.5755	0.5590	0.5590	0.5559	0.5653	0.5755	0.5827	0.5902	(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	
Half Glazed Door			2.1200	1.0000	2.1200			(26a)
Windows (Uw = 1.20)			12.8300	1.1450	14.6908			(27)
Patio Door (Uw = 1.40)			3.1500	1.3258	4.1761			(27)
Ground Floor			45.7400	0.1400	6.4036	75.0000	3430.5000	(28a)
External Wall	136.9000	18.1000	118.8000	0.2400	28.5120	60.0000	7128.0000	(29a)
Cold Roof	45.7400		45.7400	0.0900	4.1166	9.0000	411.6600	(30)
Total net area of external elements Aum(A, m2)			228.3800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	60.0192			(33)
GF - Dense Block			27.3200			75.0000	2049.0000	(32c)
GF - Timber Frame			35.7000			9.0000	321.3000	(32c)
FF - Timber Frame			126.2000			9.0000	1135.8000	(32c)
FF			45.7400			18.0000	823.3200	(32d)
GF			45.7400			18.0000	823.3200	(32e)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 16122.9000	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	176.2451	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	6.0479	(36)
Total fabric heat loss	(33) + (36) = 66.0671	(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	45.6590	45.3483	45.0439	43.6139	43.3463	42.1008	42.1008	41.8702	42.5806	43.3463	43.8876	44.4534	(38)
Heat transfer coeff	111.7261	111.4155	111.1110	109.6810	109.4134	108.1679	108.1679	107.9373	108.6477	109.4134	109.9547	110.5205	(39)
Average = Sum(39)m / 12 =												109.6797	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2213	1.2179	1.2146	1.1990	1.1960	1.1824	1.1824	1.1799	1.1877	1.1960	1.2020	1.2081	(40)
HLP (average)												1.1989	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6454 (42)
Average daily hot water use (litres/day)	97.0292 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	106.7321	102.8510	98.9698	95.0886	91.2075	87.3263	87.3263	91.2075	95.0886	98.9698	102.8510	106.7321	(44)
Energy conte	158.2807	138.4333	142.8508	124.5408	119.4998	103.1193	95.5552	109.6509	110.9605	129.3138	141.1561	153.2864	(45)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Energy content (annual)											Total = Sum(45)m =	1526.6474	(45)
Distribution loss (46)m = 0.15 x (45)m													
	23.7421	20.7650	21.4276	18.6811	17.9250	15.4679	14.3333	16.4476	16.6441	19.3971	21.1734	22.9930	(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)
Combi loss	0.6709	0.6083	0.6362	0.5329	0.4905	0.4052	0.3755	0.4500	0.4748	0.5759	0.6202	0.6497	(61)
Total heat required for water heating calculated for each month													
	158.9516	139.0416	143.4870	125.0737	119.9903	103.5245	95.9307	110.1010	111.4353	129.8897	141.7763	153.9361	(62)
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	(63)
									Solar input (sum of months) = Sum(63)m =			0.0000	(63)
Output from w/h													
	158.9516	139.0416	143.4870	125.0737	119.9903	103.5245	95.9307	110.1010	111.4353	129.8897	141.7763	153.9361	(64)
									Total per year (kWh/year) = Sum(64)m =			1533.1377	(64)
Heat gains from water heating, kWh/month													
	52.7961	46.1811	47.6569	41.5430	39.8563	34.3885	31.8660	36.5714	37.0131	43.1408	47.0895	51.1302	(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	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.1243	19.6506	15.9809	12.0986	9.0438	7.6352	8.2501	10.7238	14.3934	18.2758	21.3305	22.7392	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	241.7743	244.2832	237.9609	224.5016	207.5117	191.5435	180.8758	178.3669	184.6891	198.1485	215.1384	231.1066	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	(71)
Water heating gains (Table 5)													
	70.9624	68.7219	64.0550	57.6987	53.5703	47.7617	42.8306	49.1552	51.4070	57.9850	65.4020	68.7233	(72)
Total internal gains													
	400.5427	398.3373	383.6785	359.9805	335.8074	312.6220	297.6381	303.9275	316.1712	340.0908	367.5526	388.2507	(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	3.3500	11.2829	0.6300	0.7000	0.7700	11.5515	(75)
Southwest	2.7000	36.7938	0.6300	0.7000	0.7700	30.3606	(79)
Northwest	6.7800	11.2829	0.6300	0.7000	0.7700	23.3789	(81)
Southwest	3.1500	36.7938	0.6300	0.7000	0.7700	35.4207	(79)

Solar gains	100.7117	183.1518	281.4146	400.3423	495.5660	512.7218	485.6877	411.4759	322.0995	210.7312	122.7424	84.8210	(83)
Total gains	501.2544	581.4891	665.0931	760.3228	831.3735	825.3438	783.3258	715.4033	638.2707	550.8220	490.2950	473.0718	(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	40.0854	40.1971	40.3073	40.8328	40.9327	41.4040	41.4040	41.4925	41.2212	40.9327	40.7312	40.5226	
alpha	3.6724	3.6798	3.6872	3.7222	3.7288	3.7603	3.7603	3.7662	3.7481	3.7288	3.7154	3.7015	
util living area													
	0.9941	0.9892	0.9771	0.9421	0.8601	0.7156	0.5672	0.6290	0.8478	0.9644	0.9900	0.9953	(86)
MIT	19.1995	19.3944	19.7325	20.1916	20.5993	20.8650	20.9580	20.9381	20.7232	20.1965	19.6206	19.1697	(87)
Th 2	19.9030	19.9057	19.9083	19.9208	19.9232	19.9341	19.9341	19.9361	19.9299	19.9232	19.9184	19.9135	(88)
util rest of house													
	0.9927	0.9865	0.9710	0.9256	0.8185	0.6322	0.4466	0.5089	0.7864	0.9511	0.9870	0.9941	(89)
MIT 2	17.5009	17.7863	18.2783	18.9419	19.4979	19.8266	19.9131	19.9019	19.6743	18.9607	18.1256	17.4639	(90)
Living area fraction									fLA = Living area / (4) =			0.1986	(91)
MIT	17.8383	18.1057	18.5671	19.1901	19.7167	20.0328	20.1206	20.1077	19.8826	19.2061	18.4226	17.8027	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.6883	17.9557	18.4171	19.0401	19.5667	19.8828	19.9706	19.9577	19.7326	19.0561	18.2726	17.6527	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9879	0.9792	0.9591	0.9079	0.8020	0.6277	0.4510	0.5116	0.7725	0.9360	0.9799	0.9901	(94)
Useful gains	495.2047	569.3680	637.8784	690.3087	666.7513	518.0390	353.3090	365.9995	493.0462	515.5576	480.4573	468.3973	(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													
	1495.8191	1454.6056	1324.1251	1112.1765	860.7187	571.4346	364.5922	384.0070	611.9738	925.2156	1228.4747	1486.8030	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	744.4571	594.8796	510.5676	303.7448	144.3118	0.0000	0.0000	0.0000	0.0000	304.7855	538.5725	757.6938	(98)
Space heating												3899.0128	(98)
Space heating per m2											(98) / (4) =	42.6215	(99)

8c. Space cooling requirement

Not applicable

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 %)	90.2000	(206)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)
Space heating requirement	4322.6306	(211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	744.4571	594.8796	510.5676	303.7448	144.3118	0.0000	0.0000	0.0000	0.0000	304.7855	538.5725	757.6938	(98)
Space heating efficiency (main heating system 1)													
	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)													
	825.3405	659.5118	566.0394	336.7460	159.9909	0.0000	0.0000	0.0000	0.0000	337.8997	597.0870	840.0153	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	158.9516	139.0416	143.4870	125.0737	119.9903	103.5245	95.9307	110.1010	111.4353	129.8897	141.7763	153.9361	(64)
Efficiency of water heater												76.4000	(216)
(217)m	87.4217	87.2155	86.7619	85.6857	83.3639	76.4000	76.4000	76.4000	76.4000	85.5807	86.9280	87.5303	(217)
Fuel for water heating, kWh/month													
	181.8217	159.4230	165.3801	145.9679	143.9356	135.5033	125.5637	144.1112	145.8577	151.7744	163.0963	175.8661	(219)
Water heating fuel used												1838.3011	(219)
Annual totals kWh/year													
Space heating fuel - main system												4322.6306	(211)
Space heating fuel - secondary												0.0000	(215)

Electricity for pumps and fans:		
central heating pump	30.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	75.0000	(231)
Electricity for lighting (calculated in Appendix L)	390.7219	(232)
Total delivered energy for all uses	6626.6536	(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	4322.6306	0.2160	933.6882	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1838.3011	0.2160	397.0730	(264)
Space and water heating			1330.7613	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	390.7219	0.5190	202.7846	(268)
Total CO2, kg/year			1572.4709	(272)
Dwelling Carbon Dioxide Emission Rate (DER)			17.1900	(273)

16 CO2 EMISSIONS ASSOCIATED WITH APPLIANCES AND COOKING AND SITE-WIDE ELECTRICITY GENERATION TECHNOLOGIES

DER		17.1900	ZC1
Total Floor Area	TFA	91.4800	
Assumed number of occupants	N	2.6454	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		15.6614	ZC2
CO2 emissions from cooking, equation (L16)		1.9949	ZC3
Total CO2 emissions		34.8463	ZC4
Residual CO2 emissions offset from biofuel CHP		0.0000	ZC5
Additional allowable electricity generation, kWh/m²/year		0.0000	ZC6
Resulting CO2 emissions offset from additional allowable electricity generation		0.0000	ZC7
Net CO2 emissions		34.8463	ZC8

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF TARGET EMISSIONS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	45.7400 (1b)	x	2.3900 (2b)	=	109.3186	(1b) - (3b)
First floor	45.7400 (1c)	x	2.6000 (2c)	=	118.9240	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	91.4800					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	228.2426	(5)

2. Ventilation rate

	main heating		secondary heating		other		total	m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =	0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =	0.0000	(6b)
Number of intermittent fans							3 * 10 =	30.0000	(7a)
Number of passive vents							0 * 10 =	0.0000	(7b)
Number of flueless gas fires							0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1314	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.3814	(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) =	0.3242	(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	0.4134	0.4053	0.3972	0.3566	0.3485	0.3080	0.3080	0.2999	0.3242	0.3485	0.3648	0.3810	(22b)
Effective ac	0.5854	0.5821	0.5789	0.5636	0.5607	0.5474	0.5474	0.5450	0.5526	0.5607	0.5665	0.5726	(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	
TER Semi-glazed door			2.1200	1.2000	2.5440			(26a)
TER Opening Type (Uw = 1.40)			15.9800	1.3258	21.1856			(27)
Ground Floor			45.7400	0.1300	5.9462			(28a)
External Wall	136.9000	18.1000	118.8000	0.1800	21.3840			(29a)
Cold Roof	45.7400		45.7400	0.1300	5.9462			(30)
Total net area of external elements Aum(A, m2)			228.3800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		57.0060			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	10.5105	(36)
Total fabric heat loss (33) + (36) =	67.5165	(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	44.0956	43.8457	43.6008	42.4502	42.2350	41.2329	41.2329	41.0473	41.6189	42.2350	42.6704	43.1257	(38)
Heat transfer coeff	111.6121	111.3622	111.1173	109.9667	109.7515	108.7494	108.7494	108.5638	109.1354	109.7515	110.1870	110.6422	(39)
Average = Sum(39)m / 12 =												109.9657	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2201	1.2173	1.2147	1.2021	1.1997	1.1888	1.1888	1.1867	1.1930	1.1997	1.2045	1.2095	(40)
HLP (average)												1.2021	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6454 (42)
Average daily hot water use (litres/day)	97.0292 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	106.7321	102.8510	98.9698	95.0886	91.2075	87.3263	87.3263	91.2075	95.0886	98.9698	102.8510	106.7321	(44)
Energy conte	158.2807	138.4333	142.8508	124.5408	119.4998	103.1193	95.5552	109.6509	110.9605	129.3138	141.1561	153.2864	(45)
Energy content (annual)										Total = Sum(45)m =		1526.6474	(45)
Distribution loss (46)m = 0.15 x (45)m	23.7421	20.7650	21.4276	18.6811	17.9250	15.4679	14.3333	16.4476	16.6441	19.3971	21.1734	22.9930	(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													

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

	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)
Combi loss	50.9589	46.0274	50.4339	46.8930	46.4783	43.0650	44.5005	46.4783	46.8930	50.4339	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	209.2396	184.4607	193.2847	171.4338	165.9781	146.1843	140.0557	156.1293	157.8535	179.7477	190.4712	204.2453	(62)
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	(63)
								Solar input (sum of months) = Sum(63)m =				0.0000	(63)
Output from w/h													
	209.2396	184.4607	193.2847	171.4338	165.9781	146.1843	140.0557	156.1293	157.8535	179.7477	190.4712	204.2453	(64)
								Total per year (kWh/year) = Sum(64)m =				2099.0838	(64)
Heat gains from water heating, kWh/month													
	65.3681	57.5359	60.1064	53.1331	51.3533	45.0534	42.8972	48.0785	48.6176	55.6053	59.2632	63.7075	(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	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	132.2720	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.1243	19.6506	15.9809	12.0986	9.0438	7.6352	8.2501	10.7238	14.3934	18.2758	21.3305	22.7392	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	241.7743	244.2832	237.9609	224.5016	207.5117	191.5435	180.8758	178.3669	184.6891	198.1485	215.1384	231.1066	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	36.2272	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	-105.8176	(71)
Water heating gains (Table 5)													
	87.8603	85.6189	80.7881	73.7959	69.0232	62.5742	57.6576	64.6217	67.5245	74.7383	82.3100	85.6283	(72)
Total internal gains													
	417.4405	415.2343	400.4116	376.0778	351.2603	327.4345	312.4650	319.3940	332.2887	356.8442	384.4605	405.1557	(73)

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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	3.3500	11.2829	0.6300	0.7000	0.7700	11.5515	(75)
Southwest	5.8500	36.7938	0.6300	0.7000	0.7700	65.7813	(79)
Northwest	6.7800	11.2829	0.6300	0.7000	0.7700	23.3789	(81)

Solar gains	100.7117	183.1518	281.4146	400.3423	495.5660	512.7218	485.6877	411.4759	322.0995	210.7312	122.7424	84.8210	(83)
Total gains	518.1523	598.3861	681.8262	776.4201	846.8264	840.1562	798.1527	730.8698	654.3882	567.5754	507.2029	489.9768	(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	56.9183	57.0461	57.1718	57.7700	57.8833	58.4167	58.4167	58.5165	58.2101	57.8833	57.6545	57.4173	
alpha	4.7946	4.8031	4.8115	4.8513	4.8589	4.8944	4.8944	4.9011	4.8807	4.8589	4.8436	4.8278	
util living area													
	0.9984	0.9966	0.9907	0.9681	0.8966	0.7440	0.5789	0.6459	0.8826	0.9828	0.9968	0.9988	(86)
MIT	19.6350	19.7864	20.0506	20.4112	20.7341	20.9277	20.9832	20.9721	20.8212	20.4063	19.9570	19.6092	(87)
Th 2	19.9040	19.9062	19.9083	19.9183	19.9202	19.9290	19.9290	19.9306	19.9256	19.9202	19.9164	19.9124	(88)
util rest of house													
	0.9979	0.9954	0.9872	0.9552	0.8545	0.6506	0.4484	0.5137	0.8178	0.9737	0.9955	0.9984	(89)
MIT 2	18.0859	18.3086	18.6945	19.2183	19.6541	19.8799	19.9228	19.9188	19.7754	19.2195	18.5656	18.0541	(90)
Living area fraction										fLA = Living area / (4) =		0.1986	(91)
MIT	18.3936	18.6021	18.9638	19.4552	19.8686	20.0880	20.1334	20.1280	19.9832	19.4552	18.8420	18.3630	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3936	18.6021	18.9638	19.4552	19.8686	20.0880	20.1334	20.1280	19.9832	19.4552	18.8420	18.3630	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9967	0.9932	0.9829	0.9480	0.8521	0.6659	0.4744	0.5397	0.8220	0.9681	0.9935	0.9975	(94)
Useful gains	516.4567	594.3121	670.1949	736.0329	721.5526	559.4186	378.6118	394.4451	537.8833	549.4975	503.8836	488.7457	(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													
	1573.0165	1525.8964	1384.9455	1160.7228	896.5147	596.8186	384.2544	404.7307	642.0609	971.8715	1293.8100	1567.0247	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	786.0805	626.0246	531.7745	305.7767	130.1718	0.0000	0.0000	0.0000	0.0000	314.2463	568.7470	802.2395	(98)
Space heating												4065.0607	(98)
Space heating per m2											(98) / (4) =	44.4366	(99)

8c. Space cooling requirement

Not applicable

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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 %)												93.4000	(206)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement												4352.3134	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	786.0805	626.0246	531.7745	305.7767	130.1718	0.0000	0.0000	0.0000	0.0000	314.2463	568.7470	802.2395	(98)
Space heating efficiency (main heating system 1)													
	93.4000	93.4000	93.4000	93.4000	93.4000	0.0000	0.0000	0.0000	0.0000	93.4000	93.4000	93.4000	(210)
Space heating fuel (main heating system)													
	841.6279	670.2619	569.3517	327.3840	139.3702	0.0000	0.0000	0.0000	0.0000	336.4521	608.9368	858.9288	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	209.2396	184.4607	193.2847	171.4338	165.9781	146.1843	140.0557	156.1293	157.8535	179.7477	190.4712	204.2453	(64)
Efficiency of water heater												80.3000	(216)
(217)m	88.0713	87.8842	87.4672	86.4919	84.4471	80.3000	80.3000	80.3000	80.3000	86.4438	87.6347	88.1500	(217)
Fuel for water heating, kWh/month													
	237.5799	209.8906	220.9795	198.2079	196.5469	182.0477	174.4155	194.4325	196.5797	207.9360	217.3468	231.7019	(219)
Water heating fuel used												2467.6649	(219)
Annual totals kWh/year													
Space heating fuel - main system												4352.3134	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
central heating pump												30.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												75.0000	(231)
Electricity for lighting (calculated in Appendix L)												390.7219	(232)
Total delivered energy for all uses												7285.7002	(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	4352.3134	0.2160	940.0997	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	2467.6649	0.2160	533.0156	(264)
Space and water heating			1473.1153	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	390.7219	0.5190	202.7846	(268)
Total CO2, kg/m2/year			1714.8250	(272)
Emissions per m2 for space and water heating			16.1031	(272a)
Fuel factor (mains gas)			1.0000	
Emissions per m2 for lighting			2.2167	(272b)
Emissions per m2 for pumps and fans			0.4255	(272c)
Target Carbon Dioxide Emission Rate (TER) = (16.1031 * 1.00) + 2.2167 + 0.4255, rounded to 2 d.p.			18.7500	(273)

U-VALUE CALCULATOR REPORT

Design SAP
elmhurst energy

Property Reference	007818 - Plot 103	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2324-MT
Project	Plot 103		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	**DER**	17.19	**TER**	18.75
Environmental	86 B	**% DER<TER**	8.30		
CO_2 Emissions (t/year)	1.29	**DFEE**	48.18	**TFEE**	57.42
General Requirements Compliance	Pass	**% DFEE<TFEE**	16.10		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

Building Elements

Roof 007818 - Cold Roof

Roof Type: Pitched Roof, insulated flat ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	**Standard cavity**				
	Main construction	50	0.3125	0.1600	100.00
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 2	**Crown Loft Roll 40**				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	**Crown Loft Roll 40**				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	**Crown Loft Roll 40**				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 5	**Plasterboard, standard**				
	Main construction	12.5	0.2100	0.0595	100.00
Int surface				0.1000	

Total resistance: **Upper limit =** 11.610 m² K/W **Lower limit =** 11.610 m² K/W **Average =** 11.610 m² K/W

Total correction = 0.0031 m² K/W **U-value (unrounded) =** 0.09 W/m² K

Unheated space: None

Total thickness: 513 mm **U-value: 0.09 W/m² K** **Kappa: n/a**

U-VALUE CALCULATOR REPORT

Design SAP
elmhurst energy

Property Reference	007818 - Plot 103	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2324-MT
Project	Plot 103		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	**DER**	17.19	**TER**	18.75
Environmental	86 B	**% DER<TER**	8.30		
CO_2 Emissions (t/year)	1.29	**DFEE**	48.18	**TFEE**	57.42
General Requirements Compliance	Pass	**% DFEE<TFEE**	16.10		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

Building Elements

Wall 007818 - External Wall

Wall Type: Standard Wall

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	**Brick, outer leaf**				
	Main construction	100	0.7700	0.1299	82.81
	Main construction	100	0.9407	0.1063	17.19
Layer 2	**URSA Cavity BATT 32**				
	Main construction	100	0.0320	3.1250	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	**Thermalite Shield**				
	Main construction	100	0.1500	0.6667	93.43
	Main construction	100	0.8803	0.1136	6.57
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	**airspace/plaster dabs**				
	Main construction	15	0.0882	0.1700	80.00
	Main construction	15	0.0882	0.1700	20.00
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 5	**Plasterboard, standard**				
	Main construction	12.5	0.2100	0.0595	100.00
Int surface				0.1300	

Total resistance: **Upper limit =** 4.276 m² K/W **Lower limit =** 4.155 m² K/W **Average =** 4.215 m² K/W

Total correction = 0.0056 m² K/W **U-value (unrounded) =** 0.24 W/m² K

Unheated space: None

Total thickness: 328 mm **U-value: 0.24 W/m² K** **Kappa: n/a**

U-VALUE CALCULATOR REPORT

Design SAP
elmhurst energy

Property Reference	007818 - Plot 103	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2324-MT
Project	Plot 103		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	**DER**	17.19	**TER**	18.75
Environmental	86 B	**% DER<TER**	8.30		
CO_2 Emissions (t/year)	1.29	**DFEE**	48.18	**TFEE**	57.42
General Requirements Compliance	Pass	**% DFEE<TFEE**	16.10		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

Building Elements

Floor 007818 - Ground Floor

Floor Type: Suspended Floor
Area = 45.74 m², Perimeter = 21.78 m, Wall thickness = 275.00 mm, Soil: Unknown
Depth of underfloor space below ground:0.200 m Floor wind shielding: Average (suburban)
Floor height above ground:h = 0.200 m
U-value of walls above ground:Uw = 1.500 m
Ventilation openings per perimeter length:e = 0.0015 %
Mean wind speed:v = 5.000 m/s
Resistance on solum:Rg = 0.000 m²K/W

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.1700	
Layer 1	**Standard cavity**				
	Main construction	50	0.2381	0.2100	50.00
	Main construction	50	1.3500	0.0370	50.00
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 2	**Blockwork, dense**				
	Main construction	100	1.5900	0.0629	77.78
	Main construction	100	1.3500	0.0741	22.22
Layer 3	**Celotex XR4000**				
	Main construction	120	0.0220	5.4545	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	**Screed**				
	Main construction	75	1.1500	0.0652	100.00
Int surface				0.1700	

Total resistance: **Upper limit =** 6.047 m² K/W **Lower limit =** 5.988 m² K/W **Average =** 6.018 m² K/W

Total correction = 0.0082 m² K/W **U-value (unrounded) =** 0.14 W/m² K

Unheated space: None

Total thickness: 345 mm **U-value: 0.14 W/m² K** **Kappa: n/a**

BASIC COMPLIANCE REPORT
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	007818 - Plot 103	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2324-MT
Property	Plot 103		

SAP Rating	84 B	**DER**	17.19	**TER**	18.75
Environmental	86 B	**% DER<TER**	8.30		
CO_2 Emissions (t/year)	1.29	**DFEE**	48.18	**TFEE**	57.42
General Requirements Compliance	Pass	**% DFEE<TFEE**	16.10		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

SUMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.75	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	17.19	$kgCO_2/m^2$	Pass
	-1.56 (-8.3%)	$kgCO_2/m^2$	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	57.42	$kWh/m^2/yr$	
Dwelling Fabric Energy Efficiency (DFEE)	48.18	$kWh/m^2/yr$	
	-9.2 (-16.0%)	$kWh/m^2/yr$	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Roof	0.09 (max. 0.20)	0.09 (max. 0.35)	Pass
Openings	1.21 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB) Combi boiler Efficiency: 89.3% SEDBUK2009 Minimum: 88.0%		Pass
Secondary heating system	None		

5 Cylinder insulation

Hot water storage	No cylinder		

6 Controls

Space heating controls	Time and temperature zone control		Pass
Hot water controls	No cylinder		
Boiler interlock	Yes		Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)	Not significant		Pass

Based on:

Overshading	Average		
Windows facing North East Windows facing South West Windows facing North West	3.35 m², No overhang 5.85 m², No overhang 6.78 m², No overhang		
Air change rate	8.00 ach		
Blinds/curtains	None		

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
		W/m²K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)		
Maximum	10.0		Pass

10 Key features

Party wall U-value	0.00	W/m²K
Roof U-value	0.09	W/m²K
Door U-value	1.00	W/m²K
Thermal bridging y-value	0.026	W/m²K

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

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

Design SAP
elmhurst energy

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

Orientation	North West
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2020
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	27.46 m	45.74 m²	2.39 m
1st Storey:	27.46 m	45.74 m²	2.60 m

7.0 Living Area	18.17	m²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	176.25	kJ/m²K

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.24	60.00	136.90	118.80

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
		Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity		45.00	

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
GF - Dense Block	Dense block, plasterboard on dabs	75.00	27.32
GF - Timber Frame	Plasterboard on timber frame	9.00	35.70
FF - Timber Frame	Plasterboard on timber frame	9.00	126.20

10.0 External Roofs

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

Design SAP
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Description	Type	Construction	U-Value (W/m^2K)	Kappa (kJ/m^2K)	Gross Area (m^2)	Nett Area (m^2)
Cold Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.09	9.00	45.74	45.74

10.2 Internal Ceilings

Description	Construction	Kappa (kJ/m^2K)	Area (m^2)
GF	Plasterboard ceiling, carpeted chipboard floor	9.00	45.74

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m^2K)	Kappa (kJ/m^2K)	Area (m^2)
Ground Floor	Ground Floor - Solid	Suspended concrete floor, carpeted	0.14	75.00	45.74

11.2 Internal Floors

Description	Construction	Kappa (kJ/m^2K)	Area (m^2)
FF	Plasterboard ceiling, carpeted chipboard floor	18.00	45.74

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m^2K)
Half Glazed Door	Manufacturer	Half Glazed Door	Double Low-E Soft 0.05			0.63		0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Patio Door	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40
Rooflights	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m^2)	Curtain Closed
Front Entrance	Half Glazed Door	[1] External Wall	North West							2.12	
Front Windows	Window	[1] External Wall	North West	None	0.00					6.78	
LHS Windows	Window	[1] External Wall	North East	None	0.00					3.35	
RHS Windows	Window	[1] External Wall	South West	None	0.00					2.70	
RHS Patio Doors	Window	[1] External Wall	South West	None	0.00					3.15	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Calculate Bridges	

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E2 Other lintels (including other steel lintels)	13.02	0.040	No
Independently assessed	E3 Sill	10.51	0.027	No
Independently assessed	E4 Jamb	30.00	0.029	No
Independently assessed	E5 Ground floor (normal)	27.46	0.049	No
Independently assessed	E6 Intermediate floor within a dwelling	27.46	0.003	No
Independently assessed	E10 Eaves (insulation at ceiling level)	16.09	0.083	No
Independently assessed	E12 Gable (insulation at ceiling level)	11.37	0.054	No
Independently assessed	E16 Corner (normal)	19.92	0.050	No

Y-value	0.026	W/m^2K
18.0 Pressure Testing	Yes	
Designed AP_{50}	5.00	$m^3/(h.m^2)$ @ 50 Pa
Property Tested ?		
As Built AP_{50}		$m^3/(h.m^2)$ @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System	No	

22.0 Lighting

Internal

Total number of light fittings	1	
Total number of L.E.L. fittings	1	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	No	

23.0 Electricity Tariff	Standard	

24.0 Main Heating 1	Database	
Percentage of Heat	100	%
Database Ref. No.	17960	
Fuel Type	Mains gas	
Main Heating	BGW	
SAP Code	104	
In Winter	90.2	
In Summer	76.4	
Controls	CBI Time and temperature zone control	
PCDF Controls	0	
Delayed Start Stat	Yes	
Sap Code	2110	
Flue Type	Balanced	
Fan Assisted Flue	Yes	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	Normal (> 45°C)	
Combi boiler type	Standard Combi	
Combi keep hot type	None	

25.0 Main Heating 2	None	

Community Heating	None
28.0 Water Heating	HWP From main heating 1
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	901
29.0 Hot Water Cylinder	None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£31	B 85	
	Typical Cost	**Typical savings per year**	**Ratings after improvement SAP rating**	**Environmental Impact**
Solar photovoltaic panels, 2.5 kWp	£3,500 - £5,500	£345	A 95	