



elmhurst
energy



SAP Report Submission for Building Regulations Compliance

Client: Vauss Ltd

Project: Plot 2, Station Road
Quinton, AYLESBURY, HP22

Contact: Gary White
Hibec Limited
gary_hibec@btconnect.com

Report Issue Date: 01/11/2022

EXCELLENCE
IN ENERGY
ASSESSMENT

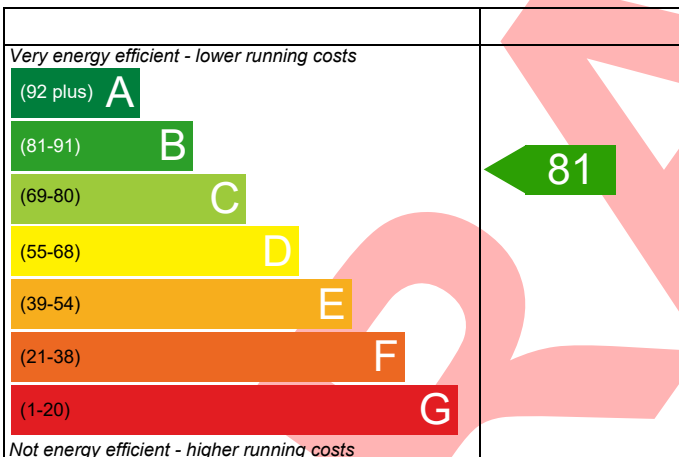
Plot 2, Station Road,
Quinton,
AYLESBURY,
HP22

Dwelling type: House, Mid-Terrace
Date of assessment: 01/11/2022
Produced by: Hibec Limited
Total floor area: 66.54 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

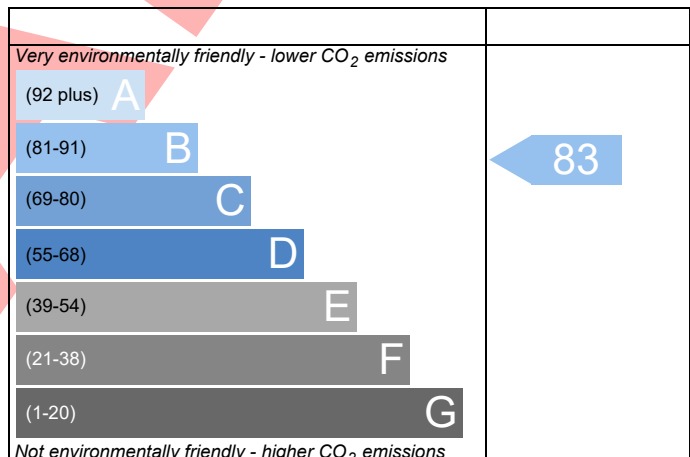
Energy Efficiency Rating



England EU Directive 2002/91/EC

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO₂) Rating



England EU Directive 2002/91/EC

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

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

THERMAL BRIDGING

Calculation Type: New Build (As Designed)



Property Reference	C2223084/2		Issued on Date	01/11/2022	
Assessment Reference	As Designed	Prop Type Ref			
Property	Plot 2, Station Road, Quainton, AYLESBURY, HP22				
SAP Rating	81 B	DER	23.62	TER	26.51
Environmental	83 B	% DER<TER	10.91		
CO ₂ Emissions (t/year)	1.31	DFEE	43.36	TFEE	47.70
General Requirements Compliance	Pass	% DFEE<TFEE	9.10		
Assessor Details	Mr. Gary White, Hibec Limited, Tel: 01564 795566, gary_hibec@btconnect.com			Assessor ID	4104-0001
Client	Vauss Ltd, 016				

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E2 Other lintels (including other steel lintels)	Table K1 - Approved	0.300	8.60	2.58	
External wall	E3 Sill	Table K1 - Approved	0.040	5.26	0.21	
External wall	E4 Jamb	Table K1 - Approved	0.050	17.10	0.86	
External wall	E5 Ground floor (normal)	Independently assessed	0.030	8.36	0.25	LABC
External wall	E6 Intermediate floor within a dwelling	Table K1 - Approved	0.070	8.36	0.59	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	8.36	0.50	
External wall	E18 Party wall between dwellings	Table K1 - Approved	0.060	20.60	1.24	
Party wall	P1 Party wall - Ground floor	Table K1 - Default	0.160	15.92	2.55	
Party wall	P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	0.000	15.92	0.00	
Party wall	P4 Party wall - Roof (insulation at ceiling level)	Table K1 - Default	0.240	15.92	3.82	

Total: **12.59** W/mK:
 Y-Value: **0.115** W/m²K:

FULL SAP CALCULATION PRINTOUT

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

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

DWELLING AS DESIGNED

Mid-Terrace House, total floor area 67 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:Electricity
Fuel factor:1.55 (electricity)
Target Carbon Dioxide Emission Rate (TER) 26.51 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 23.62 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)47.7 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)43.4 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.10 (max. 0.25)	0.10 (max. 0.70)	OK
Roof	0.09 (max. 0.20)	0.09 (max. 0.35)	OK
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	OK

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 OK

4 Heating efficiency

Main heating system: Heat pump with radiators or underfloor - Electric
Air-to-water heat pump

Secondary heating system: None

5 Cylinder insulation

Hot water storage Measured cylinder loss: 1.89 kWh/day
Permitted by DBSCG 1.89 OK
Primary pipework insulated: Yes OK

6 Controls

Space heating controls: Programmer, TRVs and bypass OK

Hot water controls:

Cylinderstat OK
Independent timer for DHW OK

7 Low energy lights

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

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley): Not significant OK

Based on:

Overshading: Average
Windows facing South East: 3.85 m², No overhang
Windows facing North West: 7.18 m², No overhang
Air change rate: 8.00 ach
Blinds/curtains: None

10 Key features

Party wall U-value 0.00 W/m²K
Roof U-value 0.09 W/m²K
Floor U-value 0.10 W/m²K

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	33.2700 (1b)	2.5000 (2b)	83.1750 (1b) - (3b)
First floor	33.2700 (1c)	2.6500 (2c)	88.1655 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5400		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 171.3405 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				40.0000 / (5) =	0.2335 (8)
Pressure test				Yes	
Measured/design AP50				5.0000	
Infiltration rate					0.4835 (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) =		0.4109 (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	0.5239	0.5137	0.5034	0.4520	0.4418	0.3904	0.3904	0.3801	0.4109	0.4418	0.4623	0.4828 (22b)
Effective ac	0.6373	0.6319	0.6267	0.6022	0.5976	0.5762	0.5762	0.5722	0.5844	0.5976	0.6069	0.6166 (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
door			1.9700	1.2000	2.3640		(26)
window (Uw = 1.40)			11.0300	1.3258	14.6231		(27)
Heat Loss Floor			33.2700	0.1000	3.3270		(28a)
External Wall	43.0500	13.0000	30.0500	0.2000	6.0100		(29a)
External Roof	33.2700		33.2700	0.0900	2.9943		(30)
Total net area of external elements Aum(A, m ²)			109.5900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	29.3184		(33)
Party Wall 1			81.9800	0.0000	0.0000		(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							12.5870 (36)
Total fabric heat loss						(33) + (36) =	41.9054 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	36.0321	35.7307	35.4353	34.0478	33.7882	32.5798	32.5798	32.3560	33.0453	33.7882	34.3134	34.8624 (38)
Heat transfer coeff	77.9375	77.6361	77.3407	75.9532	75.6936	74.4852	74.4852	74.2614	74.9507	75.6936	76.2188	76.7678 (39)
Average = Sum(39)m / 12 =												75.9520 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1713	1.1668	1.1623	1.1415	1.1376	1.1194	1.1194	1.1160	1.1264	1.1376	1.1455	1.1537 (40)
HLP (average)												1.1414 (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												2.1593 (42)
Average daily hot water use (litres/day)												85.4831 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	94.0314	90.6121	87.1927	83.7734	80.3541	76.9348	76.9348	80.3541	83.7734	87.1927	90.6121	94.0314 (44)
Energy conte	139.4458	121.9602	125.8520	109.7208	105.2797	90.8484	84.1844	96.6028	97.7566	113.9259	124.3590	135.0458 (45)
Energy content (annual)												Total = Sum(45)m = 1344.9815 (45)
Distribution loss (46)m = 0.15 x (45)m	20.9169	18.2940	18.8778	16.4581	15.7920	13.6273	12.6277	14.4904	14.6635	17.0889	18.6538	20.2569 (46)
Water storage loss:												150.0000 (47)
Store volume												1.8900 (48)
a) If manufacturer declared loss factor is known (kWh/day):												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0206 (55)
Total storage loss	31.6386	28.5768	31.6386	30.6180	31.6386	30.6180	31.6386	31.6386	30.6180	31.6386	30.6180	31.6386 (56)
If cylinder contains dedicated solar storage	31.6386	28.5768	31.6386	30.6180	31.6386	30.6180	31.6386	31.6386	30.6180	31.6386	30.6180	31.6386 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	194.3468	171.5482	180.7530	162.8508	160.1807	143.9784	139.0854	151.5038	150.8866	168.8269	177.4890	189.9468 (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)
Output from w/h	194.3468	171.5482	180.7530	162.8508	160.1807	143.9784	139.0854	151.5038	150.8866	168.8269	177.4890	189.9468 (64)
Heat gains from water heating, kWh/month	90.2865	80.2222	85.7666	78.9862	78.9263	72.7111	71.9121	76.0412	75.0081	81.8012	83.8534	88.8235 (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	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.4675	15.5145	12.6172	9.5520	7.1403	6.0281	6.5136	8.4666	11.3639	14.4290	16.8408	17.9530 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	189.0909	191.0531	186.1085	175.5820	162.2942	149.8055	141.4623	139.5001	144.4448	154.9712	168.2590	180.7477 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964 (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)	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715 (71)
Water heating gains (Table 5)	121.3529	119.3782	115.2777	109.7030	106.0838	100.9876	96.6561	102.2060	104.1779	109.9478	116.4630	119.3865 (72)
Total internal gains	386.3006	384.3351	372.3927	353.2263	333.9075	315.2106	303.0213	308.5620	318.3758	337.7374	359.9522	376.4764 (73)

6. Solar gains

[Jan]	Area	Solar flux	Specific data	Specific data	FF	Access	Gains					
	m ²	Table 6a	g	or Table 6b	or Table 6c	factor	W					
		W/m ²	or Table 6b			Table 6d						
Southeast	3.8500	36.7938	0.4600	0.0000	0.7700	50.1746 (77)						
Northwest	7.1800	11.2829	0.4600	0.0000	0.7700	28.6943 (81)						
Solar gains	78.8689	143.8740	222.1710	317.7145	394.5985	408.7817	387.0193	327.0558	254.8471	165.8374	96.2025	66.3722 (83)
Total gains	465.1695	528.2091	594.5636	670.9409	728.5060	723.9923	690.0406	635.6178	573.2229	503.5747	456.1547	442.8487 (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	59.2890	59.5191	59.7465	60.8379	61.0465	62.0369	62.0369	62.2239	61.6517	61.0465	60.6259	60.1923
alpha	4.9526	4.9679	4.9831	5.0559	5.0698	5.1358	5.1358	5.1483	5.1101	5.0698	5.0417	5.0128
util living area	0.9961	0.9920	0.9797	0.9354	0.8206	0.6299	0.4694	0.5270	0.7905	0.9599	0.9918	0.9969 (86)
MIT	19.8215	19.9785	20.2410	20.5880	20.8499	20.9707	20.9946	20.9906	20.9092	20.5702	20.1425	19.8036 (87)
Th 2	19.9430	19.9467	19.9503	19.9671	19.9703	19.9850	19.9850	19.9878	19.9793	19.9703	19.9639	19.9572 (88)
util rest of house	0.9947	0.9893	0.9727	0.9133	0.7661	0.5418	0.3641	0.4164	0.7107	0.9416	0.9886	0.9959 (89)
MIT 2	18.8795	19.0382	19.2997	19.6451	19.8743	19.9725	19.9837	19.9852	19.9322	19.6377	19.2159	18.8731 (90)
Living area fraction	fLA = Living area / (4) =											0.4376 (91)
MIT	19.2917	19.4497	19.7116	20.0577	20.3012	20.4093	20.4261	20.4252	20.3598	20.0458	19.6214	19.2803 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2917	19.4497	19.7116	20.0577	20.3012	20.4093	20.4261	20.4252	20.3598	20.0458	19.6214	19.2803 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9937	0.9877	0.9707	0.9155	0.7850	0.5798	0.4104	0.4651	0.7429	0.9432	0.9872	0.9950 (94)
Useful gains	462.2321	521.6968	577.1458	614.2583	571.8896	419.7790	283.1987	295.6302	425.8261	474.9866	450.3274	440.6295 (95)
Ext temp.	4.3000	4.9000	6.5000	8.0000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1168.4181	1129.5817	1021.7981	847.4653	651.0573	432.7089	284.9893	298.9190	469.1750	714.9866	954.3674	1157.6828 (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	525.4024	408.4986	330.8213	167.9090	58.9008	0.0000	0.0000	0.0000	0.0000	178.5600	362.9088	533.4877 (98)
Space heating												2566.4887 (98)
Space heating per m2												(98) / (4) = 38.5706 (99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 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 %)													170.0000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1509.6992 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	525.4024	408.4986	330.8213	167.9090	58.9008	0.0000	0.0000	0.0000	0.0000	178.5600	362.9088	533.4877	(98)
Space heating efficiency (main heating system 1)	170.0000	170.0000	170.0000	170.0000	170.0000	0.0000	0.0000	0.0000	0.0000	170.0000	170.0000	170.0000	(210)
Space heating fuel (main heating system)	309.0602	240.2933	194.6008	98.7700	34.6475	0.0000	0.0000	0.0000	0.0000	105.0353	213.4758	313.8163	(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 requirement	194.3468	171.5482	180.7530	162.8508	160.1807	143.9784	139.0854	151.5038	150.8866	168.8269	177.4890	189.9468	(64)
Efficiency of water heater (217)m	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	(216)
Fuel for water heating, kWh/month	114.3217	100.9107	106.3253	95.7946	94.2240	84.6932	81.8149	89.1199	88.7568	99.3099	104.4053	111.7334	(219)
Water heating fuel used													1171.4097 (219)
Annual totals kWh/year													
Space heating fuel - main system													1509.6992 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
central heating pump													39.0000 (230c)
Total electricity for the above, kWh/year													39.0000 (231)
Electricity for lighting (calculated in Appendix L)													308.4813 (232)
Total delivered energy for all uses													3028.5903 (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	1509.6992	0.5190	783.5339 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1171.4097	0.5190	607.9616 (264)
Space and water heating			1391.4955 (265)
Pumps and fans	39.0000	0.5190	20.2410 (267)
Energy for lighting	308.4813	0.5190	160.1018 (268)
Total CO2, kg/year			1571.8383 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			23.6200 (273)

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

	DER	TFA	N	EF	
Total Floor Area		66.5400			23.6200 ZC1
Assumed number of occupants			2.1593		66.5400
CO2 emission factor in Table 12 for electricity displaced from grid				0.5190	2.1593
CO2 emissions from appliances, equation (L14)					0.5190
CO2 emissions from cooking, equation (L16)					16.8397 ZC2
Total CO2 emissions					2.5672 ZC3
Residual CO2 emissions offset from biofuel CHP					43.0269 ZC4
Additional allowable electricity generation, kWh/m ² /year					0.0000 ZC5
Resulting CO2 emissions offset from additional allowable electricity generation					0.0000 ZC6
Net CO2 emissions					0.0000 ZC7
					43.0269 ZC8

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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	33.2700 (1b)	2.5000 (2b)	83.1750 (1b) - (3b)
First floor	33.2700 (1c)	2.6500 (2c)	88.1655 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5400		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 171.3405 (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				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)+(7a)+(7b)+(7c)				20.0000 / (5) =	0.1167 (8)							
Pressure test					Yes							
Measured/design AP50					5.0000							
Infiltration rate					0.3667 (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) =	0.3117 (21)							
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 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	0.3974	0.3896	0.3819	0.3429	0.3351	0.2961	0.2961	0.2883	0.3117	0.3351	0.3507	0.3663 (22b)
Effective ac	0.5790	0.5759	0.5729	0.5588	0.5561	0.5438	0.5438	0.5416	0.5486	0.5561	0.5615	0.5671 (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 Opaque door			1.9700	1.0000	1.9700		(26)					
TER Opening Type (Uw = 1.40)			11.0300	1.3258	14.6231		(27)					
Heat Loss Floor			33.2700	0.1300	4.3251		(28a)					
External Wall	43.0500	13.0000	30.0500	0.1800	5.4090		(29a)					
External Roof	33.2700		33.2700	0.1300	4.3251		(30)					
Total net area of external elements Aum(A, m2)			109.5900				(31)					
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 30.6523		(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.8072 (36)					
Total fabric heat loss							(33) + (36) = 38.4595 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 32.7369	Feb 32.5634	Mar 32.3935	Apr 31.5951	May 31.4457	Jun 30.7504	Jul 30.7504	Aug 30.6216	Sep 31.0182	Oct 31.4457	Nov 31.7479	Dec 32.0638 (38)
Heat transfer coeff	71.1964	71.0230	70.8530	70.0546	69.9052	69.2099	69.2099	69.0811	69.4777	69.9052	70.2074	70.5233 (39)
Average = Sum(39)m / 12 =												70.0539 (39)
HLP	Jan 1.0700	Feb 1.0674	Mar 1.0648	Apr 1.0528	May 1.0506	Jun 1.0401	Jul 1.0401	Aug 1.0382	Sep 1.0441	Oct 1.0506	Nov 1.0551	Dec 1.0599 (40)
HLP (average)												1.0528 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1593 (42)
Average daily hot water use (litres/day)												85.4831 (43)
Daily hot water use	94.0314	90.6121	87.1927	83.7734	80.3541	76.9348	76.9348	80.3541	83.7734	87.1927	90.6121	94.0314 (44)
Energy conte	139.4458	121.9602	125.8520	109.7208	105.2797	90.8484	84.1844	96.6028	97.7566	113.9259	124.3590	135.0458 (45)
Energy content (annual)												Total = Sum(45)m = 1344.9815 (45)
Distribution loss (46)m = 0.15 x (45)m												
Water storage loss:	20.9169	18.2940	18.8778	16.4581	15.7920	13.6273	12.6277	14.4904	14.6635	17.0889	18.6538	20.2569 (46)
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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Enter (49) or (54) in (55)												0.7527 (55)
Total storage loss												
	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage												
	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month												
	186.0407	164.0459	172.4469	154.8127	151.8746	135.9403	130.7793	143.1977	142.8484	160.5208	169.4508	181.6407 (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												
	186.0407	164.0459	172.4469	154.8127	151.8746	135.9403	130.7793	143.1977	142.8484	160.5208	169.4508	181.6407 (64)
												Total per year (kWh/year) = Sum(64)m = 1893.5989 (64)
Heat gains from water heating, kWh/month												
	83.6417	74.2203	79.1217	72.5556	72.2814	66.2806	65.2672	69.3964	68.5775	75.1563	77.4228	82.1787 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	17.4675	15.5145	12.6172	9.5520	7.1403	6.0281	6.5136	8.4666	11.3639	14.4290	16.8408	17.9530 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	189.0909	191.0531	186.1085	175.5820	162.2942	149.8055	141.4623	139.5001	144.4448	154.9712	168.2590	180.7477 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964 (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)												
	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715 (71)
Water heating gains (Table 5)												
	112.4216	110.4469	106.3464	100.7717	97.1525	92.0563	87.7248	93.2747	95.2466	101.0165	107.5317	110.4552 (72)
Total internal gains	377.3693	375.4038	363.4614	344.2950	324.9762	306.2793	294.0900	299.6307	309.4445	328.8061	351.0209	367.5452 (73)

6. Solar gains

[Jan]		Area	Solar flux									Gains
		m ²	Table 6a	g	Specific data	FF	Specific data	Access				W
			W/m ²	or Table 6b	or Table 6c		or Table 6c	factor				
								Table 6d				
Southeast		3.8500	36.7938	0.6300	0.7000	0.7000	0.7000	0.7700				43.2920 (77)
Northwest		7.1800	11.2829	0.6300	0.7000	0.7000	0.7000	0.7700				24.7582 (81)
Solar gains	68.0502	124.1383	191.6949	274.1324	340.4699	352.7075	333.9303	282.1923	219.8888	143.0888	83.0060	57.2677 (83)
Total gains	445.4194	499.5420	555.1563	618.4274	665.4461	658.9868	628.0203	581.8230	529.3333	471.8949	434.0269	424.8129 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	64.9027	65.0611	65.2172	65.9604	66.1014	66.7655	66.7655	66.8899	66.5081	66.1014	65.8169	65.5220
alpha	5.3268	5.3374	5.3478	5.3974	5.4068	5.4510	5.4510	5.4593	5.4339	5.4068	5.3878	5.3681
util living area	0.9966	0.9932	0.9826	0.9431	0.8339	0.6448	0.4800	0.5369	0.7999	0.9638	0.9929	0.9974 (86)
MIT	19.9329	20.0724	20.3091	20.6201	20.8632	20.9740	20.9956	20.9922	20.9194	20.6087	20.2173	19.9079 (87)
Th 2	20.0254	20.0276	20.0297	20.0395	20.0414	20.0500	20.0500	20.0516	20.0467	20.0414	20.0377	20.0337 (88)
util rest of house												
	0.9955	0.9910	0.9766	0.9236	0.7833	0.5604	0.3790	0.4310	0.7246	0.9474	0.9901	0.9965 (89)
MIT 2	18.6070	18.8115	19.1552	19.5993	19.9111	20.0333	20.0484	20.0485	19.9843	19.5931	19.0309	18.5766 (90)
Living area fraction										fLA = Living area / (4) =		0.4376 (91)
MIT	19.1872	19.3633	19.6602	20.0460	20.3278	20.4450	20.4629	20.4615	20.3935	20.0376	19.5501	19.1592 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1872	19.3633	19.6602	20.0460	20.3278	20.4450	20.4629	20.4615	20.3935	20.0376	19.5501	19.1592 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9943	0.9889	0.9737	0.9238	0.7996	0.5965	0.4234	0.4775	0.7542	0.9473	0.9883	0.9955 (94)
Useful gains	442.8594	494.0125	540.5827	571.2826	532.1134	393.1148	265.8868	277.8367	399.2034	447.0398	428.9411	422.8849 (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												
	1059.9163	1027.2283	932.4387	780.8311	603.1271	404.5315	267.3532	280.5712	437.2607	659.7365	874.0927	1054.9723 (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												
	459.0904	358.3211	291.5408	150.8750	52.8342	0.0000	0.0000	0.0000	0.0000	158.2464	320.5091	470.2730 (98)
Space heating												
												2261.6899 (98)
Space heating per m2												(98) / (4) = 33.9899 (99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET EMISSIONS 09 Jan 2014

9a. Energy requirements - Individual heating systems, including micro-CHP

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
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 %)													93.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2418.9197 (211)
Space heating requirement	459.0904	358.3211	291.5408	150.8750	52.8342	0.0000	0.0000	0.0000	0.0000	158.2464	320.5091	470.2730	(98)
Space heating efficiency (main heating system 1)	93.5000	93.5000	93.5000	93.5000	93.5000	0.0000	0.0000	0.0000	0.0000	93.5000	93.5000	93.5000	(210)
Space heating fuel (main heating system)	491.0057	383.2311	311.8084	161.3636	56.5072	0.0000	0.0000	0.0000	0.0000	169.2474	342.7905	502.9657	(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 requirement	186.0407	164.0459	172.4469	154.8127	151.8746	135.9403	130.7793	143.1977	142.8484	160.5208	169.4508	181.6407	(64)
Efficiency of water heater (217)m	87.1309	86.8432	86.2041	84.7453	82.3117	79.8000	79.8000	79.8000	79.8000	84.7759	86.4892	87.2407	(216)
Fuel for water heating, kWh/month	213.5186	188.8991	200.0450	182.6800	184.5115	170.3512	163.8838	179.4458	179.0081	189.3473	195.9213	208.2064	(219)
Water heating fuel used													2255.8180 (219)
Annual totals kWh/year													
Space heating fuel - main system													2418.9197 (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)													308.4813 (232)
Total delivered energy for all uses													5058.2190 (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	2418.9197	0.2160	522.4867	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	2255.8180	0.2160	487.2567	(264)
Space and water heating			1009.7433	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	308.4813	0.5190	160.1018	(268)
Total CO2, kg/m2/year			1208.7702	(272)
Emissions per m2 for space and water heating			15.1750	(272a)
Fuel factor (electricity)			1.5500	
Emissions per m2 for lighting			2.4061	(272b)
Emissions per m2 for pumps and fans			0.5850	(272c)
Target Carbon Dioxide Emission Rate (TER) = (15.1750 * 1.55) + 2.4061 + 0.5850, rounded to 2 d.p.			26.5100	(273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	C2223084/2	Issued on Date	01/11/2022
Assessment Reference	As Designed	Prop Type Ref	
Property	Plot 2, Station Road, Quainton, AYLESBURY, HP22		

SAP Rating	81 B	DER	23.62	TER	26.51
Environmental	83 B	% DER<TER	10.91		
CO ₂ Emissions (t/year)	1.31	DFEE	43.36	TFFEE	47.70
General Requirements Compliance	Pass	% DFEE<TFFEE	9.10		

Assessor Details	Mr. Gary White, Hibec Limited, Tel: 01564 795566, gary_hibec@btconnect.com	Assessor ID	4104-0001
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Client	Vauss Ltd, 016
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CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	33.2700 (1b)	x 2.5000 (2b)	= 83.1750 (1b) - (3b)
First floor	33.2700 (1c)	x 2.6500 (2c)	= 88.1655 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 171.3405 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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				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)+(7a)+(7b)+(7c)					20.0000 / (5) =	0.1167 (8)						
Pressure test					Yes							
Measured/design AP50					5.0000							
Infiltration rate					0.3667	(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) =	0.3117 (21)						
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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 infiltr rate	0.3974	0.3896	0.3819	0.3429	0.3351	0.2961	0.2961	0.2883	0.3117	0.3351	0.3507	0.3663
Effective ac	0.5790	0.5759	0.5729	0.5588	0.5561	0.5438	0.5438	0.5416	0.5486	0.5561	0.5615	0.5671

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					
door			1.9700	1.2000	2.3640		(26)					
window (Uw = 1.40)			11.0300	1.3258	14.6231		(27)					
Heat Loss Floor			33.2700	0.1000	3.3270		(28a)					
External Wall	43.0500	13.0000	30.0500	0.2000	6.0100		(29a)					
External Roof	33.2700		33.2700	0.0900	2.9943		(30)					
Total net area of external elements Aum(A, m ²)			109.5900				(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	29.3184		(33)					
Party Wall 1			81.9800	0.0000	0.0000		(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							12.5870 (36)					
Total fabric heat loss							(33) + (36) = 41.9054 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	32.7369	32.5634	32.3935	31.5951	31.4457	30.7504	30.7504	30.6216	31.0182	31.4457	31.7479	32.0638
	74.6423	74.4689	74.2989	73.5005	73.3511	72.6558	72.6558	72.5270	72.9236	73.3511	73.6533	73.9692

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

Average = Sum(39)m / 12 = 73.4998 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1218	1.1192	1.1166	1.1046	1.1024	1.0919	1.0919	1.0900	1.0959	1.1024	1.1069	1.1117 (40)
HLP (average)												1.1046 (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 2.1593 (42)
Average daily hot water use (litres/day) 85.4831 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	94.0314	90.6121	87.1927	83.7734	80.3541	76.9348	76.9348	80.3541	83.7734	87.1927	90.6121	94.0314 (44)
Energy content (annual)	139.4458	121.9602	125.8520	109.7208	105.2797	90.8484	84.1844	96.6028	97.7566	113.9259	124.3590	135.0458 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												
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)
Heat gains from water heating, kWh/month	29.6322	25.9165	26.7435	23.3157	22.3719	19.3053	17.8892	20.5281	20.7733	24.2092	26.4263	28.6972 (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	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.4675	15.5145	12.6172	9.5520	7.1403	6.0281	6.5136	8.4666	11.3639	14.4290	16.8408	17.9530 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	189.0909	191.0531	186.1085	175.5820	162.2942	149.8055	141.4623	139.5001	144.4448	154.9712	168.2590	180.7477 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964 (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)	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715 (71)
Water heating gains (Table 5)	39.8283	38.5663	35.9456	32.3829	30.0698	26.8129	24.0446	27.5915	28.8518	32.5393	36.7032	38.5716 (72)
Total internal gains	301.7760	300.5231	290.0606	272.9062	254.8936	238.0358	227.4098	230.9476	240.0497	257.3289	277.1923	292.6615 (73)

6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Southeast	3.8500	36.7938	0.4600	0.0000	0.7700	50.1746 (77)						
Northwest	7.1800	11.2829	0.4600	0.0000	0.7700	28.6943 (81)						
Solar gains	78.8689	143.8740	222.1710	317.7145	394.5985	408.7817	387.0193	327.0558	254.8471	165.8374	96.2025	66.3722 (83)
Total gains	380.6449	444.3971	512.2316	590.6207	649.4920	646.8175	614.4291	558.0034	494.8968	423.1663	373.3948	359.0338 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	61.9064	62.0505	62.1925	62.8680	62.9961	63.5990	63.5990	63.7119	63.3654	62.9961	62.7376	62.4697
alpha	5.1271	5.1367	5.1462	5.1912	5.1997	5.2399	5.2399	5.2475	5.2244	5.1997	5.1825	5.1646
util living area	0.9984	0.9961	0.9884	0.9564	0.8586	0.6778	0.5120	0.5810	0.8462	0.9787	0.9966	0.9988 (86)
MIT	19.7707	19.9266	20.1891	20.5382	20.8227	20.9621	20.9927	20.9866	20.8797	20.5035	20.0730	19.7434 (87)
Th 2	19.9831	19.9852	19.9873	19.9971	19.9989	20.0074	20.0074	20.0090	20.0042	19.9989	19.9952	19.9913 (88)
util rest of house	0.9979	0.9948	0.9843	0.9403	0.8103	0.5891	0.4009	0.4644	0.7757	0.9679	0.9952	0.9984 (89)
MIT 2	18.8612	19.0182	19.2802	19.6266	19.8816	19.9906	20.0056	20.0053	19.9377	19.6005	19.1727	18.8406 (90)
Living area fraction									fLA = Living area / (4) =			0.4376 (91)
MIT	19.2592	19.4157	19.6780	20.0256	20.2934	20.4157	20.4376	20.4347	20.3499	19.9957	19.5667	19.2357 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2592	19.4157	19.6780	20.0256	20.2934	20.4157	20.4376	20.4347	20.3499	19.9957	19.5667	19.2357 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9973	0.9938	0.9827	0.9408	0.8259	0.6271	0.4498	0.5158	0.8029	0.9679	0.9944	0.9980 (94)

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Useful gains	379.6361	441.6639	503.3587	555.6595	536.4100	405.6199	276.3835	287.8362	397.3448	409.5738	371.2961	358.3255 (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												
Month fracti	1116.5903	1080.9701	979.1098	817.7344	630.3375	422.5462	278.8259	292.6261	455.7683	689.1838	918.2118	1112.1799 (97)
Space heating kWh	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	548.2939	429.6137	353.9588	188.6939	69.8821	0.0000	0.0000	0.0000	0.0000	208.0299	393.7793	560.8677 (98)
Space heating per m2												2753.1193 (98)
												(98) / (4) = 41.3754 (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												
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	682.9645	537.6529	551.2055	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.9117	0.9548	0.9330	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	622.6375	513.3420	514.2827	0.0000	0.0000	0.0000	0.0000 (102)
Month fracti	0.0000	0.0000	0.0000	0.0000	0.0000	836.5711	797.1273	732.5410	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
Space cooling	0.0000	0.0000	0.0000	0.0000	0.0000	154.0321	211.1363	162.3842	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction												527.5526 (104)
Intermittency factor (Table 10b)												FC = cooled area / (4) = 1.0000 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.2500	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000 (106)
Space cooling	0.0000	0.0000	0.0000	0.0000	0.0000	38.5080	52.7841	40.5960	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling per m2												131.8881 (107)
Energy for space heating												1.9821 (108)
Energy for space cooling												41.3754 (99)
Total												1.9821 (108)
Dwelling Fabric Energy Efficiency (DFEE)												43.3575 (109)
												43.4 (109)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	33.2700 (1b)	2.5000 (2b)	83.1750 (1b) - (3b)
First floor	33.2700 (1c)	2.6500 (2c)	88.1655 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5400		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 171.3405 (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				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)+(7a)+(7b)+(7c) =				20.0000 / (5) =	0.1167 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3667 (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) =	0.3117 (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	0.3974	0.3896	0.3819	0.3429	0.3351	0.2961	0.2961	0.2883	0.3117	0.3351	0.3507	0.3663 (22b)
Effective ac	0.5790	0.5759	0.5729	0.5588	0.5561	0.5438	0.5438	0.5416	0.5486	0.5561	0.5615	0.5671 (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 Opaque door			1.9700	1.0000	1.9700		(26)
TER Opening Type (Uw = 1.40)			11.0300	1.3258	14.6231		(27)
Heat Loss Floor			33.2700	0.1300	4.3251		(28a)
External Wall	43.0500	13.0000	30.0500	0.1800	5.4090		(29a)
External Roof	33.2700		33.2700	0.1300	4.3251		(30)
Total net area of external elements Aum(A, m2)			109.5900				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 30.6523		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	7.8072 (36)
Total fabric heat loss	(33) + (36) = 38.4595 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	32.7369	32.5634	32.3935	31.5951	31.4457	30.7504	30.7504	30.6216	31.0182	31.4457	31.7479	32.0638 (38)
Heat transfer coeff	71.1964	71.0230	70.8530	70.0546	69.9052	69.2099	69.2099	69.0811	69.4777	69.9052	70.2074	70.5233 (39)
Average = Sum(39)m / 12 =												70.0539 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0700	1.0674	1.0648	1.0528	1.0506	1.0401	1.0401	1.0382	1.0441	1.0506	1.0551	1.0599 (40)
HLP (average)												1.0528 (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	2.1593 (42)
Average daily hot water use (litres/day)	85.4831 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	94.0314	90.6121	87.1927	83.7734	80.3541	76.9348	76.9348	80.3541	83.7734	87.1927	90.6121	94.0314 (44)
Energy conte	139.4458	121.9602	125.8520	109.7208	105.2797	90.8484	84.1844	96.6028	97.7566	113.9259	124.3590	135.0458 (45)
Energy content (annual)												Total = Sum(45)m = 1344.9815 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												
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												

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Calculation Type: New Build (As Designed)



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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	0.0000	0.0000	(57)
Heat gains from water heating, kWh/month	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	0.0000	(59)
	29.6322	25.9165	26.7435	23.3157	22.3719	19.3053	17.8892	20.5281	20.7733	24.2092	26.4263	28.6972	26.6972	28.6972	(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	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	107.9644	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.4675	15.5145	12.6172	9.5520	7.1403	6.0281	6.5136	8.4666	11.3639	14.4290	16.8408	17.9530	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	189.0909	191.0531	186.1085	175.5820	162.2942	149.8055	141.4623	139.5001	144.4448	154.9712	168.2590	180.7477	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	33.7964	(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)	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	-86.3715	(71)
Water heating gains (Table 5)	39.8283	38.5663	35.9456	32.3829	30.0698	26.8129	24.0446	27.5915	28.8518	32.5393	36.7032	38.5716	(72)
Total internal gains	301.7760	300.5231	290.0606	272.9062	254.8936	238.0358	227.4098	230.9476	240.0497	257.3289	277.1923	292.6615	(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							
Southeast	3.8500	36.7938	0.6300	0.7000	0.7700	43.2920 (77)							
Northwest	7.1800	11.2829	0.6300	0.7000	0.7700	24.7582 (81)							
Solar gains	68.0502	124.1383	191.6949	274.1324	340.4699	352.7075	333.9303	282.1923	219.8888	143.0888	83.0060	57.2677	(83)
Total gains	369.8261	424.6614	481.7555	547.0386	595.3634	590.7434	561.3401	513.1399	459.9384	400.4177	360.1984	349.9292	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation factor for gains for living area, nil,m (see Table 9a)	64.9027	65.0611	65.2172	65.9604	66.1014	66.7655	66.7655	66.8899	66.5081	66.1014	65.8169	65.5220	21.0000 (85)
tau	5.3268	5.3374	5.3478	5.3974	5.4068	5.4510	5.4510	5.4593	5.4339	5.4068	5.3878	5.3681	
util living area	0.9986	0.9968	0.9907	0.9645	0.8785	0.7035	0.5335	0.6012	0.8615	0.9817	0.9971	0.9990	(86)
MIT	19.8260	19.9680	20.2113	20.5401	20.8173	20.9606	20.9927	20.9867	20.8803	20.5200	20.1142	19.8015	(87)
Th 2	20.0254	20.0276	20.0297	20.0395	20.0414	20.0500	20.0500	20.0516	20.0467	20.0414	20.0377	20.0337	(88)
util rest of house	0.9982	0.9957	0.9873	0.9510	0.8350	0.6173	0.4230	0.4864	0.7960	0.9725	0.9959	0.9986	(89)
MIT 2	18.9506	19.0939	19.3372	19.6658	19.9178	20.0320	20.0482	20.0478	19.9790	19.6524	19.2483	18.9328	(90)
Living area fraction	19.3337	19.4764	19.7198	20.0484	20.3115	20.4384	20.4615	20.4587	20.3734	20.0321	19.6272	19.3130	(91)
MIT	19.3337	19.4764	19.7198	20.0484	20.3115	20.4384	20.4615	20.4587	20.3734	20.0321	19.6272	19.3130	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3337	19.4764	19.7198	20.0484	20.3115	20.4384	20.4615	20.4587	20.3734	20.0321	19.6272	19.3130	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9977	0.9949	0.9859	0.9512	0.8485	0.6542	0.4717	0.5371	0.8210	0.9724	0.9952	0.9983	(94)
Useful gains	368.9829	422.5003	474.9731	520.3163	505.1928	386.4454	264.7838	275.5876	377.6093	389.3613	358.4592	349.3337	(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	1070.3436	1035.2616	936.6596	780.9981	601.9872	404.0755	267.2552	280.3763	435.8639	659.3543	879.5048	1065.8180	(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	521.8124	411.7756	343.4947	187.6909	72.0150	0.0000	0.0000	0.0000	0.0000	200.8748	375.1529	533.0643	(98)
Space heating												2645.8807	(98)
Space heating per m2										(98) / (4) =		39.7638	(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	650.5731	512.1533	525.0166	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9070	0.9531	0.9316	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	590.0953	488.1547	489.1300	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	771.0298	735.0753	680.1031	0.0000	0.0000	0.0000	0.0000	(103)
Month fracti	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	(103a)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	130.2729	183.7089	142.0840	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												456.0657	(104)
Cooled fraction												1.0000	(105)
												fc = cooled area / (4) =	

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CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Intermittency factor (Table 10b)	0.0000	0.0000	0.0000	0.0000	0.2500	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000	(106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	32.5682	45.9272	35.5210	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling												114.0164 (107)
Space cooling per m2												1.7135 (108)
Energy for space heating												39.7638 (99)
Energy for space cooling												1.7135 (108)
Total												41.4773 (109)
Target Fabric Energy Efficiency (TFEE)												47.7 (109)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	C2223084/2	Issued on Date	01/11/2022
Assessment Reference	As Designed	Prop Type Ref	
Property	Plot 2, Station Road, Quainton, AYLESBURY, HP22		
SAP Rating	81 B	DER	23.62
Environmental	83 B	TER	26.51
CO ₂ Emissions (t/year)	1.31	% DER<TER	10.91
General Requirements Compliance	Pass	DFEE	43.36
		TFEE	47.70
		% DFEE<TFEE	9.10
Assessor Details	Mr. Gary White, Hibec Limited, Tel: 01564 795566, gary_hibec@btconnect.com	Assessor ID	4104-0001
Client	Vauss Ltd, 016		

SAP 2012 OVERHEATING ASSESSMENT FOR New Build (As Designed) 9.92

SAP 2012 OVERHEATING ASSESSMENT FOR New Build (As Designed) 9.92

Overheating Calculation Input Data

Dwelling type	MidTerrace House
Number of storeys	2
Cross ventilation possible	Yes
SAP Region	Thames Valley
Front of dwelling faces	South East
Overshading	Average or unknown
Thermal mass parameter	250.0
Night ventilation	No
Ventilation rate during hot weather (ach)	8.00 (Windows fully open)

Overheating Calculation

Summer ventilation heat loss coefficient	452.34 (P1)
Transmission heat loss coefficient	41.91 (37)
Summer heat loss coefficient	494.24 (P2)

Overhangs	Ratio	Z_overhangs	Overhang type
Orientation			
South East	0.000	1.000	None
North West	0.000	1.000	None

Solar shading	Z blinds	Solar access	Z overhangs	Z summer
Orientation				
South East	1.000	0.90	1.000	0.900 (P8)
North West	1.000	0.90	1.000	0.900 (P8)

[Jul]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Shading	Gains W
South East	3.8500	119.9223	0.4600	0.0000	0.9000	191.1442
North West	7.1800	98.8453	0.4600	0.0000	0.9000	293.8195

total: 484.9638

Solar gains	Jun	Jul	Aug	
	518	485	419	(P4)
Internal gains	433	417	425	
Total summer gains	951	902	844	(P5)
Summer gain/loss ratio	1.92	1.83	1.71	(P6)
Summer external temperature	16.00	17.90	17.80	
Thermal mass temperature increment (TMP = 250.0)	0.25	0.25	0.25	
Threshold temperature	18.17	19.98	19.76	(P7)
Likelihood of high internal temperature	Not significant	Not significant	Not significant	

Assessment of likelihood of high internal temperature: Not significant

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)



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General Requirements Compliance	Pass	DfEE	43.36
		TfEE	47.70
		% DfEE<TfEE	9.10
Assessor Details	Mr. Gary White, Hibec Limited, Tel: 01564 795566, gary_hibec@btconnect.com	Assessor ID	4104-0001
Client	Vauss Ltd, 016		

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

Orientation	South East
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, Mid-Terrace
2.0 Number of Storeys	2
3.0 Date Built	2022
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:	8.36 m	33.27 m ²	2.50 m
1st Storey:	8.36 m	33.27 m ²	2.65 m

7.0 Living Area m²

8.0 Thermal Mass Parameter
 Thermal Mass kJ/m²K

9.0 External Walls

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall	Cavity Wall	0.20	43.05	30.05

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	81.98

10.0 External Roofs

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Roof	External Plane Roof	0.09	33.27	33.27

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Heat Loss Floor	Ground Floor - Solid		0.10	33.27

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)



Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
door	Manufacturer	Solid Door							1.20
window	BFRC data	Window	Double Low-E Soft	0.05		0.46			1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m ²)	Curtain Closed
door	Solid Door	[1] External Wall	South East							1.97	
windows	Window	[1] External Wall	South East	None	0.00					3.85	
Bi fold door	Window	[1] External Wall	North West	None	0.00					5.04	
window	Window	[1] External Wall	North West	None	0.00					2.14	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	8.60	0.300	No
Table K1 - Approved	E3 Sill	5.26	0.040	No
Table K1 - Approved	E4 Jamb	17.10	0.050	No
Independently assessed	E5 Ground floor (normal)	8.36	0.030	No LABC
Table K1 - Approved	E6 Intermediate floor within a dwelling	8.36	0.070	No
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	8.36	0.060	No
Table K1 - Approved	E18 Party wall between dwellings	20.60	0.060	No
Table K1 - Default	P1 Party wall - Ground floor	15.92	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	15.92	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	15.92	0.240	No

Y-value W/m²K

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested ?

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

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

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)



22.0 Lighting

Internal

Total number of light fittings	20	
Total number of L.E.L. fittings	20	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

SAP table	SAP table	
Description	ASHP	
Percentage of Heat	100	%
Main Heating	PET	
SAP Code	224	
Efficiency (SAP Table)	170.0	%
Controls	CHG Programmer, TRVs and bypass	
PCDF Controls	0	
Sap Code	2206	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	Unknown	

25.0 Main Heating 2

None

Community Heating None

28.0 Water Heating

HWP From main heating 1	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
Immersion Heater	Single
Supplementary Immersion	Yes
Immersion Only Heating Hot Water	Yes

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)



Loss	<input type="text" value="1.89"/>	kWh/day
Pipes insulation	<input type="text" value="Fully insulated primary pipework"/>	
31.0 Thermal Store	<input type="text" value="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	£97	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	£375	A 97	