

PREDICTED ENERGY ASSESSMENT



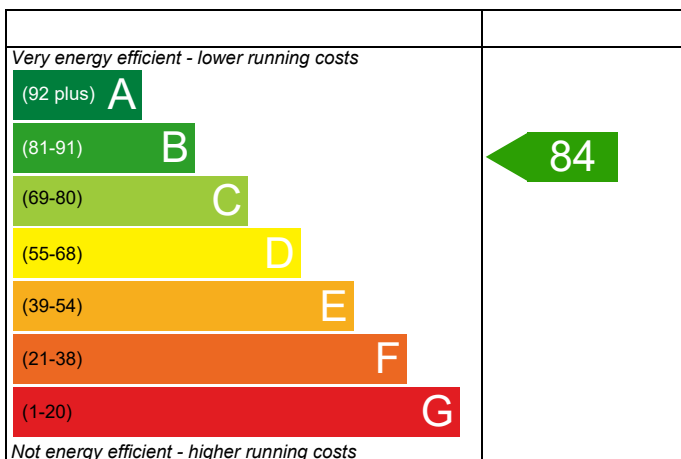
Plot 119, Grasmere Gardens,
Chestfield,
Kent

Dwelling type: House, Semi-Detached
Date of assessment: 06/10/2022
Produced by: Sean Wells
Total floor area: 79.92 m²
DRRN: 9202-1106-6901

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

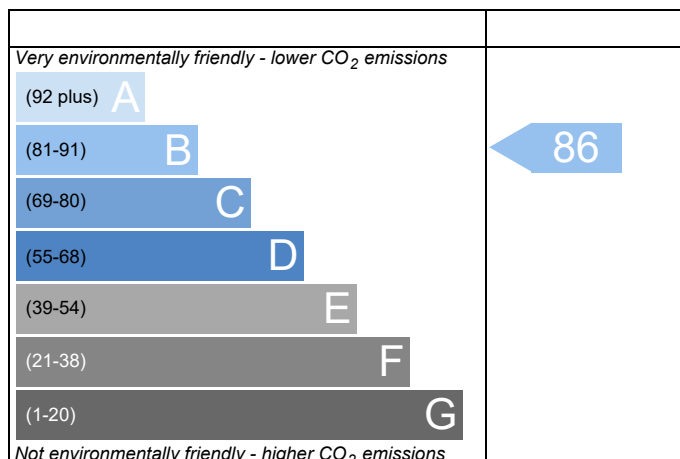


England

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 been produced by an accredited Elmhurst member whose work is subject to quality assurance audits. The data used to produce the report has been verified by the Elmhurst members' portal.



FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	4227-119F				Issued on Date	06/10/2022
Assessment Reference	As Designed Final	Prop Type Ref	Type A - A1/C1 Adj			
Property	Plot 119, Grasmere Gardens, Chestfield, Kent					
SAP Rating	84 B	DER	17.50	TER	19.06	
Environmental	86 B	% DER<TER	8.20			
CO ₂ Emissions (t/year)	1.15	DFEE	46.78	TFEE	55.62	
General Requirements Compliance	Pass	% DFEE<TFEE	15.89			
Assessor Details	Mr. Sean Wells, Energytest, Tel: 01892577562, swells@energy-test.co.uk				Assessor ID	T220-0001
Client						

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

Semi-Detached House, total floor area 80 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) 19.06 kgCO₂/m²

Dwelling Carbon Dioxide Emission Rate (DER) 17.50 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)55.6 kWh/m²/yr

Dwelling Fabric Energy Efficiency (DFEE)46.8 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.12 (max. 0.25)	0.12 (max. 0.70)	OK
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	OK
Openings	1.42 (max. 2.00)	1.60 (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: Boiler system with radiators or underfloor - Mains gas

Data from database

Vaillant ecoFIT sustain 830 VUW 306/6-3 (H-GB)

Combi boiler

Efficiency: 89.3% SEDBUK2009

Minimum: 88.0% OK

Secondary heating system:

None

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

Space heating controls: Time and temperature zone control OK

Hot water controls:

No cylinder

Boiler interlock

Yes

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 North: 0.63 m², No overhang

Windows facing East: 9.15 m², No overhang

Windows facing West: 5.10 m², No overhang

Air change rate: 8.00 ach

Blinds/curtains: Light-coloured curtain or roller blind, closed 100% of daylight hours

10 Key features

Party wall U-value	0.00 W/m ² K
Roof U-value	0.11 W/m ² K
Floor U-value	0.12 W/m ² K

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	39.9600 (1b)	x 2.4000 (2b)	= 95.9040 (1b) - (3b)
First floor	39.9600 (1c)	x 2.7000 (2c)	= 107.8920 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.9200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 203.7960 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	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) = 0.1963 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.4463 (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) =	0.3793 (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	0.4837	0.4742	0.4647	0.4173	0.4078	0.3604	0.3604	0.3509	0.3793	0.4078	0.4268	0.4457 (22b)
Effective ac	0.6170	0.6124	0.6080	0.5871	0.5831	0.5649	0.5649	0.5616	0.5719	0.5831	0.5911	0.5993 (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
window (Uw = 1.40)			14.8800	1.3258	19.7273		(27)
external door			1.8900	1.6000	3.0240		(26a)
ground floor			39.9600	0.1200	4.7952		(28a)
external wall - brick	44.5000	11.1900	33.3100	0.2000	6.6620		(29a)
external wall - weatherboard	50.0600	5.5800	44.4800	0.1800	8.0064		(29a)
pitch cold roof	39.9600		39.9600	0.1100	4.3956		(30)
Total net area of external elements Aum(A, m ²)			174.4800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	46.6105		(33)
Party Wall 1			42.3300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							174.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.2131 (36)
Total fabric heat loss						(33) + (36) =	54.8236 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	41.4921	41.1867	40.8873	39.4811	39.2180	37.9932	37.9932	37.7664	38.4650	39.2180	39.7502	40.3067 (38)
Heat transfer coeff	96.3157	96.0103	95.7109	94.3046	94.0415	92.8168	92.8168	92.5900	93.2885	94.0415	94.5738	95.1302 (39)
Average = Sum(39)m / 12 =												94.3034 (39)
HLP	1.2052	1.2013	1.1976	1.1800	1.1767	1.1614	1.1614	1.1585	1.1673	1.1767	1.1834	1.1903 (40)
HLP (average)												1.1800 (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												2.4613 (42)
Average daily hot water use (litres/day)												92.6569 (43)
Daily hot water use	101.9225	98.2163	94.5100	90.8037	87.0974	83.3912	83.3912	87.0974	90.8037	94.5100	98.2163	101.9225 (44)
Energy conte	151.1482	132.1952	136.4136	118.9287	114.1149	98.4725	91.2492	104.7098	105.9604	123.4866	134.7953	146.3790 (45)
Energy content (annual)										Total = Sum(45)m =		1457.8532 (45)
Distribution loss (46)m = 0.15 x (45)m	22.6722	19.8293	20.4620	17.8393	17.1172	14.7709	13.6874	15.7065	15.8941	18.5230	20.2193	21.9568 (46)
Water storage loss:												
Total storage loss												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

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 (56)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Total heat required for water heating calculated for each month	1.7096	1.4931	1.4826	1.2419	1.1430	0.9443	0.8751	1.0488	1.1065	1.3421	1.5225	1.6556 (61)
Solar input	152.8578	133.6883	137.8962	120.1706	115.2579	99.4168	92.1243	105.7586	107.0669	124.8287	136.3178	148.0346 (62)
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Heat gains from water heating, kWh/month	152.8578	133.6883	137.8962	120.1706	115.2579	99.4168	92.1243	105.7586	107.0669	124.8287	136.3178	148.0346 (64)
	50.6842	44.3282	45.7282	39.8543	38.2289	32.9782	30.5591	35.0782	35.5084	41.3948	45.2001	49.0849 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.8634	17.6425	14.3479	10.8622	8.1197	6.8550	7.4070	9.6279	12.9226	16.4082	19.1508	20.4155	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	219.2733	221.5486	215.8148	203.6081	188.1993	173.7172	164.0423	161.7669	167.5008	179.7075	195.1163	209.5983	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	(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)	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	(71)
Water heating gains (Table 5)	68.1239	65.9645	61.4626	55.3531	51.3830	45.8030	41.0741	47.1481	49.3173	55.6382	62.7779	65.9743	(72)
Total internal gains	370.1807	368.0758	354.5453	332.7436	310.6221	289.2953	275.4435	281.4631	292.6608	314.6740	339.9650	358.9083	(73)

6. Solar gains

[Jan]													Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North													0.6300	10.6334	0.6300	0.7000	0.7700	2.0473 (74)
East													9.1500	19.6403	0.6300	0.7000	0.7700	54.9212 (76)
West													5.1000	19.6403	0.6300	0.7000	0.7700	30.6118 (80)
Solar gains	87.5804	171.2333	282.2019	412.5573	506.9026	519.5789	494.3768	423.7190	328.4736	203.1976	109.1753	72.0450	(83)					
Total gains	457.7610	539.3091	636.7472	745.3009	817.5246	808.8743	769.8203	705.1821	621.1344	517.8716	449.1403	430.9533	(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	40.1056	40.2332	40.3591	40.9609	41.0755	41.6175	41.6175	41.7194	41.4070	41.0755	40.8443	40.6054	
alpha	3.6737	3.6822	3.6906	3.7307	3.7384	3.7745	3.7745	3.7813	3.7605	3.7384	3.7230	3.7070	
util living area	0.9929	0.9864	0.9687	0.9183	0.8147	0.6555	0.5066	0.5649	0.8038	0.9541	0.9878	0.9943	(86)
MIT	19.2383	19.4509	19.8208	20.2986	20.6795	20.9015	20.9716	20.9575	20.7775	20.2561	19.6635	19.2080	(87)
Th 2	19.9159	19.9189	19.9219	19.9360	19.9387	19.9510	19.9510	19.9533	19.9463	19.9387	19.9333	19.9278	(88)
util rest of house	0.9912	0.9831	0.9607	0.8971	0.7673	0.5724	0.3961	0.4522	0.7358	0.9380	0.9843	0.9929	(89)
MIT 2	17.5673	17.8783	18.4146	19.0990	19.6066	19.8749	19.9372	19.9305	19.7469	19.0551	18.1990	17.5306	(90)
Living area fraction									fLA = Living area / (4) =			0.3779	(91)
MIT	18.1987	18.4725	18.9460	19.5523	20.0120	20.2628	20.3280	20.3186	20.1363	19.5090	18.7524	18.1644	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.0487	18.3225	18.7960	19.4023	19.8620	20.1128	20.1780	20.1686	19.9863	19.3590	18.6024	18.0144	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9867	0.9761	0.9496	0.8841	0.7634	0.5861	0.4209	0.4767	0.7388	0.9263	0.9779	0.9892	(94)
Ext temp.	451.6697	526.4036	604.6629	658.9514	624.0984	474.0802	324.0515	336.1665	458.8724	479.7191	439.1968	426.2854	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.4000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Month fracti	1324.2156	1288.7010	1176.8584	990.4150	767.5686	511.6837	332.1026	348.9331	549.1286	823.7065	1087.8282	1314.1709	(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	649.1742	512.2638	425.7134	238.6538	106.7418	0.0000	0.0000	0.0000	0.0000	255.9267	467.0147	660.5868	(98)
Space heating per m2										(98) / (4) =		41.4924	(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 %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													3676.3582 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	649.1742	512.2638	425.7134	238.6538	106.7418	0.0000	0.0000	0.0000	0.0000	255.9267	467.0147	660.5868	(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)	719.7053	567.9200	471.9661	264.5829	118.3390	0.0000	0.0000	0.0000	0.0000	283.7325	517.7546	732.3578	(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	152.8578	133.6883	137.8962	120.1706	115.2579	99.4168	92.1243	105.7586	107.0669	124.8287	136.3178	148.0346	(64)
Efficiency of water heater (217)m	87.1484	86.8958	86.3198	84.9717	82.3453	76.2000	76.2000	76.2000	76.2000	85.0756	86.6049	76.2000	(216)
Fuel for water heating, kWh/month	175.3994	153.8490	159.7504	141.4243	139.9690	130.4683	120.8980	138.7908	140.5077	146.7269	157.4019	169.6383	(219)
Water heating fuel used												1774.8240	(219)
Annual totals kWh/year													
Space heating fuel - main system												3676.3582	(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)												350.7941	(232)
Total delivered energy for all uses												5876.9763	(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	3676.3582	0.2160	794.0934 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1774.8240	0.2160	383.3620 (264)
Space and water heating			1177.4553 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	350.7941	0.5190	182.0621 (268)
Total CO2, kg/year			1398.4425 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			17.5000 (273)

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

DER		17.5000	ZC1
Total Floor Area		79.9200	
Assumed number of occupants	TFA	2.4613	
CO2 emission factor in Table 12 for electricity displaced from grid	N	0.5190	
CO2 emissions from appliances, equation (L14)	EF	16.2583	ZC2
CO2 emissions from cooking, equation (L16)		2.2281	ZC3
Total CO2 emissions		35.9865	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		35.9865	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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	39.9600 (1b)	x 2.4000 (2b)	= 95.9040 (1b) - (3b)
First floor	39.9600 (1c)	x 2.7000 (2c)	= 107.8920 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.9200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 203.7960 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					30.0000 / (5) = 0.1472 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3972 (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) =	0.3376 (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	0.4305	0.4220	0.4136	0.3714	0.3629	0.3207	0.3207	0.3123	0.3376	0.3629	0.3798	0.3967 (22b)
Effective ac	0.5927	0.5891	0.5855	0.5690	0.5659	0.5514	0.5514	0.5488	0.5570	0.5659	0.5721	0.5787 (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
TER Semi-glazed door			1.8900	1.2000	2.2680		(26a)
TER Opening Type (Uw = 1.40)			14.8800	1.3258	19.7273		(27)
ground floor			39.9600	0.1300	5.1948		(28a)
external wall - brick	44.5000	11.1900	33.3100	0.1800	5.9958		(29a)
external wall - weatherboard	50.0600	5.5800	44.4800	0.1800	8.0064		(29a)
pitch cold roof	39.9600		39.9600	0.1300	5.1948		(30)
Total net area of external elements Aum(A, m ²)			174.4800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		46.3871		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							9.8128 (36)
Total fabric heat loss						(33) + (36) =	56.1999 (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	39.8575	39.6155	39.3784	38.2644	38.0560	37.0857	37.0857	36.9060	37.4594	38.0560	38.4776	38.9184 (38)
Heat transfer coeff	96.0574	95.8154	95.5782	94.4643	94.2558	93.2856	93.2856	93.1059	93.6593	94.2558	94.6775	95.1183 (39)
Average = Sum(39)m / 12 =												94.4633 (39)
HLP	1.2019	1.1989	1.1959	1.1820	1.1794	1.1672	1.1672	1.1650	1.1719	1.1794	1.1847	1.1902 (40)
HLP (average)												1.1820 (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												2.4613 (42)
Average daily hot water use (litres/day)												92.6569 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	101.9225	98.2163	94.5100	90.8037	87.0974	83.3912	83.3912	87.0974	90.8037	94.5100	98.2163	101.9225 (44)
Energy content (annual)	151.1482	132.1952	136.4136	118.9287	114.1149	98.4725	91.2492	104.7098	105.9604	123.4866	134.7953	146.3790 (45)
Distribution loss (46)m = 0.15 x (45)m	22.6722	19.8293	20.4620	17.8393	17.1172	14.7709	13.6874	15.7065	15.8941	18.5230	20.2193	21.9568 (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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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	50.9589	45.2064	48.1613	44.7799	44.3839	41.1244	42.4952	44.3839	44.7799	48.1613	48.4354	50.9589 (61)
Total heat required for water heating calculated for each month	202.1071	177.4016	184.5748	163.7086	158.4988	139.5969	133.7444	149.0937	150.7403	171.6479	183.2307	197.3379 (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	202.1071	177.4016	184.5748	163.7086	158.4988	139.5969	133.7444	149.0937	150.7403	171.6479	183.2307	197.3379 (64)
Heat gains from water heating, kWh/month	62.9965	55.2565	57.3978	50.7388	49.0392	43.0232	40.9642	45.9120	46.4268	53.0996	56.9283	61.4107 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.8634	17.6425	14.3479	10.8622	8.1197	6.8550	7.4070	9.6279	12.9226	16.4082	19.1508	20.4155 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	219.2733	221.5486	215.8148	203.6081	188.1993	173.7172	164.0423	161.7669	167.5008	179.7075	195.1163	209.5983 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067 (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)	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537 (71)
Water heating gains (Table 5)	84.6727	82.2269	77.1476	70.4705	65.9129	59.7544	55.0594	61.7097	64.4817	71.3704	79.0671	82.5413 (72)
Total internal gains	386.7295	384.3382	370.2304	347.8609	325.1519	303.2467	289.4288	296.0246	307.8252	330.4062	356.2542	375.4752 (73)

6. Solar gains

[Jan]			Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
North			0.6300	10.6334		0.6300		0.7000		0.7700		2.0473 (74)
East			9.1500	19.6403		0.6300		0.7000		0.7700		54.9212 (76)
West			5.1000	19.6403		0.6300		0.7000		0.7700		30.6118 (80)
Solar gains	87.5804	171.2333	282.2019	412.5573	506.9026	519.5789	494.3768	423.7190	328.4736	203.1976	109.1753	72.0450 (83)
Total gains	474.3099	555.5715	652.4322	760.4183	832.0545	822.8257	783.8056	719.7436	636.2988	533.6038	465.4295	447.5202 (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	57.7780	57.9239	58.0676	58.7524	58.8823	59.4947	59.4947	59.6095	59.2573	58.8823	58.6201	58.3484
alpha	4.8519	4.8616	4.8712	4.9168	4.9255	4.9663	4.9663	4.9740	4.9505	4.9255	4.9080	4.8899
util living area	0.9981	0.9955	0.9864	0.9504	0.8521	0.6781	0.5134	0.5760	0.8383	0.9766	0.9961	0.9986 (86)
MIT	19.6837	19.8474	20.1349	20.5090	20.8042	20.9542	20.9906	20.9839	20.8680	20.4633	20.0046	19.6571 (87)
Th 2	19.9185	19.9209	19.9233	19.9344	19.9365	19.9463	19.9463	19.9481	19.9425	19.9365	19.9323	19.9279 (88)
util rest of house	0.9974	0.9940	0.9814	0.9321	0.8012	0.5852	0.3958	0.4538	0.7637	0.9647	0.9944	0.9981 (89)
MIT 2	18.1671	18.4077	18.8263	19.3637	19.7487	19.9168	19.9430	19.9417	19.8375	19.3112	18.6460	18.1349 (90)
Living area fraction	18.7402	18.9517	19.3208	19.7964	20.1475	20.3088	20.3388	20.3355	20.2269	19.7466	19.1593	18.7101 (92)
Temperature adjustment	18.7402	18.9517	19.3208	19.7964	20.1475	20.3088	20.3388	20.3355	20.2269	19.7466	19.1593	18.7101 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9964	0.9920	0.9778	0.9293	0.8124	0.6188	0.4405	0.5002	0.7863	0.9619	0.9927	0.9973 (94)
Ext temp.	472.5961	551.1339	637.9171	706.6237	675.9901	509.1524	345.2804	360.0457	500.2947	513.2771	462.0421	446.2916 (95)
Heat loss rate W	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)
Month fracti	1387.0864	1346.3729	1225.3888	1029.3249	796.2300	532.5490	348.7790	366.4192	573.8379	862.1168	1141.7484	1380.1782 (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 per m2	680.3808	534.4007	437.0789	232.3449	89.4585	0.0000	0.0000	0.0000	0.0000	259.5368	489.3885	694.8117 (98)
												3417.4007 (98)
												42.7603 (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

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													3658.8873 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	680.3808	534.4007	437.0789	232.3449	89.4585	0.0000	0.0000	0.0000	0.0000	259.5368	489.3885	694.8117	(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)	728.4591	572.1634	467.9646	248.7632	95.7800	0.0000	0.0000	0.0000	0.0000	277.8766	523.9706	743.9097	(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	202.1071	177.4016	184.5748	163.7086	158.4988	139.5969	133.7444	149.0937	150.7403	171.6479	183.2307	197.3379	(64)
Efficiency of water heater (217)m	87.8689	87.6523	87.1456	85.9323	83.6727	80.3000	80.3000	80.3000	80.3000	86.0895	87.4052	87.9530	(216)
Fuel for water heating, kWh/month	230.0099	202.3923	211.8006	190.5087	189.4271	173.8442	166.5560	185.6709	187.7214	199.3831	209.6337	224.3673	(219)
Water heating fuel used												2371.3152	(219)
Annual totals kWh/year													
Space heating fuel - main system												3658.8873	(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)												350.7941	(232)
Total delivered energy for all uses												6455.9966	(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	3658.8873	0.2160	790.3197 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2371.3152	0.2160	512.2041 (264)
Space and water heating			1302.5237 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	350.7941	0.5190	182.0621 (268)
Total CO2, kg/m2/year			1523.5109 (272)
Emissions per m2 for space and water heating			16.2978 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.2781 (272b)
Emissions per m2 for pumps and fans			0.4870 (272c)
Target Carbon Dioxide Emission Rate (TER) = (16.2978 * 1.00) + 2.2781 + 0.4870, rounded to 2 d.p.			19.0600 (273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	4227-119F	Issued on Date	06/10/2022
Assessment Reference	As Designed Final	Prop Type Ref	Type A - A1/C1 Adj
Property	Plot 119, Grasmere Gardens, Chestfield, Kent		
SAP Rating	84 B	DER	17.50
Environmental	86 B	% DER<TER	8.20
CO ₂ Emissions (t/year)	1.15	DFEE	46.78
General Requirements Compliance	Pass	% DFEE<TFEE	15.89
Assessor Details	Mr. Sean Wells, Energytest, Tel: 01892577562, swells@energy-test.co.uk	Assessor ID	T220-0001
Client			

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	39.9600 (1b)	x 2.4000 (2b)	= 95.9040 (1b) - (3b)
First floor	39.9600 (1c)	x 2.7000 (2c)	= 107.8920 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.9200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 203.7960 (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) =	0.1472 (8)			
Pressure test								Yes				
Measured/design AP50								5.0000				
Infiltration rate								0.3972 (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) =	0.3376 (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	0.4305	0.4220	0.4136	0.3714	0.3629	0.3207	0.3207	0.3123	0.3376	0.3629	0.3798	0.3967 (22b)
Effective ac	0.5927	0.5891	0.5855	0.5690	0.5659	0.5514	0.5514	0.5488	0.5570	0.5659	0.5721	0.5787 (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					
window (Uw = 1.40)			14.8800	1.3258	19.7273		(27)					
external door			1.8900	1.6000	3.0240		(26a)					
ground floor			39.9600	0.1200	4.7952		(28a)					
external wall - brick	44.5000	11.1900	33.3100	0.2000	6.6620		(29a)					
external wall - weatherboard	50.0600	5.5800	44.4800	0.1800	8.0064		(29a)					
pitch cold roof	39.9600		39.9600	0.1100	4.3956		(30)					
Total net area of external elements Aum(A, m2)			174.4800				(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	46.6105		(33)					
Party Wall 1			42.3300	0.0000	0.0000		(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							174.0000 (35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.2131 (36)					
Total fabric heat loss						(33) + (36) =	54.8236 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 39.8575	Feb 39.6155	Mar 39.3784	Apr 38.2644	May 38.0560	Jun 37.0857	Jul 37.0857	Aug 36.9060	Sep 37.4594	Oct 38.0560	Nov 38.4776	Dec 38.9184 (38)
Heat transfer coeff	94.6811	94.4391	94.2019	93.0880	92.8795	91.9093	91.9093	91.7296	92.2830	92.8795	93.3012	93.7420 (39)
Average = Sum(39)m / 12 =												93.0870 (39)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1847	1.1817	1.1787	1.1648	1.1622	1.1500	1.1500	1.1478	1.1547	1.1622	1.1674	1.1729	(40)
Days in month												1.1648	(40)
	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.4613 (42)
Average daily hot water use (litres/day)													92.6569 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.9225	98.2163	94.5100	90.8037	87.0974	83.3912	83.3912	87.0974	90.8037	94.5100	98.2163	101.9225	(44)
Energy conte	151.1482	132.1952	136.4136	118.9287	114.1149	98.4725	91.2492	104.7098	105.9604	123.4866	134.7953	146.3790	(45)
Energy content (annual)													
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													
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	(57)
Heat gains from water heating, kWh/month	32.1190	28.0915	28.9879	25.2723	24.2494	20.9254	19.3905	22.2508	22.5166	26.2409	28.6440	31.1055	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.8634	17.6425	14.3479	10.8622	8.1197	6.8550	7.4070	9.6279	12.9226	16.4082	19.1508	20.4155	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	219.2733	221.5486	215.8148	203.6081	188.1993	173.7172	164.0423	161.7669	167.5008	179.7075	195.1163	209.5983	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	(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)	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	(71)
Water heating gains (Table 5)	43.1707	41.8028	38.9622	35.1005	32.5933	29.0631	26.0624	29.9070	31.2730	35.2700	39.7833	41.8085	(72)
Total internal gains	342.2275	340.9141	329.0450	309.4909	288.8324	269.5553	257.4319	261.2220	271.6165	291.3058	313.9705	331.7425	(73)

6. Solar gains

[Jan]														
	Area				Solar flux		g		FF		Access		Gains	
	m2				Table 6a		Specific data		Specific data		factor		W	
					W/m2		or Table 6b		or Table 6c		Table 6d			
North	0.6300				10.6334		0.6300		0.7000		0.7700		2.0473 (74)	
East	9.1500				19.6403		0.6300		0.7000		0.7700		54.9212 (76)	
West	5.1000				19.6403		0.6300		0.7000		0.7700		30.6118 (80)	
Solar gains	87.5804	171.2333	282.2019	412.5573	506.9026	519.5789	494.3768	423.7190	328.4736	203.1976	109.1753	72.0450	(83)	
Total gains	429.8079	512.1474	611.2468	722.0482	795.7349	789.1343	751.8087	684.9410	600.0901	494.5034	423.1458	403.7874	(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)													
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
alpha	40.7980	40.9025	41.0055	41.4962	41.5894	42.0284	42.0284	42.1107	41.8582	41.5894	41.4014	41.2067	
util living area	3.7199	3.7268	3.7337	3.7664	3.7726	3.8019	3.8019	3.8074	3.7905	3.7726	3.7601	3.7471	
	0.9943	0.9884	0.9719	0.9236	0.8216	0.6633	0.5131	0.5746	0.8140	0.9593	0.9900	0.9955	(86)
MIT	19.2299	19.4429	19.8142	20.2917	20.6761	20.8997	20.9712	20.9561	20.7709	20.2418	19.6475	19.1956	(87)
Th 2	19.9323	19.9347	19.9371	19.9483	19.9504	19.9602	19.9602	19.9620	19.9564	19.9504	19.9461	19.9417	(88)
util rest of house													
	0.9928	0.9856	0.9647	0.9035	0.7753	0.5806	0.4025	0.4617	0.7480	0.9448	0.9870	0.9943	(89)
MIT 2	18.3163	18.5298	18.8984	19.3686	19.7200	19.9069	19.9505	19.9458	19.8149	19.3315	18.7432	18.2892	(90)
Living area fraction													
MIT	18.6615	18.8749	19.2445	19.7174	20.0813	20.2821	20.3362	20.3275	20.1762	19.6755	19.0849	18.6317	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6615	18.8749	19.2445	19.7174	20.0813	20.2821	20.3362	20.3275	20.1762	19.6755	19.0849	18.6317	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9905	0.9818	0.9588	0.8983	0.7817	0.6077	0.4438	0.5034	0.7636	0.9400	0.9837	0.9924	(94)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

Useful gains	425.7385	502.8370	586.0848	648.6342	622.0312	479.5962	333.6823	344.7714	458.2333	464.8450	416.2690	400.7255 (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	1359.7651	1319.7731	1200.5523	1006.9710	778.4530	522.2354	343.3904	360.2710	560.7262	842.9273	1118.2068	1352.8564 (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	694.9158	548.9810	457.1638	258.0025	116.3778	0.0000	0.0000	0.0000	0.0000	281.2932	505.3952	708.3854 (98)
Space heating per m2											(98) / (4) =	44.6761 (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	863.9472	680.1287	697.1450	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.8500	0.9050	0.8769	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	734.3917	615.4970	611.3478	0.0000	0.0000	0.0000	0.0000 (102)
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	201.4880	262.7967	208.9036	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												673.1883 (104)
Cooled fraction									FC = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	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 kWh	0.0000	0.0000	0.0000	0.0000	0.0000	50.3720	65.6992	52.2259	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												168.2971 (107)
Space cooling per m2												2.1058 (108)
Energy for space heating												44.6761 (99)
Energy for space cooling												2.1058 (108)
Total												46.7819 (109)
Dwelling Fabric Energy Efficiency (DFEE)												46.8 (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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	39.9600 (1b)	x 2.4000 (2b)	= 95.9040 (1b) - (3b)
First floor	39.9600 (1c)	x 2.7000 (2c)	= 107.8920 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.9200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 203.7960 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c)					30.0000 / (5) = 0.1472 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3972 (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) =	0.3376 (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	0.4305	0.4220	0.4136	0.3714	0.3629	0.3207	0.3207	0.3123	0.3376	0.3629	0.3798	0.3967 (22b)
Effective ac	0.5927	0.5891	0.5855	0.5690	0.5659	0.5514	0.5514	0.5488	0.5570	0.5659	0.5721	0.5787 (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
TER Semi-glazed door			1.8900	1.2000	2.2680		(26a)
TER Opening Type (Uw = 1.40)			14.8800	1.3258	19.7273		(27)
ground floor			39.9600	0.1300	5.1948		(28a)
external wall - brick	44.5000	11.1900	33.3100	0.1800	5.9958		(29a)
external wall - weatherboard	50.0600	5.5800	44.4800	0.1800	8.0064		(29a)
pitch cold roof	39.9600		39.9600	0.1300	5.1948		(30)
Total net area of external elements Aum(A, m ²)			174.4800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	46.3871		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							9.8128 (36)
Total fabric heat loss						(33) + (36) =	56.1999 (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	39.8575	39.6155	39.3784	38.2644	38.0560	37.0857	37.0857	36.9060	37.4594	38.0560	38.4776	38.9184 (38)
Heat transfer coeff	96.0574	95.8154	95.5782	94.4643	94.2558	93.2856	93.2856	93.1059	93.6593	94.2558	94.6775	95.1183 (39)
Average = Sum(39)m / 12 =												94.4633 (39)
HLP	1.2019	1.1989	1.1959	1.1820	1.1794	1.1672	1.1672	1.1650	1.1719	1.1794	1.1847	1.1902 (40)
HLP (average)												1.1820 (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												2.4613 (42)
Average daily hot water use (litres/day)												92.6569 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	101.9225	98.2163	94.5100	90.8037	87.0974	83.3912	83.3912	87.0974	90.8037	94.5100	98.2163	101.9225 (44)
Energy content (annual)	151.1482	132.1952	136.4136	118.9287	114.1149	98.4725	91.2492	104.7098	105.9604	123.4866	134.7953	146.3790 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1457.8532 (45)
Water 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 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

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	32.1190	28.0915	28.9879	25.2723	24.2494	20.9254	19.3905	22.2508	22.5166	26.2409	28.6440	31.1055 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	123.0671	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.8634	17.6425	14.3479	10.8622	8.1197	6.8550	7.4070	9.6279	12.9226	16.4082	19.1508	20.4155	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	219.2733	221.5486	215.8148	203.6081	188.1993	173.7172	164.0423	161.7669	167.5008	179.7075	195.1163	209.5983	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	35.3067	(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)	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	-98.4537	(71)
Water heating gains (Table 5)	43.1707	41.8028	38.9622	35.1005	32.5933	29.0631	26.0624	29.9070	31.2730	35.2700	39.7833	41.8085	(72)
Total internal gains	342.2275	340.9141	329.0450	309.4909	288.8324	269.5553	257.4319	261.2220	271.6165	291.3058	313.9705	331.7425	(73)

6. Solar gains

[Jan]												Gains
				Area	Solar flux			g	FF		Access	
				m2	Table 6a			Specific data	Specific data		factor	W
					W/m2			or Table 6b	or Table 6c		Table 6d	
North				0.6300	10.6334			0.6300	0.7000		0.7700	2.0473 (74)
East				9.1500	19.6403			0.6300	0.7000		0.7700	54.9212 (76)
West				5.1000	19.6403			0.6300	0.7000		0.7700	30.6118 (80)

Solar gains	87.5804	171.2333	282.2019	412.5573	506.9026	519.5789	494.3768	423.7190	328.4736	203.1976	109.1753	72.0450 (83)
Total gains	429.8079	512.1474	611.2468	722.0482	795.7349	789.1343	751.8087	684.9410	600.0901	494.5034	423.1458	403.7874 (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	57.7780	57.9239	58.0676	58.7524	58.8823	59.4947	59.4947	59.6095	59.2573	58.8823	58.6201	58.3484		
alpha	4.8519	4.8616	4.8712	4.9168	4.9255	4.9663	4.9663	4.9740	4.9505	4.9255	4.9080	4.8899		
util living area	0.9988	0.9969	0.9895	0.9588	0.8688	0.6997	0.5333	0.6012	0.8612	0.9827	0.9974	0.9991	(86)	
MIT	19.6323	19.7979	20.0898	20.4734	20.7834	20.9475	20.9889	20.9806	20.8485	20.4222	19.9561	19.6064	(87)	
Th 2	19.9185	19.9209	19.9233	19.9344	19.9365	19.9463	19.9463	19.9481	19.9425	19.9365	19.9323	19.9279	(88)	
util rest of house	0.9983	0.9957	0.9857	0.9430	0.8208	0.6065	0.4121	0.4756	0.7914	0.9735	0.9963	0.9988	(89)	
MIT 2	18.6715	18.8385	19.1302	19.5121	19.7925	19.9228	19.9436	19.9427	19.8579	19.4706	19.0059	18.6531	(90)	
Living area fraction														
MIT	19.0346	19.2010	19.4928	19.8754	20.1670	20.3100	20.3386	20.3349	20.2322	19.8302	19.3649	19.0134	(92)	
Temperature adjustment														
adjusted MIT	19.0346	19.2010	19.4928	19.8754	20.1670	20.3100	20.3386	20.3349	20.2322	19.8302	19.3649	19.0134	(93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9979	0.9947	0.9837	0.9419	0.8324	0.6405	0.4583	0.5235	0.8132	0.9723	0.9955	0.9984	(94)
Useful gains	428.8849	509.4582	601.2665	680.1096	662.4089	505.4724	344.5906	358.5960	487.9880	480.8154	421.2446	403.1481	(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	1415.3635	1370.2602	1241.8332	1036.7792	798.0627	532.6578	348.7549	366.3640	574.3401	869.9988	1161.2121	1409.0216	(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	733.9401	578.4589	476.5816	256.8021	100.9264	0.0000	0.0000	0.0000	0.0000	289.5524	532.7765	748.3698	(98)
Space heating												3717.4079	(98)
Space heating per m2											(98) / (4) =	46.5141	(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	876.8844	690.3133	707.6048	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8867	0.9384	0.9128	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	777.5415	647.8092	645.9351	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1014.2362	968.7185	892.1322	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	170.4201	238.7565	183.1706	0.0000	0.0000	0.0000	0.0000	(104)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Space cooling											592.3473 (104)
Cooled fraction											1.0000 (105)
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	0.0000	42.6050	59.6891	45.7927	0.0000	0.0000	0.0000 (107)
Space cooling											148.0868 (107)
Space cooling per m2											1.8529 (108)
Energy for space heating											46.5141 (99)
Energy for space cooling											1.8529 (108)
Total											48.3671 (109)
Target Fabric Energy Efficiency (TFEE)											55.6 (109)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Property Reference	4227-119F	Issued on Date	06/10/2022
Assessment Reference	As Designed Final	Prop Type Ref	Type A - A1/C1 Adj
Property	Plot 119, Grasmere Gardens, Chestfield, Kent		
SAP Rating	84 B	DER	17.50
Environmental	86 B	TER	19.06
CO₂ Emissions (t/year)	1.15	% DER<TER	8.20
General Requirements Compliance	Pass	DFEE	46.78
		TFEE	55.62
		% DFEE<TFEE	15.89
Assessor Details	Mr. Sean Wells, Energytest, Tel: 01892577562, swells@energy-test.co.uk		Assessor ID
Client			T220-0001

SUMMARY 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)	19.06	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.50	kgCO ₂ /m ²	Pass
	-1.56 (-8.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.62	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	46.78	kWh/m ² /yr	
	-8.8 (-15.8%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.20 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.12 (max. 0.25)	0.12 (max. 0.70)	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.42 (max. 2.00)	1.60 (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 830 VUW 306/6-3 (H-GB) Combi boiler Efficiency: 89.3% SEDBUK2009 Minimum: 88.0%	Pass
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



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

0.63 m², No overhang

Windows facing East

9.15 m², No overhang

Windows facing West

5.10 m², No overhang

Air change rate

8.00 ach

Blinds/curtains

Light-coloured curtain or roller blind, closed 100% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

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

0.11

W/m²K

Floor U-value

0.12

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.