

PREDICTED ENERGY ASSESSMENT



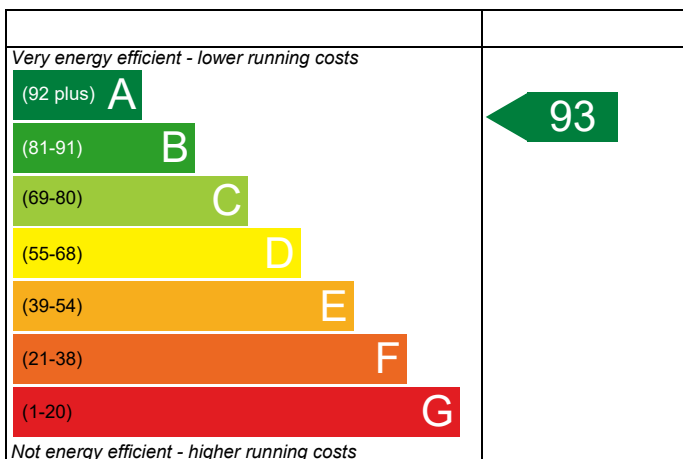
Plot 136, Grasmere Gardens,
Chestfield,
Kent

Dwelling type: House, Semi-Detached
Date of assessment: 06/10/2022
Produced by: Sean Wells
Total floor area: 94.62 m²
DRRN: 0902-4056-2033

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

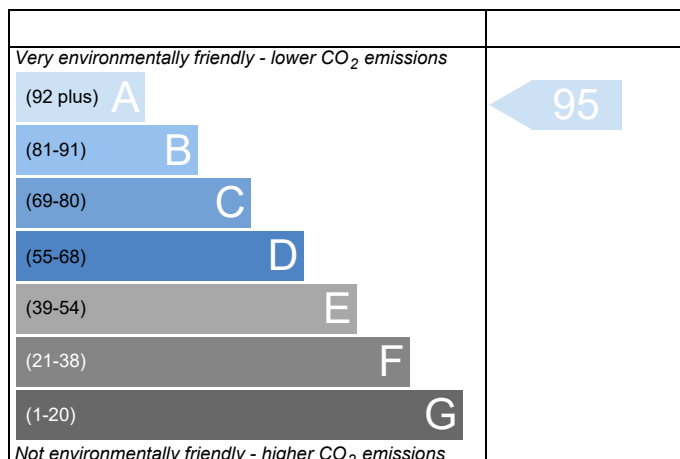


England

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	4227-136F				Issued on Date	06/10/2022
Assessment Reference	As Designed Final		Prop Type Ref	Type C3 - C3/C3 Adj		
Property	Plot 136, Grasmere Gardens, Chestfield, Kent					
SAP Rating	93 A	DER	7.66	TER	17.91	
Environmental	95 A	% DER<TER	57.23			
CO ₂ Emissions (t/year)	0.38	DFEE	45.34	TFEE	54.18	
General Requirements Compliance	Pass	% DFEE<TFEE	16.32			
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 95 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) 17.91 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.66 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)54.2 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)45.3 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: 1.26 m², No overhang
Windows facing East: 11.49 m², No overhang
Windows facing West: 5.94 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/m²K
Roof U-value 0.11 W/m²K
Floor U-value 0.12 W/m²K
Photovoltaic array 2.35 kW

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	47.3100 (1b)	x 2.4000 (2b)	= 113.5440 (1b) - (3b)
First floor	47.3100 (1c)	x 2.7000 (2c)	= 127.7370 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 241.2810 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 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) = 0.1658 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.4158 (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) =	0.3534 (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	0.4506	0.4418	0.4329	0.3888	0.3799	0.3357	0.3357	0.3269	0.3534	0.3799	0.3976	0.4153 (22b)
Effective ac	0.6015	0.5976	0.5937	0.5756	0.5722	0.5564	0.5564	0.5534	0.5625	0.5722	0.5790	0.5862 (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)			18.6900	1.3258	24.7784		(27)
external door			1.8900	1.6000	3.0240		(26a)
ground floor			47.3100	0.1200	5.6772		(28a)
external wall - brick	47.2800	11.6700	35.6100	0.2000	7.1220		(29a)
external wall - weatherboard	53.1900	8.9100	44.2800	0.1800	7.9704		(29a)
pitch cold roof	47.3100		47.3100	0.1100	5.2041		(30)
Total net area of external elements Aum(A, m ²)			195.0900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.7761		(33)
Party Wall 1			42.3300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							184.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.1661 (36)
Total fabric heat loss						(33) + (36) =	61.9422 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	47.8948	47.5809	47.2732	45.8281	45.5577	44.2991	44.2991	44.0660	44.7839	45.5577	46.1047	46.6765 (38)
Heat transfer coeff	109.8370	109.5231	109.2155	107.7703	107.4999	106.2413	106.2413	106.0082	106.7261	107.4999	108.0469	108.6187 (39)
Average = Sum(39)m / 12 =												107.7690 (39)
HLP	1.1608	1.1575	1.1543	1.1390	1.1361	1.1228	1.1228	1.1204	1.1279	1.1361	1.1419	1.1479 (40)
HLP (average)												1.1390 (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												2.6838 (42)
Average daily hot water use (litres/day)												97.9410 (43)
Daily hot water use	107.7351	103.8174	99.8998	95.9821	92.0645	88.1469	88.1469	92.0645	95.9821	99.8998	103.8174	107.7351 (44)
Energy conte	159.7680	139.7341	144.1931	125.7110	120.6227	104.0882	96.4530	110.6813	112.0032	130.5289	142.4825	154.7268 (45)
Energy content (annual)										Total = Sum(45)m =		1540.9927 (45)
Distribution loss (46)m = 0.15 x (45)m	23.9652	20.9601	21.6290	18.8567	18.0934	15.6132	14.4680	16.6022	16.8005	19.5793	21.3724	23.2090 (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	1.7049	1.5513	1.6566	1.3876	1.2771	1.0551	0.9777	1.1718	1.2363	1.4996	1.5819	1.6511 (61)
Solar input	161.4729	141.2854	145.8496	127.0986	121.8998	105.1434	97.4308	111.8531	113.2394	132.0285	144.0643	156.3779 (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	161.4729	141.2854	145.8496	127.0986	121.8998	105.1434	97.4308	111.8531	113.2394	132.0285	144.0643	156.3779 (64)
	53.5491	46.8494	48.3583	42.1458	40.4263	34.8731	32.3151	37.0945	37.5501	43.7757	47.7709	51.8594 (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)
(66)m	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.2345	19.7485	16.0605	12.1589	9.0889	7.6732	8.2912	10.7772	14.4651	18.3668	21.4368	22.8525	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.3255	249.8920	243.4246	229.6562	212.2762	195.9413	185.0287	182.4622	188.9296	202.6980	220.0780	236.4129	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	(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)	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	(71)
Water heating gains (Table 5)	71.9746	69.7164	64.9978	58.5358	54.3365	48.4349	43.4342	49.8582	52.1529	58.8384	66.3485	69.7035	(72)
Total internal gains	407.7920	405.6143	390.7403	366.6084	341.9590	318.3069	303.0116	309.3551	321.8052	346.1606	374.1207	395.2263	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W
North				1.2600	10.6334	0.6300	0.7000	0.7700		4.0946 (74)
East				11.4900	19.6403	0.6300	0.7000	0.7700		68.9667 (76)
West				5.9400	19.6403	0.6300	0.7000	0.7700		35.6538 (80)
Solar gains	108.7151	212.4848	350.3421	512.9186	631.1971	647.4905	615.8703	527.1367	407.9847	252.1607 135.5006 89.4482 (83)
Total gains	516.5071	618.0991	741.0825	879.5270	973.1561	965.7974	918.8818	836.4917	729.7899	598.3214 509.6214 484.6745 (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	44.0301	44.1563	44.2807	44.8744	44.9873	45.5203	45.5203	45.6204	45.3135	44.9873	44.7596	44.5239	
alpha	3.9353	3.9438	3.9520	3.9916	3.9992	4.0347	4.0347	4.0414	4.0209	3.9992	3.9840	3.9683	
util living area	0.9951	0.9895	0.9729	0.9214	0.8106	0.6430	0.4918	0.5536	0.8044	0.9601	0.9910	0.9962	(86)
MIT	19.3480	19.5579	19.9190	20.3793	20.7346	20.9256	20.9804	20.9689	20.8117	20.3160	19.7473	19.3159	(87)
Th 2	19.9515	19.9541	19.9568	19.9691	19.9714	19.9822	19.9822	19.9842	19.9781	19.9714	19.9668	19.9619	(88)
util rest of house	0.9938	0.9869	0.9657	0.9004	0.7623	0.5607	0.3856	0.4438	0.7362	0.9454	0.9883	0.9952	(89)
MIT 2	17.7417	18.0490	18.5729	19.2306	19.7000	19.9262	19.9730	19.9681	19.8117	19.1572	18.3350	17.7017	(90)
Living area fraction													(91)
MIT	18.3376	18.6087	19.0723	19.6567	20.0838	20.2970	20.3467	20.3394	20.1827	19.5871	18.8589	18.3005	(92)
Temperature adjustment													(93)
adjusted MIT	18.1876	18.4587	18.9223	19.5067	19.9338	20.1470	20.1967	20.1894	20.0327	19.4371	18.7089	18.1505	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9906	0.9813	0.9562	0.8890	0.7604	0.5748	0.4087	0.4670	0.7403	0.9353	0.9834	0.9926	(94)
Ext temp.	511.6673	606.5703	708.6395	781.9109	739.9582	555.1713	375.5633	390.6601	540.2865	559.6200	501.1614	481.0845	(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	1525.3706	1484.9926	1356.7020	1143.0868	885.1299	589.3152	382.1176	401.7068	633.1713	949.9873	1254.3053	1515.2831	(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	754.1952	590.2998	482.1585	260.0467	108.0077	0.0000	0.0000	0.0000	0.0000	290.4333	542.2636	769.4438	(98)
Space heating per m2													(98) / (4) =

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													4209.3666 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	754.1952	590.2998	482.1585	260.0467	108.0077	0.0000	0.0000	0.0000	0.0000	290.4333	542.2636	769.4438	(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)	836.1366	654.4343	534.5438	288.3001	119.7425	0.0000	0.0000	0.0000	0.0000	321.9882	601.1792	853.0419	(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	161.4729	141.2854	145.8496	127.0986	121.8998	105.1434	97.4308	111.8531	113.2394	132.0285	144.0643	156.3779	(64)
Efficiency of water heater (217)m	87.3693	87.1092	86.5088	85.0689	82.1932	76.2000	76.2000	76.2000	76.2000	85.3021	86.8506	76.2000	(216)
Fuel for water heating, kWh/month	184.8165	162.1934	168.5952	149.4067	148.3088	137.9834	127.8619	146.7888	148.6082	154.7776	165.8761	178.7480	(219)
Water heating fuel used												1873.9647	(219)
Annual totals kWh/year													
Space heating fuel - main system												4209.3666	(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)												392.6681	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 2.35 * 853 * 1.00) =										-1603.6963		-1603.6963	(233)
Total delivered energy for all uses												4947.3031	(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	4209.3666	0.2160	909.2232	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1873.9647	0.2160	404.7764	(264)
Space and water heating			1313.9996	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	392.6681	0.5190	203.7947	(268)
Energy saving/generation technologies				
PV Unit	-1603.6963	0.5190	-832.3184	(269)
Total CO2, kg/year			724.4009	(272)
Dwelling Carbon Dioxide Emission Rate (DER)			7.6600	(273)

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

DER			7.6600	ZC1
Total Floor Area		TFA	94.6200	
Assumed number of occupants		N	2.6838	
CO2 emission factor in Table 12 for electricity displaced from grid		EF	0.5190	
CO2 emissions from appliances, equation (L14)			15.4893	ZC2
CO2 emissions from cooking, equation (L16)			1.9384	ZC3
Total CO2 emissions			25.0877	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			25.0877	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	47.3100 (1b)	x 2.4000 (2b)	= 113.5440 (1b) - (3b)
First floor	47.3100 (1c)	x 2.7000 (2c)	= 127.7370 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.6200		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 241.2810 (5)
Dwelling volume			

2. Ventilation rate

										main	secondary	other	total	m3 per hour			
										heating	heating						
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) =							0.1243 (8)
Pressure test										Yes							
Measured/design AP50																	5.0000
Infiltration rate																	0.3743 (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) =							0.3182 (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	0.4057	0.3977	0.3898	0.3500	0.3420	0.3023	0.3023	0.2943	0.3182	0.3420	0.3580	0.3739	(22b)				
Effective ac	0.5823	0.5791	0.5760	0.5613	0.5585	0.5457	0.5457	0.5433	0.5506	0.5585	0.5641	0.5699	(25)				

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K						
TER Semi-glazed door			1.8900	1.2000	2.2680			(26a)					
TER Opening Type (Uw = 1.40)			18.6900	1.3258	24.7784			(27)					
ground floor			47.3100	0.1300	6.1503			(28a)					
external wall - brick	47.2800	11.6700	35.6100	0.1800	6.4098			(29a)					
external wall - weatherboard	53.1900	8.9100	44.2800	0.1800	7.9704			(29a)					
pitch cold roof	47.3100		47.3100	0.1300	6.1503			(30)					
Total net area of external elements Aum(A, m2)			195.0900					(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.7272			(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.4040	(36)					
Total fabric heat loss						(33) + (36) =	64.1312	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 46.3636	Feb 46.1092	Mar 45.8598	Apr 44.6884	May 44.4692	Jun 43.4490	Jul 43.4490	Aug 43.2600	Sep 43.8420	Oct 44.4692	Nov 44.9126	Dec 45.3761	(38)
Heat transfer coeff	110.4948	110.2404	109.9910	108.8196	108.6004	107.5802	107.5802	107.3913	107.9732	108.6004	109.0438	109.5073	(39)
Average = Sum(39)m / 12 =												108.8185	(39)
HLP	Jan 1.1678	Feb 1.1651	Mar 1.1624	Apr 1.1501	May 1.1478	Jun 1.1370	Jul 1.1370	Aug 1.1350	Sep 1.1411	Oct 1.1478	Nov 1.1524	Dec 1.1573	(40)
HLP (average)												1.1501	(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												2.6838 (42)
Average daily hot water use (litres/day)												97.9410 (43)
Daily hot water use	Jan 107.7351	Feb 103.8174	Mar 99.8998	Apr 95.9821	May 92.0645	Jun 88.1469	Jul 88.1469	Aug 92.0645	Sep 95.9821	Oct 99.8998	Nov 103.8174	Dec 107.7351 (44)
Energy conte	159.7680	139.7341	144.1931	125.7110	120.6227	104.0882	96.4530	110.6813	112.0032	130.5289	142.4825	154.7268 (45)
Energy content (annual)										Total = Sum(45)m =		1540.9927 (45)
Distribution loss (46)m = 0.15 x (45)m	23.9652	20.9601	21.6290	18.8567	18.0934	15.6132	14.4680	16.6022	16.8005	19.5793	21.3724	23.2090 (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)

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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	46.0274	50.9078	47.3337	46.9151	43.4697	44.9187	46.9151	47.3337	50.9078	49.3151	50.9589 (61)
Total heat required for water heating calculated for each month	210.7269	185.7615	195.1009	173.0447	167.5378	147.5579	141.3717	157.5963	159.3368	181.4367	191.7976	205.6857 (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	210.7269	185.7615	195.1009	173.0447	167.5378	147.5579	141.3717	157.5963	159.3368	181.4367	191.7976	205.6857 (64)
Heat gains from water heating, kWh/month	65.8626	57.9684	60.6712	53.6323	51.8358	45.4768	43.3003	48.5303	49.0745	56.1278	59.7042	64.1864 (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	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.2345	19.7485	16.0605	12.1589	9.0889	7.6732	8.2912	10.7772	14.4651	18.3668	21.4368	22.8525 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.3255	249.8920	243.4246	229.6562	212.2762	195.9413	185.0287	182.4622	188.9296	202.6980	220.0780	236.4129 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191 (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)	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532 (71)
Water heating gains (Table 5)	88.5250	86.2626	81.5472	74.4893	69.6718	63.1622	58.1993	65.2289	68.1590	75.4406	82.9225	86.2720 (72)
Total internal gains	424.3424	422.1605	407.2898	382.5619	357.2943	333.0342	317.7767	324.7258	337.8112	362.7629	390.6948	411.7948 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W		
North				1.2600	10.6334	0.6300	0.7000	0.7700		4.0946 (74)		
East				11.4900	19.6403	0.6300	0.7000	0.7700		68.9667 (76)		
West				5.9400	19.6403	0.6300	0.7000	0.7700		35.6538 (80)		
Solar gains	108.7151	212.4848	350.3421	512.9186	631.1971	647.4905	615.8703	527.1367	407.9847	252.1607	135.5006	89.4482 (83)
Total gains	533.0575	634.6453	757.6320	895.4805	988.4914	980.5247	933.6469	851.8625	745.7959	614.9236	526.1954	501.2430 (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	59.4673	59.6046	59.7397	60.3828	60.5047	61.0785	61.0785	61.1859	60.8562	60.5047	60.2587	60.0036
alpha	4.9645	4.9736	4.9826	5.0255	5.0336	5.0719	5.0719	5.0791	5.0571	5.0336	5.0172	5.0002
util living area	0.9985	0.9961	0.9870	0.9489	0.8431	0.6628	0.4989	0.5640	0.8345	0.9781	0.9968	0.9989 (86)
MIT	19.7010	19.8689	20.1611	20.5365	20.8247	20.9616	20.9925	20.9865	20.8780	20.4757	20.0166	19.6727 (87)
Th 2	19.9459	19.9480	19.9502	19.9602	19.9620	19.9708	19.9708	19.9724	19.9674	19.9620	19.9582	19.9543 (88)
util rest of house	0.9980	0.9948	0.9823	0.9303	0.7914	0.5720	0.3864	0.4460	0.7602	0.9670	0.9954	0.9985 (89)
MIT 2	18.2116	18.4583	18.8838	19.4216	19.7948	19.9461	19.9681	19.9670	19.8705	19.3481	18.6819	18.1762 (90)
Living area fraction	18.7641	18.9816	19.3576	19.8352	20.1769	20.3228	20.3481	20.3452	20.2442	19.7664	19.1770	18.7314 (92)
Temperature adjustment	18.7641	18.9816	19.3576	19.8352	20.1769	20.3228	20.3481	20.3452	20.2442	19.7664	19.1770	18.7314 (93)
adjusted MIT	18.7641	18.9816	19.3576	19.8352	20.1769	20.3228	20.3481	20.3452	20.2442	19.7664	19.1770	18.7314 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9971	0.9931	0.9788	0.9277	0.8032	0.6044	0.4284	0.4901	0.7825	0.9642	0.9940	0.9979 (94)
Ext temp.	531.5306	630.2371	741.5572	830.7084	793.9828	592.6756	399.9595	417.4575	583.5818	592.9182	523.0155	500.1775 (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	1598.2094	1552.3600	1414.2233	1189.9626	920.5912	615.6594	403.2196	423.6793	663.4118	995.4770	1316.9259	1591.2914 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating per m2	793.6090	619.6666	500.4636	258.6630	94.1966	0.0000	0.0000	0.0000	0.0000	299.5037	571.6155	811.7887 (98)
												3949.5068 (98)
												41.7407 (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													4228.5940 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	793.6090	619.6666	500.4636	258.6630	94.1966	0.0000	0.0000	0.0000	0.0000	299.5037	571.6155	811.7887	(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)	849.6885	663.4546	535.8283	276.9411	100.8529	0.0000	0.0000	0.0000	0.0000	320.6678	612.0080	869.1528	(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	210.7269	185.7615	195.1009	173.0447	167.5378	147.5579	141.3717	157.5963	159.3368	181.4367	191.7976	205.6857	(64)
Efficiency of water heater (217)m	88.0756	87.8515	87.3194	86.0611	83.6641	80.3000	80.3000	80.3000	80.3000	86.3048	87.6309	88.1584	(216)
Fuel for water heating, kWh/month	239.2567	211.4494	223.4337	201.0719	200.2505	183.7583	176.0544	196.2594	198.4269	210.2278	218.8699	233.3136	(219)
Water heating fuel used												2492.3727	(219)
Annual totals kWh/year													
Space heating fuel - main system												4228.5940	(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)												392.6681	(232)
Total delivered energy for all uses												7188.6347	(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	4228.5940	0.2160	913.3763 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2492.3727	0.2160	538.3525 (264)
Space and water heating			1451.7288 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	392.6681	0.5190	203.7947 (268)
Total CO2, kg/m2/year			1694.4485 (272)
Emissions per m2 for space and water heating			15.3427 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.1538 (272b)
Emissions per m2 for pumps and fans			0.4114 (272c)
Target Carbon Dioxide Emission Rate (TER) = (15.3427 * 1.00) + 2.1538 + 0.4114, rounded to 2 d.p.			17.9100 (273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	4227-136F	Issued on Date	06/10/2022
Assessment Reference	As Designed Final	Prop Type Ref	Type C3 - C3/C3 Adj
Property	Plot 136, Grasmere Gardens, Chestfield, Kent		
SAP Rating	93 A	DER	7.66
Environmental	95 A	% DER<TER	57.23
CO ₂ Emissions (t/year)	0.38	DFEE	45.34
General Requirements Compliance	Pass	% DFEE<TFEE	16.32
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	47.3100 (1b)	x 2.4000 (2b)	= 113.5440 (1b) - (3b)
First floor	47.3100 (1c)	x 2.7000 (2c)	= 127.7370 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 241.2810 (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) =	0.1243 (8)				
Pressure test							Yes					
Measured/design AP50							5.0000					
Infiltration rate							0.3743 (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) =	0.3182 (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	0.4057	0.3977	0.3898	0.3500	0.3420	0.3023	0.3023	0.2943	0.3182	0.3420	0.3580	0.3739 (22b)
Effective ac	0.5823	0.5791	0.5760	0.5613	0.5585	0.5457	0.5457	0.5433	0.5506	0.5585	0.5641	0.5699 (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)			18.6900	1.3258	24.7784		(27)					
external door			1.8900	1.6000	3.0240		(26a)					
ground floor			47.3100	0.1200	5.6772		(28a)					
external wall - brick	47.2800	11.6700	35.6100	0.2000	7.1220		(29a)					
external wall - weatherboard	53.1900	8.9100	44.2800	0.1800	7.9704		(29a)					
pitch cold roof	47.3100		47.3100	0.1100	5.2041		(30)					
Total net area of external elements Aum(A, m2)			195.0900				(31)					
Fabric heat loss, W/K = Sum (A x U)				(26) ... (30) + (32) =	53.7761		(33)					
Party Wall 1			42.3300	0.0000	0.0000		(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							184.0000 (35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.1661 (36)					
Total fabric heat loss						(33) + (36) =	61.9422 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 46.3636	Feb 46.1092	Mar 45.8598	Apr 44.6884	May 44.4692	Jun 43.4490	Jul 43.4490	Aug 43.2600	Sep 43.8420	Oct 44.4692	Nov 44.9126	Dec 45.3761 (38)
Heat transfer coeff	108.3058	108.0514	107.8020	106.6306	106.4114	105.3912	105.3912	105.2023	105.7842	106.4114	106.8548	107.3183 (39)
Average = Sum(39)m / 12 =												106.6295 (39)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1446	1.1420	1.1393	1.1269	1.1246	1.1138	1.1138	1.1118	1.1180	1.1246	1.1293	1.1342	(40)
HLP (average)												1.1269	(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													2.6838 (42)
Average daily hot water use (litres/day)													97.9410 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.7351	103.8174	99.8998	95.9821	92.0645	88.1469	88.1469	92.0645	95.9821	99.8998	103.8174	107.7351	(44)
Energy conte	159.7680	139.7341	144.1931	125.7110	120.6227	104.0882	96.4530	110.6813	112.0032	130.5289	142.4825	154.7268	(45)
Energy content (annual)										Total =	Sum(45)m =	1540.9927	(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													
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	33.9507	29.6935	30.6410	26.7136	25.6323	22.1187	20.4963	23.5198	23.8007	27.7374	30.2775	32.8794	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.2345	19.7485	16.0605	12.1589	9.0889	7.6732	8.2912	10.7772	14.4651	18.3668	21.4368	22.8525	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.3255	249.8920	243.4246	229.6562	212.2762	195.9413	185.0287	182.4622	188.9296	202.6980	220.0780	236.4129	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	(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)	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	(71)
Water heating gains (Table 5)	45.6327	44.1867	41.1842	37.1022	34.4520	30.7205	27.5488	31.6126	33.0565	37.2814	42.0521	44.1928	(72)
Total internal gains	378.4501	377.0847	363.9267	342.1747	319.0746	297.5925	284.1261	288.1095	299.7087	321.6037	346.8244	366.7156	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
North					1.2600	10.6334	0.6300	0.7000			0.7700			4.0946 (74)
East					11.4900	19.6403	0.6300	0.7000			0.7700			68.9667 (76)
West					5.9400	19.6403	0.6300	0.7000			0.7700			35.6538 (80)
Solar gains	108.7151	212.4848	350.3421	512.9186	631.1971	647.4905	615.8703	527.1367	407.9847	252.1607	135.5006			89.4482 (83)
Total gains	487.1652	589.5695	714.2689	855.0933	950.2717	945.0830	899.9963	815.2462	707.6934	573.7644	482.3250			456.1638 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	44.6526	44.7577	44.8613	45.3541	45.4475	45.8875	45.8875	45.9699	45.7170	45.4475	45.2589	45.0634	
alpha	3.9768	3.9838	3.9908	4.0236	4.0298	4.0592	4.0592	4.0647	4.0478	4.0298	4.0173	4.0042	
util living area	0.9960	0.9911	0.9757	0.9262	0.8171	0.6502	0.4977	0.5624	0.8141	0.9646	0.9926	0.9970	(86)
MIT	19.3379	19.5481	19.9108	20.3717	20.7311	20.9241	20.9800	20.9678	20.8057	20.3020	19.7314	19.3028	(87)
Th 2	19.9645	19.9667	19.9689	19.9789	19.9808	19.9895	19.9895	19.9912	19.9862	19.9808	19.9770	19.9730	(88)
util rest of house	0.9950	0.9888	0.9692	0.9063	0.7699	0.5682	0.3912	0.4523	0.7475	0.9513	0.9903	0.9962	(89)
MIT 2	18.4426	18.6535	19.0135	19.4664	19.7920	19.9503	19.9831	19.9797	19.8679	19.4100	18.8448	18.4141	(90)
Living area fraction									fLA = Living area / (4) =			0.3710	(91)
MIT	18.7747	18.9854	19.3464	19.8023	20.1404	20.3115	20.3529	20.3462	20.2157	19.7409	19.1737	18.7437	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7747	18.9854	19.3464	19.8023	20.1404	20.3115	20.3529	20.3462	20.2157	19.7409	19.1737	18.7437	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9934	0.9859	0.9642	0.9023	0.7780	0.5957	0.4306	0.4926	0.7644	0.9474	0.9879	0.9949	(94)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

Useful gains	483.9385	581.2367	688.7041	771.5125	739.2835	562.9441	387.5216	401.5930	540.9443	543.5997	476.4827	453.8156 (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	1567.6951	1521.9418	1384.8640	1162.5136	898.1512	601.9437	395.5237	415.1539	646.9489	972.6953	1290.1323	1560.8078 (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	806.3149	632.1538	517.9430	281.5208	118.1976	0.0000	0.0000	0.0000	0.0000	319.2471	585.8277	823.6023 (98)
Space heating per m2										(98) / (4) =		43.1707 (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												
Ext. temp.	0.0000	0.0000	0.0000	0.0000	0.0000	990.6771	779.8948	799.5371	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8727	0.9230	0.8959	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	864.5289	719.8052	716.2855	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1206.6238	1151.7507	1054.4845	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	246.3083	321.3674	251.6200	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												819.2958 (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	61.5771	80.3419	62.9050	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												204.8239 (107)
Space cooling per m2												2.1647 (108)
Energy for space heating												43.1707 (99)
Energy for space cooling												2.1647 (108)
Total												45.3354 (109)
Dwelling Fabric Energy Efficiency (DFEE)												45.3 (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	47.3100 (1b)	x 2.4000 (2b)	= 113.5440 (1b) - (3b)
First floor	47.3100 (1c)	x 2.7000 (2c)	= 127.7370 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 241.2810 (5)

2. Ventilation rate

										main	secondary	other	total	m3 per hour			
										heating	heating						
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) =							0.1243 (8)
Pressure test										Yes							
Measured/design AP50																	5.0000
Infiltration rate																	0.3743 (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) =							0.3182 (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	0.4057	0.3977	0.3898	0.3500	0.3420	0.3023	0.3023	0.2943	0.3182	0.3420	0.3580	0.3739	(22b)				
Effective ac	0.5823	0.5791	0.5760	0.5613	0.5585	0.5457	0.5457	0.5433	0.5506	0.5585	0.5641	0.5699	(25)				

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K						
TER Semi-glazed door			1.8900	1.2000	2.2680			(26a)					
TER Opening Type (Uw = 1.40)			18.6900	1.3258	24.7784			(27)					
ground floor			47.3100	0.1300	6.1503			(28a)					
external wall - brick	47.2800	11.6700	35.6100	0.1800	6.4098			(29a)					
external wall - weatherboard	53.1900	8.9100	44.2800	0.1800	7.9704			(29a)					
pitch cold roof	47.3100		47.3100	0.1300	6.1503			(30)					
Total net area of external elements Aum(A, m2)			195.0900					(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.7272			(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.4040	(36)					
Total fabric heat loss						(33) + (36) =	64.1312	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 46.3636	Feb 46.1092	Mar 45.8598	Apr 44.6884	May 44.4692	Jun 43.4490	Jul 43.4490	Aug 43.2600	Sep 43.8420	Oct 44.4692	Nov 44.9126	Dec 45.3761	(38)
Heat transfer coeff	110.4948	110.2404	109.9910	108.8196	108.6004	107.5802	107.5802	107.3913	107.9732	108.6004	109.0438	109.5073	(39)
Average = Sum(39)m / 12 =												108.8185	(39)
HLP	Jan 1.1678	Feb 1.1651	Mar 1.1624	Apr 1.1501	May 1.1478	Jun 1.1370	Jul 1.1370	Aug 1.1350	Sep 1.1411	Oct 1.1478	Nov 1.1524	Dec 1.1573	(40)
HLP (average)												1.1501	(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												2.6838 (42)
Average daily hot water use (litres/day)												97.9410 (43)
Daily hot water use	Jan 107.7351	Feb 103.8174	Mar 99.8998	Apr 95.9821	May 92.0645	Jun 88.1469	Jul 88.1469	Aug 92.0645	Sep 95.9821	Oct 99.8998	Nov 103.8174	Dec 107.7351 (44)
Energy conte	159.7680	139.7341	144.1931	125.7110	120.6227	104.0882	96.4530	110.6813	112.0032	130.5289	142.4825	154.7268 (45)
Energy content (annual)										Total = Sum(45)m =		1540.9927 (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)

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	33.9507	29.6935	30.6410	26.7136	25.6323	22.1187	20.4963	23.5198	23.8007	27.7374	30.2775	32.8794 (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	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	134.1915	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.2345	19.7485	16.0605	12.1589	9.0889	7.6732	8.2912	10.7772	14.4651	18.3668	21.4368	22.8525	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.3255	249.8920	243.4246	229.6562	212.2762	195.9413	185.0287	182.4622	188.9296	202.6980	220.0780	236.4129	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	36.4191	(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)	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	-107.3532	(71)
Water heating gains (Table 5)	45.6327	44.1867	41.1842	37.1022	34.4520	30.7205	27.5488	31.6126	33.0565	37.2814	42.0521	44.1928	(72)
Total internal gains	378.4501	377.0847	363.9267	342.1747	319.0746	297.5925	284.1261	288.1095	299.7087	321.6037	346.8244	366.7156	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
North					1.2600	10.6334	0.6300	0.7000			0.7700			4.0946 (74)
East					11.4900	19.6403	0.6300	0.7000			0.7700			68.9667 (76)
West					5.9400	19.6403	0.6300	0.7000			0.7700			35.6538 (80)
Solar gains	108.7151	212.4848	350.3421	512.9186	631.1971	647.4905	615.8703	527.1367	407.9847	252.1607	135.5006			89.4482 (83)
Total gains	487.1652	589.5695	714.2689	855.0933	950.2717	945.0830	899.9963	815.2462	707.6934	573.7644	482.3250			456.1638 (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	59.4673	59.6046	59.7397	60.3828	60.5047	61.0785	61.0785	61.1859	60.8562	60.5047	60.2587	60.0036	
alpha	4.9645	4.9736	4.9826	5.0255	5.0336	5.0719	5.0719	5.0791	5.0571	5.0336	5.0172	5.0002	
util living area	0.9990	0.9972	0.9898	0.9567	0.8586	0.6821	0.5162	0.5863	0.8556	0.9835	0.9978	0.9993	(86)
MIT	19.6559	19.8251	20.1207	20.5051	20.8073	20.9563	20.9912	20.9840	20.8613	20.4388	19.9737	19.6282	(87)
Th 2	19.9459	19.9480	19.9502	19.9602	19.9620	19.9708	19.9708	19.9724	19.9674	19.9620	19.9582	19.9543	(88)
util rest of house	0.9987	0.9962	0.9861	0.9405	0.8094	0.5907	0.4005	0.4651	0.7855	0.9747	0.9969	0.9990	(89)
MIT 2	18.7168	18.8874	19.1826	19.5637	19.8348	19.9514	19.9686	19.9679	19.8902	19.5078	19.0442	18.6959	(90)
Living area fraction													(91)
MIT	19.0652	19.2352	19.5306	19.9129	20.1956	20.3242	20.3480	20.3449	20.2504	19.8532	19.3890	19.0418	(92)
Temperature adjustment													(93)
adjusted MIT	19.0652	19.2352	19.5306	19.9129	20.1956	20.3242	20.3480	20.3449	20.2504	19.8532	19.3890	19.0418	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	486.3178	586.8203	702.9451	803.4184	780.8444	589.4108	399.3854	416.1818	571.2922	558.5898	480.4887	455.5922	(94)
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	1631.4745	1580.3216	1433.2491	1198.4243	922.6237	615.8055	403.2061	423.6435	664.0828	1004.8968	1340.0412	1625.2835	(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	851.9966	667.6328	543.3462	284.4042	105.4838	0.0000	0.0000	0.0000	0.0000	332.0524	618.8778	870.2503	(98)
Space heating												4274.0441	(98)
Space heating per m2												45.1706	(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	1011.2537	796.0934	816.1735	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8995	0.9469	0.9221	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	909.6420	753.8372	752.5588	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1206.6238	1151.7507	1054.4845	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	213.8269	296.0476	224.6327	0.0000	0.0000	0.0000	0.0000	(104)

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Calculation Type: New Build (As Designed)



CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Space cooling												734.5073 (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	53.4567	74.0119	56.1582	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												183.6268 (107)
Space cooling per m2												1.9407 (108)
Energy for space heating												45.1706 (99)
Energy for space cooling												1.9407 (108)
Total												47.1113 (109)
Target Fabric Energy Efficiency (TFEE)												54.2 (109)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Property Reference	4227-136F	Issued on Date	06/10/2022
Assessment Reference	As Designed Final	Prop Type Ref	Type C3 - C3/C3 Adj
Property	Plot 136, Grasmere Gardens, Chestfield, Kent		
SAP Rating	93 A	DER	7.66
Environmental	95 A	TER	17.91
CO ₂ Emissions (t/year)	0.38	% DER<TER	57.23
General Requirements Compliance	Pass	DFEE	45.34
		TFEE	54.18
		% DFEE<TFEE	16.32
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)	17.91	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	7.66	kgCO ₂ /m ²	Pass
	-10.25 (-57.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	54.18	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	45.34	kWh/m ² /yr	
	-8.9 (-16.4%)	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

1.26 m², No overhang

Windows facing East

11.49 m², No overhang

Windows facing West

5.94 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

Photovoltaic array

2.35

kW

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