

PREDICTED ENERGY ASSESSMENT



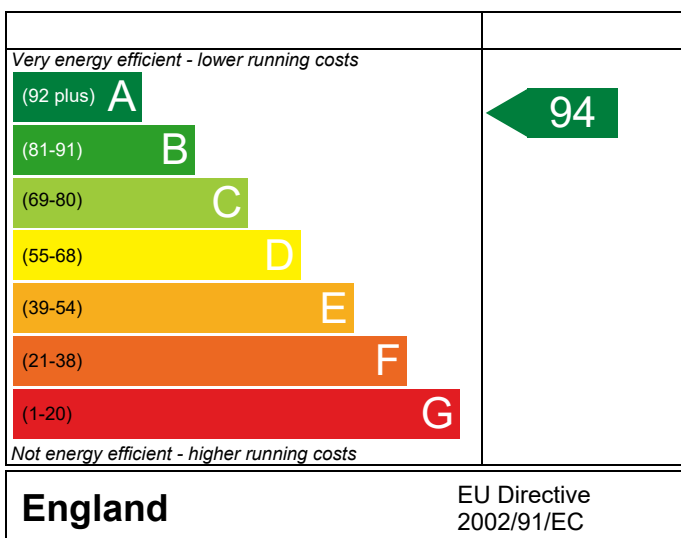
Plot 122, Grasmere Gardens,
Chestfield,
Kent

Dwelling type: House, Detached
Date of assessment: 06/10/2022
Produced by: Sean Wells
Total floor area: 162 m²
DRRN: 4992-2096-2023

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.

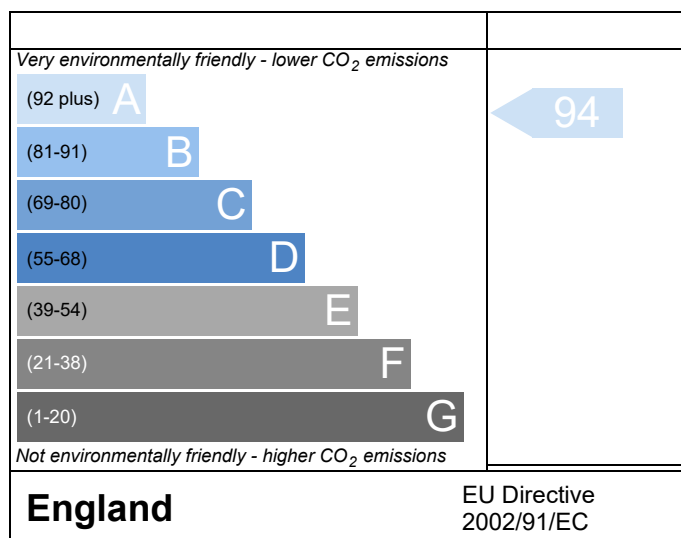
The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating



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



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	4227-122F				Issued on Date	06/10/2022
Assessment Reference	As Designed Final		Prop Type Ref	Type E1 - Detached		
Property	Plot 122, Grasmere Gardens, Chestfield, Kent					
SAP Rating	94 A	DER	7.20	TER	15.47	
Environmental	94 A	% DER<TER	53.47			
CO ₂ Emissions (t/year)	0.73	DFEE	45.36	TFEE	56.10	
General Requirements Compliance	Pass	% DFEE<TFEE	19.14			
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

Detached House, total floor area 162 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) 15.47 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.20 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)56.1 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)45.4 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.18 (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	0.13 (max. 0.20)	0.15 (max. 0.35)	OK
Openings	1.40 (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 630 VU 306/6-3 (H-GB)

Efficiency: 89.8% SEDBUK2009

Minimum: 88.0% OK

Secondary heating system: None

5 Cylinder insulation

Hot water storage Measured cylinder loss: 1.69 kWh/day
Permitted by DBSCG 2.86 OK
Primary pipework insulated: Yes OK

6 Controls

Space heating controls: Time and temperature zone control OK

Hot water controls:

Cylinderstat OK
Independent timer for DHW OK

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: 4.01 m², No overhang
Windows facing East: 14.03 m², No overhang
Windows facing South: 0.59 m², No overhang
Windows facing West: 11.82 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
Thermal bridging y-value 0.029 W/m²K
Photovoltaic array 2.68 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	54.0000 (1b)	x 2.4000 (2b)	= 129.6000 (1b) - (3b)
First floor	54.0000 (1c)	x 2.7000 (2c)	= 145.8000 (1c) - (3c)
Second floor	54.0000 (1d)	x 2.5500 (2d)	= 137.7000 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	162.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 413.1000 (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					5 * 10 = 50.0000 (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) =				50.0000 / (5) = 0.1210 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3710 (18)
Number of sides sheltered					3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.2876 (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	0.3666	0.3594	0.3523	0.3163	0.3091	0.2732	0.2732	0.2660	0.2876	0.3091	0.3235	0.3379 (22b)
Effective ac	0.5672	0.5646	0.5620	0.5500	0.5478	0.5373	0.5373	0.5354	0.5413	0.5478	0.5523	0.5571 (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)			30.4500	1.3258	40.3693		(27)
external door			1.8900	1.6000	3.0240		(26a)
velux (Uw = 1.30)			2.4000	1.2357	2.9658		(27a)
ground floor			54.0000	0.1200	6.4800		(28a)
external wall - wboard&tile	220.6200	32.3400	188.2800	0.1800	33.8904		(29a)
pitch cold roof	36.0000	2.4000	33.6000	0.1100	3.6960		(30)
pitch slope roof	25.4600		25.4600	0.1500	3.8190		(30)
Total net area of external elements Aum(A, m ²)			336.0800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		94.2445		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							140.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							9.5873 (36)
Total fabric heat loss						(33) + (36) =	103.8318 (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	77.3236	76.9678	76.6191	74.9811	74.6747	73.2480	73.2480	72.9838	73.7975	74.6747	75.2946	75.9428 (38)
Heat transfer coeff	181.1554	180.7996	180.4509	178.8129	178.5064	177.0798	177.0798	176.8156	177.6293	178.5064	179.1264	179.7745 (39)
Average = Sum(39)m / 12 =												178.8114 (39)
HLP	1.1182	1.1160	1.1139	1.1038	1.1019	1.0931	1.0931	1.0915	1.0965	1.1019	1.1057	1.1097 (40)
HLP (average)												1.1038 (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												2.9517 (42)
Average daily hot water use (litres/day)												104.3028 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	114.7331	110.5610	106.3888	102.2167	98.0446	93.8725	93.8725	98.0446	102.2167	106.3888	110.5610	114.7331 (44)
Energy conte	170.1458	148.8106	153.5592	133.8767	128.4578	110.8493	102.7182	117.8707	119.2784	139.0075	151.7375	164.7771 (45)
Energy content (annual)										Total = Sum(45)m =		1641.0889 (45)
Distribution loss (46)m = 0.15 x (45)m												
	25.5219	22.3216	23.0339	20.0815	19.2687	16.6274	15.4077	17.6806	17.8918	20.8511	22.7606	24.7166 (46)
Water storage loss:												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													90.8000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													6829.2297 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1223.4303	955.7515	780.3781	428.9409	187.6412	0.0000	0.0000	0.0000	0.0000	484.5561	888.3526	1251.8899	(98)
Space heating efficiency (main heating system 1)	90.8000	90.8000	90.8000	90.8000	90.8000	0.0000	0.0000	0.0000	0.0000	90.8000	90.8000	90.8000	(210)
Space heating fuel (main heating system)	1347.3902	1052.5897	859.4472	472.4019	206.6533	0.0000	0.0000	0.0000	0.0000	533.6521	978.3619	1378.7334	(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	221.6988	195.3746	205.1122	183.7667	180.0108	160.7393	154.2712	169.4237	169.1684	190.5605	201.6275	216.3301	(64)
Efficiency of water heater (217)m	88.9766	88.7870	88.3438	87.3022	85.2258	80.1000	80.1000	80.1000	80.1000	87.5007	88.6104	89.0473	(216)
Fuel for water heating, kWh/month	249.1653	220.0487	232.1751	210.4948	211.2164	200.6733	192.5983	211.5152	211.1965	217.7816	227.5439	242.9384	(219)
Water heating fuel used												2627.3474	(219)
Annual totals kWh/year													
Space heating fuel - main system												6829.2297	(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)												527.0172	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 2.68 * 1068 * 1.00) =													
Total delivered energy for all uses										-2289.9431		-2289.9431	(233)
												7768.6511	(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	6829.2297	0.2160	1475.1136 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2627.3474	0.2160	567.5070 (264)
Space and water heating			2042.6206 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	527.0172	0.5190	273.5219 (268)
Energy saving/generation technologies			
PV Unit	-2289.9431	0.5190	-1188.4805 (269)
Total CO2, kg/year			1166.5871 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			7.2000 (273)

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

DER			7.2000	ZC1
Total Floor Area		TFA	162.0000	
Assumed number of occupants		N	2.9517	
CO2 emission factor in Table 12 for electricity displaced from grid		EF	0.5190	
CO2 emissions from appliances, equation (L14)			12.1917	ZC2
CO2 emissions from cooking, equation (L16)			1.1719	ZC3
Total CO2 emissions			20.5635	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			20.5635	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	54.0000 (1b)	x 2.4000 (2b)	= 129.6000 (1b) - (3b)
First floor	54.0000 (1c)	x 2.7000 (2c)	= 145.8000 (1c) - (3c)
Second floor	54.0000 (1d)	x 2.5500 (2d)	= 137.7000 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	162.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 413.1000 (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) =	0.0968 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3468 (18)
Number of sides sheltered					3 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.7750 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2688 (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	0.3427	0.3360	0.3293	0.2957	0.2890	0.2554	0.2554	0.2486	0.2688	0.2890	0.3024	0.3158 (22b)
Effective ac	0.5587	0.5564	0.5542	0.5437	0.5417	0.5326	0.5326	0.5309	0.5361	0.5417	0.5457	0.5499 (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)			30.4500	1.3258	40.3693		(27)
TER Room Window (Uw = 1.70)			2.4000	1.5918	3.8202		(27a)
ground floor			54.0000	0.1300	7.0200		(28a)
external wall - wboard&tile	220.6200	32.3400	188.2800	0.1800	33.8904		(29a)
pitch cold roof	36.0000	2.4000	33.6000	0.1300	4.3680		(30)
pitch slope roof	25.4600		25.4600	0.1300	3.3098		(30)
Total net area of external elements Aum(A, m ²)			336.0800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		95.0457		(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)							15.3360 (36)
Total fabric heat loss						(33) + (36) =	110.3817 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	76.1671	75.8562	75.5515	74.1203	73.8525	72.6060	72.6060	72.3751	73.0861	73.8525	74.3942	74.9606 (38)
Average = Sum(39)m / 12 =	186.5488	186.2380	185.9333	184.5020	184.2343	182.9877	182.9877	182.7569	183.4679	184.2343	184.7760	185.3423 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1515	1.1496	1.1477	1.1389	1.1372	1.1296	1.1296	1.1281	1.1325	1.1372	1.1406	1.1441 (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												2.9517 (42)
Average daily hot water use (litres/day)												104.3028 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	114.7331	110.5610	106.3888	102.2167	98.0446	93.8725	93.8725	98.0446	102.2167	106.3888	110.5610	114.7331 (44)
Energy content (annual)	170.1458	148.8106	153.5592	133.8767	128.4578	110.8493	102.7182	117.8707	119.2784	139.0075	151.7375	164.7771 (45)
Distribution loss (46)m = 0.15 x (45)m	25.5219	22.3216	23.0339	20.0815	19.2687	16.6274	15.4077	17.6806	17.8918	20.8511	22.7606	24.7166 (46)
Water storage loss:												

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Store volume													300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													2.1127 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.1409 (55)
Total storage loss													
	35.3664	31.9439	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	34.2256	35.3664	34.2256	35.3664	(56)
If cylinder contains dedicated solar storage													
	35.3664	31.9439	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	34.2256	35.3664	34.2256	35.3664	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Total heat required for water heating calculated for each month													
	228.7746	201.7657	212.1880	190.6142	187.0867	167.5869	161.3470	176.4995	176.0160	197.6363	208.4751	223.4060	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
								Solar input (sum of months) = Sum(63)m =				0.0000	(63)
Output from w/h													
	228.7746	201.7657	212.1880	190.6142	187.0867	167.5869	161.3470	176.4995	176.0160	197.6363	208.4751	223.4060	(64)
								Total per year (kWh/year) = Sum(64)m =				2331.3959	(64)
Heat gains from water heating, kWh/month													
	103.4765	91.8436	97.9615	89.9040	89.6153	82.2475	81.0569	86.0950	85.0501	93.1230	95.8428	101.6914	(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	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.8419	26.5053	21.5556	16.3189	12.1986	10.2986	11.1280	14.4646	19.4143	24.6509	28.7713	30.6713 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	333.2979	336.7565	328.0410	309.4867	286.0651	264.0522	249.3462	245.8876	254.6032	273.1575	296.5790	318.5920 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585 (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)	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678 (71)
Water heating gains (Table 5)	139.0814	136.6720	131.6687	124.8667	120.4506	114.2326	108.9474	115.7191	118.1252	125.1654	133.1150	136.6821 (72)
Total internal gains	572.4966	570.2093	551.5407	520.9478	488.9898	458.8588	439.6970	446.3468	462.4181	493.2492	528.7407	556.2207 (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					4.0100	10.6334	0.6300	0.7000	0.7700	13.0313 (74)		
East					14.0300	19.6403	0.6300	0.7000	0.7700	84.2125 (76)		
South					0.5900	46.7521	0.6300	0.7000	0.7700	8.4299 (78)		
West					11.8200	19.6403	0.6300	0.7000	0.7700	70.9474 (80)		
Horizontal					2.4000	26.0000	0.6300	0.7000	1.0000	24.7666 (82)		
Solar gains	201.3878	393.6736	651.2132	959.7542	1188.6121	1223.0660	1161.7611	989.0208	760.1567	467.5634	250.9689	165.7476 (83)
Total gains	773.8844	963.8829	1202.7538	1480.7020	1677.6019	1681.9248	1601.4582	1435.3675	1222.5748	960.8127	779.7096	721.9683 (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	60.3059	60.4066	60.5056	60.9749	61.0636	61.4795	61.4795	61.5572	61.3186	61.0636	60.8845	60.6985
alpha	5.0204	5.0271	5.0337	5.0650	5.0709	5.0986	5.0986	5.1038	5.0879	5.0709	5.0590	5.0466
util living area												
	0.9993	0.9977	0.9904	0.9541	0.8440	0.6588	0.4951	0.5692	0.8499	0.9847	0.9983	0.9995 (86)
MIT	19.6426	19.8192	20.1273	20.5238	20.8271	20.9633	20.9929	20.9863	20.8681	20.4364	19.9605	19.6117 (87)
Th 2	19.9590	19.9605	19.9620	19.9692	19.9705	19.9768	19.9768	19.9779	19.9744	19.9705	19.9678	19.9650 (88)
util rest of house												
	0.9991	0.9969	0.9869	0.9371	0.7927	0.5686	0.3840	0.4510	0.7789	0.9766	0.9976	0.9994 (89)
MIT 2	18.1356	18.3948	18.8441	19.4121	19.8055	19.9533	19.9742	19.9724	19.8675	19.2999	18.6071	18.0946 (90)
Living area fraction												
MIT	18.5226	18.7605	19.1736	19.6976	20.0678	20.2126	20.2358	20.2327	20.1245	19.5917	18.9546	0.2568 (91)
Temperature adjustment												18.4842 (92)
adjusted MIT	18.5226	18.7605	19.1736	19.6976	20.0678	20.2126	20.2358	20.2327	20.1245	19.5917	18.9546	0.0000
												18.4842 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9985	0.9956	0.9831	0.9316	0.7981	0.5904	0.4127	0.4815	0.7909	0.9725	0.9965	0.9990 (94)
Useful gains	772.7552	959.6029	1182.4613	1379.3596	1338.8516	993.0231	660.8772	691.1302	966.9452	934.3611	777.0042	721.2226 (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												
	2653.2106	2581.3565	2356.4421	1992.1820	1541.6361	1027.0418	665.3114	700.4603	1105.2936	1656.5820	2190.4516	2647.4637 (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												
	1399.0588	1089.8185	873.4417	441.2321	150.8717	0.0000	0.0000	0.0000	0.0000	537.3323	1017.6821	1433.1234 (98)
Space heating												6942.5606 (98)
Space heating per m2												(98) / (4) = 42.8553 (99)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET EMISSIONS 09 Jan 2014

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													93.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													7425.1985 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1399.0588	1089.8185	873.4417	441.2321	150.8717	0.0000	0.0000	0.0000	0.0000	537.3323	1017.6821	1433.1234	(98)
Space heating efficiency (main heating system 1)	93.5000	93.5000	93.5000	93.5000	93.5000	0.0000	0.0000	0.0000	0.0000	93.5000	93.5000	93.5000	(210)
Space heating fuel (main heating system)	1496.3196	1165.5812	934.1622	471.9060	161.3601	0.0000	0.0000	0.0000	0.0000	574.6869	1088.4301	1532.7523	(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	228.7746	201.7657	212.1880	190.6142	187.0867	167.5869	161.3470	176.4995	176.0160	197.6363	208.4751	223.4060	(64)
Efficiency of water heater (217)m	88.8261	88.6433	88.1888	86.9815	84.2466	79.8000	79.8000	79.8000	79.8000	87.3505	88.4828	88.8925	(216)
Fuel for water heating, kWh/month	257.5533	227.6154	240.6065	219.1433	222.0702	210.0087	202.1893	221.1773	220.5714	226.2567	235.6109	251.3214	(219)
Water heating fuel used													(219)
Annual totals kWh/year													
Space heating fuel - main system													7425.1985 (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)													527.0172 (232)
Total delivered energy for all uses													10761.3397 (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	7425.1985	0.2160	1603.8429 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2734.1241	0.2160	590.5708 (264)
Space and water heating			2194.4137 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	527.0172	0.5190	273.5219 (268)
Total CO2, kg/m2/year			2506.8606 (272)
Emissions per m2 for space and water heating			13.5458 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			1.6884 (272b)
Emissions per m2 for pumps and fans			0.2403 (272c)
Target Carbon Dioxide Emission Rate (TER) = (13.5458 * 1.00) + 1.6884 + 0.2403, rounded to 2 d.p.			15.4700 (273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	4227-122F	Issued on Date	06/10/2022
Assessment Reference	As Designed Final	Prop Type Ref	Type E1 - Detached
Property	Plot 122, Grasmere Gardens, Chestfield, Kent		
SAP Rating	94 A	DER	7.20
Environmental	94 A	% DER<TER	53.47
CO ₂ Emissions (t/year)	0.73	DFEE	45.36
General Requirements Compliance	Pass	% DFEE<TFEE	19.14
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	54.0000 (1b)	x 2.4000 (2b)	= 129.6000 (1b) - (3b)
First floor	54.0000 (1c)	x 2.7000 (2c)	= 145.8000 (1c) - (3c)
Second floor	54.0000 (1d)	x 2.5500 (2d)	= 137.7000 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	162.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 413.1000 (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) =	0.0968 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3468 (18)
Number of sides sheltered					3 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.7750 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2688 (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	0.3427	0.3360	0.3293	0.2957	0.2890	0.2554	0.2554	0.2486	0.2688	0.2890	0.3024	0.3158 (22b)
Effective ac	0.5587	0.5564	0.5542	0.5437	0.5417	0.5326	0.5326	0.5309	0.5361	0.5417	0.5457	0.5499 (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)			30.4500	1.3258	40.3693		(27)
external door			1.8900	1.6000	3.0240		(26a)
velux (Uw = 1.30)			2.4000	1.2357	2.9658		(27a)
ground floor			54.0000	0.1200	6.4800		(28a)
external wall - wboard&tile	220.6200	32.3400	188.2800	0.1800	33.8904		(29a)
pitch cold roof	36.0000	2.4000	33.6000	0.1100	3.6960		(30)
pitch slope roof	25.4600		25.4600	0.1500	3.8190		(30)
Total net area of external elements Aum(A, m ²)			336.0800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		94.2445		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							140.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							9.5873 (36)
Total fabric heat loss						(33) + (36) =	103.8318 (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	76.1671	75.8562	75.5515	74.1203	73.8525	72.6060	72.6060	72.3751	73.0861	73.8525	74.3942	74.9606 (38)
Heat transfer coeff	179.9989	179.6880	179.3833	177.9521	177.6843	176.4377	176.4377	176.2069	176.9179	177.6843	178.2260	178.7923 (39)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

Average = Sum(39)m / 12 = 177.9508 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1111	1.1092	1.1073	1.0985	1.0968	1.0891	1.0891	1.0877	1.0921	1.0968	1.1002	1.1037 (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 2.9517 (42)
Average daily hot water use (litres/day) 104.3028 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	114.7331	110.5610	106.3888	102.2167	98.0446	93.8725	93.8725	98.0446	102.2167	106.3888	110.5610	114.7331 (44)
Energy content (annual)	170.1458	148.8106	153.5592	133.8767	128.4578	110.8493	102.7182	117.8707	119.2784	139.0075	151.7375	164.7771 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Heat gains from water heating, kWh/month	36.1560	31.6223	32.6313	28.4488	27.2973	23.5555	21.8276	25.0475	25.3467	29.5391	32.2442	35.0151 (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	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.8419	26.5053	21.5556	16.3189	12.1986	10.2986	11.1280	14.4646	19.4143	24.6509	28.7713	30.6713 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	333.2979	336.7565	328.0410	309.4867	286.0651	264.0522	249.3462	245.8876	254.6032	273.1575	296.5790	318.5920 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585 (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)	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678 (71)
Water heating gains (Table 5)	48.5968	47.0569	43.8593	39.5122	36.6899	32.7160	29.3382	33.6660	35.2037	39.7031	44.7836	47.0634 (72)
Total internal gains	479.0120	477.5942	460.7313	432.5933	402.2291	374.3422	357.0878	361.2936	376.4966	404.7869	437.4094	463.6020 (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					4.0100	10.6334	0.6300	0.7000	0.7700	13.0313 (74)		
East					14.0300	19.6403	0.6300	0.7000	0.7700	84.2125 (76)		
South					0.5900	46.7521	0.6300	0.7000	0.7700	8.4299 (78)		
West					11.8200	19.6403	0.6300	0.7000	0.7700	70.9474 (80)		
Horizontal					2.4000	26.0000	0.6300	0.7000	1.0000	24.7666 (82)		
Solar gains	201.3878	393.6736	651.2132	959.7542	1188.6121	1223.0660	1161.7611	989.0208	760.1567	467.5634	250.9689	165.7476 (83)
Total gains	680.3998	871.2678	1111.9445	1392.3475	1590.8412	1597.4081	1518.8490	1350.3144	1136.6533	872.3504	688.3783	629.3496 (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	35.0002	35.0608	35.1203	35.4028	35.4561	35.7066	35.7066	35.7534	35.6097	35.4561	35.3484	35.2364
alpha	3.3333	3.3374	3.3414	3.3602	3.3637	3.3804	3.3804	3.3836	3.3740	3.3637	3.3566	3.3491
util living area	0.9945	0.9872	0.9657	0.9040	0.7853	0.6248	0.4838	0.5525	0.7981	0.9561	0.9901	0.9958 (86)
MIT	18.9067	19.1721	19.6260	20.1932	20.6361	20.8814	20.9625	20.9416	20.7167	20.0851	19.3812	18.8593 (87)
Th 2	19.9918	19.9933	19.9949	20.0021	20.0034	20.0097	20.0097	20.0109	20.0073	20.0034	20.0007	19.9978 (88)
util rest of house	0.9934	0.9845	0.9584	0.8836	0.7410	0.5504	0.3855	0.4509	0.7380	0.9430	0.9877	0.9949 (89)
MIT 2	18.0608	18.3260	18.7758	19.3298	19.7358	19.9417	19.9951	19.9861	19.8209	19.2380	18.5409	18.0180 (90)
Living area fraction									fLA = Living area / (4) =			0.2568 (91)
MIT	18.2780	18.5433	18.9941	19.5515	19.9670	20.1830	20.2435	20.2315	20.0509	19.4556	18.7567	18.2340 (92)
Temperature adjustment												0.0000
adjusted MIT	18.2780	18.5433	18.9941	19.5515	19.9670	20.1830	20.2435	20.2315	20.0509	19.4556	18.7567	18.2340 (93)

8. Space heating requirement

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	
Utilisation	0.9906	0.9794	0.9491	0.8727	0.7392	0.5642	0.4096	0.4748	0.7410	0.9337	0.9835	0.9927	(94)
Useful gains	674.0296	853.2825	1055.3852	1215.0788	1175.9476	901.3024	622.1080	641.1649	842.2417	814.4921	676.9923	624.7477	(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													
	2516.0308	2451.5308	2241.2321	1895.4579	1468.9167	985.0486	642.8576	675.1345	1052.8272	1573.4931	2077.5239	2509.1779	(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	1370.4489	1074.0229	882.2701	489.8730	217.9690	0.0000	0.0000	0.0000	0.0000	564.6967	1008.3828	1402.0161	(98)
Space heating												7009.6795	(98)
Space heating per m2												(98) / (4) =	43.2696 (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	0.0000	1658.5148	1305.6393	1339.1725	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8322	0.8872	0.8509	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1380.2514	1158.3301	1139.4520	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1964.6592	1871.5198	1682.2689	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	0.0000	420.7736	530.6131	403.8558	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												1355.2425	(104)
Cooled fraction												fc = cooled area / (4) =	1.0000 (105)
Intermittency factor (Table 10b)													
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	0.0000	105.1934	132.6533	100.9639	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling												338.8106	(107)
Space cooling per m2												2.0914	(108)
Energy for space heating												43.2696	(99)
Energy for space cooling												2.0914	(108)
Total												45.3611	(109)
Dwelling Fabric Energy Efficiency (DFEE)												45.4	(109)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	54.0000 (1b)	x 2.4000 (2b)	= 129.6000 (1b) - (3b)
First floor	54.0000 (1c)	x 2.7000 (2c)	= 145.8000 (1c) - (3c)
Second floor	54.0000 (1d)	x 2.5500 (2d)	= 137.7000 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	162.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 413.1000 (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) = 0.0968 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3468 (18)
Number of sides sheltered					3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.2688 (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	0.3427	0.3360	0.3293	0.2957	0.2890	0.2554	0.2554	0.2486	0.2688	0.2890	0.3024	0.3158 (22b)
Effective ac	0.5587	0.5564	0.5542	0.5437	0.5417	0.5326	0.5326	0.5309	0.5361	0.5417	0.5457	0.5499 (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)			30.4500	1.3258	40.3693		(27)
TER Room Window (Uw = 1.70)			2.4000	1.5918	3.8202		(27a)
ground floor			54.0000	0.1300	7.0200		(28a)
external wall - wboard&tile	220.6200	32.3400	188.2800	0.1800	33.8904		(29a)
pitch cold roof	36.0000	2.4000	33.6000	0.1300	4.3680		(30)
pitch slope roof	25.4600		25.4600	0.1300	3.3098		(30)
Total net area of external elements Aum(A, m ²)			336.0800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		95.0457		(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)	15.3360 (36)
Total fabric heat loss	(33) + (36) = 110.3817 (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	76.1671	75.8562	75.5515	74.1203	73.8525	72.6060	72.6060	72.3751	73.0861	73.8525	74.3942	74.9606 (38)
Heat transfer coeff	186.5488	186.2380	185.9333	184.5020	184.2343	182.9877	182.9877	182.7569	183.4679	184.2343	184.7760	185.3423 (39)
Average = Sum(39)m / 12 =												184.5008 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1515	1.1496	1.1477	1.1389	1.1372	1.1296	1.1296	1.1281	1.1325	1.1372	1.1406	1.1441 (40)
HLP (average)												1.1389 (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	2.9517 (42)
Average daily hot water use (litres/day)	104.3028 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	114.7331	110.5610	106.3888	102.2167	98.0446	93.8725	93.8725	98.0446	102.2167	106.3888	110.5610	114.7331 (44)
Energy conte	170.1458	148.8106	153.5592	133.8767	128.4578	110.8493	102.7182	117.8707	119.2784	139.0075	151.7375	164.7771 (45)
Energy content (annual)										Total = Sum(45)m =		1641.0889 (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:												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Heat gains from water heating, kWh/month	36.1560	31.6223	32.6313	28.4488	27.2973	23.5555	21.8276	25.0475	25.3467	29.5391	32.2442	35.0151 (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	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	147.5848	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.8419	26.5053	21.5556	16.3189	12.1986	10.2986	11.1280	14.4646	19.4143	24.6509	28.7713	30.6713	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	333.2979	336.7565	328.0410	309.4867	286.0651	264.0522	249.3462	245.8876	254.6032	273.1575	296.5790	318.5920	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	37.7585	(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)	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	-118.0678	(71)
Water heating gains (Table 5)	48.5968	47.0569	43.8593	39.5122	36.6899	32.7160	29.3382	33.6660	35.2037	39.7031	44.7836	47.0634	(72)
Total internal gains	479.0120	477.5942	460.7313	432.5933	402.2291	374.3422	357.0878	361.2936	376.4966	404.7869	437.4094	463.6020	(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					4.0100	10.6334		0.6300	0.7000		0.7700		13.0313 (74)	
East					14.0300	19.6403		0.6300	0.7000		0.7700		84.2125 (76)	
South					0.5900	46.7521		0.6300	0.7000		0.7700		8.4299 (78)	
West					11.8200	19.6403		0.6300	0.7000		0.7700		70.9474 (80)	
Horizontal					2.4000	26.0000		0.6300	0.7000		1.0000		24.7666 (82)	
Solar gains	201.3878	393.6736	651.2132	959.7542	1188.6121	1223.0660	1161.7611	989.0208	760.1567	467.5634	250.9689	165.7476	(83)	
Total gains	680.3998	871.2678	1111.9445	1392.3475	1590.8412	1597.4081	1518.8490	1350.3144	1136.6533	872.3504	688.3783	629.3496	(84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	60.3059	60.4066	60.5056	60.9749	61.0636	61.4795	61.4795	61.5572	61.3186	61.0636	60.8845	60.6985	
alpha	5.0204	5.0271	5.0337	5.0650	5.0709	5.0986	5.0986	5.1038	5.0879	5.0709	5.0590	5.0466	
util living area	0.9996	0.9986	0.9932	0.9635	0.8646	0.6858	0.5201	0.6004	0.8773	0.9898	0.9991	0.9998	(86)
MIT	19.5886	19.7660	20.0769	20.4824	20.8037	20.9560	20.9912	20.9826	20.8437	20.3884	19.9079	19.5581	(87)
Th 2	19.9590	19.9605	19.9620	19.9692	19.9705	19.9768	19.9768	19.9779	19.9744	19.9705	19.9678	19.9650	(88)
util rest of house	0.9995	0.9981	0.9906	0.9493	0.8168	0.5948	0.4044	0.4780	0.8127	0.9842	0.9987	0.9997	(89)
MIT 2	18.6601	18.8385	19.1492	19.5506	19.8402	19.9572	19.9746	19.9730	19.8848	19.4663	18.9863	18.6344	(90)
Living area fraction									fLA = Living area / (4) =			0.2568	(91)
MIT	18.8985	19.0767	19.3874	19.7899	20.0876	20.2137	20.2356	20.2323	20.1310	19.7031	19.2229	18.8716	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.8985	19.0767	19.3874	19.7899	20.0876	20.2137	20.2356	20.2323	20.1310	19.7031	19.2229	18.8716	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	679.9167	869.0483	1099.3255	1317.5527	1309.1175	985.8262	659.6831	688.3336	936.9480	856.8401	687.1582	629.0495	(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	2723.3393	2640.2378	2396.1950	2009.2119	1545.2784	1027.2315	665.2760	700.3733	1106.5034	1677.0966	2240.0260	2719.2618	(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	1520.3064	1190.2394	964.8709	497.9946	175.7037	0.0000	0.0000	0.0000	0.0000	610.2709	1118.0647	1555.1179	(98)
Space heating												7632.5685	(98)
Space heating per m2												(98) / (4) =	47.1146 (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	1720.0845	1354.1091	1388.9522	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8862	0.9383	0.9049	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1524.3738	1270.6054	1256.8412	0.0000	0.0000	0.0000	0.0000	(102)

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1964.6592	1871.5198	1682.2689	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												
Space cooling	0.0000	0.0000	0.0000	0.0000	0.0000	317.0055	447.0803	316.5182	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												1080.6040 (104)
Cooled fraction									fC = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)												
Intermittency factor	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												
Space cooling	0.0000	0.0000	0.0000	0.0000	0.0000	79.2514	111.7701	79.1296	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												270.1510 (107)
Space cooling per m2												1.6676 (108)
Energy for space heating												47.1146 (99)
Energy for space cooling												1.6676 (108)
Total												48.7822 (109)
Target Fabric Energy Efficiency (TFEE)												56.1 (109)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Property Reference	4227-122F	Issued on Date	06/10/2022
Assessment Reference	As Designed Final	Prop Type Ref	Type E1 - Detached
Property	Plot 122, Grasmere Gardens, Chestfield, Kent		
SAP Rating	94 A	DER	7.20
Environmental	94 A	TER	15.47
CO ₂ Emissions (t/year)	0.73	% DER<TER	53.47
General Requirements Compliance	Pass	DFEE	45.36
		TFEE	56.10
		% DFEE<TFEE	19.14
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)	15.47	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	7.20	kgCO ₂ /m ²	Pass
	-8.27 (-53.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	56.10	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	45.36	kWh/m ² /yr	
	-10.7 (-19.1%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.18 (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	0.13 (max. 0.20)	0.15 (max. 0.35)	Pass
Openings	1.40 (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 630 VU 306/6-3 (H-GB) Efficiency: 89.8% 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

Measured cylinder loss: 1.69 kWh/day
Permitted by DBSCG 2.86

Pass

Primary pipework insulated

Yes

Pass

6 Controls

Space heating controls

Time and temperature zone control

Pass

Hot water controls

Cylinderstat

Pass

Independent timer for DHW

Pass

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

4.01 m², No overhang

Windows facing East

14.03 m², No overhang

Windows facing South

0.59 m², No overhang

Windows facing West

11.82 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

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

Thermal bridging y-value

0.029

W/m²K

Photovoltaic array

2.68

kW

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



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