

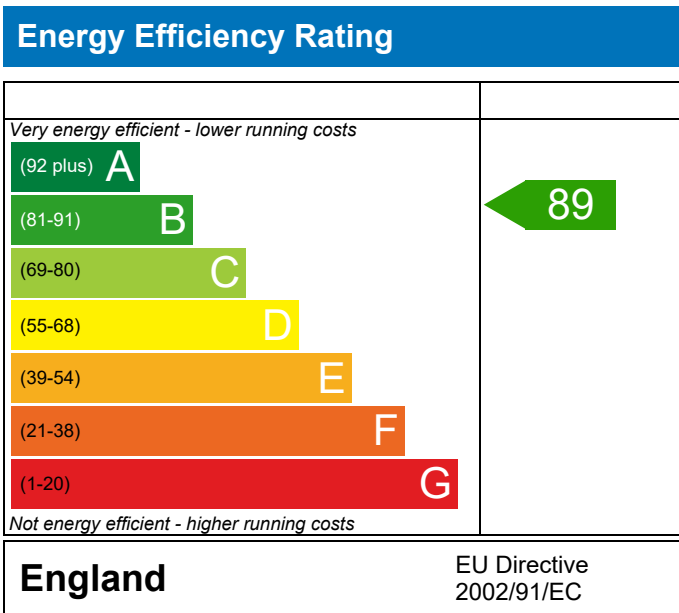
PREDICTED ENERGY ASSESSMENT

001 - PRJ012279

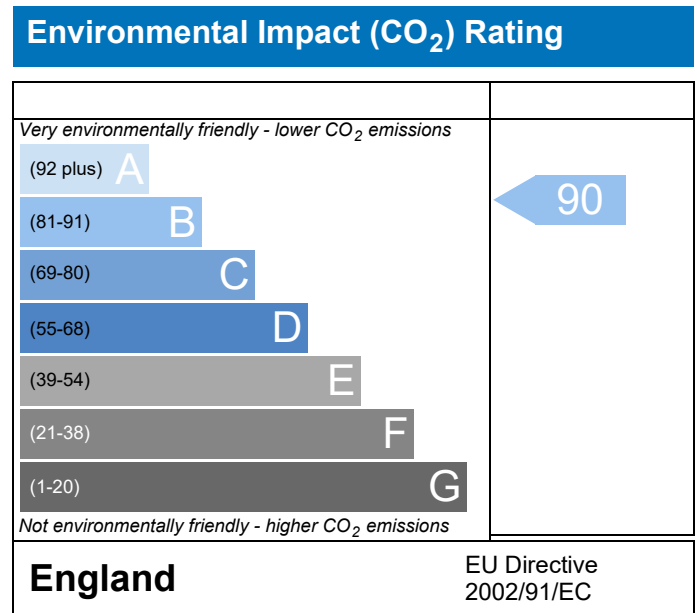
Dwelling type: House, Detached
 Date of assessment: 27/04/2022
 Produced by: Scott Binstead
 Total floor area: 319.24 m²

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

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



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.



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.

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Property Reference	001 - PRJ012279			Issued on Date	27/04/2022
Assessment Reference	001 D	Prop Type Ref	Rockleigh		
Property	001 - PRJ012279				
SAP Rating	89 B	DER	8.95	TER	23.15
Environmental	90 B	% DER<TER	61.34		
CO ₂ Emissions (t/year)	2.50	DFEE	50.13	TFEE	65.97
General Requirements Compliance	Pass	% DFEE<TFEE	24.01		
Assessor Details	Chris Nicholls, , Tel: ,			Assessor ID	U903-0001
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 319 m²

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

1a TER and DER

Fuel for main heating:Electricity
Fuel factor:1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER) 23.15 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 8.95 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)66.0 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)50.1 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.14 (max. 0.30)	0.18 (max. 0.70)	OK
Floor	0.12 (max. 0.25)	0.22 (max. 0.70)	OK
Roof	0.14 (max. 0.20)	0.22 (max. 0.35)	OK
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals: 5.01 (design value)
Maximum 10.0 OK

4 Heating efficiency

Main heating system: Heat pump with radiators or underfloor - Electric
Grant AERONA3 HPID12R32

Secondary heating system: Room heaters - Wood Logs

Closed room heater

Efficiency: 65%
Minimum: 65% OK

5 Cylinder insulation

Hot water storage Measured cylinder loss: 2.16 kWh/day
Permitted by DBSCG 2.56 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

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): Slight OK

Based on:

Overshading: Average
Windows facing North East: 0.94 m², No overhang
Windows facing South East: 22.27 m², No overhang
Windows facing South West: 6.43 m², No overhang
Windows facing North West: 19.90 m², No overhang
Air change rate: 4.55 ach
Blinds/curtains: Dark-coloured curtain or roller blind, closed 100% of daylight hours

10 Key features

External wall U-value 0.14 W/m²K
External wall U-value 0.14 W/m²K
External wall U-value 0.12 W/m²K
External wall U-value 0.14 W/m²K
Roof U-value 0.11 W/m²K
Floor U-value 0.10 W/m²K
Secondary heating (wood logs)
Secondary heating fuel: wood logs

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	162.4400 (1b)	2.9600 (2b)	480.8224 (1b) - (3b)
First floor	156.8000 (1c)	2.4300 (2c)	381.0240 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	319.2400		(3a) + (3b) + (3c) + (3d) + (3e)...(3n) = 861.8464 (5)
Dwelling volume			

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				9 * 10 =	90.0000 (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) =				90.0000 / (5) =	0.1044 (8)
Pressure test				Yes	
Measured/design AP50					5.0100
Infiltration rate					0.3549 (18)
Number of sides sheltered					0 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.3549 (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												
Effective ac	0.4525	0.4437	0.4348	0.3904	0.3815	0.3372	0.3372	0.3283	0.3549	0.3815	0.3993	0.4170 (22b)
	0.6024	0.5984	0.5945	0.5762	0.5728	0.5568	0.5568	0.5539	0.5630	0.5728	0.5797	0.5870 (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
Windows (Uw = 1.40)			49.5400	1.3258	65.6780		(27)
Solid Door			2.1100	1.4000	2.9540		(26)
Half Glazed Door			12.1400	1.4000	16.9960		(26a)
Roof Window (Uw = 1.40)			1.7300	1.3258	2.2936		(27a)
Flr - Ground			133.3600	0.1000	13.3360	75.6000	10082.0160 (28a)
Flr - Over Garage			29.0800	0.2200	6.3976	17.6000	511.8080 (28b)
Wl - Render	261.6000	59.1380	202.4620	0.1400	28.3447	69.7200	14115.6506 (29a)
Wl - Dormer Below Roof	7.0500		7.0500	0.1549	1.0921	7.6200	53.7210 (29a)
Wl - Dormer	11.1900	4.6450	6.5450	0.1800	1.1781	7.6200	49.8729 (29a)
Wl - Garage	27.5300		27.5300	0.1338	3.6840	69.7200	1919.3916 (29a)
WI - Stud Ashlar	29.0000		29.0000	0.1200	3.4800	7.6200	220.9800 (29a)
Wl - Block	1.9600		1.9600	0.1400	0.2744	69.7200	136.6512 (29a)
Rf - Ins Joist	112.8700		112.8700	0.1100	12.4157	7.6200	860.0694 (30)
Rf - Ins Rafter	88.9300	1.7310	87.1990	0.1700	14.8238	1.8000	156.9582 (30)
Rf - Flat Roof Dormer	5.1100		5.1100	0.1500	0.7665	1.8000	9.1980 (30)
Rf - Balcony	2.8600		2.8600	0.2200	0.6292	7.6200	21.7932 (30)
Rf - Behind Stud	11.1700		11.1700	0.1300	1.4521	7.6200	85.1154 (30)
Total net area of external elements Aum(A, m ²)			721.7160				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	175.7958	(33)
Ground Floor Block			170.2059			54.0300	9196.2259 (32c)
Ground Floor Stud			134.2715			5.8200	781.4602 (32c)
1st Floor Block			51.2827			54.0300	2770.8054 (32c)
1st Floor Stud			259.2178			5.8200	1508.6477 (32c)
Internal Floor			126.4700			18.0000	2276.4600 (32d)
Internal Ceiling			126.4700			5.8200	736.0554 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	45492.8801 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							142.5037 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							38.4763 (36)
Total fabric heat loss						(33) + (36) =	214.2721 (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	171.3261	170.1952	169.0868	163.8806	162.9065	158.3720	158.3720	157.5323	160.1186	162.9065	164.8770	166.9371 (38)
Heat transfer coeff	385.5981	384.4673	383.3589	378.1526	377.1786	372.6441	372.6441	371.8044	374.3907	377.1786	379.1491	381.2092 (39)
Average = Sum(39)m / 12 =												378.1480 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2079	1.2043	1.2008	1.1845	1.1815	1.1673	1.1673	1.1647	1.1728	1.1815	1.1877	1.1941 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

4. Water heating energy requirements (kWh/year)

Assumed occupancy												3.1569 (42)	
Average daily hot water use (litres/day)												109.1774 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	120.0951	115.7280	111.3609	106.9938	102.6267	98.2596	98.2596	102.6267	106.9938	111.3609	115.7280	120.0951	(44)
Energy content (annual)	178.0976	155.7653	160.7358	140.1334	134.4613	116.0299	107.5187	123.3793	124.8529	145.5040	158.8290	172.4780	(45)
Distribution loss (46)m = 0.15 x (45)m	26.7146	23.3648	24.1104	21.0200	20.1692	17.4045	16.1278	18.5069	18.7279	21.8256	23.8243	25.8717	(46)
Water storage loss:												250.0000 (47)	
Store volume												2.1600 (48)	
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)	
Temperature factor from Table 2b												1.1664 (55)	
Enter (49) or (54) in (55)													
Total storage loss	36.1584	32.6592	36.1584	34.9920	36.1584	34.9920	36.1584	36.1584	34.9920	36.1584	34.9920	36.1584	(56)
If cylinder contains dedicated solar storage	36.1584	32.6592	36.1584	34.9920	36.1584	34.9920	36.1584	36.1584	34.9920	36.1584	34.9920	36.1584	(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	237.5184	209.4357	220.1566	197.6374	193.8821	173.5339	166.9395	182.8001	182.3569	204.9248	216.3330	231.8988	(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	237.5184	209.4357	220.1566	197.6374	193.8821	173.5339	166.9395	182.8001	182.3569	204.9248	216.3330	231.8988	(64)
Total per year (kWh/year) = Sum(64)m =												2417.4172 (64)	
Heat gains from water heating, kWh/month	106.7541	94.7283	100.9813	92.5975	92.2450	84.5831	83.2866	88.5603	87.5168	95.9167	98.8138	104.8856	(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	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	43.7276	38.8385	31.5856	23.9123	17.8747	15.0906	16.3059	21.1951	28.4480	36.1212	42.1588	44.9429	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	473.6643	478.5794	466.1934	439.8250	406.5397	375.2561	354.3568	349.4417	361.8277	388.1961	421.4814	452.7650	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	(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)	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	(71)
Water heating gains (Table 5)	143.4867	140.9647	135.7276	128.6077	123.9853	117.4766	111.9444	119.0326	121.5511	128.9203	137.2414	140.9752	(72)
Total internal gains	731.2327	728.7367	703.8607	662.6992	618.7538	578.1775	552.9613	560.0235	582.1809	623.5917	671.2358	709.0373	(73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains							
	m2	Table 6a	Specific data	Specific data	factor	W							
		W/m2	or Table 6b	or Table 6c	Table 6d								
Northeast	0.9420	11.2829	0.7600	0.7200	0.7700	4.0304 (75)							
Southeast	22.2720	36.7938	0.7600	0.7200	0.7700	310.7517 (77)							
Southwest	6.4250	36.7938	0.7600	0.7200	0.7700	89.6453 (79)							
Northwest	19.8980	11.2829	0.7600	0.7200	0.7700	85.1356 (81)							
Southwest	1.7310	40.5020	0.7600	0.7200	1.0000	34.5272 (82)							
Solar gains	524.0903	926.3995	1354.8535	1821.6613	2168.3838	2208.3284	2105.9645	1839.2299	1515.4732	1047.6068	633.9220	444.4838	(83)
Total gains	1255.3230	1655.1262	2058.7142	2484.3605	2787.1376	2786.5058	2658.9258	2399.2534	2097.6541	1671.1986	1305.1578	1153.5210	(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	32.7722	32.8686	32.9637	33.4175	33.5038	33.9115	33.9115	33.9881	33.7533	33.5038	33.3297	33.1495	
alpha	3.1848	3.1912	3.1976	3.2278	3.2336	3.2608	3.2608	3.2659	3.2502	3.2336	3.2220	3.2100	
util living area	0.9956	0.9891	0.9733	0.9311	0.8431	0.7027	0.5606	0.6241	0.8373	0.9626	0.9916	0.9967	(86)
Tweekday	17.4903	17.7959	18.2736	18.8888	19.3920	19.7034	19.7968	19.7830	19.5528	18.8750	18.0761	17.4580	
Tweekend	19.8415	19.9761	20.1880	20.4618	20.6980	20.8548	20.9145	20.9009	20.7688	20.4504	20.0956	19.8239	
24 / 16	1	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	2	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	20	0	0	0	0	0	0	0	0	0	0	0	
MIT	19.9536	19.4162	19.7468	20.1596	20.5340	20.7769	20.8681	20.8470	20.6391	20.1518	19.5878	19.1849	(87)
Th 2	19.9137	19.9165	19.9193	19.9324	19.9348	19.9463	19.9463	19.9484	19.9419	19.9348	19.9299	19.9247	(88)
util rest of house	0.9946	0.9867	0.9672	0.9145	0.8034	0.6252	0.4470	0.5118	0.7804	0.9507	0.9894	0.9959	(89)
Tweekday	17.4903	17.7959	18.2736	18.8888	19.3920	19.7034	19.7968	19.7830	19.5528	18.8750	18.0761	17.4580	
Tweekend	17.4903	17.7959	18.2736	18.8888	19.3920	19.7034	19.7968	19.7830	19.5528	18.8750	18.0761	17.4580	
MIT 2	17.7248	17.7959	18.2736	18.8888	19.3920	19.7034	19.7968	19.7830	19.5528	18.8750	18.0761	17.4580	(90)
Living area fraction												fLA = Living area / (4) = 0.1375 (91)	

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

MIT	18.0312	18.0186	18.4761	19.0635	19.5490	19.8510	19.9440	19.9292	19.7021	19.0505	18.2839	17.6954 (92)
Temperature adjustment												0.0000
adjusted MIT	18.0312	18.0186	18.4761	19.0635	19.5490	19.8510	19.9440	19.9292	19.7021	19.0505	18.2839	17.6954 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9922	0.9806	0.9560	0.8973	0.7863	0.6174	0.4468	0.5095	0.7647	0.9369	0.9844	0.9936 (94)
Useful gains	1245.5169	1623.0713	1968.2096	2229.2152	2191.5148	1720.3139	1187.8912	1222.5062	1604.0089	1565.8030	1284.7359	1146.1376 (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												
5294.7089	5043.6694	4591.1295	3843.3390	2960.4741	1956.7380	1246.1317	1312.1819	2097.3798	3187.3576	4240.3598	5144.5701 (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												
3012.5989	2298.6420	1951.4524	1162.1691	572.1057	0.0000	0.0000	0.0000	0.0000	1206.4366	2128.0492	2974.8338 (98)	
Space heating												
Space heating per m2												(98) / (4) = 47.9460 (99)

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												469.1554 (206)
Efficiency of secondary/supplementary heating system, %												65.0000 (208)
Space heating requirement												3262.5197 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	3012.5989	2298.6420	1951.4524	1162.1691	572.1057	0.0000	0.0000	0.0000	0.0000	1206.4366	2128.0492	2974.8338 (98)
Space heating efficiency (main heating system 1)	469.1554	469.1554	469.1554	469.1554	469.1554	0.0000	0.0000	0.0000	0.0000	469.1554	469.1554	469.1554 (210)
Space heating fuel (main heating system)	642.1324	489.9532	415.9501	247.7152	121.9438	0.0000	0.0000	0.0000	0.0000	257.1507	453.5915	634.0828 (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	237.5184	209.4357	220.1566	197.6374	193.8821	173.5339	166.9395	182.8001	182.3569	204.9248	216.3330	231.8988 (64)
Efficiency of water heater (217)m	164.5200	164.5200	164.5200	164.5200	164.5200	164.5200	164.5200	164.5200	164.5200	164.5200	164.5200	164.5200 (216)
Fuel for water heating, kWh/month	144.3705	127.3010	133.8175	120.1297	117.8471	105.4789	101.4707	111.1112	110.8418	124.5592	131.4934	140.9548 (219)
Water heating fuel used												1469.3759 (219)
Annual totals kWh/year												
Space heating fuel - main system												3262.5197 (211)
Space heating fuel - secondary												0.0000 (215)
Electricity for pumps and fans:												
Total electricity for the above, kWh/year												0.0000 (231)
Electricity for lighting (calculated in Appendix L)												772.2431 (232)
Total delivered energy for all uses												5504.1386 (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	3262.5197	0.5190	1693.2477 (261)
Space heating - secondary	0.0000	0.0190	0.0000 (263)
Water heating (other fuel)	1469.3759	0.5190	762.6061 (264)
Space and water heating			2455.8538 (265)
Pumps and fans	0.0000	0.0000	0.0000 (267)
Energy for lighting	772.2431	0.5190	400.7942 (268)
Total CO2, kg/year			2856.6480 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			8.9500 (273)

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

DER		8.9500 ZC1
Total Floor Area	TFA	319.2400
Assumed number of occupants	N	3.1569
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190
CO2 emissions from appliances, equation (L14)		8.7922 ZC2
CO2 emissions from cooking, equation (L16)		0.6101 ZC3
Total CO2 emissions		18.3523 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		18.3523 ZC8

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	162.4400 (1b)	2.9600 (2b)	480.8224 (1b) - (3b)
First floor	156.8000 (1c)	2.4300 (2c)	381.0240 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	319.2400		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 861.8464 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour							
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)							
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)							
Number of intermittent fans				4 * 10 =	40.0000 (7a)							
Number of passive vents				0 * 10 =	0.0000 (7b)							
Number of flueless gas fires				0 * 40 =	0.0000 (7c)							
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				40.0000 / (5) =	0.0464 (8)							
Pressure test					Yes							
Measured/design AP50					5.0000							
Infiltration rate					0.2964 (18)							
Number of sides sheltered					0 (19)							
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)							
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2964 (21)							
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.3779	0.3705	0.3631	0.3261	0.3186	0.2816	0.2816	0.2742	0.2964	0.3186	0.3335	0.3483 (22b)
Effective ac	0.5714	0.5686	0.5659	0.5532	0.5508	0.5396	0.5396	0.5376	0.5439	0.5508	0.5556	0.5607 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K					
TER Opaque door			2.1100	1.0000	2.1100		(26)					
TER Semi-glazed door			12.1400	1.2000	14.5680		(26a)					
TER Opening Type (Uw = 1.40)			49.5400	1.3258	65.6780		(27)					
TER Room Window (Uw = 1.70)			1.7300	1.5918	2.7537		(27a)					
Flr - Ground			133.3600	0.1300	17.3368		(28a)					
Flr - Over Garage			29.0800	0.1300	3.7804		(28b)					
Wl - Render	261.6000	59.1380	202.4620	0.1800	36.4432		(29a)					
Wl - Dormer Below Roof	7.0500		7.0500	0.1800	1.2690		(29a)					
Wl - Dormer	11.1900	4.6450	6.5450	0.1800	1.1781		(29a)					
Wl - Garage	27.5300		27.5300	0.1800	4.9554		(29a)					
WI - Stud Ashlar	29.0000		29.0000	0.1800	5.2200		(29a)					
Wl - Block	1.9600		1.9600	0.1800	0.3528		(29a)					
Rf - Ins Joist	112.8700		112.8700	0.1300	14.6731		(30)					
Rf - Ins Rafter	88.9300	1.7310	87.1990	0.1300	11.3359		(30)					
Rf - Flat Roof Dormer	5.1100		5.1100	0.1300	0.6643		(30)					
Rf - Balcony	2.8600		2.8600	0.1300	0.3718		(30)					
Rf - Behind Stud	11.1700		11.1700	0.1300	1.4521		(30)					
Total net area of external elements Aum(A, m2)			721.7160				(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	184.1426		(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							46.0313 (36)					
Total fabric heat loss						(33) + (36) =	230.1739 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 162.5154	Feb 161.7267	Mar 160.9536	Apr 157.3225	May 156.6432	Jun 153.4806	Jul 153.4806	Aug 152.8949	Sep 154.6988	Oct 156.6432	Nov 158.0175	Dec 159.4543 (38)
Heat transfer coeff	392.6893	391.9006	391.1275	387.4964	386.8171	383.6545	383.6545	383.0688	384.8727	386.8171	388.1914	389.6282 (39)
Average = Sum(39)m / 12 =												387.4932 (39)
HLP	Jan 1.2301	Feb 1.2276	Mar 1.2252	Apr 1.2138	May 1.2117	Jun 1.2018	Jul 1.2018	Aug 1.1999	Sep 1.2056	Oct 1.2117	Nov 1.2160	Dec 1.2205 (40)
HLP (average)												1.2138 (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	3.1569 (42)
Average daily hot water use (litres/day)	109.1774 (43)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	120.0951	115.7280	111.3609	106.9938	102.6267	98.2596	98.2596	102.6267	106.9938	111.3609	115.7280	120.0951 (44)
Energy conte	178.0976	155.7653	160.7358	140.1334	134.4613	116.0299	107.5187	123.3793	124.8529	145.5040	158.8290	172.4780 (45)
Energy content (annual)	Total = Sum(45)m = 1717.7852 (45)											
Distribution loss (46)m = 0.15 x (45)m	26.7146	23.3648	24.1104	21.0200	20.1692	17.4045	16.1278	18.5069	18.7279	21.8256	23.8243	25.8717 (46)
Water storage loss:												
Store volume												250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8903 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0208 (55)
Total storage loss	31.6444	28.5820	31.6444	30.6236	31.6444	30.6236	31.6444	31.6444	30.6236	31.6444	30.6236	31.6444 (56)
If cylinder contains dedicated solar storage	31.6444	28.5820	31.6444	30.6236	31.6444	30.6236	31.6444	31.6444	30.6236	31.6444	30.6236	31.6444 (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	233.0044	205.3585	215.6426	193.2690	189.3681	169.1655	162.4255	178.2861	177.9885	200.4108	211.9646	227.3848 (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	233.0044	205.3585	215.6426	193.2690	189.3681	169.1655	162.4255	178.2861	177.9885	200.4108	211.9646	227.3848 (64)
Heat gains from water heating, kWh/month	103.1429	91.4665	97.3701	89.1028	88.6338	81.0884	79.6754	84.9491	84.0221	92.3055	95.3191	101.2744 (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	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471	157.8471 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	43.9637	39.0482	31.7561	24.0414	17.9712	15.1721	16.3940	21.3095	28.6016	36.3162	42.3864	45.1856 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	473.6643	478.5794	466.1934	439.8250	406.5397	375.2561	354.3568	349.4417	361.8277	388.1961	421.4814	452.7650 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847	38.7847 (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)	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777	-126.2777 (71)
Water heating gains (Table 5)	138.6329	136.1109	130.8738	123.7539	119.1315	112.6228	107.0906	114.1788	116.6973	124.0665	132.3877	136.1215 (72)
Total internal gains	729.6150	727.0927	702.1774	660.9745	616.9965	576.4052	551.1955	558.2841	580.4807	621.9330	669.6096	707.4261 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b g	Specific data or Table 6c FF	Access factor Table 6d	Gains W						
Northeast	0.9420	11.2829	0.6300	0.7000	0.7700	3.2482 (75)						
Southeast	22.2720	36.7938	0.6300	0.7000	0.7700	250.4414 (77)						
Southwest	6.4250	36.7938	0.6300	0.7000	0.7700	72.2470 (79)						
Northwest	19.8980	11.2829	0.6300	0.7000	0.7700	68.6126 (81)						
Southwest	1.7310	40.5020	0.6300	0.7000	1.0000	27.8262 (82)						
Solar gains	422.3754	746.5968	1091.9050	1468.1152	1747.5461	1779.7383	1697.2412	1482.2741	1221.3518	844.2884	510.8911	358.2188 (83)
Total gains	1151.9904	1473.6895	1794.0824	2129.0897	2364.5427	2356.1435	2248.4367	2040.5582	1801.8325	1466.2214	1180.5007	1065.6450 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains for living area, nil,m (see Table 9a)	0.9998	0.9993	0.9972	0.9877	0.9504	0.8458	0.6935	0.7633	0.9451	0.9951	0.9995	0.9999 (86)
tau	56.4554	56.5690	56.6809	57.2120	57.3125	57.7849	57.7849	57.8733	57.6020	57.3125	57.1096	56.8990
alpha	4.7637	4.7713	4.7787	4.8141	4.8208	4.8523	4.8523	4.8582	4.8401	4.8208	4.8073	4.7933
util living area	19.4324	19.5969	19.8733	20.2480	20.6072	20.8652	20.9625	20.9404	20.7225	20.2541	19.7744	19.4082 (87)
MIT	19.8960	19.8980	19.8999	19.9090	19.9107	19.9186	19.9186	19.9200	19.9155	19.9107	19.9072	19.9036 (88)
util rest of house	0.9997	0.9990	0.9961	0.9820	0.9249	0.7646	0.5501	0.6280	0.9050	0.9922	0.9992	0.9998 (89)
MIT 2	17.7842	18.0262	18.4317	18.9825	19.4892	19.8165	19.9031	19.8914	19.6563	18.9959	18.2927	17.7540 (90)
Living area fraction	18.0107	18.2421	18.6299	19.1565	19.6429	19.9607	20.0487	20.0356	19.8029	19.1689	18.4964	17.9813 (92)
MIT	18.0107	18.2421	18.6299	19.1565	19.6429	19.9607	20.0487	20.0356	19.8029	19.1689	18.4964	17.9813 (92)
Temperature adjustment	18.0107	18.2421	18.6299	19.1565	19.6429	19.9607	20.0487	20.0356	19.8029	19.1689	18.4964	17.9813 (93)
adjusted MIT	18.0107	18.2421	18.6299	19.1565	19.6429	19.9607	20.0487	20.0356	19.8029	19.1689	18.4964	17.9813 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	1151.4057	1471.1732	1783.3451	2078.7753	2167.4907	1810.3132	1279.6077	1315.3058	1620.3523	1450.0534	1178.9896	1065.2776 (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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Heat loss rate W	5384.0575	5228.7685	4744.3328	3974.3471	3072.4514	2056.6482	1323.1142	1392.6875	2194.8884	3314.5883	4423.9794	5369.5970 (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	3149.0929	2525.1040	2202.9748	1364.8117	673.2907	0.0000	0.0000	0.0000	0.0000	1387.2140	2336.3926	3202.4136 (98)
Space heating												16841.2945 (98)
Space heating per m2												(98) / (4) = 52.7543 (99)

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												93.5000 (206)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement												18012.0797 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	3149.0929	2525.1040	2202.9748	1364.8117	673.2907	0.0000	0.0000	0.0000	0.0000	1387.2140	2336.3926	3202.4136 (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)	3368.0138	2700.6460	2356.1228	1459.6917	720.0970	0.0000	0.0000	0.0000	0.0000	1483.6513	2498.8157	3425.0413 (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	233.0044	205.3585	215.6426	193.2690	189.3681	169.1655	162.4255	178.2861	177.9885	200.4108	211.9646	227.3848 (64)
Efficiency of water heater (217)m	89.6716	89.5965	89.4309	89.0194	87.9124	79.8000	79.8000	79.8000	79.8000	88.9937	89.5018	79.8000 (216)
Fuel for water heating, kWh/month	259.8417	229.2038	241.1277	217.1088	215.4055	211.9868	203.5408	223.4162	223.0432	225.1966	236.8272	253.4874 (219)
Water heating fuel used												2740.1858 (219)
Annual totals kWh/year												
Space heating fuel - main system												18012.0797 (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)												776.4125 (232)
Total delivered energy for all uses												21603.6779 (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	18012.0797	0.2160	3890.6092 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2740.1858	0.2160	591.8801 (264)
Space and water heating			4482.4893 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	776.4125	0.5190	402.9581 (268)
Total CO2, kg/m2/year			4924.3724 (272)
Emissions per m2 for space and water heating			14.0411 (272a)
Fuel factor (electricity)			1.5500
Emissions per m2 for lighting			1.2622 (272b)
Emissions per m2 for pumps and fans			0.1219 (272c)
Target Carbon Dioxide Emission Rate (TER) = (14.0411 * 1.55) + 1.2622 + 0.1219, rounded to 2 d.p.			23.1500 (273)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	001 - PRJ012279	Issued on Date	27/04/2022
Assessment Reference	001 D	Prop Type Ref	Rockleigh
Property	001 - PRJ012279		

SAP Rating	89 B	DER	8.95	TER	23.15
Environmental	90 B	% DER<TER	61.34		
CO₂ Emissions (t/year)	2.50	DFEE	50.13	TFEE	65.97
General Requirements Compliance	Pass	% DFEE<TFEE	24.01		

Assessor Details	Chris Nicholls, , Tel: ,	Assessor ID	U903-0001
Client			

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	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	23.15	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	8.95	kgCO ₂ /m ²	Pass
	-14.20 (-61.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	65.97	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	50.13	kWh/m ² /yr	
	-15.9 (-24.1%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.14 (max. 0.30)	0.18 (max. 0.70)	Pass
Floor	0.12 (max. 0.25)	0.22 (max. 0.70)	Pass
Roof	0.14 (max. 0.20)	0.22 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Grant AERONA3 HPID12R32	
Secondary heating system	Room heaters - Wood Logs Closed room heater Efficiency: 65% Minimum: 65%	Pass

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 2.16 kWh/day Permitted by DBSCG 2.56	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

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)	Slight	Pass
Based on:		
Overshading	Average	
Windows facing North East	0.94 m ² , No overhang	
Windows facing South East	22.27 m ² , No overhang	
Windows facing South West	6.43 m ² , No overhang	
Windows facing North West	19.90 m ² , No overhang	
Air change rate	4.55 ach	
Blinds/curtains	Dark-coloured curtain or roller blind, closed 100% of daylight hours	

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	5.01 (design value)	
Maximum	10.0	Pass

10 Key features

External wall U-value	0.14	W/m ² K
External wall U-value	0.14	W/m ² K
External wall U-value	0.12	W/m ² K
External wall U-value	0.14	W/m ² K
Roof U-value	0.11	W/m ² K
Floor U-value	0.10	W/m ² K
Secondary heating (wood logs)	N/A	
Secondary heating fuel:	wood logs	