

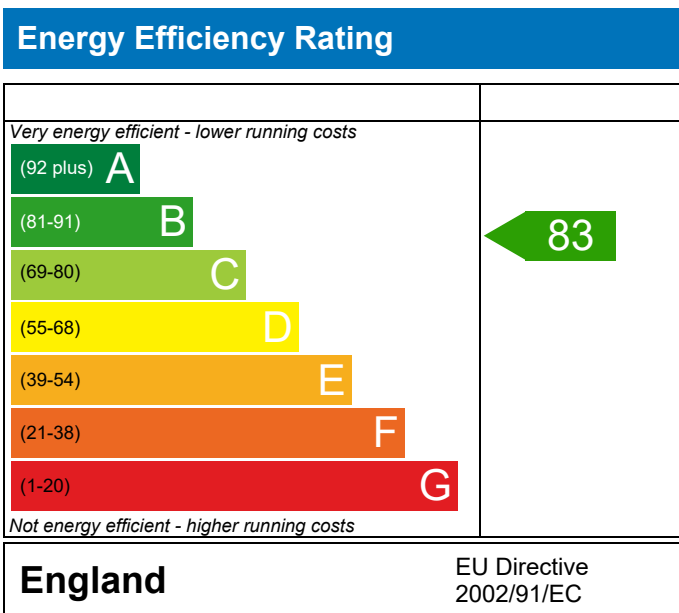
PREDICTED ENERGY ASSESSMENT

Plot 219

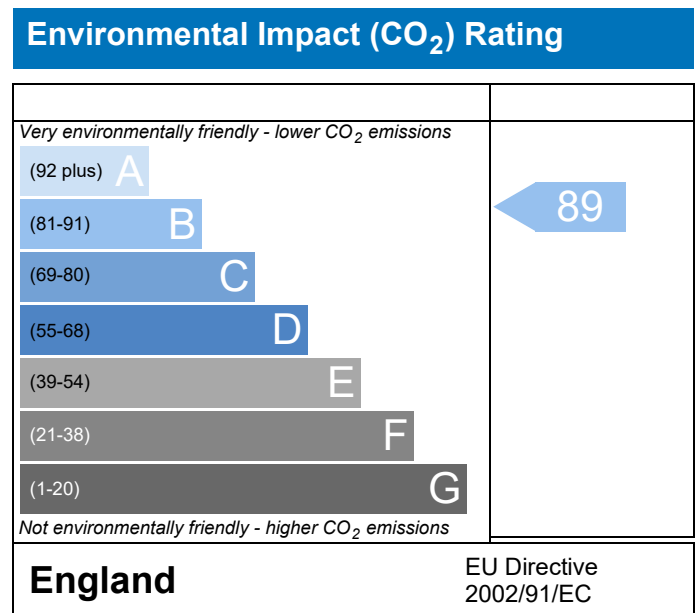
Dwelling type: Flat, Semi-Detached
 Date of assessment: 30/03/2022
 Produced by: Gary Nicholls
 Total floor area: 45.63 m²

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	219 - PRJ009077	Issued on Date	30/03/2022
Assessment Reference	219 S	Prop Type Ref	BSP603-1
Property	Plot 219		

SAP Rating	83 B	DER	18.55	TER	20.03
Environmental	89 B	% DER<TER	7.40		
CO ₂ Emissions (t/year)	0.73	DFEE	42.12	TTEE	45.36
General Requirements Compliance	Pass	% DFEE<TTEE	7.16		

Assessor Details	Chris Nicholls, , Tel: ,	Assessor ID	W947-0001
Client			

CALCULATION OF HEAT DEMAND 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	45.6300 (1b)	x 2.3700 (2b)	= 108.1431 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	45.6300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 108.1431 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour									
Number of chimneys	0	0	0	0 + 40 =	0.0000 (6a)									
Number of open flues	0	0	0	0 + 20 =	0.0000 (6b)									
Number of intermittent fans				0 + 10 =	0.0000 (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) =				0.0000 / (5) =	0.0000 (8)									
Pressure test				Yes										
Measured/design AP50				5.0100										
Infiltration rate				0.2505	(18)									
Number of sides sheltered				1	(19)									
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.9250 (20)									
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.2317 (21)									
Wind speed	Jan 4.5000	Feb 4.5000	Mar 4.4000	Apr 3.9000	May 3.8000	Jun 3.4000	Jul 3.3000	Aug 3.3000	Sep 3.5000	Oct 3.8000	Nov 3.9000	Dec 4.1000	(22)	
Wind factor	1.1250	1.1250	1.1000	0.9750	0.9500	0.8500	0.8250	0.8250	0.8750	0.9500	0.9750	1.0250	(22a)	
Adj infilt rate	0.2607	0.2607	0.2549	0.2259	0.2201	0.1970	0.1912	0.1912	0.2027	0.2201	0.2259	0.2375	(22b)	
Mechanical extract ventilation - decentralised													0.5000	(23a)
If mechanical ventilation:													0.5000	(23a)
Effective ac	0.5107	0.5107	0.5049	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	(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 = 1.30)			6.2400	1.2357	7.7110		(27)
Solid Door			1.9600	1.2000	2.3520		(26)
W1 - Brick	49.9660	6.2420	43.7240	0.2800	12.2427	104.1000	4551.6684 (29a)
W1 - Stud to Lobby	7.3840	1.9570	5.4270	0.2107	1.1435	4.4800	24.3130 (29a)
Total net area of external elements Aum(A, m ²)			57.3510				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	23.4492			(33)
Party Wall			12.0420	0.0000	0.0000	54.0300	650.6293 (32)
Party Floor			45.6250			40.0000	1825.0000 (32d)
Party Ceiling			45.6250			70.0000	3193.7500 (32b)
1st Floor Stud			74.5003			5.8200	433.5918 (32c)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =				10678.9524 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							234.0336 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.6267 (36)
Total fabric heat loss			(33) + (36) =				28.0759 (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
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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

(38)m	18.2246	18.2246	18.0179	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436	(38)
Heat transfer coeff	46.3005	46.3005	46.0938	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195	(39)
Average = Sum(39)m / 12 =														(39)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
HLP	1.0147	1.0147	1.0102	1.0063	1.0063	1.0063	1.0063	1.0063	1.0063	1.0063	1.0063	1.0063	(40)	
HLP (average)													(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													1.5627	(42)	
Average daily hot water use (litres/day)														71.3140	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Daily hot water use	78.4455	75.5929	72.7403	69.8878	67.0352	64.1826	64.1826	67.0352	69.8878	72.7403	75.5929	78.4455	(44)		
Energy conte	116.3323	101.7450	104.9917	91.5343	87.8294	75.7901	70.2306	80.5907	81.5532	95.0424	103.7462	112.6617	(45)		
Energy content (annual)													Total = Sum(45)m =	1122.0477	(45)
Distribution loss (46)m = 0.15 x (45)m	17.4499	15.2618	15.7488	13.7302	13.1744	11.3685	10.5346	12.0886	12.2330	14.2564	15.5619	16.8992	(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															
Combi loss	14.4907	13.0718	14.4460	13.9502	14.3935	13.9042	14.3521	14.3790	13.9293	14.4243	13.9936	14.4820	(61)		
Total heat required for water heating calculated for each month	130.8230	114.8168	119.4378	105.4846	102.2229	89.6943	84.5828	94.9697	95.4825	109.4667	117.7398	127.1437	(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	130.8230	114.8168	119.4378	105.4846	102.2229	89.6943	84.5828	94.9697	95.4825	109.4667	117.7398	127.1437	(64)		
RHI water heating demand													Total per year (kWh/year) = Sum(64)m =	1291.8645	(64)
Heat gains from water heating, kWh/month	42.3032	37.0982	38.5213	33.9227	32.8017	28.6763	26.9397	30.3912	30.5988	35.2077	37.9940	41.0805	(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	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	32.4605	28.8311	23.4470	17.7509	13.2690	11.2023	12.1044	15.7338	21.1179	26.8140	31.2959	33.3627	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	202.8448	204.9497	199.6454	188.3533	174.0990	160.7019	151.7519	149.6470	154.9512	166.2434	180.4977	193.8948	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	(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)	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	(71)
Water heating gains (Table 5)	56.8591	55.2056	51.7759	47.1149	44.0882	39.8281	36.2093	40.8483	42.4983	47.3221	52.7695	55.2157	(72)
Total internal gains	372.3572	369.1792	355.0612	333.4119	311.6490	291.9251	280.2584	286.4219	298.7602	320.5724	344.7559	362.6660	(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 Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	1.4400	12.1063	0.7600	0.7200	0.7700	6.6108	(75)						
Southeast	1.9220	38.7358	0.7600	0.7200	0.7700	28.2322	(77)						
Northwest	2.8800	12.1063	0.7600	0.7200	0.7700	13.2215	(81)						
Solar gains	48.0645	89.8907	141.3584	209.4330	247.2520	277.5764	253.0653	216.9482	168.8422	106.9853	66.1741	44.5975	(83)
Total gains	420.4218	459.0699	496.4196	542.8449	558.9010	569.5015	533.3237	503.3702	467.6024	427.5576	410.9300	407.2635	(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	64.0679	64.0679	64.3552	64.5995	64.5995	64.5995	64.5995	64.5995	64.5995	64.5995	64.5995	64.5995	(86)		
alpha	5.2712	5.2712	5.2903	5.3066	5.3066	5.3066	5.3066	5.3066	5.3066	5.3066	5.3066	5.3066	(86)		
util living area	0.9812	0.9694	0.9354	0.8477	0.7055	0.4935	0.3775	0.4084	0.6550	0.8874	0.9633	0.9838	(86)		
MIT	20.1973	20.3212	20.5558	20.7974	20.9372	20.9919	20.9984	20.9976	20.9662	20.7710	20.4596	20.1735	(87)		
Th 2	20.0711	20.0711	20.0749	20.0780	20.0780	20.0780	20.0780	20.0780	20.0780	20.0780	20.0780	20.0780	(88)		
util rest of house	0.9761	0.9614	0.9188	0.8129	0.6493	0.4229	0.2991	0.3258	0.5807	0.8531	0.9522	0.9794	(89)		
MIT 2	19.3594	19.4798	19.7074	19.9277	20.0396	20.0747	20.0776	20.0774	20.0612	19.9107	19.6219	19.3419	(90)		
Living area fraction													fLA = Living area / (4) =	0.5012	(91)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

MIT	19.7793	19.9015	20.1326	20.3636	20.4895	20.5344	20.5391	20.5386	20.5148	20.3419	20.0418	19.7587 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.6293	19.7515	19.9826	20.2136	20.3395	20.3844	20.3891	20.3886	20.3648	20.1919	19.8918	19.6087 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9732	0.9582	0.9169	0.8184	0.6659	0.4467	0.3257	0.3538	0.6046	0.8578	0.9496	0.9766 (94)
Useful gains	409.1558	439.8678	455.1887	444.2690	372.1468	254.3763	173.6866	178.0908	282.7230	366.7614	390.2130	397.7529 (95)
Ext temp.	4.3000	4.8000	6.6000	9.0000	11.8000	14.8000	16.6000	16.5000	14.0000	10.5000	7.1000	4.2000 (96)
Heat loss rate W												
Month fracti	709.7565	692.2627	616.8561	514.9241	392.1289	256.4327	173.9942	178.5625	292.2668	445.0455	587.3906	707.5601 (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	223.6470	169.6094	120.2805	50.8717	14.8667	0.0000	0.0000	0.0000	0.0000	58.2434	141.9678	230.4965 (98)
RHI space heating demand												1009.9830 (98)
												1010 (98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	45.6300 (1b)	x 2.3700 (2b)	= 108.1431 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	45.6300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 108.1431 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (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) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50					5.0100
Infiltration rate					0.2505 (18)
Number of sides sheltered					1 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2317 (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				0.2549	0.2491	0.2201	0.2201	0.2143	0.2317	0.2491	0.2607	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5396	0.5338	0.5049	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5223 (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 = 1.30)			6.2400	1.2357	7.7110		(27)
Solid Door			1.9600	1.2000	2.3520		(26)
Wl - Brick	49.9660	6.2420	43.7240	0.2800	12.2427	104.1000	4551.6684 (29a)
Wl - Stud to Lobby	7.3840	1.9570	5.4270	0.2107	1.1435	4.4800	24.3130 (29a)
Total net area of external elements Aum(A, m ²)			57.3510				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.4492		(33)
Party Wall			12.0420	0.0000	0.0000	54.0300	650.6293 (32)
Party Floor			45.6250			40.0000	1825.0000 (32d)
Party Ceiling			45.6250			70.0000	3193.7500 (32b)
1st Floor Stud			74.5003			5.8200	433.5918 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	10678.9524 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							234.0336 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.6267 (36)
Total fabric heat loss						(33) + (36) =	28.0759 (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	19.4650	19.2583	19.0515	18.0179	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436	18.2246	18.6381 (38)
Heat transfer coeff	47.5409	47.3341	47.1274	46.0938	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195	46.3005	46.7140 (39)
Average = Sum(39)m / 12 =												46.3856 (39)
HLP	1.0419	1.0373	1.0328	1.0102	1.0063	1.0063	1.0063	1.0063	1.0063	1.0063	1.0147	1.0238 (40)
HLP (average)												1.0166 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												1.5627 (42)
Average daily hot water use (litres/day)												71.3140 (43)
Daily hot water use	78.4455	75.5929	72.7403	69.8878	67.0352	64.1826	64.1826	67.0352	69.8878	72.7403	75.5929	78.4455 (44)
Energy conte	116.3323	101.7450	104.9917	91.5343	87.8294	75.7901	70.2306	80.5907	81.5532	95.0424	103.7462	112.6617 (45)
Energy content (annual)										Total = Sum(45)m =		1122.0477 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	17.4499	15.2618	15.7488	13.7302	13.1744	11.3685	10.5346	12.0886	12.2330	14.2564	15.5619	16.8992 (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)
Combi loss	14.4907	13.0718	14.4460	13.9502	14.3935	13.9042	14.3521	14.3790	13.9293	14.4243	13.9936	14.4820 (61)
Total heat required for water heating calculated for each month	130.8230	114.8168	119.4378	105.4846	102.2229	89.6943	84.5828	94.9697	95.4825	109.4667	117.7398	127.1437 (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	130.8230	114.8168	119.4378	105.4846	102.2229	89.6943	84.5828	94.9697	95.4825	109.4667	117.7398	127.1437 (64)
Heat gains from water heating, kWh/month	42.3032	37.0982	38.5213	33.9227	32.8017	28.6763	26.9397	30.3912	30.5988	35.2077	37.9940	41.0805 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1291.8645 (64)												

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	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	32.4605	28.8311	23.4470	17.7509	13.2690	11.2023	12.1044	15.7338	21.1179	26.8140	31.2959	33.3627 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	202.8448	204.9497	199.6454	188.3533	174.0990	160.7019	151.7519	149.6470	154.9512	166.2434	180.4977	193.8948 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389 (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)	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079 (71)
Water heating gains (Table 5)	56.8591	55.2056	51.7759	47.1149	44.0882	39.8281	36.2093	40.8483	42.4983	47.3221	52.7695	55.2157 (72)
Total internal gains	372.3572	369.1792	355.0612	333.4119	311.6490	291.9251	280.2584	286.4219	298.7602	320.5724	344.7559	362.6660 (73)

6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	1.4400	11.2829	0.7600	0.7200	0.7700	6.1612 (75)						
Southeast	1.9220	36.7938	0.7600	0.7200	0.7700	26.8168 (77)						
Northwest	2.8800	11.2829	0.7600	0.7200	0.7700	12.3224 (81)						
Solar gains	45.3004	83.3028	130.2861	188.7648	236.3816	245.6465	232.2624	195.0604	150.2728	96.4643	55.3775	38.0442 (83)
Total gains	417.6576	452.4821	485.3473	522.1767	548.0306	537.5716	512.5209	481.4824	449.0330	417.0367	400.1334	400.7102 (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	62.3963	62.6688	62.9437	64.3552	64.5995	64.5995	64.5995	64.5995	64.5995	64.5995	64.0679	63.5008
alpha	5.1598	5.1779	5.1962	5.2903	5.3066	5.3066	5.3066	5.3066	5.3066	5.3066	5.2712	5.2334
util living area	0.9824	0.9715	0.9444	0.8674	0.7215	0.5364	0.3925	0.4356	0.6689	0.8925	0.9675	0.9853 (86)
MIT	20.1509	20.2855	20.5010	20.7665	20.9294	20.9877	20.9980	20.9966	20.9632	20.7652	20.4293	20.1337 (87)
Th 2	20.0486	20.0523	20.0561	20.0749	20.0780	20.0780	20.0780	20.0780	20.0780	20.0780	20.0711	20.0636 (88)
util rest of house	0.9776	0.9639	0.9296	0.8352	0.6662	0.4635	0.3112	0.3499	0.5931	0.8588	0.9574	0.9812 (89)
MIT 2	19.2951	19.4296	19.6398	19.8990	20.0343	20.0727	20.0775	20.0771	20.0598	19.9063	19.5871	19.2908 (90)
Living area fraction	fLA = Living area / (4) = 0.5012 (91)											
MIT	19.7240	19.8586	20.0715	20.3338	20.4829	20.5313	20.5389	20.5380	20.5126	20.3368	20.0092	19.7132 (92)
Temperature adjustment	-0.1500											
adjusted MIT	19.5740	19.7086	19.9215	20.1838	20.3329	20.3813	20.3889	20.3880	20.3626	20.1868	19.8592	19.5632 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9747	0.9606	0.9271	0.8394	0.6821	0.4879	0.3387	0.3789	0.6174	0.8633	0.9547	0.9785 (94)
Useful gains	407.0822	434.6576	449.9745	438.2927	373.8230	262.2574	173.6121	182.4532	277.2352	360.0221	381.9978	392.1005 (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	726.1399	700.9531	632.5195	520.1138	396.4194	265.4739	173.9845	183.1262	287.5750	440.2194	590.7579	717.6779 (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	237.3789	178.9506	135.8135	58.9112	16.8117	0.0000	0.0000	0.0000	0.0000	59.6668	150.3073	242.2296 (98)
Space heating	1080.0696 (98)											
Space heating per m ²	(98) / (4) = 23.6702 (99)											

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

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 %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1193.4471 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	237.3789	178.9506	135.8135	58.9112	16.8117	0.0000	0.0000	0.0000	0.0000	59.6668	150.3073	242.2296	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	262.2972	197.7355	150.0701	65.0952	18.5765	0.0000	0.0000	0.0000	0.0000	65.9301	166.0854	267.6570	(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	130.8230	114.8168	119.4378	105.4846	102.2229	89.6943	84.5828	94.9697	95.4825	109.4667	117.7398	127.1437	(64)
Efficiency of water heater (217)m	89.3365	89.2218	88.9739	88.4204	87.7382	87.3000	87.3000	87.3000	87.3000	88.4027	89.0660	87.3000	(216)
Fuel for water heating, kWh/month	146.4385	128.6870	134.2390	119.2989	116.5091	102.7426	96.8875	108.7854	109.3728	123.8273	132.1939	142.2629	(219)
Water heating fuel used													1461.2450 (219)
Annual totals kWh/year													
Space heating fuel - main system													1193.4471 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 6.9550, total flow = 29.0000, SFP = 0.2398)													
mechanical ventilation fans (SFP = 0.2398)													31.6416 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													106.6416 (231)
Electricity for lighting (calculated in Appendix L)													229.3050 (232)
Total delivered energy for all uses													2990.6386 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1193.4471	3.4800	41.5320 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1461.2450	3.4800	50.8513 (247)
Mechanical ventilation fans	31.6416	13.1900	4.1735 (249)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	229.3050	13.1900	30.2453 (250)
Additional standing charges			120.0000 (251)
Total energy cost			256.6946 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1896 (257)
SAP value		83.4053
SAP rating (Section 12)		83 (258)
SAP band		B

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	1193.4471	0.2160	257.7846 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1461.2450	0.2160	315.6289 (264)
Space and water heating			573.4135 (265)
Pumps and fans	106.6416	0.5190	55.3470 (267)
Energy for lighting	229.3050	0.5190	119.0093 (268)
Total kg/year			747.7697 (272)
CO2 emissions per m2			16.3900 (273)
EI value			88.9439
EI rating			89 (274)
EI band			B

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8831 = 3.941$, stars = 4
Water heating environmental impact	$0.216 / 0.8831 = 0.2446$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	45.6300 (1b)	2.3700 (2b)	108.1431 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	45.6300		108.1431 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	108.1431 (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				0 * 10 =	0.0000 (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) =					0.0000 / (5) =	0.0000 (8)
Pressure test					Yes	
Measured/design AP50					5.0100	
Infiltration rate					0.2505	(18)
Number of sides sheltered					1	(19)
Shelter factor					(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor					(21) = (18) x (20) =	0.2317 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.5000	4.5000	4.4000	3.9000	3.8000	3.4000	3.3000	3.3000	3.5000	3.8000	3.9000	4.1000 (22)
Wind factor	1.1250	1.1250	1.1000	0.9750	0.9500	0.8500	0.8250	0.8250	0.8750	0.9500	0.9750	1.0250 (22a)
Adj infilt rate	0.2607	0.2607	0.2549	0.2259	0.2201	0.1970	0.1912	0.1912	0.2027	0.2201	0.2259	0.2375 (22b)
Mechanical extract ventilation - decentralised	0.5000 (23a)											
If mechanical ventilation:	0.5000 (23a)											
Effective ac	0.5107	0.5107	0.5049	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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
Windows (Uw = 1.30)			6.2400	1.2357	7.7110		(27)
Solid Door			1.9600	1.2000	2.3520		(26)
Wl - Brick	49.9660	6.2420	43.7240	0.2800	12.2427	104.1000	4551.6684 (29a)
Wl - Stud to Lobby	7.3840	1.9570	5.4270	0.2107	1.1435	4.4800	24.3130 (29a)
Total net area of external elements Aum(A, m2)			57.3510				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	23.4492			(33)
Party Wall			12.0420	0.0000	0.0000	54.0300	650.6293 (32)
Party Floor			45.6250			40.0000	1825.0000 (32d)
Party Ceiling			45.6250			70.0000	3193.7500 (32b)
1st Floor Stud			74.5003			5.8200	433.5918 (32c)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =				10678.9524 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							234.0336 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.6267 (36)
Total fabric heat loss			(33) + (36) =				28.0759 (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	18.2246	18.2246	18.0179	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436	17.8436 (38)
Heat transfer coeff	46.3005	46.3005	46.0938	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195	45.9195 (39)
Average = Sum(39)m / 12 =	45.9975 (39)											
HLP	1.0147	1.0147	1.0102	1.0063	1.0063	1.0063	1.0063	1.0063	1.0063	1.0063	1.0063	1.0063 (40)
HLP (average)	1.0081 (40)											
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy	1.5627 (42)											
Average daily hot water use (litres/day)	71.3140 (43)											
Daily hot water use	78.4455	75.5929	72.7403	69.8878	67.0352	64.1826	64.1826	67.0352	69.8878	72.7403	75.5929	78.4455 (44)
Energy conte	116.3323	101.7450	104.9917	91.5343	87.8294	75.7901	70.2306	80.5907	81.5532	95.0424	103.7462	112.6617 (45)
Energy content (annual)	Total = Sum(45)m = 1122.0477 (45)											

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	17.4499	15.2618	15.7488	13.7302	13.1744	11.3685	10.5346	12.0886	12.2330	14.2564	15.5619	16.8992 (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)
Combi loss	14.4907	13.0718	14.4460	13.9502	14.3935	13.9042	14.3521	14.3790	13.9293	14.4243	13.9936	14.4820 (61)
Total heat required for water heating calculated for each month	130.8230	114.8168	119.4378	105.4846	102.2229	89.6943	84.5828	94.9697	95.4825	109.4667	117.7398	127.1437 (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	130.8230	114.8168	119.4378	105.4846	102.2229	89.6943	84.5828	94.9697	95.4825	109.4667	117.7398	127.1437 (64)
Heat gains from water heating, kWh/month	42.3032	37.0982	38.5213	33.9227	32.8017	28.6763	26.9397	30.3912	30.5988	35.2077	37.9940	41.0805 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1291.8645 (64)												

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	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618	93.7618 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	32.4605	28.8311	23.4470	17.7509	13.2690	11.2023	12.1044	15.7338	21.1179	26.8140	31.2959	33.3627 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	202.8448	204.9497	199.6454	188.3533	174.0990	160.7019	151.7519	149.6470	154.9512	166.2434	180.4977	193.8948 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389	45.9389 (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)	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079	-62.5079 (71)
Water heating gains (Table 5)	56.8591	55.2056	51.7759	47.1149	44.0882	39.8281	36.2093	40.8483	42.4983	47.3221	52.7695	55.2157 (72)
Total internal gains	372.3572	369.1792	355.0612	333.4119	311.6490	291.9251	280.2584	286.4219	298.7602	320.5724	344.7559	362.6660 (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						
Northeast	1.4400	12.1063	0.7600	0.7200	0.7700	6.6108 (75)						
Southeast	1.9220	38.7358	0.7600	0.7200	0.7700	28.2322 (77)						
Northwest	2.8800	12.1063	0.7600	0.7200	0.7700	13.2215 (81)						
Solar gains	48.0645	89.8907	141.3584	209.4330	247.2520	277.5764	253.0653	216.9482	168.8422	106.9853	66.1741	44.5975 (83)
Total gains	420.4218	459.0699	496.4196	542.8449	558.9010	569.5015	533.3237	503.3702	467.6024	427.5576	410.9300	407.2635 (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	64.0679	64.0679	64.3552	64.5995	64.5995	64.5995	64.5995	64.5995	64.5995	64.5995	64.5995	64.5995
alpha	5.2712	5.2712	5.2903	5.3066	5.3066	5.3066	5.3066	5.3066	5.3066	5.3066	5.3066	5.3066
util living area	0.9812	0.9694	0.9354	0.8477	0.7055	0.4935	0.3775	0.4084	0.6550	0.8874	0.9633	0.9838 (86)
MIT	20.1973	20.3212	20.5558	20.7974	20.9372	20.9919	20.9984	20.9976	20.9662	20.7710	20.4596	20.1735 (87)
Th 2	20.0711	20.0711	20.0749	20.0780	20.0780	20.0780	20.0780	20.0780	20.0780	20.0780	20.0780	20.0780 (88)
util rest of house	0.9761	0.9614	0.9188	0.8129	0.6493	0.4229	0.2991	0.3258	0.5807	0.8531	0.9522	0.9794 (89)
MIT 2	19.3594	19.4798	19.7074	19.9277	20.0396	20.0747	20.0776	20.0774	20.0612	19.9107	19.6219	19.3419 (90)
Living area fraction	fLA = Living area / (4) = 0.5012 (91)											
MIT	19.7793	19.9015	20.1326	20.3636	20.4895	20.5344	20.5391	20.5386	20.5148	20.3419	20.0418	19.7587 (92)
Temperature adjustment	-0.1500											
adjusted MIT	19.6293	19.7515	19.9826	20.2136	20.3395	20.3844	20.3891	20.3886	20.3648	20.1919	19.8918	19.6087 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9732	0.9582	0.9169	0.8184	0.6659	0.4467	0.3257	0.3538	0.6046	0.8578	0.9496	0.9766 (94)
Useful gains	409.1558	439.8678	455.1887	444.2690	372.1468	254.3763	173.6866	178.0908	282.7230	366.7614	390.2130	397.7529 (95)
Ext temp.	4.3000	4.8000	6.6000	9.0000	11.8000	14.8000	16.6000	16.5000	14.0000	10.5000	7.1000	4.2000 (96)
Heat loss rate W	709.7565	692.2627	616.8561	514.9241	392.1289	256.4327	173.9942	178.5625	292.2668	445.0455	587.3906	707.5601 (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	223.6470	169.6094	120.2805	50.8717	14.8667	0.0000	0.0000	0.0000	0.0000	58.2434	141.9678	230.4965 (98)
Space heating	1009.9830 (98)											
Space heating per m2	(98) / (4) = 22.1342 (99)											

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

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 %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1116.0033 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	223.6470	169.6094	120.2805	50.8717	14.8667	0.0000	0.0000	0.0000	0.0000	58.2434	141.9678	230.4965	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	247.1237	187.4137	132.9067	56.2118	16.4273	0.0000	0.0000	0.0000	0.0000	64.3573	156.8705	254.6923	(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	130.8230	114.8168	119.4378	105.4846	102.2229	89.6943	84.5828	94.9697	95.4825	109.4667	117.7398	127.1437	(64)
Efficiency of water heater (217)m	89.2920	89.1804	88.8768	88.3160	87.6937	87.3000	87.3000	87.3000	87.3000	88.3853	89.0207	87.3000	(216)
Fuel for water heating, kWh/month	146.5114	128.7467	134.3857	119.4399	116.5681	102.7426	96.8875	108.7854	109.3728	123.8516	132.2612	142.3210	(219)
Water heating fuel used													1461.8741 (219)
Annual totals kWh/year													
Space heating fuel - main system													1116.0033 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
(MEV)Decentralised, Database: total watage = 6.9550, total flow = 29.0000, SFP = 0.2398)													
mechanical ventilation fans (SFP = 0.2398)													31.6416 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													106.6416 (231)
Electricity for lighting (calculated in Appendix L)													229.3050 (232)
Total delivered energy for all uses													2913.8240 (238)

10a. Fuel costs - using BEDF prices (491)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1116.0033	3.6300	40.5109 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1461.8741	3.6300	53.0660 (247)
Mechanical ventilation fans	31.6416	19.4400	6.1511 (249)
Pumps and fans for heating	75.0000	19.4400	14.5800 (249)
Energy for lighting	229.3050	19.4400	44.5769 (250)
Additional standing charges			95.0000 (251)
Total energy cost			253.8850 (255)

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	1116.0033	0.2160	241.0567 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1461.8741	0.2160	315.7648 (264)
Space and water heating			556.8215 (265)
Pumps and fans	106.6416	0.5190	55.3470 (267)
Energy for lighting	229.3050	0.5190	119.0093 (268)
Total kg/year			731.1778 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1116.0033	1.2200	1361.5241 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1461.8741	1.2200	1783.4864 (264)
Space and water heating			3145.0105 (265)
Pumps and fans	106.6416	3.0700	327.3896 (267)
Energy for lighting	229.3050	3.0700	703.9662 (268)
Primary energy kWh/year			4176.3663 (272)
Primary energy kWh/m2/year			91.5268 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating:

B 83

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Current environmental impact rating:

B 89

(For testing purposes):

A	Not considered
B	Not considered
C	Not considered
D	Not considered
E Low energy lighting	Already installed
F	Not considered
G	Not considered
H	Not considered
I	Not considered
J	Not considered
K	Not considered
M	Not considered
N Solar water heating	Not applicable
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Not applicable
A2	Not considered
A3	Not considered
T2	Not considered
W	Not considered
X	Not considered
Y	Not considered
J2	Not considered
Q2	Not considered
Z1	Not considered
Z2	Not considered
Z3	Not considered
Z4	Not considered
Z5	Not considered
V2 Wind turbine	Not applicable
L2	Not considered
Q3	Not considered
O3	Not considered

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)	Total Savings £0	0.00 kg/m ²	

Potential energy efficiency rating:
Potential environmental impact rating:

B 83
B 89

Fuel prices for cost data on this page from database revision number 491 TEST (28 Feb 2022)
Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, Midlands):

	Current	Potential	Saving
Electricity	£65	£65	£0
Mains gas	£189	£189	£0
Space heating	£156	£156	£0
Water heating	£53	£53	£0
Lighting	£45	£45	£0
Total cost of fuels	£254	£254	£0
Total cost of uses	£254	£254	£0
Delivered energy	64 kWh/m ²	64 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m ²	16 kg/m ²	16 kg/m ²	0 kg/m ²
Primary energy	92 kWh/m ²	92 kWh/m ²	0 kWh/m ²

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

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

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	219 - PRJ009077	Issued on Date	30/03/2022
Assessment Reference	219 S	Prop Type Ref	BSP603-1
Property	Plot 219		

SAP Rating	83 B	DER	18.55	TER	20.03
Environmental	89 B	% DER<TER	7.40		
CO₂ Emissions (t/year)	0.73	DFEE	42.12	TFEE	45.36
General Requirements Compliance	Pass	% DFEE<TFEE	7.16		

Assessor Details	Chris Nicholls, , Tel: ,	Assessor ID	W947-0001
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	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	20.03	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.55	kgCO ₂ /m ²	Pass
	-1.48 (-7.4%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	45.36	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	42.12	kWh/m ² /yr	
	-3.3 (-7.3%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.28 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Openings	1.28 (max. 2.00)	1.30 (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	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP1 30 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

5 Cylinder insulation

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

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

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Midlands)

Not significant

Pass

Based on:

Overshading

Average

Windows facing North East

1.44 m², No overhang

Windows facing South East

1.92 m², No overhang

Windows facing North West

2.88 m², No overhang

Air change rate

4.21 ach

Blinds/curtains

Dark-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

5.01 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00

W/m²K