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Regulations Compliance Report

Approved Document L1A 2010 edition assessed by Stroma FSAP 2009 program, Version: 1.5.0.63
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Project Information:

Assessed By: Gary Nicholls (STRO003305) **Building Type:** Detached House

Dwelling Details:

NEW DWELLING DESIGN STAGE

Site Reference : 31 Percy Street **Plot Reference:** 31 Percy Street

Address : 31 Percy Street, London, W1T 2DD

Client Details:

Name: GCC Design Ltd
Address :

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

1 TER and DER

Fuel for main heating system: Natural gas
Fuel factor: 1.00 (natural gas)

Target Carbon Dioxide Emission Rate (TER)	17.89 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.72 kg/m²	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.25 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.18 (max. 0.25)	0.18 (max. 0.70)	OK
Roof	0.18 (max. 0.20)	0.18 (max. 0.35)	OK
Openings	1.54 (max. 2.00)	1.80 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals	6.00	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system:	Boiler system with radiators or underfloor - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 Minimum 88.0 %	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water Storage:	No cylinder

6 Controls

Space heating controls	Time and temperature zone control	OK
Hot water controls:	No cylinder	
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

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8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames valley):	Not significant	**OK**
Based on:		
Overshading:	Average or unknown	
Windows facing: South West	9.35m², Overhang twice as wide as window, ratio NaN	
Windows facing: South East	1.6m², Overhang twice as wide as window, ratio NaN	
Ventilation rate:	8.00	
Blinds/curtains:	None shutter closed 0% of daylight hours	

10 Key features

Floors U-value	0.18 W/m²K

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SAP Input

Property Details: 31 Percy Street

Address:	31 Percy Street, London, W1T 2DD
Located in:	England
Region:	Thames valley
UPRN:	na
Date of assessment:	28 January 2014
Date of certificate:	28 January 2014
Assessment type:	New dwelling design stage
Transaction type:	New dwelling
Tenure type:	Unknown
Related party disclosure:	No related party
Thermal Mass Parameter:	Indicative Value Medium
Dwelling designed to use less than 125 litres per Person per day:	True

Property description:

Dwelling type:	House
Detachment:	Detached
Year Completed:	2014

Floor Location:	Floor area:	Storey height:
Floor 0	36.2 m²	2.3 m
Floor 1	34.19 m²	2.5 m

Living area:	28.91 m² (fraction 0.411)
Front of dwelling faces:	South West

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
front door	Manufacturer	Solid			Wood
windows front	Manufacturer	Windows	double-glazed	Yes	Metal
windows side	Manufacturer	Windows	double-glazed	Yes	Metal

Name:	**Gap:**	**Frame Factor:**	**g-value:**	**U-value:**	**Area:**	**No. of Openings:**
front door	mm	0.7	0	1.8	1.68	1
windows front	16mm or more	0.8	0.76	1.5	9.35	1
windows side	16mm or more	0.8	0.76	1.5	1.6	1

Name:	Type-Name:	Location:	Orient:	Width:	Height:
front door		wall to corridor	South East	0	0
windows front		external wall	South West	0	0
windows side		external wall	South East	0	0

Overshading:	Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
External Elements							
external wall	37.96	10.95	27.01	0.25	0	False	N/A
wall to corridor	10.08	1.68	8.4	0.25	0.82	False	N/A
flat roof	41.63	0	41.63	0.18	0		N/A
ground floor	36.2			0.18			N/A
Internal Elements							
Party Elements							
party wall	87.87						N/A

Thermal bridges:

Thermal bridges: User-defined (individual PSI-values) Y-Value = 0.0948

Length **PSI-value**

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SAP Input

10.45	0.214	Other lintels (including other steel lintels)
7.6	0.019	Sill
19.6	0.02	Jamb
9.8	0.044	Ground floor
10.2	0	Intermediate floor within a dwelling
11.2	0.04	Flat roof
2.3	-0.09	Corner (inverted)
28.6	0.076	Party wall between dwellings
20.9	0.08	Ground floor
15.9	0	Intermediate floor within a dwelling
21.4	0.12	Roof (insulation at ceiling level)

Ventilation:

Pressure test:	Yes (As designed)
Ventilation:	Natural ventilation (extract fans)
Number of chimneys:	0
Number of open flues:	0
Number of fans:	3
Number of sides sheltered:	2
Pressure test:	6

Main heating system:

Main heating system:	Central heating systems with radiators or underfloor heating Gas boilers and oil boilers Fuel: mains gas Info Source: Manufacturer Declaration Manufacturer's data Efficiency: 89.0% (SEDBUK2009) Condensing combi with automatic ignition Fuel Burning Type: Systems with radiators Pump in heat space: Yes Delayed start

Main heating Control:

Main heating Control:	Time and temperature zone control Control code: 2110 Boiler interlock: Yes

Secondary heating system:

Secondary heating system:	None

Water heating:

Water heating:	From main heating system Water code: 901 Fuel :mains gas No hot water cylinder Solar panel: False

Others:

Electricity tariff:	standard tariff
In Smoke Control Area:	Unknown
Conservatory:	No conservatory
Low energy lights:	100%
Terrain type:	Low rise urban / suburban
EPC language:	English
Wind turbine:	No
Photovoltaics:	None
Assess Zero Carbon Home:	No

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SAP WorkSheet: New dwelling design stage

User Details:

Assessor Name:	Gary Nicholls	**Stroma Number:**	STRO003305
Software Name:	Stroma FSAP 2009	**Software Version:**	Version: 1.5.0.63

Property Address: 31 Percy Street

Address : 31 Percy Street, London, W1T 2DD

1. Overall dwelling dimensions:

	Area(m²)			Ave Height(m)			Volume(m³)	
Ground floor	36.2	(1a)	x	2.3	(2a)	=	83.26	(3a)
First floor	34.19	(1b)	x	2.5	(2b)	=	85.48	(3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+.....(1n)	70.39	(4)						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)+.....(3n)		=	168.74	(5)

2. Ventilation rate:

	main heating		Secondary heating		other		total		m³ per hour	
Number of chimneys	0	+	0	+	0	=	0	x 40 =	0	(6a)
Number of open flues	0	+	0	+	0	=	0	x 20 =	0	(6b)
Number of intermittent fans							3	x 10 =	30	(7a)
Number of passive vents							0	x 10 =	0	(7b)
Number of flueless gas fires							0	x 40 =	0	(7c)

			Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	30	÷ (5) =	0.18	(8)

If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16)

Number of storeys in the dwelling (ns)		0	(9)
Additional infiltration	[(9)-1]x0.1 =	0	(10)
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction		0	(11)
if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35			
If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0		0	(12)
If no draught lobby, enter 0.05, else enter 0		0	(13)
Percentage of windows and doors draught stripped		0	(14)
Window infiltration	0.25 - [0.2 x (14) ÷ 100] =	0	(15)
Infiltration rate	(8) + (10) + (11) + (12) + (13) + (15) =	0	(16)
Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area		6	(17)
If based on air permeability value, then	(18) = [(17) ÷ 20]+(8), otherwise (18) = (16)	0.48	(18)
Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used			
Number of sides on which sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.85	(20)
Infiltration rate incorporating shelter factor	(21) = (18) x (20) =	0.41	(21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average wind speed from Table 7												
(22)m=	5.4	5.1	5.1	4.5	4.1	3.9	3.7	3.7	4.2	4.5	4.8	5.1

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Wind Factor (22a)m = (22)m ÷ 4

(22a)m=	1.35	1.27	1.27	1.12	1.02	0.98	0.92	0.92	1.05	1.12	1.2	1.27

Adjusted infiltration rate (allowing for shelter and wind speed) = (21a) x (22a)m

0.55	0.52	0.52	0.46	0.42	0.4	0.38	0.38	0.43	0.46	0.49	0.52

Calculate effective air change rate for the applicable case

If mechanical ventilation: 0 (23a)

If exhaust air heat pump using Appendix N, (23b) = (23a) × Fmv (equation (N5)) , otherwise (23b) = (23a) 0 (23b)

If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) = 0 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR) (24a)m = (22b)m + (23b) × [1 – (23c) ÷ 100]

(24a)m=	0	0	0	0	0	0	0	0	0	0	0	0	(24a)

b) If balanced mechanical ventilation without heat recovery (MV) (24b)m = (22b)m + (23b)

(24b)m=	0	0	0	0	0	0	0	0	0	0	0	0	(24b)

c) If whole house extract ventilation or positive input ventilation from outside
if (22b)m < 0.5 × (23b), then (24c) = (23b); otherwise (24c) = (22b) m + 0.5 × (23b)

(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0	(24c)

d) If natural ventilation or whole house positive input ventilation from loft
if (22b)m = 1, then (24d)m = (22b)m otherwise (24d)m = 0.5 + [(22b)m² x 0.5]

(24d)m=	0.65	0.63	0.63	0.6	0.59	0.58	0.57	0.57	0.59	0.6	0.62	0.63	(24d)

Effective air change rate - enter (24a) or (24b) or (24c) or (24d) in box (25)

(25)m=	0.65	0.63	0.63	0.6	0.59	0.58	0.57	0.57	0.59	0.6	0.62	0.63	(25)

3. Heat losses and heat loss parameter:

ELEMENT	Gross area (m²)	Openings m²	Net Area A ,m²		U-value W/m2K		A X U (W/K)	k-value kJ/m²·K	A X k kJ/K	
Doors			1.68	x	1.8	=	3.024			(26)
Windows Type 1			9.35	x1/[1/(1.5)+ 0.04]		=	13.23			(27)
Windows Type 2			1.6	x1/[1/(1.5)+ 0.04]		=	2.26			(27)
Floor			36.2	x	0.18	=	6.52			(28)
Walls Type1	37.96	10.95	27.01	x	0.25	=	6.75			(29)
Walls Type2	10.08	1.68	8.4	x	0.21	=	1.74			(29)
Roof	41.63	0	41.63	x	0.18	=	7.49			(30)
Total area of elements, m²			125.87							(31)
Party wall			87.87	x	0	=	0			(32)

** for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2*
*** include the areas on both sides of internal walls and partitions*

Fabric heat loss, W/K = S (A x U) (26)…(30) + (32) = 41.02 (33)

Heat capacity Cm = S(A x k) ((28)…(30) + (32) + (32a)…(32e) = 0 (34)

Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K Indicative Value: Medium 250 (35)

For design assessments where the details of the construction are not known precisely the indicative values of TMP in Table 1f can be used instead of a detailed calculation.

Thermal bridges : S (L x Y) calculated using Appendix K 11.93 (36)

if details of thermal bridging are not known (36) = 0.15 x (31)

Total fabric heat loss (33) + (36) = 52.96 (37)

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Ventilation heat loss calculated monthly (38)m = 0.33 × (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m=	36.21	35.31	35.31	33.65	32.67	32.21	31.77	31.77	32.9	33.65	34.45	35.31	(38)

Heat transfer coefficient, W/K (39)m = (37) + (38)m

(39)m=	89.17	88.26	88.26	86.61	85.62	85.16	84.73	84.73	85.86	86.61	87.41	88.26	

Average = $Sum(39)_{1...12}$ /12= 86.73 (39)

Heat loss parameter (HLP), W/m²K (40)m = (39)m ÷ (4)

(40)m=	1.27	1.25	1.25	1.23	1.22	1.21	1.2	1.2	1.22	1.23	1.24	1.25	

Average = $Sum(40)_{1...12}$ /12= 1.23 (40)

Number of days in month (Table 1a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement: kWh/year:

Assumed occupancy, N 2.26 (42)
if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA -13.9)2)] + 0.0013 x (TFA -13.9)
if TFA £ 13.9, N = 1

Annual average hot water usage in litres per day Vd,average = (25 x N) + 36 87.77 (43)

Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43)													
(44)m=	96.55	93.04	89.52	86.01	82.5	78.99	78.99	82.5	86.01	89.52	93.04	96.55	

Total = $Sum(44)_{1...12}$ = 1053.23 (44)

Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d)

(45)m=	143.52	125.52	129.53	112.92	108.35	93.5	86.64	99.42	100.61	117.25	127.99	138.99	

Total = $Sum(45)_{1...12}$ = 1384.26 (45)

If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61)

(46)m=	21.53	18.83	19.43	16.94	16.25	14.03	13	14.91	15.09	17.59	19.2	20.85	(46)

Water storage loss:

a) If manufacturer's declared loss factor is known (kWh/day): 0 (47)

Temperature factor from Table 2b 0 (48)

Energy lost from water storage, kWh/year (47) x (48) = 0 (49)

If manufacturer's declared cylinder loss factor is not known:

Cylinder volume (litres) including any solar storage within same 0 (50)

If community heating and no tank in dwelling, enter 110 litres in box (50)

Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in box (50)

Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51)

Volume factor from Table 2a 0 (52)

Temperature factor from Table 2b 0 (53)

Energy lost from water storage, kWh/year ((50) x (51) x (52) x (53) = 0 (54)

Enter (49) or (54) in (55) 0 (55)

Water storage loss calculated for each month ((56)m = (55) × (41)m

(56)m=	0	0	0	0	0	0	0	0	0	0	0	0	(56)

If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11)] ÷ (50), else (57)m = (56)m where (H11) is from Appendix H

(57)m=	0	0	0	0	0	0	0	0	0	0	0	0	(57)

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Primary circuit loss (annual) from Table 3 | 0 | (58)

Primary circuit loss calculated for each month (59)m = (58) ÷ 365 × (41)m

(modified by factor from Table H5 if there is solar water heating and a cylinder thermostat)

(59)m=	0	0	0	0	0	0	0	0	0	0	0	0	(59)

Combi loss calculated for each month (61)m = (60) ÷ 365 × (41)m

(61)m=	49.2	42.82	45.62	42.42	42.04	38.96	40.25	42.04	42.42	45.62	45.88	49.2	(61)

Total heat required for water heating calculated for each month (62)m = 0.85 × (45)m + (46)m + (57)m + (59)m + (61)m

(62)m=	192.72	168.34	175.15	155.34	150.4	132.46	126.9	141.47	143.03	162.87	173.87	188.19	(62)

Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating)

(add additional lines if FGHRS and/or WWHRS applies, see Appendix G)

(63)m=	0	0	0	0	0	0	0	0	0	0	0	0	(63)

Output from water heater

(64)m=	192.72	168.34	175.15	155.34	150.4	132.46	126.9	141.47	143.03	162.87	173.87	188.19

Output from water heater (annual)$_{1…12}$ | 1910.73 | (64)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45)m + (61)m] + 0.8 x [(46)m + (57)m + (59)m]

(65)m=	60.02	52.44	54.47	48.15	46.54	40.83	38.87	43.57	44.06	50.39	54.03	58.51	(65)

include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating

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=	135.33	135.33	135.33	135.33	135.33	135.33	135.33	135.33	135.33	135.33	135.33	135.33	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

(67)m=	45.21	40.15	32.66	24.72	18.48	15.6	16.86	21.91	29.41	37.35	43.59	46.47	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

(68)m=	295.83	298.9	291.16	274.69	253.91	234.37	221.32	218.25	225.98	242.45	263.24	282.78	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

(69)m=	50.79	50.79	50.79	50.79	50.79	50.79	50.79	50.79	50.79	50.79	50.79	50.79	(69)

Pumps and fans gains (Table 5a)

(70)m=	10	10	10	10	10	10	10	10	10	10	10	10	(70)

Losses e.g. evaporation (negative values) (Table 5)

(71)m=	-90.22	-90.22	-90.22	-90.22	-90.22	-90.22	-90.22	-90.22	-90.22	-90.22	-90.22	-90.22	(71)

Water heating gains (Table 5)

(72)m=	80.67	78.04	73.22	66.88	62.55	56.71	52.25	58.56	61.19	67.73	75.04	78.65	(72)

Total internal gains = (66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m

(73)m=	527.61	522.99	502.94	472.2	440.84	412.58	396.32	404.62	422.48	453.43	487.76	513.79	(73)

6. Solar gains:

Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.

Orientation:	Access Factor Table 6d		Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
Southeast 0.9x	0.77	x	1.6	x	37.39	x	0.76	x	0.8	=	25.2	(77)
Southeast 0.9x	0.77	x	1.6	x	63.74	x	0.76	x	0.8	=	42.97	(77)

Southeast	0.9x	0.77	x	1.6	x	84.22	x	0.76	x	0.8	=	56.77	(77)
Southeast	0.9x	0.77	x	1.6	x	103.49	x	0.76	x	0.8	=	69.77	(77)
Southeast	0.9x	0.77	x	1.6	x	113.34	x	0.76	x	0.8	=	76.41	(77)
Southeast	0.9x	0.77	x	1.6	x	115.04	x	0.76	x	0.8	=	77.56	(77)
Southeast	0.9x	0.77	x	1.6	x	112.79	x	0.76	x	0.8	=	76.04	(77)
Southeast	0.9x	0.77	x	1.6	x	105.34	x	0.76	x	0.8	=	71.02	(77)
Southeast	0.9x	0.77	x	1.6	x	92.9	x	0.76	x	0.8	=	62.63	(77)
Southeast	0.9x	0.77	x	1.6	x	72.36	x	0.76	x	0.8	=	48.78	(77)
Southeast	0.9x	0.77	x	1.6	x	44.83	x	0.76	x	0.8	=	30.22	(77)
Southeast	0.9x	0.77	x	1.6	x	31.95	x	0.76	x	0.8	=	21.54	(77)
Southwest	0.9x	0.77	x	9.35	x	37.39		0.76	x	0.8	=	147.29	(79)
Southwest	0.9x	0.77	x	9.35	x	63.74		0.76	x	0.8	=	251.09	(79)
Southwest	0.9x	0.77	x	9.35	x	84.22		0.76	x	0.8	=	331.77	(79)
Southwest	0.9x	0.77	x	9.35	x	103.49		0.76	x	0.8	=	407.7	(79)
Southwest	0.9x	0.77	x	9.35	x	113.34		0.76	x	0.8	=	446.5	(79)
Southwest	0.9x	0.77	x	9.35	x	115.04		0.76	x	0.8	=	453.22	(79)
Southwest	0.9x	0.77	x	9.35	x	112.79		0.76	x	0.8	=	444.35	(79)
Southwest	0.9x	0.77	x	9.35	x	105.34		0.76	x	0.8	=	415	(79)
Southwest	0.9x	0.77	x	9.35	x	92.9		0.76	x	0.8	=	365.98	(79)
Southwest	0.9x	0.77	x	9.35	x	72.36		0.76	x	0.8	=	285.08	(79)
Southwest	0.9x	0.77	x	9.35	x	44.83		0.76	x	0.8	=	176.59	(79)
Southwest	0.9x	0.77	x	9.35	x	31.95		0.76	x	0.8	=	125.87	(79)

Solar gains in watts, calculated for each month (83)m = Sum(74)m …(82)m

(83)m=	172.5	294.06	388.55	477.47	522.9	530.78	520.39	486.01	428.6	333.86	206.81	147.41	(83)

Total gains – internal and solar (84)m = (73)m + (83)m , watts

(84)m=	700.11	817.05	891.48	949.66	963.74	943.36	916.71	890.63	851.09	787.29	694.58	661.2	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (°C) | 21 | (85)

Utilisation factor for gains for living area, h1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(86)m=	0.98	0.97	0.93	0.87	0.74	0.56	0.38	0.39	0.64	0.87	0.97	0.98	(86)

Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)

(87)m=	19.98	20.18	20.45	20.69	20.89	20.98	21	21	20.96	20.74	20.28	19.99	(87)

Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)

(88)m=	19.87	19.88	19.88	19.9	19.91	19.91	19.92	19.92	19.91	19.9	19.89	19.88	(88)

Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)

(89)m=	0.98	0.96	0.91	0.84	0.68	0.47	0.28	0.29	0.55	0.83	0.96	0.98	(89)

Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)

(90)m=	18.56	18.86	19.23	19.56	19.81	19.9	19.92	19.92	19.88	19.63	19	18.59	(90)

fLA = Living area ÷ (4) = | 0.41 | (91)

Mean internal temperature (for the whole dwelling) = fLA × T1 + (1 – fLA) × T2

(92)m=	19.14	19.4	19.73	20.02	20.26	20.34	20.36	20.36	20.32	20.09	19.53	19.16	(92)

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Apply adjustment to the mean internal temperature from Table 4e, where appropriate

(93)m=	18.99	19.25	19.58	19.87	20.11	20.19	20.21	20.21	20.17	19.94	19.38	19.01	(93)

8. Space heating requirement

Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate the utilisation factor for gains using Table 9a

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation factor for gains, hm:													
(94)m=	0.97	0.95	0.91	0.83	0.69	0.5	0.31	0.31	0.57	0.83	0.95	0.98	(94)
Useful gains, hmGm , W = (94)m x (84)m													
(95)m=	681	775.71	807.46	792.1	664.88	467.47	279.97	279.87	486.68	652.38	661.36	644.87	(95)
Monthly average external temperature from Table 8													
(96)m=	4.5	5	6.8	8.7	11.7	14.6	16.9	16.9	14.3	10.8	7	4.9	(96)
Heat loss rate for mean internal temperature, Lm , W =[(39)m x [(93)m– (96)m]													
(97)m=	1292.1	1258.09	1127.73	967.54	719.76	476.35	280.6	280.58	504.22	791.47	1081.86	1245.77	(97)
Space heating requirement for each month, kWh/month = 0.024 x [(97)m – (95)m] x (41)m													
(98)m=	454.66	324.15	238.28	126.32	40.83	0	0	0	0	103.48	302.76	447.07	

Total per year (kWh/year) = Sum(98)$_{1...5,9...12}$ = 2037.55 (98)

Space heating requirement in kWh/m²/year 28.95 (99)

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

Space heating:

Fraction of space heat from secondary/supplementary system		0	(201)
Fraction of space heat from main system(s)	(202) = 1 – (201) =	1	(202)
Fraction of total heating from main system 1	(204) = (202) × [1 – (203)] =	1	(204)
Efficiency of main space heating system 1		89.8	(206)
Efficiency of secondary/supplementary heating system, %		0	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/year
Space heating requirement (calculated above)													
	454.66	324.15	238.28	126.32	40.83	0	0	0	0	103.48	302.76	447.07	
(211)m = {[(98)m x (204)] + (210)m } x 100 ÷ (206)													(211)
	506.3	360.97	265.34	140.67	45.47	0	0	0	0	115.23	337.15	497.85	

Total (kWh/year) =Sum(211)$_{1...5,10....12}$= 2268.99 (211)

Space heating fuel (secondary), kWh/month
= {[(98)m x (201)] + (214) m } x 100 ÷ (208)

(215)m=	0	0	0	0	0	0	0	0	0	0	0	0

Total (kWh/year) =Sum(215)$_{1...5,10....12}$= 0 (215)

Water heating

Output from water heater (calculated above)

	192.72	168.34	175.15	155.34	150.4	132.46	126.9	141.47	143.03	162.87	173.87	188.19	
Efficiency of water heater												80.5	(216)
(217)m=	86.81	86.39	85.61	84.42	82.32	80.5	80.5	80.5	80.5	83.87	86.17	86.83	(217)

Fuel for water heating, kWh/month
(219)m = (64)m x 100 ÷ (217)m

(219)m=	221.99	194.87	204.59	184.01	182.7	164.54	157.64	175.74	177.68	194.19	201.78	216.74

Total = Sum(219a)$_{1...12}$ = 2276.44 (219)

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Annual totals		**kWh/year**	**kWh/year**	
Space heating fuel used, main system 1			2268.99	
Water heating fuel used			2276.44	
Electricity for pumps, fans and electric keep-hot				
central heating pump:		130		(230c)
Total electricity for the above, kWh/year	sum of (230a)…(230g) =		130	(231)
Electricity for lighting			319.37	(232)

10a. Fuel costs - individual heating systems:

	Fuel kWh/year	**Fuel Price** (Table 12)		**Fuel Cost** £/year	
Space heating - main system 1	(211) x	3.1	x 0.01 =	70.3386	(240)
Space heating - main system 2	(213) x	0	x 0.01 =	0	(241)
Space heating - secondary	(215) x	0	x 0.01 =	0	(242)
Water heating cost (other fuel)	(219)	3.1	x 0.01 =	70.57	(247)
Pumps, fans and electric keep-hot	(231)	11.46	x 0.01 =	14.9	(249)

(if off-peak tariff, list each of (230a) to (230g) separately as applicable and apply fuel price according to Table 12a

Energy for lighting	(232)	11.46	x 0.01 =	36.6	(250)
Additional standing charges (Table 12)				106	(251)

Appendix Q items: repeat lines (253) and (254) as needed

Total energy cost	(245)...(247) + (250)…(254) =	298.4057	(255)

11a. SAP rating - individual heating systems

Energy cost deflator (Table 12)		0.47	(256)
Energy cost factor (ECF)	[(255) x (256)] ÷ [(4) + 45.0] =	1.2154	(257)
SAP rating (Section 12)		83.0445	(258)

12a. CO_2 emissions – Individual heating systems including micro-CHP

	Energy kWh/year	**Emission factor** kg CO2/kWh		**Emissions** kg CO2/year	
Space heating (main system 1)	(211) x	0.198	=	449.26	(261)
Space heating (secondary)	(215) x	0	=	0	(263)
Water heating	(219) x	0.198	=	450.74	(264)
Space and water heating	(261) + (262) + (263) + (264) =			900	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.517	=	67.21	(267)
Electricity for lighting	(232) x	0.517	=	165.11	(268)
Total CO2, kg/year		sum of (265)…(271) =		1132.32	(272)
CO2 emissions per m²		(272) ÷ (4) =		16.09	(273)
EI rating (section 14)				87	(274)

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13a. Primary Energy

	Energy kWh/year		Primary factor		P. Energy kWh/year	
Space heating (main system 1)	(211)	x	1.02	=	2314.37	(261)
Space heating (secondary)	(215)	x	0	=	0	(263)
Energy for water heating	(219)	x	1.02	=	2321.97	(264)
Space and water heating	(261) + (262) + (263) + (264) =				4636.34	(265)
Electricity for pumps, fans and electric keep-hot	(231)	x	2.92	=	379.6	(267)
Electricity for lighting	(232)	x	0	=	932.55	(268)
‘Total Primary Energy			sum of (265)…(271) =		5948.49	(272)
Primary energy kWh/m²/year			(272) ÷ (4) =		84.51	(273)

Predicted Energy Assessment

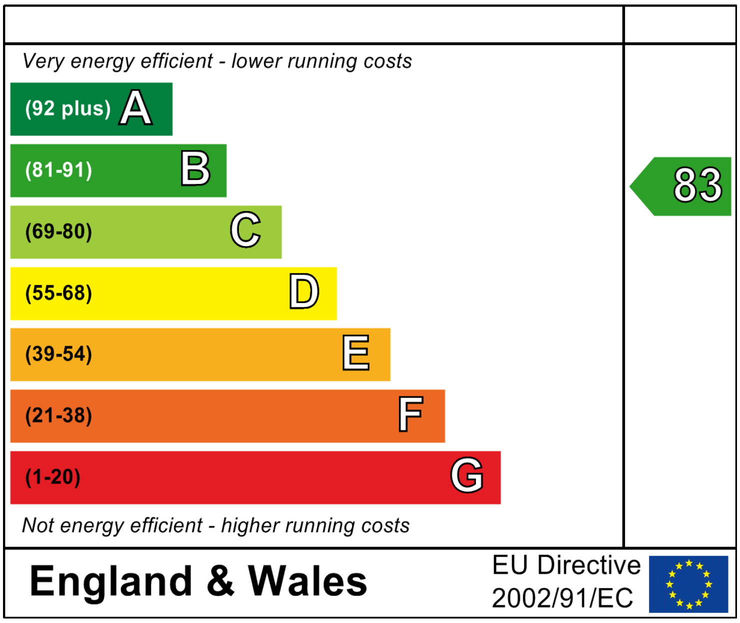
31 Percy Street
London
W1T 2DD

Dwelling type:	Detached House
Date of assessment:	28 January 2014
Produced by:	Gary Nicholls
Total floor area:	70.39 m²

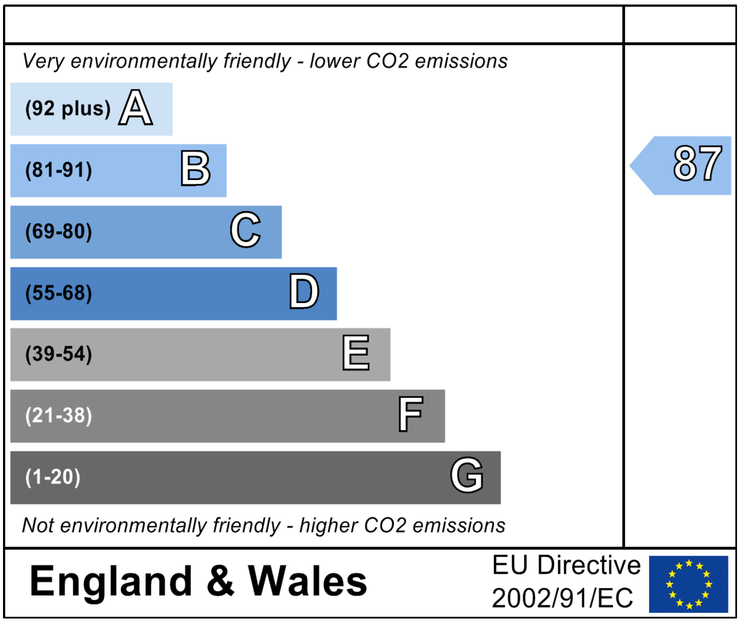
This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2009 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



Environmental Impact (CO_2) 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.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbonn dioxide (CO2) emissions. The higher the rating the less impact it has on the environment.