

Regulations Compliance Report

Approved Document L1A 2010 edition assessed by Stroma FSAP 2009 program, Version: 1.4.0.39
Printed on 01 November 2011 at 16:42:25

Project Information:

Assessed By: Gary Nicholls (STRO003305)

Building Type: End-terrace Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Site Reference : Flat 6 139-147 Camden Road

Plot Reference: BEC/SV/CAMDEN/0006

Address : Flat 6, 139-147 Camden Road, London, NW1 9HA

Client Details:

Name: Studio V Architects

Address : 224 West Hendon Broadway, Hendon, London, NW9 7ED

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

Target Carbon Dioxide Emission Rate (TER) 20.74 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 15.49 kg/m²

OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	(no floor)		
Roof	0.13 (max. 0.20)	0.13 (max. 0.35)	OK
Openings	1.44 (max. 2.00)	1.50 (max. 3.30)	OK

3 Design air permeability

Design air permeability at 50 pascals	3.00	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system:	Database: (rev 315, product index 016669): Boiler system with radiators or underfloor - mains gas Brand name: Alpha Model: InTec 28X Model qualifier: (Combi boiler) Efficiency 88.2 % SEDBUK2009 Minimum 88.0 %	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water Storage:	No cylinder	N/A
Solar water heating		
Dedicated solar storage volume:	90 litres	
Minimum:	61 litres	OK

Regulations Compliance Report

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

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (South East England):	Medium	OK
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Based on:

Overshading:	Average or unknown
Windows facing: North East	11.96m ² , Overhang twice as wide as window, ratio NaN
Ventilation rate:	4.00
Blinds/curtains:	shutter closed 100% of daylight hours

10 Key features

Design air permeability	3.0 m ³ /m ² h
Doors U-value	1 W/m ² K
External Walls U-value	0.17 W/m ² K
Solar water heating	

SAP Input

Property Details: Flat 6 139-147 Camden Road

Address: Flat 6, 139-147 Camden Road, London, NW1 9HA
 Located in: England
 Region: South East England
 UPRN: na
 RRN: 0000-0000-0000-0000-0000
 Date of assessment: 01 November 2011
 Date of certificate: 01 November 2011
 Assessment type: New dwelling design stage
 Transaction type: New dwelling
 Related party disclosure: No related party
 Thermal Mass Parameter: Indicative Value
 Dwelling designed to use less than 125 litres per day: True

Property description:

Dwelling type: Flat
 Detachment: End-terrace
 Year Completed: 2011
 Floor Location: Floor area: Storey height:
 Floor 0 51.95 m² 2.8 m
 Living area: 27.31 m² (fraction 0.526)
 Front of dwelling faces: North East

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
front door	Manufacturer	Solid			Metal
NE	Manufacturer	Windows	low-E, En = 0.1, soft coat	Yes	PVC-U

Name:	Gap:	Frame Factor:	g-value:	U-value:	No. of Openings:
front door	mm	0.8	0	1	1
NE	16mm or more	0.8	0.8	1.5	1

Name:	Type-Name:	Location:	Orient:	Width:	Height:
front door		to common area	West	0	0
NE		external wall	North East	0	0

Overshading: Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
<u>External Elements</u>							
external wall	40	11.96	28.04	0.2	0	False	N/A
to common area	39.34	1.68	37.66	0.2	0.82	False	N/A
<u>Internal Elements</u>							
<u>Party Elements</u>							
party wall	20.16						N/A

Thermal bridges:

Thermal bridges: User-defined y-value
 y =0.04
 Reference: ACD

Ventilation:

Pressure test: Yes (As designed)

SAP Input

Ventilation:	Natural ventilation (extract fans)
Number of chimneys:	0
Number of open flues:	0
Number of fans:	3
Number of sides sheltered:	2
Design q50:	3

Main heating system:

Main heating system:	Central heating systems with radiators or underfloor heating
	Gas boilers and oil boilers
	Fuel: mains gas
	Info Source: Boiler Database
	Database: (rev 315, product index 016669) SEDBUK2009 90.0%
	Brand name: Alpha
	Model: InTec 28X
	Model qualifier:
	(Combi boiler)
	Systems with radiators
	Pump in heat space: Yes

Main heating Control:

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

Secondary heating system:

Secondary heating system:	None
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Water heating:

Water heating:	From main heating system
	Water code: 901
	Fuel :mains gas
	No hot water cylinder
	Flue Gas Heat Recovery System:
	Database (rev 315, product index 060002)
	Brand name: Zenex
	Model: GasSaver
	Model qualifier: GS-1
	Solar panel: True
	aperture area: 2.5
	Flat plate, glazed
	default values: False
	collector zero-loss efficiency: 0.8
	collector heat loss coefficient: 3.175
	orientation: South, 30° pitch
	overshading: None or Very Little (<20%)
	dedicated solar store volume: 90 litres (seperate store)
	solar powered pump: False

Others:

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

DER WorkSheet: New dwelling design stage

User Details:

Assessor Name: Gary Nicholls **Stroma Number:** STRO003305
Software Name: Stroma FSAP 2009 **Software Version:** Version: 1.4.0.39

Property Address: Flat 6 139-147 Camden Road

Address : Flat 6, 139-147 Camden Road, London, NW1 9HA

1. Overall dwelling dimensions:

	Area(m ²)	Ave Height(m)	Volume(m ³)
Ground floor	51.95 (1a)	2.8 (2a)	145.46 (3a)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+.....(1n)	51.95 (4)		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)+.....(3n)	145.46 (5)

2. Ventilation rate:

	main heating	Secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0	0 (6a)
Number of open flues	0	0	0	0	0 (6b)
Number of intermittent fans				3	30 (7a)
Number of passive vents				0	0 (7b)
Number of flueless gas fires				0	0 (7c)

Air changes per hour

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	30	÷ (5) =	0.21 (8)
<i>If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16)</i>			
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 <i>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</i>			0 (11)
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			3 (17)
If based on air permeability value, then (18) = [(17) ÷ 20] + (8), otherwise (18) = (16)			0.36 (18)
<i>Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used</i>			
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) =		0.3 (21)

Infiltration rate modified for monthly wind speed

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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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
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DER WorkSheet: New dwelling design stage

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

0.41	0.39	0.39	0.34	0.31	0.3	0.28	0.28	0.32	0.34	0.36	0.39
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Calculate effective air change rate for the applicable case

If mechanical ventilation:

0 (23a)

If exhaust air heat pump using Appendix N, (23b) = (23a) x 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) x [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 x (23b), then (24c) = (23b); otherwise (24c) = (22b) m + 0.5 x (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= 0.58 0.57 0.57 0.56 0.55 0.54 0.54 0.54 0.55 0.56 0.57 0.57 (24d)

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

(25)m= 0.58 0.57 0.57 0.56 0.55 0.54 0.54 0.54 0.55 0.56 0.57 0.57 (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	= 1.68		(26)
Windows			11.96	x 1/[1/(1.5)+0.04]	= 16.92		(27)
Walls Type1	40	11.96	28.04	x 0.2	= 5.61		(29)
Walls Type2	39.34	1.68	37.66	x 0.17	= 6.47		(29)
Total area of elements, m²			79.34				(31)
Party wall			20.16	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) = 30.68 (33)

Heat capacity Cm = S(A x k) ((28)...(30) + (32) + (32a)...(32e) = 13390.2 (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 3.17 (36)

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

Total fabric heat loss (33) + (36) = 33.86 (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=	28.01	27.58	27.58	26.79	26.31	26.09	25.88	25.88	26.43	26.79	27.17	27.58

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

(39)m= 61.87 61.44 61.44 60.64 60.17 59.95 59.74 59.74 60.28 60.64 61.03 61.44
Average = Sum(39)_{1...12} /12= 60.7 (39)

DER WorkSheet: New dwelling design stage

Heat loss parameter (HLP), W/m²K

$$(40)m = (39)m \div (4)$$

(40)m=	1.19	1.18	1.18	1.17	1.16	1.15	1.15	1.15	1.16	1.17	1.17	1.18		
Average = Sum(40) _{1...12} / 12=													1.17	(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

1.75

(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

75.71

(43)

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

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

(44)m=	83.28	80.25	77.22	74.19	71.16	68.13	68.13	71.16	74.19	77.22	80.25	83.28		
Total = Sum(44) _{1...12} =													908.46	(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=	123.79	108.27	111.72	97.4	93.46	80.65	74.73	85.76	86.78	101.14	110.4	119.89		
Total = Sum(45) _{1...12} =													1193.99	(45)

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

(46)m=	18.57	16.24	16.76	14.61	14.02	12.1	11.21	12.86	13.02	15.17	16.56	17.98		(46)
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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

$$(47) \times (48) =$$

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

$$((50) \times (51) \times (52) \times (53) =$$

0

(54)

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

0

(55)

Water storage loss calculated for each month

$$((56)m = (55) \times (41)m$$

(56)m=	0	0	0	0	0	0	0	0	0	0	0	0		(56)
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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 x (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)
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Combi loss calculated for each month (61)m = (60) ÷ 365 x (41)m

(61)m=	22.37	20.21	22.37	21.65	22.37	21.65	22.37	22.37	21.65	22.37	21.65	22.37		(61)
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DER WorkSheet: New dwelling design stage

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

(62)m=

146.16	128.47	134.09	119.05	115.83	102.3	97.1	108.13	108.43	123.51	132.05	142.26
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 (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=

-22.7	-36.9	-59.66	-81.58	-102.46	-105.43	-105.05	-90.14	-67.78	-47.99	-26.99	-18.81
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 (63)

Output from water heater

(64)m=

94.31	70.9	61.17	34.74	13.37	0	0	17.99	38.8	65.35	82.02	94.57
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Output from water heater (annual)_{1...12}

573.22

 (64)

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

(65)m=

46.75	41.05	42.74	37.8	36.67	32.23	30.44	34.11	34.27	39.22	42.12	45.45
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 (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

(66)m=

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
87.38	87.38	87.38	87.38	87.38	87.38	87.38	87.38	87.38	87.38	87.38	87.38

 (66)

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

(67)m=

13.58	12.06	9.81	7.42	5.55	4.69	5.06	6.58	8.83	11.22	13.09	13.95
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 (67)

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

(68)m=

152.3	153.88	149.89	141.42	130.71	120.66	113.94	112.36	116.34	124.82	135.52	145.58
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 (68)

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

(69)m=

31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74
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 (69)

Pumps and fans gains (Table 5a)

(70)m=

10	10	10	10	10	10	10	10	10	10	10	10
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 (70)

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

(71)m=

-69.9	-69.9	-69.9	-69.9	-69.9	-69.9	-69.9	-69.9	-69.9	-69.9	-69.9	-69.9
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 (71)

Water heating gains (Table 5)

(72)m=

62.84	61.09	57.45	52.5	49.29	44.76	40.92	45.84	47.59	52.72	58.5	61.09
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 (72)

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

(73)m=

287.93	286.24	276.36	260.55	244.76	229.32	219.13	223.99	231.98	247.96	266.32	279.84
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 (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 m ²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)							
Northeast	0.9x	<table><tr><td>0.77</td></tr></table>	0.77	x	<table><tr><td>11.96</td></tr></table>	11.96	x	<table><tr><td>11.51</td></tr></table>	11.51	x	<table><tr><td>0.8</td></tr></table>	0.8	x	<table><tr><td>0.8</td></tr></table>	0.8	=	<table><tr><td>61.05</td></tr></table> (75)	61.05
0.77																		
11.96																		
11.51																		
0.8																		
0.8																		
61.05																		
Northeast	0.9x	<table><tr><td>0.77</td></tr></table>	0.77	x	<table><tr><td>11.96</td></tr></table>	11.96	x	<table><tr><td>23.55</td></tr></table>	23.55	x	<table><tr><td>0.8</td></tr></table>	0.8	x	<table><tr><td>0.8</td></tr></table>	0.8	=	<table><tr><td>124.94</td></tr></table> (75)	124.94
0.77																		
11.96																		
23.55																		
0.8																		
0.8																		
124.94																		
Northeast	0.9x	<table><tr><td>0.77</td></tr></table>	0.77	x	<table><tr><td>11.96</td></tr></table>	11.96	x	<table><tr><td>41.13</td></tr></table>	41.13	x	<table><tr><td>0.8</td></tr></table>	0.8	x	<table><tr><td>0.8</td></tr></table>	0.8	=	<table><tr><td>218.16</td></tr></table> (75)	218.16
0.77																		
11.96																		
41.13																		
0.8																		
0.8																		
218.16																		
Northeast	0.9x	<table><tr><td>0.77</td></tr></table>	0.77	x	<table><tr><td>11.96</td></tr></table>	11.96	x	<table><tr><td>67.8</td></tr></table>	67.8	x	<table><tr><td>0.8</td></tr></table>	0.8	x	<table><tr><td>0.8</td></tr></table>	0.8	=	<table><tr><td>359.63</td></tr></table> (75)	359.63
0.77																		
11.96																		
67.8																		
0.8																		
0.8																		
359.63																		
Northeast	0.9x	<table><tr><td>0.77</td></tr></table>	0.77	x	<table><tr><td>11.96</td></tr></table>	11.96	x	<table><tr><td>89.77</td></tr></table>	89.77	x	<table><tr><td>0.8</td></tr></table>	0.8	x	<table><tr><td>0.8</td></tr></table>	0.8	=	<table><tr><td>476.16</td></tr></table> (75)	476.16
0.77																		
11.96																		
89.77																		
0.8																		
0.8																		
476.16																		
Northeast	0.9x	<table><tr><td>0.77</td></tr></table>	0.77	x	<table><tr><td>11.96</td></tr></table>	11.96	x	<table><tr><td>97.5</td></tr></table>	97.5	x	<table><tr><td>0.8</td></tr></table>	0.8	x	<table><tr><td>0.8</td></tr></table>	0.8	=	<table><tr><td>517.2</td></tr></table> (75)	517.2
0.77																		
11.96																		
97.5																		
0.8																		
0.8																		
517.2																		
Northeast	0.9x	<table><tr><td>0.77</td></tr></table>	0.77	x	<table><tr><td>11.96</td></tr></table>	11.96	x	<table><tr><td>92.98</td></tr></table>	92.98	x	<table><tr><td>0.8</td></tr></table>	0.8	x	<table><tr><td>0.8</td></tr></table>	0.8	=	<table><tr><td>493.21</td></tr></table> (75)	493.21
0.77																		
11.96																		
92.98																		
0.8																		
0.8																		
493.21																		
Northeast	0.9x	<table><tr><td>0.77</td></tr></table>	0.77	x	<table><tr><td>11.96</td></tr></table>	11.96	x	<table><tr><td>75.42</td></tr></table>	75.42	x	<table><tr><td>0.8</td></tr></table>	0.8	x	<table><tr><td>0.8</td></tr></table>	0.8	=	<table><tr><td>400.05</td></tr></table> (75)	400.05
0.77																		
11.96																		
75.42																		
0.8																		
0.8																		
400.05																		

DER WorkSheet: New dwelling design stage

Northeast 0.9x	0.77	x	11.96	x	51.24	x	0.8	x	0.8	=	271.83	(75)
Northeast 0.9x	0.77	x	11.96	x	29.6	x	0.8	x	0.8	=	157.01	(75)
Northeast 0.9x	0.77	x	11.96	x	14.52	x	0.8	x	0.8	=	77.05	(75)
Northeast 0.9x	0.77	x	11.96	x	9.36	x	0.8	x	0.8	=	49.65	(75)

Solar gains in watts, calculated for each month

(83)m = Sum(74)m ... (82)m

(83)m=	61.05	124.94	218.16	359.63	476.16	517.2	493.21	400.05	271.83	157.01	77.05	49.65	(83)
--------	-------	--------	--------	--------	--------	-------	--------	--------	--------	--------	-------	-------	------

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

(84)m=	348.98	411.18	494.52	620.19	720.93	746.51	712.34	624.05	503.8	404.97	343.37	329.49	(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=	1	0.99	0.97	0.9	0.71	0.5	0.34	0.39	0.73	0.95	0.99	1	(86)

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

(87)m=	19.79	19.97	20.3	20.66	20.92	20.99	21	21	20.93	20.58	20.08	19.81	(87)
--------	-------	-------	------	-------	-------	-------	----	----	-------	-------	-------	-------	------

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

(88)m=	19.93	19.94	19.94	19.95	19.96	19.96	19.96	19.96	19.95	19.95	19.94	19.94	(88)
--------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	------

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

(89)m=	1	0.99	0.96	0.87	0.65	0.43	0.26	0.29	0.64	0.93	0.99	1	(89)
--------	---	------	------	------	------	------	------	------	------	------	------	---	------

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

(90)m=	18.33	18.59	19.07	19.57	19.88	19.95	19.96	19.96	19.91	19.48	18.76	18.37	(90)
--------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	------

fLA = Living area ÷ (4) =

0.53

(91)

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

(92)m=	19.1	19.31	19.71	20.14	20.43	20.5	20.51	20.51	20.45	20.06	19.45	19.13	(92)
--------	------	-------	-------	-------	-------	------	-------	-------	-------	-------	-------	-------	------

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

(93)m=	18.95	19.16	19.56	19.99	20.28	20.35	20.36	20.36	20.3	19.91	19.3	18.98	(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=	0.99	0.99	0.96	0.87	0.67	0.46	0.29	0.33	0.67	0.93	0.99	0.99	(94)
--------	------	------	------	------	------	------	------	------	------	------	------	------	------

Useful gains, hmGm , W = (94)m x (84)m

(95)m=	346.83	405.67	474.24	540.08	484.24	340.62	206.23	205.95	338.97	377.54	339.42	327.71	(95)
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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)
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Heat loss rate for mean internal temperature, Lm , W = [(39)m x [(93)m – (96)m]

(97)m=	894.03	870.19	784.08	684.89	516.14	344.5	206.52	206.48	361.57	552.45	750.67	864.87	(97)
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Space heating requirement for each month, kWh/month = 0.024 x [(97)m – (95)m] x (41)m

(98)m=	407.11	312.16	230.52	104.27	23.74	0	0	0	0	130.13	296.1	399.65	(98)
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Total per year (kWh/year) = Sum(98)_{1...5,9...12} =

1903.68

Space heating requirement in kWh/m²/year

36.64

(99)

DER WorkSheet: New dwelling design stage

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		89.1	(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)

407.11	312.16	230.52	104.27	23.74	0	0	0	0	130.13	296.1	399.65
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(211)m = {[(98)m x (204)] + (210)m } x 100 ÷ (206) (211)

456.92	350.35	258.72	117.02	26.64	0	0	0	0	146.05	332.32	448.54
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Total (kWh/year) =Sum(211)_{1...5,10...12}= 2136.56 (211)

Space heating fuel (secondary), kWh/month

= {[(98)m x (201)] + (214) m } x 100 ÷ (208)

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

Water heating

Output from water heater (calculated above)

94.31	70.9	61.17	34.74	13.37	0	0	17.99	38.8	65.35	82.02	94.57
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Efficiency of water heater 86.9 (216)

(217)m= 88.68 88.68 88.63 88.54 88.29 0 0 86.9 86.9 88.35 88.61 88.67 (217)

Fuel for water heating, kWh/month

(219)m = (64)m x 100 ÷ (217)m

106.35	79.95	69.02	39.23	15.14	0	0	20.7	44.65	73.97	92.56	106.65
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Total = Sum(219a)_{1...12} = 648.22 (219)

Annual totals

	kWh/year	kWh/year
Space heating fuel used, main system 1	2136.56	
Water heating fuel used	648.22	

Electricity for pumps, fans and electric keep-hot

central heating pump:	130	(230c)
boiler with a fan-assisted flue	45	(230e)
pump for solar water heating	75	(230g)

Total electricity for the above, kWh/year sum of (230a)...(230g) = 250 (231)

Electricity for lighting 239.78 (232)

12a. CO2 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	= 423.04 (261)
Space heating (secondary)	(215) x	0	= 0 (263)
Water heating	(219) x	0.198	= 128.35 (264)

DER WorkSheet: New dwelling design stage

Space and water heating	(261) + (262) + (263) + (264) =			551.39	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.517	=	129.25	(267)
Electricity for lighting	(232) x	0.517	=	123.97	(268)
Total CO2, kg/year	sum of (265)...(271) =			804.6	(272)
Dwelling CO2 Emission Rate	(272) ÷ (4) =			15.49	(273)
El rating (section 14)				89	(274)

Predicted Energy Assessment

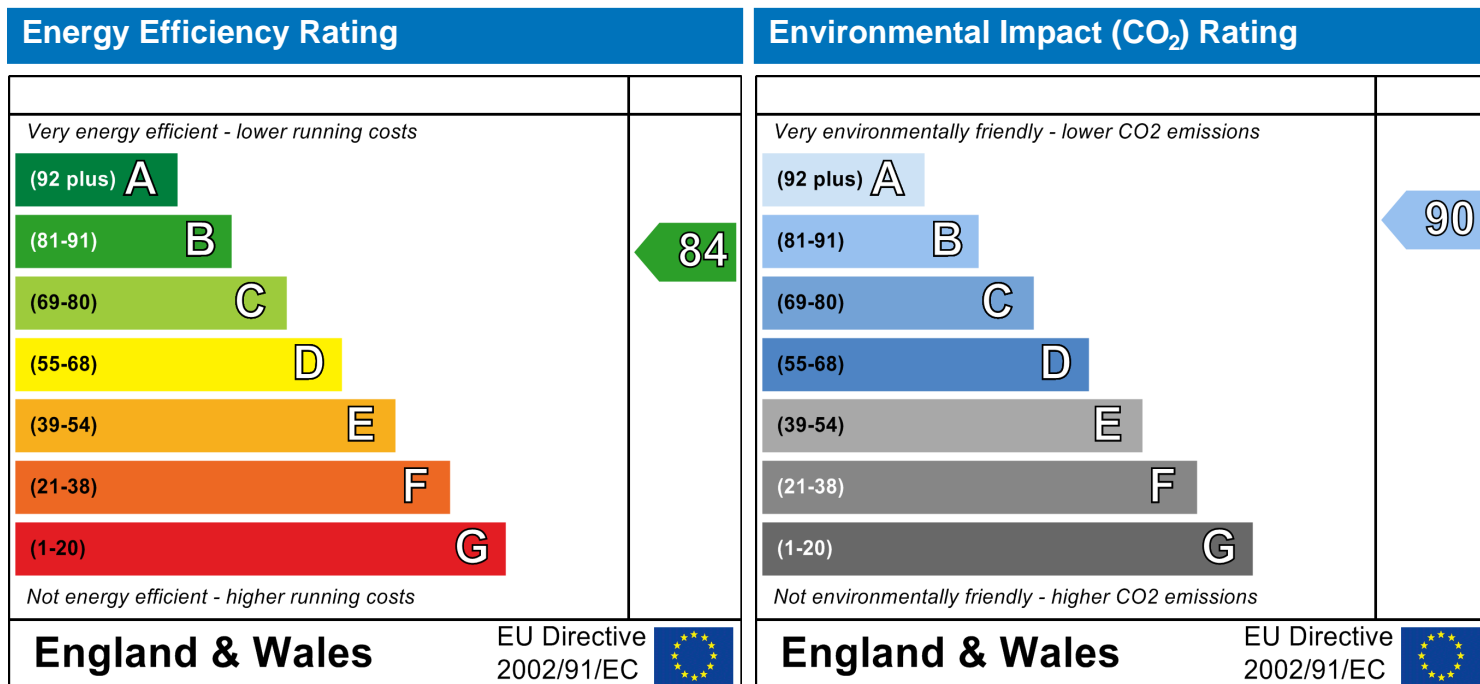
Flat 6
139-147 Camden Road
London
NW1 9HA

Dwelling type:
Date of assessment:
Produced by:
Total floor area:

End-terrace Mid floor Flat
01 November 2011
Gary Nicholls
51.95 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.



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.