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Regulations Compliance Report

Approved Document L1A 2010 edition assessed by Stroma FSAP 2009 program, Version: 1.4.0.39
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Project Information:

Assessed By:	Gary Nicholls (STRO003305)	**Building Type:**	End-terrace Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Site Reference :	Flat 9 139-147 Camden Road	**Plot Reference:**	BEC/SV/CAMDEN/0009
Address :	Flat 9, 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)	23.73 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.55 kg/m²	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (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:	57 litres	OK

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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**
Based on:		
Overshading:	Average or unknown	
Windows facing: North East	12.24m², 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 permeablility	3.0 m³/m²h
Doors U-value	1 W/m²K
External Walls U-value	0.17 W/m²K
Solar water heating	

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SAP Input

Property Details: Flat 9 139-147 Camden Road

Address:	Flat 9, 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	45 m²	2.4 m

Living area:	29.13 m² (fraction 0.74)
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	45	12.24	32.76	0.2	0	False	N/A
to common area	29.28	1.68	27.6	0.2	0.82	False	N/A
flat roof	39.38	0	39.38	0.13	0		N/A
<u>Internal Elements</u>							
<u>Party Elements</u>							
party wall	15.36						N/A

Thermal bridges:

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

Ventilation:

Pressure test:	Yes (As designed)

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Ventilation:	Natural ventilation (extract fans)
Number of chimneys:	0
Number of open flues:	0
Number of fans:	2
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

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 060001) 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

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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 9 139-147 Camden Road

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

1. Overall dwelling dimensions:

	Area(m²)		Ave Height(m)		Volume(m³)	
Ground floor	45	(1a) x	2.4	(2a) =	108	(3a)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+.....(1n)	45	(4)				
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)+.....(3n) =	108	(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							2	x 10 =	20	(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) = 20 ÷ (5) = 0.19 (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		3	(17)
If based on air permeability value, then	(18) = [(17) ÷ 20]+(8), otherwise (18) = (16)	0.34	(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) =	0.28	(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
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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Adjusted infiltration rate (allowing for shelter and wind speed) = (21a) x (22a)m

0.38	0.36	0.36	0.32	0.29	0.28	0.26	0.26	0.3	0.32	0.34	0.36

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=	0.57	0.57	0.57	0.55	0.54	0.54	0.53	0.53	0.54	0.55	0.56	0.57	(24d)

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

(25)m=	0.57	0.57	0.57	0.55	0.54	0.54	0.53	0.53	0.54	0.55	0.56	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			12.24	x1/[1/(1.5)+ 0.04]		=	17.32			(27)
Walls Type1	45	12.24	32.76	x	0.2	=	6.55			(29)
Walls Type2	29.28	1.68	27.6	x	0.17	=	4.74			(29)
Roof	39.38	0	39.38	x	0.13	=	5.12			(30)
Total area of elements, m²			113.66							(31)
Party wall			15.36	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) =	35.41	(33)
Heat capacity Cm = S(A x k)	((28)…(30) + (32) + (32a)…(32e) =	12514.02	(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		4.55	(36)

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

Total fabric heat loss	(33) + (36) =	39.96	(37)

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=	20.46	20.17	20.17	19.65	19.34	19.2	19.06	19.06	19.41	19.65	19.9	20.17	(38)

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

(39)m=	60.42	60.13	60.13	59.61	59.3	59.16	59.02	59.02	59.38	59.61	59.86	60.13	

Average = Sum(39)$_{1…12}$ /12= 59.65 (39)

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

(40)m=	1.34	1.34	1.34	1.32	1.32	1.31	1.31	1.31	1.32	1.32	1.33	1.34

Average = Sum(40)$_{1...12}$ /12= 1.33 (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 1.54 (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 70.89 (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=	77.97	75.14	72.3	69.47	66.63	63.8	63.8	66.63	69.47	72.3	75.14	77.97	
												Total = Sum(44)$_{1...12}$ = 850.63	(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=	115.91	101.38	104.61	91.2	87.51	75.51	69.98	80.3	81.26	94.7	103.37	112.25	
												Total = Sum(45)$_{1...12}$ = 1117.97	(45)
If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61)													
(46)m=	17.39	15.21	15.69	13.68	13.13	11.33	10.5	12.04	12.19	14.2	15.51	16.84	(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)

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=	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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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=	138.28	121.58	126.98	112.85	109.88	97.16	92.35	102.67	102.91	117.07	125.02	134.62	(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=	-21.6	-35.11	-56.77	-77.63	-97.5	-100.32	-99.97	-85.77	-64.49	-45.66	-25.68	-17.9	(63)

Output from water heater

(64)m=	86.77	66.13	57.24	32.67	12.38	0	0	16.9	36.7	61.19	75.98	87.05	

Output from water heater (annual)$_{1...12}$ 533.01 (64)

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

(65)m=	44.13	38.76	40.38	35.74	34.69	30.52	28.86	32.29	32.43	37.08	39.78	42.92	(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=	77.23	77.23	77.23	77.23	77.23	77.23	77.23	77.23	77.23	77.23	77.23	77.23	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
(67)m=	11.97	10.63	8.65	6.55	4.89	4.13	4.46	5.8	7.79	9.89	11.54	12.3	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
(68)m=	134.28	135.67	132.16	124.69	115.25	106.38	100.46	99.06	102.58	110.05	119.49	128.36	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
(69)m=	30.72	30.72	30.72	30.72	30.72	30.72	30.72	30.72	30.72	30.72	30.72	30.72	(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=	-61.79	-61.79	-61.79	-61.79	-61.79	-61.79	-61.79	-61.79	-61.79	-61.79	-61.79	-61.79	(71)
Water heating gains (Table 5)													
(72)m=	59.32	57.68	54.27	49.63	46.63	42.39	38.79	43.4	45.04	49.84	55.25	57.68	(72)
Total internal gains = (66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m													
(73)m=	261.74	260.15	251.25	237.04	222.94	209.07	199.88	204.44	211.58	225.95	242.45	254.51	(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)	
Northeast 0.9x	0.77	x	12.24	x	11.51	x	0.8	x	0.8	=	62.48	(75)
Northeast 0.9x	0.77	x	12.24	x	23.55	x	0.8	x	0.8	=	127.87	(75)
Northeast 0.9x	0.77	x	12.24	x	41.13	x	0.8	x	0.8	=	223.26	(75)
Northeast 0.9x	0.77	x	12.24	x	67.8	x	0.8	x	0.8	=	368.05	(75)
Northeast 0.9x	0.77	x	12.24	x	89.77	x	0.8	x	0.8	=	487.31	(75)
Northeast 0.9x	0.77	x	12.24	x	97.5	x	0.8	x	0.8	=	529.31	(75)
Northeast 0.9x	0.77	x	12.24	x	92.98	x	0.8	x	0.8	=	504.75	(75)
Northeast 0.9x	0.77	x	12.24	x	75.42	x	0.8	x	0.8	=	409.42	(75)

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Northeast 0.9x	0.77	x	12.24	x	51.24	x	0.8	x	0.8	=	278.19	(75)
Northeast 0.9x	0.77	x	12.24	x	29.6	x	0.8	x	0.8	=	160.68	(75)
Northeast 0.9x	0.77	x	12.24	x	14.52	x	0.8	x	0.8	=	78.85	(75)
Northeast 0.9x	0.77	x	12.24	x	9.36	x	0.8	x	0.8	=	50.82	(75)

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

(83)m=	62.48	127.87	223.26	368.05	487.31	529.31	504.75	409.42	278.19	160.68	78.85	50.82	(83)

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

(84)m=	324.22	388.02	474.51	605.09	710.25	738.38	704.64	613.86	489.77	386.63	321.3	305.33	(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	0.89	0.7	0.5	0.34	0.39	0.72	0.95	0.99	1	(86)

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

(87)m=	19.64	19.83	20.2	20.6	20.89	20.98	21	21	20.91	20.51	19.95	19.66	(87)

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

(88)m=	19.81	19.82	19.82	19.82	19.83	19.83	19.83	19.83	19.83	19.82	19.82	19.82	(88)

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

(89)m=	0.99	0.99	0.95	0.85	0.64	0.41	0.25	0.28	0.63	0.92	0.99	0.99	(89)

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

(90)m=	18.03	18.31	18.84	19.39	19.74	19.82	19.83	19.83	19.77	19.29	18.49	18.06	(90)

fLA = Living area ÷ (4) = 0.65 (91)

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

(92)m=	19.07	19.3	19.72	20.17	20.49	20.57	20.59	20.59	20.51	20.08	19.43	19.1	(92)

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

(93)m=	18.92	19.15	19.57	20.02	20.34	20.42	20.44	20.44	20.36	19.93	19.28	18.95	(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	0.98	0.95	0.86	0.67	0.46	0.3	0.34	0.68	0.93	0.99	0.99	(94)
Useful gains, hmGm , W = (94)m x (84)m													
(95)m=	321.71	381.59	451.75	520.23	473.06	338.5	208.16	207.63	330.71	358.22	316.83	303.25	(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=	871.39	850.68	768.02	675.09	512.16	344.43	208.76	208.68	359.8	544.28	735.41	844.62	(97)
Space heating requirement for each month, kWh/month = 0.024 x [(97)m – (95)m] x (41)m													
(98)m=	408.96	315.23	235.31	111.5	29.09	0	0	0	0	138.43	301.38	402.79	

Total per year (kWh/year) = Sum(98)1…5,9…12 = 1942.68 (98)

Space heating requirement in kWh/m²/year 43.17 (99)

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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)	408.96	315.23	235.31	111.5	29.09	0	0	0	0	138.43	301.38	402.79		
(211)m = {[(98)m x (204)] + (210)m } x 100 ÷ (206)	458.99	353.79	264.09	125.14	32.65	0	0	0	0	155.36	338.25	452.06		(211)
Total (kWh/year) =Sum(211)$_{1...5,10...12}$=													2180.34	(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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Output from water heater (calculated above)	86.77	66.13	57.24	32.67	12.38	0	0	16.9	36.7	61.19	75.98	87.05		
Efficiency of water heater													86.9	(216)
(217)m=	88.71	88.71	88.66	88.59	88.43	0	0	86.9	86.9	88.41	88.65	88.7		(217)
Fuel for water heating, kWh/month (219)m = (64)m x 100 ÷ (217)m														
(219)m=	97.82	74.55	64.56	36.88	14	0	0	19.44	42.23	69.21	85.71	98.13		
Total = Sum(219a)$_{1...12}$ =													602.53	(219)

Annual totals		**kWh/year**	**kWh/year**	
Space heating fuel used, main system 1			2180.34	
Water heating fuel used			602.53	
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			211.42	(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	=	431.71	(261)
Space heating (secondary)	(215)	x	0	=	0	(263)
Water heating	(219)	x	0.198	=	119.3	(264)

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DER WorkSheet: New dwelling design stage

Space and water heating	(261) + (262) + (263) + (264) =			551.01	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.517	=	129.25	(267)
Electricity for lighting	(232) x	0.517	=	109.3	(268)
Total CO_2, kg/year		sum of (265)…(271) =		789.56	(272)
Dwelling CO_2 Emission Rate		(272) ÷ (4) =		17.55	(273)
EI rating (section 14)				88	(274)

Predicted Energy Assessment

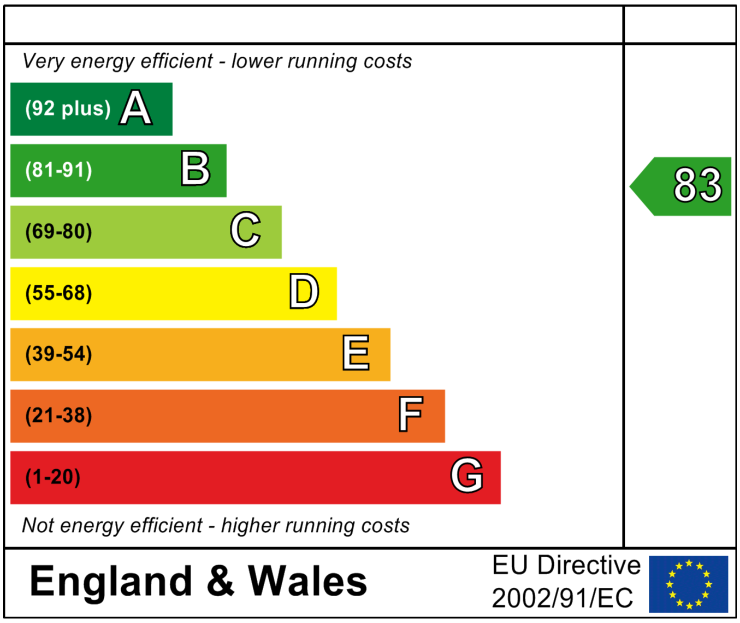
Flat 9
139-147 Camden Road
London
NW1 9HA

Dwelling type:	End-terrace Top floor Flat
Date of assessment:	01 November 2011
Produced by:	Gary Nicholls
Total floor area:	45 m²

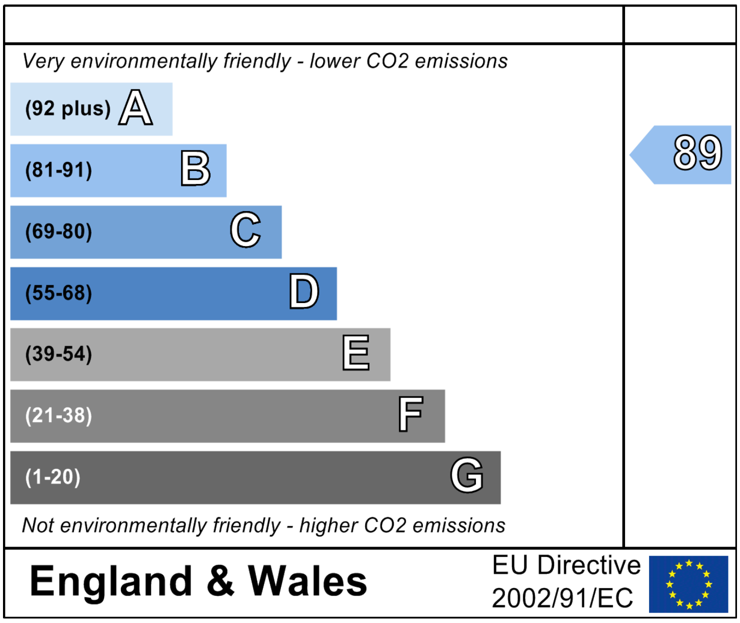
This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about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