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**Assessor Number** 1591

**Client**

**Date Last Modified** 21/04/2010

**Address** Unit 3 Makepeace Mansions Unit 3 Holly Lodge Estate, Camden, Greater London, NW1

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## 1. Overall dwelling dimensions

	Area (m <sup>2</sup> )	Average storey height (m)	Volume (m <sup>3</sup> )
Ground Floor	<input type="text" value="42.24"/> (1a)	<input type="text" value="2.63"/>	<input type="text" value="111.09"/> (1)
Total floor area (1a)+(2a)+(3a)+(4a)+(4b)+(4d)+(4f)+(4h) =	<input type="text" value="42.24"/> (5)		
Dwelling volume		(1)+(2)+(3)+(4)+(4c)+(4e)+(4g)+(4i) =	<input type="text" value="111.09"/> (6)

## 2. Ventilation rate

	m <sup>3</sup> per hour	Air changes per hour
Number of chimneys	<input type="text" value="0"/> × 40 = <input type="text" value="0"/> (7)	
Number of open flues	<input type="text" value="0"/> × 20 = <input type="text" value="0"/> (8)	
Number of intermittent fans or passive vents	<input type="text" value="0"/> × 10 = <input type="text" value="0"/> (9)	
Number of flueless gas fires	<input type="text" value="0"/> × 40 = <input type="text" value="0"/> (9a)	
Infiltration due to chimneys, flues and fans = (7)+(8)+(9)+(9a) =	<input type="text" value="0"/>	÷ box (6) = <input type="text" value="0.00"/> (10)
<i>If a pressurisation test has been carried out, proceed to box (19)</i>		
Number of storeys in the dwelling	<input type="text" value="1"/> (11)	
Additional infiltration		[(11) - 1] × 0.1 = <input type="text" value="N/A"/> (12)
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction		<input type="text" value="N/A"/> (13)
If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0		<input type="text" value="N/A"/> (14)
If no draught lobby, enter 0.05, else enter 0		<input type="text" value="N/A"/> (15)
Percentage of windows and doors draught stripped	<input type="text" value="N/A"/> (16)	
<i>Enter 100 in box (16) for new dwellings which are to comply with Building Regulations</i>		
Window infiltration	0.25 - [0.2 × (16) ÷ 100] =	<input type="text" value="N/A"/> (17)
Infiltration rate	(10)+(12)+(13)+(14)+(15)+(17) =	<input type="text" value="N/A"/> (18)
If based on air permeability value, then [q <sub>50</sub> ÷ 20] + (10) in box (19), otherwise (19) = (18)		<input type="text" value="0.50"/> (19)
<i>Air permeability value applies if a pressurisation test has been done or the design air permeability is being used</i>		

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Number of sides on which sheltered (Enter 2 in box (20) for new dwellings where location is not shown)		<div>2</div>	(20)
Shelter factor	$1 - [0.075 \times (20)] =$	<div>0.85</div>	(21)
Adjusted infiltration rate	$(19) \times (21) =$	<div>0.38</div>	(22)
Calculate effective air change rate for the applicable case			
If balanced whole house mechanical ventilation system	air throughput (ach) =	<div>0.30</div>	(22a)
If balanced with heat recovery	efficiency in % allowing for in-use factor =	<div>79.05</div>	(22b)
a) If balanced whole house mechanical ventilation with heat recovery	$(22) + (22a) \times [1 - (22b) / 100] =$	<div>0.45</div>	(23)
b) If balanced whole house mechanical ventilation without heat recovery	$(22) + (22a) =$	<div>N/A</div>	(23a)
c) If whole house extract ventilation or positive input ventilation from outside if $(22) < 0.25$ , then $(23b) = 0.5$ ; otherwise $(23b) = 0.25 + (22)$		<div>N/A</div>	(23b)
d) If natural ventilation or whole house positive input ventilation from loft if $(22) \geq 1$ , then $(24) = (22)$ ; otherwise $(24) = 0.5 + [(22)^2 \times 0.5]$		<div>N/A</div>	(24)
Effective air change rate - enter (23) or (23a) or (23b) or (24) in box (25)		<div>0.45</div>	(25)

### 3. Heat losses and heat loss parameter

ELEMENT	Area (m <sup>2</sup> )	U - value	AXU (W/K)
Windows *	<div>10.16</div>	<div>1.77</div>	<div>17.94</div> (27)
Ground Floor	<div>42.24</div>	<div>0.22</div>	<div>9.12</div> (28)
Walls	<div>31.40</div>	<div>0.31</div>	<div>9.83</div> (29)
Walls	<div>20.77</div>	<div>0.25</div>	<div>5.19</div> (29)
Total area of elements $\Sigma A$ , m <sup>2</sup>	<div>104.57</div> (32)		

\* for windows and rooflights use effective window U-value calculated as given in paragraph 3.2

Fabric heat loss, W/K	$(26)+(27)+(27a)+(27b)+(28)+(29)+(29a)+(30)+(30a)+(31) =$	<div>42.09</div>	(33)
Thermal bridges - $\Sigma (l \times \Psi)$ calculated using Appendix K if details of thermal bridging are not known calculate $y \times (32)$ [see Appendix K] and enter in box (34)		<div>15.69</div>	(34)
Total fabric heat loss	$(33)+(34) =$	<div>57.77</div>	(35)
Ventilation heat loss	$(25) \times 0.33 \times (6) =$	<div>16.33</div>	(36)
Heat loss coefficient, W/K	$(35)+(36) =$	<div>74.10</div>	(37)
Heat loss parameter (HLP), W/m <sup>2</sup> K	$(37) \div (5) =$	<div>1.75</div>	(38)

### 4. Water heating energy requirement

**kWh/year**

Energy content of hot water used from Table 1 column (b)	<div>1325.73</div>	(39)
Distribution loss from Table 1 column (c) If instantaneous water heating at point of use, enter "0" in boxes (40) to (45) For community heating use Table 1 (c) whether or not hot water tank is present	<div>233.95</div>	(40)
Water storage loss:		

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

	<input type="text" value="N/A"/>	(41)
Temperature factor from Table 2b	<input type="text" value="N/A"/>	(41a)
Energy lost from water storage, kWh/year	$(41) \times (41a) \times 365 =$	<input type="text" value="N/A"/> (42)

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

Cylinder volume (litres) including any solar storage within same cylinder	<input type="text" value="150.00"/>	(43)
<i>If community heating and no tank in dwelling, enter 110 litres in box (43)</i>		
<i>Otherwise, if no stored hot water (this includes instantaneous combi boilers), enter '0' in box (43)</i>		
Hot water storage loss factor from Table 2 (kWh/litre/day)	<input type="text" value="0.01"/>	(44)
<i>If community heating and no tank in dwelling, use cylinder loss from Table 2 for 50 mm factory insulation in box (44)</i>		
Volume factor from Table 2a	<input type="text" value="0.93"/>	(44a)
Temperature factor from Table 2b	<input type="text" value="0.60"/>	(44b)
Energy lost from water storage, kWh/year	$(43) \times (44) \times (44a) \times (44b) \times 365 =$	<input type="text" value="261.39"/> (45)
Enter (42) or (45) in box (46)	<input type="text" value="261.39"/>	(46)
If cylinder contains dedicated solar storage, box (47) = (46) $\times [(43) - (H11)] / (43)$ , else (47) = (46)	<input type="text" value="261.39"/>	(47)
Primary circuit loss from Table 3	<input type="text" value="360.00"/>	(48)
Combi loss from Table 3a (enter "0" if no combi boiler)	<input type="text" value="0.00"/>	(49)
Solar DHW input calculated using Appendix H (enter "0" if no solar collector)	<input type="text" value="0.00"/>	(50)
Output from water heater, kWh/year	$(39) + (40) + (47) + (48) + (49) - (50) =$	<input type="text" value="2181.08"/> (51)
Heat gains from water heating	$0.25 \times [(39) + (49)] + 0.8 \times [(40) + (47) + (48)] =$	<input type="text" value="1015.71"/> (52)
<i>include (47) in calculation of (52) only if cylinder is in the dwelling or hot water is from community heating</i>		

## 5. Internal gains

		Watts
Lights, appliances, cooking and metabolic (Table 5)	<input type="text" value="388.80"/>	(53)
Reduction of internal gains due to low energy lighting (calculated in Appendix L)	<input type="text" value="30.13"/>	(53a)
Additional gains from Table 5a	<input type="text" value="0.00"/>	(53b)
Water heating	$(52) \div 8.76 =$	<input type="text" value="115.95"/> (54)
Total internal gains	$(53) + (53b) + (54) - (53a) =$	<input type="text" value="474.62"/> (55)

## 6. Solar gains

	Access factor Table 6d	Area m <sup>2</sup>	Flux Table 6a	g Table 6b	FF Table 6c	Gains (W)
East	<input type="text" value="0.77"/>	<input type="text" value="1.58"/>	<input type="text" value="48.48"/>	<input type="text" value="0.9"/>	<input type="text" value="0.72"/>	<input type="text" value="26.69"/> (59)
South	<input type="text" value="0.77"/>	<input type="text" value="8.58"/>	<input type="text" value="72.72"/>	<input type="text" value="0.9"/>	<input type="text" value="0.72"/>	<input type="text" value="218.03"/> (62)

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Total solar gains: [(56) + ..... + (64)] = 244.72 (65)

*Note: for new dwellings where overshadowing is not known, the solar access factor is '0.77'*

Total gains, W (55) + (65) = 719.33 (66)

Gain/loss ratio (GLR) (66) ÷ (37) = 9.71 (67)

Utilisation factor (Table 7, using GLR in box (67)) 0.84 (68)

Useful gains, W (66) × (68) = 606.70 (69)

Gains Zone 1, G1 364.02 (NHER)

Gains Zone 2, G2 242.68 (NHER)

## 7. Mean internal temperature

° C

Living area fraction (0 to 1.0) living room area ÷ (5) = 0.54 (75)

Interzone heat coefficient 98.58 (NHER)

Mean external temperature 3.15 (NHER)

	Zone1	Zone2	
Specific loss	40.15	33.94	(NHER)
Demand temperature	21.00	19.12	(NHER)
Mean internal temperature	19.23	16.89	(NHER)

## 8. Degree days

	Zone1	Zone2	
Base temperature	10.90	2.95	(NHER)
Degree-days	874.32	46.51	(NHER)

## 9. Space heating requirements

	Zone1	Zone2	
Space heating requirement (useful), kWh/year	1372.40	9.71	(NHER)
Total space heating requirement (useful), kWh/year		1382.11	(81)

*For range cooker boilers where efficiency is obtained from the Boiler Efficiency Database or manufacturer's declared value, multiply the result in box (81) by (1 - Φ<sub>case</sub>/Φ<sub>water</sub>) where Φ<sub>case</sub> is the heat emission from the case of the range cooker at fullload (in kW); and Φ<sub>water</sub> is the heat transferred to water at full load (in kW). Φ<sub>case</sub> and Φ<sub>water</sub> are obtained from the database record for the range cooker boiler or manufacturer's declared value.*

## 9b. Energy requirements - Community heating scheme

*This page should be used when space and water heating is provided by community heating only, with or without CHP or heat recovered from power stations. If CHP, recovered heat, or second boiler type is not involved enter "0" in box (83\*), and "1.0" in box (84\*)*

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Overall system efficiency of the heating plant or boilers (100% minus the amount shown in the 'efficiency adjustment' column of Table 4c(3) where appropriate)		100.00	(82*)
Fraction of heat from CHP unit or fraction of heat recovered from power station or boilers Type 2 (from operational records or the plant design specification)		N/A	(83*)
Fraction of heat from boilers Type 1	1 - (83*) =	1.00	(84*)
Distribution loss factor for boilers Type 1 (Table 12c)		1.05	(85a*)
<b>kWh/year</b>			
Space heating from CHP, recovered/geothermal heat or boilers Type 2	$[(81) \times (83*) \times 100] \div (82*) \times (85*) =$	N/A	(86*)
Space heating from boilers Type 1	$[(81) \times (84*) \times 100] \div (82*) \times (85*) =$	1451.22	(87*)
Water heated by CHP or recovered heat or boilers Type 2	$[(51) \times (83*) \times 100] \div (82*) \times (85*) =$	0.00	(87a*)
Water heated by boilers Type 1 (or other system)	$[(51) \times (84*) \times 100] \div (82*) \times (85*) =$	N/A	(87b*)
<b>Water heating from DHW only community heating</b>			
Overall system efficiency of the DHW only heating plant		100.00	(82*)
Fraction of water heating from CHP unit		0.00	(83*)
Fraction of heat from boilers or heat pump	1 - (83*) =	1.00	(84*)
Distribution loss factor for DHW only community heating (Table 12c)		1.05	(85*)
Water heated by CHP	$[(51) \times (83*) \times 100] \div (82*) \times (85*) =$	N/A	(87a*)
Water heated by boiler or heat pump	$[(51) \times (84*) \times 100] \div (82*) \times (85*) =$	2290.13	(87b*)
<b>Electricity for pumps,fans lights and appliances:</b>		1846.70	(NHER)
<b>Cooking:</b>			
Cooking fuel requirement (Electricity), kWh/year		302.30	(NHER)
Cooking fuel requirement (Other fuel), kWh/year		531.08	(NHER)

## 10b. Fuel costs - Community heating scheme

	Fuel required kWh/year	×	Fuel price (Table 12)	=	Fuel cost £/year	
<b>Space heating</b>						
Space heating (CHP or from power stations or boilers Type 2) <i>For CHP price from Table 12 is irrespective of fuel used by CHP</i>	(86*)	×	0.00	× 0.01 =	0.00	(89*)
Space heating (community boilers Type 1)	(87*)	×	1.90	× 0.01 =	27.50	(90*)
<b>Water heating from DHW only community heating</b>						
			<b>Fuel price</b>			
Water heated by CHP	(87a*)	×	N/A	× 0.01 =	N/A	(91*)
Water heated by boilers or heat pump	(87b*)	×	1.90	× 0.01 =	43.40	(92*)
<b>Pump,fan,lights and appliances energy cost</b>						
On-peak fraction					1.00	

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Off-peak fraction

0.00

**Fuel price**

On-peak cost  $\frac{1846.70}{\text{box}} \times \frac{1.00}{\text{box}} \times \frac{7.96}{\text{box}} \times 0.01 = \frac{147.07}{\text{box}}$  (NHER)

Off-peak cost  $\frac{1846.70}{\text{box}} \times \frac{0.00}{\text{box}} \times \frac{-1.00}{\text{box}} \times 0.01 = \frac{0.00}{\text{box}}$  (NHER)

**Cooking**

Cooking cost (Electricity)  $\frac{302.30}{\text{box}} \times \frac{7.96}{\text{box}} \times 0.01 = \frac{24.08}{\text{box}}$  (NHER)

Cooking cost (Other fuel)  $\frac{531.08}{\text{box}} \times \frac{1.87}{\text{box}} \times 0.01 = \frac{9.92}{\text{box}}$  (NHER)

**Additional standing charges**

61.64 (94\*)

**Renewable and energy-saving technologies ( Appendix M)**
**PV**

Energy produced or saved, kWh/year  $\frac{\text{N/A}}{\text{box}}$  (95\*)

Cost of energy produced or saved, £/year  $\frac{\text{N/A}}{\text{box}} \times 0.01 = \frac{\text{N/A}}{\text{box}}$  (95a\*)

**Wind**

Energy produced or saved, kWh/year  $\frac{\text{N/A}}{\text{box}}$  (95b1\*)

Cost of energy produced or saved, £/year  $\frac{\text{N/A}}{\text{box}} \times 0.01 = \frac{\text{N/A}}{\text{box}}$  (95b\*)

**Special features (Appendix Q)**

Energy produced or saved, kWh/year  $\frac{\text{N/A}}{\text{box}}$  (s1\*)

Cost of energy produced or saved, £/year  $\frac{\text{N/A}}{\text{box}} \times 0.01 = \frac{\text{N/A}}{\text{box}}$  (s1a\*)

Energy consumed by the technology, kWh/year  $\frac{\text{N/A}}{\text{box}}$  (s2\*)

Cost of energy consumed, £/year  $\frac{\text{N/A}}{\text{box}} \times 0.01 = \frac{\text{N/A}}{\text{box}}$  (s2a\*)

**Total heating**  $(89^*) + (90^*) + (91^*) + (92^*) + (94^*) + (94a^*) + (94b^*) - (95a^*) - (95b^*) - (s1a^*) + (s2a^*) = \frac{313.60}{\text{box}}$  (97\*)

**11b. NHER rating - Community heating scheme**
**NHER rating**

11.70

**12a. Total CO2 for individual heating systems (including micro-CHP) and community heating without CHP**
**Community scheme:**

Efficiency of community boilers % *use actual efficiency if known, or value in Table 4a*  $\frac{75.00}{\text{box}}$  (104)

Energy for space heating  $(87^*) \times 100 \div (104) = \frac{1934.95}{\text{box}} \times \frac{0.194}{\text{box}} = \frac{375.38}{\text{box}}$  (105)

**DHW only community scheme:**

Efficiency of community boilers % *use actual efficiency if known, or value in Table 4a*  $\frac{90.00}{\text{box}}$  (104)

Energy for water heating  $[(87b^*) \times 100 \div (104)] = \frac{2544.59}{\text{box}} \times \frac{0.194}{\text{box}} = \frac{493.65}{\text{box}}$  (106)

Space and water heating  $[(101) + (102) + (106)] = \frac{869.03}{\text{box}}$  (107)

Electricity for pumps,fans,lights and appliances  $\frac{1846.70}{\text{box}} \times \frac{0.422}{\text{box}} = \frac{779.31}{\text{box}}$  (NHER)

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## Cooking

Energy for cooking (Electricity)	302.30	×	0.42	=	127.57	(NHER)
Energy for cooking (Other fuel)	531.08	×	0.19	=	103.03	(NHER)
Energy produced or saved in dwelling (Appendices M and N)						
PV energy produced or saved (95) or (95*)		×	N/A	=	N/A	(110)
Wind energy produced or saved (95b1) or (95b1*)		×	N/A	=	N/A	(110b)
Micro-CHP energy produced or saved (95c1) or (95c1*)		×	N/A	=	N/A	(110c)
Micro-CHP energy consumed (96) or (96*)		×	N/A	=	0.00	(111)
Energy produced or saved in dwelling (Appendix Q) (s1) or (s1*)		×	N/A	=	0.00	(s1a)
Energy consumed by the technology (Appendix Q) (s2) or (s2*)		×	N/A	=	0.00	(s2a)
Total CO <sub>2</sub> kg/year	(107) + (108) + (109) - (110) + (111) - (s1a) + (s2a)				=	1877.94 (112)
Total CO <sub>2</sub> (kg/m <sup>2</sup> /year)	(112) ÷ (5)				=	44.46 (113)

## DHW only community scheme (uses section 12a calculations):

Efficiency of community boilers %	use actual efficiency if known, or value in Table 4a				90.00	(104)
Energy for water heating	$[(87b*) \times 100 \div (104)] =$	2544.59	×	0.194	=	493.65 (106)

## 13a. Primary energy, for individual heating systems (including micro-CHP) and community heating without CHP

### Community scheme:

Efficiency of community boilers %	75.00	(104)	use actual efficiency if known, or value in Table 4a			
Energy for space heating	$(87*) \times 100 \div (104) =$	1934.95	×	1.150	=	2225.20

### DHW only community scheme:

Efficiency of community boilers %	use actual efficiency if known, or value in Table 4a				90.00	
Energy for water heating	$[(87b*) \times 100 \div (104)] =$	2290.13	×	N/A	=	N/A
Space and water heating	$[(101) + (102) + (106)] =$				5151.47	
Primary energy for pumps,fans,lights and appliances	1846.70	×	2.80	=	5170.76	(NHER)

## Cooking

Primary energy for cooking (Electricity)	302.30	×	2.80	=	846.43	(NHER)
Primary energy for cooking (Other fuel)	531.08	×	1.15	=	610.74	(NHER)
Energy produced or saved in dwelling (Appendices M and N)						
PV energy produced or saved (95) or (95*)		×	N/A	=	N/A	
Wind energy produced or saved (95b1) or (95b1*)		×	N/A	=	N/A	
Micro-CHP energy produced or saved (95c1) or (95c1*)		×	N/A	=	N/A	

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Micro-CHP energy consumed	(96) or (96*)	×	N/A	=	0.00
Energy produced or saved in dwelling (Appendix Q)	(s1) or (s1*)	×	N/A	=	0.00
Energy consumed by the above technology (Appendix Q)	(s2) or (s2*)	×	N/A	=	0.00
<b>Primary energy kWh/year</b>					11779.41
<b>Primary energy kWh/m<sup>2</sup>/year</b>					278.87

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